FINAL

WISCONSIN RAPIDS AREA

East Arterial Feasibility Study

Prepared for

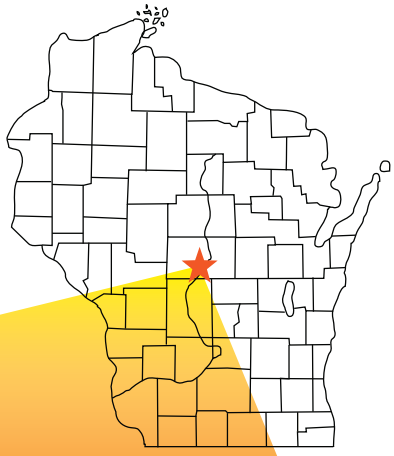
Wisconsin Rapids, Village of Port Edwards,
Town of Grand Rapids, Wood County,
WisDOT North Central Region

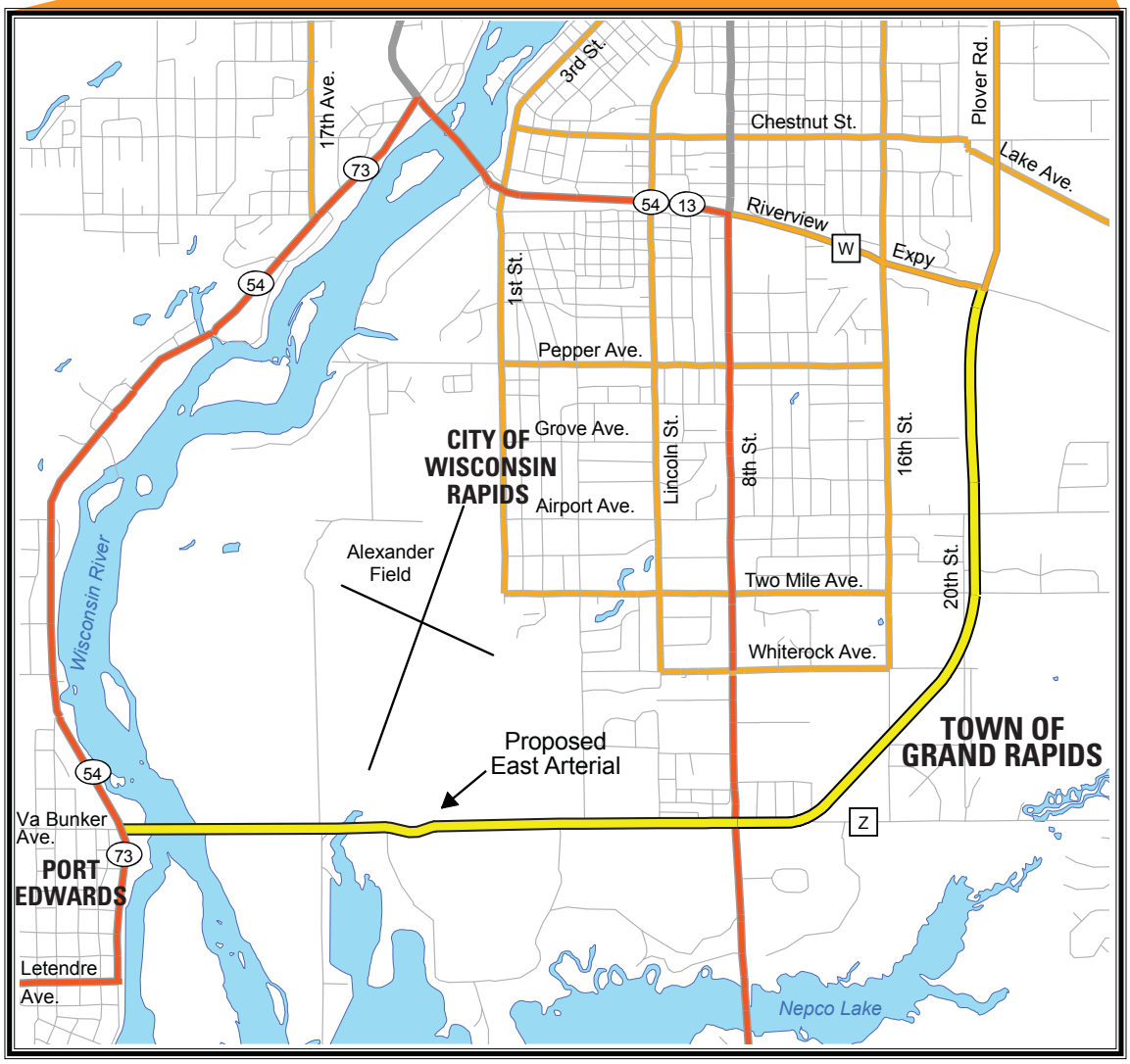
July 2009

PROJECT LOCATION

Project I.D. 6999-08-09

Wisconsin Rapids Area East Arterial Study
Wood County





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Acronyms and Abbreviations

AADT	average annual daily traffic
BMPs	best management practices
County Z	County Trunk Highway Z
EIS	environmental impact statement
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
NCWRPC	North Central Wisconsin Regional Planning Commission
NEPA	National Environmental Policy Act
PCBs	polychlorinated biphenyls
TDM	Transportation Demand Management
TSM	Transportation System Management
TWLTL	2-way left turn lane
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WIS 54	Wisconsin Highway 54
WisDOT	Wisconsin Department of Transportation

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Section 1
Introduction

SECTION 1

Introduction

The City of Wisconsin Rapids, the Village of Port Edwards, the Town of Grand Rapids, and Wood County are studying the feasibility of creating a new alignment for Wisconsin Highway 54 (WIS 54) between the Village of Port Edwards and the east side of the City of Wisconsin Rapids. The Wisconsin Department of Transportation (WisDOT), which is administering the study contract for the communities, is also participating in the study. The intent of the Wisconsin Rapids East Arterial Feasibility Study is to provide local municipalities, WisDOT, and other agencies and stakeholders with a comprehensive report that identifies the need for the proposed new WIS 54 alignment, a range of alternatives that address the project need, and the project's environmental impacts.

This section introduces the feasibility study and its role in planning the future of the Wisconsin Rapids East Arterial. It includes a description of the study area, and information on the project planning process, study background, and the format and content of this report.

1.1 Study Area

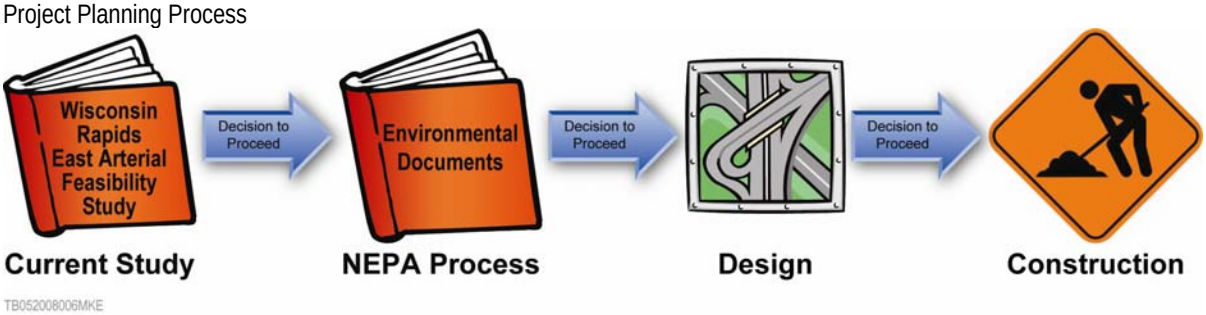
The general project study area is located in parts of Port Edwards, Wisconsin Rapids, and the Town of Grand Rapids in southern Wood County. The project termini extend from the WIS 54-73/Wisconsin River Drive intersection in Port Edwards to the WIS 54/County W intersection in Wisconsin Rapids.

The project study area includes two distinct yet interrelated corridors. WIS 54 in Port Edwards and the WIS 54/County W intersection in Wisconsin Rapids are connected by WIS 54-73 (known locally as Wisconsin River Drive/2nd Avenue) and WIS 54-13 (known locally as the Riverview Expressway). Included in the "existing corridor" part of the study area is the segment of WIS 13 (8th Street) between WIS 13-54/Riverview Expressway and County Z which also provides a connection to WIS 54. The 4-mile corridor for the proposed East Arterial begins in the Village of Port Edwards at the intersection of WIS 54/73 and Wisconsin River Drive and extends east across the Wisconsin River along Wood County Highway Z (Griffith Avenue). The alignment crosses WIS 13 (8th Street) and continues to 12th Street, where it leaves the existing alignment and runs northeasterly crossing 16th Street and then along 20th Street to WIS 54/County W. The Location Map inside the front cover shows the two corridors within the project area.

1.2 Overview of the Project Planning Process

The Wisconsin Rapids East Arterial Feasibility Study is a precursor to the National Environmental Policy Act (NEPA) process. NEPA requires federal agencies to prepare an environmental document to evaluate a project's impacts on the natural and built environment. The position of this feasibility study within the process that ultimately may lead to a construction project is shown in Exhibit 1-1.

EXHIBIT 1-1
Project Planning Process



The development of an environmental document (environmental impact statement [EIS] or environmental assessment) provides resource agencies and the public with access to project information and the opportunity to participate in the development of transportation projects. It should be noted that the formal decision making process concerning the East Arterial begins during the NEPA process. The recommendations included in this feasibility study are advisory and will be evaluated in depth during a future NEPA phase.

1.3 Study Background

1.3.1 Wisconsin Rapids Urban Area Federal-Aid Urban System and Boundary Agreement

The vision of developing an East Arterial as part of Wisconsin Rapids' transportation network dates to at least the mid-1970s. At that time, the Federal-aid Highway Program was directed primarily toward the construction and improvement of four federal-aid systems: interstate, primary (such as WIS 54), urban (such as the extension of Riverview Expressway east of 8th Street), and secondary (such as County G or WIS 173 in the Nekoosa area) systems. In the mid-1960s, planning began for the expected completion of the interstate highway system in the mid-1970s.

In April 1965, the U.S. Bureau of Public Roads, forerunner of the Federal Highway Administration (FHWA), requested that states prepare estimates of future highway needs for the period 1965 to 1985. The results were documented in the *1968 National Highway Needs Report,* which recommended that a larger share of federal-aid highway funds be made available to urban areas. The report discussed expanding the urban extensions of primary and secondary highway systems to include all principal arterial routes in a federal-aid urban system as a means of accomplishing this.

During this period of changing highway priorities WisDOT, the FHWA, and local units of government in the Wisconsin Rapids area developed the *Wisconsin Rapids Urban Area Federal Aid Urban System and Boundary Agreement*. The 1974–1975 agreement established an urban boundary and identified the federal aid system funding status of existing and proposed roadways within the urban boundary that complemented the secondary and primary highway system. As part of the agreement, the proposed extension of WIS 54 from Letendre Avenue in Port Edwards across the Wisconsin River and along County Z was classified as part of the federal aid urban system (Exhibit 1-2). The north-south part (20th Street corridor) of the current East Arterial was not included in the 1975 plan. The agreement was signed by

WisDOT, FHWA, the City of Wisconsin Rapids, the Village of Port Edwards, the City of Nekoosa, the Town of Saratoga, the Town of Grand Rapids, and Wood County.

Inclusion of the Wisconsin River crossing in the 1970s federal-aid system plan is evidence that federal, state and local officials understood the importance of the East Arterial not only to the local street network, but also to other federal-designated roads in the plan. The potential contribution of part of the East Arterial to Wisconsin Rapids' primary and secondary highway system acknowledged in 1975 is still applicable 33 years later.

1.3.2 1990 State Trunk Highway 54 Study, Wood, and Portage Counties

In 1988, WisDOT introduced Corridors 2020 as part of its long-range highway improvement plan designed to provide essential links to key employment and population centers throughout the state. Corridors 2020 supports economic development as the highway system assists the state in meeting its intercity mobility needs. These connections are important for the movement of goods and services within the state and other market areas outside Wisconsin. Corridors 2020 identified a system of two-lane and multilane highways. The network is made up of two subsystems:

- **Backbone system:** 1,550-mile network of multilane highways connecting all major population and economic regions of the state.
- **Connector system:** 2,100-mile network of high quality 2-lane highways directly linking significant economic and tourism centers to the Backbone system. WIS 54 is identified as part of the "connector system" in the plan (Exhibit 1-3).

In 1990, WisDOT prepared an EIS that evaluated 4-lane improvements along WIS 54 between the Riverview Expressway (west of the Wisconsin River) and the WIS 54/USH 51 (now I-39) interchange southeast of Plover. The focus of the study was to improve the WIS 54 connection between Wisconsin Rapids and USH 51 rather than focusing on potential improvements along WIS 54 within Wisconsin Rapids and Port Edwards. An alternative was considered during the study to connect WIS 54/County W with the 8th Street/County Z intersection along the general 20th Street corridor. Although the alternative ultimately was eliminated because it was not critical to connecting WIS 54 to USH 51 (I-39), Wisconsin Rapids maintained that part of the East Arterial on its planning maps following the study. The City's commitment to the alternative was reaffirmed when, in 1995, it placed part of the East Arterial on the Official Street Map (Exhibit 1-4).

1.3.3 2025 South Wood County Area Transportation Study

In 1998, WisDOT received several highway improvement proposals from communities in southeast Wood County. The proposals included north and east side bypasses of Wisconsin Rapids, a 2nd Avenue bypass, and a new south river crossing. WisDOT recommended that the communities participate in a long-range planning study that would identify the transportation problems and opportunities in southeast Wood County. WisDOT committed to developing a traffic model for southeast Wood County and offered to assist in developing the long-range plan. In spring 1999, representatives of the communities in the South Wood County Urban Area agreed to conduct the *2025 South Wood County Area Transportation Study,* a long-range plan for the South Wood County Urban Area to guide local units of government in making appropriate transportation decisions through 2025. Table 1-1 lists the

participating communities and the agencies that provided technical expertise. A copy of the study report is found on the CD at the back of this document.

TABLE 1-1
Participants in 2025 South Wood County Area Transportation Study

Participating Communities	Agencies Providing Technical Expertise[a]
Village of Port Edwards	Wood County
City of Wisconsin Rapids	WisDOT
Town of Grand Rapids	North Central Wisconsin Regional Planning Commission
Village of Biron	
City of Nekoosa	
Town of Rudolph	
Town of Port Edwards	
Town of Grant	
Town of Saratoga	
Town of Seneca	

[a]Technical assistance was also offered by transportation planning and engineering staff from Wisconsin Rapids, the City of Nekoosa, and the Village of Port Edwards.

WisDOT's travel demand model simulated traffic conditions in the study area to identify emerging capacity problems. The traffic model evaluated the study area's 1999 road network, projected 2025 conditions assuming no change in the study area road network, and the following development scenarios:

- Double Casino Trips—simulated the traffic impacts of significant new development surrounding the casino in the southwestern corner of the study area
- New East Side Arterial—a new 2-lane expressway between WIS 54 and County Z
- New Port Edwards Bridge—a new bridge over the Wisconsin River in Port Edwards that would reduce the traffic on the three bridges in south Wood County
- Combined East Side Arterial and New Bridge

The travel demand model identified roadways in the study area that were either "approaching congestion" (average annual daily traffic at 75 to 100 percent of "capacity") or were "congested" (average annual daily traffic at more than 100 percent of "capacity"). For the year 1999 base network, the study identified the segments listed below and shown in Exhibit 1-5 as "approaching congestion":

- WIS 54-73 (2nd Avenue) between Gaynor Avenue and WIS 13-54 (Riverview Expressway)
- WIS 13-54 (Riverview Expressway Bridge) over the Wisconsin River
- WIS 13 (8th Street) between the Riverview Expressway and County Z

The traffic model determined that the three corridors would be congested in 2025 and that five others would approach congestion without improvements to the existing network (Exhibit 1-6).

After comparing the 2025 projected traffic volumes from the four development scenarios to the 1999 base traffic volumes and the 2025 No-Build Alternative volumes, study area communities selected Scenario 4 (combined east side arterial and new bridge) as the preferred project alternative. Implementing Scenario 4, the model indicated that six of the eight congested or near-congested segments, including the three noted above, would experience some degree of relief (Exhibit 1-7). In almost all instances, the combined east arterial and new bridge scenario resulted in greater traffic congestion reductions than either the east arterial or new bridge alone.

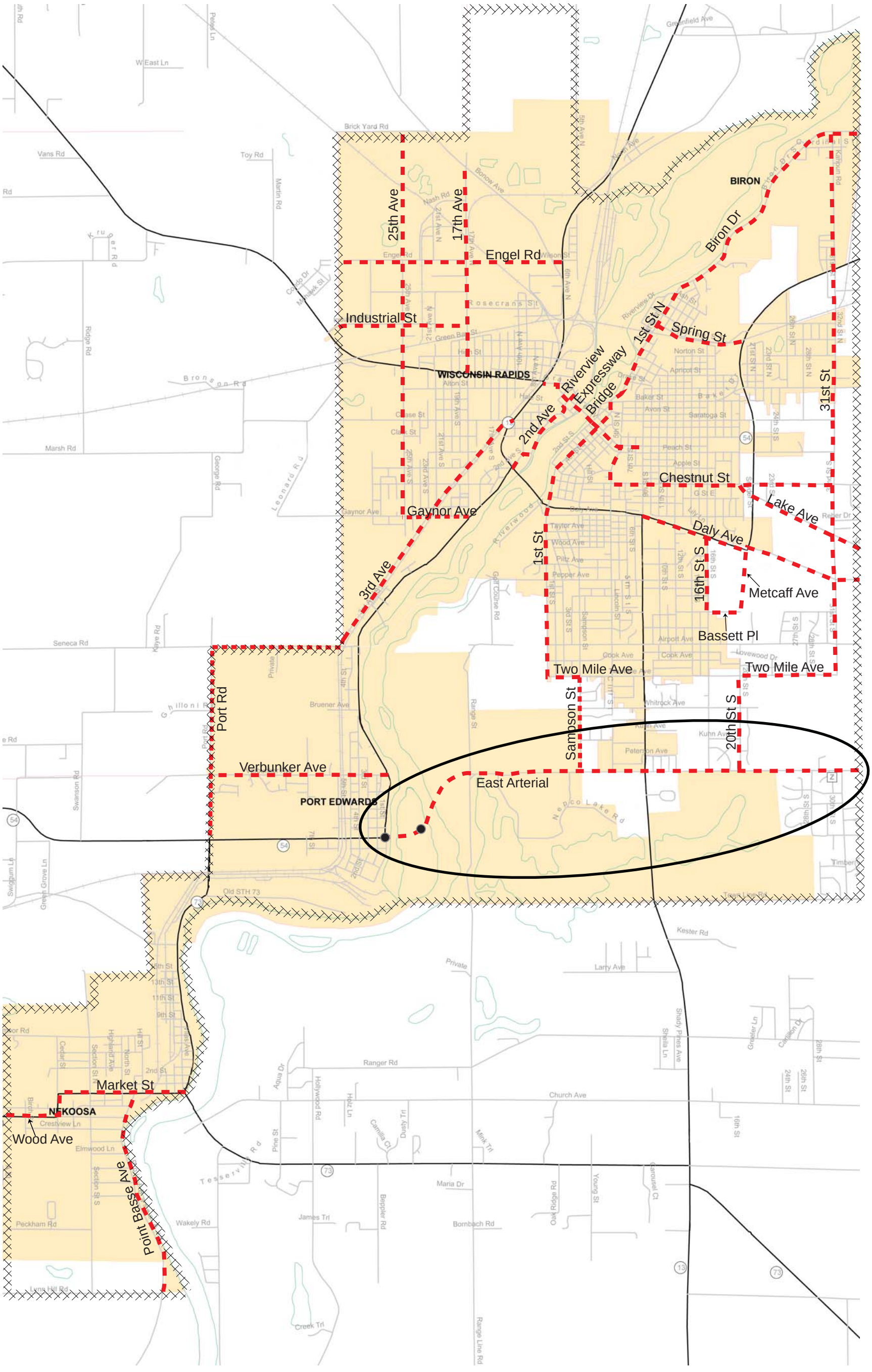
The 2003 decision to evaluate and select the East Arterial alternative in the *2025 South Wood County Area Transportation Study* was a natural continuation of the East Arterial's long history in area transportation and planning documents. The *2025 South Wood County Area Transportation Study* findings were the impetus for the current feasibility study. This study uses the findings of the *2025 South Wood County Area Transportation Study* as a starting point in reexamining existing and future congestion on segments of Wisconsin River Drive/2nd Avenue, Riverview Expressway, and 8th Street and the role of the combined East Side Arterial and New Bridge corridor in reducing that congestion. This study goes beyond the *2025 South Wood County Area Transportation Study* and investigates safety issues along 2nd Avenue, Riverview Expressway, and 8th Street, and considers whether the combined East Side Arterial and New Bridge corridor could influence the safety experience on those roadways.

1.4 Format and Content

Although there is no required format for a feasibility study, the format used in this document is modeled after an EIS. However, this document examines a more limited range of socioeconomic and natural resource issues than is normally found in an EIS. The resource topics discussed in this document, particularly the natural resources in the area of the Wisconsin River crossing (e.g. floodplain forests, threatened and endangered species), have a high profile with regulatory agencies. By identifying the extent of these resources in the project area and the probable level of impact to them, this document provides the project-area communities and WisDOT with insights into the likely document type and agency challenges to expect in a future NEPA phase. This study also provides a cost effective means of determining the need for and feasibility of the East Arterial in addressing project area transportation deficiencies which will allow project-area communities to prioritize this project among the other local transportation needs.

A brief description of the sections in this feasibility study is found below.

- **Section 2, Purpose of and Need for the Proposed Action,** describes the purpose of and need for the proposed East Arterial Corridor. Purpose and need factors encompass improvements intended to correct not only existing problems, but also those that may occur before and after the project is constructed.
- **Section 3, Alternatives,** describes the range of alternatives developed to address the purpose and need factors identified in Section 2. It presents the range of alternatives evaluated within the corridor without eliminating any alternatives from consideration.
- **Section 4, Affected Environment, Environmental Consequences, and Measures to Minimize Harm,** describes the socioeconomic and natural resources in the project area. It identifies the effects the proposed East Arterial may have on those resources and conceptual measures to minimize adverse effects.
- **Section 5, Agency Coordination and Public Involvement,** describes the agency coordination and public involvement activities that occurred during preparation of this study.



LEGEND

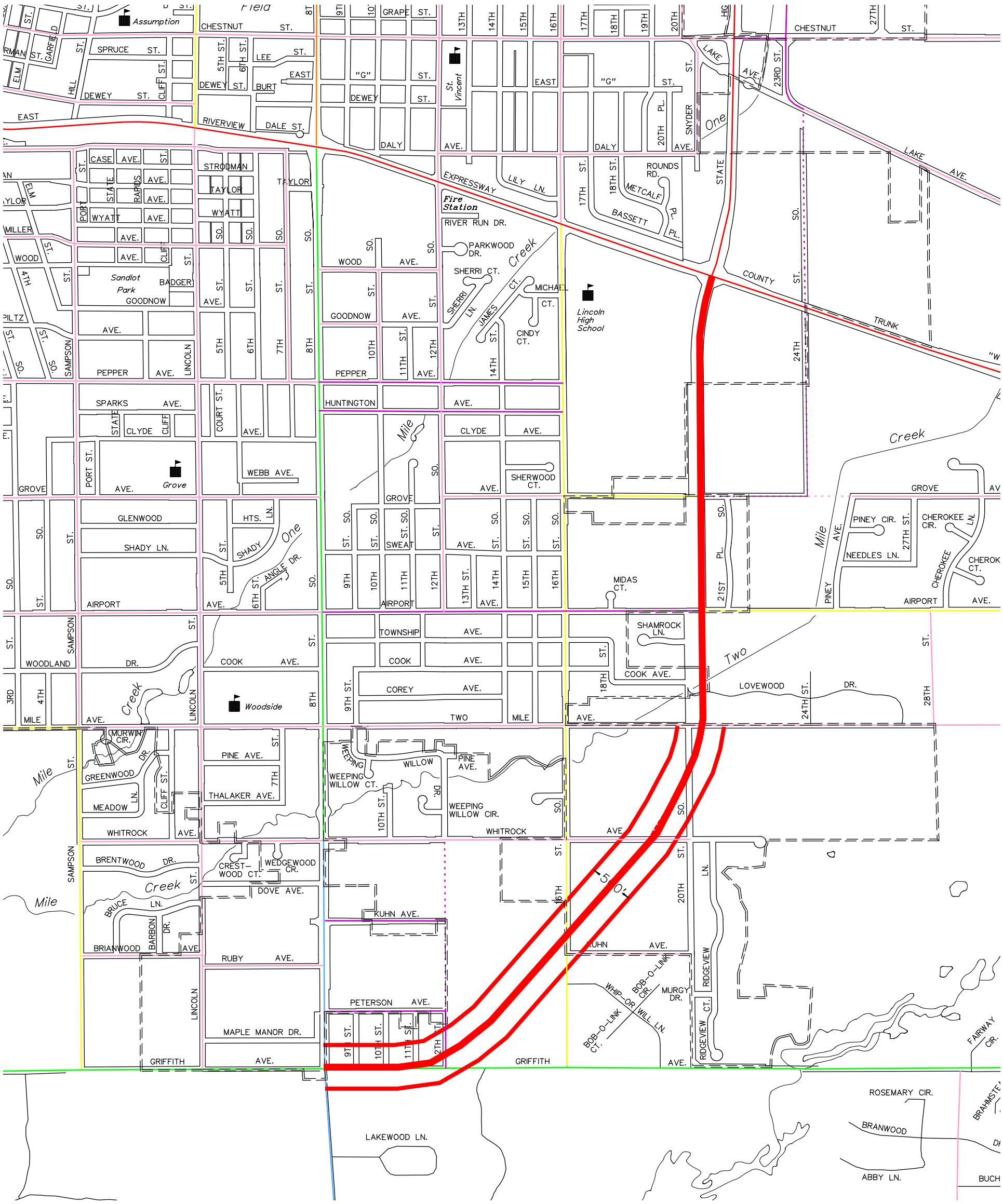
Federal Aid Urban System (1975)

EXHIBIT 1-2
Wisconsin Rapids Urban Area
Federal Aid Primary System and
Official Federal Aid Route Location (1975)

North

Source: Wisconsin Department of Transportation, Geographic Information System

EXHIBIT 1-3
Corridors 2020 Routes:
Backbone & Connectors



LEGEND

	DESIGNATED	PROPOSED
132' R.O.W. EXP		
125' R.O.W. PA		
100' R.O.W. PA		
80' R.O.W. SA		
80' R.O.W. MA		
70' R.O.W. MAC		
66' R.O.W. MIC		
Expressway Corridor		
Rural Sections		

North

0 2,000 4,000

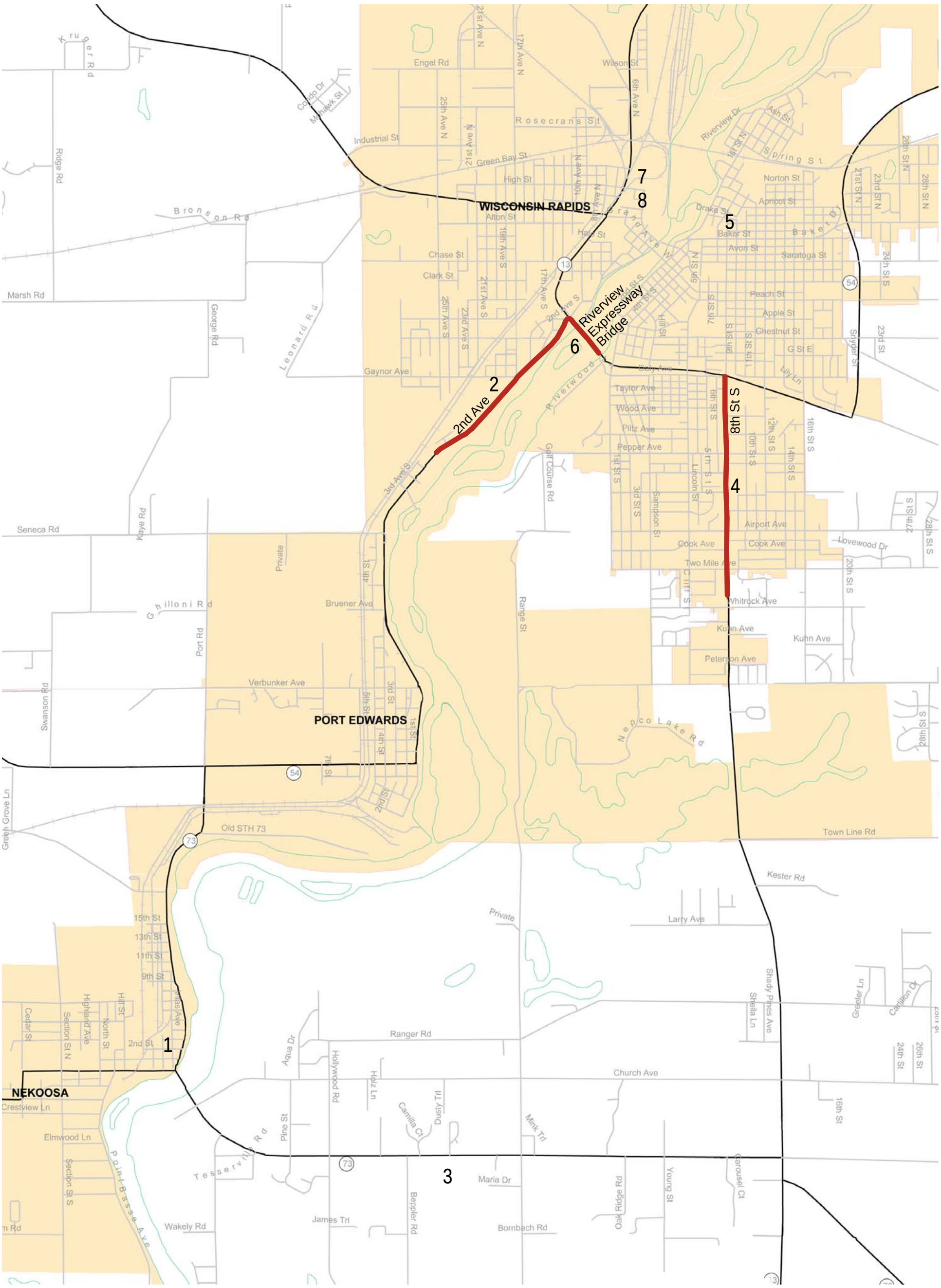
Approximate scale in feet

Source: City of Wisconsin Rapids

EXHIBIT 1-4
Official Street Map in Area of East Arterial

CH2MHILL

TB052008006MKE 1.4_Street_Map_5 10.28.08 cae



Source: 2025 South Wood County Area Transportation Study

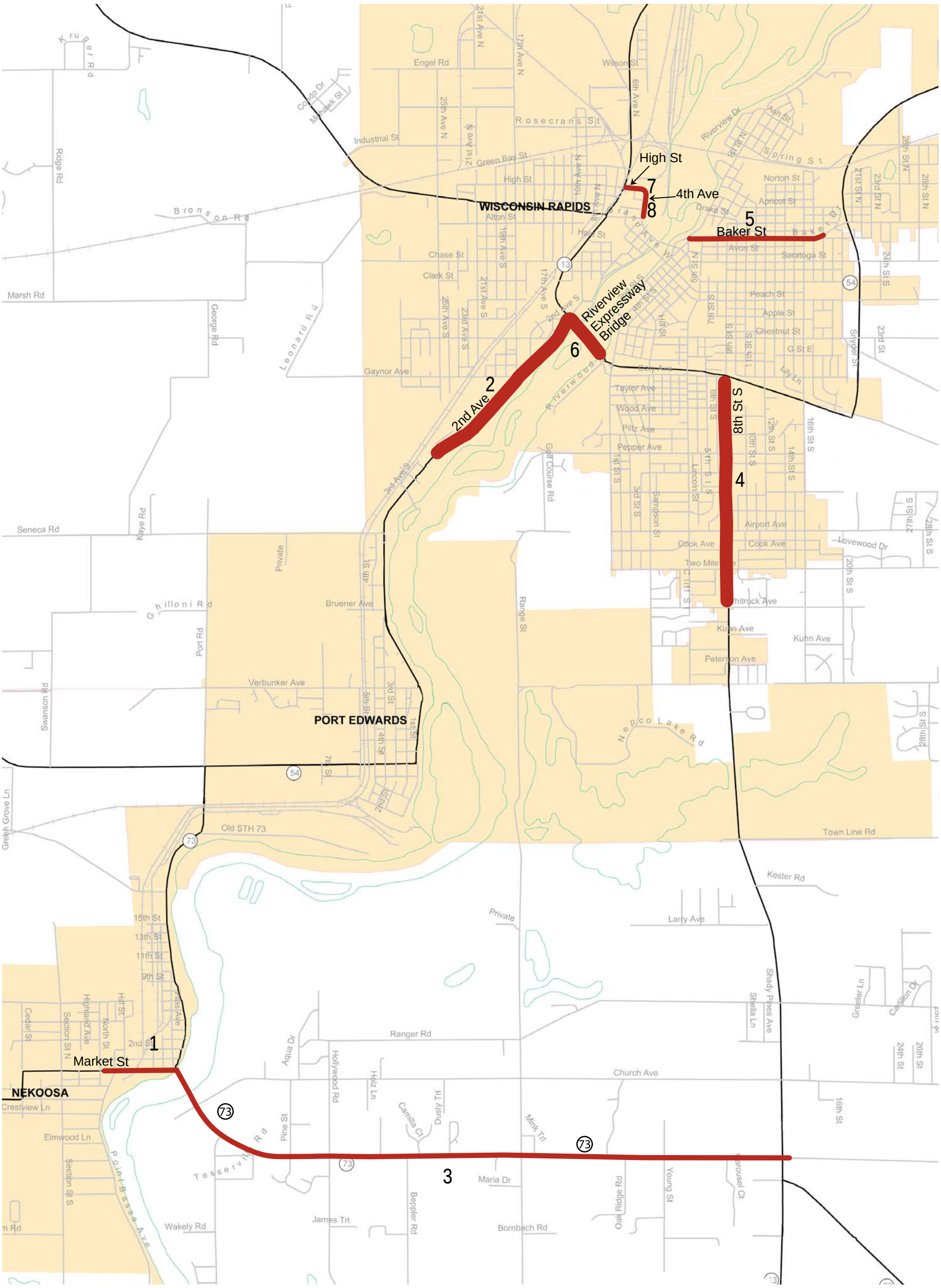
LEGEND

0 - 0.75 – Roads with sufficient capacity

0.76 - 1 – Roads approaching congestion

1.01 - or Greater – Congested roads

EXHIBIT 1-5
Roads Approaching Congestion in 1999

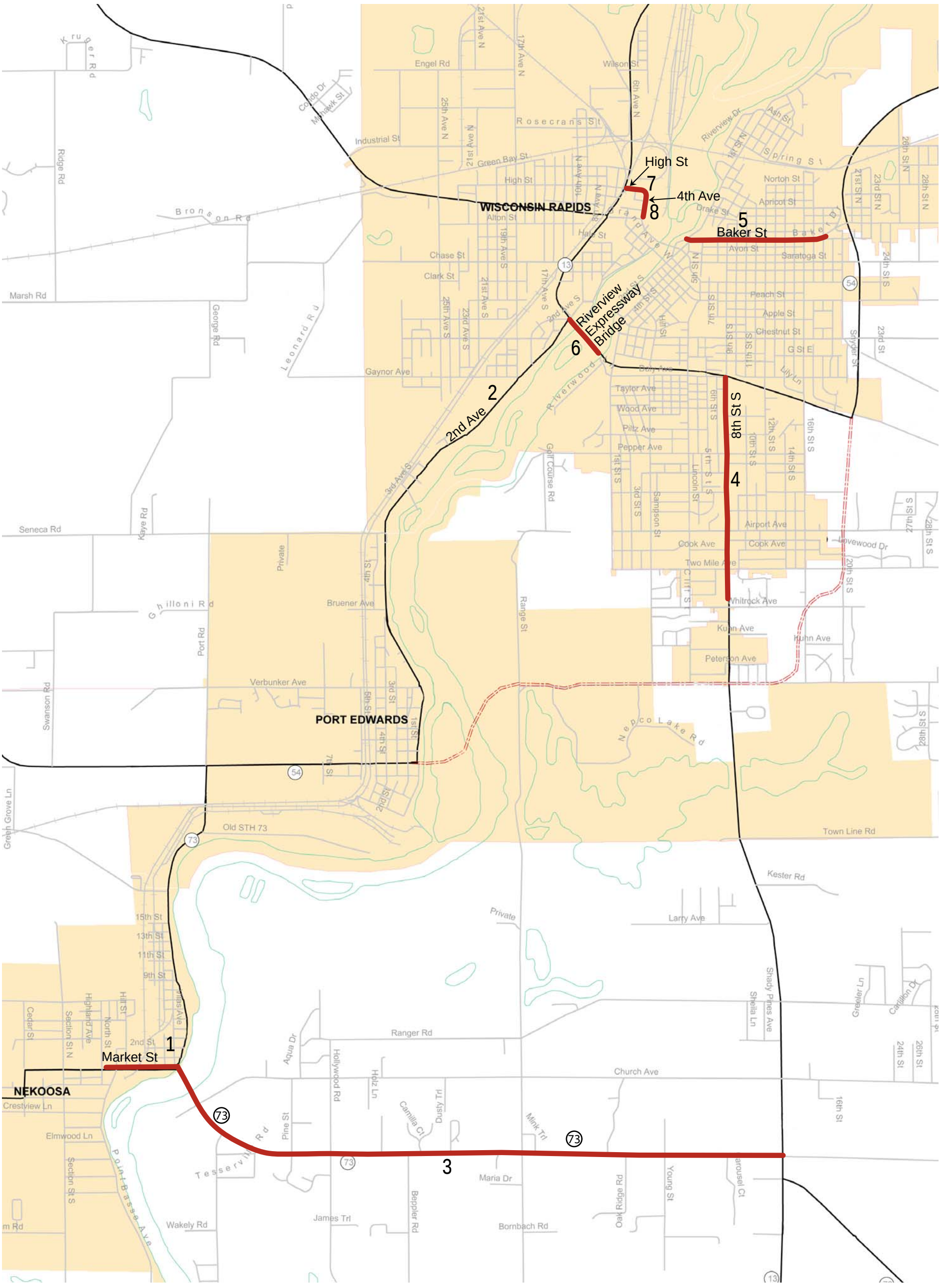


Source: 2025 South Wood County Area Transportation Study

LEGEND

- 0 - 0.75 – Roads with sufficient capacity
- 0.76 - 1 – Roads approaching congestion
- 1.01 - or Greater – Congested roads

EXHIBIT 1-6
Congested Roads and Roads Approaching Congestion in 2025
No–Build Alternative



Source: 2025 South Wood County Area Transportation Study

LEGEND

- 0 - 0.75 – Roads with sufficient capacity
- 0.76 - 1 – Roads approaching congestion
- 1.01 - or Greater – Congested roads
- East Arterial

EXHIBIT 1-7
Congested Roads and Roads Approaching Congestion in 2025 with the East Arterial

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2-8. Primary Economic Opportunities Village of Port Edwards, Wisconsin

Section 2

Purpose of and Need for the Proposed Action

SECTION 2

Purpose of and Need for the Proposed Action

Section 2 describes the purpose of and need for improvements being considered for the Wisconsin Rapids East Arterial corridor between Port Edwards and Wisconsin Rapids, and the problems those improvements would correct. Because this is a long-range study, the proposed improvements are intended to correct not only existing problems but also problems likely to occur between now and 2035, a possible design year for the project.

2.1 Proposed Action

WisDOT is evaluating long-term improvements to traffic flow and safety on parts of WIS 54/73 (2nd Avenue), WIS 13/54 (Riverview Expressway), and WIS 13 (8th Street) in Wisconsin Rapids, Grand Rapids, and Port Edwards through the development of the East Arterial (Exhibit 2-1). 2nd Avenue, the Riverview Expressway, and 8th Street are important segments in the local street network and through routes on the state trunk highway system. The dual function served requires that the need to provide safe and efficient operation for through traffic be carefully balanced against access to local development. To that end, the study is evaluating the potential for the East Arterial to address deficiencies on the state trunk highway network by removing traffic from those roadway segments named above.

WIS 54/County W at the northeast end of the project and the WIS 54/Letendre intersection at the southwest end are the logical termini for the study. The termini are of sufficient length to address environmental matters and to provide a section of study that has independent utility (that is, would be a reasonable expenditure even if no additional transportation improvements were made in the area). They do not restrict consideration of alternatives for other reasonably foreseeable transportation improvements in the South Wood County Urban Area.

2.2 Purpose of Proposed Action

One purpose of the proposed action is to improve the safety and efficiency of the state trunk highways in the study area while minimizing overall impacts. Another is to improve the transportation continuity of WIS 54 and enhance economic stability in the study area. Beyond the project purpose, the proposed transportation improvements have the following objectives:

- Address future traffic demand and growth in the area and improve local and through traffic access to commercial and industrial uses in Wisconsin Rapids, Port Edwards, the Town of Grand Rapids, Biron, and Neekoosa.
- Enhance the attractiveness of 8th Street as a commercial corridor that provides safe and efficient commercial access by reducing conflicting turning movements among commercial uses.
- Improve safety on WIS 54 and 8th Street by reducing conflicts between through and local traffic.

- Improve traffic flow, pedestrian safety, and emergency services in the Wisconsin Rapids area by removing heavy truck traffic, to the extent possible, from commercial corridors.
- Maintain the traffic carrying capacity of study area roads while providing reasonable access to adjacent land uses.

2.3 Need for Proposed Action

The need for proposed improvements is based on the following factors:

- Existing roadway characteristics
- Safety
- Travel demand
- System continuity
- Economic stability

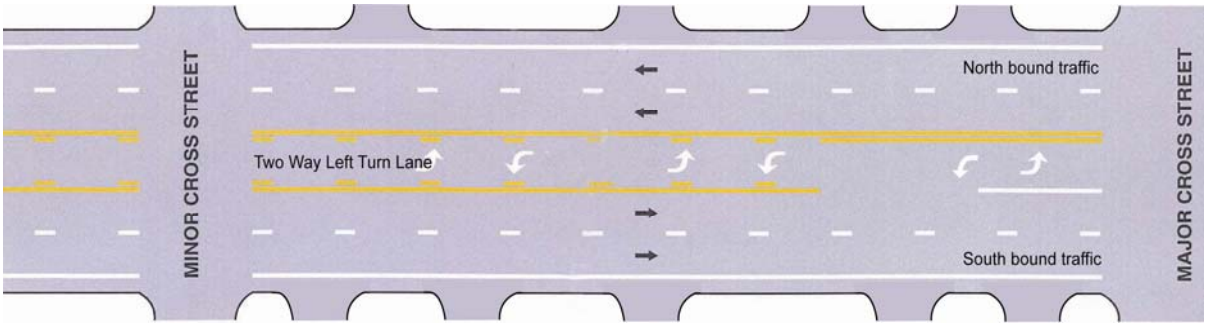
This section discusses these factors. Together, the purpose of and need for the proposed improvements shape the range of build alternatives presented in Section 3.

2.3.1 Existing Roadway Characteristics

This subsection describes the deficiencies associated with the typical section of 8th Street. As a 4-lane divided facility with adequate capacity and access control, the Riverview Expressway does not have notable geometric deficiencies. There are also no notable geometric deficiencies on 2nd Avenue.

In 1965, Wisconsin Rapids annexed into the city the area along 8th Street south of what is now the Riverview Expressway. At that time 8th Street was a 2-lane rural road. Beginning in 1969, WisDOT expanded 8th Street to 2 lanes in each direction, separated by a 16-to-18-foot-wide 2-way left turn lane (TWLTL). The 5-lane TWLTL improved traffic operations for 8th Street through traffic while providing convenient access to commercial development that began developing after the provision of city utilities. The center TWLTL provides a separate lane to allow northbound and southbound vehicles to turn left into access points at midblock locations, thus separating live traffic from traffic stopped to access local development.

According to Iowa State Center for Transportation Research and Education's *Access Management Toolkit*, roads with a center TWLTL function well when traffic levels are moderate, the percentage of turning volumes is high, and the density of commercial driveways is low to moderate. Arterials with a TWLTL operate well when traffic volumes average from 10,000 to 28,000 vehicles per day. As traffic volumes increase, most arterials with a TWLTL begin to lose



Two-way left-turn lane configuration

their effectiveness. A Georgia Tech University study indicated operating degradation occurs between an average annual daily traffic (AADT) of 24,000 to 28,000 vehicles per day. Traffic volumes on most of 8th Street in 2006 ranged from 24,000 to 29,500 AADT. Volumes in 2035 are predicted to range between 29,000 to 39,000 AADT, well above the volumes at which operating degradation occurs. See "Existing and Future Traffic" for more information.

Roads with a TWLTL are also much less effective in areas where commercial driveway densities are high and driveways are closely spaced. In such situations, the number of conflict points is high and this will be reflected in crash rates. Research indicates that when commercial driveway density exceeds 24 per mile (12 per mile in each direction), crash rates increase significantly. This equates roughly to an average driveway spacing of 440 feet. According to the Center for Transportation Research and Education, TWLTL configurations generally should be avoided unless driveway density can be kept at that level or below.

It is roughly 2 miles between Riverview Expressway and County Z, with Airport Avenue as the midpoint. There are about 140 full access points along the 2-mile stretch, or 3 times the number recommended for the safe operation of roads with a TWLTL. There are also 20 right-in/right-out access points along 8th Street. From County Z to Airport Avenue there are 54 access points (28 northbound and 26 southbound), more than twice the recommended number. From Airport Avenue to Riverview Expressway there are 83 access points (40 northbound and 43 southbound), more than 3 times the recommended number. Table 2-1 shows the number of commercial access points by block along 8th Street (southbound and northbound).

Operational problems resulting from the high commercial driveway densities and high traffic volumes on 8th Street include the following:

- At high-traffic businesses along 8th Street, multiple vehicles stack up in the TWLTL waiting for a gap in oncoming traffic. Because of the density of northbound and southbound access points, drivers traveling in the opposite direction that want to enter the TWLTL to access driveways opposite the high traffic business slow down (or stop) in the inside through lane looking for a place to enter the TWLTL, creating delays and potential safety issues for nonturning traffic. Such queuing in the TWLTL can also interfere with left-turning vehicles departing the business attempting to cross the TWLTL (Exhibit 2-2).
- High traffic volumes, a short dedicated left-turn lane at an intersection, and lack of a physical barrier between the TWLTL and a dedicated left-turn lane can pose safety problems when vehicles use the TWLTL as a through lane to reach the left-turn lane, rather than waiting in the through lane to reach the left-turn lane (Exhibit 2-3).
- High traffic volumes increase the difficulty for left-turning vehicles exiting commercial driveways to enter 8th Street. It is normal for vehicles to clear the two opposing lanes of traffic and to wait in the TWLTL to enter the desired lanes of traffic. A safety issue arises with vehicles that use the TWLTL as a through lane to merge right. Using the TWLTL in this manner increases the potential for conflict with vehicles moving into the TWLTL to turn in the opposite direction (Exhibit 2-4). A similar problem occurs when vehicles enter the TWLTL well before the desired turning location and travel some distance within it.

TABLE 2-1
Commercial Access Points Along 8th Street (Riverview Expressway to County Z)

From – To	Full Access Points	Right-in/Right-out Access Points
Southbound		
Riverview Exp – Taylor Street	—	1
Taylor Street – Pepper Avenue	23	1
Pepper Avenue – Clyde Avenue	2	2
Clyde Avenue – Grove Avenue	4	
Grove Avenue – Airport Avenue	14	1
Subtotal	**43**	**5**
Airport Avenue – Cook Avenue	3	1
Cook Avenue – Two Mile Avenue	4	
Two Mile Avenue – Whitrock Avenue	12	
Whitrock Avenue – Dove Avenue	4	
Dove Avenue – Kuhn Avenue	—	
Kuhn Avenue – Ruby Avenue	1	
Ruby Avenue – Maple Manor	2	
Maple Manor – County Z	—	1
Subtotal	**26**	**2**
Total	**69**	**7**
Northbound		
County Z – Peterson Avenue	3	
Peterson Avenue – Kuhn Avenue	1	
Kuhn Avenue – Whitrock Avenue	4	3
Whitrock Avenue – Two Mile Avenue	10	
Two Mile Avenue – Township Avenue	10	1
Township Avenue – Airport Avenue	—	3
Subtotal	**28**	**7**
Airport Avenue – Sweat Avenue	11	1
Sweat Avenue – Huntington Avenue	16	
Huntington Avenue – Pepper Avenue	—	3
Pepper Avenue – Goodnow Avenue	3	2
Goodnow Avenue – Wood Avenue	3	
Wood Avenue – Taylor Avenue	7	
Taylor Avenue – Riverview Exp	—	1
Subtotal	**40**	**6**
Total Northbound	**68**	**13**

2.3.2 Safety

Roadway safety is measured by the frequency and severity of crashes. An important objective of any transportation improvement is to minimize overall crash potential through roadway mainline and intersection design features and access management. The following arterial roadway design features affect overall safety:

- Although 5-lane TWLTLs are safer than 4-lane undivided roads, 4-lane divided facilities are safer than 5-lane TWLTLs. An accident study of urban arterials conducted in Minnesota between 1991 and 1993 found that 5-lane roads such as 8th Street are about 40 percent safer than 4-lane undivided roads. Adding a median to a road that previously had a continuous TWLTL can reduce the crash rate about 37 percent and the injury rate about 48 percent (TRB Committee on Access Management, *Access Management Manual,* Transportation Research Board, 2003).
- Intersections generally have more, and more severe, crashes than mid-block areas, so intersections are of primary concern on arterial highways. Crashes at intersections are related to total traffic, traffic mix, level of congestion, and intersection design features.
- Roadways with access control (limited driveways and local street connections) have better safety records than those without access control. According to the Iowa State Center for Transportation Research and Education's *Access Management Toolkit*, traffic safety research commissioned by the Minnesota DOT shows that roadways with many closely spaced driveways are always less safe than similar roads where driveway access is more limited. For example, an urban route with 100 feet between driveways should have roughly twice the accidents of a route with similar turning and through volumes with 250 feet between driveways.

Crash information for 2nd Avenue, Riverview Expressway, and 8th Street was derived from WisDOT data for the period 2000 through 2004. A total of 806 crashes occurred during the 5-year period (112 on 2nd Avenue, 272 on Riverview Expressway, and 422 on 8th Street. To identify potential crash hotspots within the study area, the three roads were divided into 12 segments (Table 2-2).

WisDOT maintains an annual database on crashes that occurred on the state trunk highway system and uses that information to develop statewide average crash rates for urban and rural highways. Crash rates are expressed as the number of crashes per 100 million vehicle miles traveled. Crash rates for 2000 through 2004 were calculated for each of the 12 segments. A crash rate also was calculated for each of the three roadways across all segments. For comparison purposes, Riverview Expressway and 8th Street are considered to be urban streets and 2nd Avenue is considered to be a rural state trunk highway.

2.3.2.1 Total Crash Rates

The crash rates listed in Table 2-3 include fatal, nonfatal injury, and property damage only crashes. Crash rates that are higher than the statewide average for their facility type are shown in bold. The study area's total crash rate by segment is compared to the statewide total crash rate in Exhibit 2-5. Key findings concerning the total crash rates are as follows:

- The 5-year average total crash rate for segments of 2nd Avenue, Riverview Expressway, and 8th Street were higher than the 5-year statewide average for similar facilities.

TABLE 2-2
Roadway Segments for Crash Analysis

Roadway Segment	Length
2nd Avenue Segments	
From 100 ft south of Letendre Ave. to 1,000 ft south of Ver Bunker Ave.	0.43 mile
From 1,000 ft south of Ver Bunker Ave. to 1,000 ft south of Seneca Rd.	0.96 mile
From 1,000 ft south of Seneca Rd. to 1,000 ft south of Gaynor Ave.	1.35 miles
From 1,000 ft south of Gaynor Ave. to 500 ft north of Riverview Expressway	0.81 mile
Riverview Expressway Segments	
From 500 ft west of 2nd Ave. to 1,000 ft west of Lincoln	0.80 mile
From 1,000 ft west of Lincoln to 500 ft east of 12th St	0.81 mile
From 500 ft east of 12th St. to 500 ft east of County W/WIS 54	0.59 mile
8th Street Segments	
From 500 ft north of Riverview Expressway to 500 ft north of Pepper Ave.	0.52 mile
From 500 ft north of Pepper Ave. to 500 ft north of Airport Ave.	0.50 mile
From 500 ft north of Airport Ave. to 500 ft north of Two Mile Ave.	0.25 mile
From 500 ft north of Two Mile Ave. to 500 ft north of Whitrock Ave.	0.25 mile
From 500 ft north of Whitrock Ave. to 500 ft south of County Z	0.68 mile

TABLE 2-3
Total Crash Rates (per 100 million vehicle miles): 2000–2004

	2000	2001	2002	2003	2004	5-yr. Avg
2nd Avenue	172.7	213.2	236.2	173.0	177.0	194.4
From 100 ft south of Letendre Ave. to 1,000 ft south of Ver Bunker Ave.	449.5	327.9	318.6	301.0	190.2	317.4
From 1,000 ft south of Ver Bunker Ave. to 1,000 ft south of Seneca Rd.	44.4	43.1	125.9	120.9	0.0	66.9
Statewide Average Rural WIS	176	162	164	182	186	174
From 1,000 ft south of Seneca Rd. to 1,000 ft south of Gaynor Ave.	55.9	91.4	143.7	71.1	105.6	93.5
From 1,000 ft south of Gaynor Ave. to 500 ft north of Riverview Expwy.	317.8	428.5	378.8	294.4	370.5	358.0
Statewide Average Urban Streets	322	289	280	260	242	279
Riverview Expressway	376.8	326.1	342.6	418.8	331.7	359.2
From 500 ft west of 2nd Ave. to 1,000 ft west of Lincoln	421.6	404.4	371.9	516.1	267.7	396.3
From 1,000 ft west of Lincoln to 500 ft east of 12th St	444.8	385.5	321.2	431.6	345.1	385.6
From 500 ft east of 12th St. to 500 ft east of County W/WIS 54	151.3	84.2	313.9	215.1	415.1	235.9
Statewide Average Urban Streets	322	289	280	260	242	279
8th Street	548.3	445.0	346.8	451.6	414.8	441.3
From 500 ft north of Riverview Expressway to 500 ft north of Pepper Ave.	726.7	704.0	340.6	559.5	485.4	563.2
From 500 ft north of Pepper Ave. to 500 ft north of Airport Ave.	798.5	332.5	528.7	581.9	721.9	592.7
From 500 ft north of Airport Ave. to 500 ft north of Two Mile Ave.	479.5	466.8	252.5	625.4	505.4	465.9
From 500 ft north of Two Mile Ave. to 500 ft north of Whitrock Ave.	458.1	809.4	322.3	276.6	310.3	435.3
From 500 ft north of Whitrock Ave. to 500 ft south of County Z	243.3	181.9	266.6	299.4	169.0	232.0
Statewide Average Urban Streets	322	289	280	260	242	279

- The 5-year average total crash rate on 2nd Avenue was 111 percent of the statewide rural average, but below the statewide urban average. The segments of 2nd Avenue in Port Edwards are considered rural while the segments in Wisconsin Rapids are considered urban. Riverview Expressway was about 130 percent of the statewide urban average and 8th Street about 160 percent.
- For 2nd Avenue, segment 1 (south of Letendre Avenue to south of Ver Bunker Avenue) exceeded the rural statewide average each of the 5 years evaluated, and the 5-year average for the segment was about 200 percent of the rural statewide 5-year average. Segment 4 (south of Gaynor Avenue to north of Riverview Expressway) exceeded the statewide urban average each of the 5 years evaluated, and the 5-year average for the segment was about 130 percent of the urban statewide 5-year average.
- For Riverview Expressway, with few exceptions, all segments in all years exceeded the 5-year statewide wide average. The 5-year average for 3 of the 4 Riverview Expressway segments exceeded the 5-year statewide average by about 30 to 42 percent.
- For 8th Street, with few exceptions, all segments in all years exceeded the statewide average for the year and the 5-year statewide average rate. The 5-year average rate for segment 8 (north of Riverview Expressway to north of Pepper Avenue) and segment 9 (north of Pepper Avenue to north of Airport Avenue) was at or above 200 percent of the 5-year statewide average rate.

2.3.2.2 Injury Crash Rates

There was one fatal crash during the 5-year period. Crash rates that exceed the statewide average for their facility type are indicated in bold in Table 2-4. Exhibit 2-5 depicts the study area's injury crash rate by segment as compared to the statewide injury crash. The following key findings are made from the injury crash rates:

- The 5-year average injury crash rate for the rural portion of 2nd Avenue is 1.6 times higher than the statewide average, however the injury crash rate for the urban portion is below the statewide average. The 5-year average injury crash rate for Riverview Expressway and 8th Street were 1.5 to 1.8 times higher than the 5-year statewide average for similar facilities.
- For 2nd Avenue, segment 1 (south of Letendre to south of Verbunker) exceeded the statewide rural average each of the 5 years evaluated, and the 5-year average was 4.2 times higher than the rural statewide 5-year average. Segment 4 (south of Gaynor to north of Riverview Expressway) exceeded the statewide urban average each of the 5 years evaluated, and the 5-year average was higher than the urban statewide 5-year average.
- For Riverview Expressway, with few exceptions, all segments in all years exceeded the 5-year statewide wide average. The 5-year average for 3 of the 4 Riverview Expressway segments was 1.5 to 2 times higher than the 5-year statewide average.
- For 8th Street, with few exceptions, all segments in all years exceeded the statewide average for the year and the 5-year statewide average rate. The 5-year average rate for 4 of the 5 segments was 1.7 to 2.5 times higher than the 5-year statewide average rate.

As might be expected, the 2nd Avenue, Riverview Expressway, and 8th Street segments

with the highest total crash rates also had the highest injury crash rates. With 8th Street having the highest traffic volumes on the network and the most access points, it is not surprising that the statewide average for total crash rate and injury crash rates are exceeded by a greater margin than those for 2nd Avenue and the Riverview Expressway. On 8th Street, the segments with the highest total crash and injury rates are between the Riverview Expressway and Airport Avenue. Eighth Street between the Riverview Expressway and Airport Avenue has many more access points than the segment of 8th Street between Airport Avenue and County Z (Table 2-1). As predicted by the research on TWLTLs, operating conditions on 8th Street are degraded because of the combination of high traffic volumes and commercial driveway density.

TABLE 2-4
Injury Crash Rates (per 100 million vehicles): 2000–2004

	2000	2001	2002	2003	2004	5-yr. Avg
2nd Avenue	95.0	59.7	75.9	90.6	56.3	75.5
From 100 ft south of Letendre Ave. to 1,000 ft south of Ver Bunker Ave.	337.1	218.6	106.2	200.7	95.1	191.5
From 1,000 ft south of Ver Bunker Ave. to 1,000 ft south of Seneca Rd.	44.4	43.1	83.9	40.3	0.0	42.3
Statewide Average Rural WIS	48	44	43	48	49	46
From 1,000 ft south of Seneca Rd. to 1,000 ft south of Gaynor Ave.	37.2	36.6	71.8	35.6	35.2	43.3
From 1,000 ft south of Gaynor Ave. to 500 ft north of Riverview Expwy.	132.4	53.6	54.1	160.6	105.9	101.3
Statewide Average Urban Streets	109	99	95	85	79	93
Riverview Expressway	127.8	153.1	145.0	150.5	143.1	143.9
From 500 ft west of 2nd Ave. to 1,000 ft west of Lincoln	109.3	155.5	139.5	151.8	163.6	143.9
From 1,000 ft west of Lincoln to 500 ft east of 12th St	203.9	192.7	180.7	215.8	134.2	185.5
From 500 ft east of 12th St. to 500 ft east of County W/WIS 54	30.3	84.2	104.6	53.8	110.7	76.7
Statewide Average Urban Streets	109	99	95	85	79	93
8th Street	186.5	171.5	147.9	210.7*	133.3	170.0
From 500 ft north of Riverview Expwy to 500 ft north of Pepper Ave.	204.4	317.9	68.1	268.6	176.5	207.1
From 500 ft north of Pepper Ave. to 500 ft north of Airport Ave.	281.8	142.5	240.3	279.3*	248.1	238.4
From 500 ft north of Airport Ave. to 500 ft north of Two Mile Ave.	213.1	103.7	101.0	384.9	137.8	188.1
From 500 ft north of Two Mile Ave. to 500 ft north of Whitrock Ave.	50.9	359.8	201.5	118.6	38.8	153.9
From 500 ft north of Whitrock Ave. to 500 ft south of County Z	131.0	33.1	133.3	104.8	61.5	92.7
Statewide Average Urban Streets	109	99	95	85	79	93

2.3.2.3 Crash Types

The crash data were examined to determine the most common types of crashes on the three roadways. Of 116 crashes along 2nd Avenue, 81 percent were angle, rear end, or no collision/ran off road. Higher percentages of rear end and angle crashes occurred along the urban segments of 2nd Avenue, which have higher volume cross road intersections. Conversely, rural segments had higher percentages of no collision/ran off road crashes.

The most common crash types among the 272 crashes along Riverview Expressway were rear end and angle, which accounted for 69 percent of all crashes. The segment of Riverview Expressway between Lincoln and 12th streets had a greater percentage of angle crashes than the other segments. This is because this segment has a greater number of signalized intersections and access points than the other segments.

Of 422 crashes that occurred along 8th Street, 77 percent were rear end and angle. In general, the segments along 8th Street were fairly similar in their breakdown by accident type, with angle and rear end crashes accounting for most. This is expected given the large number of intersections and access points along 8th Street. The only notable difference among the 8th Street segments, was a higher percentage of sideswipe/same direction crashes and a lower percentage of rear end crashes along the southernmost segment.

2.3.3 Travel Demand

Existing traffic on 2nd Avenue, the Riverview Expressway and 8th Street was compiled from the most recent WisDOT counts available (2002–2005). Forecast volumes for the No-Build and Build alternatives, developed by WisDOT's Traffic Forecasting Section in Madison, are based on historic traffic counts and are consistent with the forecasts developed during the *2025 South Wood County Area Transportation Study*. The forecasts include land use, population and employment inputs.

Traffic volumes are expressed as AADT. The AADT volumes reflect average travel conditions on a particular highway rather than daily or seasonal variations. The forecast volumes, developed by WisDOT, are based on historic counts and associated growth trends, and demographic data such as changes in population and employment.

Existing and forecast traffic volumes for 2035 under the No-Build Alternative show that traffic is expected to increase over time (Exhibit 2-6). Table 2-5 summarizes existing traffic and forecast traffic for the design year—the end of the planning period within which traffic forecasts can reasonably be made. It includes forecast traffic for 2035 with the East Arterial and summarizes the key findings concerning the traffic volume increases by roadway segment.

2nd Avenue

- The highest existing volumes (and no-build future volumes) are at Letendre Avenue and just south of the Riverview Expressway intersection.
- The 2035 no-build traffic volumes would be 29 to 44 percent higher than 2006 volumes.
- The 2035 volumes with the East Arterial would be 10 to 20 percent lower than under the No-Build Alternative with the exception of at Letendre Avenue and near the Riverview intersection. As would be expected, the 2035 volume at Letendre with the East Arterial is higher (13,700 AADT) than with the No-Build Alternative (12,200 AADT) because of the new river crossing. Also, as expected, the 2035 volume near the Riverview Expressway intersection with the East Arterial is less (11,700 AADT) than with the No-Build Alternative (16,850 AADT). It is also less than the existing volume of 13,050 AADT.

TABLE 2-5
Existing and Design Year Traffic Comparison

Existing Roadway Section	Existing AADT (2006)	Design Year AADT (2035) (No-Build Alt.)	% Increase (No-Build Alt.)	Design Year AADT (2035) (w/East Arterial)	% Increase (w/East Arterial)
2nd Avenue					
Letendre Ave (WIS 54)	8,500	12,200	44	13,700	61
Ver Bunker Avenue	7,700	10,930	42	10,200	32
Near Seneca Road	7,930	11,260	42	9600	21
Near Riverview Expressway Intersection	13,050	16,850	29	11,700	(10)
Riverview Expressway					
On the bridge	26,900	36,100	34	31,750	18
6th Street	21,450	30,800	44	27,300	27
10th Street	15,400	23,650	54	18,150	18
20th Street	15,150	23,300	54	17,950	18
8th Street					
Near Taylor Avenue	24,050	34,350	43	24,650	2
Near Pepper Avenue	26,050	32,300	24	23,850	(8)
Airport Avenue	24,700	34,450	39	25,700	4
Near Two Mile Avenue	29,300	39,100	33	29,400	No change
Kuhn Avenue	29,500	39,400	34	29,900	1
Near County Z	19,450	29,250	50	19,600	No change

Riverview Expressway

- The highest existing and no-build future volumes are on the Wisconsin River Bridge and at 6th Street. East of 6th Street, volumes decline to the northeast terminus at Plover Road.
- The 2035 no-build traffic volumes would be 34 to 54 percent higher than 2006 volumes.
- The 2035 volumes with the East Arterial would be 18 to 27 percent higher than 2006 volumes.

8th Street

- The highest existing volumes and no-build future volumes are in the area between Two Mile and Kuhn avenues. The Wal Mart is located at Kuhn Avenue.
- The 2035 no-build traffic volumes would be 24 to 50 percent higher than 2006 volumes.
- The 2035 volumes with the East Arterial would be 1 to 4 percent higher than 2006 volumes with no change in volume in some segments and an 8 percent decrease in the Pepper Avenue area.

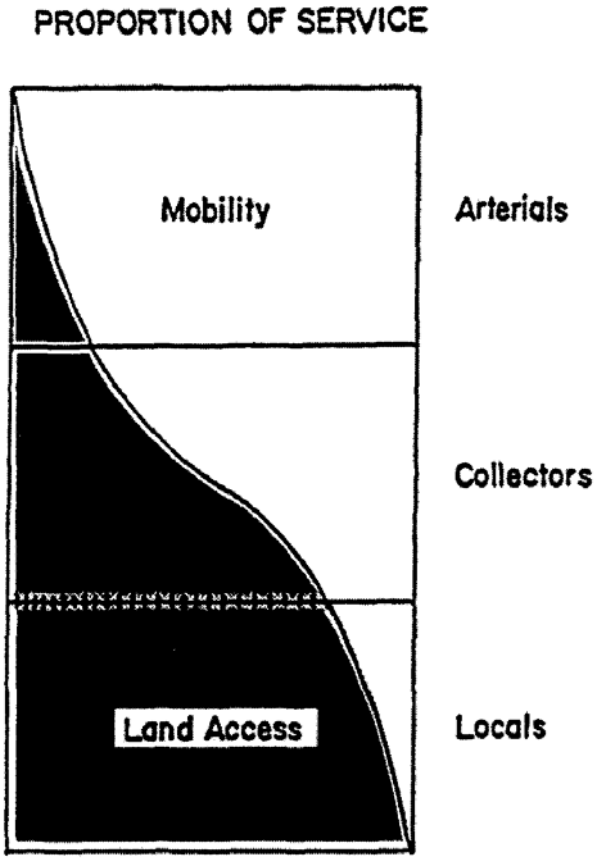
- Overall, the East Arterial would have a greater impact on reducing future traffic volumes on 8th Street than on the Riverview Expressway or 2nd Avenue.

As noted, inclusion of the East Arterial in the Wisconsin Rapids road network would reduce the growth of traffic volumes on 2nd Avenue, the Riverview Expressway, and 8th Street (Table 2-5). By reducing the growth of traffic on the existing network, the East Arterial could also lessen the crash rate or number of crashes on 2nd Avenue, the Riverview Expressway, and 8th Street. This potential is most important on 8th Street. With the No-Build Alternative, 2035 traffic volumes on 8th Street would be between 29,000 and 39,000 AADT, well above volumes at which operational degradation would be expected. With the increase in traffic, the already serious crash experience on 8th Street would be expected to worsen. The effect of the East Arterial is to essentially keep traffic levels on 8th Street in 2035 at 2006 levels. By doing so, the East Arterial would not solve 8th Street's crash problem, but it would keep it from becoming more serious.

2.3.4 System Continuity

The connection between WIS 54 (Plover Road) at the County W intersection in Wisconsin Rapids and WIS 54 (Letendre Avenue) in Port Edwards creates a partial ring around the south half of Wisconsin Rapids. Constructing the East Arterial would complete the east and south portion of the ring. The gap on the south and east side of Wisconsin Rapids focuses demand on other parts of the circle (and 8th Street that passes through the middle of Wisconsin Rapids) and hinders opportunities for moving people and goods in the study area and beyond.

As planned growth continues in the study area and traffic volumes on the entire system increase, the gap in the system would be expected to worsen the reliability of commuter trips, emergency service trips, and other trips through the area. The East Arterial can provide systemwide benefits because it provides another connection between segments of WIS 54 east and west of the Wisconsin River and also because, as a proposed arterial, it would emphasize mobility over access. As noted in the AASHTO Green Book, a road network serves the dual role of providing access to property and travel mobility. Access is a fixed need for every area. Mobility is provided at varying levels of service. As can be seen in the exhibit, arterials emphasize the high level of mobility for through movement.



Relationship of Functionally Classified Systems in Serving Traffic Mobility and Land Access

Source: AASHTO Green Book, Exhibit 1-5.

In conjunction with a gap in the roadway network mentioned above, there is also a gap in the spacing of crossings of the Wisconsin River. There are no bridges in the 7 miles between the Riverview Expressway Bridge in Wisconsin Rapids and the WIS 73 Bridge in Nekoosa. In contrast, it is less than 1 mile between the Riverview Expressway Bridge and the West Grand Avenue and West Jackson Street bridges. The gap in the spacing of the river crossings exerts additional pressure on the Riverview Expressway Bridge. It has been nearly 30 years since the construction of the Riverview Expressway Bridge, which was intended to provide relief for the West Grand Avenue and West Jackson Avenue bridges. To maintain safe and efficient operations with the predicted growth in traffic volumes crossing the Wisconsin River, a new crossing location is crucial.

2.3.5 Economic Stability

Two major goals of the study area's transportation system are to enhance the South Wood County Urban Area's economic advantage and to retain (and expand) existing economic bases and employment. Ensuring economic stability in the study area and constructing the East Arterial are linked. Commercial and industrial uses in the study area stimulate transportation demand by increasing the number of workers commuting to and from work, the customers traveling to and from services areas, and the products being shipped between producers and consumers.

2.3.5.1 Facilitate Important Commuting Patterns

When discussing transportation demand caused by workers commuting to and from work and customers traveling to and from service areas, it is important to understand the study area's somewhat unique position in this regard. The *Wood County Workforce Profile (*State of Wisconsin, Department of Workforce Development, 2006) indicates that there is a high degree of economic integration among Wood, Marathon, and Portage counties, with the counties' four major population centers in fairly close proximity. The publication stated that more than 23 percent of Wood County's workers commute in from neighboring counties while 15 percent of Wood County's workers work outside the county. According to the 2000 Census (county-to-county worker-flow files), 2,572 people from Wood County commuted to Portage County, and 2,639 people from Portage County commuted to Wood County. The economic and social connections between the study area and, in particular, the Stevens Point/Plover area were also noted in the 1990 *WIS 54 Draft Environmental Impact Statement.* A traffic origin-destination study conducted as part of that project determined that 70 percent of the traffic using WIS 54 at the Wood County line was locally generated trips (trips beginning and ending between Wisconsin Rapids and the Plover/Stevens Point area). More recently, the 1999 origin-destination survey for the South Wood County Transportation Study concluded that 88 percent of the trips surveyed had an origin or destination in the study area. The primary internal attraction zone was the area where Stora ENSO (now New Page), Wisconsin Rapids' largest employer, is located. Because the East Arterial would provide a second connection between WIS 54 east (Plover Road) and west (Letendre Avenue) of the Wisconsin River, it would serve the travel demand of study area businesses and further strengthen the economic ties between the study area and Portage and Marathon counties.

2.3.5.2 Attract New Businesses/Maintain Existing (Regional Focus)

In today's competitive economy, industrial products produced in the study area must move efficiently and safely throughout the region, the state and beyond. Businesses in the study area depend on an efficient road network to meet their shipping needs. Within the study area, the East Arterial also has a role in strengthening the local economy. Because of paper mills and supporting industries, the study area and Wood County as a whole historically have enjoyed higher wages than other nonmetropolitan areas (and small counties) in the state. In 2002, the per capita personal income in Wood County ranked 15th among Wisconsin's 72 counties, ahead of larger counties such as Fond du Lac, Kenosha, and La Crosse. Even after years of a declining paper industry, Wood County had higher wages than most counties, regardless of size. In the third quarter of 2007, Wood County had the highest wages of Wisconsin's 65 smallest counties. In the future, the study area and Wood County will be challenged to maintain their past economic standing. The closing of the Domtar mill and job cuts at New Page are signals that the economy of the study area is in transition. The greatest potential for job growth in the study area appears to be in the small business sector. The importance of small business development is well understood by study area communities and the state, and the competition to attract small businesses is intense.

The existing and developing industrial parks in the study area offer evidence of the commitment to the creation of small businesses. The five industrial parks in the general study area are shown in Exhibit 2-7. The proximity of the industrial parks to the state trunk highway system is consistent with the findings of an article by Glen Weisbrod "Industries on the Interstates—What Is the Best Location?" The article reported that data collected on new manufacturing plant locations in Wisconsin showed that industrial plants were built primarily along interstate highways, 4-lane highways with access control features similar to those on interstate highways, and rural 2-lane highways with easy access to an interstate highway interchange. Of the five industrial parks shown in Exhibit 2-7, Woodlands Business Center, Rapids East Commerce Center, and the proposed Biron 54 East Business Park have direct or easy access to WIS 54, a 4-lane facility that provides a direct connection to I-39 15 to 20 minutes away.

Wisconsin Rapids, Nekoosa, and the state have made investments in the business parks and in attracting small businesses to the study area. Wisconsin Rapids and Nekoosa have provided the industrial parks city services. Beyond that, Wisconsin Rapids has used community development block grant money to assist an industry in acquiring property in an industrial park and the city has issued industrial revenue bonds on behalf of the same business to finance the construction of their plant. The business, Advanced Fiberglass Technologies, will receive a $1 million community development block grant from the Wisconsin Energy Independence Fund to pay for an expansion to produce parts for wind energy and methane digester systems. Advanced Fiberglass Technologies could add as many as 400 jobs as a result of the plant expansion.

Despite the advantages the Wisconsin Rapids area offers to prospective businesses—access to markets, proximity of an educated workforce, availability of utilities—transportation investments still are necessary to support the changing pattern of industrial and commercial development in the study area. The construction of the East Arterial is just such a transportation investment. The East Arterial would create a more efficient link among the business parks but, more important, it would create a more efficient connection between

Port Edwards, Nekoosa, and Wisconsin Rapids thus benefiting employees working in the business parks, businesses' clientele (Woodlands Business Center has uses such as a branch of the Marshfield Clinic), and shippers serving the industrial parks.

The transport of raw materials and finished products is a large part of the business costs borne by manufacturers. Constructing the East Arterial would benefit existing commercial and industrial development in the study area by decreasing transportation costs and making transportation more reliable. Developing another connection between the WIS 54/County W intersection and WIS 54 in Port Edwards would enhance the efficiency of the study area's state highway system and allow commercial and industrial interests to transport raw and finished products at less cost. As a result of reduced transportation costs, businesses in the study area could experience greater profitability or increased market share.

2.3.5.3 Revitalize Tri-City Area (Nekoosa, Port Edwards, Wisconsin Rapids)

In spring 2008, Domtar Pulp and Paper Mill (Port Edwards's largest employer and land owner) closed, resulting in the loss of 501 jobs. While the mill closure had a direct adverse impact on Port Edwards's property taxes and water utility income, the lost mill jobs and jobs supporting the mill affected Port Edwards, Nekoosa, and Wisconsin Rapids. The geographic proximity of the communities, and the economic interdependence that developed with a paper mill in each community and a shared network of businesses supporting the mills, results in the tri-city area's economic fortunes generally rising or declining together.

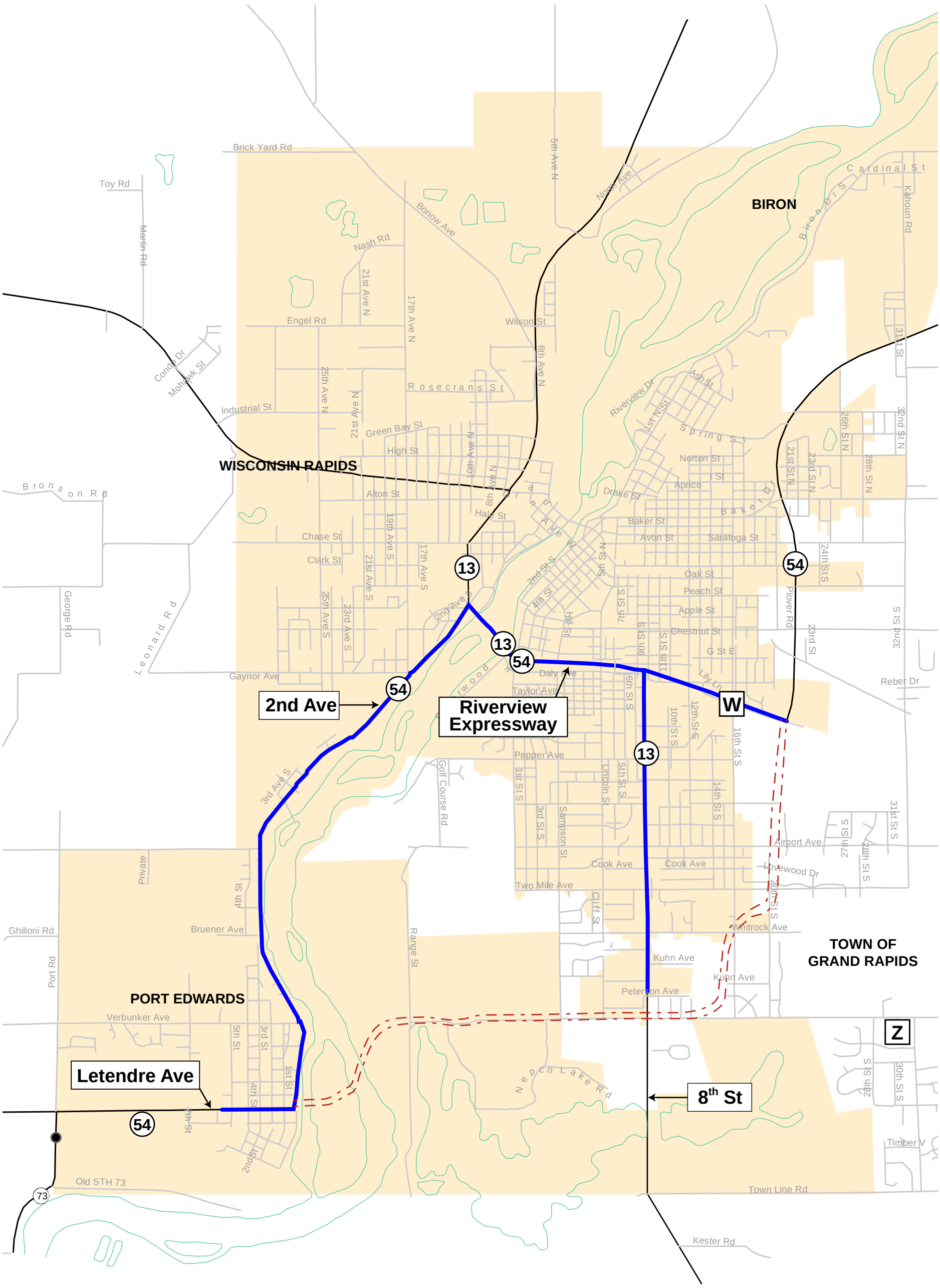
Following the closing of the Domtar mill, the Village of Port Edwards launched a strategic planning effort focused on economic replacement and mill site reuse. The planning process, documented in *The Economic Importance of the Highway 54 Realignment for Port Edwards & the Tri-Cities Region: A Key to Connecting the Region, Repositioning the Paper Industry, Unleashing the Bio-Economy, and Creating Green Job Growth in Central Wisconsin* (Vandewalle & Associates, April 2009), examines means to reposition the assets of the mill site and surrounding properties to bring them back into productive use. The Vandewalle study asserts that the proposed East Arterial "would help facilitate an effective response to the loss of the Port Edwards Mill and would help launch an innovative green energy project." It goes on to note that "Though the mill is currently not operating, the site's equipment, transportation connections, and supply chain remain intact and ready for reuse. As a major biomass processing facility with multiple systems for on-site renewable energy generation, the most exciting opportunity for the site is to reposition it for the production of bioenergy and other forest-based products. Further, with surrounding land available for industrial development, available high-quality warehousing and office facilities, a unique opportunity to commercialize hydrogen fuel cell technologies, and growing regional industries well-suited to this site, this area of Port Edwards presents a unique opportunity to create a green powered distributed energy district. . . . Currently, the access from this site to Wisconsin Rapids, the Wood County Airport, and other regional destinations is limited by the lack of a nearby bridge. The proposed realignment of Highway 54 and new bridge connection across the River will be an important step to unlocking the full potential of this area."

While identifying opportunities for reusing the Domtar Mill site is a focus of the Vandewalle & Associates study, other industries proximate to the former mill, such as the

ERCO Worldwide plant, could benefit from the connections provided by the proposed East Arterial. According to a May 6, 2009 article in iStockAnalyst ,ERCO Worldwide, which is the second largest producer of sodium chorlate in North America, has recently committed to investing $130 million to convert the Port Edwards' chloralkali facility from mercury based technology to membrane technology. The project maintains the facility's ability to produce both sodium and potassium products, provides increased production capacity of approximately 30%, provides a significant extension of the plant life (25 to 30 years) and enhances the efficiency of ERCO's use of electrical energy.

Beyond reusing the former mill site and adjacent areas west of the river, the study notes that there is an indirect connection between the more developed part of the Village west of the Wisconsin River and the largely undeveloped part east of the river. The study contends that creating the new bridge and connecting the Village would open up several development opportunities for the community. For one, the bridge would give both Port Edwards and Nekoosa more convenient access to the Wood County Airport and create the opportunity to build a business park along the south side of the airport. Besides being adjacent to the airport, the business park would be centrally located within the region and provide needed employment opportunities for the growing areas south of Wisconsin Rapids, and also the older communities of Nekoosa and Port Edwards.

The proposed bridge would unlock the potential of new residential growth in the Village along the shore of Nepco Lake. The land along Nepco Lake could support high quality second home and retirement home development that could help attract new residents to the region and bring new economic growth and opportunities. With an older population and limited opportunities for employment, attracting and retaining retiring baby boomers will be a key to maintaining this regions economy and the land surrounding Nepco Lake provides an excellent opportunity to build housing with the type of amenities that this demographic is seeking. However, in order for lakefront projects to work, better access to the properties is needed, and a connection across the river is critical. Exhibit 2-8 depicts the primary economic opportunities envisioned by the Vandewalle study as a result of constructing a new Wisconsin River bridge. The CD at the back of this report contains a copy of the complete study.



LEGEND

East Arterial

Existing Network

EXHIBIT 2-1
Existing Network and East Arterial

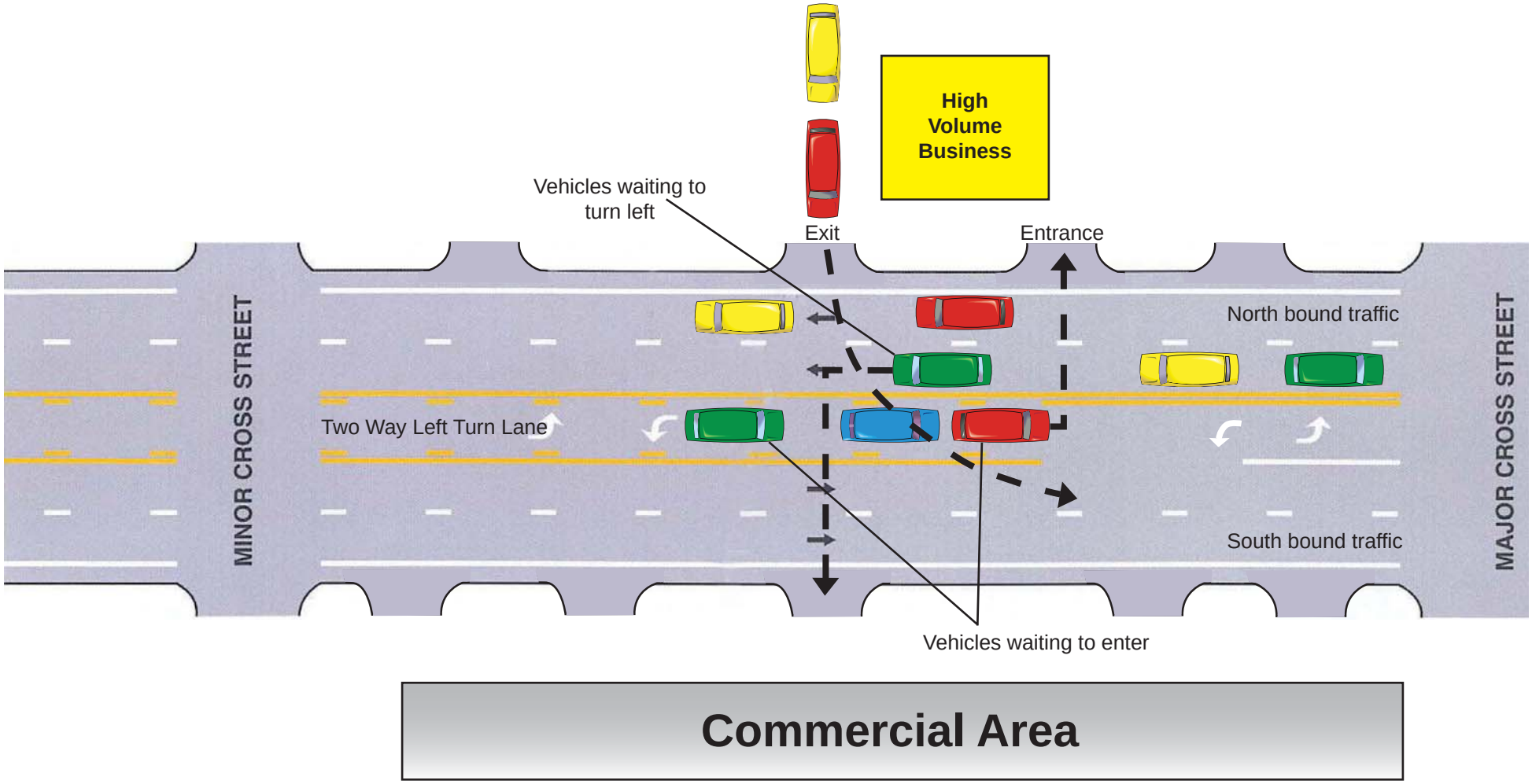


EXHIBIT 2-2
Congested Two Way Left Turn Lane

CH2MHILL

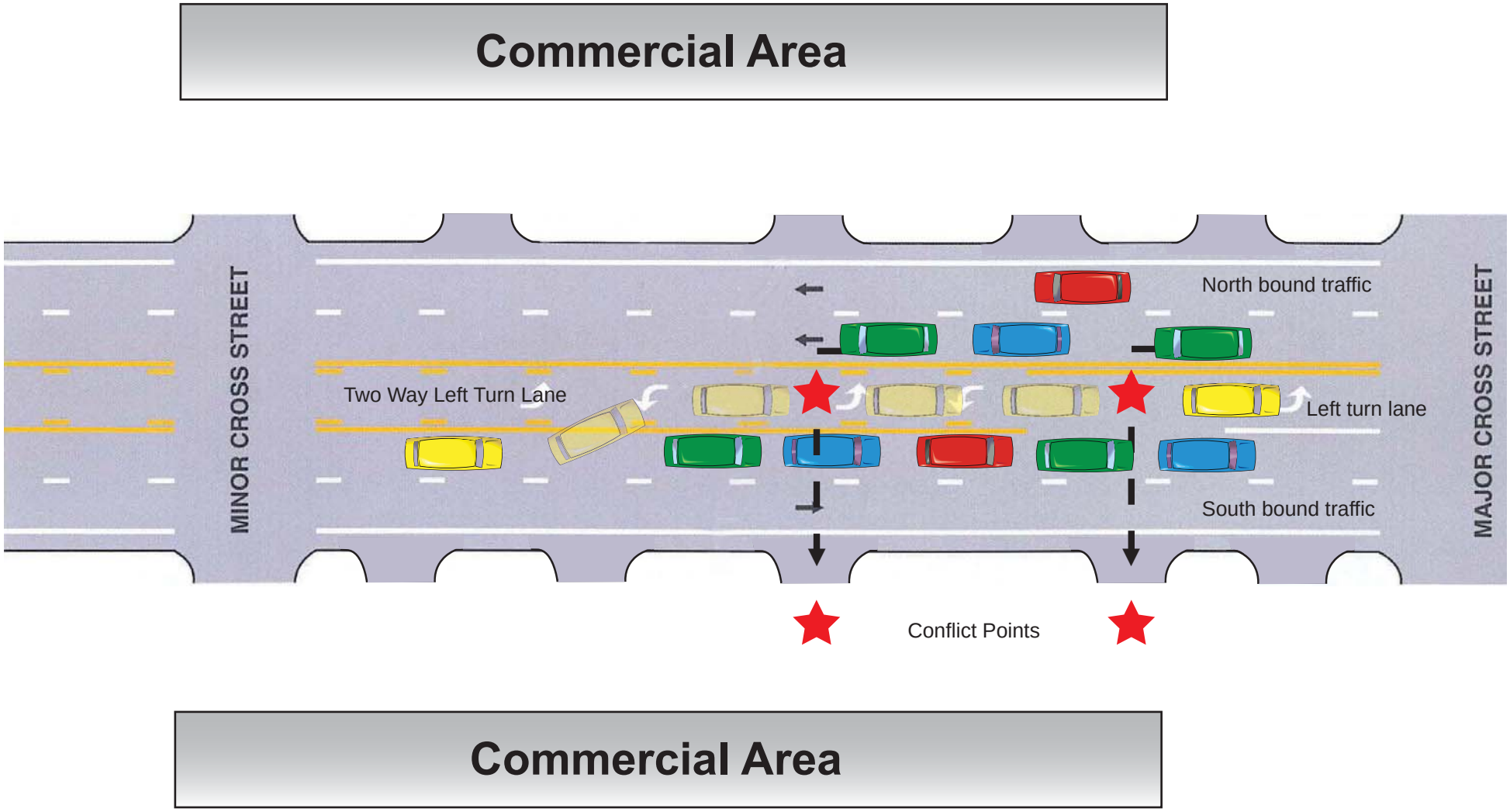


EXHIBIT 2-3
Two Way Left Turn Lane used to Access Left Turn Lane

CH2MHILL

TB052008006MKE 2.3_TWLTL_Uses_to_Access_Left_Turn_Lane_v1 08.21.08 cae

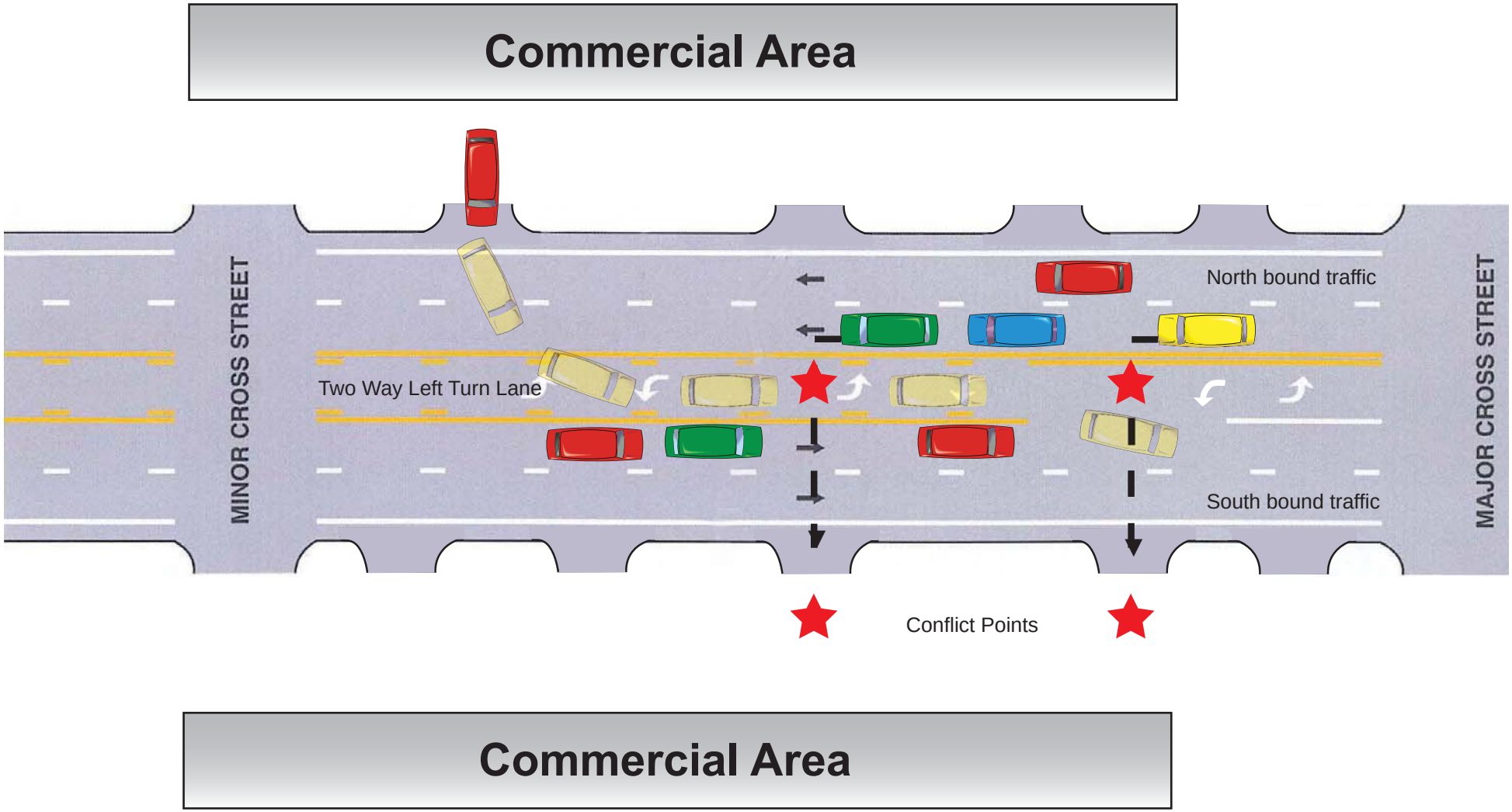


EXHIBIT 2-4
Two Way Left Turn Lane Used as Merging Lane

CH2MHILL

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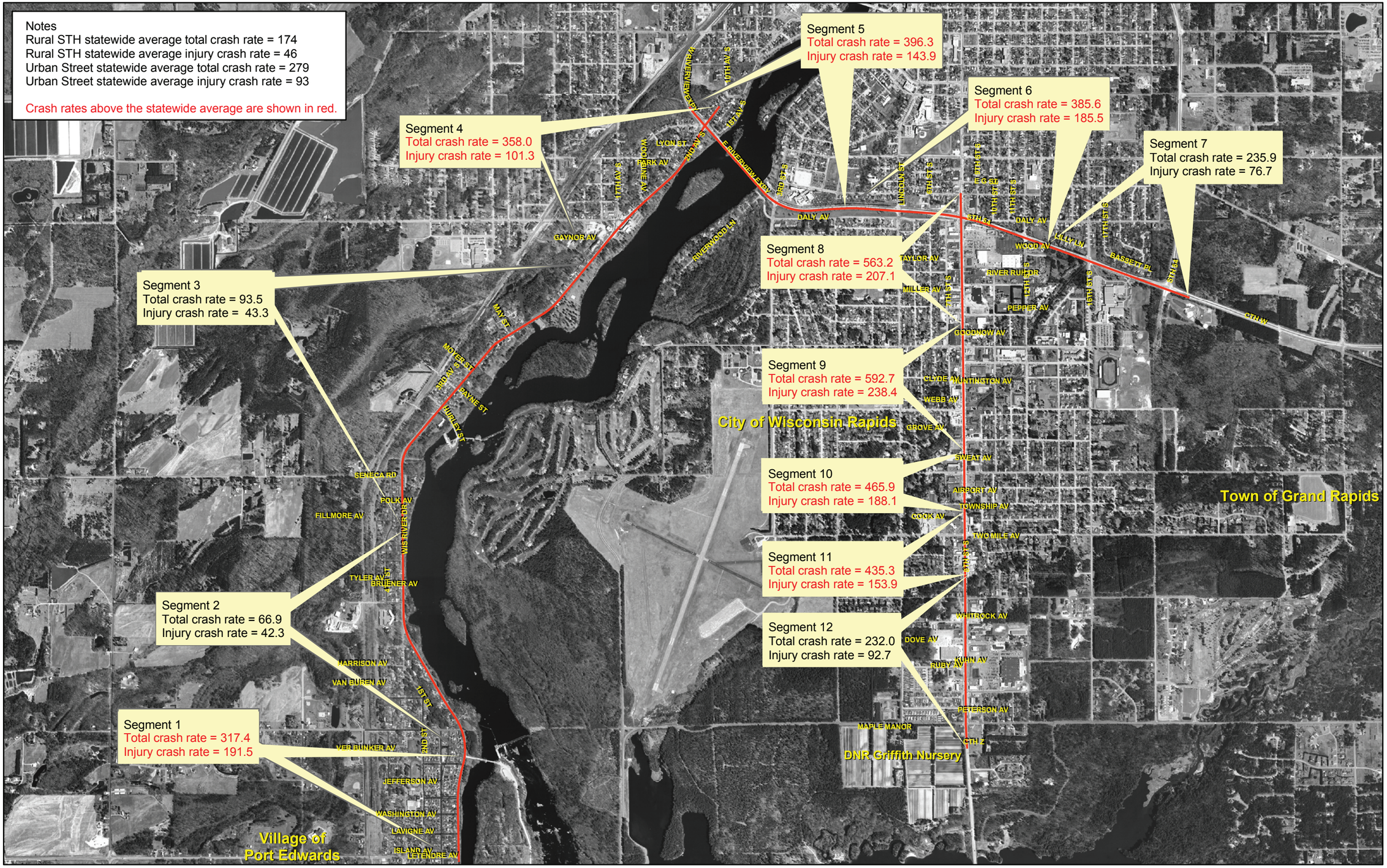


EXHIBIT 2-5
Study Area Crash Rates

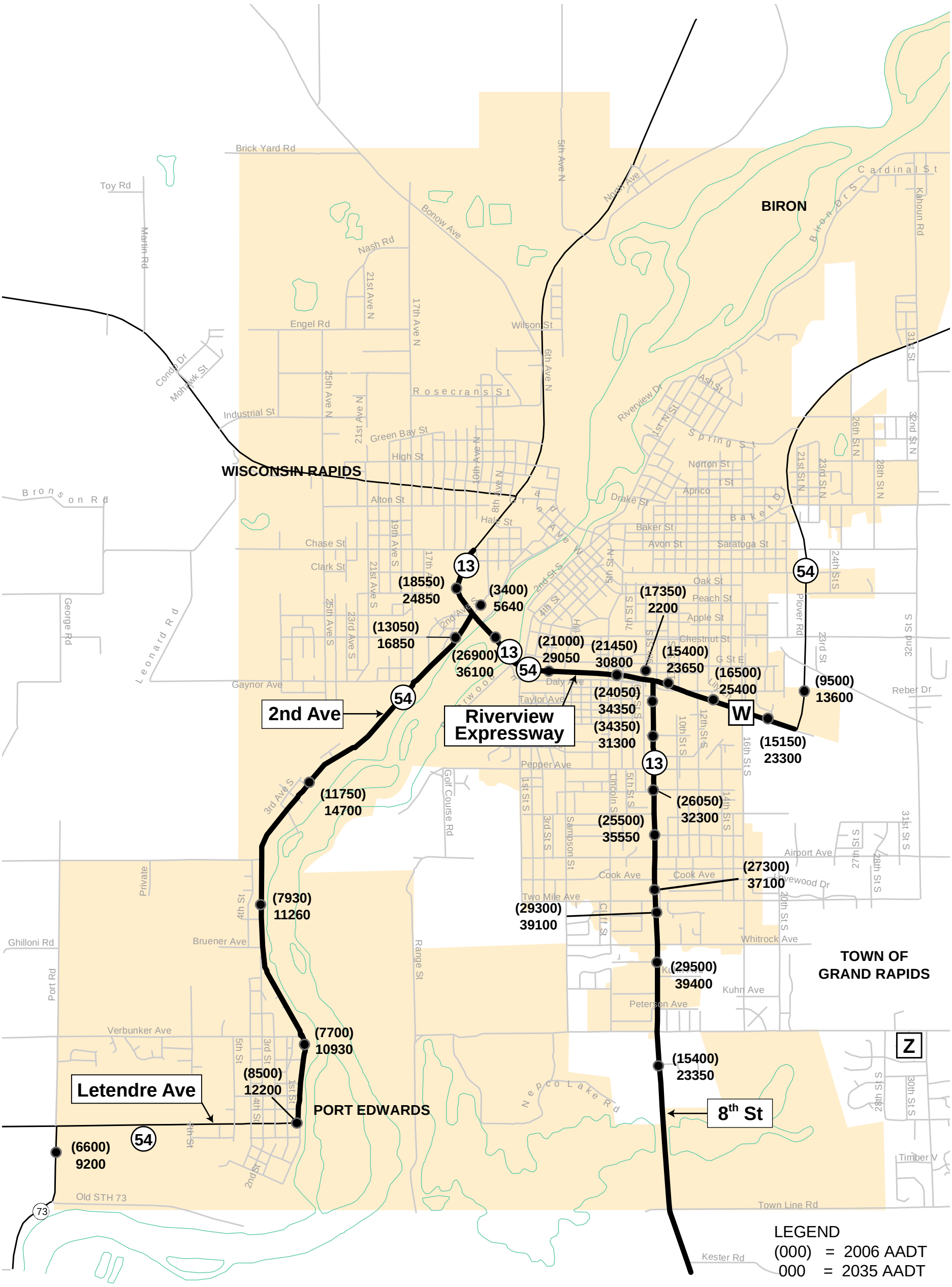
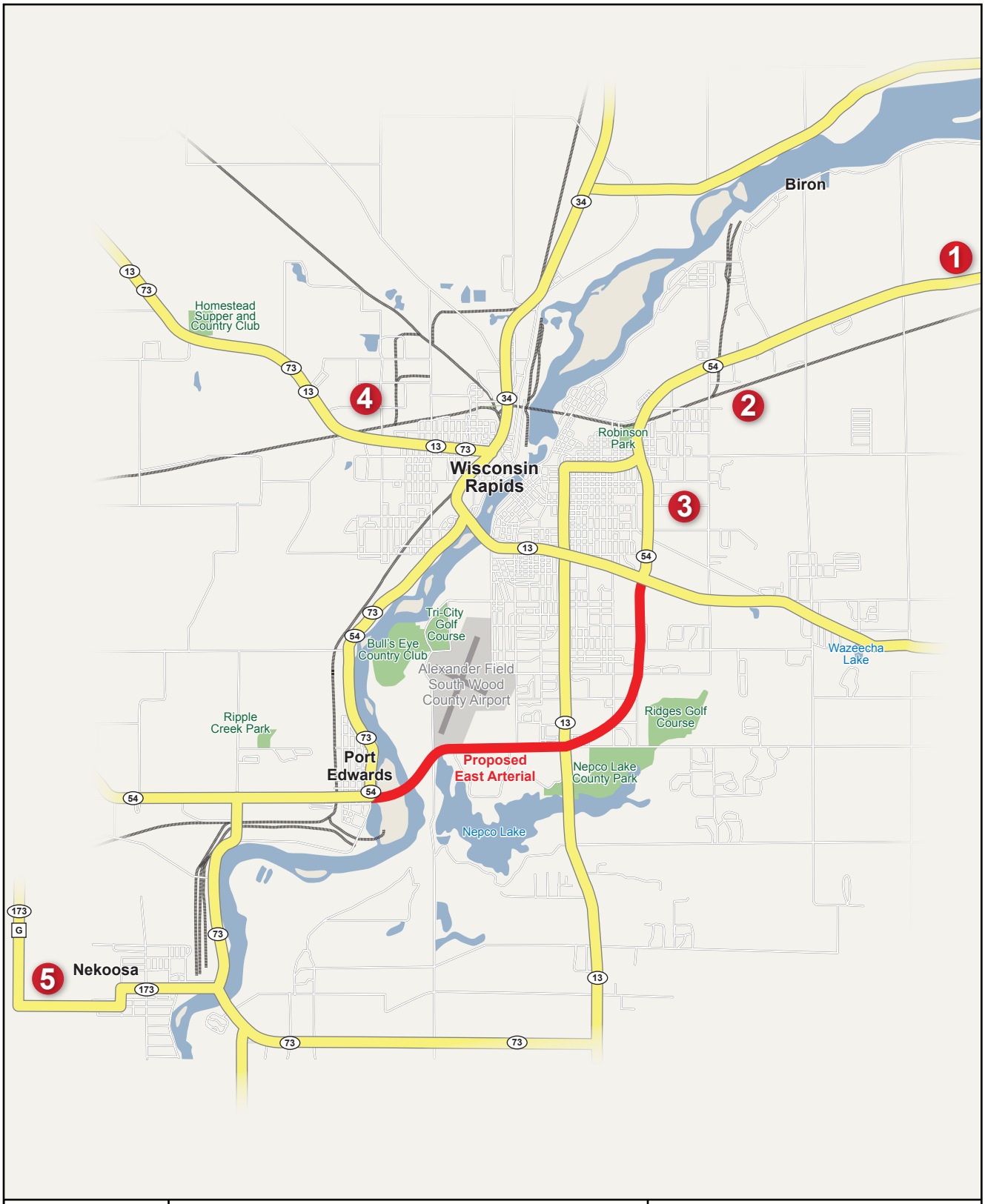


EXHIBIT 2-6
Existing and Future Traffic
without East Arterial

CH2MHILL



North

0 0.5 1

Approximate Scale in Miles

LEGEND

1. Proposed Biron 54 East Business Park
2. Rapids East Commerce Center
3. Woodlands Business Center
4. West Side Industrial Park
5. Nekoosa Business Park

EXHIBIT 2-7
South Wood County Business Parks

TB052008006MKE 2.7_South_Wood_Cty_Business_Parks_3 10.30.08 cae/sls

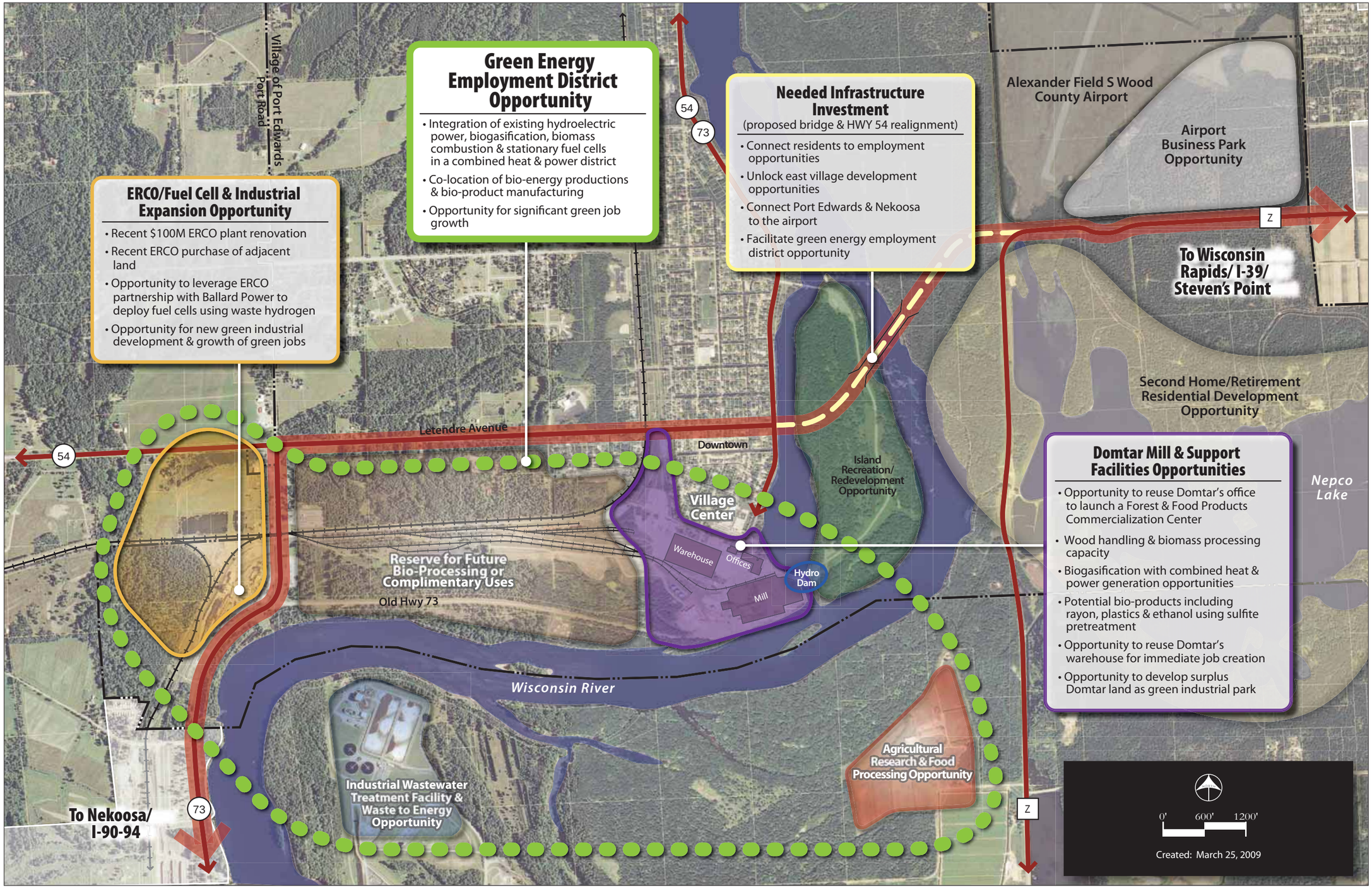


EXHIBIT 2-8
Primary Economic Opportunities
Village of Port Edwards, Wisconsin

CH2MHILL

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Section 3
Alternatives Development and Evaluation

SECTION 3

Alternatives Development and Evaluation

This section describes the East Arterial and 8th Street alternatives developed to address the transportation problems identified in Section 2. As noted, this feasibility study is a precursor to the NEPA process. In a NEPA study, a broad range of alternatives is screened and reduced to a select few for further detailed study. When a preferred alternative is selected, it is described in detail in the environmental document. Because this is a feasibility study, there is no requirement to screen alternatives as there is in a NEPA study. To provide the greatest degree of flexibility to a future East Arterial NEPA study, WisDOT has decided not to eliminate any alternatives considered as part of the feasibility study.

3.1 Range of Alternatives

3.1.1 Non-highway Alternatives

3.1.1.1 Transportation Demand Management

The Transportation Demand Management (TDM) Alternative evaluates the potential to reduce the number of auto trips and to increase transit use (primarily bus ridership) or carpooling. The TDM Alternative would not address future transportation problems caused by through traffic and trucks destined for industrial and commercial areas in Wisconsin Rapids and Port Edwards.

Mass transit service is unavailable in the project area, and there are no known plans to begin such service. There is, however, a shared-ride taxi service (River City Cab) in Wisconsin Rapids. River City Cab, which has vehicles to serve the disabled, receives state and federal funding. Given the lack of mass transit in the project area, the TDM Alternative is not a reasonable stand-alone solution for addressing the transportation deficiencies identified in Section 2.

3.1.1.2 Transportation System Management

The Transportation System Management (TSM) Alternative is a low-cost, low-impact means to improve traffic operations on existing roads without adding capacity. TSMs include intersection capacity improvements, parking removal at spot locations, use of one-way street pairs, eliminating or restricting on-street parking, and adding traffic signals.

The isolated or site-specific traffic flow improvements associated with this alternative would not address the transportation problems on 8th Street or provide the advantages of enhanced connectivity provided by the East Arterial. Thus, the TSM Alternative is not a reasonable stand-alone alternative.

3.1.2 No-Build Alternative

The No-Build Alternative consists of doing nothing to the existing routes within Wisconsin Rapids beyond continued routine maintenance. No capacity improvements would be made. The No-Build Alternative would not require new right-of-way, and it would avoid impacts to the natural environment and to residential and commercial properties. Although the No-Build

Alternative would not address the transportation problems identified in Section 2, it serves as a baseline of comparison to the Build Alternatives.

3.1.3 Build Alternatives

The build alternatives consist of improvements along 8th Street between the Riverview Expressway and County Z, and improvements along the East Arterial between Letendre Avenue in Port Edwards and the County W/Plover Road in Wisconsin Rapids. Aerial exhibits showing the proposed improvements along the East Arterial and 8th Street are found at the back of this document after Appendix B. The following sections describe the basic features of the proposed East Arterial and 8th Street improvements followed by a more detailed description of those alternatives. The design criteria report for the project, which was developed to help select the appropriate typical section for the proposed improvements, is found on the CD at the back of this document.

3.1.3.1 Basic Features of the East Arterial

County W to Lincoln Street. The section of the proposed East Arterial between County W and Lincoln Street is a 4-lane divided urban roadway (FDM Design Class U4) with a design speed of 45 mph and a posted speed limit of 40 mph. The typical section is similar to that of Plover Road (WIS 54) north of the County W intersection. It includes two 12-foot-wide travel lanes in each direction separated by a 30-foot-wide grass median with curb and gutter. The grass median with curb and gutter was selected to provide continuity with Plover Road north of County W, to provide for protected turn lanes at intersections, and to preserve a corridor to meet long-term needs beyond 2035. Adjacent to the travel lanes, a 4-foot-wide bike lane (or 2-foot-wide bike accommodation) may be developed in each direction. A 10-foot-wide multi-use path is proposed on one side of the roadway to connect to the multi-use path along Plover Road and along County W to the east and west (Exhibit 3-1). The City's standard corridor width for a 4-lane divided urban facility is 132 feet. The 4-lane divided typical section is shown in Exhibit 3-1. It should be noted that between 8th Street and Lincoln Street the 4-lane section is transitioning to a 2-lane roadway.

Plover Road (WIS 54) looking south toward the County W intersection.

Lincoln Street to Wisconsin River Drive (Port Edwards). The East Arterial from Lincoln Street to Wisconsin River Drive on the west side of the Wisconsin River would be a 2-lane urban roadway (FDM Design Class 2b) with a design speed of 45 mph and a posted speed of 40 mph. The design speeds are reduced to 30 to 35 mph as the East Arterial approaches the west terminus because the posted speed on Letendre Avenue (WIS 54) is 25 mph. The 66-foot-wide typical section includes one 12-foot-wide travel lane in each direction. Adjacent to the travel lanes, a 4-foot-wide bike lane (or 2-foot-wide bike accommodation) may be developed in each direction. A 10-foot-wide multi-use path is proposed on one side of the roadway to connect to the multi-use path in Port Edwards (Exhibit 3-1). The existing and proposed right-of-way along County Z is generally 66 feet wide.

A 2-lane urban section was selected between Lincoln Street and the west terminus (Wisconsin River Drive) to provide continuity between the existing and proposed urban sections at each terminus. The 2-lane urban section helps to minimize right-of-way impacts between Sampson and 8th streets and between Alexander Field and Nepco Lake, where there are constraints on both sides of County Z. That said, it is acknowledged that a rural section with grass ditches could have stormwater quality advantages over the proposed urban section with its proposed storm sewers and detention ponds.

3.1.3.2 Basic Features of the 8th Street Improvements

Eighth Street generally is a 4-lane urban roadway with two 12-foot travel lanes in each direction separated by a 16-to-18-foot-wide 2-way left turn lane (TWLTL) median, and 5-foot sidewalks on both sides. The right-of-way along 8th Street generally is 90 to 100 feet wide (Exhibit 3-2). Two changes to the typical section are being considered. One alternative would install a 16-to-18-foot-wide raised median to replace the existing TWLTL (Exhibit 3-2). Under the second alternative, 8th Street would be reconstructed as a 4-lane divided urban roadway with four 12-foot-wide travel lanes, a 4-foot-wide bike lane in each direction, a 30-foot-wide raised median that would accommodate mid-block U-turns, and 8-foot-wide sidewalks on both sides of the street. The right-of-way would be expanded from the existing 90-to-100-foot-wide corridor to 116 feet wide (Exhibit 3-2).

3.2 Detailed Description of the Build Alternatives (East Arterial)

The 4.3-mile East Arterial corridor begins in Wisconsin Rapids at the intersection of County W/WIS 54 (Plover Road) and extends south along the 20th Street corridor to Kuhn Avenue. There it turns southwest, continuing to County Z near 12th Street where it turns west following County Z to Rangeline Road. At roughly Rangeline Road, the proposed East Arterial would extend west on new alignment, crossing the Wisconsin River, and terminate at Wisconsin River Drive in Port Edwards.

To facilitate the development of alignments, the project area was divided into three sections:

- County W to Kuhn Avenue
- Kuhn Avenue to Nepco Lake Road
- Wisconsin River Crossings

Alignments developed within the three project sections are described below. Their names were developed by combining the section name with the alternative number. The intersection concepts developed at the 8th Street/County Z intersection and the three

western touchdown points of the Wisconsin River crossing alternatives (Ver Bunker, Lavigne, and Letendre avenues) also are described below. As noted, the East Arterial is a 4-lane divided facility between the County W intersection and a point just west of 8th Street. From Lincoln Street to the west project terminus, it would be a 2-lane roadway (and bridge). The proposed improvements fall largely within a City-owned and City-mapped corridor from County W to 8th Street.

3.2.1 County W to Kuhn Avenue

Two alternatives were developed in the section from the County W intersection south to Kuhn Avenue. Both generally are on the same alignment from County W to Grove Avenue and from Whitrock Avenue to Kuhn Avenue, but the alignment of the East Arterial and the local road connections between Grove and Whitrock avenues differs between alternatives. As part of a previous project, part of the south leg of the County W intersection, into which this project would tie, has been constructed.

South leg of the County W/WIS 54 (Plover Road) intersection looking north

3.2.1.1 Alternative 1

From the County W intersection, Alternative 1 proceeds south on new alignment to Grove Avenue within City-owned right-of-way. It continues south on new alignment between Grove and Airport avenues, then uses the 20th Street right-of-way between Airport and Whitrock avenues. There would be two residential relocations on the south side of 20th Street between Lovewood Drive and Two Mile Avenue. Between Whitrock and Kuhn avenues, Alternative 1 bends to the southwest on new alignment through the City-owned woodland. Local road connections to the East Arterial are proposed at Grove, Airport, Two Mile, and Kuhn avenues. Lovewood Drive, Shamrock Lane, Cook Avenue, and Whitrock Avenue are proposed to be closed with a cul-de-sac at the East Arterial. A 300-foot segment of roadway is planned to connect Shamrock Lane to Airport Avenue (East Arterial aerial exhibit, sheet 1). There would be one residential displacement associated with the Shamrock Lane connection.

3.2.1.2 Alternative 2

Alternative 2 has the same alignment as Alternative 1 from County W to Grove Avenue. Between Grove and Two Mile avenues, the western edge of the East Arterial lies about 42 feet east of the 20th Street right-of-way to avoid the City's sanitary lift station near Two Mile Creek. A frontage road is planned within the 20th Street right-of-way to provide circulation in the residential area west of the East Arterial between Airport and Two Mile avenues. There would be two residential relocations on the south side of 20th Street between Lovewood Drive and Two Mile Avenue. A 300-foot-long segment of roadway is proposed to connect Shamrock Lane to 18th Street. There would be one residential displacement associated with the Shamrock Lane connection. A frontage road connecting Lovewood Drive to Airport Avenue is proposed east of the East Arterial to improve circulation in the residential area between Airport and Two Mile avenues. Local road connections to the East Arterial are proposed at Grove, Airport, Two Mile, and Kuhn avenues (East Arterial aerial exhibit, sheet 2).

3.2.2 Kuhn Avenue to Nepco Lake Road

Two alternatives were developed in the Kuhn Avenue to Nepco Lake Road section. Both generally are on the same alignment from Kuhn Avenue to 12th Street and Lincoln Street to Nepco Lake Road. Between 12th and Lincoln streets, Alternative 1 would affect properties on the north side of County Z, and Alternative 2 would affect uses on the south side of County Z. Local road connections generally are the same for both alternatives.

3.2.2.1 Alternative 1

Alternative 1 runs southwest from Kuhn Avenue on new alignment through the City-owned forest (between 12th and 16th streets) to County Z. Between 12th and Lincoln streets, Alternative 1 is north of County Z, which would function as a frontage road between Lakewood Lane and 16th Street to improve circulation in the residential and commercial area south of County Z and east of 8th Street. West of Lincoln Street, Alternative 1 follows County Z to Nepco Lake Road (East Arterial aerial exhibit, sheet 3). This alternative would displace seven residences on the north side of County Z (east of 8th Street), one residence on the south side of County Z (east of 8th Street), one on Lakewood Lane, and 13 mobile homes west of 8th Street. It would also displace the chiropractic office, Maple Manor Motel, and Sportsman's Pub and Grill at the County Z/8th Street intersection.

Local road connections to the East Arterial are proposed at Peterson Avenue, County Z (east), 8th Street, Lincoln Avenue, Sampson Street, and Nepco Lake Road. Local roads at 9th, 10th, 11th, 12th streets, and Maple Manor are proposed to be closed with a cul-de-sac at the East Arterial. A 300-foot segment of roadway is proposed to connect the mobile home community to Maple Manor. Conceptual design of the proposed East Arterial/8th Street intersection determined that two through lanes in each direction, exclusive northbound and southbound left-turn lanes on 8th Street, an exclusive eastbound left-turn lane, and exclusive westbound dual left-turn lanes would be required (Exhibit 3-3).

3.2.2.2 Alternative 2

Alternative 2 has the same alignment as Alternative 1 between Kuhn Avenue and 12th Street. Between 12th and Lincoln streets, Alternative 2 runs south of County Z. West of Lincoln Street, it has the same alignment as Alternative 1 (East Arterial aerial exhibit, sheet 4). Local road connections to the East Arterial are the same as those for Alternative 1. The

intersection location differs from that of Alternative 1 because of the different alignments between 12th and Lincoln streets, but the intersection geometry is the same (Exhibit 3-4). This alternative would displace eight residences along County Z (east of 8th Street), one on Lakewood Lane, and two mobile homes west of 8th Street. It would displace the same businesses as Alternative 1.

3.2.3 Wisconsin River Crossing

Four alternatives were developed to connect the east and west sides of the Wisconsin River: two at Letendre Avenue (Alternatives 1A and 1B), one at Lavinge Avenue (Alternative 2), and one at Ver Bunker Avenue (Alternative 3). These alternatives are described below. As noted, the Wisconsin River Crossing alternatives would be 2-lane roadways.

The project team developed conceptual designs to understand the impacts of bridge landings at Letendre, Lavinge, and Ver Bunker avenues on adjacent residences. Three concepts were developed for Letendre Avenue, two for Lavigne Avenue, and one for Ver Bunker Avenue. In developing the intersection concepts, the project team conducted a preliminary structure sizing for the bridges over the west river channel using minimum span lengths and maximum girder sizes, and minimum girder sizes with more spans. This was done to analyze the various profiles over the west channel and the impacts on the bridge landing areas. Detailed structure hydraulics were not analyzed. To aid in developing profiles for the proposed bridge crossings, the low chord elevations for the various structures were set 2 feet above the 100-year flood elevation available from the Wisconsin River Flood Insurance Study. The intersection concepts at Letendre and Lavigne avenues also evaluated the tradeoffs of realigning Wisconsin River Drive with the associated residential impacts and constructing retaining walls to minimize river impacts and residential and institutional relocations. The intersection concepts are described below under the mainline discussions.

3.2.3.1 Letendre Avenue Alternative 1A

Alternative 1A proceeds west along County Z from Nepco Lake Road passing between Alexander Field and the north tip of Nepco Lake. It continues west of the Rangeline Road intersection along the utility corridor for 500 feet before curving southwest toward the Wisconsin River. A new bridge roughly 1,300 feet long would cross the east channel of the river about 1,300 feet downstream of the Domtar Dam. Alternative 1A would cross Domtar Island on fill. Another new bridge is proposed over the power channel (west channel) connecting to Letendre Avenue (East Arterial aerial exhibit, sheet 5). Alternative 1A employs a series of curves and lower design speeds (25 to 40 mph) to use higher ground and minimize wetland impacts through the Wisconsin River crossing. The new Wisconsin River bridges would be about 1,300 feet long. Local road connections to the East Arterial are proposed at Nepco Lake Road and Rangeline Road/County Z (south).

3.2.3.2 Letendre Avenue Alternative 1B

Alternative 1B has the same alignment as Alternative 1A to a point just west of the Rangeline Road intersection. From that point Alternative 1B has a straighter alignment to the east channel of the Wisconsin River than Alternative 1A. Alternative 1B would cross the east channel at a greater skew than Alternative 1A about 1,200 feet downstream of the Domtar Dam. It would cross Domtar Island on fill with another new bridge proposed over the power

channel (west channel) connecting to Letendre Avenue (East Arterial aerial exhibit, sheet 6). Alternative 1B has design speeds of 40 to 45 mph and is a more geometrically direct route through the Wisconsin River crossing than Alternative 1A. The new Wisconsin River bridges would be about 1,500 feet long. Local road connections to the East Arterial are the same as for Alternative 1A.

3.2.3.3 Letendre Avenue Intersection Concepts

Intersection 1 is a 4-legged intersection with a 330-foot-long, 3-span bridge over the west channel. The bridge touchdown point on Letendre Avenue would be about 9 to 10 feet higher than the existing intersection grade. Wisconsin River Drive would be realigned west to avoid placing fill in the river, thereby displacing five residences between Letendre and Island avenues and the United Methodist Church on the south side of Letendre (Exhibit 3-5).

Intersection 2 is a 4-legged intersection with a 340-foot-long, 5-span bridge over the west channel. The touchdown point on Letendre Avenue would be about 6 feet higher than the existing intersection grade. Reconstruction along Wisconsin River Drive would displace the five residences between Letendre and Island avenues. Retaining walls would be erected along Wisconsin River Drive to avoid placing fill in the river and along Letendre Avenue to avoid displacing the United Methodist Church (Exhibit 3- 6).

Intersection 3 is a 3-legged intersection with a 330-foot-long, 3-span bridge over the west channel. The touchdown point on Letendre Avenue would be about 9 to 10 feet higher than the existing intersection grade. Wisconsin River Drive would be realigned west to avoid placing fill in the river, displacing five residences between Letendre and Island avenues. By closing the south leg of the intersection and using a retaining wall, this concept would not displace the United Methodist Church (Exhibit 3- 7).

3.2.3.4 Lavigne Avenue Alternative 2

Alternative 2 runs west from Nepco Lake Road, but unlike the Letendre Avenue alternatives, it crosses County Z south of the Rangeline Road intersection. It crosses the east channel of the Wisconsin River at about the same location as Letendre Avenue Alternative 1A. Alternative 2 would cross Domtar Island on fill with another new bridge proposed over the power channel (west channel) connecting to Wisconsin River Drive. Lavigne Avenue would be closed west of Wisconsin River Drive (East Arterial aerial exhibit, sheet 7). This alternative is a geometrically direct route across the Wisconsin River area and with design speeds 40 to 45 mph. The new Wisconsin River bridges would be about 1,400 feet long.

3.2.3.5 Lavigne Avenue Intersection Concepts

Intersection 1 is a 3-legged intersection (Lavigne Avenue would be closed west of Wisconsin River Drive) with a 420-foot-long, 3-span bridge over the west channel. The bridge touchdown point on Lavigne Avenue would be about 9 to 10 feet higher than the existing intersection grade. Wisconsin River Drive would be realigned north to avoid placing fill in the river, displacing the eight residences between Island and Washington avenues and one residence north of Washington Avenue (Exhibit 3-8). The Washington Avenue/Wisconsin River Drive intersection would be closed, but the Island Avenue intersection would remain open.

Intersection 2 is a 3-legged intersection (Lavigne Avenue would be closed west of Wisconsin River Drive) with a 400-foot-long, 5-span bridge over the west channel. The bridge touchdown point on Lavigne Avenue would be about 6 feet higher than the existing intersection grade. Retaining walls would be used along the river to avoid placing fill in the river and along the front of five residences (two south and three north of the Lavigne intersection) to avoid residential displacements. The retaining wall along the front of the residential properties would be 2 to 7 feet high, and the wall along Wisconsin River Drive would be 2 to 10 feet high. The Washington Avenue/Wisconsin River Drive would be closed under this alternative (Exhibit 3-9).

3.2.3.6 Ver Bunker Avenue Alternative 3

Ver Bunker Avenue Alternative 3 extends west from Nepco Lake Road and continues directly west through the Rangeline Road intersection and along the utility corridor. It crosses the Wisconsin River about 100 to 300 feet north of the Domtar dam (conceptualized on page 3-6) and touches down in the parking lot for the "Domtar boat launch" west of the Ver Bunker intersection (aerial exhibit, sheet 8). Alternative 3 is the most direct connection across the Wisconsin River and has a design speed of 45 mph. Because of the crossing location, Alternative 3 has one bridge (1,125 feet long), unlike the two bridges required with the Letendre and Lavigne Avenue alternatives. It is also the only alternative that touches down east of Wisconsin River Drive. Local road connections to the East Arterial would be made at Nepco Lake Road and Rangeline Road/County Z (south).

Utility corridor west of Rangeline Road the Ver Bunker Alternative would use

3.2.3.7 Ver Bunker Avenue Intersection Concept

Intersection 1 is a 3-legged intersection (Ver Bunker Avenue would be closed) with a 1,125-foot-long, 7-span bridge over the river. The touchdown point on Ver Bunker Avenue would be 1 to 2 feet higher than the existing intersection grade. Some of Wisconsin River Drive would be reconstructed under this alternative, but there would be no residential displacements and no retaining walls (Exhibit 3-10).

3.3 Detailed Description of the Build Alternatives (8th Street)

The 8th Street corridor begins at Riverview Expressway and extends south to the County Z intersection, a distance of about 2 miles. The 8th Street typical section generally is a 4-lane urban roadway with four 12-foot travel lanes, a 16-to-18-foot TWLTL median, and 5-foot

sidewalks on both sides (Exhibit 3-2). The right-of-way along 8th Street generally is 90 to 100 feet wide.

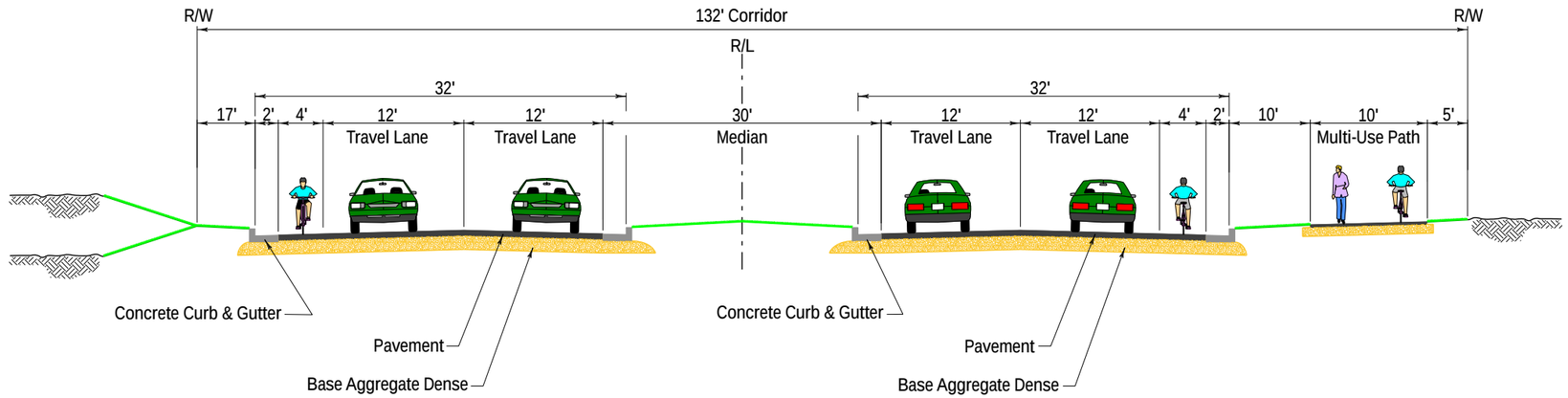
Two alternatives were developed along 8th Street to address improvements that are needed even if the proposed East Arterial were constructed.

3.3.1.1 Alternative 1: Convert TWLTL to Raised Median

Alternative 1 consists of reconstructing the TWLTL as a raised median with curb and gutter. The median no longer would allow two-way left turns and would convert all driveways along 8th Street to right-in/right-out. There is generally no expansion within existing right-of-way under this alternative. Alternative 1 eliminates left turns by constructing a raised median through the unsignalized intersections of Taylor, Wood, Goodnow, Huntington, Clyde, Grove, Sweat, Township, Cook, Whitrock, Dove, and Peterson avenues. Improvements include increased left-turn storage at the signalized intersections of Pepper, Airport, and Two Mile avenues. Improvements at those intersections may require minor strip taking of right-of-way for any turn lane improvements on the local side streets. U-turns are not allowed at signalized intersections, and the 16-to-18-foot median will not accommodate U-turns throughout the 2-mile corridor. Alternative 1 is shown on the 8th Street aerial exhibit (sheets 1 through 3) which are located at the back of the document after the East Arterial aerial exhibits.

3.3.1.2 Alternative 2: Wider Footprint to Accommodate U-turns

Alternative 2 consists of reconstructing 8th Street as a 4-lane divided urban roadway with four 12-foot travel lanes, a 4-foot bike lane in each direction, a 30-foot-wide raised median with curb and gutter that will accommodate mid-block U-turns, and pedestrian accommodations on both sides with 8-foot-wide sidewalks. The right-of-way would be expanded from the existing 90-to-100-foot-wide corridor to 116 feet wide to accommodate the typical section. Alternative 2 would eliminate left turns by constructing a raised median through the unsignalized intersections of Taylor, Wood, Goodnow, Huntington, Clyde, Grove, Sweat, Township, Cook, Whitrock, Dove, and Peterson avenues. Improvements include increased left-turn storage at the signalized intersections of Pepper, Airport, and Two Mile avenues. Although all driveways along 8th Street would be right-in/right-out, U-turn opportunities are proposed roughly every 1,000 feet and prior to signalized intersections throughout the corridor. Alternative 2 is shown on the 8th Street aerial exhibit (sheets 4 through 6) at the back of the document.

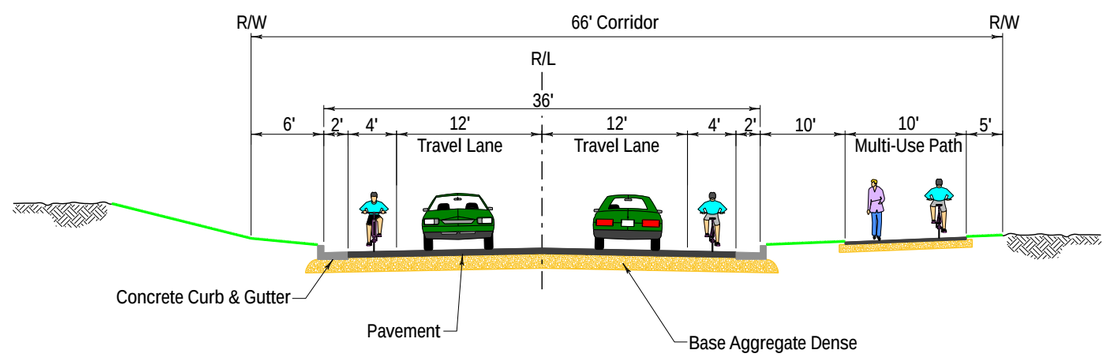


PROPOSED 4-LANE DIVIDED TYPICAL SECTION

EAST ARTERIAL

COUNTY W - WIS 13 (8TH STREET)

Note: Between WIS 13 and Lincoln Street, the typical section is transitioning from a 4-lane divided roadway to a 2-lane roadway.



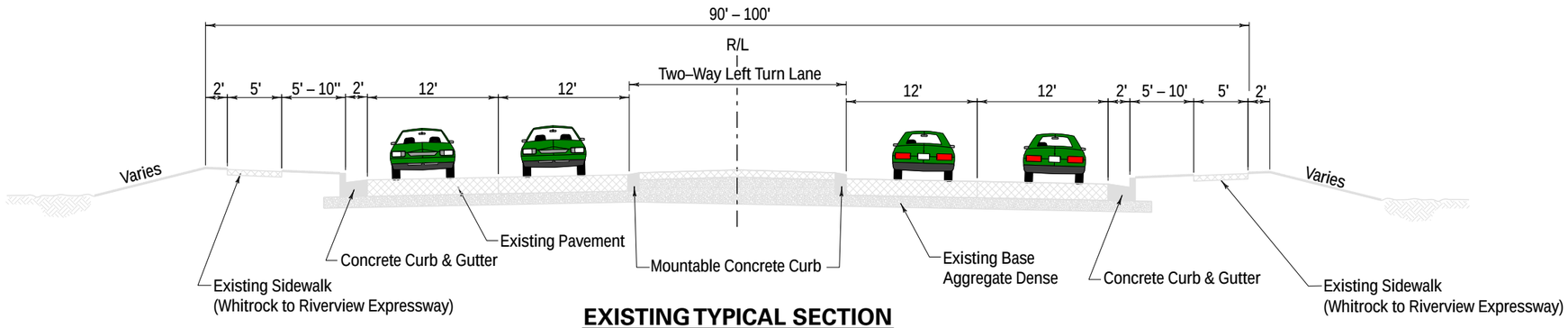
PROPOSED 2-LANE TYPICAL SECTION

EAST ARTERIAL

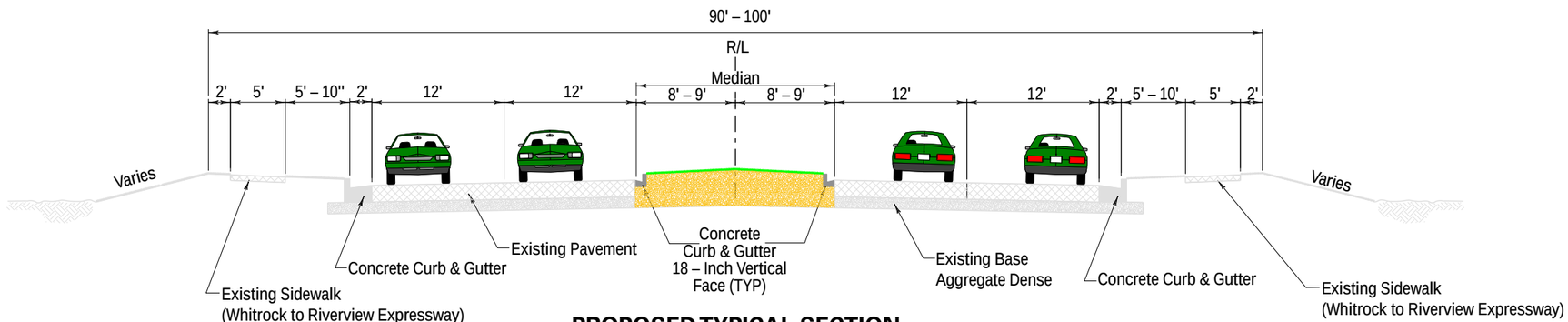
WIS 13 - WISCONSIN RIVER DRIVE

EXHIBIT 3-1

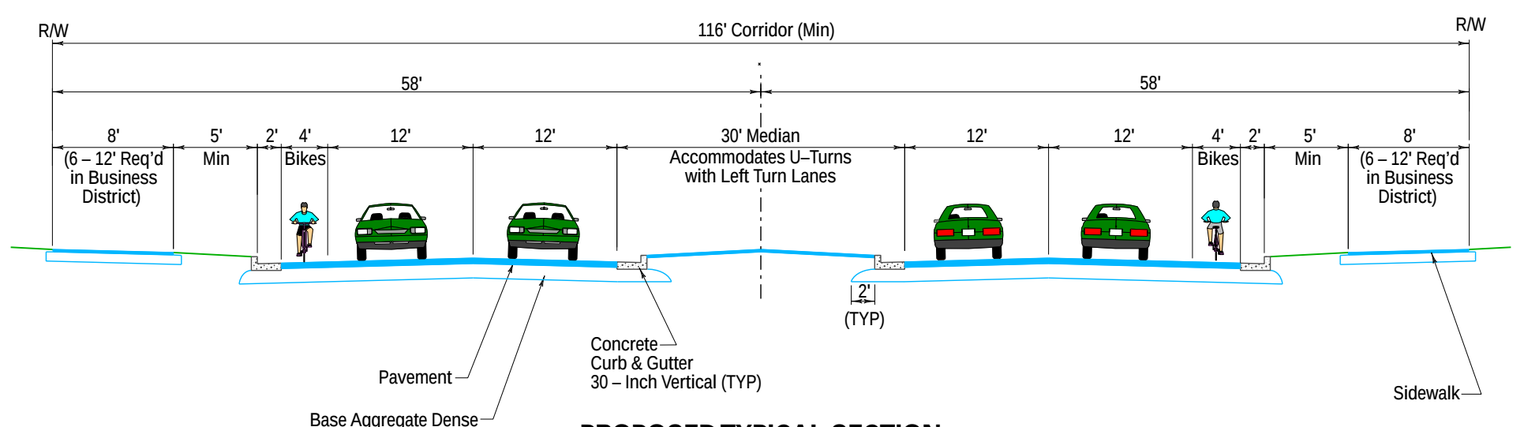
East Arterial Proposed Typical Sections



EXISTING TYPICAL SECTION
8TH STREET
COUNTY Z - RIVERVIEW EXPRESSWAY

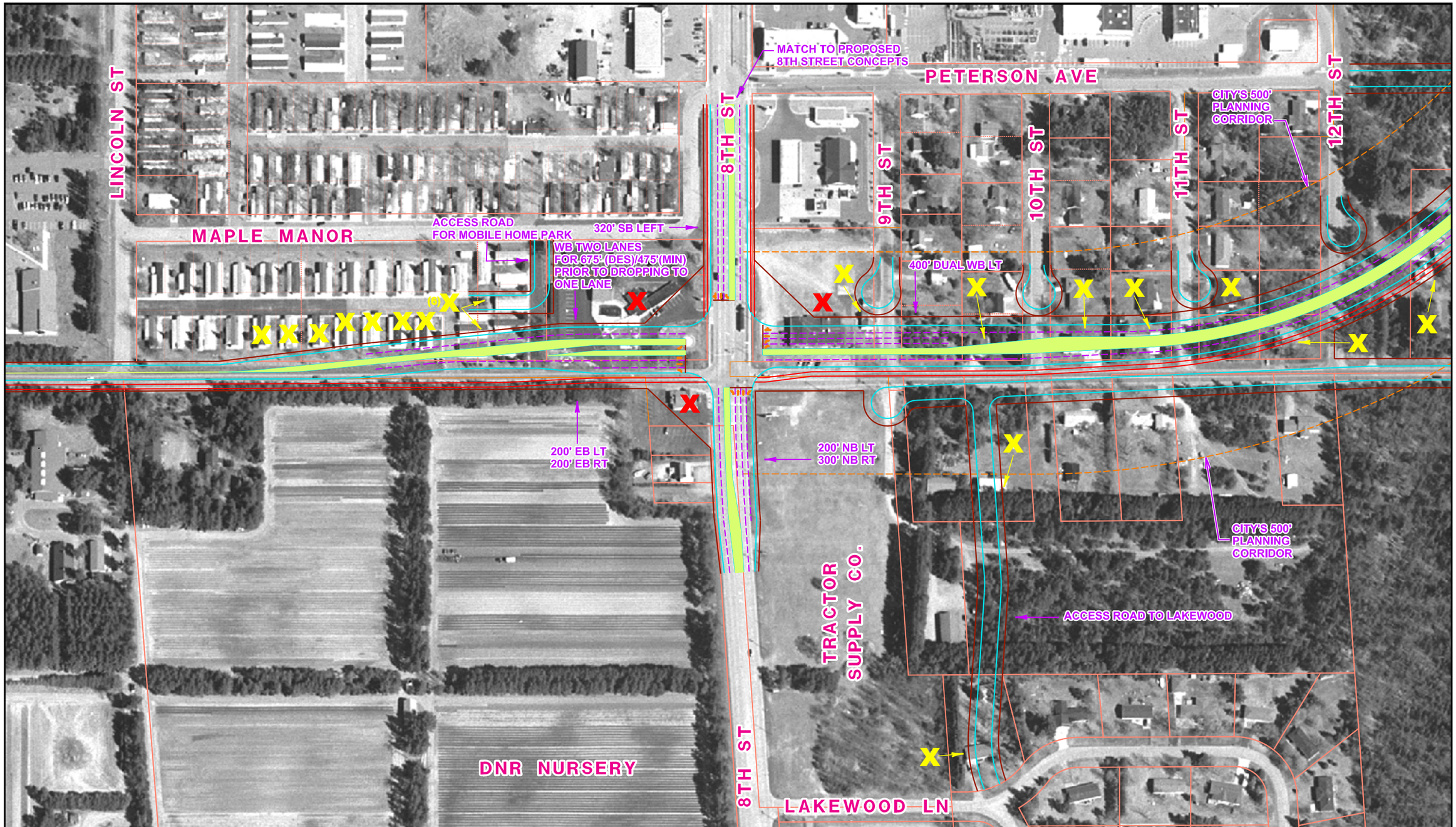


PROPOSED TYPICAL SECTION
8TH STREET - ALTERNATIVE 1 (Convert TWLTL to Raised Median)
COUNTY Z - RIVERVIEW EXPRESSWAY



PROPOSED TYPICAL SECTION
8th Street - Alternative 2 (Divided Roadway to Accommodate U-Turns)
COUNTY Z - RIVERVIEW EXPRESSWAY

EXHIBIT 3-2
8th Street Typical Sections



North

LEGEND

- Existing Parcels and R/W
- X Residential Relocation
- X Commercial Relocation

R/W
Travel lane
Travel lane
Median
Travel lane
Travel lane
Bike/Ped. path
R/W
City's 500' wide planning corridor

EXHIBIT 3-3
8TH Street/County Z Intersection Design
Kuhn Avenue to Nepco Lake Road
Alternative 1

TB052008006MKE 3.3_8TH_Street__CTH-Z_Intersection_no1_4 09.18.08 cae/mjl

LINCOLN ST
MAPLE MANOR
8TH ST
MATCH TO PROPOSED 8TH STREET CONCEPTS
PETERSON AVE
9TH ST
10TH ST
11TH ST
12TH ST
CITY'S 500' PLANNING CORRIDOR
320' SB LEFT
ACCESS ROAD FOR MOBILE HOME PARK
MOTEL ACCESS
WB TWO LANES FOR 675' (DES)/475'(MIN) PRIOR TO DROPPING TO ONE LANE
ACCESS
400' DUAL WB LT
200' EB LT
200' EB RT
200' NB LT
300' NB RT
TRACTOR SUPPLY CO.
CITY'S 500' PLANNING CORRIDOR
ACCESS ROAD TO LAKEWOOD
DNR NURSERY
8TH ST
LAKEWOOD LN

North

LEGEND

- Existing Parcels and R/W
- X Residential Relocation
- X Commercial Relocation

R/W
Travel lane
Travel lane
Median
Travel lane
Travel lane
Bike/Ped. path
R/W
City's 500' wide planning corridor

EXHIBIT 3-4
8TH Street/County Z Intersection Design
Kuhn Avenue to Nepco Lake Road
Alternative 2

TB052008006MKE 3.4_8TH_Street__CTH-Z_Intersection_no2_3 09.18.08 cae/mjl

North

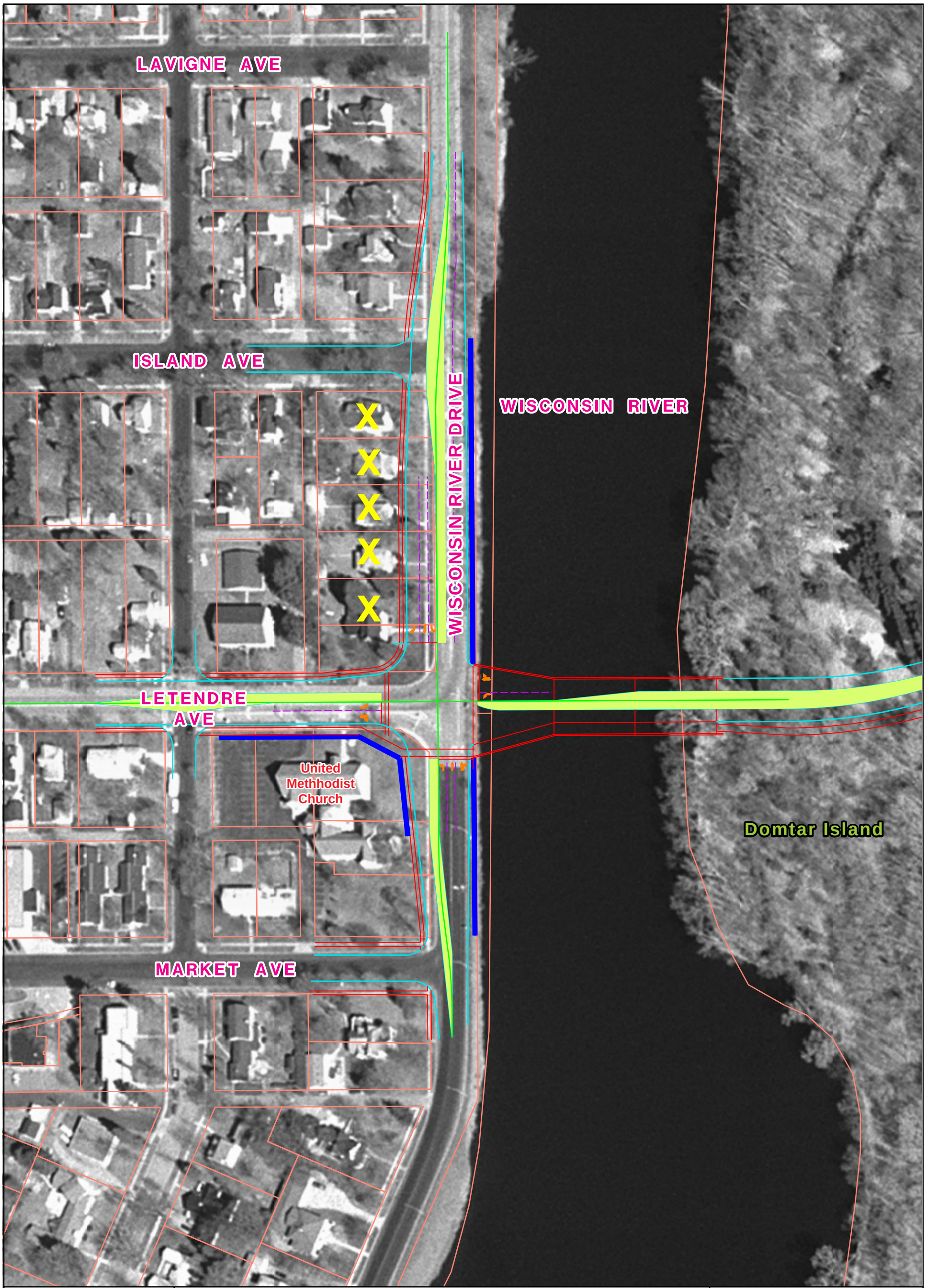
LEGEND

Residential Relocation

Institutional Relocation

EXHIBIT 3-5
Letendre Avenue Intersection
Concept No. 1
Realign Wisconsin River Drive

TB052008006MKE 3.5_Letendre_Alternative_no1_3 08.22.08 cae



North

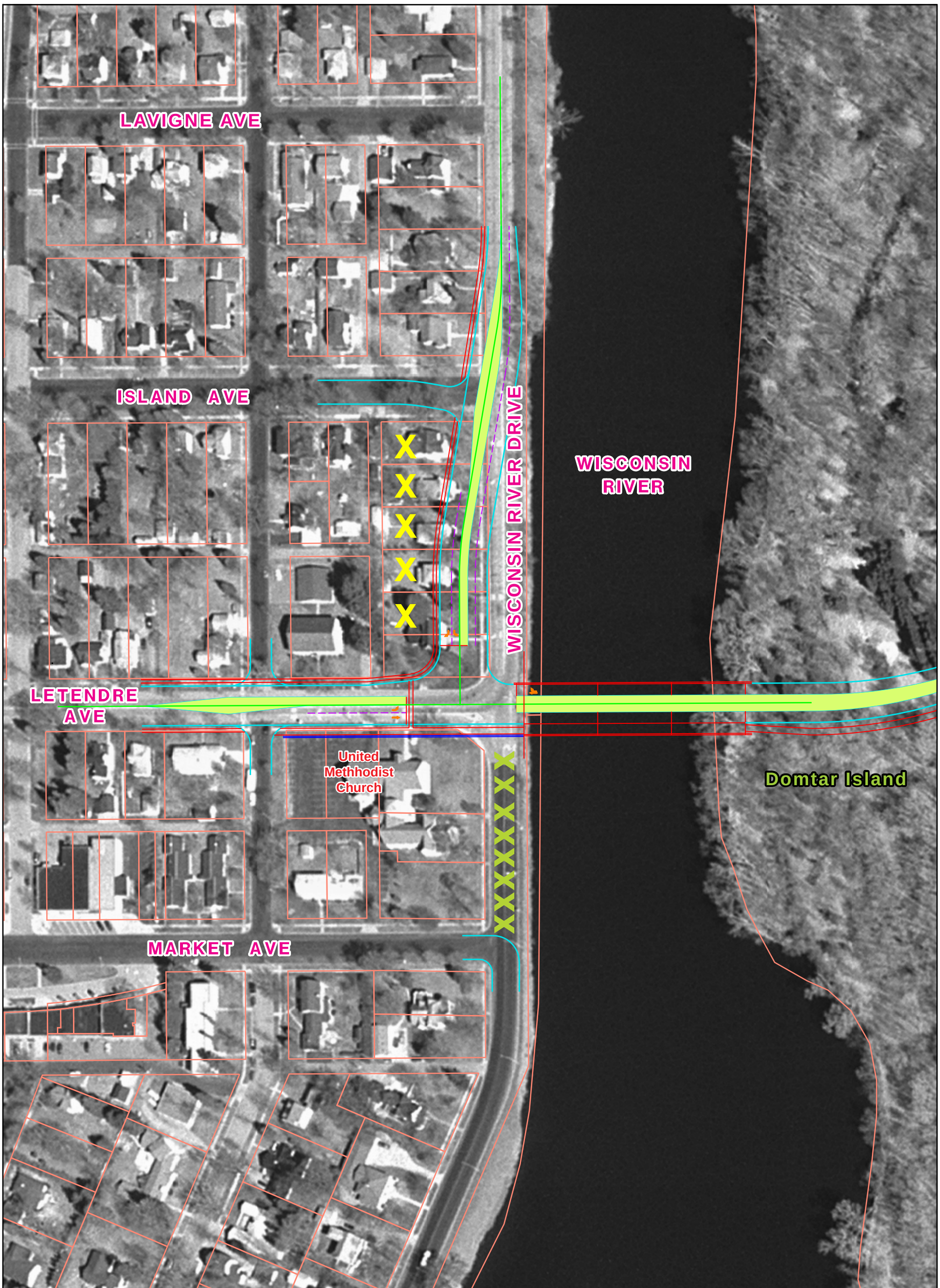
LEGEND

X Residential Relocation

Retaining Walls

EXHIBIT 3-6
Letendre Avenue Intersection
Concept No. 2
Hold Existing Wisconsin River Drive

TB052008006MKE 3.6_Letendre_Alternative_no2_3 08.22.08 cae



North

LEGEND

- X Residential Relocation
- Retaining Walls
- X Road to be Removed

EXHIBIT 3-7
Letendre Avenue Intersection
Concept No. 3
Close South Leg of Wisconsin River Dr

TB052008006MKE 3.7_Letendre_Alternative_no3_7 10.22 .08 cae

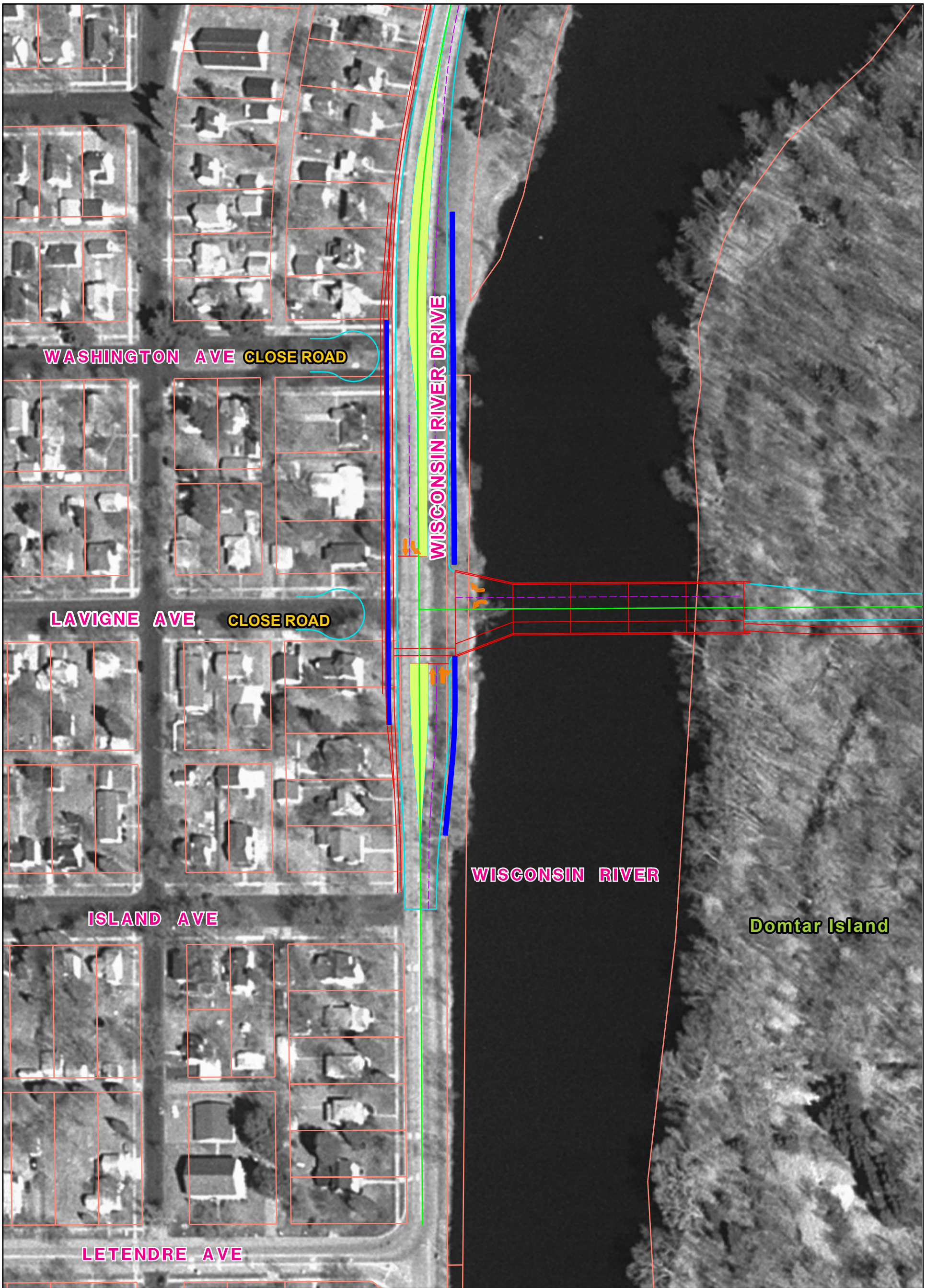
North

LEGEND

X Residential Relocation

EXHIBIT 3-8
Lavigne Avenue Intersection
Concept No. 1
Realign Wisconsin River Drive

TB052008006MKE 3.8_Lavigne_Alternative_no1_4 08.25.08 cae



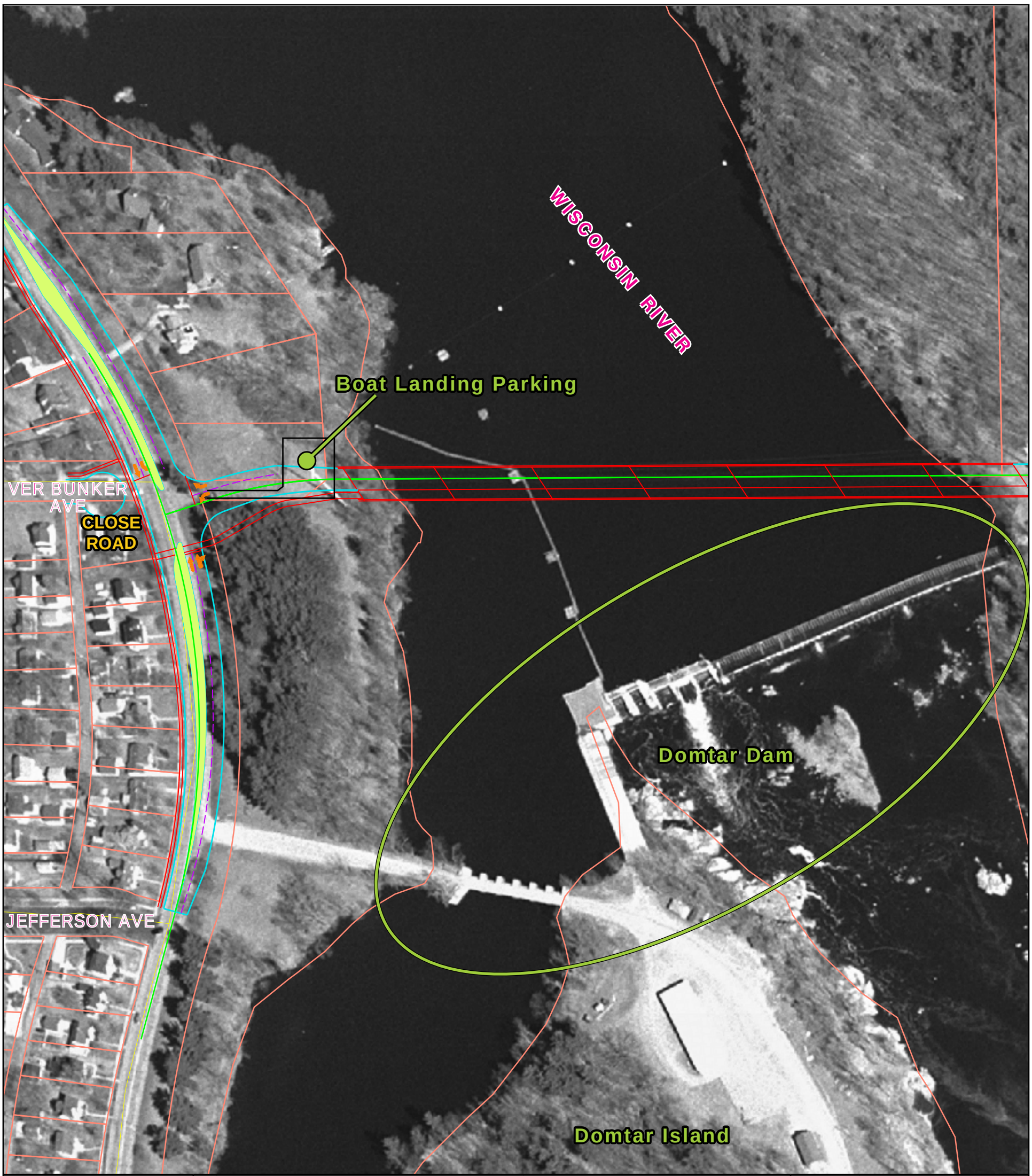
North

LEGEND

Retaining Walls

EXHIBIT 3-9
Lavigne Avenue Intersection
Concept No. 2
Hold Existing Wisconsin River Drive

TB052008006MKE 3.9_Lavigne_Alternative_no2_4 10.30.08 cae



North

EXHIBIT 3-10
Ver Bunker Avenue Intersection
Concept #1

TB052008006MKE 3.10_Ver_Bunker_Alternative_no1_4 09.19.08 cae/sls

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Section 4
Affected Environment, Environmental Consequences, and Measures to Minimize Harm

Exhibits

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SECTION 4

Affected Environment, Environmental Consequences, and Measures to Minimize Harm

This section describes the socioeconomic and natural resources in the project area. It also identifies the effects the proposed Wisconsin Rapids East Arterial may have on those resources and conceptual measures to minimize adverse effects. The discussion of existing conditions/characteristics and impacts is arranged by the topics listed below. The impacts of the No-Build and Build alternatives discussed in Section 3 are addressed within the applicable topics.

- Geographical Setting
- Socioeconomic Characteristics
- Land Use Planning /Land Use
- Utilities
- Surface Water Resources
- Wetlands
- Floodplains
- Upland Plant Communities
- Wildlife Resources
- Threatened and Endangered Species
- Regulated Materials
- Cultural Resources
- Recreational Resources/Public Use Land

This section analyzes the direct impacts of the No-Build and Build Alternatives. *Direct impacts* are caused by the action and occur at the same time and place (40 *Code of Federal Regulations [CFR]* 1508.8). That is, direct impacts will be those caused by construction of the proposed East Arterial improvements, and they will occur within the proposed right-of-way. It should be noted that the direct impacts reported in this section were calculated without having evaluated the vertical geometry along the project corridor. While much of the corridor is relatively flat, not having vertical information means that the impacts in this document likely will be less than impacts developed during a future NEPA phase. This is particularly true in the area between County Z and the east channel of the Wisconsin River. Exhibit 4-1 summarizes the East Arterial's potential direct impacts.

The Land Use Planning/Land Use subsection also considers the East Arterial's potential to create "highway induced" land use changes (an indirect impact) within the general project area. *Indirect impacts* "are caused by an action and are later in time or further removed in distance but are still reasonably foreseeable" (40 *CFR* 1508.8). They may include growth-inducing effects related to changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems. Indirect impacts associated with highway improvements affect the natural or built environment beyond the immediate "footprint" of the improvements. For example: the loss of agricultural land at an interchange to service stations, restaurants, and motels following construction.

Cumulative effects, defined as "impacts on the environment, which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions." (40 *CFR* 1508.7) are not analyzed as part of this feasibility study. Detailed indirect and cumulative effects analysis will be completed in a future NEPA phase.

4.1 Geographical Setting

The project area is within southeast Wood County and covers parts of the south and east sides of the City of Wisconsin Rapids, the west side of the Town of Grand Rapids, and the east side of the Village of Port Edwards. As noted, the study area includes two distinct yet interrelated corridors. The connection between WIS 54 in Port Edwards and the WIS 54/County W intersection in Wisconsin Rapids is WIS 54-73/Wisconsin River Drive/2nd Avenue and Riverview Expressway. The corridor also contains the segment of WIS 13 (8th Street) between WIS 13-54/Riverview Expressway and County Z, which also provides a connection to WIS 54. The 4-mile corridor for the proposed East Arterial begins in Port Edwards at the intersection of WIS 54/73 and Wisconsin River Drive and extends east across the Wisconsin River along Wood County Highway Z (Griffith Avenue). The alignment crosses 8th Street and continues to 12th Street where it leaves the existing alignment and runs northeasterly, crossing 16th Street and running along 20th Street to the WIS 54 and County W intersection.

The study area lies near the border of the Northern Highland and Central Plain geographical provinces of Wisconsin (Martin 1965). The Northern Highland stands on Precambrian bedrock and much of it was glaciated during the Pleistocene era. The Central Plain is formed on Cambrian age sandstone, portions of which were glaciated. Unglaciated areas occur in the central Wisconsin River Valley, which was occupied by Glacial Lake Wisconsin until about 14,000 years ago. The project lies at the upper end of ancient Glacial Lake Wisconsin. The area was not directly covered by glacial ice but carried meltwater deposits into the lake basin. Wisconsin Rapids is a distinct landmark along the Wisconsin River, where some of the last exposures of Precambrian bedrock occur at the surface of the Wisconsin River.

The soils in the area reflect the geological origins. Domtar Island is formed on exposures of Precambrian bedrock with an irregular cap of Meehan and Plainfield sand loam supporting the woods. The eastern shoreline of the Wisconsin River rises on a high sand and gravel outwash deposit that is also dominated by Plainfield and Meehan sandy loam. Parts of the terrace top are eroded from ancient meltwater floods, and low, poorly drained channels are evident on the wooded surface. To the east and north, Wisconsin Rapids is constructed on a series of sand and gravel terraces, with relatively level surfaces.

4.2 Socioeconomic Characteristics

4.2.1 Population

Between 1990 and 2000, Wood County and the three project-area communities in the project area gained population. According to the U.S. Bureau of the Census, all four units of government were estimated to have lost population between 2000 and 2007 (Table 4-1). Based on population estimates, Wisconsin Rapids, Grand Rapids and Port Edwards accounted for about 37 percent of Wood County's 2006 population. 1n 1970, the three communities accounted for roughly 40 percent of the total population of Wood County.

Table 4-2 summarizes projected populations within the study area through 2025. Population is forecast to increase in Wood County and Grand Rapids and to decline in Wisconsin Rapids and Port Edwards. In 2025, the three communities in the study area are expected to make up nearly 37 percent of the total population in Wood County, the same percentage as in 2006.

TABLE 4-1
Area Population Trends

	1990	2000	2006	% Population Change 1990–00	% Population Change 2000–06[a]
Wood County	73,605	75,555	73,944	2.6	-2.1
City of Wisconsin Rapids	18,245	18,435	17,739	1.0	-3.7
Town of Grand Rapids	7,071	7,801	7,747	10.3	-0.7
Village of Port Edwards	1,848	1,944	1,836	5.2	-5.6

Source: U.S. Bureau of the Census, Census of Population and Housing 1990, 2000; U.S. Bureau of the Census, Population Estimates 2006, 2007.
[a]The population projection for Wood County is for 2007.

TABLE 4-2
Study Area Projected Population (2000–2025)

	2000 Population	2005 Projection	2010 Projection	2015 Projection	2020 Projection	2025 Projection	% Change 2000–2025
Wood County	75,555	76,420	77,455	78,393	79,072	79,026	4.6
Wisconsin Rapids	18,435	18,361	18,280	18,173	18,013	17,688	-4.0
Grand Rapids	7,801	8,151	8,521	8,880	9,208	9,448	21.1
Port Edwards	1,944	1,941	1,943	1,942	1,935	1,910	-1.7
State of Wisconsin	5,363,715	5,563,896	5,751,470	5,931,386	6,110,878	6,274,867	17.0

Source: Wisconsin Department of Administration, Demographic Services Center. January 2004. http://www.doa.state.wi.us/docs_view2.asp?docid=2023.

4.2.2 Households

The number of households increased and the average household size decreased in Wood County, Wisconsin Rapids, and Grand Rapids between 1990 and 2000 (Table 4-3). This mirrors the statewide trend. In Port Edwards, the number of households increased, but the average household size remained consistent.

TABLE 4-3
Area Household Trends

	Number of Households			Average Household Size		
	1990	2000	% Change	1990	2000	% Change
Wood County	27,473	30,135	9.7	2.65	2.47	-0.18
City of Wisconsin Rapids	7,549	7,970	5.6	2.38	2.26	-0.12
Town of Grand Rapids	2,348	2,788	18.7	3.01	2.79	-0.22
Village of Port Edwards	660	706	7.0	2.58	2.58	0

Source: U.S. Bureau of the Census, Census of Population and Housing 1990, 2000

4.2.3 Housing

Table 4-4 provides data on housing characteristics in the study area. Roughly 38 percent of the housing units available in Wood County are found in Wisconsin Rapids, Grand Rapids, and Port Edwards. In 2000, the occupancy rate in the three project-area communities was 95 to 98 percent. Grand Rapids has the newest housing stock in the project area and the highest rate of homeownership. The 2000 median value of owner-occupied housing units was $68,700 in Wisconsin Rapids, $83,500 in Port Edwards, and $108,800 in Grand Rapids. The median value for Wood County was $81,400.

TABLE 4-4
Housing Characteristics: 2000

Unit of Government	Housing Units	Homeownership Rate	% of Homes Built Before 1960
Wood County	30,135	74.3	40
City of Wisconsin Rapids	7,970	64.4	50
Town of Grand Rapids	2,788	93.5	18
Village of Port Edwards	706	84.8	62

Source: U.S. Bureau of the Census. 2000 Census.

4.2.4 Age Distribution

In 2000, 26 percent of the population of the three communities in the study area was under the age of 18; 58 percent between the ages of 18 and 64; and 16 percent over the age of 65. These figures are very similar to those for Wood County as a whole, where 26 percent of the population was under the age of 18; 59 percent between the ages of 18 and 64; and 15 percent over the age of 65 (Table 4-5). The median age in Wood County and the project-area communities is higher than the statewide median age.

TABLE 4-5
Population Characteristics: 2000

	Wood County	Wisconsin Rapids	Grand Rapids	Port Edwards	Wisconsin
Population	75,555	18,435	7,801	1,944	5,363,675
Under 18	19,385	4,559	2,229	519	1,368,756
18 to 64	44,574	10,300	4,906	1,000	3,292,366
65 and older	11,596	3,576	666	425	702,553
Median Age	38.0	37.6	38.4	40.1	36.0

Source: U.S. Bureau of the Census. 2000 Census.

4.2.5 Racial and Ethnic Characteristics

In Wisconsin Rapids, Grand Rapids, and Port Edwards, 94 percent or more residents are white (Table 4-6). This percentage is comparable to white residents countywide, but notably higher than the state's percentage (88.9 percent). The percentage of Asians in Wisconsin Rapids and Port Edwards is more than double the statewide percentage. The percentage of

TABLE 4-6
Population by Race: 2000

	Wood County		Wisconsin Rapids		Grand Rapids		Port Edwards		Wisconsin	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Total Population	**75,555**	**—**	**18,435**	**—**	**7,801**	**—**	**1,944**	**—**	**5,363,675**	**—**
One race	75,034	99.3	18,257	99.0	7,763	99.5	1,924	99.0	5,296,780	98.8
White	72,855	96.4	17,337	94.0	7,630	97.8	1,814	93.3	4,769,857	88.9
Black or African American	201	0.3	63	0.3	19	0.2	11	0.6	304,460	5.7
American Indian/ Alaska Native	528	0.7	148	0.8	40	0.5	21	1.1	47,228	0.9
Asian	1,220	1.6	638	3.5	60	0.8	75	3.9	88,763	1.7
Native Hawaiian/ Pacific Islander	7	0.1	3	0.1	3	0.1	0	0.0	1,630	0.1
Other	223	0.3	68	0.4	11	0.1	3	0.2	84,842	1.6
Two or More Races	521	0.7	178	1.0	38	0.5	20	1.0	66,895	1.2
Hispanic or Latino (of any race)*	709	0.9	242	1.3	63	0.8	18	0.9	192,921	3.6

Source: U.S. Bureau of the Census. 2000 Census.

[a] Hispanics may be of any race, so also are included in applicable race categories.

African Americans and Hispanics in the three communities is similar to Wood County's percentage but well below the statewide percentage.

4.2.6 Income Characteristics

Table 4-7 summarizes the median family income in the study area. The median family income in Grand Rapids and Port Edwards exceed the state and county figures. The percentage of families living below the poverty level in Wisconsin Rapids and Port Edwards is higher than the county percentage. Grand Rapids has a lower percentage of families below the poverty level than Wood County and the state. The 2000 Census poverty level for a family of four is $17,029. The 2008 Health and Human Services Poverty Guidelines for a family of four is $21,200.

TABLE 4-7
Income Characteristics by Township and Community

	Median Family Income	% Families below Poverty Level
Wood County	$50,798	4.4
City of Wisconsin Rapids	$43,594	7.0
Town of Grand Rapids	$66,423	1.8
Village of Port Edwards	$54,801	5.5
State of Wisconsin	$52,911	5.6

Source: U.S. Bureau of the Census. 2000 Census.

4.3 Land Use Planning / Land Use

4.3.1 Affected Environment

4.3.1.1 Land Use Planning

Wood County, Port Edwards, Wisconsin Rapids, Grand Rapids, and the North Central Wisconsin Regional Planning Commission (NCWRPC) are the entities involved in land use and other planning within the study area. The NCWRPC, which serves Adams, Forest, Juneau, Langlade, Lincoln, Marathon, Oneida, Portage, Vilas, and Wood counties, provides land use planning, zoning assistance, economic development strategies, Community Development Block Grant program assistance, environmental planning, mapping and GIS, transportation plans, and other specialized studies for member units of government. Although the NCWRPC is helping Wisconsin Rapids develop a comprehensive plan, its planning role generally is limited to economic development and transportation planning studies, such as the *2005 South Wood County Area Transportation Study* (2003). Wood County provides a range of planning services for Wood County communities, with a focus on serving smaller towns and villages that do not have planning staff. It currently is helping Grand Rapids to develop a comprehensive plan. Port Edwards and Grand Rapids do not have planning staff and would rely on Wood County for assistance on planning matters. Wisconsin Rapids, which has a planner, is a member of the NCWRPC and would seek NCWRPC's assistance on an as needed basis.

Wood County, Wisconsin Rapids, and Grand Rapids are developing comprehensive plans that will provide a land use vision for their communities, among other information. Because those documents are under development, their contents are not discussed in this report. Local planning documents applicable to the project area are summarized below.

North Central Wisconsin Regional Planning Commission Regional Comprehensive Plan: "A Framework for the Future" 2000–2020 (2003). The NCWRPC, created by state statute in 1973, is the official planning agency for the north central Wisconsin region, which includes Adams, Forest, Juneau, Langlade, Lincoln, Marathon, Oneida, Portage, Vilas and Wood Counties. The NCWRPC is governed by three commissioners from each county it represents.

The regional comprehensive plan adopted in 2003 by NCWRPC is an update of the original 1981 regional plan entitled *A Framework for Regional Development*. Specific elements that the 2003 plan covers includes: Natural, Agricultural and Cultural Resources; Housing; Transportation; Utilities and Community Facilities; Economic Development; Land Use; and, Intergovernmental Cooperation. There are numerous goals and objectives for each element of the regional comprehensive plan. Among the transportation goals and objectives is to plan for the extension of County highways and other major arterial streets as necessary to complete connections, provide for appropriate routes for trucks and emergency vehicles, and serve planned development areas. Another goal states that transportation planning and project development should protect and enhance the environment, promote energy conservation and improve quality of life.

There is little specific mention of the project area in the regional comprehensive plan. The plan notes that WIS 13 (8th Street) through Wisconsin Rapids is a truck route. The plan also shows that, assuming no capacity expansion, in the year 2020, WIS 54 and WIS 13 in the Wisconsin Rapids area would suffer from extreme congestion. A macro-level future land use map is

provided and shows that the East Arterial project area is located in an "existing developed area" and an "urban growth area." The urban growth area adjoins a developed area where there is existing infrastructure and service capacity or where it is more efficient to expand those services.

Wood County Land and Water Resource Management Plan (2007). This plan, which is an update of the 2000 Wood County Land and Water Resource Management Plan, provides direction for the protection and improvement of natural resources in Wood County. The purpose of the plan is to identify and prioritize the major natural resource issues and concerns for Wood County and to develop a coordinated effort to resolve these issues and concerns. The plan looks to develop strategies, goals, objectives, and outcomes for the period 2007 to 2011 while servicing funding for the management of the natural resource base in Wood County. Regarding the East Arterial study area, the plan mentions that a 1-mile stretch of the Wisconsin River near Port Edwards is listed as an impaired water under section 303(d) of the federal Clean Water Act. Impaired waters are those that do not meet federal water quality standards.

2025 South Wood County Area Transportation Study (2003). The purpose of this study, prepared by the NCWRPC in cooperation with WisDOT and 10 communities in south Wood County, was to prepare a long-range transportation plan to guide local governments in making transportation decisions through 2025. A travel demand model developed by WisDOT was used to simulate traffic for the 1999 base year condition, projected 2025 conditions assuming no change in the study area road network, and scenarios including double the number of casino trips, a new east side arterial, a new Port Edwards bridge and a combined east side arterial and new bridge. The travel demand model identified roadways in the study area that were either "approaching congestion" (average annual daily traffic at 75 to 100 percent of "capacity") or "congested" (average annual daily traffic at more than 100 percent of "capacity"). After comparing the 2025 projected traffic volumes from the four development scenarios to the 1999 base traffic volumes and the 2025 No-Build Alternative volumes, study area communities selected a new east side arterial (a new 2-lane expressway between WIS 54 and County Z) and a new Port Edwards bridge (over the Wisconsin River) as the preferred strategy to address forecasted transportation capacity deficiencies in the study area.

Wood County Parks, Recreation and Open Space Plan (2001). The plan focuses on the role Wood County is expected to play in meeting demand for outdoor recreation areas and facilities. The outdoor recreation facilities provided by the cities, villages, and towns in Wood County are also reviewed. The plan makes recommendations for the use, acquisition, and development of outdoor facilities in Wood County. Demand for more and better outdoor recreation facilities will continue to grow along with the County's population.

The Plan notes that the Wood County Park & Forestry Department developed a 1.7-mile hiking/cross-country skiing trail in Nepco Lake Park. Trail expansion is being considered in Nepco Lake Park, both on County-owned land and adjacent parcels that could be leased from private ownership. The Plan also notes that most of the facilities at NEPCO Lake Park are handicapped accessible, including the double boat landing. A paved fishing area for the handicapped is also located at the park. A 2000 survey showed that the public was interested in expanding the land area of Nepco Lake Park.

Wood County Bicycle and Pedestrian Plan (1995). The plan is intended to guide the development of bicycle and pedestrian facilities and policies in Wood County within the framework of the County's overall transportation system. The plan looks to increase mobility of the County's residents by making bicycling and walking viable transportation options. In the rural parts of the County the plan looked to connect natural and cultural resources and connect communities. In urban areas, the plan developed corridors to connect people to employment centers, institutional uses and commercial areas. This plan builds upon the recommendations of the *Bicycle Facilities Plan, Wood County Wisconsin* (1980).

The plan notes that informal user surveys pointed out the need for better bicycle and pedestrian accommodations along 8th Street in Wisconsin Rapids. Most bicycle and pedestrian accidents in Wisconsin Rapids occur along 8th Street, and some have proven to be fatal. Airport Avenue and County Z were listed as corridors often used by cyclists. The plan calls for a proposed bicycle path along 8th Street, north to Airport Avenue, and proposes wide curb lanes along Airport Avenue east of 8th Street. To improve pedestrian safety along 8th Street, the plan calls for, among other improvements, limited vehicular access to businesses along 8th Street by requiring shared entries and parking lots and by providing strong pedestrian oriented corridors along streets perpendicular to 8th Street.

Wood County Parks and Forestry 15-Year Plan. The goal of the land use plan is to manage, conserve, and protect the natural resources of the Wood County Parks. The County Forest resources should be protected from natural catastrophes, managed for environmental needs, and managed and provide for sociological needs. The plan establishes objectives, policies, procedures, rules and regulations, and promotes an efficient and orderly program of development and management of the County Forest.

Wisconsin Rapids Area Water Quality Management Plan (1985). The plan focuses on water pollution problems, causes, and solutions in the Wisconsin Rapids urban area. The goals of the plan are to preserve the quality of the urban area's groundwater and surface water, to preserve the area's prime agricultural lands, and to coordinate facility planning efforts to provide for a cost-effective, long-range regional system. The plan also outlines where future sewer service areas should be located.

4.3.1.2 Existing Land Use

Land use in the East Arterial study area is a mix of single-family residential development, institutional uses, open space, and commercial development. From County W (north terminus) to west of the 8th Street/County Z intersection, development is primarily low-density, single-family residential with the Lincoln High School campus between Grove Avenue and County W, large undeveloped parcels owned by Wisconsin Rapids (wellhead protection area), and Nepco Lake Park. There is a small area of commercial development at the 8th Street/County Z intersection. Commercial development is the primary land use along 8th Street between the Riverview Expressway and County Z. The DNR's Service Center and Griffith Nursery are located west of the intersection, and between Sampson Street and Rangeline Road there is wooded open space and the south edge of the South Wood County Airport (Alexander Field). West of Rangeline Road is the Wisconsin River, and on its west side residential development in Port Edwards. Exhibit 4-2 shows existing land uses in the project area.

Residential, commercial, and institutional development within the study area is described below.

4.3.1.3 Residential Development

Most of the residential development adjacent to the East Arterial is located between County W and 8th Street and along the Wisconsin River in Port Edwards. Beginning on the east side of the study area, there is residential development along both sides of the 20th Street corridor between Grove Avenue and Two Mile Road (East Arterial aerial exhibit, sheet 1). Woodmere Estates, on 21st Place between Grove Avenue and Airport Avenue, is a developing subdivision in this area. South of Two Mile Avenue, there is residential development adjacent to the Ridges Golf Course on the east side of 20th Street (Ridges Estates), as well as a subdivision along Whip Or Will Lane between 20th and 16th streets. Rosewood Estates, a developing subdivision on the west side of 16th Street and The Gardens at Whitrock, a condominium development, are also located near the East Arterial (East Arterial aerial exhibit, sheet 2).There are residences along both sides of County Z between 12th and 9th streets. South of County Z, near, but not immediately adjacent to the proposed East Arterial, is a subdivision along Lakewood Lane. The Maple Manor Mobile Home Park, located on the north side of County Z between Lincoln and 8th streets, is the last notable block of residential development along the proposed East Arterial east of the Wisconsin River (East Arterial aerial exhibit, sheet 2). In Port Edwards, there is residential development along the west side of Wisconsin River Drive between Letendre Avenue and Ver Bunker Avenue (East Arterial aerial exhibit, sheet 3).

4.3.1.4 Commercial Development

The center of commercial development in the project area is the 8th Street corridor between Riverview Expressway and County Z. The 2-mile commercial strip includes a shopping center with a Shopko and Copps grocery store, strip malls, big box development, and numerous individual businesses. The Maples Motel is located in the northwestern quadrant of the intersection of 8th Street/County Z with the East Arterial. The Sportsman Pub and Grill is located in the southwestern quadrant, a commercial facility with a chiropractic office and other uses is in the northeastern quadrant, and a Tractor Supply Company store in the southeastern quadrant.

In Port Edwards, commercial development is concentrated along Market Street, south of Letendre Avenue (WIS 54).

4.3.1.5 Institutional Development

In addition to the larger institutional uses described below, the United Methodist Church of Port Edwards is located on the southwestern corner of the intersection of WIS 54 (Letendre Avenue) and Wisconsin River Drive.

City of Wisconsin Rapids Compost Site. The east side compost dropoff site is located immediately south of the WIS 54/County W intersection, east of Lincoln High School. The site accepts materials such as grass clippings, leaves, brush, and garden waste. It is open from noon until 7:00 P.M. on Mondays and Wednesdays from April to September, and 10:00 A.M. to 5:00 P.M. on Mondays and Wednesdays from October to November and on Saturdays from 10:00 A.M. to 5:00 P.M. from April to November.

Lincoln High School Complex. This 80-acre parcel is located between County W and Grove Avenue, west of the 20th Street corridor. It includes Lincoln High School and the Performing Arts Center of Wisconsin Rapids, an 833-seat theater that opened in 2000. The high school's

sports facilities include a fieldhouse, six tennis courts, two softball fields, a baseball field, and a football/track stadium. The South Wood County Recreation Center is located at the south end of the high school complex. The recreation center, which is used for hockey, figure skating, curling, and ice skating, is leased from the school district by a private operator.

Wisconsin DNR Service Center and Griffith State Forestry Nursery. The DNR's Service Center is located on the north side of County Z immediately west of Lincoln Avenue. The center provides office space for DNR staff and provides various services to local residents such as the sale of hunting and fishing licenses. The DNR estimates that the average number of daily service center visitors is between 35 and 40. The DNR's forest fire control staff is also located at the Service Center.

The DNR's Griffith State Forestry Nursery is a 102-acre facility located on the south side of County Z opposite the Service Center. The facility, one of three DNR-operated nurseries in the state, was established in 1932 "to insure a consistent supply of high quality seedlings, of desirable forest species, at an economical price, to encourage reforestation in Wisconsin." The three state nurseries produce between 18 and 25 million seedlings annually for reforestation projects on state, county, industrial, and private lands. The Griffith State Nursery also serves as the clearinghouse for seedling orders for all three state nurseries. Roughly 60 acres of the 102-acre site are used for seedling production. More information about the nursery is found under Section 4.13 Cultural Resources.

South Wood County Airport (Alexander Field). North of the County Z/Rangeline Road intersection is the South Wood County Airport, also known as Alexander Field. The airport began in the late 1930s as the Tri-City Airport when the U.S. Army Air Forces used it as a training site. A few hangars and buildings were constructed to house operations and training planes. On May 6, 1945, a prisoner-of-war camp was created at the airport for 100 to 200 German soldiers. The camp was disbanded in December 1945. Sometime in the late 1950s or early 1960s, Tri-City Airport was renamed Alexander Field and used as a municipally owned airport (Kooiman and Swanson, 2004). The Alexander Foundation, which provided some of the land for the airport, has prohibited the sale of any airport property and would take control of the property if the airport ceased operation.

Alexander Field consists of two asphalt runways with the northeast/southwest (primary) runway being 5,500 feet long and the northwest/southeast (secondary or crosswind) runway 3,640 feet long. There is also a 2,100-foot north/south turf runway. There are nine taxiways at the airport. Sixty-nine aircraft are based at the airport, using 36 hangars. Sixteen thousand (16,000) takeoffs and landings occur at the airport each year. The types of planes using the airport include single engine, twin engine, turbo prop, and jet airplanes. According to the airport manager, small corporate planes are the most popular users of the airport. Wings Air Charter, LLC, a fixed base operator provides fuel services and other services.

A feasibility study is planned to begin in 2009 or 2010 to evaluate the need for a 500-foot extension of the airport's primary runway. The airport is seeking the extension in order to serve larger planes.

4.3.1.6 Future Land Use

With Port Edwards, Wisconsin Rapids, and Grand Rapids in the process of developing future land use plans, no future land use plans are currently available for the study area.

4.3.2 Environmental Consequences

The No-Build Alternative would not affect land use planning efforts in the project area or land uses. The potential impacts of the Build Alternative on land use planning and land use are described below.

4.3.2.1 Land Use Planning (Future Land Use)

The East Arterial has the potential to affect and to be affected by land uses. While WisDOT supports land use planning in the project area, the authority for such control rests with local units of government. WisDOT's authority is limited to that which occurs within the highway right-of-way.

Based on discussions with planning representatives in the project area, the Build Alternative (the East Arterial) would not be in conflict with future land use plans that are being developed by project area communities. Grand Rapids indicated that the proposed East Arterial would serve planned development identified in their Comprehensive Land Use Plan, and it is a high priority for economic growth. As noted, Wisconsin Rapids has included part of the East Arterial on its official street map since the mid-1990s.

4.3.2.2 Future Land Use (Secondary Development Potential)

The secondary development potential of the East Arterial and other transportation projects is affected by the extent of land use planning (land use controls) adjacent to and beyond the project area and the amount of access permitted to the transportation improvement. The absence of land use planning (and zoning) adjacent to a proposed highway improvement and ready access to that improvement would tend to increase a project's secondary development potential, whereas the opposite would be true in an area that has land use and access control in place.

The comprehensive plans being developed by project-area communities as well as other land use controls such as the zoning, subdivision, building, and construction codes that regulate development in the project area would all tend to limit the secondary development potential of the proposed East Arterial. Access to the proposed East Arterial will also limit the project's secondary development potential. Currently, access to the East Arterial will be allowed only at local road connections. The section of WIS 54 (Plover Road) north of the proposed East Arterial is proof that access controlled roadways limit secondary development. Access to Plover Road is limited to local road intersections. In the 9 years since Plover Road has been open, the development along this corridor has been in keeping with the city's land use plan.

It seems unlikely that reasonably foreseeable development attributable to the proposed East Arterial would occur beyond the development being planned by Grand Rapids, Wisconsin Rapids, and Port Edwards. Growth in the 16th/20th Street corridor is evidence that development is not dependent on the construction of the East Arterial. That said, the East Arterial could be a catalyst for redevelopment in Port Edwards, particularly redevelopment of the Domtar paper mill property, which closed in summer 2008. Enhanced access to the west side of the river and WIS 54 provided by the East Arterial could enhance the attractiveness of the Domtar property. While redevelopment of an industrial site would not create impacts in the same manner as "new" development beyond a transportation project's footprint, it is a beneficial impact worthy of note. In addition, the East Arterial could influence the timing of

development in Port Edwards east of the Wisconsin River. The large tracts of undeveloped land in that area, until recently, have been owned by paper companies and Plum Creek, a business actively managing timberland. With the relatively recent sale of Plum Creek's holdings to local developers, the East Arterial could accelerate the timing of development in this area, although it is unlikely that it would cause a change in the type or intensity of development envisioned by Port Edwards. It should be noted, that because of the long-term nature of the East Arterial proposal, it is not at all a given that the new bridge and roadway will precede development of the former Plum Creek properties.

Finally, if, as expected, the land use plans being developed by Grand Rapids, Wisconsin Rapids, and Port Edwards call for both the future development of undeveloped land within the project area adjacent to the proposed East Arterial and the East Arterial, then it would not be accurate to attribute future development to the East Arterial. The proposed East Arterial would have to be viewed, like other facilities and services noted in the communities' comprehensive plans, as serving planned development, not driving it.

4.3.2.3 Residential Impacts

The No-Build Alternative would not affect residences. The Build Alternative would affect up to 34 residences. The potential displacements are shown on the aerial exhibits at the back of this document. Table 4-8 lists the potential residential displacements by alternative.

There is no Section 8 housing or other public subsidized housing affected by any of the Build Alternatives. The combination of alternatives with the greatest relocation potential would displace 21 single family residences and 13 mobile homes. Assuming an average household size of 2.47 persons in Wood County, the East Arterial could displace up to 84 people.

4.3.2.4 Commercial Impacts

The No-Build Alternative would not acquire new right-of-way from commercial properties, however, it may have consequences for businesses on 8th Street. The City of Wisconsin Rapids indicated that it receives calls from older drivers complaining about safety along 8th Street while entering and exiting businesses. As traffic volumes increase on 8th Street, the crash problem described in Section 2 would be expected to worsen. As a result, it would be reasonable to expect that an increasing number of drivers of all ages may avoid 8th Street thereby adversely affecting local businesses. The Build Alternative along the East Arterial would affect up to three businesses. The potential business displacements are shown on the aerial exhibit at the back of this document. Table 4-9 lists the potential business displacements by alternative.

Improvements along 8th Street between Riverview Expressway and County Z consist of replacing the center TWLTL with a raised median. Alternative 1 would replace the TWLTL with a raised median of exactly the same width (16 to 18 feet). As a result, Alternative 1 would not acquire new right-of-way from any businesses along 8th Street. The proposed raised median would convert all driveways along 8th Street and the unsignalized intersections at Taylor Avenue, Wood Avenue, Goodnow Avenue, Huntington Avenue, Clyde Avenue, Grove Avenue, Sweat Avenue, Township Avenue, Cook Avenue, Whitrock Avenue, Dove Avenue, and Peterson Avenue to right-in/right-out movements.

TABLE 4-8
Residential Displacements

Location	Displacements	Community
County W to Kuhn Avenue Alternatives		
Alternative #1	3 single-family residence	2–Town of Grand Rapids 1–City of Wisconsin Rapids
Alternative #2	3 single-family residence	3–Town of Grand Rapids
Kuhn Avenue to Nepco Lake Road Alternatives		
Alternative #1	9 single-family residence, 13 mobile homes	9–single family (Grand Rapids) 13–mobile homes (Wisconsin Rapids)
Alternative #2	9 single-family residence, 2 mobile homes	9–single family (Grand Rapids) 2–mobile homes (Wisconsin Rapids)
Wisconsin River Crossing Alternatives		
Ver Bunker Intersection	None	
Lavigne Intersection #1	9 single-family residences	9–Village of Port Edwards
Lavigne Intersection #2	None	
Letendre Intersection #1	5 single-family residences	5–Village of Port Edwards
Letendre Intersection #2	5 single-family residences	5–Village of Port Edwards
Letendre Intersection #3	5 single-family residences	5–Village of Port Edwards
8th Street Improvements	4 single-family residences	4–Wisconsin Rapids

TABLE 4-9
Commercial Displacements

Location	Displacements	Community
County W to Kuhn Avenue Alternatives		
Alternative #1	None	—
Alternative #2	None	—
Kuhn Avenue to Nepco Lake Road Alternatives		
Alternative #1	Maples Motel, Sportsman's Pub and Grill, Chiropractic office	3–Wisconsin Rapids
Alternative #2	Sportsman's Pub and Gill	1–Wisconsin Rapids
Wisconsin River Crossing Alternatives		
Ver Bunker Intersection	None	—
Lavigne Intersection #1	None	—
Lavigne Intersection #2	None	—
Letendre Intersection #1	None	—
Letendre Intersection #2	None	—
Letendre Intersection #3	None	—
8th Street Improvements (Alternative 2 – 30-foot-wide median)	Exxon Rapids Tiger Mart, 1st Choice Automotive Services, Check and Cash, Bob Gleason Insurance Service, Bowlmore Lanes, Hut's Laser Wash, American Family Insurance, Terry Wolfe Realty, Fehrenbach-Mogg Insurance Agency	9–Wisconsin Rapids

Because the proposed median would be too narrow to allow U-turns there would be a notable increase in out-of-distance travel as left turning traffic in both directions would be required to make their way to signalized intersections. There would also be an increase of traffic on local roads adjacent to 8th Street as vehicles made their way to streets with signalized intersections. It is beyond the scope of this document to anticipate the full impacts of the out-of-distance travel on businesses, but it would be reasonable to expect there would be some decline in business as shoppers seek similar services at locations with more convenient access.

Alternative 2 would replace the TWLTL with a 30-foot-wide raised median that would accommodate mid-block U-turns. While this alternative would convert all driveways along 8th Street and the unsignalized intersections listed above to right-in/right-out movements, the ability to make mid-block U-turns would substantially reduce the out-of-direction travel associated with Alternative 1. However, the 12 to 14 feet of new right-of-way required with Alternative 2 would result in up to nine business displacements and loss of parking for roughly 44 businesses and 11 strip malls. Table 4-10 lists the location of potential loss of parking locations. The potential commercial displacements and parking impacts associated with Alternative 2 are shown on the 8th Street aerial exhibits at the back of the document. This alternative's impacts are conservative because the new right-of-way was taken in equal amounts from both sides of 8th Street. In the next phase of work, an alignment would be selected along 8th Street that minimized overall impacts by shifting the alignment between the east and west sides of the road.

TABLE 4-10
Commercial Parking Loss along 8th Street

Location	Parking loss
Riverview Expressway to Pepper Avenue	
East side of 8thStreet	9 businesses, 3 strip malls
West side of 8th Street	9 businesses, 2 strip malls
Pepper Avenue to Airport Avenue	
East side of 8th Street	5 businesses, 3 strip malls
West side of 8th Street	5 businesses
Airport Avenue to Whitrock Avenue	
East side of 8th Street	7 businesses, 1 strip mall
West side of 8th Street	3 businesses, 1 strip mall
Whitrock Avenue to Peterson Avenue	
East side of 8th Street	7 businesses, 1 strip mall
West side of 8th Street	1 business

4.3.2.5 Institutional Impacts

City of Wisconsin Rapids Compost Site. The proposed East Arterial alignment would run through the compost site. The facility would need to be move east of its current location on property owned by Wisconsin Rapids.

Lincoln High School Complex. The proposed East Arterial would not acquire new right-of-way from the Lincoln High School complex, but it would locate a roadway where none exists today. In additional to the visual change, it would be expected that noise levels would increase at the baseball and softball fields and tennis courts, the closest recreational uses to the proposed East Arterial.

Wisconsin DNR Service Center and Griffith State Forestry Nursery. One alternative in the Kuhn Avenue to Nepco Lake Road segment of the East Arterial would affect DNR property. Alternative 1 maintains the south right-of-way along County Z west of 8th Street avoiding the nursery. The alternative also would avoid right-of way acquisition from the Service

Center property on the north side of the road. Alternative 2 maintains the right-of-way on the north side of County Z, avoiding the Service Center property, but the alignment would affect about 1 acre of the nursery. The area of the nursery that would be affected is an irrigated seedling production area. According to the DNR, the impacts to irrigated nursery fields would result in the loss of seedling production, which would not be easily replaced on the property. Under this alternative, the nursery fence would be relocated, internal roads be rerouted, and changes made to the irrigation system.

In a letter dated April 9, 2008, DNR indicated that it would prefer that the proposed East Arterial not affect the nursery and requested WisDOT to work with DNR property managers to minimize impact to its property. The letter also expressed concern regarding increased traffic volumes and speed at the entrances of both DNR properties, public access to the nursery and service center both during and after construction, and emergency vehicles exiting the service center property (Appendix A).

South Wood County Airport (Alexander Field). Neither Alternative 1 nor Alternative 2 in the Kuhn Avenue to Nepco Lake Road segment would require property from Alexander Field. Because of the elevation difference between the airport runways (roughly 1,015 feet) and County Z (roughly 979 feet), the proposed East Arterial improvements would not violate the Federal Aviation Administration's (FAA's) height restrictions. Exhibit 4-3 shows the FAA's height restrictions in the general area of the airport. If the primary runway is extended 500 feet to the southwest as is being contemplated to accommodate larger planes, the runway's safety area would extend over County Z and part of Rangeline Road. This would require the realignment of County Z to the south in an area constrained by Nepco Lake. Exhibit 4-4 shows the existing safety area and avigation easement. The Wisconsin River crossing alternatives could also affect or be affected by an expansion of the primary runway 500 feet to the southwest. WisDOT will coordinate with the Bureau of Aeronautics about the impacts of the potential runway expansion if the planned feasibility study determines that the runway expansion is warranted and the preferred direction of expansion is to the southwest.

United Methodist Church of Port Edwards. Of the Wisconsin River Crossing alternatives, Letendre Alternatives 1A and 1B (Intersection Concept 1) would displace the church. Intersection Concepts 2 and 3 would use retaining walls to avoid the church.

4.3.3 Avoidance, Minimization, and Mitigation

During the design of the preliminary alternatives, several measures were implemented to minimize impacts to commercial, residential and institutional properties. The segment of the East Arterial between County W and Kuhn Avenue was designed to limit residential displacements by using as much existing right-of-way and City of Wisconsin Rapids owned property as possible.

In the Kuhn Avenue to Nepco Lake Road segment, Alternative 2 was developed to minimize the residential and commercial impacts associated with Alternative 1. Alternative 2 would have 11 fewer residential displacements and 2 fewer commercial displacements than Alternative 1. Alternative 1 was developed to minimize impacts to DNR's nursery. To minimize potential impacts between County Z traffic and DNR's fire fighting equipment, the DNR suggested installing flashing warning lights at their Service Center entrance to alert traffic when emergency vehicles are leaving the Service Center.

At the west edge of the project area, the Ver Bunker Alternative 3 was developed to avoid the residential relocations associated with the Lavigne and Letendre alternatives. The Lavigne Intersection Concept 2 was developed to avoid the 9 displacements associated with Intersection Concept 1. At the Letendre Avenue crossing, Intersection Concepts 2 and 3 were developed to avoid the relocation of the United Methodist Church of Port Edwards (Intersection Concept 1).

4.3.3.1 Right-of-Way Acquisition Process

Acquisitions and relocations would be done in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Besides providing for payment of fair market value for acquired property, other benefits are available to eligible displaced persons including relocation advisory services, reimbursement of moving expenses, replacement housing and business payments, down payment and rental assistance for tenants, and business reestablishment expenses. Under state law, no person or business may be displaced unless a comparable replacement dwelling or business location is provided.

4.4 Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898 on Environmental Justice. The Order requires all federal agencies to address the effects of their programs with respect to environmental justice. It states that, to the extent practicable and permitted by law, neither minority nor low-income populations may suffer disproportionately high or adverse impacts as a result of a proposed project. It also requires that representatives from low-income or minority populations that could be affected by the project be provided the opportunity to be included in the impact assessment and public involvement process. If a project's potential impacts are found to be borne disproportionately by low-income and minority populations, an analysis must examine mitigation measures, offsetting benefits, and impacts of other system elements in accordance with FHWA Order 6640.23, Actions to Address Environmental Justice in Minority Populations and Low-income Populations (USDOT, FHWA 1998).

Up to 34 residential and 12 commercial relocations (including the 8th Street improvements) could be caused by the proposed East Arterial. In the three project-area communities where residential displacements will occur, the white population ranges from 93.3 to 97.8 percent, which is greater than the statewide average. The percentage of families below the poverty level in the three communities ranges from 1.8 percent in Grand Rapids to 7.0 percent in Wisconsin Rapids. Because census data are collected and reported for relatively large geographic areas, it is not possible to know the racial and economic characteristics of individual households displaced by the project. However, based on the demographic information for the affected communities, contacts with the public at the public information meetings, and discussions with community representatives on the project's Oversight Committee, the project team has concluded that the proposed action would not have the potential to exert high or disproportionate adverse impacts on minority or low-income populations. While some impacts may be borne by minority and low-income residents, the level of impact would not be disproportionately high and, therefore, would not be considered specifically as an environmental justice impact.

4.5 Utilities

The Wisconsin Rapids Water Works and Lighting Commission (WW&LC) provides water and electric service to parts of the Town of Grand Rapids (including Kellner), the Village of Biron, the Town of Plover, the Town of Seneca, the Town of Sigel, the Town of Grant, and the entire City of Wisconsin Rapids. In Grand Rapids, electric service is provided by Wisconsin Power and Light Company and residences have onsite wells and septic systems. Port Edwards provides water service for users west of the Wisconsin River. The residences in Port Edwards east of the river have their own wells and septic systems. Electric service in Port Edwards is provided by Alliant Energy. Natural gas in the study area is provided by We Energies. Telecommunications service in the project area is provided by Solarus and Charter Communications.

The text below focuses on the major utilities in the project area and the project's potential impacts on them.

4.5.1 Affected Environment

4.5.1.1 Water Tower, Wells, and Water Mains

A water tower in Wisconsin Rapids is roughly 875 feet east of the proposed East Arterial/ County W intersection. Two City collector wells are located near the project area. The radial collector wells pump groundwater to the City's water treatment plant on 16th Street, north of the project area. Collector well No. 1 is located on the east side of 16th Street about 450 feet south of Whitrock Avenue. Collector well No. 5 is located about 2,000 feet east of 20th Street on the south side of Two Mile Avenue. There are also 20-inch transmission water mains along Two Mile and Airport avenues.

4.5.1.2 Wisconsin Rapids Lift Station

A lift station is located on the east side of 20th Street near the Lovewood Drive intersection, about 500 feet north of Two Mile Avenue and just south of where 20th Street crosses Two Mile Creek. The lift station pumps sewage from the lower elevation east of 20th Street to the sewer system west of 20th Street for treatment at the City of Wisconsin Rapids Waste Water Treatment Plant, located west of the study area on Pepper Avenue.

4.5.1.3 Electric Transmission Towers

Electrical poles owned by Wisconsin Power and Light Company are located within the right-of-way on the north side of County Z. The lines cross the County Z/Rangeline Road intersection and continue west

Electrical poles and transmission towers along County Z and utility corridor west of Rangeline Road

along the utility corridor. Nine transmission towers are located along the utility corridor (east of the river), and two are located east of the Wisconsin Avenue/Ver Bunker intersection within the Domtar boat landing parking lot.

4.5.1.4 Domtar Dam

The Domtar Dam and associated facilities are located close to the Ver Bunker Avenue alterative. The facilities include the dam, reservoir, forebay channel, and powerhouse (outside the project area). The 1,215-foot dam includes a 525-foot-long uncontrolled overflow timber crib spillway surmounted by 3.3-foot-high flashboards, a 190-foot long gated spillway section, a 239-foot-long emergency timber crib spillway capped with concrete, a 184-foot-long timber crib guard lock section, and non-overflow abutment sections (Exhibit 4-5). The reservoir north of the dam has a surface area of 150 acres at the flashboard elevation of 963.3 feet. The forebay channel extends about 1 mile from the guard lock section of the dam to the powerhouse.

4.5.2 Environmental Consequences

The No-Build Alternative would not affect project area utilities. The potential utility impacts of the Build Alternative are described below.

4.5.2.1 Water Tower, Wells, and Water Mains

The City of Wisconsin Rapids water tower would not be affected by the proposed project.

During a conference call on June 16, 2008, representatives of the WW&LC said that the proposed East Arterial would not affect collector wells No. 5 and No. 1 or the water mains along Two Mile and Airport avenues that cross the 20th Street corridor. (See record of the conference call in Appendix A.) The representatives noted that the wellhead protection area, which consists of three 40-acre parcels the city owns in the 20th Street corridor, would not be affected by the East Arterial.

4.5.2.2 Wisconsin Rapids Lift Station

County W to Kuhn Avenue Alternative 1 would relocate the lift station east of 20th Street. Alternative 2, which is about 42 feet east of the 20th Street right-of-way, would avoid the lift station.

Lift station east of 20th Street near Two Mile Creek

4.5.2.3 Electric Transmission Towers

The Ver Bunker Alternative 3 crossing of the Wisconsin River would displace nine transmission towers on the east side of the river and the two towers in the Domtar boat landing parking lot east of Wisconsin River Drive. Letendre Alternative 1A would affect two towers, and Alternative 1B would affect one tower. No other river crossing alternatives would affect the towers.

4.5.2.4 Domtar Dam

Of the three Wisconsin River crossing alternatives, only the Ver Bunker Alternative 3 is near Domtar Dam. The Ver Bunker Alternative would not directly affect any structural component of the dam. During a future design phase when WisDOT would locate the Ver Bunker Alternative's piers, WisDOT would determine whether any pier would affect the log boom, which keeps boaters and large debris out of the forebay (west) channel (Exhibit 4-5).

4.5.3 Avoidance, Minimization, and Mitigation

Utilities within the right-of-way affected by the East Arterial would be relocated at the utility's expense. Utility impacts outside existing right-of-way would be compensated for by WisDOT. WisDOT would coordinate with utility providers during a future NEPA phase and design phase to minimize utility impacts and interruption of service during construction.

4.6 Surface Water and Water Quality

4.6.1 Affected Environment

Wood County consists of two major drainage basins: the Black-Buffalo-Trempealeau River Basin and the Central Wisconsin River Basin. The East Arterial project area is located in the Central Wisconsin River Basin and the Four Mile/Five Mile Creek Watershed. According to the Wood County Land Conservation Department, the Four Mile/Five Mile Creek Watershed covers 211 square miles and has 136 miles of streams. It is located in Portage County and in the east central part of Wood County. The DNR ranked the watershed using its Nonpoint Source Priority Watershed Selection Criteria. Based on available surface and groundwater data, the overall ranking is medium. The DNR's report on the Four Mile/Five Mile watershed indicated that comparing original vegetative cover in the watershed to current land use indicates that approximately 49 percent of the original woodlands and wetlands are now used for agriculture. Many of the cropfields are irrigated with self-propelled overhead sprinkler systems which use water from high capacity wells. Using groundwater for irrigation that would normally discharge to streams, reduces streamflow. Some estimates indicate that approximately 70 percent of water applied to irrigated land is lost to evapotranspiration and about 30 percent is returned to the water table. The reduction of groundwater inputs to streams could affect trout and other organisms by increasing water temperature, decreasing living space or habitat and reducing streamflow.

The groundwater contamination potential ranking for the Four Mile/Five Mile Creek Watershed is high. The water quality information used in this section was provided by the DNR. Appendix B contains a copy of the water quality information DNR provided for the watershed.

Water bodies within Four Mile/Five Mile Creek Watershed include Two Mile Creek, One Mile Creek, Nepco Lake, and the Wisconsin River. The water bodies are described below.

4.6.1.1 Two Mile Creek

Two Mile Creek is an 11-mile-long perennial stream that begins northeast of Washington Street in Portage County and flows into One Mile Creek near the southeast side of Alexander

Field. The habitat and Index of Biotic Integrity ratings at monitored sites are "poor" to "fair" (DNR 1998). The Index of Biotic Integrity assesses the biotic integrity and environmental quality of streams using ecological attributes of fish communities. Factors limiting habitat include stream bank erosion, weak baseflow, low velocity, channel ditching, sedimentation, and the lack of fish cover, pools, and riffles. During a field review in July 2006, a high amount of organic stream bed sedimentation and a medium amount of undesirable vegetation was noted in the creek. DNR's electrofishing results on Two Mile Creek indicate the entire stream supports a forage fishery. Forage fish include mudminnows, brook sticklebacks, pearl dace, creek chubs, white suckers, northern red bellied dace, and fathead minnows. Based on the results of the electrofishing results the DNR recommended that Two Mile Creek's status be changed from warm water sport fishery to warm water forage fishery.

One Mile Creek looking northeast from County Z.

Two Mile Creek looking east from 20th Street.

4.6.1.2 One Mile Creek

One Mile Creek is a 3-mile-long perennial stream that flows through Wisconsin Rapids and empties into the north end of Nepco Lake. The DNR's habitat rating for the creek was "poor" to "fair" and the Index of Biotic Integrity rating was "very poor." Limiting factors to habitat include the lack of pools, riffles, fish cover, coarse substrate, and low stream flow. The creek is adversely affected by stormwater runoff from Wisconsin Rapids. Stormwater travels over the impervious areas of the city carrying sediment and other pollutants to the stream. Storm sewers emptying into the stream deliver large volumes of water, causing rapid increases in stream flow that cause stream bed scouring and stream bank erosion. Electrofishing surveys only found fish in the lower stream reach consisting of forage species and one largemouth bass. Based on this data, the DNR recommended that One Mile Creek's status be changed from warm water sport fishery to warm water forage fishery.

4.6.1.3 Nepco Lake

Nepco Lake is a 494-acre lake that the Nekoosa-Edwards Paper Company created in 1926 to provide a water source for its operation. Nepco Lake supports a warm water sport fishery that includes largemouth bass, panfish, northern pike, and walleye. As part of a 1997 survey of the lake, the DNR rated the water quality as "fair/poor." Nepco Lake is known to have excessive aquatic plant growth and a long history of lake drawdowns or increasing lake levels in conjunction with chemical treatments to combat the growth of aquatic plants. Of the 12 species of aquatic plants noted in the lake, Eurasian water milfoil was the most prevalent. Eurasian

water milfoil is an exotic species that can form a thick underwater stand of tangled stems and vast mats of vegetation at the water's surface, crowding out important native plants.

4.6.1.4 Wisconsin River

The Wisconsin River is the largest river in Wisconsin. It extends 430 miles from Lac Vieux Desert on the Wisconsin-Michigan boundary to Prairie du Chien where it discharges into the Mississippi River. The Wisconsin River runs generally north to south through or along 15 counties. It drains a basin covering more than 12,000 square miles, roughly one-fourth of the state's surface area. Over its length, the river drops 1,050 vertical feet, an average 2.4 feet per mile. The only substantial stretches of free-flowing river are located in the uppermost part of the river (Lac Vieux Desert to Otter Rapids) and the lowermost part (downstream of Wisconsin Dells). The principal uses of the water resources in the Wisconsin River Basin are recreation, aquatic life habitat, and hydroelectric power generation. Other uses include irrigation, cooling water and wastewater disposal, and industrial process water supply (primarily for pulp and paper mills). Within the East Arterial project area, the Port Edwards reservoir (on the Wisconsin River) is about 1.25 miles long, with a surface area of about 150 acres and 2.5 miles of shoreline.

The DNR has designated the Wisconsin River within the study area and surrounding region as suitable for warmwater fish and aquatic life and for recreation. Between Tomahawk and Nekoosa, the Wisconsin River has a diverse fishery, supporting 51 known species in 12 families. Virtually all the species are classified as cool water and warm water. A survey of the reservoir in 1988 identified 16 fish species representing 6 families, mostly from the sunfish family (Federal Energy Regulatory Commission 1996). The reservoir supports healthy populations of carp, smallmouth bass, black crappie, and walleye. The walleye is the most significant game species. Significant fish habitat in the Port Edwards reservoir includes two islands and numerous remnants of timber-crib log boom supports. The reservoir substrate is mostly bedrock, rubble, gravel, and sand.

The Wisconsin River Basin from Lac Vieux Desert to Merrill has no widespread water quality problems other than mercury accumulation in fish. Between Merrill and the Whiting flowage, nonpoint source pollution degrades water quality, especially in Marathon and Portage counties. Agricultural pollution also affects water quality adversely in the basin between Whiting and Castle Rock. The following potentially toxic substances are found in the sediments and fish in the basin:

- Pesticides and herbicides
- Metals, including mercury
- Polychlorinated biphenyls (PCBs)
- Phenolic compounds

Table 4-11 summarizes information on toxic substances in sediment and fish tissue.

In 2006, the Wisconsin River near Port Edwards was on Wisconsin's list of Section 303(d) impaired waters. Under Section 303(d) of the Clean Water Act, states are required to submit a list of waters for which effluent limits will not be sufficient to meet all state water quality standards. Failure to meet water quality standards might be due to an individual pollutant, multiple pollutants, "pollution," or an unknown cause of impairment. The 303(d) listing process includes waters impaired by point sources and nonpoint sources of pollutants.

TABLE 4-11
Toxic Substances in Sediments and Fish

Category	Jersey	Rothschild	Wisconsin River Division	Wisconsin Rapids	Centralia	Port Edwards	Nekoosa
Sediment							
Metals	A-D	A-D	A-D	A-D	A-D	A-D	A-D
Mercury	A-below LQ	A-D	A-D	A-D	A-D	A-D	A-D
Pesticides	NA	A-ND	A-ND	A-ND	A-ND	A-ND	A-ND
PCBs	A-ND	NA	A-D	A-ND	A-ND	A-ND	A-ND
Dioxin	NA	A-D	A-D	A-D	A-D	A-D	A-P
Phenols	NA	A-D	NA	NA	A-D	A-D	A-D
Fish Tissue	NA	NA					
Mercury			A-D	A-D	A-D	A-D	A-D
Pesticides			A-D	A-D	A-D	A-D	A-D
PCBs			A-ND	A-D	A-D	A-P	A-D
Dioxin			A-D	A-D	A-D	AD*	A-D*
Phenols			NA	NA	NA	NA	NA

Source: Federal Energy Regulatory Commission, Office of Hydropower Licensing. June 1996. *Final Environmental Impact Statement: Wisconsin River Basin, Wisconsin*.

Note: The headwaters, Kings Dam, and Wausau reservoirs were not analyzed.

A-ND = analyzed but not detected
A-D = analyzed and detected
NA = not analyzed

*Detected levels exceed fish consumption advisory criteria.

States must also establish a priority ranking for the listed waters, taking into account the severity of pollution and uses. The Wisconsin River's impairment near Port Edwards is related to mercury (with a fish consumption advisory).

4.6.2 Environmental Impacts

The No-Build Alternative may cause negligible water quality impacts because of erosion and sedimentation during pavement and structure maintenance activities over and near Two Mile Creek, One Mile Creek, and the Wisconsin River. There may also be potential impacts associated with highway operations (runoff) and maintenance activities (spraying, deicing).

The East Arterial could affect Two Mile Creek, One Mile Creek, Nepco Lake, and the Wisconsin River during construction and during operation of the proposed roadway. Surface water impacts generally are related to the potential for increased sedimentation, siltation, and suspended solids loads in the project-area water bodies. The project's potential construction and operation impacts are discussed below.

4.6.2.1 Construction Impacts to Surface Water

Typical operations associated with roadway construction involve clearing, grading, filling, and excavation. These activities all increase the erosion potential of surface soils because of

the reduction in vegetative cover and increased impervious areas resulting from compaction of soil by heavy equipment.

Construction of the East Arterial would involve replacing existing structures at Two Mile Creek (pipe) and One Mile Creek/Nepco Lake (pipes), and building one or more new structures across the Wisconsin River. During construction of the Wisconsin River crossing alternatives, barges would likely be used to accommodate the equipment necessary for pile driving and pier construction operations in the east and west channels and north of the existing dam, as well as for the installation of sheet piling. The photo below shows barges being used to construct a new bridge over the Missouri River at Herman, Missouri. Because of the dams on the Wisconsin River, it is possible that water levels in the project area could be raised or lowered to accommodate construction. Coordination with the Wisconsin Valley Improvement Company, which owns and operates the reservoirs, and the DNR and the COE would be required to discuss this possibility.

Barges used in bridge construction on the Missouri River

A "remove and replace" method will be used to replace the culverts in Two Mile Creek and One Mile. This would require installing a temporary culvert or temporary diversion channel to divert stream water during construction of the new culverts. Installation may require excavation and riprap placement in the channel.

Reconstructing the creek crossings and constructing a new Wisconsin River bridge would likely cause an increase in turbidity and sedimentation, and temporarily alter downstream hydraulics and substrate conditions. The level of water present in the streams while work is being conducted would affect the amount of sediment transported downstream. The potential increase in turbidity and sedimentation from in-stream work at Two Mile and One Mile creeks may be less than constructing piers in the Wisconsin River. With the mitigation measures normally employed by WisDOT, the construction activities in and adjacent to Two Mile and One Mile creeks (and Nepco Lake) would not be expected to adversely affect the streams' overall habitat quality. The DNR has rated the habitat quality of Two Mile and One Mile Creeks as "poor" to "fair."

One Mile Creek to Nepco Lake culverts on north side of County Z

Any long-term increases in suspended sediments can reduce aquatic productivity by limiting photosynthesis, lowering oxygen levels, and covering food sources and fish spawning areas. The potential impact of suspended sediments on fish and macroinvertebrates would likely be a greater concern at

the Wisconsin River which supports a warmwater sport fishery rather than at Two Mile and One Mile creeks which support a forage fishery.

The major short-term water quality impacts due to construction are increases in turbidity and sedimentation resulting from erosion of disturbed areas and in-stream work.

Two Mile Creek culvert looking west toward 20th Street

4.6.2.2 Operational Impacts to Surface Water

Operational impacts of the project on water quality result from stormwater runoff from road surfaces, bridge decks, median areas, and adjoining rights of way. The increase in impervious area would increase stormwater runoff volumes and could increase in-stream erosion at Two Mile and One Mile creeks. The runoff carries pollutants that have accumulated as a result of roadway use. The primary highway runoff components include suspended sediments (pavement wear and dirt), lead (gasoline, tire filler), zinc (tire filler, motor oil stabilizers), copper (metal platings, brake linings), and petroleum (gasoline, antifreeze, hydraulic fluids).

Throughout the mid-1980s, the FHWA conducted nationwide studies to determine highway runoff constituents, amounts relative to roadway types and traffic conditions, and the potential impacts to surface water resources (*Pollutant Loadings and Impacts from Highway Stormwater Runoff, Volume I*, April 1990). FHWA's research concluded that pollutants in highway runoff are not present in amounts sufficient to threaten surface water or groundwater where average daily traffic volumes are below 30,000. Forecast traffic for the East Arterial in the area of the Wisconsin River and One Mile Creek (13,000 ADT) and Two Mile Creek (23,000 ADT) for the design year (2035) is below that threshold.

4.6.3 Measures to Minimize Harm and Mitigation

Construction in and near waterways would be performed in accordance with WisDOT *Standard Specifications for Road and Bridge Construction* and Wisconsin Administrative Code Chapter TRANS 401, *Construction Site Erosion Control and Storm Water Management Procedures*. Erosion control devices would be installed before erosion-prone construction activities begin. Construction at Two Mile Creek, One Mile Creek, and the Wisconsin River would be conducted during periods of low or normal flow.

Under revisions to the WisDOT/DNR Cooperative Agreement (Memorandum of Understanding on Erosion Control and Storm water Management), post-construction storm water quality control measures must be provided on urban highway construction projects that include curb and gutter and storm sewers for conveyance of storm water. Additional impact mitigation techniques during construction may include the following:

- If dewatering is required, dirty water would be pumped into a settling basin before being allowed to reenter a stream.

- Trenched-in erosion bales would be installed in areas of moderate-velocity runoff; clean aggregate ditch checks would be installed in ditches with moderate- to high-velocity runoff during and after construction; and ditches would be protected with erosion bales and jute matting in conjunction with seeding.
- Construction equipment would be stored and fueled in upland areas, away from sensitive environments. Accidental spills during refueling at construction sites or as a result of an accident involving hazardous materials haulers would be handled in accordance with local government response procedures.
- Disturbed areas would be revegetated as soon as practicable following completion of construction activities, preferably with native vegetation.
- Contractors would be required to follow DNR guidelines for ensuring that construction equipment used in or near waterways is adequately decontaminated for zebra mussels and exotic plants, including purple loosestrife and Eurasian milfoil.

4.7 Wetlands

The *U.S. Army Corps of Engineers Wetland Delineation Manual* (1987) defines wetlands as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions." According to the manual, in order to be considered a jurisdictional wetland, three criteria must be met: (1) prevalence of hydrophytic vegetation, (2) presence of hydric soils, and (3) wetland hydrology.

4.7.1 Affected Environment

Published data, including the Wood County wetland database, the Wood County Soil Survey, and U.S. Geological Survey topographical maps, and wetland determinations were used to evaluate the extent of wetlands within the project area. In July 2006, wetland determinations were conducted in the project area using the Wisconsin DNR's Rapid Assessment methodology. Rapid assessment methodology consists of reviewing data sources, visiting the site, and answering questions that indicate the presence of factors important for each wetland functional value. The answers to these questions are used as a guide in rating the significance of each functional value for a wetland. The CD at the back of this document contains a technical memorandum documenting the results of the wetland survey.

Twenty-five wetlands totaling 50 acres were identified during the 2-day survey. As a comparison, there are 131,068 acres of wetland in all of Wood County. Table 4-12 summarizes characteristics of individual wetlands in the project area, and these areas are depicted on Exhibit 4-6 and on the East Arterial aerial exhibit, sheets 5 to 8.

Of the 25 wetlands identified, 18 (W-1 through W-18) are located on Domtar Island. These 18 wetlands cover 16.25 acres or 32.5 percent of the total acres of wetland in the study area and are mostly forested/scrub-shrub wetlands with some wet meadow wetland and one pond wetland. Although the mix of wetlands and uplands on the island provides quality wildlife habitat, the long history of wetland disturbing activities on the island has compromised the wetlands' floristic quality.

TABLE 4-12
Summary of Wetland Characteristics in the Project Area

Wetland #	Location	Wetland Types[a]	Dominant Vegetation	Total wetland size (ac)	Dominant Wetland Functions
W-1	West-central portion of Domtar Island	FO, SS	Tussock sedge, sensitive fern, speckled alder, black willow	0.29	Floodwater retention, wildlife habitat,
W-2	Northwest portion of Domtar Island	FO	Lakebank sedge, black ash, cursed buttercup, speckled alder	0.79	Shoreline stabilization, floodwater retention, wildlife habitat
W-3	Northern tip of Domtar Island	FO, SS	Eastern cottonwood, river birch, silver maple	1.16	Floodwater retention, wildlife habitat,
W-4	Northern tip of Domtar Island	FO	Green ash, sensitive fern	0.18	Floodwater retention, wildlife habitat,
W-5	Northern tip of Domtar Island	FO	Sedge species, green ash, quaking aspen	0.03	Floodwater retention, wildlife habitat,
W-6	Northern tip of Domtar Island	FO	Sedge species, green ash	0.01	Floodwater retention, wildlife habitat,
W-7	East-central portion of Domtar Island, west of north-south gravel road	FO, SS	Tussock sedge, lakebank sedge, blue flag iris, speckled alder	1.05	Floodwater retention, wildlife habitat,
W-8	Central portion of Domtar Island	FO	Reed canary grass, speckled alder, sedge species	2.08	Floodwater retention, wildlife habitat,
W-9	East-central portion of Domtar Island	SS	Rush species, speckled alder,	0.06	Floodwater retention, wildlife habitat,
W-10	Central portion of Domtar Island	FO, WM	Reed canary grass, speckled alder, lakebank sedge, touch-me-not	1.34	Floodwater retention, wildlife habitat,
W-11	Central portion of Domtar Island	FO	Sedge species, quaking aspen,	0.07	Floodwater retention, wildlife habitat,
W-12	Central portion of Domtar Island	FO	Sedge species, speckled alder, river birch, box elder, eastern cottonwood	0.68	Floodwater retention, wildlife habitat,
W-13	West-central portion of Domtar Island	FO, SS, WM	Sedge species, reed canary grass, speckled alder, box elder	0.34	Floodwater retention, wildlife habitat,
W-14	Western edge of Domtar Island	FO	Sedge species, eastern cottonwood, silver maple	0.85	Shoreline stabilization, floodwater retention, wildlife habitat
W-15	South-central portion of Domtar Island	WM	Stinging nettle, motherwort, box elder, black willow	5.47	Floodwater retention, wildlife habitat,
W-16	South-central portion of Domtar Island – just west of north-south	SS	Reed canary grass, sensitive fern, sandbar willow, speckled alder	0.31	Floodwater retention, wildlife habitat,

TABLE 4-12
Summary of Wetland Characteristics in the Project Area

Wetland #	Location	Wetland Types[a]	Dominant Vegetation	Total wetland size (ac)	Dominant Wetland Functions
	gravel road				
W-17	South-central portion of Domtar Island – just east of north-south gravel road	PO	duckweed	0.40	Floodwater retention, wildlife habitat,
W-18	Four areas along the eastern edge of Domtar Island	FO	Sedge species, river birch, silver maple	1.35	Shoreline stabilization, floodwater retention, wildlife habitat
W-19	East of the Wisconsin River and north of the east-west utility corridor	FO, WM	Sedge species, sensitive fern, speckled alder	3.80	Floodflow desynchronization, wildlife habitat
W-20	East of the Wisconsin River and north of the east-west utility corridor	FO, SS	Sensitive fern, speckled alder	7.47	Floodflow desynchronization, wildlife habitat
W-21	East of the Wisconsin River and south of the east-west utility corridor	FO	Sedge species, sensitive fern, smooth buckthorn	0.33	Floodflow desynchronization, wildlife habitat
W-22	East of the Wisconsin River and south of the east-west utility corridor	FO, WM	Sedge species, speckled alder, smooth buckthorn	0.81	Floodflow desynchronization, wildlife habitat
W-23	East of the Wisconsin River and south of the east-west utility corridor	FO, WM	Sedge species, speckled alder, smooth buckthorn, American elm	0.45	Floodflow desynchronization, wildlife habitat
W-24	Between Nepco Lake and the Airport	EM, SS	Narrow-leaved cattail, spikerush species, speckled alder	2.70	Shoreline stabilization, floodflow desynchronization, wildlife habitat
W-25	North of and across County Road Z from the Nepco Lake pumping station	FO, SS, WM	Skunk cabbage, touch-me-not, speckled alder	17.9	Groundwater discharge, shoreline stabilization, floodflow desynchronization, floodwater retention, wildlife habitat
			Total	49.92	

Note: The wetland numbering system in this table differs from that in the wetland memorandum on the CD at the back of this document. Wetlands 15 and 22 in the memorandum have been determined not to be wetlands.

[a] Field-truthed wetland types are FO = forested, SS = scrub-shrub, EM = emergent, WM = wet meadow, and PO = pond wetland.

Five wetlands (W-19 through W-23) totaling about 13 acres are located between the Wisconsin River and County Z, within 1000 feet north and south of the utility corridor. These are mainly forested/scrub-shrub/wet meadow wetlands that are slightly higher in elevation than wetlands on Domtar Island. Thus, they are not in a landscape position to provide flood flow retention. However, they do contribute to flood desynchronization by retaining sheetflow and slowing hydrologic outflow into the Wisconsin River. This mosaic of wetlands and uplands provides good wildlife habitat, and the wetlands have a limited disturbance history, providing for relatively high floristic quality.

A large forested/scrub-shrub/wet meadow wetland complex (W-25) is located along the eastern edge of the Wisconsin River, north of the Nepco Lake Dam. This 18-acre wetland is fed hydrologically primarily through groundwater discharge. The mosaic of upland and wetland communities provides good wildlife habitat and this wetlands has very little disturbance history, resulting in high floristic quality. Finally, a 2.70 acre emergent wetland (W-24) is located between the north edge of Nepco Lake and Alexander Field. This is an emergent marsh wetland and provides shoreline protection, flood retention, wildlife habitat, aesthetics, and recreation functions.

No wetlands were observed along the East Arterial corridor east of One Mile Creek.

4.7.2 Environmental Consequences

Of the 25 wetlands in the project area, the Wisconsin River crossing alternatives would affect between 5 and 10 individual wetlands and 0.7 and 1.3 wetland acres. Besides the loss of wetland area, wetland functions and values would be affected by the Wisconsin River crossing alternatives (Table 4-13). The No-Build Alternative would not affect wetlands.

As noted in Table 4-13, all river crossing alternatives would affect W-24 which is located between Alexander Field and Nepco Lake. The Ver Bunker Alternative, which has the lowest potential wetland impact, avoids the wetlands on Domtar Island. All river crossing alternatives avoid W-25, the largest wetland in the project area. As noted, wetland impacts would be expected to increase in a future NEPA phase when data is available on the vertical alignment of the river crossing alternatives.

4.7.3 Measures to Minimize Harm and Mitigation

Presidential Executive Order 11990, Protection of Wetlands, requires federal agencies to avoid, to the extent practicable, long- and short-term adverse impacts associated with the destruction or modification of wetlands. More specifically, the Order directs federal agencies to avoid new construction in wetlands unless there is no practicable alternative. The Order states that where wetlands cannot be avoided, the proposed action must include all practicable measures to minimize harm to wetlands.

The Clean Water Act's Section 404(b)1 Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR Part 230) are administered by the U.S. Environmental Protection Agency (USEPA) and the U.S. Army Corps of Engineers (USACE). The guidelines state that dredged or fill material should not be discharged into aquatic ecosystems (including wetlands), unless it can be demonstrated that there are no practicable alternatives to such discharge; that such discharge will not have unacceptable adverse impacts; and that all practicable measures to minimize adverse effects are undertaken.

TABLE 4-13
Summary of Wetland Acreage and Functional Impacts of the Wisconsin River Crossing Alternatives

Wetland #	Location	Wetland Types[a]	Total wetland size (ac)	Impact area (ac)				Functions
				Ver Bunker	Lavigne	Letendre 1A	Letendre 1B	
W-1	West-central part of Domtar Island	FO, SS	0.29	—	—	—	—	Floodwater retention, wildlife habitat,
W-2	Northwest part of Domtar Island	FO	0.79	—	0.11	—	—	Shoreline stabilization, floodwater retention, wildlife habitat
W-3	Northern tip of Domtar Island	FO, SS	1.16	—	—	—	—	Floodwater retention, wildlife habitat,
W-4	Northern tip of Domtar Island	FO	0.18	—	—	—	—	Floodwater retention, wildlife habitat,
W-5	Northern tip of Domtar Island	FO	0.03	—	—	—	—	Floodwater retention, wildlife habitat,
W-6	Northern tip of Domtar Island	FO	0.01	—	—	—	—	Floodwater retention, wildlife habitat,
W-7	East-central part of Domtar Island, west of north-south gravel road	FO, SS	1.05	—	—	—	0.15	Floodwater retention, wildlife habitat,
W-8	Central part of Domtar Island	FO	2.08	—	—	0.20	0.18	Floodwater retention, wildlife habitat,
W-9	East-central part of Domtar Island	SS	0.06	—	—	—	—	Floodwater retention, wildlife habitat,
W-10	Central part of Domtar Island	FO, WM	1.34	—	—	—	0.18	Floodwater retention, wildlife habitat,
W-11	Central part of Domtar Island	FO	0.07	—	—	—	0.01	Floodwater retention, wildlife habitat,
W-12	Central part of Domtar Island	FO	0.68	—	—	0.08	0.18	Floodwater retention, wildlife habitat,
W-13	West-central part of Domtar Island	FO, SS, WM	0.34	—	—	0.20	0.13	Floodwater retention, wildlife habitat,
W-14	Western edge of Domtar Island	FO	0.85	—	—	0.05	0.05	Shoreline stabilization, floodwater retention, wildlife habitat
W-15	South-central part of Domtar Island	WM	5.47	—	—	—	—	Floodwater retention, wildlife habitat,
W-16	South-central part of Domtar Island – just west of north-south gravel road	SS	0.31	—	—	—	—	Floodwater retention, wildlife habitat,
W-17	South-central part of Domtar Island – just east of north-south gravel road	PO	0.40	—	—	—	—	Floodwater retention, wildlife habitat,

TABLE 4-13
Summary of Wetland Acreage and Functional Impacts of the Wisconsin River Crossing Alternatives

Wetland #	Location	Wetland Types[a]	Total wetland size (ac)	Impact area (ac)				Functions
				Ver Bunker	Lavigne	Letendre 1A	Letendre 1B	
W-18	Four areas along the eastern edge of Domtar Island	FO	1.35	—	—	—	—	Shoreline stabilization, floodwater retention, wildlife habitat
W-19	East of the Wisconsin River and north of the east-west utility corridor	FO, WM	3.80	0.12	—	—	—	Floodflow desynchronization, wildlife habitat
W-20	East of the Wisconsin River and north of the east-west utility corridor	FO, SS	7.47	0.24	0.75	0.06	—	Floodflow desynchronization, wildlife habitat
W-21	East of the Wisconsin River and south of the east-west utility corridor	FO	0.33	0.03	0.15	0.05	0.08	Floodflow desynchronization, wildlife habitat
W-22	East of the Wisconsin River and south of the east-west utility corridor	FO, WM	0.81	0.02	0.17	0.06	0.08	Floodflow desynchronization, wildlife habitat
W-23	East of the Wisconsin River and south of the east-west utility corridor	FO, WM	0.45	0.03	—	—	—	Floodflow desynchronization, wildlife habitat
W-24	Between Nepco Lake and the Airport	EM, SS	2.70	0.26	0.12	0.30	0.26	Shoreline stabilization, floodflow desynchronization, wildlife habitat
W-25	North of and across County Z from the Nepco Lake pumping station	FO, SS, WM	17.9	—	—	—	—	Groundwater discharge, shoreline stabilization, floodflow desynchronization, floodwater retention, wildlife habitat
Total			**49.2**	0.70	1.30	1.00	1.30	

Note: The wetland numbering system in this table differs from that in the wetland memorandum on the CD at the back of this document. Wetlands 15 and 22 in the memorandum have been determined not to be wetlands.

[a] Field-truthed wetland types are FO = forested, SS = scrub-shrub, EM = emergent, WM = wet meadow, and PO = pond wetland.

4.7.3.1 Wetland Avoidance

Because of the position of wetlands on Domtar Island, between the Wisconsin River and County Z, and along County Z between Nepco Lake and One Mile Creek, it is not possible to completely avoid wetland impacts. Although the Ver Bunker and Lavigne Alternatives avoid wetland impacts on Domtar Island, no alternative would be able to avoid wetland impacts (W-24) between Nepco Lake and One Mile Creek.

4.7.3.2 Minimize Wetland Impacts

The Ver Bunker, Lavigne, and Letendre (Alternative 1A) alternatives were designed to minimize the impact to wetlands. In a future design phase, WisDOT will investigate additional measures to minimize wetland impacts. Additional options for minimizing wetland impacts involve a combination of best management practices (BMPs) and low impact engineering techniques that may include the following:

- Using structure rather than embankment to limit the area of impact for bridge approaches
- Providing adequate cross drainage to assure that fills/excavations associated with the highway result in minimal amounts of damming or draining of adjacent or hydrologically connected wetlands
- Rapid re-vegetation of road embankment with established restoration techniques to minimize siltation impacts to wetlands
- Properly constructed, monitored, and maintained silt fences – specifications of which will be incorporated into site plan sheets
- Establishment of construction staging areas in areas well away from wetlands.

4.7.3.3 Wetland Compensation

Compensation for unavoidable wetland loss will be carried out in accordance with the interagency Wisconsin Department of Transportation Wetland Mitigation Banking Technical Guideline developed as part of the WisDOT/DNR Cooperative Agreement on Compensatory Wetland Mitigation. WisDOT developed the Guideline in 1993 and updated it in 1997 and 2002 in cooperation with the DNR, USACE, USEPA, U.S. Fish and Wildlife Service (USFWS), and FHWA. Through the Guideline, these agencies established a statewide policy regarding the sequence of activities required for WisDOT to compensate for wetland losses. Specifically, the Guideline states "preference should be given for compensatory mitigation accomplished in the vicinity of the impacted area (onsite). Where such opportunities are not present or practical, in-watershed (near-site) opportunities should be explored." In the time since the Guideline was developed, "onsite" typically has been interpreted as being within 0.25 mile of the wetland impact, whereas "near-site" has been interpreted as within 2.5 miles of the wetland impact area.

For those cases in which onsite or near-site opportunities for wetland mitigation are not available, WisDOT can debit the wetland loss at the closest established wetland mitigation bank. For the Wisconsin Rapids East Arterial project, the Big Eau Pleine wetland mitigation bank site in Marathon County would be used. The Guideline provides ratios for wetland replacement versus wetland loss depending on where the mitigation is to be provided. The

replacement ratios increase with the mitigation site's distance from the impacted wetland. A wetland mitigation plan will be developed during a future design phase, in consultation with state and federal agencies.

4.8 Floodplains

4.8.1 Affected Environment

Floodplains attenuate flood and storm waters by decreasing water velocities and providing temporary water storage. By temporarily storing water, floodplains help to filter sediments and to provide erosion control. They also provide important ecosystem functions such as nutrient export, increased primary productivity, and wildlife habitat and movement corridors. The extent to which these functions are expressed varies depending on vegetative structure, stream hydrology, and distance from the stream.

As delineated on Flood Insurance Rate Maps (FIRM) by the Federal Emergency Management Agency (FEMA), 100-year floodplains are associated with Two Mile Creek, One Mile Creek, Nepco Lake, and the Wisconsin River. The floodplain boundaries are shown on the East Arterial aerial exhibit. FEMA defines floodplain as "the land adjacent to a body of water, with ground surface elevations at or below the one percent annual chance or 100-year flood elevation."

4.8.1.1 Natural and Beneficial Floodplain Values

Floodplains in their natural or relatively undisturbed state have water resource value (natural moderation of floods, water quality maintenance, and groundwater recharge); living resource value (fish, wildlife and plant resources); cultural resource value (open space, recreation); and cultivated resource value (agriculture, aquaculture and forestry). The floodplains within the project's area of potential effect include a mix of vegetation (cover types) and floodplain values. The natural and beneficial floodplain values served by surface waters in the project area are summarized below.

Two Mile Creek and its floodplain in the 20th Street corridor are within a developing residential area. The floodplain includes a mix of natural area (wooded) and built-up land. The wooded areas and other undeveloped areas within the floodplain may provide some moderation of floods, water quality benefits (water resource values), and habitat for wildlife (living resource values). As development continues in that area, one would expect the ability of the Two Mile Creek floodplain to continue serving those functions to diminish. The One Mile Creek floodplain north of County Z includes a wooded area and a wetland. As such it serves all the resource values mentioned above, although recreational use of the stream (cultural resource value) is expected to be minimal, particularly given its proximity to Nepco Lake and the Wisconsin River.

The Wisconsin River and Nepco Lake floodplains, both located fairly close to their respective shorelines, are located in natural settings. This would be less true for parts of the western shore of the Wisconsin River and Nepco Lake. Both floodplains serve the range of resource values mentioned above, although the narrowness of the floodplain diminishes its importance for any one resource value.

4.8.2 Environmental Consequences

Executive Order 11988 and 23 CFR 650 Subpart A direct federal agencies to take action to reduce the risk of flood loss; to minimize the impacts of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served by floodplains. The Order also requires agencies to elevate structures above the base flood level whenever possible. The object of the Order is to avoid the long- and short-term adverse impacts associated with occupation and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

Between County W and Rangeline Road, the East Arterial would affect the Two Mile Creek floodplain and the One Mile Creek/Nepco Lake floodplain. The Wisconsin River Crossing alternatives would affect the Wisconsin River floodplain. The Letendre Avenue and Lavigne Avenue alternatives would have greater floodplain impacts than the Ver Bunker Avenue alternative because they would place fill on Domtar Island, which is completely within the 100-year floodplain. Table 4-14 summarizes the project's potential floodplain encroachments. The No-Build Alternative would not affect floodplains.

TABLE 4-14

Summary of Potential 100-Year Floodplain Encroachments

Alternative	Floodplain Name	Affected Area (acres)	Type & Length of Encroachment (ft)	Existing Structure at Proposed Crossing?
County W to Kuhn Avenue				
Alternative 1	Two Mile Creek	1.0	Transverse (300 ft)	Yes (pipe)
Alternative 2	Two Mile Creek	2.0	Transverse (350 ft)	Yes (pipe)
Wisconsin River Crossings (Nepco Lake Road to West Termini)				
Letendre 1A	One Mile Creek	0.9	Transverse (560 ft)	Yes (pipe)
Letendre 1B	One Mile Creek	0.9	Transverse (560 ft)	Yes (pipe)
Lavigne 2	One Mile Creek	0.9	Transverse (560 ft)	Yes (pipe)
Ver Bunker 3	One Mile Creek	0.9	Transverse (560 ft)	Yes (pipe)
Letendre 1A	Wisconsin River	2.9	Transverse (2,700 ft)[a]	No
Letendre 1B	Wisconsin River	2.6	Transverse (2,620 ft)[a]	No
Lavigne 2	Wisconsin River	2.0	Transverse (2,100 ft)[a]	No
Ver Bunker 3	Wisconsin River	0.4	Transverse (1,200 ft)[a]	No
8th Street Improvements				
8th Street—Wider Median to Accommodate U-Turns	One Mile Creek	0.1	Transverse (100 ft)	Yes (pipe)
8th Street—Wider Median to Accommodate U-Turns	Two Mile Creek	0.3	Transverse (125 ft)	Yes (pipe)

[a]The length of floodplain encroachment includes the lengths of structure over the east and west channels of the river where floodplain impacts would be limited to bridge piers.

4.8.3 Measures to Minimize Harm and Mitigation

The object of Executive Order 11988 is to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. When a proposed action is to occur in the base floodplain, the Executive Order requires that practicable alternatives to avoid affecting the floodplain be identified. Given the location of Two Mile and One Mile creeks and the Wisconsin River, there are no practicable alternatives that would avoid floodplain.

Impacts to the mapped 100-year floodplains could be minimized by several means, including, where practicable, clear spanning the floodplains and use of a reduced pier footprint design to reduce impacts to the 100-year floodplain. The feasibility of these methods would be evaluated in a future design phase. Hydraulic modeling would likely be required before construction to determine the effect of proposed fill removal, fill placement, and pier placement on the 100-year floodplain and the hydraulics upstream and downstream of the Wisconsin River. The hydraulic study and the need for floodplain mitigation will be evaluated during a future NEPA/design phase.

4.9 Upland Habitat

4.9.1 Affected Environment

Wood County is within the biological tension zone between the northern hardwood forest province and the prairie-forest province. In that area many plant species of the southern prairie-forest province reach their northern limits, and those of the northern forest province reach their southern limits. Plant communities within the zone have richer species diversity than do similar communities to the north or south. Most of the undeveloped uplands in the project area are woodlands. The woodlands vary from pine plantations to a more natural assemblage that includes maple, ash, and oak. In the project area, woodlands provide wildlife habitat and are used for outdoor recreation.

Two surveys were conducted in the summer of 2006 to characterize upland forests in the project area; a combined wetland-upland survey, and observations made about forests as part of the threatened and endangered species survey. The results of the surveys are documented on the CD at the back of this report. Observations from both surveys about the project area's upland forests are provided in Table 4-15.

4.9.2 Environmental Consequences

The locations of the East Arterial's upland forest impacts are discussed below and summarized in Table 4-16.

TABLE 4-15
Summary of Upland Forests in the Project Area

Forest #	Location	Dominant Species[a]	Age Structure	Comments
1	Between Grove Ave. and the north project terminus.	Red pine plantation.	Young to submature, low number of snags.	Trees generally 8 to 10 inches in diameter at breast height. Poor floristic quality.
2	East of 20th Street, between Two Mile Ave. and Whitrock Ave.	Mixed coniferous/ deciduous. Jack pine and black oak.	Submature, moderate number of snags.	Second growth, relatively intact. Moderate floristic quality.
3	West of 20th Street, between Two Mile Ave. and Whitrock Ave.	Jack pine, white pine.	Young to submature, low number of snags.	Scrubby growth. Relatively poor floristic quality.
4	West of 24th Street, between Whitrock Ave. and Kuhn Ave.	Red pine plantation.	Young to submature, low number of snags.	Straight rows, no undergrowth. Poor floristic quality.
5	West of 16th Street, between Kuhn Ave. (extended) and County Z.	Mixed deciduous/ coniferous. White pine, black oak.	Submature to mature, moderate number of snags.	Relatively good floristic diversity is indicative of moderate disturbance history
6	North and south of County Z, between Sampson Street and Rangeline Road.	Mixed deciduous/ coniferous.	Submature to mature, moderate number of snags.	Relatively good floristic diversity. North of County Z the area has been recently thinned. Formerly a jack pine–pin oak barrens, succeeded into a southern dry forest, managed primarily for conifer production. White pine lowland understory dominated by young red maple and prickly ash, upland edge understory dominated by American hazelnut, northern pin oak. Presence of invasive species increases along County Z with spotted knapweed and Asian honeysuckle the primary invasives. South of County Z West steep slope drops down to Nepco Lake wetland edge. Slope and wooded edge dominated by Pennsylvania sedge, five other *Carex* sp., American hazelnut, paper birch, quaking and bigtooth aspen, speckled alder, and black cherry. Eastern part of upland dominated by old pine plantation, which recently experienced a third cutting. Standing timber is healthy stand of primarily 40-to-50-year-old red pine mixed with 80-to-100-year-old white pine, and some scattered red maple and black oak. Western Portion, primarily 40-to-80-year-old white pine forest grading downslope to wetland surrounding north end of Nepco Lake. Upland understory dominated by Pennsylvania sedge, lowbush blueberry, red maple seedlings, black oak seedlings, and white pine seedlings, and various native herbs in isolated undisturbed patches.

TABLE 4-15
Summary of Upland Forests in the Project Area

Forest #	Location	Dominant Species[a]	Age Structure	Comments
7	East of Wisconsin River near southern part of project area,	Black oak, basswood, sugar maple, hop hornbeam.	Submature to mature, high number of snags.	Generally excellent quality forest. Good assemblage of spring flora is indicative of low disturbance history; however, there has been disturbance within the recently thinned part of the level uplands close to County Z. Within 10 meters of the access roads and 3 meters of the bike trails, invasives have established large areas dominated by mostly Asian honeysuckle, and scattered patched of European buckthorn, spotted knapweed, Asian barberry.
8	East of Wisconsin River, within 1,000 feet north and south of the utility corridor.	Mixed deciduous/ coniferous. White pine, black oak, sugar maple, hop hornbeam.	Submature to mature, moderate number of snags.	Relatively good floristic diversity. Understory dominated by excellent structure of young subdominant trees and shrubs and relatively undisturbed herb layer. Invasive species (Asian honeysuckle and European buckthorn) along access road.
9	Domtar Island, east of gravel road.	Basswood, black oak, sugar maple.	Submature to mature, moderate number of snags.	Relatively good floristic diversity is indicative of moderate disturbance history
10	Domtar Island, west of gravel road.	American elm, green ash, eastern cottonwood, box elder.	Submature to mature, moderate number of snags.[b]	Relatively low floristic quality indicative of high disturbance history. The second growth mixed hardwoods are interspersed with small pine plantations.

[a]Dominant species are those most characteristic (in abundance, size, and distribution) of an ecological community and usually determines the presence, abundance, and type of other species. Highly disturbed forests tend to be dominated by disturbance tolerant species (red elm, black locust, black cherry), whereas intact forests tend to be dominated by species that are intolerant of disturbance (white oak, black oak, white ash).

[b]Snags are any dead or dying standing tree or live trees containing cavities. Snags and cavities are specialized habitats used for nesting, shelter, and feeding by various wildlife species.

TABLE 4-16
Acreage Impacts to Major Upland Forests in the Project Area

Upland Forest	Location	Acreage Impacts
1	Between Grove Ave. and the northern project terminus	5.9
2	East of 20th Street, between Two Mile Ave. and Whitrock Ave.	1.7–2.9
3	West of 20th Street, between Two Mile Ave. and north of Whitrock Ave.	1.0–1.3
4	West of 20th Street, between Whitrock Ave. and Kuhn Ave.	4.5
5	West of 16th Street, between Kuhn Ave. and north of County Z	7.6
6	North and south of County Z, between Sampson Street and Rangeline Road	3.3
7	East of Wisconsin River near southern portion of project area	0.0
8	East of Wisconsin River, within 1000 feet north and south of the utility corridor	3.0–4.4
9	Domtar Island, east of gravel road	0.2
10	Domtar Island, west of gravel road	1.5–2.5

Note: The range of acreages reflects the variation in level of impacts caused by the County W to Kuhn Avenue and river crossing alternatives. It does not include upland forest strip takings in smaller wooded areas.

The East Arterial would affect the edge of forests (1, 2, and 3) between County W and Whitrock Avenue and sever the city's forested parcels (4 and 5) between Whitrock Avenue and County Z. Because the floristic composition of forest edge tends to be more disturbed than the forest interior, the edge impacts to the forests between County W and Whitrock Avenue would have minor impacts on upland habitat. The project's severance of two city-owned parcels between Whitrock Avenue and County Z would have a greater impact on habitat value than the edge impacts to the north, despite the relatively poor floristic quality of one of the properties (upland forest 4). Severing the forested parcels between Whitrock Avenue and County Z creates more forest edge environment and increases the likelihood that nuisance plant species will gain a footing in the soil that is exposed during construction. It should be noted that Wisconsin Rapid's Water and Light Commission representatives indicated that the city plans to maintain ownership of its four forested parcels with no other development planned on those properties. See Section 5, Local Agency Coordination.

Upland forest impacts along County Z between Sampson Street and Rangeline Road would be edge impacts and have minor adverse consequences for upland habitat. Although County Z may be straightened on a new alignment for roughly 800 feet east of Nepco Lake Road, the edge of the forest still would be affected. The project's most notable upland forest impacts would be associated with crossing the Wisconsin River. This area, with its relatively large and isolated forest complex between the river and County Z, exhibits the highest quality forest and wildlife habitat. Table 4-17 lists the impacts of the Wisconsin River Crossing alternatives on upland forests.

Because the Ver Bunker Alternative 3 would use an existing utility line corridor and avoid Domtar Island, it would affect the fewest acres of upland forest. By taking advantage of the utility corridor, the Ver Bunker Alternative also minimizes the impacts associated with upland forest fragmentation that the Letendre and Lavigne alternatives would create. The Letendre and Lavigne alternatives would not only remove a substantial number of acres of good quality upland habitat east of the Wisconsin River; those alternatives also would

TABLE 4-17
Acreage Impacts to Upland Forests in the Wisconsin River Crossing Area

Alternative	Acreage Impacts East of the Wisconsin River	Acreage Impacts on Domtar Island	Total Impacts
Letendre Alternative 1A	3.4	2.7	6.1
Letendre Alternative 1B	3.1	2.4	5.5
Lavingne Alternative 2	4.4	1.7	6.1
Ver Bunker Alternative 3	3.0	—	3.0

create edge habitat. It would be expected that more disturbance-tolerant species and invasives would establish themselves in the edge habitat and encroach on relatively undisturbed areas adjacent to the edge habitat. Other impacts caused by removing vegetation include interrupting the natural succession to mature communities; increasing the potential for soil erosion; and reducing aesthetic values. Road maintenance activities such as the application of deicing agents and herbicides could have impacts that extend beyond the edge area created by the Letendre and Lavigne alternatives.

The Letendre and Lavigne alternatives' impacts on Domtar Island would be less an issue because of the relatively low floristic quality of the upland forest on most of the island.

4.9.3 Measures to Minimize Harm and Mitigation

During a future NEPA/design phase, WisDOT would evaluate measures to limit the footprint of the Wisconsin River Crossing alternatives on Domtar Island and east of the Wisconsin River. WisDOT may also consider developing a landscaping plan that would identify areas where native grasses, shrubs and trees might be planted on the road sideslopes and backslopes to limit the adverse impacts of invasive species.

4.10 Threatened and Endangered Species

4.10.1 Affected Environment

The project contract identifies the red-shouldered hawk, Blanding's turtle, and wood turtle as threatened and endangered species to be investigated as part of the study. Subsequent correspondence from the DNR identified the osprey and the wood turtle as state-listed species of primary concern in the study area. The U.S. Fish and Wildlife Service noted that the bald eagle and Karner blue butterfly were observed within several miles of the project area.

Robert Welch conducted a survey of threatened and endangered species between mid-March and mid-June 2006 to determine whether the red-shouldered hawk, Blanding's turtle and wood turtle occur within the project area (Welch 2006). During the course of the survey, Robert Welch made observations about other protected and rare species. The survey results are summarized below.

4.10.1.1 Red-shouldered Hawk

The red-shouldered hawk (*Buteo lineatus*) is a state threatened species. It prefers forests with open understory, especially bottomland hardwoods, riparian areas, and flooded swamps. It

preys on small mammals, birds, reptiles, amphibians, and crayfish, and is thought to be the most vocal American hawk.[1]

Red-shouldered hawk

The study area comprises four survey areas.

- Area 1—County Z (north-south segment) and Rangeline Road West to Wisconsin River Channels and Domtar Island
- Area 2—North of County Z (east-west segment), Sampson Road to Airport Complex
- Area 3—South of County Z (east-west segment) to north shore of Nepco Lake
- Area 4—20th Street Corridor, Ridges Golf Course to Lovewood Drive and Airport Avenue

Broadcast calling and listening stations were spread across the forested habitat to provide good auditory coverage and excellent observations if territorial hawks responded to the calls. A cassette tape player, power horn speaker, and voice calling were all used to attempt to attract territorial hawks within the survey areas, which appeared to support promising nesting habitat. Broadcast calling was used at all four areas, usually shortly after dawn until mid-morning and again during late afternoon until dusk to avoid interference with automobile traffic and aircraft noise. The frequency of broadcast calling was higher during the early nesting season, between March and early May. Area 1 contained the most promising habitat for red-shouldered hawks; however, field observations did not identify any territorial red-shouldered hawks in the entire study area.

4.10.1.2 Blanding's Turtle and Wood Turtle

Blanding's turtle (*Emydoidea blandingii*) and the wood turtle (*Clemmys insculpta*) are state threatened species. Blanding's turtle is a large aquatic turtle with an elongated, smooth, high-domed carapace that is black and commonly marked with light colored spots or irregular lines. Habitat requirements of the Blanding's turtle in central Wisconsin show a preference for the still waters of open marshes and sloughs, even man-made farm ponds and reservoirs that provide deep enough pools for hibernation and produce a variety of submergent, emergent, and floating aquatic plants for cover and food.

The carapace of the wood turtle is highly sculptured and keeled, and ranges from tan to brown with shades of grayish-brown in between. The plastron typically is yellow and has black blotches on the outside edge of each scute. Another important characteristic of the wood turtle's plastron is that it is hingeless, and consequently the turtle is unable to close the front of its shell. The wood turtle has been referred to as the "redleg" turtle because of the coloration of the underside of its forelegs, which can be anywhere from yellow to red. The throat, neck and tail may display similar coloration to the forelegs and the head may also be speckled with faint yellow dots. The wood turtle is one of the most terrestrial turtles

[1] http://www.birds.cornell.edu/AllAboutBirds/BirdGuide/Red-shouldered_Hawk_dtl.html

Blanding's turtle

Wood turtle

in the U.S. and is usually found inhabiting forested areas associated with rivers or streams. The species prefers streams with harder substrates, moderate currents, and clear water.[2]

Surveys for the Blanding's turtle and wood turtle were conducted in the following locations:

- Along the east and west shores of the Wisconsin River from Ver Bunker Avenue on the north to the south side of Domtar's island (including the island shoreline)
- Along One Mile and Two Mile creeks from Rangeline Road/County Z to the Wisconsin River and along the creek from the south edge of the airport to Sampson Street
- Along the Two Mile Creek crossing in the 20th Street corridor
- Along the west shore of Nepco Lake (north of the Pumping Station) and along the lake's north shore in the bay adjacent to County Z

Traps were used to determine the presence of the turtles in the study area. Turtle basking and swimming observations were also conducted along the banks of the Wisconsin River and Nepco Lake. In addition, river banks and stream channels of One Mile and Two Mile creeks were evaluated from the Wisconsin River to County Z to Sampson Street.

Blanding's turtles are not expected to be found in the Wisconsin River because of its strong current and lack of aquatic weed beds. No Blanding's turtles were seen or trapped at the trapping sites. The nature of the weed beds and the fact that Nepco Lake is a flooded swamp made that body of water more promising for Blanding's turtles, but turtles were not observed basking, swimming, egg-laying, or in the turtle traps placed in Nepco Lake.

It was expected that One Mile and Two Mile creeks would provide the best habitat for the wood turtle, but neither stream had deep enough pools to provide protection. The average water depth was shallow at 2 to 6 inches, with some areas ranging from 10 to 36 inches. The upland habitats may be good habitat in a normal year, but the drought of 2006 severely affected water levels. The infrequency of rainfall between March and June 2006 significantly reduced the flow in both streams. Turtle traps were located in areas of the Wisconsin River with slower currents nearest to the proposed bridge crossing. No wood turtles were captured in the traps, seen basking near the Wisconsin River or its tributaries, or found nesting along the banks of the Wisconsin River or Nepco Lake.

2 http://herpcenter.ipfw.edu/index.htm?
http://herpcenter.ipfw.edu/outreach/accounts/ reptiles/turtles/Wood_turtle/&2

4.10.1.3 Other Species Observed

While conducting surveys for the species discussed above, Robert Welch looked for or observed the following other species in the project area:

- Federal-endangered Karner blue butterfly (*Lycaeides melissa samuelis*)
- State-threatened osprey (*Pandion haliaetus*)
- State species of special concern bald eagle (*Haliaeetus leucocephalus*)
- State species of special concern veery (*Catharus fuscescens*), a forest thrush
- Other species of great conservation need, such as prothonotary warbler (*Protonotaria citrea*), American woodcock (*Scolopax minor*), least flycatcher (*Empidonax minimus*), and wood thrush (*Hylocichla mustelina*)

No Karner blue butterflies were observed within the survey areas, but the other species all were encountered within Survey Area One (County Z (north-south segment) and Rangeline Road West to Wisconsin River Channels and Domtar Island) and Survey Area Three (south of County Z [east-west segment] to north shore of Nepco Lake).

Most notable were the regular observations of two pairs of osprey using the Wisconsin River and Nepco Lake. Further investigation of the pairs helped to locate an active nest about 1 mile south of the Nepco Lake-Domtar Pumping Station, on a private cranberry operation. The nest was checked August 17, 2006, and two well-grown fledglings were observed on the nest.

A bald eagle was observed for a 30-minute period fishing along the rapids of the Wisconsin River within the project area, between the east bank of the river and Domtar Island. No nests were located within the project area. On June 28, 2007, the Secretary of the Interior announced the removal of the bald eagle from the federal list of threatened and endangered species. The delisting became effective on August 8, 2007. Though delisted, the bald eagle is still protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

As noted, no Karner blue butterflies, or its host plant, wild lupine, were observed in the study area during the 2006 field survey. However in a letter dated April 2008, the DNR identified two populations of wild lupine along County Z in the area of Alexander Field.

4.10.2 Environmental Consequences

Based on the results of 2006 survey, the East Arterial would not affect the red-shouldered hawk, Blanding's turtle, or wood turtle. Because state threatened osprey and wild lupine, the sole host plant for the Karner blue butterfly, were observed in the project corridor, the proposed East Arterial improvements may affect protected species. It is recommended that WisDOT conduct surveys for the red-shouldered hawk, Blanding's turtle, wood turtle, osprey, and Karner blue butterfly in a future NEPA phase.

4.10.3 Measures to Minimize Harm and Mitigation

The need to mitigate harm to state and/or federal protected species would be determined after additional surveys are conducted during a future NEPA phase.

4.11 Wildlife Resources

4.11.1 Affected Environment

The project area's upland forests, wetlands, and streams provide habitat for a variety of wildlife. Because of differences in the distribution and quality of habitat types and the level of urban development within the project area, there are fairly clear differences among the amount and diversity of wildlife resources in the project area. Although there are relatively large blocks of upland forests in the 20th Street Corridor and although Two Mile Creek passes through that area, the floristic quality of the upland forests is low, and Two Mile Creek is not a high quality riparian corridor. In addition, there are no wetlands in that corridor. The 20th Street corridor is a developing residential area. The upland forests of the 20th Street corridor provide habitat for generalist species, such as the eastern gray squirrel, eastern fox squirrel, eastern chipmunk, Virginia opossum, red fox, white-footed mouse, raccoon, Eastern cottontail, white-tailed deer, various species of bats, and a range of song birds. Two Mile Creek provides habitat for reptiles and amphibians.

With the highest quality upland forests, the largest aquatic habitat (Nepco Lake and the Wisconsin River), and the most wetlands being located at the west edge of the project area, particularly the area from Nepco Lake to the Wisconsin River, the area supports the greatest diversity of wildlife in the project area. The extensive mosaic of contiguous undeveloped upland forest and wetlands adjacent to the Wisconsin River and Nepco Lake provides important foraging and loafing habitat and migration corridors for wildlife. The forested areas within the area have a large number of snags and trees with cavities that provide nesting, shelter, and feeding areas for a number of species. Because of the diverse habitat, the area of the proposed Wisconsin River crossing would have not only the generalist species noted in the 20th Street corridor, but also the wildlife species discussed below that require more specialized habitats.

4.11.1.1 Neotropical Migrants

Neotropical migrants are birds that winter in the tropics and migrate to the U.S. and Canada to breed. Some species require large tracts of forested habitat for nesting. During the survey of threatened and endangered species conducted by Robert Welch, 16 species of neotropical migrants were encountered, all within the west edge of the project area. They include warblers, flycatchers, vireos, tanagers, and orioles. The more common species within the project corridor include the eastern wood-pewee, great-crested flycatcher, and red-eyed vireo. Species listed by Herkert et al. (1993) as being highly sensitive to habitat fragmentation include yellow-throated vireo, black and white warbler, ovenbird, mourning warbler, and American redstart.
Table 4-18 lists neotropical migrants and other birds encountered in the project area.

4.11.1.2 Raptors

Raptors include hawks, falcons, eagles, vultures, and owls. The Wisconsin River corridor provides habitat for several species of hawks, owls, and eagles. As noted in Section 4.10.1.1, the Wisconsin River corridor was surveyed for the presence of the red-shouldered hawk. Robert Welch observed turkey vulture, osprey, red-tailed hawk, American kestrel, bald eagle, Cooper's hawk, great horned owl, and barred owl in the Wisconsin River corridor.

TABLE 4-18
Bird Species Observed or Heard during Listening Surveys of the Wisconsin River Bottomlands, Domtar Island, and Forested Areas Surrounding Nepco Lake and Adjacent to County Highway Z between March 18 and June 14, 2006

Sandhill Crane with Nest	Observed and heard	Hairy woodpecker	Observed and heard
Canada Goose	Observed and heard	Red-bellied woodpecker	Observed and heard
Mallard Duck	Observed and heard	Cedar waxwing	Observed and heard
Wood Duck	Observed and heard	Common nighthawk	Observed
Double-crested Cormorant	Observed	Chimney swift	Observed
Great Blue Heron	Observed and heard	Warbling vireo	Observed and heard
Belted Kingfisher	Observed and heard	Red-eyed vireo	Heard
Green Heron	Observed and heard	Bank swallow	Observed
Turkey Vulture	Observed	Tree swallow	Observed and heard
Osprey with nest	**Observed**	House wren	Observed and heard
Red-tailed Hawk	Observed	Red-breasted nuthatch	Observed and heard
American Kestel	Observed	White-breasted nuthatch	Observed and heard
Bald eagle, adult	**Observed**	Black-capped chickadee	Observed and heard
Cooper's Hawk	Observed and heard	Northern cardinal	Observed and heard
Ring-billed Gull	Observed	House finch	Heard
Killdeer	Observed and heard	American goldfinch	Observed and heard
Spotted Sandpiper	Observed and heard	Indigo bunting	Observed and heard
American woodcock	**Observed**	Rose-breasted grosbeak	Observed and heard
Wild Turkey (feather)	Observed	Scarlet tanager	Observed and heard
Rock Pigeon	Observed	Baltimore oriole	Observed and heard
Mourning Dove	Observed and heard	Red-winged blackbird	Observed and heard
Great Horned Owl	Observed and heard	Common grackle	Observed
Barred Owl	Observed and heard	Brown-headed cowbird	Observed and heard
Blue Jay	Observed and heard	European starling	Observed and heard
American Crow	Observed and heard	American redstart	Observed and heard
Eastern Phoebe	Observed and heard	Mourning warbler	Heard
Eastern Kingbird	Observed	Common yellowthroat	Observed and heard
Least Flycatcher	**Observed and heard**	Ovenbird	Heard
Eastern Wood-Pewee	Observed and heard	Chestnut-sided warbler	Observed and heard
Great Crested Flycatcher	Observed and heard	Black and white warbler	Observed and heard
Wood Thrush	**Heard**	Yellow warbler	Heard
Veery	**Heard**	**Prothonotary warbler**	**Observed and heard**
Eastern Bluebird	Observed	Eastern towhee	Observed and heard
American Robin	Observed and heard	Song sparrow	Observed and heard
Gray Catbird	Observed and heard	Swamp sparrow	Observed and heard
Pileated Woodpecker	Observed and heard	Chipping sparrow	Observed and heard
Downy Woodpecker	Observed	Clay-colored sparrow	Observed and heard

Bold indicates species of special concern or a species of greatest conservation need. Species in red are neotropical migrants.

4.11.2 Environmental Impacts

4.11.2.1 Habitat Loss

The No-Build Alternative will not cause the loss of wildlife habitat. Construction would convert between approximately 32 and 38 acres of upland forest and up to 1.3 acres of wetlands in the project area. Potential impacts to the wildlife species (neotropical migrants, raptors, herons) that occupy these habitats are discussed below.

4.11.2.2 Wildlife Impacts

No adverse impacts to the continued abundance of generalist wildlife species are expected.

Neotropical Migrants. Of the 32 to 38 acres of upland forest that would be affected by East Arterial project, the 3 to 6 acres that would be affected by the Wisconsin River crossing alternatives would have the greatest potential impact on neotropical migrants; the Ver Bunker alternative, which would affect 3.0 acres of upland forest, would have the least impact. The Letendre and Lavigne alternatives would affect 5.5 to 6 acres of upland forest. Impacts to the forest between the Wisconsin River and County Z would result in the loss of neotropical migrant breeding habitat. Species expected to occur within that area are listed in Table 4-18.

Raptors. The 2006 species survey did not identify red-shouldered hawk or bald eagle nests in the Wisconsin River Crossing area. Robert Welch, who conducted the survey, said that the fringes of the area between County Z and the Wisconsin River provide excellent nesting habitat for red tail hawks, and the interior would provide excellent nesting habitat for broad wing hawks, Cooper's hawks, and red-shouldered hawks. With the exception of the red-shouldered hawk, no raptor species listed in Table 4-18 were included in the 2006 survey.

The Letendre and Lavigne alternatives that would be on new alignment through this area would affect potential habitat for raptor species that prefer nesting within the interior of forests.

4.11.2.3 Operational Mortality

Studies by USEPA and the Highway Safety Information System report that the overall rate of vehicle/animal collisions has increased steadily over a 7-year period. The study, which included data from Illinois and four other states, also found the rate of animal crashes, expressed as number of accidents per million vehicle kilometers, was greatest on 2-lane rural roads, followed by multilane rural and urban road types. The study reported collision rates for rural roads ranged from 0.07 crash to 1.16 crashes per kilometer per year (Hughes and Saremi 1995).Vehicle/animal crashes would be an issue along the entire length of the East Arterial, but the Wisconsin River Crossing alternatives would introduce a section of roadway where none exists today. It is reasonable to assume that mammal and amphibian/reptile species in that part of the project corridor will continue to be drawn to existing movement corridors. Movement corridors that intersect the river crossing alternatives would be new locations of animal/vehicle crashes.

4.11.3 Measures to Minimize Harm and Mitigation

Efforts should be made to minimize impacts to floodplain forests and other fish and wildlife habitat. The USFWS recommends that any bridge design allow wildlife passage under the bridge, particularly along the main river channel where there is an extensive riparian and riverine habitat corridor.

Under the Migratory Bird treaty Act of 1918, as a mended, it is unlawful to take, capture, kill, or possess migratory birds, their nests, eggs, and young. If habitat impacts for nesting migratory bird species are unavoidable, potential habitat or nesting structures should be removed before the spring nesting of migrants begins or after the breeding season has ended. Alternately, the structures can be tightly screened before breeding season to prevent nesting. The USFWS recommends that screening or any other habitat disturbance occur before May 1 or after August 30 to minimize potential impacts to migratory birds.

4.12 Regulated Materials

4.12.1 Affected Environment

Preliminary hazardous materials reconnaissance activities were conducted in the project area to locate potential sources of contamination on or adjacent to the right-of-way needed for the East Arterial. The technical memorandum documenting these activities, titled "Hazardous Materials Preliminary Reconnaissance Summary," can be found on the CD at the back of this document. The review consisted of reconnaissance (windshield survey of the proposed corridor); a meeting with representatives from Port Edwards and Domtar, conference calls with the DNR and a local historian; a review of historic aerial photographs from Domtar Island; and an environmental database search of state and federal databases for the project corridor. The database search conducted as part of this review included properties within a 1-mile radius of the East Arterial project corridor. A windshield survey was conducted on February 8, 2007, to inspect properties along the corridor. The windshield survey and agency contacts were used to confirm and supplement information obtained during the records review and database search.

4.12.2 Environmental Consequences

Potentially contaminated soil and contaminated groundwater adjacent to the proposed East Arterial will be an important environmental factor during a future NEPA screening of alternatives. It is WisDOT's policy to avoid acquiring potentially contaminated properties to the extent practicable. When such properties cannot be avoided for the selected improvement, alternative public and private funds are required for additional investigation and, if needed, remediation.

The No-Build Alternative would not likely affect any potential contaminated sites. Within the project's area of potential effect, there are several locations with aboveground and underground storage tanks that may pose issues for the project. See the hazardous materials technical memorandum on the CD at the back of the document for more information. There is evidence of past contamination on Domtar Island caused by ponds that held liquid wastes from the papermaking process and from municipal landfilling. It is recommended that a Phase I investigation be conducted as part of a future NEPA phase to determine the need for additional work along the corridor. See Section 5 and the meeting summary in Appendix A for more information.

Improvements along 8th Street could be affected by contamination from former gas stations and several current uses if subsurface activities are performed.

4.12.3 Measures to Minimize Harm and Mitigation

Given the potential to encounter potential contamination along the proposed East Arterial and 8th Street improvements, it is recommended that WisDOT conduct a Phase 1 survey to update the list of potential contaminated sites identified during this study. It is also recommended that WisDOT conduct a Phase 2 survey, which involves taking soil and water samples to confirm or dismiss the possibility of contamination, on Domtar Island and other locations. If contamination encountered in the project area must be removed before construction, WisDOT will work with concerned parties to address the contamination to the satisfaction of the DNR, the WisDOT Bureau of Environment, and the Federal Highway Administration.

Measures to avoid or remediate potentially contaminated properties cannot be taken until there is a clearer understanding of the nature of the problem. That would occur during a future NEPA phase. Given the preliminary information gathered during the study, alternatives have been developed to avoid the potential contamination on Domtar Island.

4.13 Cultural Resources

4.13.1 Affected Environment

4.13.1.1 Archaeology

Archaeological investigations along the proposed East Arterial were conducted by the Mississippi Valley Archaeological Center of the University of Wisconsin–La Crosse. The archaeological assessment included a literature search of published reports, site forms, and reports on previously recorded sites on file at the State Historical Society of Wisconsin. The assessment also included a review of previously surveyed areas, previously reported archeological sites near the proposed East Arterial, and a field visit to walk over and drive by the project area to assess degrees of past disturbance, with the goal of identifying areas of high, medium, and low archaeological potential. The assessment did not include shovel tests or coordination with the Historical Society through completing WisDOT's Section 106 form.

A review of the Archaeological Site Inventory within the Wisconsin Archaeological and Historic Resources Database for known archaeological resources in the study area revealed several prehistoric archaeological sites, two of which are along the east bank of the Wisconsin River within the proposed Wisconsin River crossing area. The sites were reported during a FERC relicensing survey of the Wisconsin River shoreline (Salkin 1991). These sites contain quartz debitage, chert flakes, grit tempered pottery sherds, and Hixton silicified sandstone, among other types of artifacts. These known sites are likely eligible for the National Register of Historic Places.

No other sites were previously reported in the immediate vicinity of the proposed project, although much of the area has not been formally surveyed.

The assessment of undisturbed areas along the proposed East Arterial concluded that the upland forest areas along the 20th Street corridor have low archaeological probability. The area adjacent to County Z between Sampson Street and One Mile Creek has medium archaeological potential, as does the forested area between County Z and the Wisconsin River shoreline. The area where One Mile Creek enters the north end of Nepco Lake and the

Wisconsin River shoreline were identified as having high archaeological potential. The shoreline of Domtar Island was considered to have high archaeological potential, the interior only medium potential.

United Methodist Church of Port Edwards

In April 2004, the Mississippi Valley Archaeological Center performed a phase I archaeological survey at Alexander Field. Testing was undertaken in advance of refurbishing existing gravel roads and expansion of the airport into an area that is known to have housed prisoners of war during World War II. Archaeological testing revealed no substantial archaeological or historical deposits (Kooiman and Swanson, 2004).

Colonial Revival style house

4.13.1.2 Historic Properties

Three potentially historic properties were identified along the East Arterial as part of the project's historical survey. Two are located at the corner of Letendre Avenue and Wisconsin River Drive (WIS 54) in Port Edwards. On the northwestern corner of the intersection is a 1920s Colonial Revival style house. On the southwestern corner is the United Methodist Church of Port Edwards, a mid-20th Century Gothic Revival church. Neither property is in the database of the Wisconsin State Historical Society.

The third potentially historic property is the DNR's Griffith State Nursery property. This property was identified in the *1991 State Facilities Survey: Reconnaissance Survey Report.* This report identified the site and 17 structures on it constructed before 1945 as "considered as a potential Historic District." The property was also home to a small camp that the local Civilian Conservation Corps used during the New Deal program in the 1930s and possibly into the 1940s. The structures at the nursery are very similar and in excellent condition. A copy of the historical report is found on the CD at the back of the document.

4.13.2 Environmental Consequences

4.13.2.1 Archaeology

The No-Build Alternative would not affect archaeological resources. The greatest potential to encounter archaeological material with the Build Alternatives appears to be between Sampson Street and the west side of Domtar Island. Within that area, the areas of highest

potential are at One Mile Creek as it flows into Nepco Lake, the east edge of the Wisconsin River shoreline, and the Wisconsin River shoreline on Domtar Island.

All of the Wisconsin River crossing alternatives would affect the high archaeological probability area at One Mile Creek where it enters Nepco Lake.

The Ver Bunker Avenue Alternative, being north of Domtar Island, avoids the areas of high archaeological probability on the shores of the island and the east bank of the Wisconsin River. The Lavigne Avenue and Letendre Avenue alternatives cross the east channel of the Wisconsin River north of the identified area of high archaeological probability, but do cross the high probability areas on both the east and west shores of Domtar Island.

4.13.2.2 Historic Properties

The Kuhn Avenue to Nepco Lake Road Alternative 2 requires about 1 acre of the Griffith State Nursery. The area of the state nursery that would be affected is a seedling production area that has no buildings. Under this alternative County Z would be moved closer to the buildings on the south side of the road near the County Z/Lincoln Street intersection.

Letendre Avenue Alternatives 1A and 1B (Intersection Concept 1) would affect the church and residence at the intersection of Letendre Avenue and Wisconsin River Drive. Intersection Concepts 2 and 3 would avoid the church but relocate the residence.

4.13.3 Measures to Minimize Harm and Mitigation

As part of a future NEPA phase, a full Phase 1 survey should be completed along the project's reasonable range of alternatives. The Phase 1 survey, which would include shovel testing, would verify the conclusions reached about archaeological potential in this study. The Phase 1 survey should also include determinations of eligibility for the two potentially historic structures in Port Edwards and the Griffith State Nursery.

Given the limited archaeological and historic data collected during the study, alternatives were developed to avoid some of the issues identified. The Wisconsin River crossing alternatives were designed to avoid the known archaeological sites near the east shore of the Wisconsin River and the adjacent area of high probability. The Ver Bunker Alternative avoids Domtar Island and potential areas of high probability along the island's shoreline.

Alternative 1 in the Kuhn Avenue to Nepco Lake Road segment was designed to avoid the DNR's nursery by maintaining the south right-of way line along County Z west of 8th Street. The Ver Bunker and Lavigne alternatives would not displace the United Methodist Church or the house north of it. Two of the three intersection concepts for the Letendre Alternative avoid the church. Intersection Concepts 2 and 3 include retaining walls to avoid displacing the church.

4.14 Recreational Resources/Public Use Land

This section addresses the recreational resources, parks and public use areas in or adjacent to the East Arterial corridor. There are no parks or public use areas adjacent to the 8th Street corridor. The locations of parks and recreational resources are show on the East Arterial aerial exhibit at the back of this document and are discussed below.

4.14.1 Affected Environment

4.14.1.1 Central Wisconsin BMX

The Central Wisconsin BMX facility is a BMX bike racing track east of Lincoln High School and the proposed East Arterial along County W. The facility, which is located on city property has been operated by the Central Wisconsin BMX Club since 2003. It is not considered part of the city's park system. Access to the site is gained from the unpaved road at the southern leg of the WIS 54/County W intersection.

4.14.1.2 Lincoln High School Recreation Fields

The Lincoln High School campus has a fieldhouse, six tennis courts, two softball fields, a baseball field and a football/track stadium. These facilities are located between the proposed East Arterial and 16th Street.

Central Wisconsin BMX track looking east from proposed East Arterial

4.14.1.3 South Wood County Recreation Center

The South Wood County recreation Center is located at the south end of the Lincoln High School campus. The building, which is privately operated, houses an ice rink for hockey, figure skating, curling, and recreational ice skating with locker rooms and a concession area.

4.14.1.4 Wisconsin Rapids Water Works and Lighting Commission Wellhead Protection Area

The City of Wisconsin Rapids owns the undeveloped pine plantations along the 20th Street corridor. The public has worn paths into parts of the wooded parcels, but the parcels are not part of the city's park system.

4.14.1.5 The Ridges Golf Course

The Ridges Golf Course is a privately owned 18-hole golf course located at 2311 County Z, east of the proposed East Arterial. The course is open to the public.

4.14.1.6 Nepco Lake Park

Nepco Lake Park is located south of County Z and east of 8th Street. The 125-acre park, located on Nepco Lake, was donated to Wood County in 1977 by Nekoosa Papers Inc. as a day use park. Nepco Lake Park features a beach, boat ramp, picnic area, playground, handicapped accessible walking paths, boat dock, a 1.6-mile hiking/ski trail and a small shelter. A larger, enclosed shelter is also available for rent year round.

4.14.1.7 Alexander Field Walking Trail

A 4-mile walking trail is located along the southern perimeter of Alexander Field. There is a fence along the trail that restricts access to the Alexander Field grounds. The trail runs through three jurisdictions Wisconsin Rapids, Grand Rapids and Port Edwards, and the Airport Commission is officially responsible for the trail. The trail runs through a wooded area to the southeast of the airport with the remainder of the trail following the fenced perimeter of the airport.

4.14.1.8 Domtar Boat Launch

A boat launch and parking area are located on Domtar property north of the Domtar Dam on the west side of the Wisconsin River, just north of Ver Bunker Avenue. The boat launch was created as part of the 1996 relicensing of the dam by the Federal Energy Regulatory Commission. The paved parking area has access to the Wisconsin River Drive/Ver Bunker intersection. An unpaved road extends north of the parking lot to the boat launch. The boat launch includes one disabled parking space and a pier. A buoy and cable barrier are present at the boat launch to prevent boaters from approaching the dam.

Domtar boat launch

4.14.2 Environmental Consequences

4.14.2.1 Wisconsin Rapids Water Works and Lighting Commission Wellhead Protection Area

The County W to Kuhn Avenue Alternatives 1 and 2 and the Kuhn Avenue to Nepco Lake Road Alternatives (1 and 2) could affect up to approximately 16.5 acres of the WW&LC wellhead protection area along the 16th/20th Street corridor. Representatives of the Commission have said that the proposed East Arterial would not affect the function of the property, and that the remainder of the parcels would stay undeveloped. Because the primary purpose of the properties is not public recreation, they would not be considered a Section 4(f) resources.

4.14.2.2 Alexander Field Walking Trail

The Wisconsin River crossing alternatives would widen County Z to the north in the area between

Airport trail footbridge north of County Z

Nepco Lake and Alexander Field. The widening would require the footbridge over One Mile Creek that is part of the airport walking trail to be relocated north. During a future NEPA phase coordination would have to be conducted with the three project-area communities and the airport manager to determine which entity functions as the administrator of the trail, and whether the administrator considers the trail a significant recreational resource. Based on the outcome of that coordination, WisDOT and FHWA would make a determination whether the trail is a Section 4(f) resource.

4.14.2.3 Domtar Boat Launch

The Ver Bunker Alternative 3 would affect most of the Domtar boat launch parking lot (Exhibit 3-10). The alternative would require that a new access point be developed north of the current entrance on property Domtar owns. The boat launch would be unaffected by the Ver Bunker Alternative. During a future NEPA phase coordination would have to be conducted with the entity that is responsible for maintaining the boat launch to determine the significance of the boat launch. As noted, Domtar is closing its operation in Port Edwards. Following coordination with the boat launch's owner, WisDOT and FHWA would have to determine whether the boat launch (and parking area) is a Section 4(f) resource and whether the impact to the parking area constitutes an impact to a Section 4(f) resource.

Domtar boat launch parking area east of the Wisconsin River Drive/Ver Bunker intersection

4.14.3 Measures to Minimize Harm and Mitigation

Because there would be no impacts, it is unlikely that any minimization measures or mitigation would be needed. This issue will be reevaluated during a future NEPA phase.

4.15 References

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Environmental Issue	Unit of Measure	County W to Kuhn Avenue		Kuhn Avenue to NEPCO Lake Road		Wisconsin River Crossing				8th Street Alternatives	
		Alternative 1	Alternative 2	Alternative 1	Alternative 2	Alternative 1A Letendre	Alternative 1B Letendre	Alternative 2 Lavigne	Alternative 3 Ver Bunker	Alternative 1 Convert TWTL to Raised Median	Alternative 2 Wider Median to Accommodate for U-Turns
Segment Length	Miles	1.5	1.5	1.8	1.8	1.2	1.1	1.0	0.8	1.8	1.8
Cost											
Real Estate (2007 $)	Dollars	$0.2M	$0.3M	$2.9M	$1.5M	$0.4M	$0.4M	$0.7M	—	—	$4.7M
Construction (2008 $)	Dollars	$8.5M	$9.0M	$9.9M	$9.9M	$16.5M	$15.7M	$14.9M	$10.6M	$1.1M	$10.9M
Right-of-Way Required											
Total Area Required	Acres	29.0	33.0	31.0	31.0	15.5	15.0	13.5	11.0	25.0	29.5
New Area Converted to ROW	Acres	7.5	12.0	7.5	6.5	8.0	7.2	7.5	3.7	0.0	4.5
Existing ROW Used	Acres	21.5	21.0	23.5	24.5	7.5	7.8	6.0	7.3	25.0	25.0
Land Conversion											
Residential Property Converted to ROW	Acres	7.5	12.0	6.0	4.5	1.0	1.0	1.0	0.4	0.0	0.1
Commercial Property Converted to ROW	Acres	0.0	0.0	1.5	1.0	2.7	2.3	1.7	0.3	0.0	4.4
Institutional (Church) Property Converted to ROW	Acres	0.0	0.0	0.0	0.0	0.8	0.8	0.0	0.0	0.0	0.0
DNR Nursery	Acres	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
Real Estate											
Residential Displacements	Number	3	3	22	11	5	5	9 [a] / 0 [b]	0	0	4
Commercial Displacements	Number	0	0	3	1	0	0	0	0	0	9
Institutional Displacements	Number	0	0	0	0	1 [c] / 0 [d]	1 [c] / 0 [d]	0	0	0	0
Environmental Issues											
Stream/River Crossings	Number	1	1	0	0	2	2	2	2	2	2
Floodplain Crossings	Number	1	1	0	0	2	2	2	2	2	2
Floodplain	Acres	1.0	2.0	0.0	0.0	3.8	3.5	2.9	1.3	0.0	0.4
Threatened & Endangered Species	Yes/No	No	No	No	No	No	No	No	No	No	No
Potential Historic Properties	Number	0	0	0	1	2	2	0	0	0	0
High Potential Archaeological Area	Yes/No	No	No	No	No	Yes	Yes	Yes	Yes	No	No
Contaminated Sites	Yes/No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Wetlands Impacted	Acres	0	0	0	0	1.0	1.3	1.3	0.7	0	0
Forest/Upland Impacted	Acres	27	30	27	27	11	10	12	10	0	4.0

Notes:

Segment length is centerline length along the proposed arterial and does not include additional centerline length of local road connections.

The real estate costs were obtained from the Wood County Land Records (http://landrecords.co.wood.wi.us/website/Public/viewer.htm) which lists fair market values for properties in the study area. Only the fair market value of properties that would have a business or residence displaced by the project were used to develop real estate costs. The value of strip acquisitions from residential and commercial properties are not included in the costs. The value of the United Methodist church property on Letendre Avenue in Port Edwards is not included in the cost calculations.

Existing right-of-way includes city-owned parcels.

Right-of-way and land conversion impacts are for Intersection Concept #1 at the Letendre and Lavigne intersections.

[a] Lavigne Intersection Concept #1

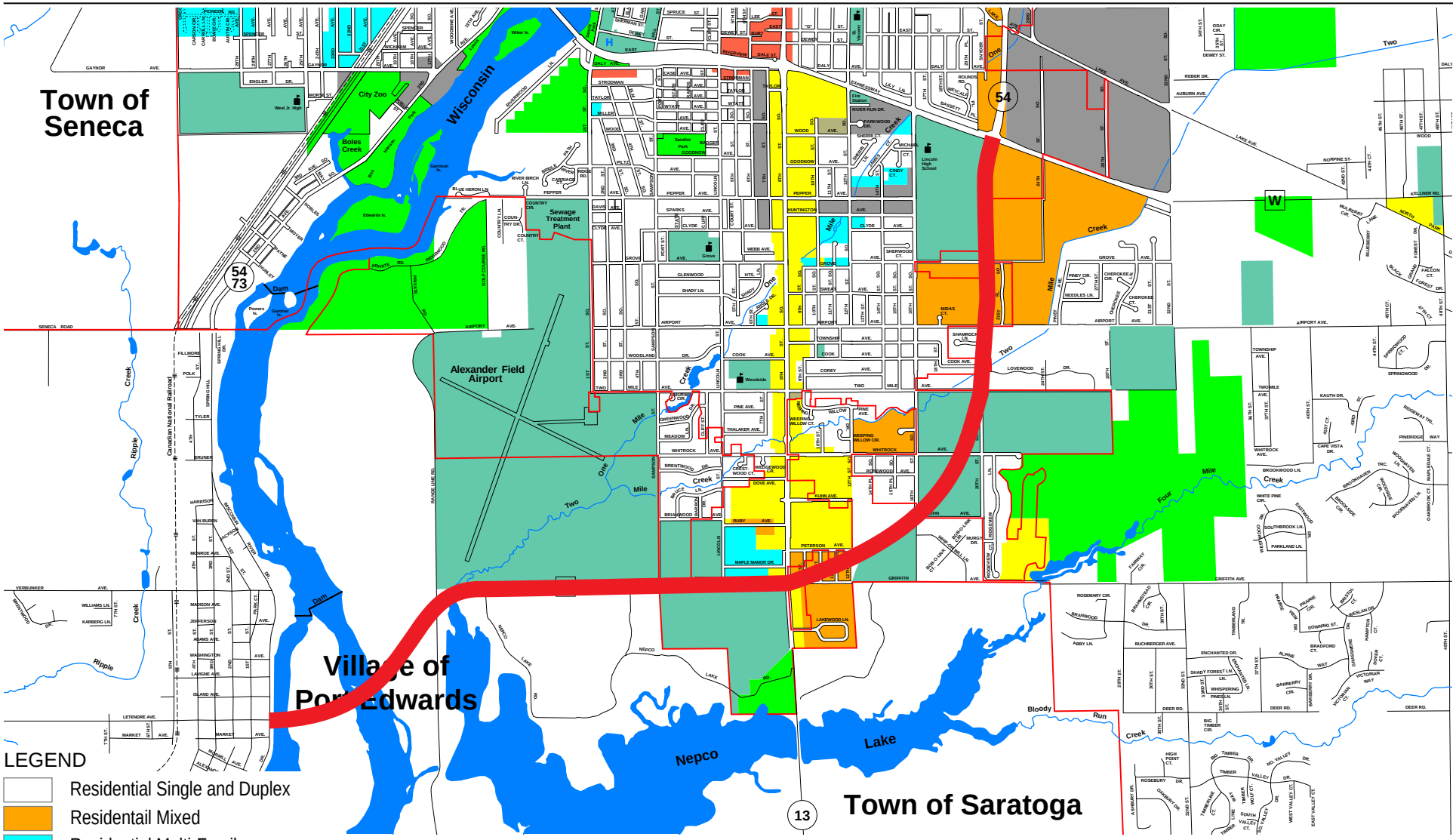
[b] Lavigne Intersection Concept #2

[c] Letendre Intersection Concept #1

[d] Letendre Intersection Concepts #2 and #3

EXHIBIT 4-1

Impact Summary Table



LEGEND

- Residential Single and Duplex
- Residentail Mixed
- Residential Multi-Family
- Residentail Single Family
- Commercial
- Central Area Mixed Use
- Exclusive Office District
- Agricultural
- Parks And Open Spaces
- General Mixed Use
- Institutional Schools / Government
- Industrial General
- Industrial Park
- Business Park

Source: City of Wisconsin Rapids

North

0 250 500 1000 1500 2000

EXHIBIT 4-2
Existing Land Use Map

TB052008006MKE 4.2_Existing_Land_Use_2 08.25.08 cae

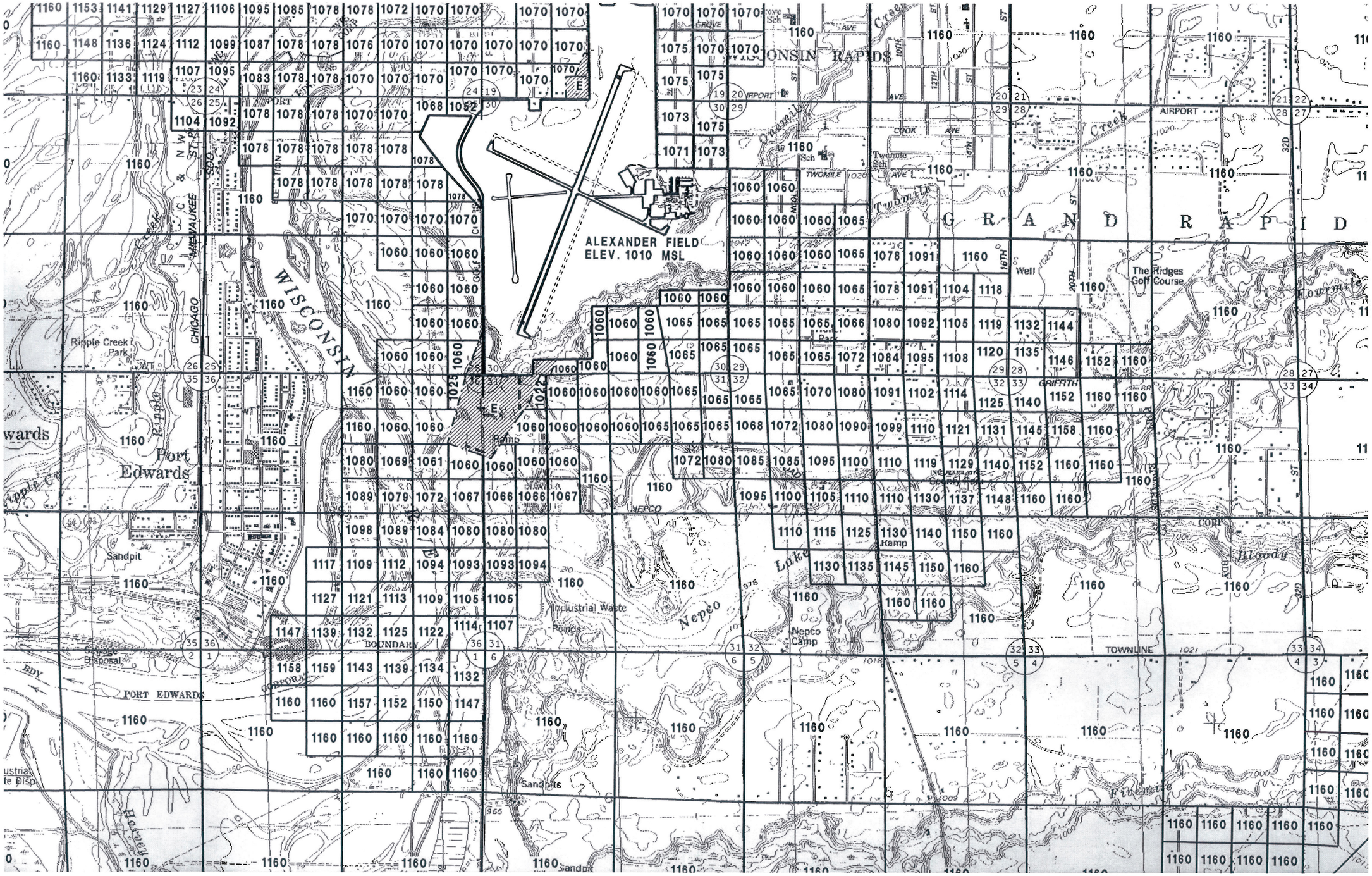


EXHIBIT 4-3
Height Restrictions in
Area Surrounding Airport

Source: WisDOT - Bureau of Aeronautics

TB052008006MKE 4.3_Height_Restrictions_2 10.30.08 cae

CH2MHILL

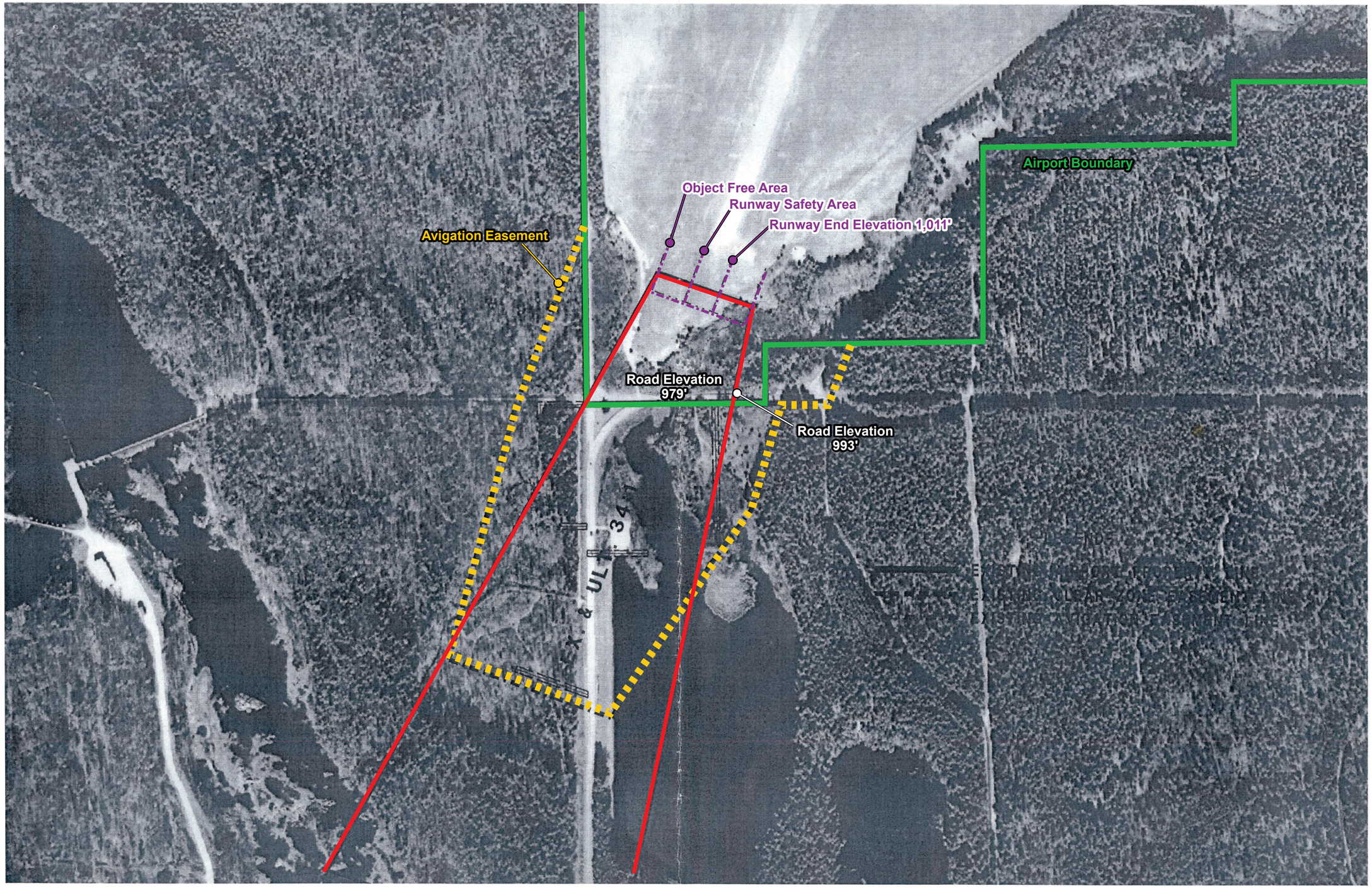


EXHIBIT 4-4
Avigation Easement and
Runway Safety Area–Alexander Field

Source: WisDOT - Bureau of Aeronautics

TB052008006MKE 4.4_Avigation_Easement_4 10.30.08 cae/sls

CH2MHILL

North

EXHIBIT 4-5
Domtar Dam

TB052008006MKE 4.5_Domtar_Dam_2 10.30.08 mjl/sls

LEGEND

- Wetlands
- Floodplain
- Property Boundaries

EXHIBIT 4-6
Wetlands in the Project Area

TB052008006MKE 4.6_Wetlands_in_Project_Area_3 9.16.08 cae/mjl

CH2MHILL

5. Agency Coordination and Community Involvement 5-1
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Section 5

Agency Coordination and Community Involvement

SECTION 5

Agency Coordination and Community Involvement

This section summarizes the agency coordination and public involvement activities that occurred during preparation of this document, including coordination activities with resource agency officials, and meetings with area officials and the public. Participation was open to any interested persons. No one was excluded because of income, race, color, religion, national origin, sex, age, or handicap.

5.1 State and Federal Agency Coordination

The project team contacted state and federal agencies by letter on May 19, 2006, to introduce the study, to request data such as the presence of protected species in the project area, and to allow the agencies to provide initial issues or concerns about the proposed project. The letters were sent to USACE, USFWS, and the Wisconsin DNR. WisDOT sent an "Initial Notification" letter to Native American tribes on May 24, 2006, to introduce the study and to provide information about the extent of the project's archaeological studies and known archaeological sites in the project area.

The project team sent a second letter to state and federal agencies and Native Americans on November 1, 2007. The letter requested agency comments on the preliminary range of alternatives that were presented at the project's first public information meeting on September 26, 2007. Agency input in response to WisDOT's coordination letters are in Appendix A.

The project team also met with the DNR and WisDOT's Bureau of Aeronautics during the study. A summary of those meetings is found below.

The feasibility study was sent to the Wisconsin DNR and the USACE for review. The USACE's comments on the feasibility study are found in Appendix A. The DNR commented on the feasibility study prior to the comment period. Their project input is also found in Appendix A.

5.1.1 March 19, 2008, DNR Meeting

The purpose of the meeting with the DNR was to discuss the project's potential impacts on the Griffith State Tree Nursery on the south side of County Z and the DNR's Service Center on the north side of County Z. The DNR described the potential impacts to the seedling production area in the nursery if County Z were to be widened to the south west of the 8th Street/County Z intersection. The DNR also provided information on the potential historic significance of the Griffith Nursery and the preliminary Wisconsin River bridge crossing alternatives. A copy of the meeting minutes from the March 19th meeting is in Appendix A.

5.1.2 April 7, 2008, Bureau of Aeronautics Meeting

The purpose of the BOA meeting was to discuss the project's potential impacts on Alexander Field South Wood County Airport. The BOA staff discussed the constraints imposed by the height limitations surrounding the airport and the avigation easement extending south of the airport runway. They also updated the project team on a future feasibility study that will investigate the need for extending one of the airport's existing runways an additional 500 feet. A copy of the meeting minutes from the April 7th meeting is in Appendix A.

5.2 Local Agency Coordination

The project team sent the preliminary alternatives to the administrators of the following public use lands in the study area, Lincoln High School, Wisconsin Rapids' Water Works and Lighting Commission (WWLC), and the Wood County Parks and Forestry Department. A conference call was held with representatives from the WWLC on June 16, 2008, to discuss the potential impacts to their property on 16th Street and 20th Street and facilities like the groundwater well on 16th Street. Appendix A contains a copy of the telephone call record, as well as an e-mail from Lincoln High School and a letter from the Wood County Parks and Forestry Department.

5.3 Oversight Committee Meetings

A project Oversight Committee representing WisDOT, the Village of Port Edwards, the City of Wisconsin Rapids, the Town of Grand Rapids, and Wood County was formed at the beginning of the project. Committee members identified socioeconomic and environmental resources along the East Arterial corridor, provided input on alternatives and impacts, communicated their community's project concerns, and reviewed technical aspects of the study.

Four Oversight Committee meetings were held during the study to discuss project progress and to provide input at key project decision points. Table 5-1 summarizes the meetings. Appendix A contains the meeting minutes under Local Agency Coordination: Oversight Committee. The PowerPoint presentations for the second, third, and fourth Oversight Committee meetings are found on the CD at the back of this report.

TABLE 5-1
Oversight Committee Meetings

Meeting	Topics
November 2006	Introduction to study. Review of traffic operations on the East Arterial and on 8th Street with and without the East Arterial. Consideration of additional traffic data that could more accurately reflect the influence of numerous driveways on 8th Street in the traffic model. Discussion of the footprint of the East Arterial.
July 2007	Discussion of design criteria used in developing the preliminary range of alternatives. Review of the preliminary East Arterial Alternatives and consideration of the need for signalized intersections along the 20th Street corridor portion of the study area. Discussion of the level of potential commercial impacts at the 8th Street/County Z intersection. Review of the Purpose and Need Statement. Planning for the first public information meeting.
March 2008	Debrief of first public information meeting in September 2007. Update on agency coordination efforts. Review of more detailed design work for the Wisconsin River crossing alternatives, including the intersection configurations at Letendre Avenue, Lavigne Avenue, and Ver Bunker Avenue in Port Edwards. Discussion of traffic operations at Port Edwards

TABLE 5-1
Oversight Committee Meetings

Meeting	Topics
	intersections under all-way and two-way stop control conditions. Review of more detailed design work on 8th Street to replace the center two-way left lane with a raised median. Review of updated project schedule.
December 2008	Debrief of draft feasibility study report. Preview of second public information meeting. Discussion of next steps in the project process.

5.4 Community Involvement

5.4.1 Community Meetings and Contacts

A meeting was held on February 8, 2007, with representatives from the Village of Port Edwards and Domtar to discuss current and past uses of "Domtar Island" by Nekoosa Paper and Domtar. The meeting was held prior to developing the river crossing alternatives so that the project team could use information about potential environmental issues on the island in designing alternatives that would avoid or minimize impacts to potentially contaminated areas. It was recommended that the project team contact Marshall to learn more about possible municipal uses on the island as well as how the island was used by the Nekoosa-Edwards Paper Company. There was also a discussion of the recreation land that Domtar maintains in the area of the dam as a result of the licensing requirements imposed by the Federal Energy Regulatory Commission. Appendix A contains a copy of the minutes and sign-in sheet from this meeting.

On April 26, 2007, the project team contacted Marshall Buehler, a local historian, regarding past uses of the island owned by Domtar. Marshall indicated that he has a long history of involvement with the island having lived in the area his entire life and worked for the Nekoosa-Edwards Paper Company. Marshall identified two historic practices that may have resulted in subsurface contamination on the island. He noted that in the 1950s a liquid waste product from the paper-making process was stored in ponds on the east side of the island. He also noted that the island was used as a municipal dump in the mid-1960s.

The project team met with the Village of Port Edward's Ad Hoc Bridge Committee on January 9, 2008. The Ad Hoc Bridge Committee is comprised of representatives from local businesses, Port Edwards schools, and the Village of Port Edwards, including Village Engineer/Administrator Joe Terry who is also a member of the project's Oversight Committee. The meeting agenda included the following topics:

- Review the project's Purpose and Need Statement
- Review and compare the three proposed Wisconsin River crossings
- Discuss quantifying the economic impact to the area

One of the key topics discussed was the need to collect information that could be used to explain the importance of the East Arterial Project to Port Edward's economy and the regional economy. Committee members were also interested in how to accelerate construction of the project. They would like a bridge constructed in four years. Appendix A contains a copy of the meeting sign-in sheet. The PowerPoint presentation developed by the Ad Hoc Committee is on the CD at the back of this report.

5.4.2 Public Information Meetings

Two public information meetings were held during the study. Meetings were announced through news releases in the *Wisconsin Rapids Daily Tribune,* a project newsletter, and a letter of invitation. The meetings were held in open house format.

5.4.2.1 First Public Information Meeting

The public information meeting was held on September 26, 2007 from 5 to 7 p.m. in the All Purpose Room of the McMillan Memorial Library in Wisconsin Rapids. WisDOT and consultant team members were present to discuss the preliminary alternatives, answer questions, and obtain comments. Approximately 120 people attended the meeting.

A project newsletter announcing the meeting was sent to property owners, local units of government, utilities, state agencies, elected officials, and other interest groups. The newsletter is on the CD at the back of this report. Project displays included an overview map with general Wisconsin Rapids East Arterial (East Arterial) corridor, a project process display that shows the steps the project must go through before it will be constructed, existing and future traffic volumes on Wisconsin Rapids-area roadways with and without the proposed East Arterial, crash rates for 2nd Avenue, the Riverview Expressway and 8th Street for the period 2000 through 2004, existing and proposed typical sections, and aerial exhibits showing the East Arterial's preliminary range of alternatives.

A take-home handout and comment form was also available. It provided information on why this study is being conducted, the need for the East Arterial, an outline of key study activities, a list of environmental studies to be conducted as part of this study, upcoming project activities and contact information. The handout is on the CD at the back of this report.

A sampling of the comments received at the public information meeting included:

- Project opposition from several 20th Street residents due to future noise impacts and declining property values,
- The bypass belongs outside of the city and not through the middle of people's homes,
- Several people felt that a new bridge between Port Edwards and Wisconsin Rapids would improve travel efficiency,
- Several people were concerned the Ver Bunker alternative would increase traffic past the park, grade school and senior living facility. They supported alternatives that connected to Letendre Avenue.

Appendix A contains the minutes and sign-in sheets from the September 26 meeting. Public comments submitted at and after the meeting are on the CD at the back of this report.

5.4.2.2 Second Public Information Meeting

The second public information meeting was held on March 24, 2009, from 5 to 7 p.m. in the All Purpose Room of the McMillan Memorial Library in Wisconsin Rapids. Project team members were available to discuss the conceptual intersection designs at the WIS 13/County Z intersection and the intersections of Wisconsin River Drive with Letendre,

Lavigne, and Ver Bunker avenues in Port Edwards, present the second improvement alternative developed along 8th Street, receive comments on the feasibility study, and receive input on the study in general. Approximately 123 people attended the meeting.

A public meeting invitation letter announcing the meeting was sent to property owners, local units of government, utilities, state agencies, elected officials, and other interest groups. The invitation letter is on the CD at the back of this report. A take-home handout and comment form was also available. It provided information on the conceptual intersection designs, including exhibits, the new WIS 13 (8th Street) alternative, highlights from the completed feasibility study, and contact information following the completion of the study. The handout is on the CD at the back of this report.

Project displays included aerial exhibits showing the East Arterial's preliminary range of alternatives, the two improvement concepts along WIS 13 between Riverview Expressway and County Z, the conceptual intersection designs at the WIS 13/County Z intersection and the intersections of Wisconsin River Drive with Letendre, Lavigne, and Ver Bunker avenues in Port Edwards. Several copies of the Feasibility Study were also available for review.

A sampling of the comments received at the public information meeting included:

- Concern that connecting Peterson Avenue and County Z would increase traffic on a road not constructed to accommodate trucks and make access difficult for local residents,
- Opposition to the project based on the dead-end streets created, environmental impacts, loss of tax base, and construction costs,
- There were a few comments about Whitrock Avenue. One request was that Whitrock Avenue intersect the proposed East Arterial in its current location. Another request was that Whitrock Avenue be realigned to intersect the East Arterial and 20th Avenue.
- There were several questions about the measures WisDOT is considering to mitigate potential noise increases and visual impacts along the East Arterial,
- A business owner on WIS 13 (8th Street) was concerned about diverting any traffic away from 8th Street and constructing a median that would restrict access to local businesses.

Appendix A contains the minutes and sign-in sheets from the March 24 meeting. Public comments submitted at and after the meeting are on the CD at the back of this report.

5.4.3 Project Newsletter

A project newsletter was prepared to introduce the project and announce the first public information meeting. The newsletter was sent to local units of government, review agencies, and project area residents before the public information meeting. It provided an overview of the need for the project and the key study activities. It also provided a map of the proposed East Arterial corridor and project contact information.

A public meeting invitation letter (March 2009) was sent to local units of government, review agencies, and project area residents to announce the date and location of the second public meeting. The letter also summarized project activities since the September 2007 public meeting.

5.4.4 Feasibility Study Comments

The project team notified the public of the availability of the feasibility study report for review in a news release submitted to the *Wisconsin Rapids Daily Tribune* and in a public meeting invitation letter. The comment period extended from March 9 to April 7, 2009. The feasibility study report was available for review at the Wisconsin Rapids engineering department, the Port Edwards village hall, the Grand Rapids town hall, and the Wood County Planning and Zoning Office. The feasibility study was also available for review at the second public information meeting.

As noted, the feasibility study also was sent to the Wisconsin DNR and the USACE for review. The USACE's comments on the feasibility study are found in Appendix A. The DNR commented on the feasibility study prior to the comment period. Their project input is also found in Appendix A. Public comments on the project received at and after the March 24 public information meeting are found on the CD at the back of this report.

Resolutions of support for the project were passed by Wisconsin Rapids, Port Edwards, the towns of Grand Rapids and Sigel, and Wood County. The resolutions are found in Appendix A.

Aerial Exhibits

East Arterial

North

LEGEND

- High Probability Archaeological Area
- Potentially Eligible Historic Structure
- Parkland
- Former Sulfate Ponds & Municipal Dump
- Wetlands
- Existing Parcels and R/W
- Water Channel
- Flood Zone
- Residential Relocation
- Commercial Relocation
- Proposed East Arterial Corridor
- Proposed Local Road Connection
- Local Road - No Local Access to the Arterial

AERIAL EXHIBIT

SHEET 1
County W to Kuhn Rd
Alternative 1
No Access from Two-Mile Rd. to Airport Ave.

TB052008006MKE Sheet1_CTH-W_to_Kuhn_2 08.22.08 cae

North

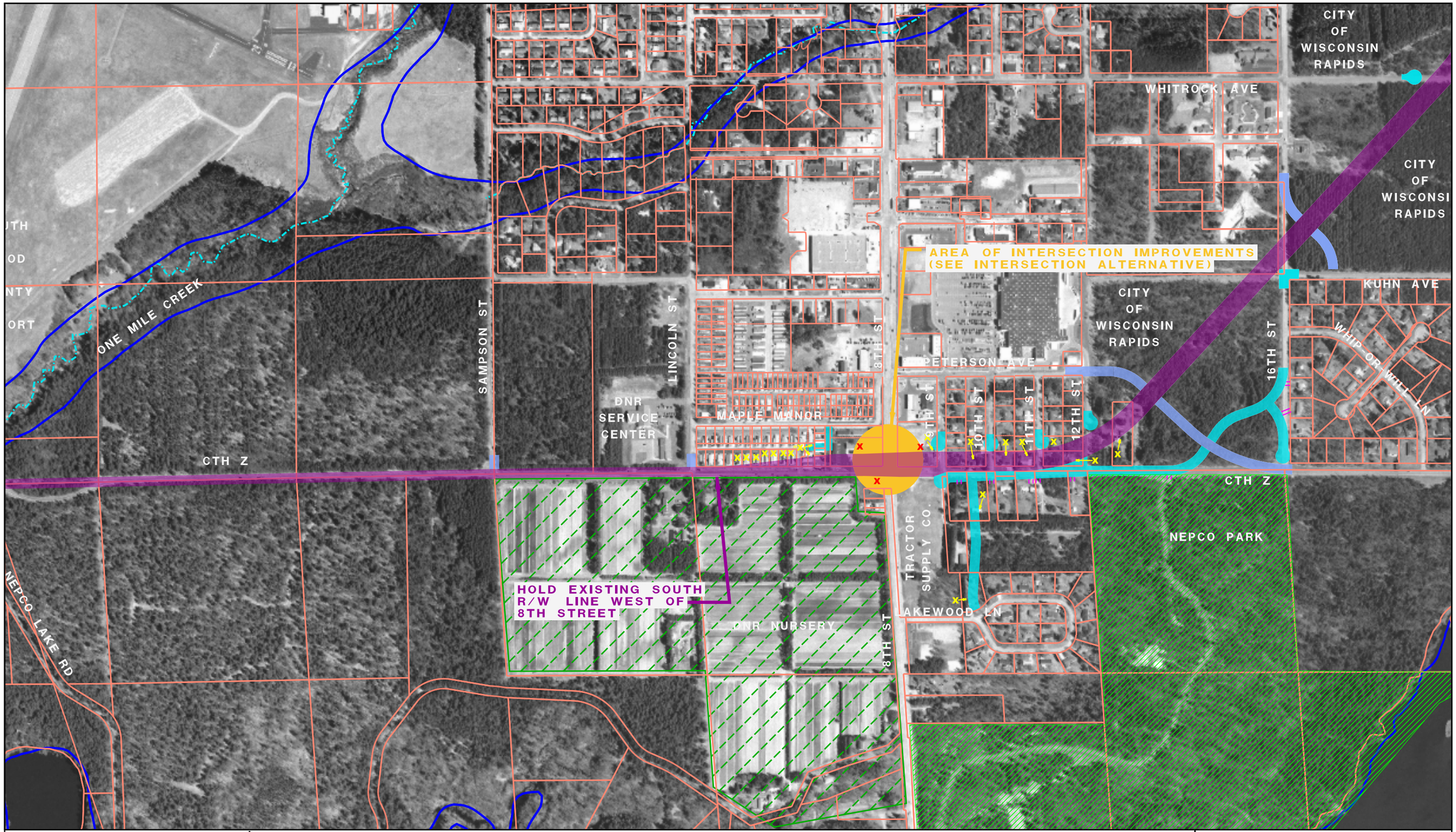
LEGEND

- High Probability Archaeological Area
- Potentially Eligible Historic Structure
- Parkland
- Former Sulfate Ponds & Municipal Dump
- Wetlands
- Existing Parcels and R/W
- Water Channel
- Flood Zone
- Residential Relocation
- Commercial Relocation
- Proposed East Arterial Corridor
- Proposed Local Road Connection
- Local Road - No Local Access to the Arterial

AERIAL EXHIBIT

SHEET 2
County W to Kuhn Ave.
Alternative 2
Frontage Roads from Two-Mile Ave. to Airport Ave.

TB052008006MKE Sheet1_CTH-W_to_Kuhn_3 08.25.08 cae



North

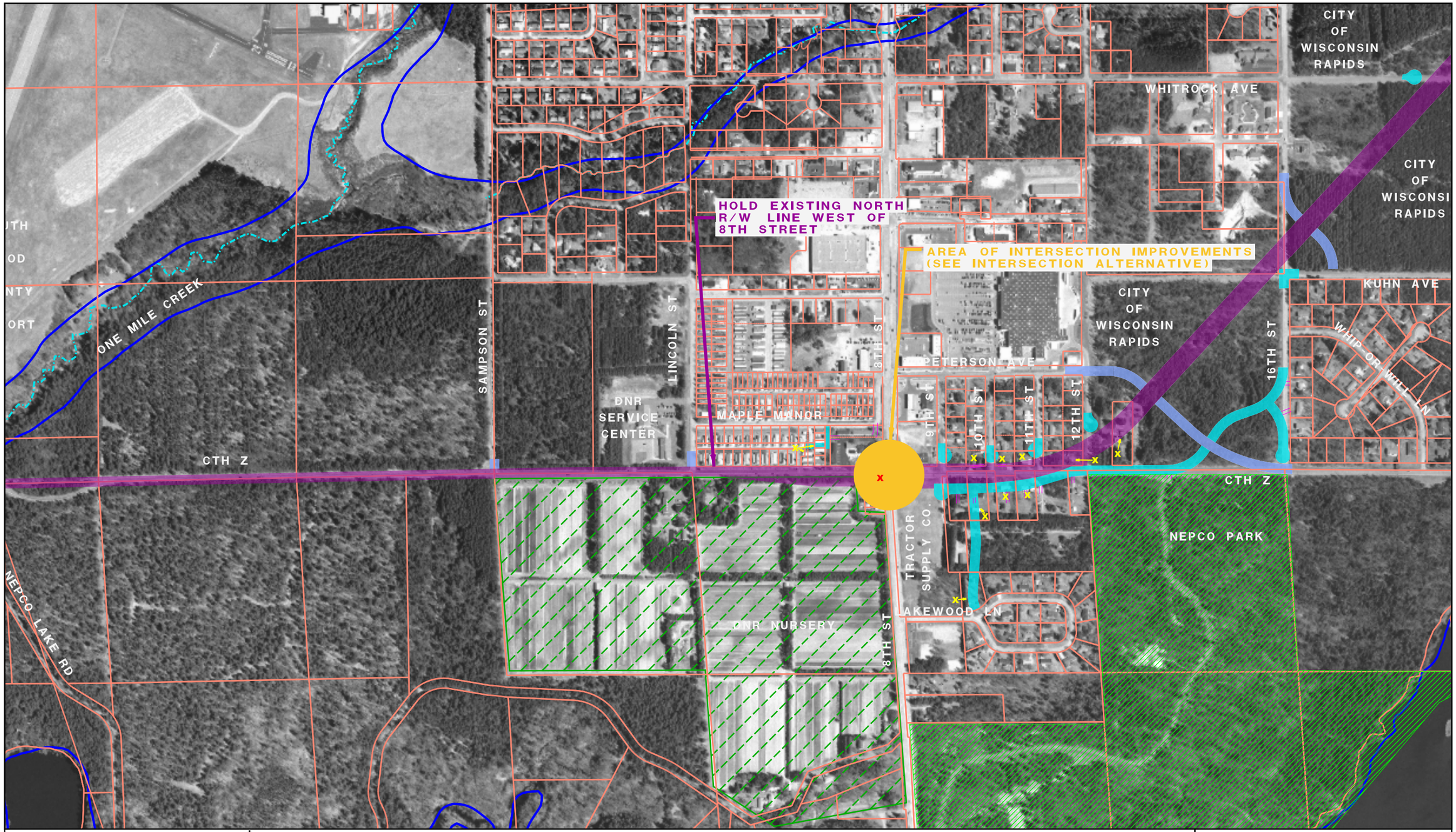
LEGEND

- High Probability Archaeological Area
- Potentially Eligible Historic Structure
- Parkland
- Former Sulfate Ponds & Municipal Dump
- Wetlands
- Existing Parcels and R/W
- Water Channel
- Flood Zone
- Residential Relocation
- Commercial Relocation
- Proposed East Arterial Corridor
- Proposed Local Road Connection
- Local Road - No Local Access to the Arterial

AERIAL EXHIBIT

SHEET 3
Kuhn Ave. to Nepco Lake Rd.
Alternative 1
No DNR Nursery Impacts

TB052008006MKE Sheet3_EA_pKuhn_to_Nepco_3 09.15.08 cae/mjl



North

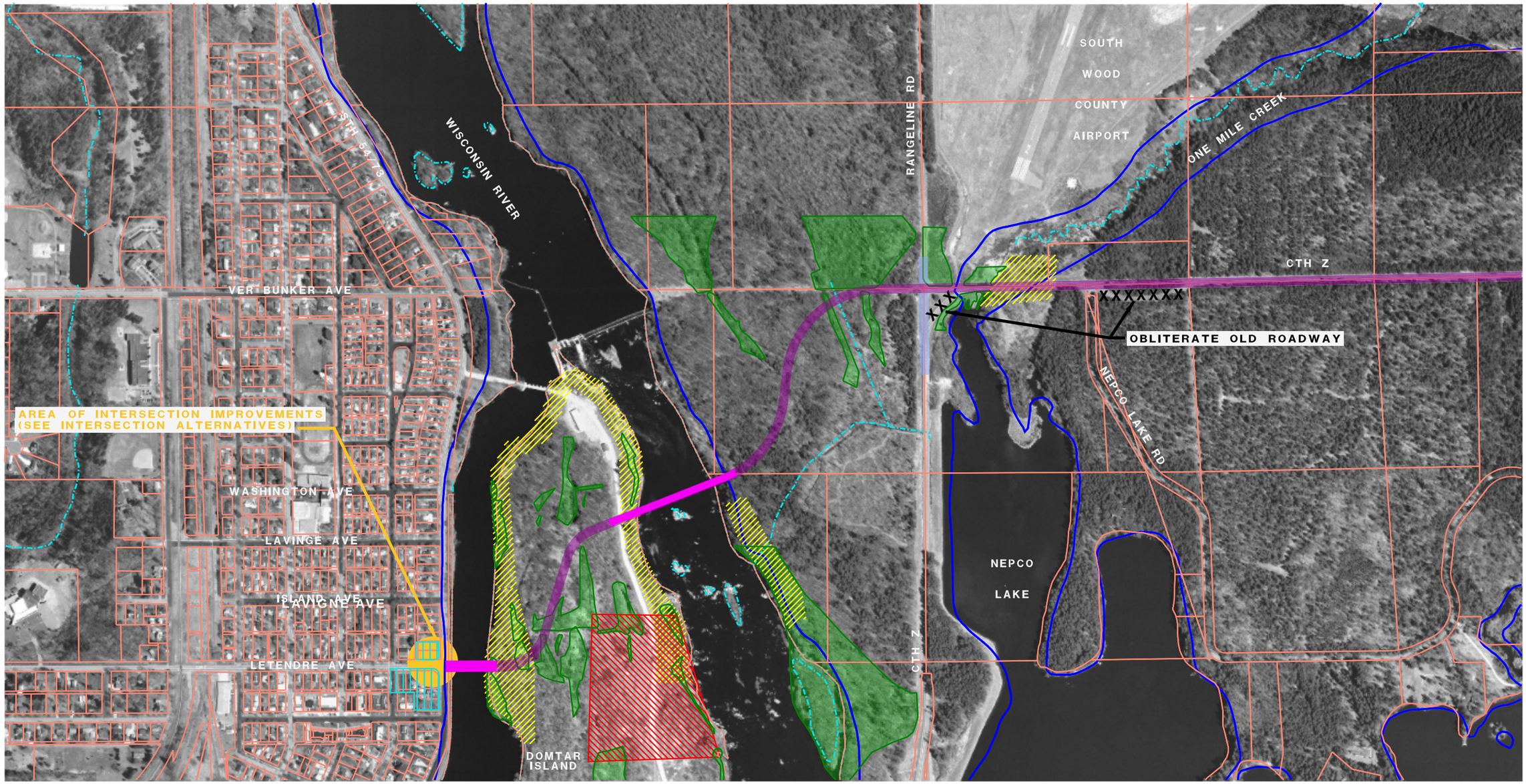
LEGEND

- High Probability Archaeological Area
- Potentially Eligible Historic Structure
- Parkland
- Former Sulfate Ponds & Municipal Dump
- Wetlands
- Existing Parcels and R/W
- Water Channel
- Flood Zone
- Residential Relocation
- Commercial Relocation
- Proposed East Arterial Corridor
- Proposed Local Road Connection
- Local Road - No Local Access to the Arterial

AERIAL EXHIBIT

SHEET 4
Kuhn Ave. to Nepco Lake Rd.
Alternative 2
DNR Nursery Impacts

TB052008006MKE Sheet4_EA_Kuhn_to_Nepco_3 09.15.08 cae/mjl



North

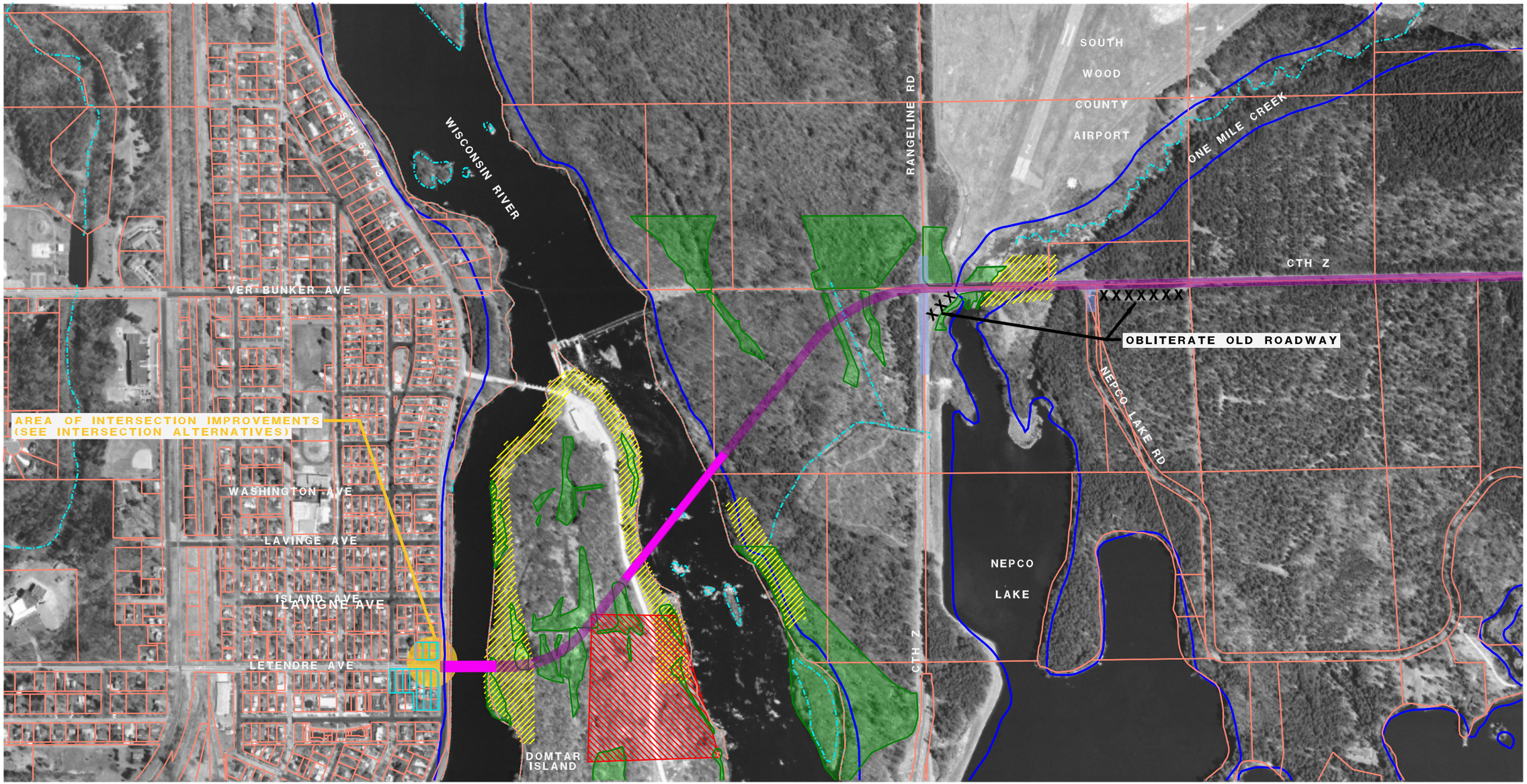
LEGEND

- High Probability Archaeological Area
- Potentially Eligible Historic Structure
- Parkland
- Former Sulfate Ponds & Municipal Dump
- Wetlands
- Existing Parcels and R/W
- Water Channel
- Flood Zone
- Residential Relocation
- Commercial Relocation
- Proposed East Arterial Corridor
- Proposed Local Road Connection
- Local Road - No Local Access to the Arterial

AERIAL EXHIBIT

SHEET 5
WI River Crossing Letendre
Alternative 1A

TB052008006MKE Sheet5_EA_WIRIV_LETENDRE_4 09.15.08 cae/mjl



North

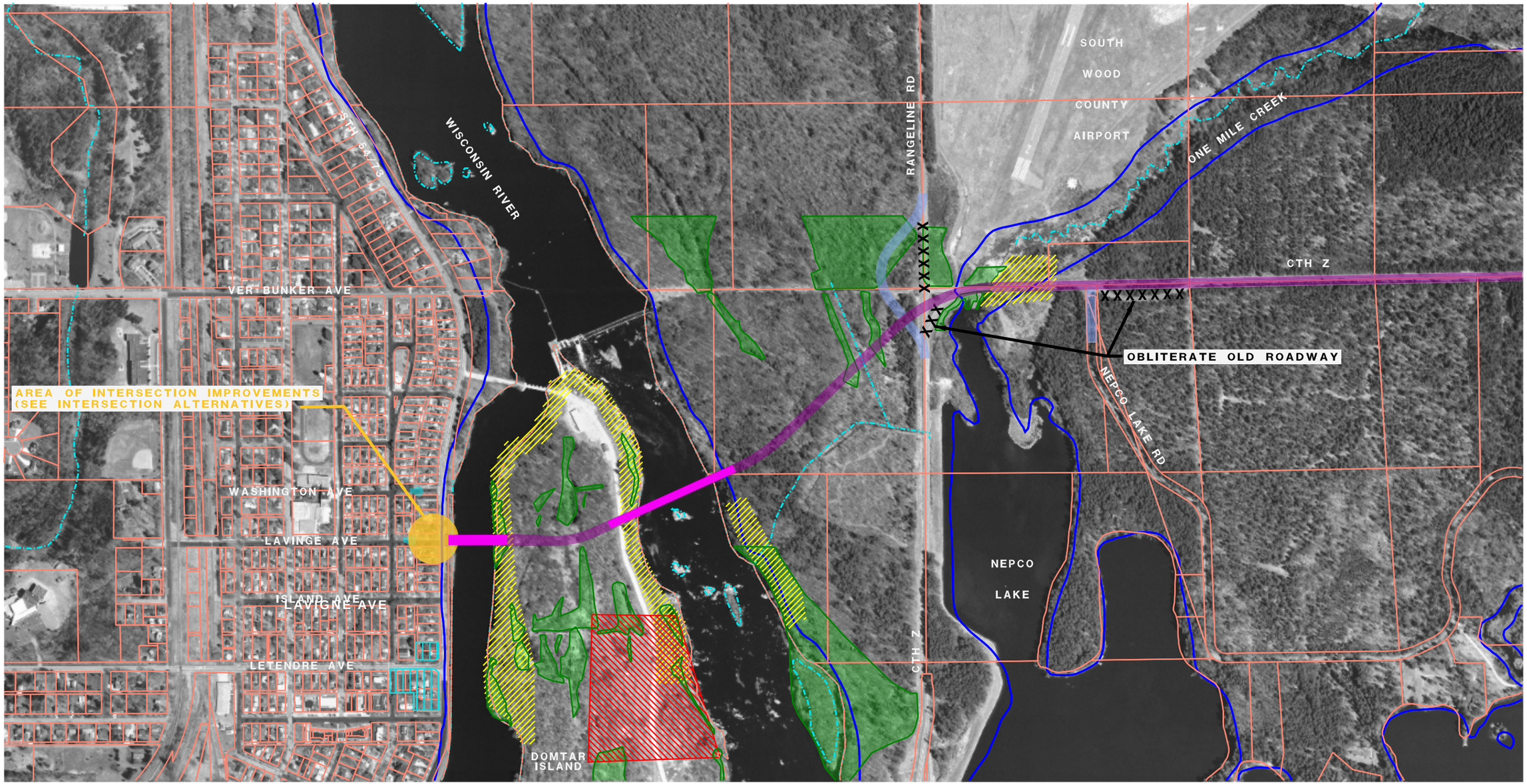
LEGEND

- High Probability Archaeological Area
- Potentially Eligible Historic Structure
- Parkland
- Former Sulfate Ponds & Municipal Dump
- Wetlands
- Existing Parcels and R/W
- Water Channel
- Flood Zone
- Residential Relocation
- Commercial Relocation
- Proposed East Arterial Corridor
- Proposed Local Road Connection
- Local Road - No Local Access to the Arterial

AERIAL EXHIBIT

SHEET 6
WI River Crossing Letendre
Alternative 1B

TB052008006MKE Sheet6_EA_WIRIV_LETENDRE_3 09.15.08 cae/mjl



North

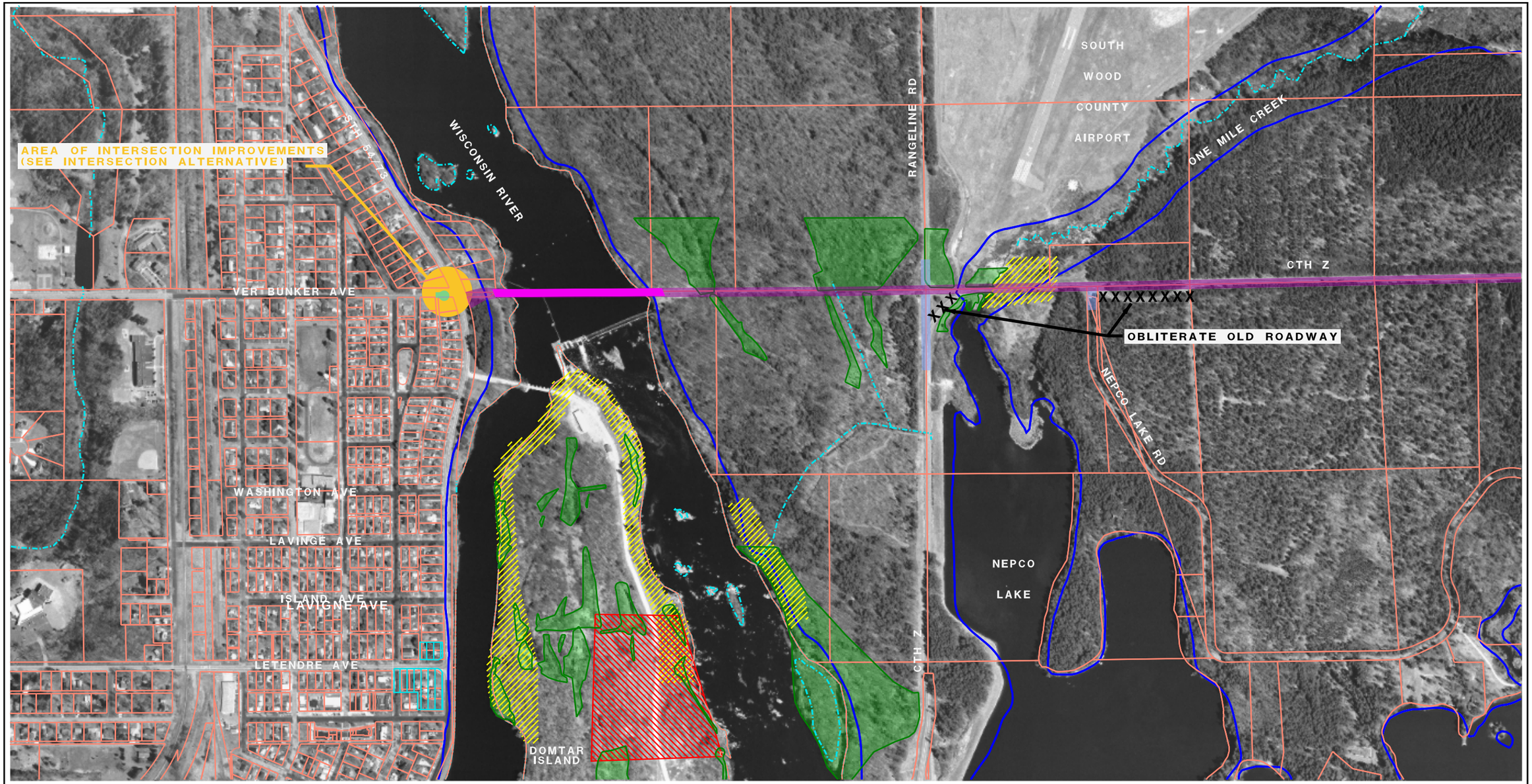
LEGEND

- High Probability Archaeological Area
- Potentially Eligible Historic Structure
- Parkland
- Former Sulfate Ponds & Municipal Dump
- Wetlands
- Existing Parcels and R/W
- Water Channel
- Flood Zone
- Residential Relocation
- Commercial Relocation
- Proposed East Arterial Corridor
- Proposed Local Road Connection
- Local Road - No Local Access to the Arterial

AERIAL EXHIBIT

SHEET 7
WI River Crossing Lavigne
Alternative 2

TB052008006MKE Sheet7_EA_WIRIV_LAVINGE_3 09.15.08 cae/mjl



North

LEGEND

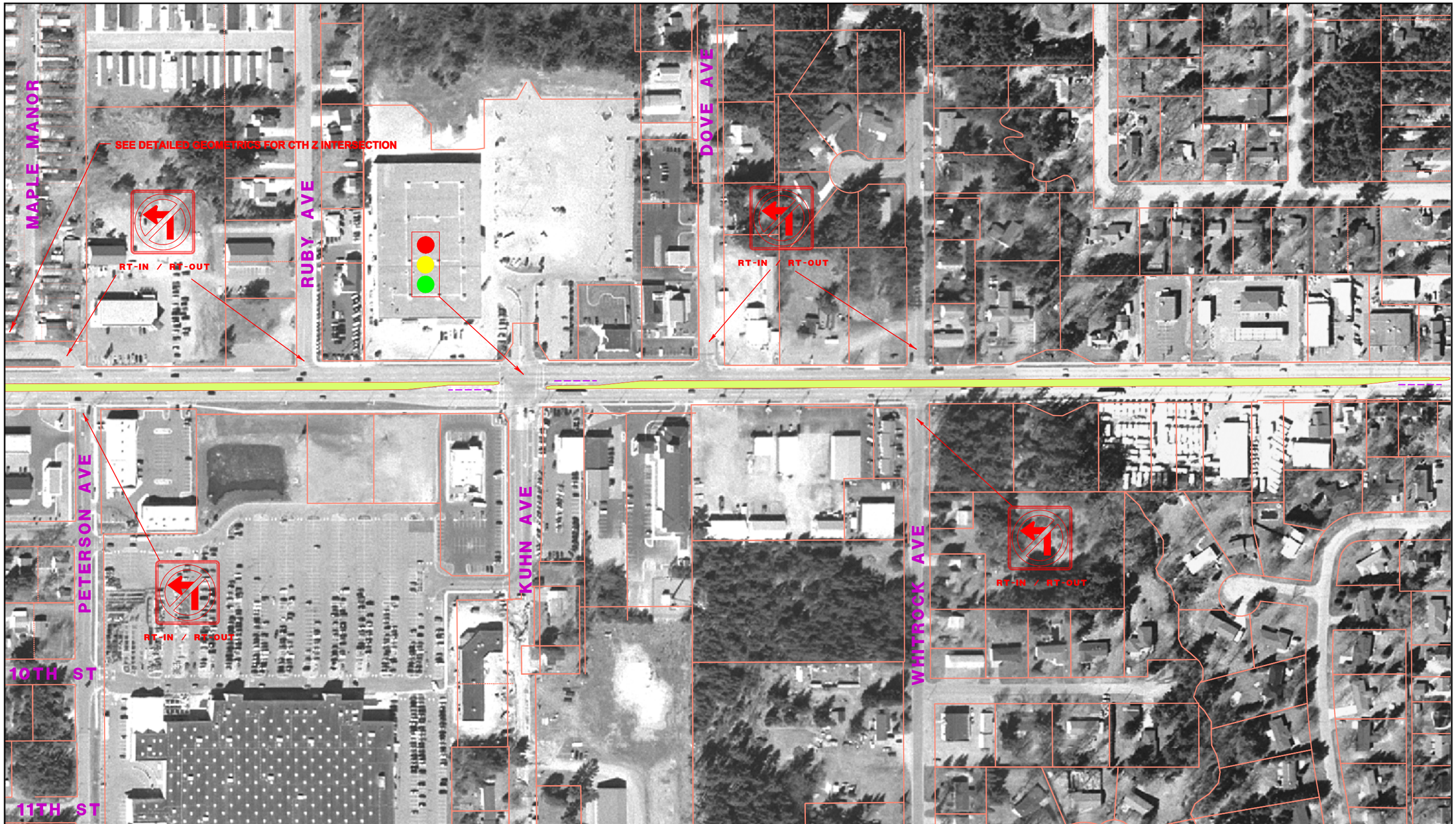
- High Probability Archaeological Area
- Potentially Eligible Historic Structure
- Parkland
- Former Sulfate Ponds & Municipal Dump
- Wetlands
- Existing Parcels and R/W
- Water Channel
- Flood Zone
- Residential Relocation
- Commercial Relocation
- Proposed East Arterial Corridor
- Proposed Local Road Connection
- Local Road - No Local Access to the Arterial

AERIAL EXHIBIT

SHEET 8
WI River Crossing Ver Bunker
Alternative 3

TB052008006MKE Sheet8_EA_WIRIV_VERBUNKER_3 09.15.08 cae/mjl

8th Street Improvements



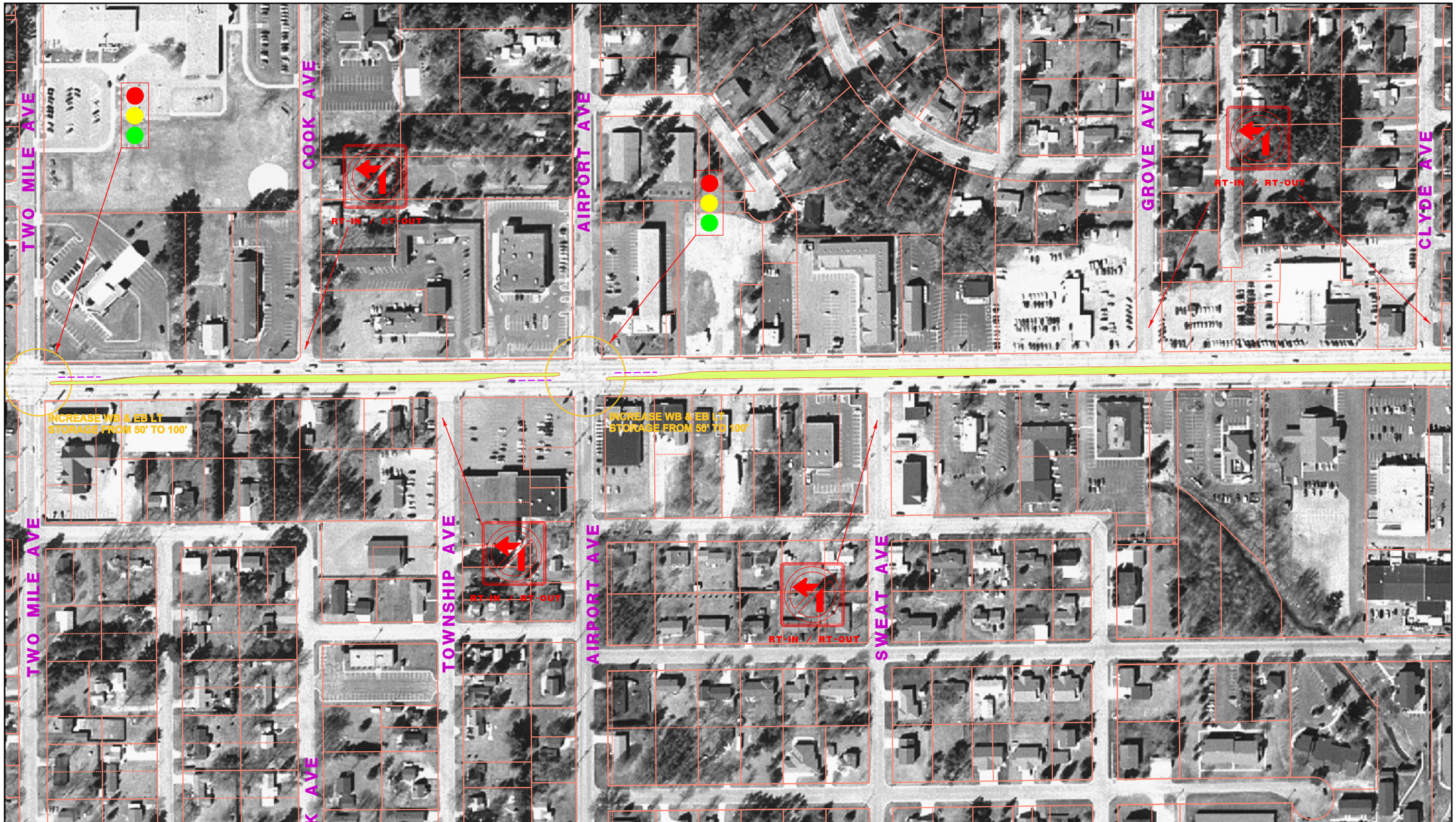
North

8th Street Alternative 1
Convert center two way left turn lane to raised median
Features of this alternative:
All driveways are right-in/right-out
All unsignalized intersections are right-in/right-out
16-foot-wide median with no U-turn opportunities

AERIAL EXHIBIT

SHEET 1
Peterson Ave. to Two Mile Ave.

TB052008006MKE Sheet1_8TH_minimal_fix_01_2 08.25.08 cae



North

8th Street Alternative 1

Convert center two way left turn lane to raised median

Features of this alternative:

All driveways are right-in/right-out

All unsignalized intersections are right-in/right-out

16-foot-wide median with no U-turn opportunities

AERIAL EXHIBIT

SHEET 2

Two Mile Ave. to Clyde Ave.

TB052008006MKE Sheet2_8TH_minimal_fix_02_2 03.24.09 cae/sls

North

8th Street Alternative 1

Convert center two way left turn lane to raised median

Features of this alternative:

All driveways are right-in/right-out

All unsignalized intersections are right-in/right-out

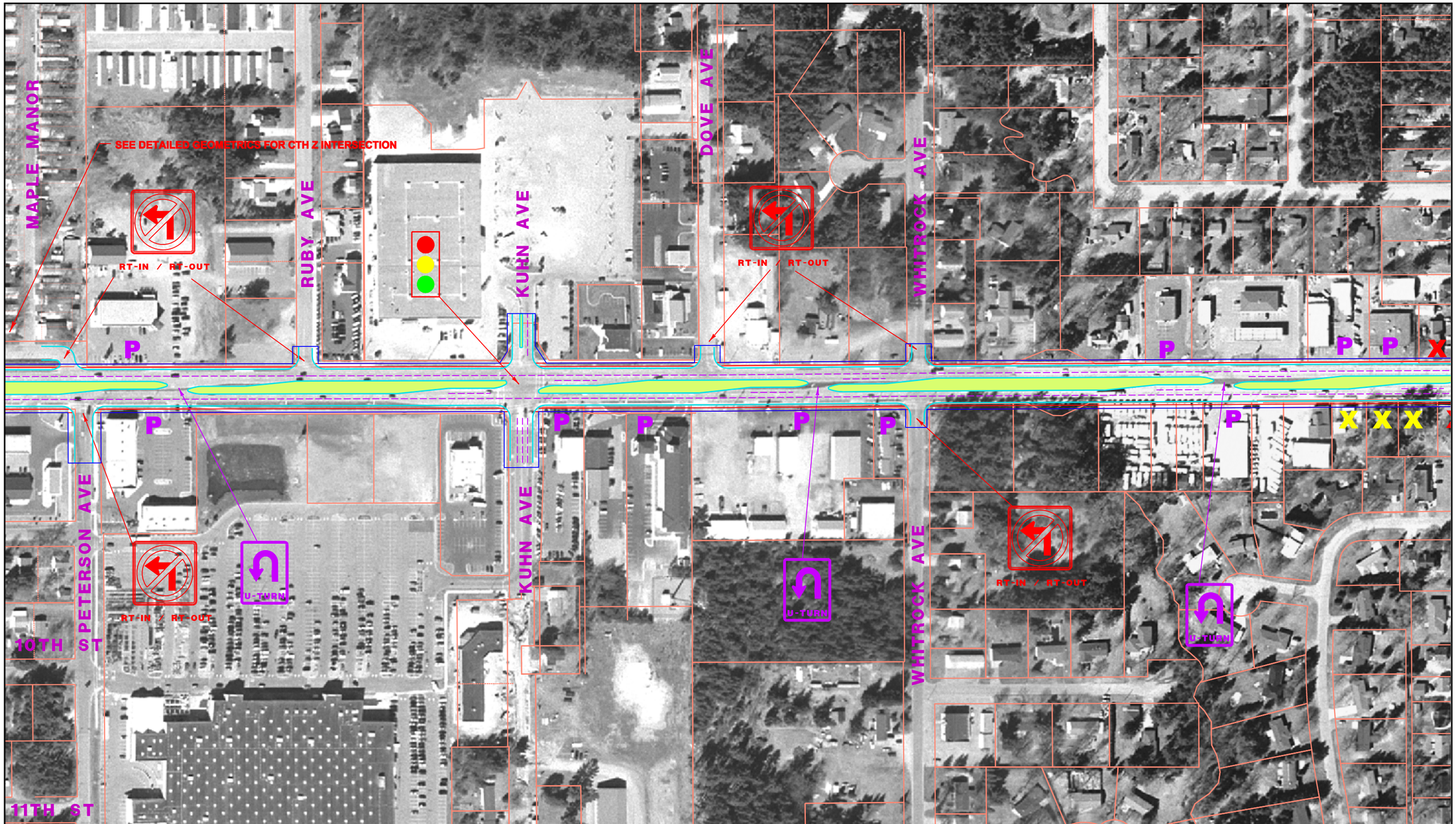
16-foot-wide median with no U-turn opportunities

AERIAL EXHIBIT

SHEET 3

Clyde Ave. to Riverview Expressway

TB052008006MKE Sheet3_8TH_minimal_fix_03_2 08.25.08 cae



North

LEGEND

X Residential Relocation

X Commercial Relocation

P Parking Spaces Affected

8th Street Alternative 2

Wider footprint to allow U-turns

Features of this alternative:

All driveways are right-in/right-out

All unsignalized intersections are right-in/right-out

30-foot-wide median allows for U-turns

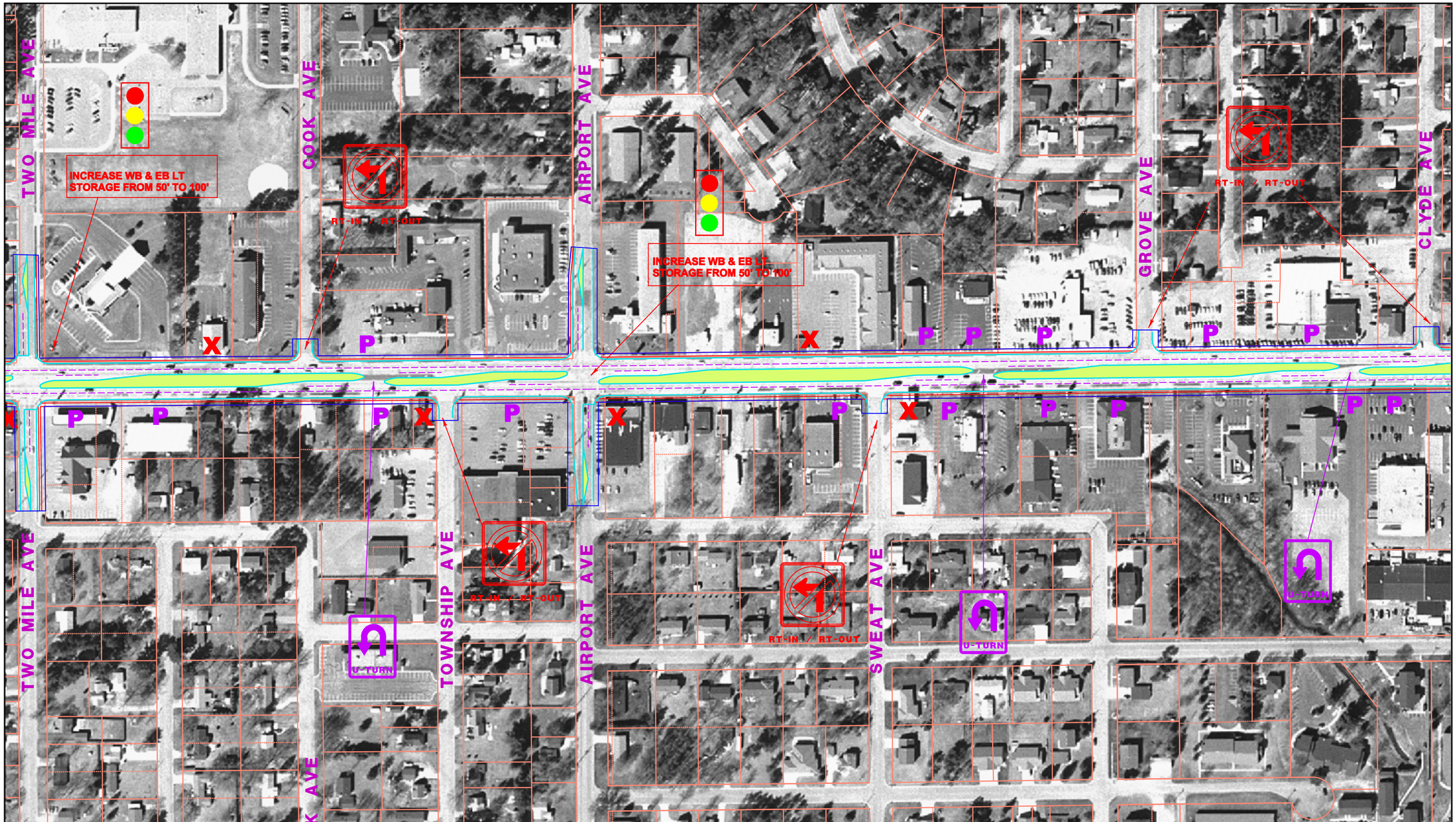
U-turn opportunities prior to signalized intersections with spacing opportunities every 1,000 feet

AERIAL EXHIBIT

SHEET 1

Peterson Ave. to Two Mile Ave.

TB052008006MKE Sheet4_8TH_ultimate_fix_01_2 08.25.08 cae



North

LEGEND

X Residential Relocation

X Commercial Relocation

P Parking Spaces Affected

8th Street Alternative 2

Wider footprint to allow U-turns

Features of this alternative:

All driveways are right-in/right-out

All unsignalized intersections are right-in/right-out

30-foot-wide median allows for U-turns

U-turn opportunities prior to signalized intersections with spacing opportunities every 1,000 feet

AERIAL EXHIBIT

SHEET 2

Two Mile Ave. to Clyde Ave.

TB052008006MKE Sheet5_8TH_ultimate_fix_02_2 08.25.08 cae

North

LEGEND

X Residential Relocation

X Commercial Relocation

P Parking Spaces Affected

8th Street Alternative 2

Wider footprint to allow U-turns

Features of this alternative:

All driveways are right-in/right-out

All unsignalized intersections are right-in/right-out

30-foot-wide median allows for U-turns

U-turn opportunities prior to signalized intersections with spacing opportunities every 1,000 feet

AERIAL EXHIBIT

SHEET 3

Clyde Ave. to Riverview Expressway

TB052008006MKE Sheet6_8TH_ultimate_fix_03_2 08.25.08 cae

Correspondence

Wisconsin Department of Natural Resources, November 13, 2006
Sac and Fox Nation of Missouri in Kansas and Nebraska, June 8, 2006
United States Department of the Interior, Fish and Wildlife Service, June 19, 2006
United States Department of the Interior, Fish and Wildlife Service, December 11, 2007
Wisconsin Department of Natural Resources, April 9, 2008
Telephone Conversation Record with WWLC, June 16, 2008
Lincoln High School, July 29, 2008
Wood County Parks and Forestry, undated
United States Army Corps of Engineers Email, April 20, 2009
Local Resolutions, May 2009

Meeting Materials

Oversight Committee Meeting No. 1, November 13, 2006
Meeting to Discuss Environmental Issues on Domtar Island, February 8, 2007
Oversight Committee Meeting No. 2, July 31, 2007
Public Information Meeting No. 1, September 26, 2007
Alternatives Meeting with DNR, March 19, 2008
Oversight Committee Meeting No. 3, March 27, 2008
Alternatives Meeting with BOA, April 7, 2008
Oversight Committee Meeting No. 4, December 19, 2008
Public Information Meeting No.2 Minutes, March 27, 2009

Appendix A
Correspondence and Meeting Materials

Correspondence

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

WISCONSIN
DEPT. OF NATURAL RESOURCES

Jim Doyle, Governor
Scott Hassett, Secretary
Scott A. Humrickhouse, Regional Director

Wisconsin Rapids Service Center
473 Griffith Avenue
Wisconsin Rapids, Wisconsin 54494
Telephone 715-421-7800
FAX 715-421-7830

November 13, 2006

Mr. Dan Dupies
CH2M Hill
135 South 84th Street
Suite 325
Milwaukee, WI 53214

SUBJECT: DOT/DNR Initial Corridor Review
Project ID#: 6999-08-09
Project Title: Wisconsin Rapids East Arterial Corridor Study
Highway: STH 54
County: Wood

Dear Mr. Dupies:

This letter is in response to your May 19th, 2006 request of DNR for comments on the Wisconsin Rapids East Arterial Corridor Study. We apologize for the delay in responding. I have reviewed the information provided and consulted other Department program staff for their comments on the proposed corridor. This letter summarizes Department comments and concerns associated with the entire proposed improvement which includes existing county highway Z (CTH Z).

Wildlife/Endangered and Threatened Species/Habitat
The project site is mostly located within an expanding urban setting and oak and pine dominated woodlots that support an associated assemblage of common, adaptable wildlife species. The exception is rare species located along the Wisconsin River corridor. The Wisconsin Natural Heritage Inventory (NHI) was reviewed for possible presence of endangered, threatened or other rare species. An extensive listing of species and natural communities has been recorded within a one mile radius of the project corridor. Of those listings we would expect two species of primary concern related to this project: 1) osprey, a state listed threatened species is known to nest on an artificial platform at Domtar dam on the Wisconsin River; and 2) wood turtle, a state listed threatened species, is known to utilize the Wisconsin River in the project vicinity. Per discussion with the Department's endangered resources staff it is expected that the river island, a small unnamed tributary stream to the Wisconsin River (the stream west of CTH Z near the proposed Wisconsin River approach) and the existing Two-mile Creek crossing at CTH Z are especially attractive wood turtle habitat. A survey for presence of wood turtles should be conducted prior to final design selection. It is likely special design and construction measures would be needed in an effort to protect both these species. To prevent the spread of oak wilt all timber removal should occur from October 1 through April 1. Any burning of trees or brush must be conducted in a safe, pollution-free manner. Therefore, given the urban setting, open burning is strongly discouraged and alternative methods (chipping) should be considered.

Waterways/Wetlands/Floodplains
In addition to the Wisconsin River crossing the proposed route twice crosses Two-mile Creek (existing crossing at CTH Z and again near the eastern project boundary) and the smaller unnamed stream west of CTH Z (near the proposed Wisconsin River approach). The Wisconsin River, Two-mile Creek, and Nepco Lake support diverse warmwater sport fisheries. The small unnamed stream west of CTH Z has no fish survey records. This stream also includes a narrow strip of riparian forested wetlands. Two-mile Creek near Nepco Lake (at the CTH Z crossing) includes various types of wetlands but primarily are described as riparian emergent wetlands. The primary concern associated with these stream / lake crossings, aside from erosion control, is direct disturbance to both this small unnamed stream (west of CTH Z) and Two-mile Creek entering Nepco Lake. We recommend any new roadway west of CTH Z be shifted north from the currently shown alignment to avoid direct stream and wetland disturbance. Also, the new Wisconsin River crossing should be designed so as to avoid an increased backwater effect upstream.

The Wisconsin River is listed on the Impaired Waters List (303(d)) for mercury contaminated sediment near Port Edwards.

Stormwater/Groundwater
Drinking water and groundwater could be affected by alterations in drainage or wellhead infiltration areas. For your information, the City of Wisconsin Rapids and the Wisconsin Rapids Water and Electric Utility are not the same entity. The DOT, city and utility may want to cooperate in developing wellhead protection and stormwater management plans for the highway improvement and adjoining (future) land use development (i.e. compliance with DNR WPDES Phase II stormwater requirements).

Solid Waste
We reviewed available Remediation and Redevelopment contaminated site listings and have located one potential site of concern. The Kwik Trip #347 site at 4611 8th Street South is approximately 400-450 feet north of the existing CTH Z /STH 13 intersection in Wisconsin Rapids. Because of a lack of information other than the location available to us, it is possible this site could affect aspects of the project. We suggest you contact Brian Taylor of the Department of Commerce at 608-266-0593 for more information. Additionally, given the industrial history of the Wisconsin River island and possibility that it may not have been completely surveyed for waste storage, disposal or contamination, we recommend additional investigative work be conducted to prevent unforeseen problems or construction delays.

Municipal Wastewater
The Village of Port Edwards 2004 facility plan included an analysis to evaluate the feasibility of connecting the Port Edwards collection system to the Wisconsin Rapids wastewater treatment plant on the other side of the Wisconsin River. The analysis determined this would be cost prohibitive, in part do to the need to cross the river. It would be advisable to consider the possibility of hanging a future sewer line under the proposed Wisconsin River bridge, as this might make connection to Wisconsin Rapids wastewater treatment facility more economically feasible. The design life of the new Port Edwards wastewater treatment plant is 20 years, so this would not be an issue for many years. The Department encourages regionalization of wastewater treatment where feasible.

Special Land Management Property
The proposed route is likely to impact state land managed as part of the DNR Service Center office and Griffith State Nursery and private lands enrolled in the Managed Forest Law program.

Most of the land for the Griffith State Nursery was gifted to the DNR and has a reversionary clause if the DNR tries to sell it. Impacts to the irrigated nursery fields will result in a loss of seedling production which is not easily replaced. A wider corridor, if proposed, may also encroach on a newly installed cooler addition on the north end of the seedling distribution center. During the months of April and May (seedling distribution) there is a lot of traffic entering and leaving the north gate of the nursery (on Z). Safe access to the DNR offices and nursery from the new STH 54 corridor must be maintained permanently and during construction.

The proposed highway also crosses areas used for public recreation, notably near the well fields and Wisconsin River. Domtar owns property along the Wisconsin River which it maintains for public access to meet FERC licensing requirements. Effort should be made to minimize recreation use impacts resulting from the project. This would also include City-owned property used as the Lincoln High School forest.

Construction Access
Aside from the new eastern approach, we assume (and strongly recommend) the existing island access road will be the primary construction access for the new river crossing. This would greatly reduce potential in-stream disturbance and water quality impacts as might result from any temporary access causeways.

If you have any questions or need additional information please call me at 715-421-7867.

Sincerely,

Tony Fischer

Tony Fischer

Environmental Analyst
Transportation Liaison

C. Janet Smith - DOT North Central Region
Chris Knotts - U.S. Army Corps of Engineers
Jim Tremelling - Wood County Highway Commissioner
Brian Taylor – Department of Commerce

Sac and Fox Nation of Missouri in Kansas and Nebraska

305 North Main Street • Reserve, Kansas 66434
Phone (785) 742-7471 • Fax (785) 742-3785

June 8, 2006

Tim Radtke
WisDOT
North Central Region - Wisconsin Rapids Office
1681 Second Avenue South
Wisconsin Rapids WI 54495

Dear Mr. Radtke:

Thank you for your letter, which is in compliance with Section 106 of the National Historic Preservation Act, and Section 110.

Project: Wisconsin Rapids East Arterial Corridor Study

The Sac and Fox Nation of Missouri in Kansas and Nebraska NAGPRA department have determined the above project as:

No objections. However, if human skeletal remains and/or any objects falling under NAGPRA are uncovered during construction, please stop immediately and notify NAGPRA representative, Deanne Bahr, at the address above.

There are two other bands of Sac and Fox that also need to be contacted, the Sac and Fox Nation of Oklahoma and the Sac and Fox of the Mississippi in Iowa.

Johnathan Buffalo, NAGPRA Representative
Sac and Fox of the Mississippi in Iowa
349 Meskwaki Rd.
Tama, IA 52339-9629

Sandra Massey, NAGPRA Representative
Sac and Fox Nation of Oklahoma
Rt. 2, Box 246
Stroud, OK 74079

If you have any questions, please contact me at the number or address above.

Sincerely,

Deanne Bahr

Deanne Bahr
Sac and Fox Nation of Missouri in Kansas and Nebraska
NAGPRA Contact Representative

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Green Bay ES Field Office
2661 Scott Tower Drive
New Franken, Wisconsin 54229-9565
Telephone 920/866-1717
FAX 920/866-1710

June 19, 2006

Mr. Dan Dupies
CH2M Hill
135 South 84th Street, Suite 325
Milwaukee, Wisconsin 53214

re: Proposed New Road Corridor and Bridge
Project ID 6999-08-09
City of Wisconsin Rapids
Wood County, Wisconsin

Dear Mr. Dupies:

The U.S. Fish and Wildlife Service (Service) has received your letter dated May 19, 2006, requesting comments on the subject project. The project entails study of a potential new road corridor within the City of Wisconsin Rapids and a new bridge crossing of the Wisconsin River between Wisconsin Rapids and the City of Port Edwards in Wood County, Wisconsin. We have reviewed the information provided in your letter and our comments follow.

Federally-Listed Species, Candidate Species, and Critical Habitat

Our records indicate that the following species have been recorded in Wood County in habitats similar to those that are in or adjacent to areas that could be affected by the proposed project:

Classification	Common Name	Scientific Name	Habitat
threatened	bald eagle	Haliaeetus leucocephalus	breeding
endangered	Karner blue butterfly	Lycaeides melissa samuelis	prairie, oak savanna, and jack pine areas with wild lupine

The Karner blue butterfly and bald eagle have both been observed within several miles of the project area. Although we do not have records of either species within the project corridor described in your letter, we request that you review areas within the corridor for eagle nests or roosts and areas of prairie, oak savanna, or pine barrens. If eagle nests or roosts are observed, or if there is potential habitat for the butterfly or its host plant, lupine, we ask that you contact this office for further consultation. Please be aware that over time, habitats near the project site may be utilized by listed or proposed species not present at this time. It is also possible that critical

habitat could be proposed or designated for a species. Therefore, if there is a time lag of more than 6 months between plan completion and execution, or if the project is modified, it is important to reassess the impact of the project on federally-listed or proposed species or designated critical habitat prior to start of construction activities.

As this project involves a Federal action (i.e., authorization, funding, or is carried out in whole or in part by a Federal agency), the lead Federal agency (e.g., U.S. Department of Transportation – 'USDOT') is responsible for making a determination under Section 7 of the Endangered Species Act of 1973, as amended (ESA), as to whether the selected project alternative may affect federally-listed threatened or endangered species or designated critical habitat. If the proposed project may affect, but is unlikely to adversely affect federally-listed threatened or endangered species or designated critical habitat, USDOT must obtain written concurrence from our office. If the project may affect, and is likely to adversely affect federally-listed species or adversely modify designated critical habitat, USDOT must initiate formal consultation with the Service in accordance with section 7 of the ESA. Further information on the section 7 consultation process can be obtained by contacting the staff person identified at the end of this letter.

Fish and Wildlife Resources

The project area includes significant habitat areas for numerous fish and wildlife species. The Wisconsin River and adjacent and tributary streams and wetlands provide forage and/or spawning habitat for fish, including the lake sturgeon (Acipenser fulvescens), which is the only freshwater fish species endemic to the Great Lakes basin, and is also the largest freshwater fish indigenous to the region. The forests in and adjacent to the project corridor include a historical heron (Ardea spp.) rookery and breeding habitat for the red-shouldered hawk (Buteo lineatus), a Federal Species of Conservation Concern and state threatened species. Every effort should be made to avoid direct or indirect impacts to those resources and to minimize impacts to the floodplain forest and other fish and wildlife habitat. In addition, as project and bridge design proceeds, we recommend that any bridge design allow wildlife passage underneath the bridge, particularly along the main river channel where there is currently an extensive riparian and riverine habitat corridor.

Under the Migratory Bird Treaty Act of 1918, as amended, it is unlawful to take, capture, kill, or possess migratory birds, their nests, eggs, and young. The project area includes habitat suitable for nesting by migratory bird species, including song birds and/or raptors. If habitat impacts are unavoidable, potential habitat or nesting structures should be removed before the initiation of spring nesting for migrants or after the breeding season has ended.

Wetland Mitigation

We note that the project area includes wetlands and floodplains. In refining and selecting project alternatives, efforts should be made to select an alternative that does not adversely impact wetlands. If no other alternative is feasible and it is clearly demonstrated that project construction resulting in wetland disturbance or loss cannot be avoided, a wetland mitigation plan should be developed that identifies measures proposed to minimize adverse impacts and

replace lost wetland habitat values and other wetland functions and values. We request that a copy of the mitigation plan be forwarded to this office for our review.

We appreciate the opportunity to respond. Questions pertaining to these comments can be directed to Ms. Leakhena Au at 920-866-1734.

Sincerely,

Louise Clemency
Field Supervisor

cc: Wisconsin DNR, Bureau of Endangered Resources, Madison, WI Attn: Jamie Schlangen
Wisconsin DNR, West Central Region, La Crosse, WI Attn: Armund Bartz

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Green Bay ES Field Office
2661 Scott Tower Drive
New Franken, Wisconsin 54229-9565
Telephone 920/866-1717
FAX 920/866-1710

December 11, 2007

Dan Dupies
CH2M HILL
135 South 84th Street, Suite 325
Milwaukee, Wisconsin 53214

re: Project I.D. 6999-08-09
Wisconsin Rapids East Arterial
Corridor Study
Wood County, Wisconsin

Dear Mr. Dupies:

The U.S. Fish and Wildlife Service (Service) has received your letter dated November 29, 2007, requesting our review of the subject project. Recent reductions in funding for the Service's Ecological Services programs have resulted in a greatly reduced staff at this office. Therefore, we are currently unable to provide the requested review of this project.

We have attached for your consideration general guidance for avoiding impacts to fish and wildlife resources from transportation projects.

If you are seeking information on potential project impacts to Federally-listed species, candidate species, or Critical Habitat, we encourage you to visit the Service's Region 3 Section 7 Technical Assistance web site at http://www.fws.gov/midwest/endangered/section7/s7process/. There, you will find guidance to assist you in fulfilling the requirements for consultation under Section 7 of the Endangered Species Act, including a step-by-step explanation of the section 7 process, species distribution lists, species life history information and conservation measures, and examples of typical letters. If your review of the above material suggests that your project may impact listed species or Critical Habitat, please contact this office for additional assistance.

If you have questions or need further information, you may contact us at 920-866-1717.

Sincerely,

Catherine J. Carnes

for Louise Clemency
Field Supervisor

Enclosure

General Guidance on Avoiding and Minimizing Project Impacts to Fish and Wildlife

Wetland Mitigation

In refining and selecting project alternatives, efforts should be made to select an alternative that does not adversely impact wetlands. If no other alternative is feasible and it is clearly demonstrated that project construction resulting in wetland disturbance or loss cannot be avoided, a wetland mitigation plan should be developed that identifies measures proposed to minimize adverse impacts and replace lost wetland habitat values and other wetland functions and values. Any project that has new impacts to wetlands or waterways, including seasonal ephemeral and intermittent streams, should include design features such as culverts to retain hydrological connection between areas fragmented by the project. If stream or wetland impacts will occur, state or federal permits may be needed.

Migratory Birds

Under the Migratory Bird Treaty Act of 1918, as amended, it is unlawful to take, capture, kill, or possess migratory birds, their nests, eggs, and young. If migratory birds are known to nest on any structures which may be disturbed by project construction, activities should begin before the initiation of the breeding season for those species or after breeding has concluded. Alternatively, the structures can be *tightly screened* before the breeding season to prevent nesting. Generally, we recommend that screening or any other habitat disturbance occur before May 1 or after August 30 to minimize potential impacts to migratory birds, but please be aware that some species may initiate nesting before May 1.

Bald and Golden Eagle Protection Act

Guidance on avoiding disturbance of bald eagles is available at the Service's "Bald Eagle Management Guidelines & Conservation Measures" web site at http://www.fws.gov/midwest/eagle/guidelines/index.html.

Other Fish and Wildlife

It has been well documented that wildlife often use riparian areas along streams and rivers as travel corridors, particularly as roads and highways have bisected the landscape. The Service supports and encourages the maintenance or creation of habitat connectivity wherever possible. As such, we recommend that you install culverts that do not impede the movement of water, sediments, or aquatic species along existing waterways. Culverts should be designed and constructed in such a way as to allow small to medium-sized terrestrial or amphibious species to safely follow the stream corridor without being forced to cross the road. This may be accomplished by enlarging culverts and including a continuous raised shelf along one or both sides of the culvert, connecting to stream banks on either side.

We recommend that bridges and abutments be designed and constructed in such a way as to allow terrestrial wildlife to pass under the bridge without entering the river during normal flow conditions. This may require lengthening the bridge, limitations on the use of exposed riprap, modifications to the surface of the riprap (e.g., grouting the surface or filling with soil or other natural materials), or modifications in the substrate and/or slope at the base of the abutments, as some wildlife species cannot or prefer not to traverse areas of riprap.

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

WISCONSIN
DEPT. OF NATURAL RESOURCES

Jim Doyle, Governor
Matthew J. Frank, Secretary
Scott Humrickhouse, Regional Director

473 Griffith Avenue
Wisconsin Rapids, Wisconsin 54494
Telephone 715-421-7831
FAX 715-421-7830
TTY Access via relay - 711

April 9, 2008

Mr. Dan Dupies
CH2M Hill
135 South 84th Street
Suite 325
Milwaukee, WI 53214

SUBJECT: DOT/DNR Corridor Alternatives Review
Project ID#: 6999-08-09
Project Title: Wisconsin Rapids East Arterial Corridor Study
Highway: STH 54
County: Wood

Dear Mr. Dupies:

This letter is in response to your November 1st, 2007 request of DNR for comments on the alternatives of the Wisconsin Rapids East Arterial Corridor Study. I have reviewed the information provided and consulted other Department program staff for their comments on the different proposed alternatives. This letter and earlier correspondence summarize Department comments and concerns associated with the entire proposed project.

Kuhn to CTH W Alternatives
This portion of the proposed route would connect Hwy 54 at CTH W due south on existing 20th Street to Whitrock Avenue then turn southwest and connect into existing CTH Z. It runs through city owned well fields which are used as the Lincoln High School Forest. It is unfortunate the school forest impacts can not be avoided, as we indicated in earlier correspondence. Any storm water treatment measures installed will have to take into account the municipal wells located here to avoid impacting them, and the Wellhead Protection Plan may need to be updated. Of the two alternatives, # 1 crosses Two Mile Creek the least and is preferred for this reason. Regardless, any crossings should minimize the impact by clear spanning the creek.

NEPCO to Kuhn Alternatives
This portion of the proposed STH 54 route is on existing CTH Z alignment, with minor variances, from approximately 12th Street west until CTH Z turns south near Nepco Lake and One Mile Creek. The two alternatives' biggest impact is at the intersection of STH 13 and CTH Z. At this intersection the proposed alternatives expand the road and intersection to the north or south. The alignment to the north impacts many residences in the trailer park and the DNR Wisconsin Rapids Service Center, but not the Griffith State Tree Nursery. Conversely, the alignment to the south impacts fewer residences, with minimal impacts to the service center, but

bridge near the water elevation to ack as a barrier to prevent boaters from accidentally going over the Dam. We do not feel this is necessary as there is a buoy and cable barrier at the boat launch itself for this purpose. Any bridge will need to avoid an increased backwater affect upstream of the Wisconsin River. Also, enclosed is a color map of the Nepco Lake and One Mile Creek area where I observed Wild Lupine. As I explained during our phone conversation these are approximate locations and I didn't complete an extensive survey or look to see if the wild lupine was occupied by the Federally Endangered Karner Blue Butterfly. This portion of the proposed route will have to be investigated for the presence of Karner Blue Butterfly occupied wild lupine.

Center Lane Closure.
This portion of the project is to replace the existing center turn lane on 8th Street with barrier median. The Department's concerns with conversion of 8th Street (STH 13) center turn lanes to barrier median are limited to contaminated soils which will need to be appropriately handled, and ensuring fish passage on any streams if culvert lengthening occurs because of road widening. We would prefer these clear spanned.

Wisconsin Rapids is a permitted municipality and as such the roads owned and operated by the DOT will need to meet Trans 401 discharge limits. The DOT has recently started to plan for the reconstruction of Business 51 from Plover to Stevens Point. As part of that project they have conceptually designed a way to treat storm water within the barrier median. As these two areas are similar in topography and soils, the DNR suggests reviewing this treatment system for applicability to this project. However, contaminated soils on this project will cause additional concerns and may need special evaluation. You may want to contact The Wisconsin Rapids DOT storm water engineer at (715) 421-8096 for more information. Additionally, using a type of storm sewer which drains groundwater is detrimental to water resources, and not viewed positively by the Department.

If you have any questions or need additional information please call me at 715-421-7867.

Sincerely,

Tony Fischer

Tony Fischer

Environmental Analyst
Transportation Liaison

C. Janet Smith - DOT North Central Region
Simone Kolb - U.S. Army Corps of Engineers
Doug Passineau - Wood County Highway Commissioner

CH2MHILL TELEPHONE CONVERSATION RECORD

Call To: Rick Skifton/WWLC Travis Eswein/WWLC
Jem Brown/WWLC

Phone No.: 715-423-6323 **Date:** June 16, 2008

Call From: Dan Dupies/CH2M HILL **Time:** 11:00 A.M.

Message Taken By:

Subject: Wisconsin Rapids East Arterial Feasibility Study

Dan Dupies and Stephanie Christensen (EMCS) contacted the Wisconsin Rapids Water Works and Light Commission staff listed above to discuss the potential impacts on their property along the 20th Street corridor. Rick Skifton (retiring commission manager), Jem Brown (recently hired commission manager) and Travis Eswein (engineering department) participated in the conference call. After introductions and a brief project background, the WWLC members indicated there are two collector wells in the general project area. Collector well No.1 is located on the east side of 16th Street between Kuhn and Whitrock avenues, and well No.5 is located near the Lovewood Drive/Two Mile Avenue intersection (east of 20th Street). The two wells pump groundwater that is sent to the city's treatment plant on 16th Street and Grand Avenue north of the study area. It was also noted that there are 20-inch transmission water mains running along Two Mile Avenue and Airport Avenues to 16th Street.

When asked whether the proposed roadway would pose any water quality concerns (road runoff) within the wellhead protection area, the WWLC staff indicated it would not but that ultimately DNR may have some input on water quality and wellhead protection. They pointed to well No.1 which is located just east of 16th Street. They also noted that there would be no need for access across the East Arterial to connect portions of their severed property. The WWLC representatives indicated that following construction their property would experience no other development beyond the road.

It was agreed that we would put Jem Brown on the mailing list so he would be notified of the final public information meeting later this fall.

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From: Tom Helgestad [Tom.Helgestad@wrps.org]
Sent: Tuesday, July 29, 2008 8:49 AM
To: Dupies, Dan/MKE
Cc: Gus Mancuso; Ryan Christianson
Subject: 54 bypass

Good morning

I'm the building and grounds director for the school district.

The district has discussed the by-pass years ago and did want access at Grove Ave, preferably with a lighted intersection should the district add a exit from its athletic complex and student parking lot to Grove Ave.

We did understand there would be no access onto the expressway from our site except at current street locations.

The district does own property on both sides of the proposed road and the east property is a possible future building site should the district need to replace facilities in the future. The district would need access at that time.

Question: Should this project go ahead what would be the financial impact to the district if any? Do you have a time frame as to when this might happen?

Mike O'Meara
WisDOT Project Manager
1681 2nd Avenue South
Wisconsin Rapids, WI 54495

Dear Mr. O'Meara:

I am writing in regards to your Wisconsin Rapids East Arterial Feasibility Study being conducted. In particular, I am writing to inform you of the possible effects to the Nepco Lake County Park, 1410 Griffith Avenue, Wisconsin Rapids 54494. I have enclosed a map of the park for your review.

First I would like to give a brief history of the park. Nepco Lake County Park was donated in 1977 by Nekoosa Papers, Inc. as a day use park. The park is 125 acres and is located on the 494 acre Nepco Lake. Nepco Lake County Park features a beach area, boat ramp, picnic area playground, handicapped access boat dock, large enclosed shelter, and small open shelter.

The enclosed shelter is open to reservations year round with air conditioning and heat. This is a very popular shelter which accommodates 150 – 200 people. Our peak reservation time is from May to September, with most Fridays through Sundays reserved. There is a 1.6 mile cross country trail that is maintained throughout the winter. We are currently in the process of increasing that trail to 5 miles of trail. The main goal of increasing the length of this trail is to be able to host competition ski events in the park.

We also have a 25 site seasonal campground planned for construction in our 5 year master plan for the park.

The main concern that the Wood County Park and Forestry Department would have with this project would be access to the park from the intersection changes that are proposed. Obviously there would be a great reduction in the traffic that goes by the entrance of the park. I believe that adequate signage for the park could be used to direct park users to the existing entrance. The connector road would have to be suitable for vehicles with trailers (boats and campers) on a regular basis.

Another concern or suggestion would be the trail system connecting Nepco Lake County Park and South Wood County Park. This would be an opportune time to create a trail system from the "Home Depot" intersection to Nepco Park. This trail could also continue west to connect up with the Port Edwards/ Nekoosa Trail system.

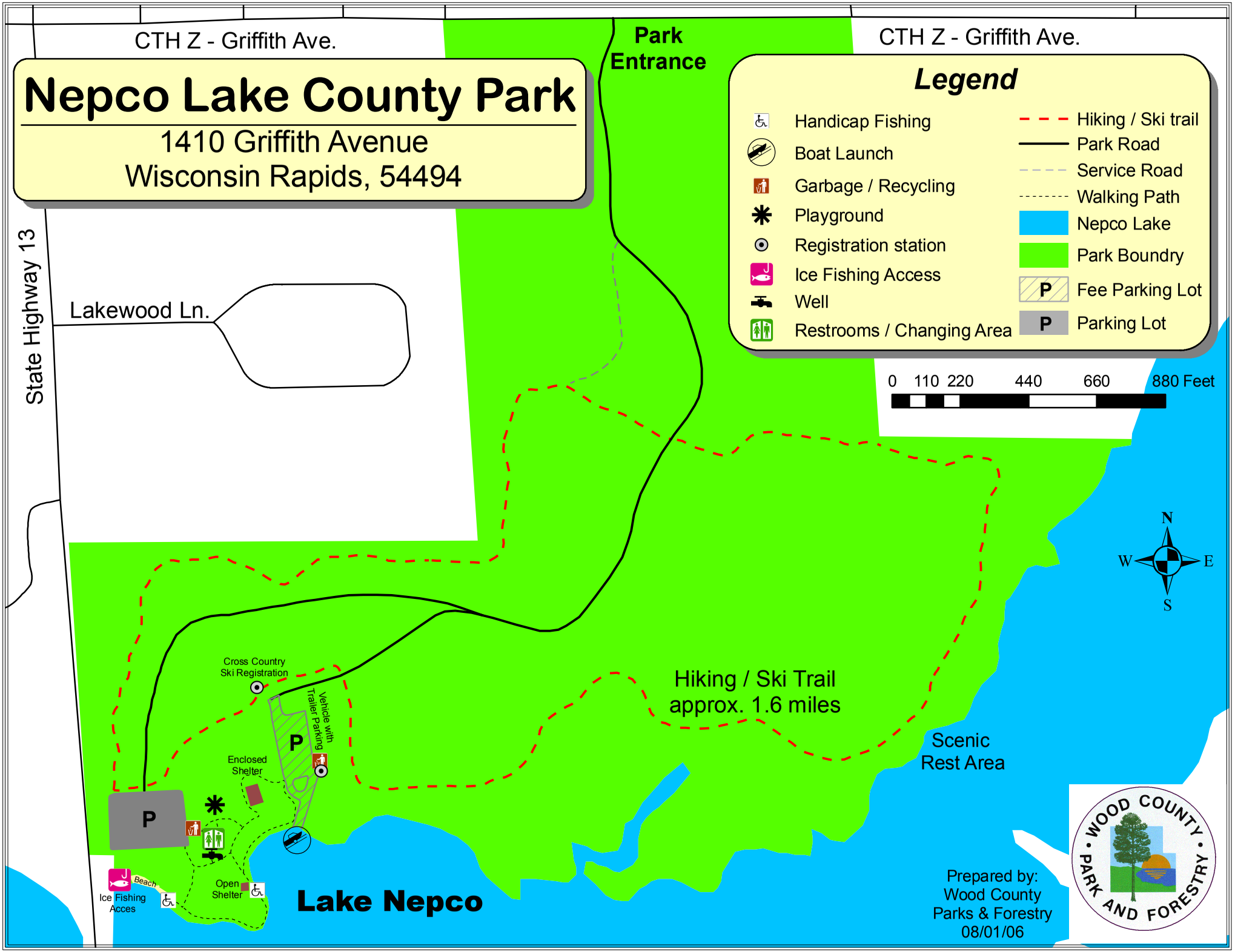
Sincerely

Chad Schooley
Park Administrator

Enclosure: Nepco Lake County Park Map

Nepco Lake County Park

1410 Griffith Avenue
Wisconsin Rapids, 54494



From: Kolb, Simone E MVP [Simone.E.Kolb@usace.army.mil]

Sent: Monday, April 20, 2009 9:49 AM

To: michael.omeara@dot.state.wi.us

Cc: Dupies, Dan/MKE

Subject: WI Rapids Eastern Arterial Feasibility Study (6999-08-09)

Dear Mr. O'Meara,

I have reviewed the Wisconsin Rapids Area Eastern Arterial Feasibility Study and wish to provide the following comments. We recognize that a preferred alternative has not been selected prior to preparation of an EIS as discussed during our conference call in spring 2008.

Since the potential impacts to waters of the U.S. appear to occur almost entirely within the Wisconsin River crossing segment of the study, our comments are largely restricted to this segment. Based on the information provided in the study, it appears that alternative 3 (crossing at Ver Bunker) involves the least amount of impact to waters of the U.S. while also avoiding the high probability archaeological areas crossed by alternatives 1A, 1B, and 2, and also the potential historic property impacts associated with 1A and 1B. From the Corps regulatory perspective, alternative 3 would therefore be preferred provided that it is practicable and meets the proposed project's need and purpose. Of the remaining alternatives, 1A offers the lowest amount of impact to waters of the U.S. and would therefore be preferred above alternatives 1B and 2.

Thank you for submitting the feasibility study. We appreciate the opportunity to comment at this point in the process. Please let me know if you have any questions.

Simone E. Kolb

Project Manager / Soil Scientist

U.S. Army Corps of Engineers

1314 Contractors Blvd.

Plover, WI 54467

Ph: 715-345-7911; Fax: 715-345-7968

simone.e.kolb@usace.army.mil

St. Paul District Regulatory Website

http://www.mvp.usace.army.mil/regulatory/

Customer survey

http://per2.nwp.usace.army.mil/survey.html

RESOLUTION NO. 2009-7
VILLAGE OF PORT EDWARDS

RESOLUTION SUPPORTING THE CONCEPT OF DEVELOPMENT OF THE EAST ARTERIAL AROUND WISCONSIN RAPIDS BY EXTENDING HIGHWAY 54 AND CONSTRUCTING A NEW BRIDGE ACROSS THE WISCONSIN RIVER TO PORT EDWARDS

WHEREAS, the proposed realignment of Highway 54 around the east side of Wisconsin Rapids and the creation of a new, centrally-located bridge across the Wisconsin River would have multiple benefits to the communities in the greater Wisconsin Rapids area, and

WHEREAS, the new route would improve safety on the existing area transportation corridors that are at or near their designed capacity and have significant above-average crash rates, by reducing the number of dangerous conflict points on these roads, and shifting through-traffic to the proposed State Highway 54 Realignment and the Wisconsin River Bridge Project , and

WHEREAS, the new route would better prepare the region to accommodate future increases in traffic volume and possible escalating traffic safety concerns by taking proactive measures of supporting transportation network improvements that include the State Highway 54 Realignment and the Wisconsin River Bridge Project, and

WHEREAS, this proposal would promote a stronger, better-connected and more competitive region for economic development by providing better access to existing and potential employment centers, downtowns, and shopping opportunities, and

WHEREAS, the new route would better connect regional business parks and allow more direct access from the South Wood County Area to the Steven's Point/Plover Area and Interstate 39, and

WHEREAS, this proposal would facilitate the redevelopment and reuse of the Domtar Mill property in the Port Edwards and surrounding land, and help the region respond to the recent loss of over 500 mill jobs and the ongoing decline of one of the region's primary industries (pulp and paper), and

WHEREAS, this route would efficiently connect Nekoosa, Port Edwards, Wisconsin Rapids, Grand Rapids, Biron and the surrounding municipalities so that they are positioned to take advantage of intergovernmental cooperation opportunities such as sharing community facilities and promote a higher level of services for residents and improved efficiencies at a lower cost to taxpayers.

NOW, THEREFORE BE IT RESOLVED, that the Village of Port Edwards Board of Trustees do hereby support the concept of the extension of Highway 54 around the east side of Wisconsin Rapids as determined in earlier studies, including construction of a new, centrally-located bridge across the Wisconsin River to Port Edwards, and

BE IT FURTHER RESOLVED, that a copy of this resolution be sent to the Wisconsin Department of Transportation, Senator Julie Lassa, and Representatives Marlin Schneider and Amy Sue Vruwink, urging them to pursue this concept by having it added to the list of major transportation projects in Wisconsin. A copy of this resolution will also be sent to the City of Wisconsin Rapids.

Adopted the 12th day of May, 2009.

VILLAGE OF PORT EDWARDS
WOOD COUNTY, WISCONSIN

_____
Ed Saylor, Village President

_____
Julie Bodette, Village Clerk

TOWN OF SIGEL

Anthony Ruesch, Chairman
Ron Ladick, Supervisor
Charles Langeberg, Supervisor
John Peckham, Town Clerk
Dawn Larson, Town Treasurer

Highway 54 Resolution
Town of Sigel

RESOLUTION 09-02

For Support of Highway 54 Realignment and Bridge

WHEREAS, the proposed realignment of Highway 54 around the east side of Wisconsin Rapids and the creation of a new, centrally-located bridge across the Wisconsin River would have multiple benefits to the communities in the greater Wisconsin Rapids area, and

WHEREAS, the new route would improve safety on the existing area transportation corridors that are at or near their designed capacity and have significant above-average crash rates, by reducing the number of dangerous conflict points on these roads, and shifting through-traffic to the proposed State Highway 54 Realignment and the Wisconsin River Bridge Project , and

WHEREAS, the new route would better prepare the region to accommodate future increases in traffic volume and possible escalating traffic safety concerns by taking proactive measures of supporting transportation network improvements that include the State Highway 54 Realignment and the Wisconsin River Bridge Project, and

WHEREAS, this proposal would promote a stronger, better-connected and more competitive region for economic development by providing better access to existing and potential employment centers, downtowns, and shopping opportunities, and

WHEREAS, the new route would better connect regional business parks, and allow more direct access of agricultural products to Interstate 39, and

WHEREAS, this route would efficiently connect various Wood County municipalities so that they are positioned to take advantage of intergovernmental cooperation opportunities such as sharing community facilities and promote a higher level of services for residents and improved efficiencies at a lower cost to taxpayers.

NOW, THEREFORE BE IT RESOLVED, that the Town of Sigel Board of Supervisors do hereby support the concept of the extension of Highway 54 around the east side of Wisconsin Rapids as determined in earlier studies, including construction of a new, centrally-located bridge across the Wisconsin River to Port Edwards, and

BE IT FURTHER RESOLVED, that a copy of this resolution be sent to the Wisconsin Department of Transportation, Senator Julie Lassa, and Representatives Marlin Schneider and Amy Sue Vruwink, urging them to pursue this concept by having it added to the list of major transportation projects in Wisconsin. A copy of this resolution will also be sent to the City of Wisconsin Rapids.

ADOPTED on the 6th day of May, 2009.

ATTEST: _____
John B. Peckham, Jr., Town Clerk

The governing body of the Town of Sigel has authorized this Resolution, dated today.

ATTEST: _____
Anthony Ruesch, Chairman

W I S C O N S I N

RAPIDS

City Clerk's Office

444 West Grand Avenue
Wisconsin Rapids, WI 54495-2780
Phone: (715) 421-8200
Fax: (715) 421-8280

CERTIFICATE

State of Wisconsin)
)ss
County of Wood)

I, Shane E. Blaser, being the duly elected Clerk of the City of Wisconsin Rapids, DO HEREBY CERTIFY that the following are true and exact excerpts of minutes of a meeting of the Wisconsin Rapids Common Council held Tuesday, June 2, 2009. Said minutes pertain to the extension of Highway 54 around the east side of Wisconsin Rapids.

Dated this 11th day of June, 2009.

[SEAL]

Shane E. Blaser, City Clerk

CITY HALL COUNCIL CHAMBERS
WISCONSIN RAPIDS, WISCONSIN

Tuesday, June 2, 2009

A regular meeting of the Wisconsin Rapids Common Council was called to order by Mayor Mary Jo Carson at 7:00 p.m. on Tuesday, June 2, 2009.

Roll call showed that all alderpersons were present.

The mayor requested that all present stand for the Pledge of Allegiance and a moment of silent prayer.

It was moved by Stack, seconded by Wiggins, to dispense with reading and accept the minutes of the previous meeting. Motion carried.

The mayor explained that people in the audience may address the council by making their request to do so through an alderperson.

(Here occurred business not pertinent.)

The council was presented a resolution for adoption.

RESOLUTION #19 (2009)

The intent of this resolution is to support the concept of development of the east arterial around Wisconsin Rapids by extending Highway 54 and constructing a new bridge across the Wisconsin River to Port Edwards.

WHEREAS, the proposed realignment of Highway 54 around the east side of Wisconsin Rapids and the creation of a new, centrally-located bridge across the Wisconsin River would greatly benefit the communities of the greater Wisconsin Rapids area, and

WHEREAS, the new route would improve safety by reducing dangerous conflict points and shifting through-traffic to the proposed State Highway 54 Realignment and the Wisconsin River Bridge Project,

WHEREAS, the new route would better connect regional business parks and allow more direct access from the SWC Area to Stevens Point / Plover Area and Interstate 39, and

WHEREAS, this proposal would facilitate the redevelopment and reuse of the Domtar Mill property in the Port Edwards and assist the area response to the loss of mill jobs and the ongoing decline of the areas pulp and paper industry, and

WHEREAS, this area would connect Nekoosa, Port Edwards, Wisconsin Rapids, Grand Rapids, Biron, and the surrounding municipalities and help support intergovernmental cooperation.

NOW, THEREFORE BE IT RESOLVED, that the Wisconsin Rapids Common Council does hereby support the concept of the extension of Highway 54 around the east side of Wisconsin Rapids as determined in earlier studies, including construction of a new, centrally-located bridge across the Wisconsin River to Port Edwards, and

BE IT FURTHER RESOLVED, that a copy of this resolution will be submitted to representatives and the Wisconsin DOT as our request to urge them to have this project added to the list of major transportation projects in Wisconsin

It was moved by Wiggins, seconded by Young, to adopt the resolution. Motion carried 8 ayes and 0 nays.

(Here occurred business not pertinent.)

There being no further business to come before the council, it was moved, seconded, and carried to adjourn; time 9:00 p.m.

Respectfully submitted,

/s/ Shane E. Blaser
Shane E. Blaser, City Clerk

WISCONSIN RAPIDS

City Clerk's Office

444 West Grand Avenue
Wisconsin Rapids, WI 54495-2780
Phone: (715) 421-8200
Fax: (715) 421-8280

RESOLUTION #19 (2009)

The intent of this resolution is to support the concept of development of the east arterial around Wisconsin Rapids by extending Highway 54 and constructing a new bridge across the Wisconsin River to Port Edwards.

WHEREAS, the proposed realignment of Highway 54 around the east side of Wisconsin Rapids and the creation of a new, centrally-located bridge across the Wisconsin River would greatly benefit the communities of the greater Wisconsin Rapids area, and

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WHEREAS, this area would connect Nekoosa, Port Edwards, Wisconsin Rapids, Grand Rapids, Biron, and the surrounding municipalities and help support intergovernmental cooperation.

NOW, THEREFORE BE IT RESOLVED, that the Wisconsin Rapids Common Council does hereby support the concept of the extension of Highway 54 around the east side of Wisconsin Rapids as determined in earlier studies, including construction of a new, centrally-located bridge across the Wisconsin River to Port Edwards, and

BE IT FURTHER RESOLVED, that a copy of this resolution will be submitted to representatives and the Wisconsin DOT as our request to urge them to have this project added to the list of major transportation projects in Wisconsin

Adopted: 06-02-2009

Mary Jo Carson

Mary Jo Carson, Mayor

[SEAL]

Shane E. Blaser

Shane E. Blaser, City Clerk

WOOD COUNTY

(12)

RESOLUTION# 09-5-5

ITEM# 4-1

DATE May 19, 2009

Effective Date May 19, 2009

Introduced by Conservation, Education and Economic Development Committee

Motion:	Adopted: ✓
1st Nelson	Lost:
2nd Henkel	Tabled:
No: 0 Yes: 19	Absent: 0

Number of votes required:

[X] Majority [ ] Two-thirds

Reviewed by: PAK, Corp Counsel

Reviewed by: _____, Finance Dir.

		NO	YES	A
1	Nelson, J		✓	
2	Rozar, D			
3	Feirer, M			
4	Josephson, K			
5	Hendler, P			
6	Schiferl, R			
7	Ashbeck, R			
8	Miner, T			
9	Winch, W			
10	Henkel, H			
11	Haferman, T			
12	Conradt, J			
13	Hokamp, M			
14	Polach, D			
15	Clendenning, B			
16	Pliml, L			
17	Allworden, G			
18	Miltimore, R			
19	Moody, R			

GFP

INTENT & SYNOPSIS: Support the concept of development of the east arterial around Wisconsin Rapids by extending Highway 54 and constructing a new bridge across the Wisconsin River to Port Edwards.

FISCAL NOTE: No fiscal commitment at this time. Regional support will help get the project on the major projects list.

Source of Money: N/A

WHEREAS, the proposed realignment of Highway 54 around the east side of Wisconsin Rapids and the creation of a new, centrally-located bridge across the Wisconsin River would have multiple benefits to the communities in the greater Wisconsin Rapids area, and

WHEREAS, the new route would improve safety on the existing area transportation corridors that are at or near their designed capacity and have significant above-average crash rates, by reducing the number of dangerous conflict points on these roads, and shifting through-traffic to the proposed State Highway 54 Realignment and the Wisconsin River Bridge Project , and

WHEREAS, the new route would better prepare the region to accommodate future increases in traffic volume and possible escalating traffic safety concerns by taking proactive measures of supporting transportation network improvements that include the State Highway 54 Realignment and the Wisconsin River Bridge Project, and

WHEREAS, this proposal would promote a stronger, better-connected and more competitive region for economic development by providing better access to existing and potential employment centers, downtowns, and shopping opportunities, and

WHEREAS, the new route would better connect regional business parks and allow more direct access from the South Wood County Area to the Steven's Point/Plover Area and Interstate 39, and

WHEREAS, this proposal would facilitate the redevelopment and reuse of the Domtar Mill property in the Port Edwards and surrounding land, and help the region respond to the recent loss of over 500 mill jobs and the ongoing decline of one of the region's primary industries (pulp and paper), and

WHEREAS, this route would efficiently connect Nekoosa, Port Edwards, Wisconsin Rapids, Grand Rapids, Biron and the surrounding municipalities so that they are positioned to take advantage of intergovernmental cooperation opportunities such as sharing community facilities and promote a higher level of services for residents and improved efficiencies at a lower cost to taxpayers.

NOW, THEREFORE BE IT RESOLVED, that the Wood County Board of Supervisors do hereby support the concept of the extension of Highway 54 around the east side of Wisconsin Rapids as determined in earlier studies, including construction of a new, centrally-located bridge across the Wisconsin River to Port Edwards, and

BE IT FURTHER RESOLVED, that a copy of this resolution be sent to the Wisconsin Department of Transportation, Senator Julie Lassa, and Representatives Marlin Schneider and Amy Sue Vruwink, urging them to pursue this concept by having it added to the list of major transportation projects in Wisconsin.

( )

I, Cynthia Cepress, County Clerk of Wood County, Wisconsin do hereby certify that this is a true and correct copy of the original on file in my office.

5/20/09 Cynthia Cepress
Date Wood County Clerk

HILDE HENKEL, (Chairman) Hilde Henkel

THOMAS HAFERMAN

GERALD NELSON

RUTH MOODY Ruth Moody

ROBERT ASHBECK

Adopted by the County Board of Wood County, this 19th day of May 2009.

Cynthia Cepress
County Clerk

County Board Chairman

RESOLUTION
Town of Grand Rapids, Wood County, Wisconsin
Resolution # 2009-19

RESOLUTION SUPPORTING THE CONCEPT OF DEVELOPMENT OF THE EAST ARTERIAL AROUND WISCONSIN RAPIDS BY EXTENDING HIGHWAY 54 AND CONSTRUCTING A NEW BRIDGE ACROSS THE WISCONSIN RIVER TO PORT EDWARDS

WHEREAS, the proposed realignment of Highway 54 around the east side of Wisconsin Rapids and the creation of a new, centrally-located bridge across the Wisconsin River would have multiple benefits to the communities in the greater Wisconsin Rapids area, and

WHEREAS, the new route would improve safety on the existing area transportation corridors that are at or near their designed capacity and have significant above average crash rates, by reducing the number of dangerous conflict points on these roads, and shifting through-traffic to the proposed State Highway 54 Realignment and the Wisconsin River Bridge Project, and

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WHEREAS, the new route would better connect regional business parks and allow more direct access from the South Wood County Area to the Steven's Point/Plover Area and Interstate 39, and

WHEREAS, this proposal would facilitate the development and reuse of the Domtar Mill property in the Port Edwards and surrounding land, and help the region respond to the recent loss of over 500 mill jobs and the ongoing decline of one of the region's primary industries)pulp and paper), and

WHEREAS, this route would efficiently connect Nekoosa, Port Edwards, Wisconsin Rapids, Grand Rapids, Biron and the surrounding municipalities so that they are positioned to take advantage of intergovernmental cooperation opportunities such as sharing community facilities and promote a higher level of services for residents and improved efficiencies at a lower cost to taxpayers.

NOW THEREFORE BE IT RESOLVED, that the Town of Grand Rapids Town Board do hereby support eh concept of the extension of Highway 54 around the east side of Wisconsin Rapids as determined in earlier studies, including construction of a new, centrally-located bridge across the Wisconsin River to Port Edwards, and

BE IT FURTHER RESOLVED, that a copy of this resolution be sent to the Wisconsin Department of Transportation, Senator Julie Lassa, and Representatives Marlin Schneider and Amy Sue Vruwink, urging them to pursue this concept by having it added to the list of major transportation projects in Wisconsin. *A copy of this resolution will also be sent to the City of Wisconsin Rapids.*

	For	Against	Abstain
Donald Bohn	[X]	[ ]	[ ]
Arne Nystrom	[X]	[ ]	[ ]
Jeanne Fehrman	[X]	[ ]	[ ]
Edward Hellner	[X]	[ ]	[ ]
William Clendenning	[X]	[ ]	[ ]

ACTION TAKEN
Adopted as presented _____
Adopted as amended X
Rejected _____
Tabled until _____
Referred to _____

I, Judy McLellan, Clerk for the Town of Grand Rapids, hereby certify that the above is a true and correct copy of a Resolution which was adopted on the 12th day of May, 2009 by the Town Board, Town of Grand Rapids, County of Wood.

Dated this 13th day of May, 2009.

By: Donald W Bohn
Donald Bohn, Town Chairman

By: Judy McLellan
Judy McLellan, Clerk

Meeting Materials

Oversight Committee Meeting No.1

ATTENDEES: See attached sign-in sheet

COPIES: File

FROM: Dan Dupies

DATE: November 21, 2006

PROJECT NUMBER: 334832.WR.PI

Introduction

The first Oversight Committee meeting was held on November 13, 2006, at the Wisconsin Department of Transportation's office (conference room 124). The purpose of the meeting was to:

- Review the results of the traffic operations analysis,
- Discuss Purpose and Need, and
- Review the 8th Street corridor and the level of proposed improvements
- Review the East Arterial corridor's footprint, and
- Discuss the results of the project's crash analysis

Meeting Highlights

Brian Roper summarized the process used to evaluate traffic operations in the study corridor and the findings of the analyses. Brian explained that traffic operations were evaluated on the existing corridor (No-Build Alternative), the existing corridor with improvements (Build Alternative 1), and the existing corridor with the proposed corridor (Build Alternative 2). All three alternatives were evaluated for the design year (2035), with the No-Build Alternative also being evaluated for the existing year (2006). WisDOT's Bureau of Planning provided traffic projections for the existing corridor without the proposed East Arterial and the existing corridor with the proposed East Arterial. For the No-Build and Build Alternatives, traffic operations were evaluated on the mainline and at several significant intersections along the corridor.

The mainline analysis for the No-Build Alternative and the Build Alternatives showed an acceptable level of service in 2035. Traffic analyses were also performed on ten intersections along the existing corridor for both the AM and PM peaks in 2006 and 2035. Three of the ten intersections were also part of the proposed corridor. Under the No-Build Alternative (2006 and 2035) all intersections except the 8th Street/CTH Z intersection in the PM peak hour in 2035 had acceptable levels of service. Under the Build Alternative 2 scenario, the intersection of STH 13/8th Street at Whitrock Avenue would have undesirable movements in the PM peak hour (2035).

Joe Terry (Village of Port Edwards) stated that when the South Wood County Study was completed in 2003, WisDOT re-ran the traffic projections and came up with different volumes than were used in the county study. Joe said the reality showed the local communities that the 2003 counts were high.

Tim Radtke (WisDOT) asked why traffic coming from the west would leave 2nd Street (Wisconsin River Drive) and take the East Arterial.

Ron Becker (WisDOT) noted that with the East Arterial, traffic speeds on 8th Street in 2035 would be similar to current speeds. Ron noted that the model used in this study does not consider the commercial driveways along 8th Street in calculating future travel speeds.

Dave Laspa (Wisconsin Rapids) mentioned that the city regularly receives calls from elderly drives about the difficulty of making some turns on and off 8th Street. Dave also asked how the model treated truck traffic. He thought trucks made up about 5 to 6 percent of the traffic on 8th Street.

Ron also pointed out the problems pedestrians have in crossing 8th Street.

Joe asked whether it was accurate to say that the model is analyzing a situation where left turns into businesses are restricted.

The Oversight Committee supported the concept of calling key businesses to obtain their number of customers in the p.m. peak. They were curious whether the owners might have data (national) on when business declines because of the difficulty entering and exiting business parking lots.

It was thought that WisDOT has a TIA from Wal-Mart and counts at the Kuhn signal. The model is less reliable without the Kuhn signal. Dave noted that the city has count information from several years ago at the Wal-Mart entrances. Dave said he has not reviewed the volumes on 12th or 16th streets to know whether those streets are being used as short cuts. Joe felt 1st Street is being used as a diversion route.

Jason Grueneberg (Wood County) asked whether there might be a higher number of crashes on 1st Street or other diversion routes that aren't reflected in the study's analysis.

Ron stated there is some evidence of trucks diverting to CTH Z and CTH U (80th Street N.). Would our model recognize that possibility? The question was asked whether Tom Buss (Town of Grand Rapids) would have insights into truck increases in his town.

What does the 1999 O-D Study indicate about trucks? Joe noted that in Marshfield, the recently-constructed improvements addressed the truck issue with an in-town solution because a Marshfield bypass was determined not to attract enough trucks.

Ron asked whether we have information about how much delay would be sufficient to cause a reduction in the number of patrons frequenting 8th Street businesses.

Tim suggested using the City's Wal-Mart entrance numbers rather than recounting. To capture potential issues associated the "side pressure" along 8th Street (commercial driveways), determine if there is any national data on traffic congestion levels detrimental to business, and contact key uses like McDonald's and Culvers.

The city is to provide old counts for the Riverview Expressway signals at Lincoln, 3rd Street, 12th Street and 16th Street.

It was noted that consideration should be given to a jurisdictional transfer that would move STH 13/54 to the East Arterial.

Joe noted that the Plum Creek land east of the Wisconsin River and along CTH Z has been sold to a developer and it will likely become residential and light commercial uses.

Tim suggested that the project would be more "sellable" if some part of the proposed improvements involve 8th Street. Joe agreed. Ron pointed out that the project would not be capable of fixing all the problems on 8th Street.

Tim noted that the purpose and need statement should mention the ability of the East Arterial to remove traffic from streets that may be functioning as diversion routes for 8th Street. Think of it as placing the appropriate traffic on the appropriate facilities.

Tim felt that the No-Build Alternative should be a true no action alternative. Whatever improvements are needed on 8th Street will be part of the Build Alternative.

Concerning the footprint of the East Arterial, Dave noted that the city has a 500-foot-wide corridor mapped from Two Mile Avenue to Griffith Avenue (CTH Z). North of Two Mile Avenue the city's reserved corridor is 207-feet-wide. The city owns the corridor between Grove Road and CTH W.

Ron thought that Airport Avenue would be a location for a future signal as well as the CTH Z "connector."

Joe thought the issue of land use would be the big concern when considering the wellhead protection area. Dave responded that the wellhead protection area will either be used as parkland or maintained it its current state. He also noted that Alexander Field is considering the possibility of expanding a runway to the south, but they are aware of this study.

oneet
ight Committee Meeting No. 1
ovember 13, 2006

East Arterial Feasibility Study
Wisconsin Rapids
Wood County

Name (Please Print)	Representing	Phone
STEPHANIE CHRISTENSEN	EMCS, Inc.	715-845-1081
Jason Grueneberg	Wood County	715-421-8478
DAVID LASPA	CITY OF WISCONSIN RAPIDS	715-421-8210
Joe Terry	Village of Port Edwards	715-887-3511
DAN Dupies	CH2M	414-272-2426
Brian Roper	CH2M HILL	414-847-0337
Ron Becker	WisDOT - Rapids - Traffic	715-421-8347
TIM RADTKE	WISDOT - Rapids - PLANNING	715-421-8318
Bob Wagner	"	715-421-8053

February 8, 2007 Meeting to Discuss Environmental Issues on Domtar Island

ATTENDEES: See attached sign-in sheet

COPIES: File

FROM: Dan Dupies

DATE: February 20, 2007

PROJECT NUMBER: 334832.WR.DG

Introduction

As part of the project's limited Phase 1 Hazardous Material Assessment, CH2M HILL was scoped to conduct a meeting with Domtar to discuss historical filling and operations on the Wisconsin River island adjacent to their mill. On February 8, 2007, the East Arterial project team met with representatives from Village of Port Edwards and Domtar at the Village Hall. Prior to beginning the alternatives development phase, the project team wanted a clearer understanding of the potential environmental issues on the island. Prior to attending the meeting the project team had heard references to dumping that occurred on the island and intensive use of the island by Nekoosa Papers, the previous owners of Domtar. In addition, EDR's regulated materials database for the study area listed several records referencing waste disposal sites/landfills for Domtar/Nekoosa Edwards Paper Company. Highlights from the meeting are described below.

Meeting Highlights

At the start of the meeting Kathi Ried (CH2M HILL) asked about several sites from the EDR database that had connections to Nekoosa Paper or Domtar. Dan Cummins (Domtar Environmental Engineer) noted the following in response:

- The Erco site in the report is a separate property,
- The ash bark landfill is in Nekoosa not Port Edwards,
- The reference to "mill refuse" is an active landfill south of the Wisconsin River within their treatment plant, and
- References to issues like the "fire station" and "gas station (Sam's Citgo)" are within the plant proper and are going into closure. Dan noted that the "gas station" had a removal and is now paved over.

Dan stated there are no pending removals at Domtar's plant. He went on to describe the island's history and current physical features. The mill (then Nekoosa Papers) has owned the island since the 1930's, and it has never been divided. The mill constructed sulfite liquor ponds on the island, and the island has been used as a municipal dump. The sulfite liquor,

which was a waste product from the process used to break down the fiber in wood chips, was piped from the mill to the ponds. The ponds were meant to be a disposal method. The ponds were located roughly in the central portion of the island along the east edge. Dan noted that the island had 1 to 2 feet of very tight clay on top of bedrock. Groundwater is present at about 10 to 12 feet below the surface.

Dan said that the railroad tracks seen on the island in historical aerials were used to transport wood chips or logs (not bulk chemicals) to the mill. The tracks extended from the south tip of the island to a point on the island roughly parallel to Lavigne Avenue. He noted that the Alexander Foundation maintains historical information on the property when it was owned by Nekoosa Papers. Marshall Buehler, a local historian, was identified as somebody who has knowledge about the island going back to the 1930's. Dan said that no corrective actions have been taken on the island.

Currently, there is a building at the north end of the island that is used to store supplies for the dam and a building on the south end to store calcium carbonate used at the mill. The road on the island is used by trucks to reach the calcium carbonate storage building. Dan pointed out that Domtar would need to keep this road operational with the East Arterial project. Trucks serving the main plant today are generally traveling south on STH 54. All logs go to the Nekoosa wood yard and are processed and shipped to Domtar by rail. There are about 20 to 30 trucks daily transporting finished products from the mill.

The dam at the tip of Domtar island has been licensed by the Federal Energy Regulatory Commission (FERC) and Dan thought the re-licensing would be in about 25 years. As part of the FERC license to operate the dam, there is public access to recreational parcels within the FERC project boundary. Dan noted that there are portages around the dam for kayakers and others. Nepco Lake is not part of the FERC project.

Dan concluded by stating that Domtar has no future vision for the island beyond its current use. Domtar would be in favor of a connection between Port Edwards and Wisconsin Rapids that crossed the island, but they would need continued access to and along the island. Dan also noted Domtar would be reluctant to pay for an expensive cleanup on the island. He suggested that given past uses by the paper mill and municipality (dump), the north end of the island may pose the fewest environmental issues. However, Domtar has no preference where the island is ultimately crossed or whether the future roadway would be built on fill or on structure crossing the island.

Sign-in Sheet

Domtar Meeting
February 8, 2007

East Arterial Feasibility Study
Wisconsin Rapids
Wood County

Name (Please Print)	Representing	Phone
Gary L. Allworden	Village of Port Edwards (President)	715-887-3135
DAN CUMMINS	DOMTAR	715-887-5155
Tim Radtke	WIS DOT	715-421-8318
Joe Terry	Village of Port Edwards	715-887-3511
Patrick Arnoldt	Village of Port Edwards (Trustee)	715-423-~~88~~45
Kathi Ried	CH2M HILL	414-272-2426 x469
DAN Dupies	CH2M	414-272-2426 ext 206

Oversight Committee Meeting No.2

ATTENDEES: See attached sign-in sheet

COPIES: File

FROM: Dan Dupies

DATE: August 8, 2007

PROJECT NUMBER: 334832.WR.PI

Introduction

The second Oversight Committee meeting was held on July 31, 2007, at the Wisconsin Rapids Council Chambers. The purpose of the meeting was to:

- Review the project's design criteria,
- Review the preliminary alternatives, and
- Summarize Purpose and Need

Design Criteria

Stephanie began the meeting by discussing some of the key design criteria that were used in developing the project's preliminary alternatives. Stephanie stated that the design speed/posted speed along corridor would vary by project section as indicated below:

- Wisconsin River Drive to the Wisconsin River - 30 mph (design)/25 mph (posted)
- Wisconsin River Crossing - 40 mph (design)/35 mph (posted)
- East side of the Wisconsin River crossing to CTH W - 45 mph (design)/40 mph (posted)

Stephanie then reviewed the proposed typical sections. Between Wisconsin River Drive (Port Edwards) and 8th Street (STH 13), the project team is proposing a two-lane urban undivided roadway with a separate multi-use trail. This roadway is envisioned within the existing 66-foot-wide right-of-way. Tim Radtke (WisDOT) asked how the multi-use trail would tie into the Port Trail. Joe Terry (Port Edwards) responded that the connection could be done similar to the transition at the fire department. Joe felt that no changes would be required to Port Edward's existing system by using 4 or 5 city blocks of a wider travel lane to transition into the village's dedicated bike trail.

From 8th Street to CTH W, the project team is proposing a four-lane divided roadway with a raised median (boulevard) and a continuation of the 10-foot-wide multi-use trail. This roadway is envisioned within a 130-foot-wide right-of-way. Dave Laspa (Wisconsin Rapids) noted that the city's ordinance calls for a 132-foot-wide right-of-way to provide a bit more flexibility. Tim noted that the multi-use trail would fit the suburban, limited access nature of this project.

Joe noted that in the 20th Street Corridor portion of the project, WisDOT should control access so that established businesses (for example those along 8th Street) do not face competition from a host of new businesses that might sprout up. Dave noted that the city is a strong proponent of 0.25-mile spacing for access.

Preliminary Alternatives Discussion

Stephanie described the preliminary alternatives beginning at the CTH W intersection. The first alternative segment is CTH W to Kuhn Avenue. Alternative 1 in this segment would hold the west 20th Street right-of-way and allow connections to the East Arterial at Grove Avenue (west), Airport Avenue, Two-Mile Avenue, and 16th Street. Dave and Don Bohn (Town of Grand Rapids) felt providing access at Grove Avenue was important. Tim asked whether we are considering signalized intersections along the 20th Street corridor in which case 0.5-mile spacing may be appropriate.

Dave noted that the city's plan was to use 20th Street as a frontage road. Stephanie noted that Alternative 2 incorporates that design feature. With Alternative 2, 20th Street is used as a frontage road between Two-Mile Avenue and Airport Avenue to eliminate long cul-de-sacs on adjacent subdivision roads. Local road connections would be provided at the same locations as with Alternative 1. Tim suggested eliminating the connection to Airport Avenue. Dave responded that he would rather signalize Airport Avenue and consider other options for the connection at Grove Avenue. Don said that the local input he has received is that this road would cut the town in half again. He noted that there is a large area of the town west of the proposed East Arterial and eliminating their access from the rest of the town for emergency services would not be well received. The town will not support the closing of Airport Avenue. Joe suggested that the East Arterial would improve emergency services in part because of the greater efficiency created by signalized intersections. The concern expressed was that accessing the East Arterial without signalized intersections would be a challenge. Dave asked about the potential for grade separated intersections. Tim responded that he did not think the roadway would meet warrants for grade separations.

Mike O'Meara (WisDOT) noted that intersections added to the East Arterial would likely require local cost sharing, and intersections are expensive. If the intersection spacing meets WisDOT standards then WisDOT is more likely to see the benefits of the intersection and cost sharing would be less expensive for the locals.

Dave said that when the barrier median was installed for the development of the Tractor Supply Store, there was a related problem for the nearby gun club. Mike pointed out that 8th Street is as much an arterial as the proposed East Arterial, and we have to consider what sort of access we are leaving for commercial businesses at the 8th Street/CTH Z intersection. Dave replied that we may be fooling ourselves if we think the bar in the southwest quadrant can stay. It was noted that the bar property might have utility as a mitigation site for impacts to the nursery. It was agreed that the bar should be shown as a displacement with Alternative 1. Tim reminded the group that when we look at new intersections, we have to consider roundabouts and that could take the bar.

Dave said that there would be continuity benefits if we could get to Lakewood with the Alternative 2 frontage road. Stephanie noted it may be difficult to make that connection without impacts to the gun club. Dave suggested that we try to avoid the gun club because

relocating them has some type of adverse effect on their permit to function as a shooting club. Tim stated that with Alternatives 1 and 2 the committee is probably underestimating the true impacts on the bar and the hotel. Tim recommended that both uses be shown as displacements, as well as the chiropractic office in the northeast quadrant.

Stephanie explained the river crossing alternatives:

- Letendre Avenue (Alt 1A) – designed to avoid wetlands on Domtar Island and the east bank of the Wisconsin River, it holds the north CTH Z right-of-way line at the airport, and avoids former sulfite pond area on Domtar Island.
- Letendre Avenue (Alt 1B) – designed as a more geometrically direct route than Alt 1A with additional wetland impacts and slight encroachment into former sulfite pond area. It also holds the north CTH Z right-of-way line at the airport.
- Lavigne Avenue (Alt 2) - designed to avoid wetlands on Domtar Island and the east bank of the Wisconsin River, it holds the north CTH Z right-of-way line at the airport, and avoids former sulfite pond area on Domtar Island.
- Ver Bunker Avenue (Alt 3) – most direct connection to Port Edwards, potential transmission line impacts, potential issues with proximity to the dam, and holds the north CTH Z right-of-way line at airport.

Purpose and Need Summary

Dan provided a brief background on the role of the Purpose and Need Statement in the document. Following that an explanation was provided about the key message for each section of the Purpose and Need Statement. The outline for the section is presented below:

- Study Background
- Proposed Action
- Purpose of Proposed Action
- Need for Proposed Action
  - Project History
  - Existing Roadway Characteristics
  - Safety
  - Travel Demand
  - System Continuity
  - Economic Stability

Draft copies of the complete Purpose and Need Statement were given to Oversight Committee members and they were encouraged to send comments/suggested revisions to Dan.

What's Next?

It was suggested that the first public information meeting should be held the second week of September. Tim felt that as work proceeds on the river crossings, the DNR would likely approve a lower vertical clearance over the river as a means of keeping boaters away from the dam. Joe pointed out that a high volume of traffic uses Seneca and Port roads as a local bypass. He expressed concern about the Ver Bunker river crossing alternative because it would promote a local bypass rather than routing vehicles through town on STH 54. Joe

said the Ver Bunker Alternative passes a number of sensitive uses and would likely be opposed by local residents.

Attendance Sheet

Oversight Committee Mtg. No. 2
July 31, 2007

Wisconsin Rapids East Arterial Study

Wood County

Name (Please Print)	Affiliation	Phone
MICHAEL O'Meara	WISDOT NC Region WISCONSIN RAPIDS	715 421 8313
Tim Radtke	WISDOT NCR PLANNING	715-421-8318
DAVID LASPA	CITY OF WISCONSIN RAPIDS	715-421-8210
ED HELLNER	TOWN OF GRAND RAPIDS	715-424-1821 423 5362
Don Bohn	Town of Grand Rapids	715-486-5927
Joe Terry	Village of Port Edwards	715-887-3511

Public Information Meeting No.1 Summary

ATTENDEES: See attached sign-in sheets

COPIES: Mike O'Meara/WisDOT
Stephanie Christiansen/EMCS

FROM: Ben Goldsworthy

DATE: September 27, 2007

PROJECT NUMBER: 332348.WR.CI

Purpose

The purpose of the first Public Information Meeting (PIM) was to present preliminary data gathering efforts for the Wisconsin Rapids East Arterial Feasibility Study, and to obtain public comments on the preliminary range of alternatives. The first PIM also provided the public the opportunity to meet the study team and review the scope and purpose of this study. The public was encouraged to ask questions and share ideas, suggestions and concerns with the study team.

Meeting Notices

The Wisconsin Department of Transportation (WisDOT) submitted a news release announcing the PIM to local media outlets on September 13, 2007. A newsletter that provided a project overview and announced the PIM was also sent to the project's mailing list that includes abutting landowners along the proposed East Arterial corridors, local officials, agencies and other interests. There are approximately 500 records on the project mailing list.

Meeting Format/Displays

The PIM was an open house conducted between 5 and 7 p.m. in the All Purpose Room of the McMillan Memorial Library located in Wisconsin Rapids. WisDOT and consultant team members were present to discuss study alternative, answer questions and obtain comments. Over 100 people attended the PIM.

Displays included the following:

- Overview map with general Wisconsin Rapids East Arterial (East Arterial) corridor noted.
- A project process display that shows the steps the project must go through before it will be constructed.
- Existing and future traffic volumes on Wisconsin Rapids-area roadways with and without the East Arterial.

- Crash rates for 2nd Avenue, the Riverview Expressway and 8th Street for the period 2000 through 2004.
- Existing and proposed typical sections
- Aerial exhibits showing the East Arterial's preliminary range of alternatives. Preliminary alternatives were developed for the following segments – 1) Kuhn Avenue to CTH W, Nepco Lake Road to Kuhn Avenue, Wisconsin River crossings at Ver Bunker, Lavigne and Letendre and along 8th Street between the Riverview Expressway and CTH Z.

A take-home handout and comment form was also available. It provided information on why this study is being conducted, the need for the East Arterial, an outline of key study activities, a list of environmental studies to be conducted as part of this study, upcoming project activities and contact information.

Comment Summary

Following is a summary of comments received at the PIM or that were mailed to the project team after the PIM.

The following comments were recorded by project team members through conversation with meeting participants.

East Arterial (20th Street Alignment)

The owner of a commercial property located on Airport Avenue, east of the proposed East Arterial, liked the fact that an intersection was proposed for the Airport Avenue/East Arterial intersection. He felt that closing Airport Avenue at this location would adversely affect his business. Several residents near the area also expressed a desire to have traffic signals located at this intersection. It was also noted that there is a lot of school bus traffic in this area.

Several residents who live near 20th Street noted that both alignments that run along the 20th Street corridor would travel very close, if not over, the new lift station that was recently constructed on the east side of 20th Street between Airport Avenue and Two Mile Avenue. Residents were also concerned about any impacts to the municipal well that is located near 16th Street. Some residents had general concerns regarding impact of ground water quality due to the new roadway.

There was opposition to the project from several people that live adjacent to 20th Street and the proposed East Arterial alignments. They were concerned about future noise impacts and declining property values.

Marvin Krzykowski, 1911 Shamrock Lane, noted that his lot is comprised of three parcels. With Alternative 1 (Kuhn Avenue to CTH W), the new subdivision road connection would take his new garage, which is not shown on the aerial photos. He preferred Alternative 2.

Leo Gachnang, 1921 Airport Avenue, wanted to know how many feet of new right-of-way would be taken from his property (north side of Airport Avenue). He would like to be contacted with this information.

Several newer condominiums have been built in the southwest quadrant of the Whitrock Avenue/16th Street intersection. Several more condominiums are slated to be constructed on this property.

A resident stated that Cook Avenue used to be a dead end street until 20th Street was constructed 30-plus years ago.

One resident in The Ridges had concern that the arterial should be shifted to the location shown on the City map between Kuhn and Two-Mile Avenue. They thought it would be further away from 20th Avenue which is the only reason they built at The Ridges.

River Crossing

A Port Edwards Village Board member discussed the development potential of the former Plum Creek property. He stated that much of the land along CTH Z that was formerly in forest cropland reserve had been removed from that program. The arterial would allow Port Edwards to provide services to the east side of the WI River and give the community room to grow since they are land locked on the west side of the WI River.

Several people felt that a new bridge between Port Edwards and Wisconsin Rapids would improve travel efficiency, but were concerned that the Ver Bunker Avenue alternative would increase the amount of traffic that travels on Ver Bunker past a park, grade school and senior living facility. This group of people supported river crossing alternatives that connected to Letendre Avenue.

One person felt the Ver Bunker Avenue river crossing alternative was the best alternative because it provided a larger "landing area" on the west side than the other alternatives. Others liked this alternative because it provided a "straight shot" across the river.

A handful of property owners questioned the need for signals where the arterial is proposed to connect to Letendre Avenue.

8th Street (STH 13)/Griffith Avenue (CTH Z)

Comments were provided that supported removing potential traffic from 8th Street to make it safer. Comments were also provided against removing traffic from 8th Street because it would adversely affect existing businesses.

Multiple people expressed concern that Wal-Mart trucks are using the existing residential streets on 9th, 10th, and 11th Streets. 12th Street is designated as a truck route. They agreed that the cul-de-sacs would eliminate that situation but there were concerns about additional traffic on Peterson and the need for signals at 8th Street so people could turn left onto 8th Street.

Other comments

A person stated that he did not see the need for a new river crossing but did like the element of the project that diverted traffic from 8th Street on to the new East Arterial.

One person stated that the project would not help the paper mills because so much of their raw materials and finished products are shipped by train rather than truck.

Two people asked about how the future traffic numbers were arrived at. Both felt that the projections were high and that declining industrial business in the area should be taken in to account. They stated there may not be a need for a bypass in the future.

A person provided a potential new alternative to route auto and train traffic away from the center of Wisconsin Rapids.

Several people submitted comments at the meeting via the Public Comment Form:

East Arterial (20th Street Alignment)

Winnie Jeffers, 1910 Bob-O-Link Court, Wisconsin Rapids: Concerned about noise from the new roadway and sound barriers. Wanted to know if any thought has been given to building the highway outside of the town, away from existing subdivisions, and suggests using CTH U and W as an alignment.

Ronald Natzke, 1921 Cook Avenue, Wisconsin Rapids: Believes that the bypass belongs outside of the city and not through the middle of it where people have homes. Proposed alignments will destroy animal habitat and the Lincoln School forest. The East Arterial alignment should follow CTH U since there is already right-of-way to CTH Z and the US 54/CTH U intersection and CTH Z intersection should be redesigned. Also wants to eliminate dead end streets that the East Arterial would create. Believes the project is too expensive to complete and would need several structures along the roadway to eliminate noise pollution.

Jane Natzke, 1921 Cook Avenue, Wisconsin Rapids: Does not support the East Arterial as proposed. Too many subdivisions would be compromised (Lovewood, Cook, Shamrock Lane, Rosewood, Ridges and new subdivision off Airport Avenue. It will be very expensive to build sound barriers, as what happened when the Expressway was expanded to the east. Thinks that using CTH U and CTH Z as the alignment for the East Arterial should be studied. It will be at the edge of town in 25-30 years.

Shirley Koltz, 4630 Whip-or-Will, Wisconsin Rapids: Supports a route the runs to the west of 20th Street (Included diagram). This route will have less impact and noise. Or, the East Arterial should travel along 32nd Street as originally proposed.

Don Bemke, 3021 21st Place South, Wisconsin Rapids: Does not support having an intersection with Grove Avenue. It is a quiet area and there are several residences to the east.

John Koltz 4630 Whip-or-Will, Wisconsin Rapids: There is no need for the project as traffic is ok as present. People living in this area do not need the additional noise or congestion. All this project does is relieve one project area and pass it along to another area.

River Crossing

Gary Allworden, 541 Market Avenue, Port Edwards: Would like to see a new river crossing so that it is easier for Port Edwards residents to have access to Wisconsin Rapids and supports the river crossings that tie in at Letendre or Lavigne Avenues. This crossing will also help Port Edwards grow.

Don, 340 Tyler Avenue, Port Edwards: Supports river crossing Alternative 1-B and believes Letendre Avenue is the logical bridge crossing point. Would use this crossing often to access the south side of Wisconsin Rapids and visit family and friends. The idea of a river crossing has been discussed for many years (back to the 1930's).

Richard Hess, 1050 Wisconsin River Drive, Port Edwards: Understands the desirability of constructing a bypass around 8th Street to go from STH 54 E to STH 13 S, but does not see the justification for a new river crossing in Port Edwards. Does not believe that the traffic volumes on Wisconsin River Drive warrant the construction of a new bridge and the expenses that go along with it.

8th Street (STH 13)/Griffith Avenue (CTH Z)

James Custer, 1471 Wisconsin River Drive, Port Edwards: Supports the bridge entering Port Edwards at Letendre Avenue. On CTH Z (Griffith Avenue), supports taking land from the DNR Nursery and not from private landowners on the north side of the street. Would like to see the project completed as soon as possible.

William McMahon, 4621 11th Street South, Wisconsin Rapids: Can see problems with CTH Z merging into Peterson Avenue between the Wal-Mart and his neighborhood. More traffic and trucks would pass down his street and it would be difficult for to cross Peterson Avenue. A traffic signal would then be needed at the 8th Street/Peterson Avenue intersection. A noise barrier would also help the local residences.

Other comments

Jerome Krofta, 4132 16th Street, Wisconsin Rapids: The sooner the East Arterial is built, the better off the area will be.

Dave Barth, 8311 STH 13 South, Wisconsin Rapids: Through traffic movement in the area is becoming more congested due to increasing local traffic. The East Arterial will separate the local traffic from the through traffic. Would like to see this constructed as soon as possible since all users will benefit from the time savings and improved safety.

Comments received following the PIM via the comment form:

East Arterial (20th Street Alignment)

John and Sandy Clark, 4110 Ridgeview Lane, Wisconsin Rapids: Would like the new arterial alignment moved west from its present alignment along 20th Street between Two Mile Avenue and Kuhn Avenue towards 16th Street o the vacant wooded land. They would also like to see noise barriers near the ridges subdivision and golf course. Major concern is the traffic congestion on Griffith Avenue (CTH Z) and 8th Street that currently exists. Believes the east Arterial would just be moving accidents from one part of Wisconsin Rapids to another. State may want to rethink the entire Hwy 54 alignment as it currently exists and utilize unpopulated land on the outskirts of the city.

Marvin Krzykowski, 1911 Shamrock Lane, Wisconsin Rapids: The aerial photos from the public meeting do not show the detached garage that he recently built. The Alternative 1 proposed route from Airport Avenue to Shamrock Lane travels through the area where the garage is located. The garage is located west and north of the residence. Does not support

alternative 1 for this reason. Supports Alternative 2, if, in fact, access to Shamrock Lane from 20th Street has to be abandoned.

River Crossing

Dick Dombrowski, 991 3rd Street, Port Edwards: Believes it is best for the river crossing to connect at Letendre Avenue in Port Edwards because of noise concern with large trucks turning and accelerating and breaking. Also states that all the other river crossings would eventually involve rebuilding the Wisconsin River Drive/Letendre Avenue intersection. Does not like alternative 3 because this would increase traffic on VerBunker Avenue and involve a bridge to the north of the existing damn where some interesting artifacts from previous river use remain. Remembers a damn at this location made of "logs standing vertically together with an opening in the center possibly for diverting logs into the main channel."

Michelle Smith, 511 Wisconsin River Drive, Port Edwards: Her family has resided at 511 Wisconsin River Drive (NW quadrant of the Wisconsin River Drive/Letendre Avenue intersection) for 12.5 years. This location would be impacted by the proposed east arterial and river crossing project. The family has worked hard to maintain the historical quality of the residence both inside and out. Primary request is that they are kept up to date on the status of this project and that all alternatives be considered. Believes that the river crossing option that crosses at VerBunker Avenue would have less of an environmental impact and perhaps would be less expensive because the bridge would be shorter. There is also more land on the east side of Wisconsin River Drive in this location and it already is public right-of-way. Would appreciate open and honest communication during the course of the project.

WISCONSIN RAPIDS

East Arterial Feasibility Study | Wood County

Public Information Meeting No.1

Sign In Form

Name	Address/Representing
Gary & Jamie Schill	4631 10th St. South WR
Patrick Stiber	2951 16th St. S. W.R.
GARY GRITZMACHER	WIS RAPIDS
[illegible]	Port Edwards
Douglas Schill	Wi Rapids
Jerome Krofta	4132 16th St So WR
Greg Stelmacher	2521 Lovewood Dr. W.R.
Ted Springer	2231 Lovewood Dr. WR
Tim Habeck	911 Ver Dunker Av. Port Edwards
SCOTT SCULLEY	4510 20 ST. S. W.R.
Charles + Karrie Oertli	940 Westport Drive P.E.
Richard Hess	1050 Wis. River Dr. P.E.
Jim Custer	1471 Wis Rive Dr PE
Mildred A. Hoffman	1331-13th Ave. S, W.R
Tom Smith	3540 Hwy 54W Nekoosa
Pam Schmidt	2211 Airport Avenue, WR
Donald A. Benke	3021 21st Pl. S. Wis. Rapids
Kathleen Bollinger	1131 Griffith Ave Wis. Rapids

WISCONSIN RAPIDS

East Arterial Feasibility Study | Wood County

Public Information Meeting No.1

Sign In Form

Name	Address/Representing
William A. Stanika	4611 9TH Street South
Nancy Clement	1532 Rosewood Ave
Mike Clement	1532 Rosewood Ave, Wisc Rapids 54494
Dorothy McMahon	4621 11th St. S
WILLIAM H. McMAHON JR	" " " W.S. RAPIDS 54494
Karen Graff	U S Sen. Russ Feingold 401 5th St, #410, Wausau 54403
Connie Klement	1941 Cook Ave. WR 54495
Paul R Gross	464 RIDGEVIEW G WR 54494
Jim Hannigan	1660 Springhill Lane Port Edwards WI 54469
Edward Snyder	1120 Griffith Av Wisc Rapids WI 54494
Sheila + Tom Bogus	1028 Larry Ave. WI Rapid - Sportsmans Pub Grill
Steve Bliek	1820 Airport AVE. WI. Rapids, WI 54494
Sue Van Asten	465 Piltz Ave Wisc Rapids WI 54494
Ray Szelagowski	120 Buffalo ST, WR 54494
GEORGE TIKALSKY	1531 ROSEWOOD AVE WISC RAPIDS 54494
Robert W. Schmidt	1640 - Township Ave WR 54494
Winnie Jeffers	1910 Bob O Link Circle Wis. Rap. 54494
GARY JEFFERS	1910 BOB O LINK CIR. WI. RAPIDS 54474
BoB Kelley	1810 Airport Ave Wis Rapids 54494

WISCONSIN RAPIDS

East Arterial Feasibility Study | Wood County

Public Information Meeting No.1

Sign In Form

Name	Address/Representing
Sybil Krzykowski	1911 Shamrock Lane Wi Rapids, WI (Grand Rapids)
David J. Cervenka	770 Ver Bunker Ave Port Edwards Wis 54469
Leo + Shirley Gachnang	1921 - Airport ave Wi Rapids WI. 54494
Lucille Kruntjes	4631 Ridgeview Ct Wis Rapids 54494
Dan Cummins	100 Wisconsin River Dr. (Domtar) Port Edwards 54469
Joe Terry	1180 Port Road Port Edwards 54469
Troy Vetrone	4711 16th St So Wis Rapids WI 54494
Fred Jesse	951 - Westport DR. Port Edwards, WI 54469
Jim Adams	3340 2nd St S Wis Rapids 54494
Steve Barton	731 Karberg Lane Port Edwards, WI 54469
Earl N. Olds	5928 5 ave Rudolph WI 54475
Arne Nyplow	7720 Warren DR Wis Rapids 54494
Doug Berryman	110 Letendre avenue Port Edwards WI 54469
Karen Berryman	" " " "
John + Susan Ludwiczak	1840 Shamrock Lane Wisconsin Rapids 54494
Jim + Ruth Greeney	940 Tourline Rd Wis Rapids WI 54494
Paula Brassuener	141 Wis River Dr. Port Edwards, WI 54469
Roland Hawk	1170 Ver Bunker Ave, Port Edwards, WI 54469

WISCONSIN RAPIDS

East Arterial Feasibility Study | Wood County

Public Information Meeting No.1

Sign In Form

Name	Address/Representing
WAYNE SIDABRAS	1180 N. DEER RIDGE DR. PORT EDWARDS, WI 54469
ARMEN ARMITAGE	140 18th St. Ho
Jake & Joy Close	4521 Eastwood Dr. WR. 54494
Carl Hilke	1030 Two Mile Ave (Residence) Representing WFHR News
[illegible]	5620 Blueberry Ln Wis Rapids 54494
Marvin Krzykowski	1911 Shamrock Lane, Wis. Rapids 54494 (Self)
Mary Mras	1931 Shamrock Lane, Wis Rapids, WI 54494
Chad & Tricia Borgwardt	2611 Brooke Lane, Wis Rapids, WI. 54494
[illegible]	474 PILTZ AVE WIS. RAPIDS, WI
Erwin Crane	4712 Ridgeview ct. Wis Rapids
Donald J. Knuth	140 Canal St. "
Lori Knuth	140 Canal St " "
[illegible]	311 First St Port Edwards WI 54469
[illegible]	1061 WI RIV DR PE "
Dean Anderson	341 Wisconsin River Dr. PE 54469
Lou Ellyn A. Vits	1620 Kuhn Ave, Wis. Rapids WI 54494
Carl Haeb	1850 Cook Ave W.R. 54494
DAVID [illegible]	ENG. DEPT. CITY OF W.R. 444 W. GRAND AV. CITY W.R., WI 54494
Robert L Johnson	1670 Springhill Lane Port Edwards - Citizen

WISCONSIN RAPIDS

East Arterial Feasibility Study | Wood County

Public Information Meeting No.1

Sign In Form

Name	Address/Representing
Michael O'Meara	Wis Dept of Transportation 1681 2nd Av. South Wis Rapids
Doug & Dorothy Regalia	430 - 20th St N.
Estelle Harcinske	4711 9th St, S.
Arnold Whitely	4611 Juniper Ln
Gary Allworden	541 Market Av. Port Edwards, W.
Sandy Clark	4110 Ridgeview Lane. Wis. Rapids, WI 54494
Glenn Koosmann	350 2nd St Port Edwards
Katherine Lee	1620 Griffith W. R.
Charles Klement	1941 Cook Ave.
Sherry Snyder	1120 Griffith Ave WS
Richard N. Schill	205 Blue Heron LA. W. Rapids 54494
Lois E Truchinski	1010 E Griffith PO Box 1042 WR 54495
J Marshall Buckley	1081 2nd St Port Edwards 54496
Tim Radtke	WisDOT 1681 2nd Ave. So WR
Cindy Kresh	2021 Two Mile Ave., WR
Carolyn Lippert	2111 Two Mile Ave. W.R.
Dave Barth	WIS. RAPIDS
Bryan Bailey	211 Wisconsin River Dr. Port Edwards WI 54469
Kathy Sidabras	1180 N. Deer Ridge dr. Port Edwards WI 54469
Leslie Arendt	311 First St. Port Edwards 54469

WISCONSIN RAPIDS

East Arterial Feasibility Study | Wood County

Public Information Meeting No.1

Sign In Form

Name	Address/Representing
Dr. Pat & Patti O'Connor	4777-8th St. S. - O'Connor Chiropractic Office
D	
Gordon Wipperfurth	8841 Highway 13 S. Wis Rapids, WI
Ed Saylor	960 Westport Dr. Port Edwards
Jane Natzke	1921 Cook Ave W. Rapids
Ron Natzke	1921 Cook Ave "
DON KROHN	340 TYLER PORT EDWARDS
INEZ KROHN	340 Tyler Ave., PORT EDWARDS
Nancy L. Schmidt	1640 Township Ave W.R.
Karen Buchholz	820 Letendre Ave Port Edwards
Alvin Buchholz	820 Letendre Ave Port Edwards
Everett Buchholz	850 Letendre ave Port Edwards
Michelle Smith	511 Wisconsin River Dr. P.E.
Dick Dombrowski	991 3rd St P.E.
Mike Zurfluh	2521 8th St. So WR 54494
Robb N. Sigler	Nekoosa Bank 886 3104
Tom Jensen	960 2nd St Port Edwards
Lori Leggett	2011 Two Mile Ave Wis Rapids
Shirley & John Kaltz	4630 WHIP-OR-WILL WR

March 19, 2008 Alternatives Meeting with DNR

ATTENDEES:	Dan Dupies/CH2M HILL Stephanie Christiansen/EMCS Mike O'Meara/WisDOT	Barry Gilbeck/DNR Jim Storandt/DNR Tony Fischer/DNR
COPIES:	File	
FROM:	Dan Dupies	
DATE:	June 12, 2008	
PROJECT NUMBER:	334832.WR.AC	

Introduction

In February 2007, the Wisconsin Department of Natural Resources' (DNR's) Nursery Manager (Jim Storandt) and Service Center Manager (Barry Gilbeck) sent CH2M HILL an e-mail listing their project concerns. The DNR's project concerns included:

- Traffic and safety concerns at the CTH Z entrance to the nursery property,
- Loss of nursery production area and fence relocation,
- Environmental impacts on seedling production areas, and
- Impact on the seedling storage facility

In November 2007, the project team sent the preliminary alternatives from the September 26th public information meeting to DNR for review and comment. A meeting was held with DNR at the Service Center on CTH Z to discuss the potential effect of the preliminary alternatives on the Service Center (north of CTH Z) and Griffith State Tree nursery (south of CTH Z). A summary of the key issues is found below.

Meeting Summary

The Nepco to Kuhn alternative aligned through the DNR's nursery was estimated to affect approximately an acre. Jim Storandt noted that this area is a seedling production area that is currently irrigated. If this alternative were selected it was noted that the nursery fence would also have to be relocated. When asked whether DNR would look for an area on their property to replace the lost acreage, they replied that it would be unlikely that they would replace the lost acreage.

Jim pointed out that the nursery functioned as a "Side Camp" for the Civilian Conservation Corps workers and is listed on the National Register of Historic Places. [The Mississippi Valley Archaeology Center historian stated that the "Side Camp" or development along the north edge of the nursery was identified in the "1991 State Facilities Survey: Reconnaissance Survey Report" by Nancy J. Hubbard. That report identified the site and the 17 structures constructed prior to 1945 (on the entire 100-acre nursery) as "considered as a potential

Historic District." This historian noted that a Determination of Eligibility would need to be prepared for the nursery if they remain in the project's area of potential effect.

Jim pointed out that the peak of the seedling distribution season (April and May) there is a good deal of heavy traffic entering and exiting the nursery entrance as well as the public picking up seedlings on a daily basis. There is activity at the nursery other times of the year although the volume of traffic would not be as heavy as in April and May. The question was asked whether turn bay would be appropriate at the nursery entrance. Tony Fischer asked what existing traffic volumes are on CTH Z. The project team did not have the information, but indicated they would send it after the meeting.

Jim asked whether our preliminary alternatives mapping includes DNR's new freezer building on the south side of CTH Z. It was not clear from looking at the aerials whether the building is shown. This issue will be investigated by the project team following the meeting.

Because the Nepco to Kuhn Alternative (Alt. 1) aligned on the north side of CTH Z affects a relatively small area in the southeast corner of the Service Center property, there was generally less concern about that alternative. DNR did note that the future road should be designed so that drainage from the road did not enter their driveway on CTH Z. It was pointed out the DNR's fire trucks use this entrance as well as the public visiting the building. Because of the presence of fire trucks there it was suggested that flashing lights might be warranted when the new road is constructed to warn vehicles of exiting trucks.

Tony Fischer thought that it would be easier to handle road drainage in a ditch (rural section) than with an urban typical section.

Commenting on the proposed bridge crossing alternatives, Tony noted that DNR preferred the Ver Bunker alternative because it uses an existing utility corridor. Tony indicated that DNR would put their thoughts together in a letter and send it to the project team. Dan Dupies noted that the project team would send the DNR a copy of the feasibility study for their review in summer/fall.

Oversight Committee Meeting No.3

ATTENDEES: See attached sign-in sheet

COPIES: File

FROM: Dan Dupies

DATE: April 8, 2008

PROJECT NUMBER: 334832.WR.PI

Introduction

The third Oversight Committee meeting was held on March 27, 2008, at the Wisconsin Rapids Council Chambers. The purpose of the meeting was to:

- Summarize first public information meeting results,
- Provide an agency coordination update,
- Review the status of the preliminary alternatives,
- Present the preliminary intersection alternatives in Port Edwards,
- Describe the latest 8th Street improvements, and
- Present the updated project schedule

Public Information Meeting No.1 Summary

Dan stated that the first public information meeting was held on September 27, 2007, at the McMillan Memorial Library in Wisconsin Rapids from 5 to 7 p.m. The meeting was conducted in an open-house format and approximately 120 people attended. The purpose of the meeting was to introduce project staff, meet study area residents, obtain public input on transportation deficiencies and preliminary alternatives, and provide background information on the study area.

Dan then provided a sample of the comments received at and after the meeting:

- Project opposition from several 20th Street residents due to future noise impacts and declining property values,
- The bypass belongs outside of the city and not through the middle of people's homes,
- Several people felt that a new bridge between Port Edwards and Wisconsin Rapids would improve travel efficiency,
- Several people were concerned the Ver Bunker alternative would increase traffic past the park, grade school and senior living facility. They supported alternatives that connected to Letendre Avenue.

Agency Coordination Update

Dan noted that the preliminary alternatives from the September 27, 2007 public information meeting were sent to state and federal agencies November 2007. The following input has been received from the agencies:

- The U.S. Fish and Wildlife Service sent a letter stating they do not have sufficient staff to review the preliminary alternatives. No further coordination will be conducted with them.
- In a February e-mail, the DNR expressed concerns about potential nursery impacts. A follow-up meeting was held with the DNR on March 19, 2008, to obtain their input on the preliminary alternatives. DNR confirmed their concerns about the project's impact on the nursery's seedling production area and provided other thoughts about the project's effect on the Service Center. The DNR will send the project team a letter with their thoughts about the preliminary alternatives.
- Dan explained that he had a recent conversation with the Corps of Engineers (COE) representatives in Stevens Point. The COE will be interested in the project's wetland impacts, particularly floodplain forest wetlands on the east bank of the Wisconsin River, and the potential impacts on threatened and endangered species. The COE did not comment on the preliminary range of alternatives, but they did commit to providing comments on the entire feasibility study at the end of the study process.
- Dan indicated that a meeting has been scheduled with the Bureau of Aeronautics on April 7th
- On January 9, 2008, the project team met with the Port Edwards committee to review alternatives and discuss the potential to collect local information to add to purpose and need. There was also discussion about accelerating construction of the project.

Review Status of Preliminary Alternatives

This portion of the meeting was meant to elicit comments on all portions of the East Arterial except the bridge crossings. In particular, input was desired on the segment from Kuhn Avenue to CTH W which has Alternative 1 that would not allow Cook, Shamrock, and Lovewood to access the East Arterial, and (Alternative 2) that would use frontage roads to connect those roads to Two-Mile Avenue and Airport Avenue. Dave Laspa (Wisconsin Rapids) stated that it has been the city's position not to allow Cook, Shamrock, and Lovewood to access the East Arterial, but to use 20th Street to provide those roadways with connections to Airport and Two-Mile. Dave said Alternative 2 would be the city's preferred alternative. Don Bohn (Town of Grand Rapids) indicated that he has heard a few comments about the project, but that many people would prefer nothing to happen.

Intersection Alternatives in Port Edwards

The intent of this portion of the meeting was to describe the more detailed analysis the project team conducted for the Ver Bunker, Lavigne, and Letendre river crossing alternatives. Before describing each alternative, Stephanie explained the general design considerations that apply to all crossing locations.

- East Channel Bridge Crossings (below dam)
  - 100-year flood elevations are 5-8' lower below the dam

  - East channel water elevation is not the controlling factor for profile development for the river crossings

- West Channel Bridge Crossings (above dam)
  - Alternative analysis focuses on developing profiles for the west channel crossings

- Profile and Bridge Design Considerations
  - 5-foot navigation clearance from OHWM (elev = +/- 963)
  - FIS 100-year elevation (elev = +/-968)
  - 2-foot clearance to 100-year elevation (elev = +/- 970)
  - Structure selection based on analysis of hydraulics and cost
  - Preliminary sizing for alternative analysis includes:
  - 72W pre-stressed concrete – maximize profile raise / minimize number of piers
  - 28" pre-stressed concrete – minimize profile raise / increase in number of piers

- Intersection Design Considerations
  - Three or four-way stop controlled standard intersection for alternative analysis
  - Consideration of roundabouts will be required

Stephanie then presented the conceptual bridge design information for the three crossing locations. For Lavigne Alternative 2, which would construct retaining walls on the east and west sides of Wisconsin River Drive, Joe Terry (Port Edwards) asked whether fill in the "man-made mill pond" would be treated by DNR the same as fill in the natural east channel. Mike O'Meara (WisDOT) responded that the agencies will always push for resource minimization regardless of whether or not it is man-made. Mike went on to note that a retaining wall in front of the home on the river could still be considered a taking and require payments to the property owners that might approach the price to purchase them. Joe noted that the view of the river from adjacent residences is part of the community's image.

Concerning Letendre Alternative 3, which closes the south leg of the Letendre/Wisconsin River Drive intersection, Joe Terry pointed out that there are no access points on Wisconsin River Drive between Market Street and Letendre Avenue.

Rich Coakley discussed traffic operations issues at the west side intersections in the design year 2035. He noted the following issues with an arterial connection at either Ver Bunker or Lavigne:

- there would be level of service F in the a.m. and p.m. peaks (under a two way stop condition) for the vehicles turning left (southbound) on to Wisconsin River Drive,
- there would be level of service E in the p.m. peak with an all way stop condition at Letendre and Wisconsin River Drive for the vehicles turning right (westbound) on to Letendre, and
- there would be level of service of F in the p.m. peak with an all way stop or two way stop at the Letendre/Wisconsin River Drive intersection for vehicles turning left (northbound) on to Wisconsin River Drive.

With an arterial connection at Letendre:

- there would be a level of service E (a.m. peak) for the westbound through vehicles with an all way stop condition
- there would be a level of service E (a.m. peak) and F (p.m. peak) for the north leg and a level of service F (a.m. and p.m. peaks) for the south leg of the intersection with a two way stop condition

With an arterial connection at Letendre (and the south leg of the intersection closed):

- there would be a level of service F (a.m. peak) for the north leg of the intersection

8th Street/CTH Z Intersection Improvements

Stephanie noted that there are two alternatives at the 8th Street/CTH Z intersection, Alternative 1 which holds the south right-of-way west of 8th Street and Alternative 2 which holds the north right-of-way. Alternative 1 would displace 22 residences and 3 businesses, and Alternative 2 would displace 11 residences and 1 business.

The City forester, who is a member of the gun club in the southeast quadrant of the intersection, noted that if the club were relocated, a city or town could deny their request to construct a replacement facility. In their current location neither the city nor Tractor Supply could regulate them out of existence.

Dave asked about the trade off between acquiring DNR land (the nursery) or acquiring the mobile homes. Mike noted that WisDOT cannot condemn DNR land, but they can condemn private property. The preliminary group consensus was that Alternative 1 may be the prudent choice even though it has more displacements.

8th Street Improvements

Since the first public information meeting, the project team added a raised median wide enough to accommodate U-turns for automobiles to 8th Street. That would make all access points along 8th Street right-in/right-out. Dave noted that this alternative would be very difficult to sell politically.

Joe noted that the Village met with Representative Obey's office and there might be interest in funding this project if there are important regional economic benefits to the project.

Sign-in Sheet

Oversight Committee Meeting No. 3
March 27, 2008

East Arterial Feasibility Study
Wisconsin Rapids
Wood County

Name (Please Print)	Representing	Phone
Bill Clendenning	Supervisor Wood Co Board	423-2469
DAVID LASPA	CITY OF WIS. RAPIDS	421-8210
ED HELLNER	TOWN OF GRAND RAPIDS	423-5362
Don Bohn	Town of Grand Rapids.	423-5023
Michael W. O'Meara	Wis DOT NCR Wis Rapids	421-8313
Joe Terry (by D.D)	Village of Port Edwards	

April 7, 2008, Alternatives Meeting with BOA

ATTENDEES: See attached sign-in sheet

COPIES: Stephanie Christiansen/EMCS

FROM: Dan Dupies/CH2M HILL

DATE: April 23, 2008

PROJECT NUMBER: 334832.WR.AC

Introduction

In January 2007, the Bureau of Aeronautics (BOA) sent CH2M HILL information that would help the project team determine whether the East Arterial Feasibility Study would affect Alexander Field (South Wood County Airport). The information from BOA included:

- Height Limitation Zoning Map,
- Aerial photo showing the airport property boundary, the approach surfaces, the runway safety area and the object free area, and
- Ordinance (No. 1) regulating the height of structures and trees and the use of property in the vicinity of the South Wood County Airport.

In November 2007, the project team sent the preliminary alternatives from the September 26th public information meeting to BOA for review and comment. A meeting was held with BOA (Terry Rip and Gary Dikkers) at their office to discuss the potential effect of the preliminary alternatives on the South Wood County Airport. A summary of the key issues is found below.

Meeting Summary

The meeting began with a review of the information that BOA sent in January 2007. Starting with the aerial photo, Terry explained that the existing aviagation easement (the dashed line coming off the end of the runway) is in place to control the height of trees and other objects within the easement boundary. Terry was not sure of the height limitation within the easement area without checking the language in the easement. She noted that the solid dark lines extending out from the runway represent the approach line to the airport. The approach line begins 200 feet from the edge of the runway and extends 5,000 feet to the southwest at a slope of 34:1 (for every 34 feet out there is an increase of 1 vertical foot). The airport boundaries are also identified on the aerial. Stephanie noted that the boundary extends to the south side of CTH Z. It was suggested that this issue be looked into to make sure the project team knows where the highway right-of-way ends and the airport boundary begins. This is a potential issue because there is process to follow if right-of-way would be needed from the airport. Because Federal Aviation Administration (FAA) grant money has been used at the South Wood County Airport, one would have to obtain a

release from the current FAA restriction(s) for any acquisition of land for a non-airport use. Beyond that issue, it was also pointed out that the Alexander Foundation may also have restrictions on acquiring property from the airport. Terry suggested contacting Ron Swenson, the airport manager, to learn more about the potential restrictions.

Terry said there is an approximately 50-foot elevation difference from the runway to CTH Z. On the aerial, BOA lists the "runway end elevation" as 1,011 feet and road elevations of 979 and 993 along CTH Z in the area between the airport and Nepco Lake. It was noted that the substantial elevation difference would likely preclude any height problems caused by the reconstruction of CTH Z or the proposed crossing of the Wisconsin River. Gary stated that the Federal Aviation Administration assumes the maximum height of a vehicle passing the airport along CTH Z would be 15 feet. It was also noted that the ordinance restricting height in the area surrounding the airport has no authority over uses that are 50 feet below the airport runway elevation. Trying to control a use in that situation would require the airport to buy the property or obtain an easement.

Gary and Terry indicated that the existing runway (220) is 5,500 feet long and the airport would like to extend it an additional 500 feet. A feasibility study will be conducted to determine whether the desired 500-foot-long extension is warranted. The Airport Improvement Program, which applies to all airports and describes how federal funds can be spent, requires completion of a feasibility study to determine the need for the additional 500 feet. Terry indicated that the earliest BOA would solicit for a consultant to perform the study would be 2009.

After reviewing the Height Limitation Zoning Map, Gary and Terry indicated that they did not seen any notable conflicts the East Arterial would pose for the South Wood County Airport. However, they indicated that there is some potential for conflict with the Verbunker Alternative or other bridge crossing alternatives if runway 220 (runway oriented over CTH Z) is realigned southwest to obtain the additional 500 feet the airport would like. A southwest realignment would mean the runway's safety area would extend over CTH Z and a portion of Rangeline Road.

Sign-in Sheet

BOA Update Meeting
April 7, 2008

Rapids East Arterial Feasibility Study
I.D. 6999-08-09
Wood County

Name (Please Print)	Representing	Phone
DIKKERS, GARY L	WISDOT/AERONAUTICS	608 · 267 · 5018
Terry Ripp	WISDOT/Aeronautics	608-267-7108
DAN Dupies	CH2M HILL	414-847-0206
Stephanie Christensen	EMCS	715-845-1081

Oversight Committee Meeting No.4

ATTENDEES: See attached sign-in sheet

FROM: Dan Dupies/CH2M HILL

DATE: December 19, 2008

PROJECT NUMBER: 334832.WR.PI

Introduction

The fourth Oversight Committee meeting was held on December 19, 2008, at the Wisconsin Rapids Council Chambers. The purpose of the meeting was to:

- Review the revised feasibility study (second iteration),
- Discuss upcoming public involvement activities, and
- Present WisDOT's vision of how the project could progress to construction

Feasibility Study Review

Each Oversight Committee member was given a revised version of the feasibility study and a "comment-response" table that listed their comments on the August 2008 version of thedocument and how their comments were addressed.

Dan began the meeting noting that he and Stephanie Christensen (EMCS) would discuss the highlights of each feasibility study chapter (excluding Section 1 Introduction). A PowerPoint presentation and hard copy exhibits were used to highlight key information in the feasibility study. Listed below is a summary of the group discussion by feasibility study chapter.

Section 2 - Purpose of and Need for the Proposed Action

Dan noted that the need for the project relates to the following factors:

- Project History
- Existing Roadway Characteristics
- Safety
- Travel Demand
- System Continuity
- Economic Stability

He gave a brief description of each need factor, pointing out that text was added to "economic stability" in response to Joe Terry's (Village of Port Edwards) request to explore the topic of the potential benefits the proposed East Arterial might have for the five industrial parks in the general study area. Dan indicated that the general message in the new text was that local communities and the state have made a significant investment in developing the study area industrial parks and attracting industrial users. To capitalize on

that investment, the East Arterial should be constructed to increase the travel efficiency of businesses shipping materials to and from the industrial parks and the people commuting to the industrial parks for work. Dan asked Joe to review the new text to determine whether it addressed his intent.

Section 3 – Alternatives

Stephanie began the alternatives discussion by reviewing the proposed 4-lane typical section east of 8th Street and the proposed 2-lane typical west of 8th Street. She then reviewed the alignment within the project's three project segments (CTH W to Kuhn Avenue, Kuhn Avenue to Nepco Lake Road, and the Wisconsin River crossing).

CTH W to Kuhn Avenue

Stephanie described the two alternatives in this project section, Alternative 1 which does not include access between Two Mile and Airport avenues and Alternative 2 which provides a frontage road connection between those roads. Dave Laspa (Wisconsin Rapids) noted that the 500-foot-wide corridor the city has reserved between Airport Avenue and CTH Z will be narrowed after the feasibility study has been accepted. It is anticipated the new width the city would continue to reserve would be closer to the 132-foot width identified in the typical section.

Ray Weber (Town of Grand Rapids) asked whether there would be any consideration of an intersection at Whitrock Avenue. Stephanie noted that both alternatives in this section close Whitrock west of the East Arterial, but east of the arterial Whitrock Avenue would be connected to 20th Street. Stephanie noted that because a detailed traffic analysis was not completed as part of this study, this issue may need to be revisited in the next project phase.

Concerning the lift station near Two Mile Creek, Dave Laspa said that the city has always envisioned a frontage road along a portion of the 20th Street corridor (as proposed in Alternative 2) which would require the East Arterial to be moved east. Shifting the East Arterial to the east would allow the lift station to be located in the median rather than being displaced as in Alternative 1. Dave also said the city's vision of the East Arterial between CTH W and Kuhn Avenue includes a frontage road extension to Grove Avenue that would occur as needed by development. Dave noted that there have also been discussions with the high school about the need to extend the frontage road north of Grove Avenue to provide more flexibility for bus service. Stephanie reminded committee members that if there were a desire to provide access between the frontage road and side roads such as Grove Avenue, the frontage road would have to be "bowed out" to achieve the required separation between the frontage road/side road intersection and the East Arterial/side road intersection. The required separation between those two intersections is 150 to 600 feet depending on average daily traffic of the crossroad. Swinging out the frontage road to maintain the required separation distance would create impacts (potential displacements and strip acquisitions) not currently reported in the feasibility study.

Ray Weber said the Town supports connecting Two Mile and Airport avenues to the East Arterial. Joe Terry asked whether we need the connection between Shamrock Lane and 18th Street with the frontage road in Alternative 2. Stephanie responded that we made the connection to limit the length of the cul-de-sac. She noted that a downside of Alternative 1 is the number of long cul-de-sacs created.

Kuhn Avenue to Nepco Lake Road

Stephanie described the two alternatives in this section – Alternative 1 which holds the south CTH Z right-of-way line west of 8th Street thereby avoiding impacts to DNR's nursery, and Alternative 2 which holds the north CTH Z right-of-way line west of 8th Street thereby avoiding impacts to the mobile home park. Although both alternatives would displace 9 residences west of 8th Street, there was a general feeling among the members that it would be difficult to justify displacing 13 mobile homes and the Maples Motel west of 8th Street to avoid impacts to DNR's nursery.

Wisconsin River Crossing

Stephanie stated that three touch down points have been studied on the west side of the Wisconsin River, Letendre Avenue (WIS 54), Lavigne Avenue, and Ver Bunker Avenue. Stephanie explained that two alternatives were developed at Letendre Avenue, one that minimizes wetland impacts on Domtar Island and, as a result, has more curves and a lower design speed (Alt. 1A) and one that is less curvilinear and has a higher design speed (Alt. 1B). In general, the bridge lengths for the three alternatives are similar. The Ver Bunker alternative, which has only one bridge, has a slightly shorter bridge length than the two bridges required with the Lavigne and Letendre alternatives.

A more pronounced difference among the alternatives is their impact on Domtar Island, which has wetlands, a high archaeological potential along its shore, and potential hazardous material issues. The Letendre Avenue and Lavigne Avenue alternatives would cross Domtar Island and impact resources while the Ver Bunker Avenue option avoids Domtar Island.

Stephanie then explained the intersection concepts developed at Letendre, Lavigne, and Ver Bunker avenues. The key features of the intersection concepts are described below.

- Letendre Avenue (Alt. 1) – This alternative would touchdown 9 to 10 feet above the existing intersection grade. Wisconsin River Drive would be realigned to the west (north of Letendre) to avoid fill in river and accommodate the tapers on the bridge structure. As a result of the realignment, the United Methodist Church and the five residences north of the church would be displaced. The church and the residence on the northwest corner are potentially eligible to the National Register.

- Letendre Avenue (Alt. 2) – This alternative would touchdown 6 feet above the existing intersection grade. Retaining walls would be used to protect the United Methodist Church and to avoid placing fill in the river. The five residences north of the United Methodist Church that would be displaced by Alt. 1 would also be displaced by this alternative.

- Letendre Avenue (Alt. 3) – This alternative would touchdown 9 to 10 above the existing intersection grade. Wisconsin River Drive would be realigned to the west (north of Letendre) to avoid fill in river and accommodate the tapers on the bridge structure. Retaining walls would be used to protect the United Methodist Church and to avoid placing fill in the river. Because the south leg of the Wisconsin River Drive intersection would be closed, no retaining wall would be needed along the east side of the church property. The five residences north of the United Methodist Church that would be displaced by Alts. 1 and 2 would also be displaced by this alternative.

- Lavigne Avenue (Alt. 1) – This alternative would touchdown 9 to 10 feet above the existing intersection grade. Wisconsin River Drive would be realigned to the west to avoid fill in river and accommodate the tapers on the bridge structure. The realignment would displace the 8 residences between Island Avenue and Washington Avenue and one residence north of Washington Avenue. Lavigne and Washington avenues would be closed with this alternative.
- Lavigne Avenue (Alt. 2) – This alternative would touchdown 6 feet above the existing intersection grade. To avoid filling in the river and displacing residences, retaining walls would be constructed along the river and at the front edge of the residential properties between Island and Washington avenues.
- Ver Bunker Avenue (Alt. 1) – This alternative would touchdown 1 to 2 feet above the existing intersection grade. Because of the amount of land east of Wisconsin River Drive at the Ver Bunker Avenue intersection, this alternative would be able to touch down without displacing any residences.

Joe Terry stated that it would be essential to allow traffic to access the YMCA and former Domtar facility from the East Arterial/Letendre Avenue intersection. He said that he likes Letendre Avenue (Alt. 3), but the community needs access to the south at that intersection. Joe noted that the Village is concerned about residential relocations associated with the Letendre and Lavigne alternatives and with the loss of river views from the residences as a result of retaining walls. Joe said that while the Village has not settled on a preferred (intersection) alternative, it has reservations about the Lavigne Avenue alternative because of the number of residential displacements and the use of retaining walls, which would protect residences, but obscure their view of the Wisconsin River. Joe said the Ver Bunker Avenue alternative "makes sense", but there are potential impacts associated with routing more traffic past the residences between Ver Bunker and Letendre avenues.

Joe asked whether there would be advantages to realigning Wisconsin River Drive with the Ver Bunker Avenue alternative to accommodate major turning movements. Stephanie explained that when the Ver Bunker crossing was initially developed, the design team anticipated that Ver Bunker to the west would remain open. Since the initial concepts, the Village of Port Edwards would prefer that the west leg of Ver Bunker be closed as part of this alternative. In future study phases, the alignment of north Wisconsin River Drive and the river crossing itself could be examined in further detail to best optimize the geometrics of the intersection with major traffic movements. It is likely intersection control would be required at this intersection (stop control, signals, or roundabout) so there may or may not be advantages to realignment of Wisconsin River Drive. Further study would be required to make this determination.

8th Street Alternatives

Stephanie reviewed the two 8th Street alternatives. Alternative 1 would replace the existing 16- to 18-foot-wide center turn lane with a raised median, and Alternative 2 would replace the existing center turn lane with a 30-foot-wide raised median. With Alternative 1, all non-signalized access points would become right-in/right-out, and left turns would only be possible at signalized intersections. This alternative would result in traffic using parking lots and local roads to reach signalized intersections. Alternative 2 would also convert all non-

signalized access points to right-in/right-out turns. However, because of its width, Alternative 2 would allow U-turns in the median approximately every 1,000 feet thereby lessening the impacts on the local street network.

Dave Laspa noted that Sheet 2 of the 8th Street Alternative 1 aerial exhibit contained the wrong image.

Next Steps

Mike O'Meara (WisDOT) presented WisDOT's vision of the future of the East Arterial project. He said that the first step would be for the communities to reach a consensus on their preferred alternative. It would be to the benefit of the project if the communities were able to identify a preferred alternative at the next public information meeting. Mike noted that the date of the next public meeting could be set to allow the communities enough time to identify their preferred alternative. Joe Terry suggested that we might want to use the input from the next public meeting to help make the decision about the preferred alternative.

Mike said the communities should preserve the corridor for the preferred alternative using tools like local Comprehensive Plans. He stated that WisDOT views the future of this project as being driven by local communities. This project would not be a WisDOT priority for approximately 20 years given the current backlog of projects. Mike noted that the County HH bridge in Stevens Point and the Snake Bridge in Wausau were constructed by the communities using STP urban funds, local high-cost bridge funds, as well as levying a half cent sales tax. Mike said that the communities could save their STP urban dollars to fund the East Arterial. A local high–cost bridge" is defined as a bridge which is not on the state trunk highway system or on marked routes of the state trunk highway system designated as connecting highways, would be longer than 475 feet, and is estimated to cost in excess of $5 million to construct.

Mike also noted that there may be some potential that this project could receive funding as part of a federal stimulus package. Mike also mentioned that the communities may be able to receive a Transportation Economic Assistance (TEA) grant which could be used as a match with other funding sources. The Transportation Economic Assistance program provides 50 percent state grants to governing bodies, private businesses, and consortiums for road, rail, harbor and airport projects that help attract employers to Wisconsin, or encourage business and industry to remain and expand in the state. Grants of up to $1 million are available for transportation improvements that are essential for an economic development project. It must begin within three years, have the local government's endorsement, and benefit the public. The program is designed to implement an improvement more quickly than normal state programming processes allow. The 50 percent local match can come from any combination of local, federal, or private funds or in-kind services.

Joe Terry said that with the connections this project would make to the state trunk highway system, it seems strange that it would not be a WisDOT project/priority. Mike responded that if the communities want this project constructed in the near term, WisDOT is not the solution.

Dave Laspa stated that with the $300,000 in STP urban funding the city receives annually, it would be impossible to save enough to fund this project. He noted that the city already has committed STP funds for other projects out to 2012.

Jason Grueneberg requested Mike O'Meara to prepare a summary document that would explain all the funding options available to the communities. Mike said he would prepare such a letter and send it to the communities.

Mike recommended that the communities construct this project as a 2-lane facility with the potential to expand. He said that the 2-lane facility would serve the transportation needs for years to come.

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Wisconsin Rapids Area East Arterial Feasibility Study

Public Information Meeting No.2 Minutes

ATTENDEES: See attached sign-in sheets

COPIES: Mike O'Meara/WisDOT
Dave Laspa/Wisconsin Rapids
Joe Terry/Port Edwards
Don Bohn/Town of Grand Rapids

FROM: Dan Dupies/CH2M HILL

DATE: March 27, 2009

Purpose

The purpose of the second public information meeting (PIM) was to obtain public comment on:

- the conceptual intersection designs at the WIS 13/County Z intersection and the intersections of Wisconsin River Drive with Letendre, Lavigne, and Ver Bunker avenues in Port Edwards;
- the new WIS 13 (8th Street) alternative that would replace the existing two way left turn lane with a median wide enough to allow mid-block U-turns; and
- the feasibility study.

Meeting Notices

The City of Wisconsin Rapids submitted a news release announcing the PIM to the Wisconsin Rapids Tribune, and an article about the meeting was published on March 17. A meeting invitation letter that announced the PIM and provided a project update was sent to the project's mailing list that includes abutting landowners along the proposed East Arterial corridors, local officials, agencies and other interests. There are approximately 570 records on the project mailing list.

Meeting Format/Displays

The PIM was an open house conducted between 5 and 7 p.m. in the All Purpose Room of the McMillan Memorial Library located in Wisconsin Rapids. WisDOT, Oversight Committee members, and consultant team members were present to discuss the conceptual intersection designs and the East Arterial alignment, answer questions, and obtain comments. About 123 people attended the PIM.

Displays included the following:

- Existing and proposed typical sections
- Conceptual intersection designs at 8th Street, Letendre Avenue, Lavigne Avenue, and Ver Bunker Avenue
- Aerial exhibits showing the East Arterial alignment and the 8th Street alignments.

A take-home handout and comment form was also available. It provided information on the study progress since the September 2007 public meeting and included the conceptual intersection designs.

Comment Summary

Following is a summary of comments received at the PIM.

Earl Arndt, 641 17th Street recommended routing WIS 54 concurrent with WIS 73 in Plainfield. He said that WIS 54/73 to WIS 13 and 34 across the river in Port Edwards.

Jane Natzke, 1921 Cook Avenue stated that destroying neighborhoods is not an improvement. She recommended improving 48th Street to Griffith Avenue. Her husband Ronald felt the East Arterial would create dead end streets, adversely affect the tax base, and remove wildlife habitat among other negative aspects.

Arliss Beckman, 531 Griffith Avenue said not to create a noisy road next to her property. She feels Griffith Avenue is noisy now.

Eric and Jean Westover, 2020 Lovewood Drive are concerned with the project's noise impacts and impacts on safety and access. They would expect that a noise berm be constructed as part of the project to reduce noise levels and maintain their property value.

Matt Heideman, 2320 Lovewood Drive indicated that the project's noise impact, displacements, and adverse impact on property value outweigh its ability to reduce traffic congestion. As alternative solutions, Matt recommended creating frontage roads along 8th Street or running WIS 54 with WIS 73 and creating a 4-lane connection to Plainfield (I-39).

Joe Ott, 1651 Township Avenue preferred Alternative 1 in the County W to Kuhn Avenue segment. He asked how his property would be affected with Alternative 2, which would relocate his neighbor.

David Stark, 4611 16th Street asked whether a berm would be constructed on the east side of the East Arterial in the County W to Kuhn Avenue segment. He also asked whether the trees would remain in place on the city owned property at the County Z/16th Street intersection.

Earl Hoefs, 1850 Cook Avenue felt that in the County W to Kuhn Avenue segment it was preferable to allow 20th Street to remain between Airport Avenue and Two Mile Avenue.

Mike Clement, 1532 Rosewood Avenue requested that we consider a cul-de-sac on 16th Avenue and creating an intersection between the East Arterial and Whitrock Avenue.

Jerome Krofta, 4132 16th Street said that the project's "crossing on 16th Street should be moved to Whitrock and 20th Street, and make 16th Street a dead end."

William McMahon Jr., 4621 11th Street is concerned with the connection between Peterson Avenue and County Z. He notes that Peterson Avenue is a residential road that was not

constructed to accommodate large trucks. He is also concerned about access to County Z. William feels that the cars turning from Peterson Avenue north into Wal-Mart on 9th and 10th streets as well as trucks accessing Wal-Mart from 12th Street will create a "mess." He feels signals would be required on both ends of Peterson Avenue to create gaps to improve the safety for vehicles entering and exiting that roadway.

Estelle Harcinske, 4711 9th Street supports Alternative 2 in the Kuhn Avenue to Nepco Lake Road segment.

Julie Bodette, 731 Wisconsin River Drive supports a bridge connection to Letendre Avenue. She is opposed to the Lavigne Avenue connection because the proposal to use retaining walls would obscure her view of the river.

Terry and Neil Lindholm, 2797 Port Road support the west terminus at Letendre Avenue, and the installation of a signal at Letendre Avenue and Port Road to improve the safety of crossing WIS 54 at that intersection.

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WISCONSIN RAPIDS AREA

East Arterial Feasibility Study | Wood County

Public Information Meeting No.2

Sign In Form

Name	Address/Representing			
Paula Bassuener	1111 Wisconsin River Dr.	Port Edwards,	WI	54469
Joe Schill	1181 LAKEWOOD LANE	WIS RAPIDS	WI	54494
William H McMahon	4621 - 11TH St. So.	WIS. RAPIDS	WI	54494
Earl Arndt	641 17th St So	WI Rapids	WI	54494
William O. Casper	2841 Golf Course Road	Wis. Rapids	WI	54494
Steve Springer	2321 Two Mile Ave	Wis. Rapids	WI	54494
PAUL RICHMOND	4530 Whip or Will Ln	Wis. Rapids	WI	54494
[illegible]	1061 WI RIVER DR	P.E.	WI	54469
Michelle Smith	511 Wisconsin River Dr	PE	WI	54469
Holly Spurlin	2221 Carols Ct	Plover		54467
Darwin & Mary Mras	1931 Shamrock Lane	Wisconsin Rapids,	WI	54494
Roy Szelagowski	120 Buffalo ST	Wis Rapids		54494
DIANE GENNARO	4711 RIDGEVIEW CT	WR		54494
DARWIN LAMB	1821 Two Mile Ave	WR		54494
Ed + Dorothy Heaven	4310 Ridgeview Ln	WR		54494
Diane Connor	2220 Lovewood DR	WR		54494
Connie Loden	1120 Heart of Wisconsin Lincoln St	WR		54494
Roland Hawk	~~3180~~ 1170 VerBunker Ave Port Edwards	WI	54469	
Jim & Lona Johnson	960 2nd St Port Edwards	WI		54469
Gary & Jamie Schill	4631 10th STS	Wis. Rapids	WI	54494

WISCONSIN RAPIDS AREA

East Arterial Feasibility Study | Wood County

Public Information Meeting No.2

Sign In Form

Name	Address/Representing
Chris Beckman	531 Griffith Ave
Gayle Holtz	531 Griffith Ave
Tom Smith	3540 Hwy 54 W Nekoosa 54457
Jack & Shawn Ingram	1021 Griffith Ave, WR 54494
DALE GUNDERSON	531 GRIFFITH AVE. LOT K 54494
Marie Kanyas	4610 8th St. S Lot 54 54494
Don Bohn	3131 48th St. S. 54494
Joan Barton	2110 Cindy Ct WR 54494
Lyle Bev: Lowell	4731 10th St So WR 54494
KERRY HARDING	250 Hwy 73 S., PE 54469
Doug BERRYMAN	110 LETENDRE AVE, P.E. 54469
Wendy Allen	4750 8th Str. So. WR
Dave Barth	8311 HWY 13 So, #13, W.R.
Edward Allen	5411 - 28th St So WR - TOWN OF GRAND RAPIDS
Gretchen Pawpore	3821 Southbrook Ln Town of G.R.
Joanne Cisgczyn	4521 Whip-a-Will Rapids
ARNE NYSTROM	7720 WARREN DR WIS Rapids
Jason Grueneberg	Wood County Planning Department
Ray + Gloria Hunrow	910 Park Ct. Ln. Port Edwards 54469
Earl Haefs	1850 Cook Ave W.R. WI 54494

WISCONSIN RAPIDS AREA

East Arterial Feasibility Study | Wood County

Public Information Meeting No.2

Sign In Form

Name	Address/Representing
ESTELLE HARCINSKE	4711 9th St. S., Wis. Rapids 54494
BARRY JENS	1131 WEEPING WILLOW WIS RAPIDS 54494
Fred & Karen Brinkman	1151 Lakewood Ln Wis Rapids 54494
Dick Dombrowski	991 3rd Street Port Edwards 54469
Jim Parvin	4710 Ridgeview Ct. Wis. Rapids 54494
Pat Arendt	311 1st St Port Edwards 54469
Bob Lee	1020 Griffith Ave
Kay Lee	1020 Griffith Ave 54494
James Adams	3340 2nd St S. Wis Rapids 54494
Marcia Back	481 Maple Manor Drive, Wis. Rapids 54494
Charles V. Martin Jr.	4320 Ridgeview Lane, Wis. Rapids 54494
Bob-Betty Zimmerman	1530 Rosewood Ave W.R. 54494
Joe Burggraf	1621 Township Ave. W.R. 54494
DICK SKIRBA	2620 AMUNDSON ST WR 54494
BARBARA & GEORGE TIKALSKY	1531 ROSEWOOD AVE 54494
THOMAS O. REITZ	3361 GEORGE RD. W.R. 54495
Phil Heggett	2011 Two Mile Avenue WR 54494
Bob + Lois McMahon	1111 Whitrock Ave. WR 54494
Garth Larson	2331 Carriage Ct. WI 54494
Michael W O'Malley	WiDOT Wis Rapids

WISCONSIN RAPIDS AREA

East Arterial Feasibility Study | Wood County

Public Information Meeting No.2

Sign In Form

Name	Address/Representing		
MIKE & CATHY Grotefend	4610 12th St So	Wis Rapids	54494
GORDON WIPPERFURTH	11206 CTY RD Z	NEKOOSA, WI	54457
Robert J THOMPSON	4610 8th St S. #49	Wisc. Rapids	54494
MARILYN BECKER	4610 8th ST S #57	WISC RAPIDS	54494
Leslie Auerdt	311 First St	Port Edwards	54469
John & Dolores Carrigan	4121 15TH Place South	Wis. Rapids	54494
Andy Gilbert	2421 Lovewood Dr.	Wis Rapids	54494
Amy Schride	3310 20TH St. S.	WR	54494
Greg Allen	4750 8th STS.	WR	54494
Renee Gemlage	140 18th St. N	W.R	54494
Bob Barton	2110 Cindy Ct, Wis Rapids	54494	
Del Stevenson	474 Pilty Ave	WIS Rapids	54494
Al Ciardelli	4511 Whipporwill	WR	54494
Matt Henderson	2320 LOVEWOOD DR	W.R.	54494
Lynn Saeger	930 Fawn Lane	Port Edwards	WI 54469
Dennis Carrigan	4521 WHIPORWILL LN	WIS RAPIDS	54494
Les Bach	481 Maple Manor Dr.	Wis. Rapids	54494
Bill Clondenning	1811 45th St So	WR	54494
Ed Saylor	960 Westport Dr.	P.E	54469
Cary Smith	2810 Swanson Rd	Nekoosa	54457
Jim + ANN STAINBROOK	1096 SUNRISE LANE	W.R	54494

WISCONSIN RAPIDS AREA

East Arterial Feasibility Study | Wood County

Public Information Meeting No.2

Sign In Form

Name	Address/Representing
Joe Terry	1180 Port Rd, Port Edwards / Village of Port Edwards
Dorothy McMahon	4621 11th St. S. WR
John Henkelmann	1951 1st St N WI Rapids
John & Susan Ludwiczak	1840 Shamrock Lane W.R. 54494
Julie + Chris Bodette	731 Wisc. River Drive Port Edwards, WI 54469
William L. Arnold	2411 Two Mile Av Wi Rapids, Wi 54494
Edward Sundam	1120 Griffith Ave WR 54494
Lois Truchinski	1010 E Griffith ave WR
Tim Dith	1721 Bob-O-Link Ct
Jeanne Fekema	6320 Pointe Place WR 54494
John-Susan Ludwiczak	1840 Shamrock Ln. W.R. 54494
Connie + Jim Landry	4520 Whipoorwill Ln WR 54494
Lee Lindgren	3010 Geneva Ct. WR
Daniel Hohs	3341 3rd St. So. WI. Rapids 54494
Shirley/John Koltz	4630 Whip-or-Will - Wis. Rapids
Doug Conny Schill	1720 Kuhn Av - W.R
Robbie Sigler	1081 Wisc. River Drive Port
Kitty Gross	8330 Lake Rd, Wis Rapids 54494
Kaye Bollinger	1131 Griffith Ave. Wis. Rapids, WI 54494
Charles Klement	1941 Cook Ave. Wis. Rapids, WI 54494
Ronald Natzke	1921 Cook Ave WRW 54494

WISCONSIN RAPIDS AREA

East Arterial Feasibility Study | Wood County

Public Information Meeting No.2

Sign In Form

Name	Address/Representing
Eric Westover	2020 Lovewood Dr.
Mike & Nancy Clement	1532 Rosewood Ave. 54494
Jerome Krofta	4132 16th St S
Alvin Bogdansky	3020 49 St So
Jason + Kim Shields	1590 4th St. Port Edwards
Mary Beaziau Brown	2466 County Road D. Wis Rapids 54495
James Custer	1471 Wise River Dr Port Edwards 54494
FRED JESSE	957 Westport DR. PORT ED 54469
Jim Quinn	1831 BASSETT PL WIS RAPIDS 54494
Pat & Patty O'Connor	921 Washington Str Wis Rapids 54494
DAVE POSCI	2530 GROVE AVE W.R. 54494
Rog & Peg Landerman	4621 Eastwood Dr WR. 54494
Roger Lee	1020 Griffith AVE 54494
Neil & Terry Lindholm	2797 Port Road Port Edwards 54469
David Stark	4611 16th Str. So, Wisconsin Rapids 54495
Mark Erickson	1070 Wisconsin River Dr. Port Edwards, WI 54469
Greg Stilmacher	2521 Lovewood Dr. Wi Rapids, WI 54494
DONALD BEMKE	3021 21st PL. S. " " " "
Dave + Karen Thiel	911 Craig Ct. Port Edwards, WI 54494
Jane + Ron Natzke	1921 Cook Ave Wi Rapids, WI 54494
Charles Oertle	940 Westport Drive Port Edwards, WI 54469

Appendix B
Nepco Lake and Four Mile/Five Mile Creek Watershed Quality

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

WISCONSIN
DEPT. OF NATURAL RESOURCES

Jim Doyle, Governor
Matthew J. Frank, Secretary
Scott Humrickhouse, Regional Director

Wisconsin Rapids Service Center
473 Griffith Ave.
Wisconsin Rapids, Wisconsin 54494
Telephone 715-421-7881
FAX 715-421-7830
TTY Access via relay - 711

July 8, 2008

CH2M Hill
Attn. Mr. Dan Dupies
135 S. 84th Street, Suite 235
Milwaukee, WI 53214

Subject: Onemile Creek, Twomile Creek and Lake Nepco

Dear Mr. Dan Dupies:

I have been able to locate some material for the Onemile Creek, Twomile Creek and Lake Nepco. There is too much Wisconsin River data for me to go through. The data ranges the entire stretch from Marathon to Juneau County. There is also old correspondence for the aforementioned streams that may or may not be of interest to you. You are welcome to review these through the open records format.

I have included some data that may serve as a baseline for now. If more detail is needed we will need to make arrangements for someone to be here and request the material that is pertinent. I hope this helps for now.

Sincerely,

Scott Provost, P.S.
Water Resources Specialist - WDNR
Wisconsin Rapids, WI
715.421.7881

The Aquatic Plant Community in Nepco Lake

I. INTRODUCTION

The scheduled study of the aquatic macrophytes (plants) in Nepco Lake was unable to take place in 1997 due to the refusal of the chemical applicator hired by the property owners to delay treatment until after the quanitative plant survey would have been conducted the following week. Faced with the fact the plants would have been killed in many areas, it was decided to cancel the survey. Harvesting plants does not bias the study results in the same way because of the methods used during the macrophyte survey (See Appendix - Methods). The plants are still present after harvesting, only the tops have been removed. This would have been the first quantitative vegetation study of Nepco Lake. DNR personnel from the Northern Region did a qualitative assessment of the vegetation for purposes of the chemical treatment on the day of the treatment.

A study of the diversity, density, and distribution of aquatic plants is an essential component of understanding a lake due to the important ecological role of aquatic vegetation and the ability of the vegetation to characterize the water quality (Dennison et al. 1993).

Ecological Role: All other life in the lake depends on the plant life (including algae) - the beginning of the food chain. Aquatic plants provide food and shelter for fish, wildlife, and the invertebrates that in turn provide food for other organisms. Plants improve water quality, protect shorelines and lake bottoms, add to the aesthetic quality of the lake, impact recreation, and serve as indicators of water quality.

Characterize Water Quality: Aquatic plants serve as indicators of water quality because of their sensitivity to water quality parameters, such as water clarity and nutrient levels (Dennison et. al. 1993).

The study was intended to provide information that is important for effective management of the lake including fish habitat improvement, protection of sensitive wildlife areas, aquatic plant management, and water resource regulations. The baseline data that it would have provided could be compared to future plant inventories and offer insight into any changes occurring in the lake.

Background and History: Nepco Lake is a 494-acre impoundment at the confluence of Nine-mile Creek, Four-mile Creek and Trout Creek in Wood County, Wisconsin. The Nepco Lake watershed was selected as a Priority Watershed. The maximum depth of Nepco Lake is 29 feet.

Nepco Lake was created in 1926 when the Nekoosa-Edwards Paper Company constructed the dam and purchased the surrounding lakeshore property. The dam was built by the paper company as a water source for their operations.

Controlled burns, chemical treatments and lake drawdowns of about 4-feet were started as early as 1929 in order to keep the lake free of plants and algae that the paper company claimed interfered with their operation. Although chemical control of plants and algae have been used since about 1929, records have only been kept since 1950 (Table 1).

Maps of treatment areas were not made until 1959. Maps made during the years 1959-1983 indicated that nearly the entire lake surface or the entire lake except for a channel in the center of the lake was sprayed with copper sulfate. The maps also indicated that in 1986-1972 treatments for rooted plants occurred at scattered locations around the lake. Since 1994, copper treatments for algae and treatments for rooted plants have been carried out along discontinuous sections of shoreline with an average width of 80 feet. The amount of shoreline treated is about 7% of the total shoreline, most of it along the north shore of the portion of the lake that is west of Hwy 13.

In 1944, there was a fish kill in the lake that was believed to have been caused by the copper sulfate treatments. The lake was treated in mid-May that year instead of mid-June when treatments normally start. The water appeared blue after the treatment. Crappies, bluegill, bass in the 1-5.5" range and large suckers were impacted. However, it was later proposed that the direct cause of the fish kill was the loss of dissolved oxygen due to the algae decaying after the copper treatment.

In 1948, Nepco Lake was lowered 8 feet and arsenic was applied by helicopter to "sterilize" the sediments.

In 1949, the lake level was increased 1.5 feet in order to help control plant growth.

In 1950, complaints were filed that the treatment on Nepco Lake applied copper sulfate at four times the rate adequate to control algae.

In 1956, a mollusc kill was noted.

Table 1. Chemical treatments for Aquatic Plants and Algae.

	$CuSO_4$ (lbs.)	Aquathol (lbs.)	2,4-D (gal.)	2,4,5-TP (lb.)	Diquat (gal.)	Sodium arsenite (gal.)
1948			72			868
1950	4000					
1951	5500					
1952	2800					
1953	5200					
1954	8850					
1955	4750					
1956	9500					
1957	9000					
1958	5900					
1959	8050					
1960	5300					
1961	5100					
1962	4600					
1963	3900					
1964	4350					
1965	2350					
1966	4100					4860#
1967	4400					4860#
1968	3900	4400				
1969	2200	1425		200		
1970	1900	4050				
1971	2900	1800				
1972	1500	2200				
1973	350					
1974	950					
1976	600					
1977	400					
1994	5.5*	5.5 gal			5.5	
1995	9*	40 + 7.5 gal			7.5	
1996	5*	5 gal			5	
1997	4.5*	4.5 gal			4.5	
Totals	112,350# + 24 gal.*	13,915# + 22.5 gal.	72	200	22.5	868 gal. + 9720#

*gal. of Cutrine

Pounds of copper added from $CuSO_4$	=	28,312
Pounds of copper added from Cutrine	=	22
Total pounds of copper added		28,334

This calculates to an average of 57 pound of copper per acre having been applied over the years that treatments have been recorded. What is unknown is how much copper and what other chemicals were applied during the years 1928-1949. Copper is an element, so it does not break down further but remains in the sediment, building up with continued application.

MACROPHYTES

During the 1997 pre-treatment assessment, a total of 12 species was found at the proposed treatment sites in Nepco Lake. Of the 12 species, 1 was a floating-leaf species and 11 were submergent species (Table 2). No emergent species were found, but since the assessment took place in the proposed treatment areas, the vegetation edging the shoreline was probably not recorded. No endangered or threatened species were found. Two non-native species were found: *Potamogeton crispus* and *Myriophyllum spicatum*.

Table 2. Nepco Lake Aquatic Plant Species

Scientific Name	Common Name
Floating-leaf Species	
1) Lily pad	Lily pad
Submergent Species	
2) *Ceratophyllum* sp.	coontail
3) *Myriophyllum spicatum*	Eurasian water milfoil
4) *Potamogeton amplifolius*	large-leaf pondweed
5) *Potamogeton crispus*	curly-leaf pondweed
6) *Potamogeton natans*	floating-leaf pondweed
7) *Potamogeton pectinatus*	sago pondweed
8) *Potamogeton richardsonii*	clasping-leaf pondweed
9) *Potamogeton zosteriformis*	flat-stem pondweed
10) *Potamogeton* sp.	fine-leaf pondweed
11) *Vallisneria americana*	wild celery
12) *Zosterella dubia*	water stargrass

FREQUENCY OF OCCURRENCE

The pre-treatment assessment was carried out only in the proposed treatment areas, so we do not have data that can characterize the plant community is over the entire lake. Since the assessments were in the areas proposed for treatment, the frequencies will probably be higher than frequencies over the whole lake.

The species with the highest frequency of occurrence at the proposed treatment sites was *Myriophyllum spicatum* (73%) (Figure 3). Other species that were abundant at the proposed treatment sites were *Vallisneria americana* (67%), *Potamogeton crispus* (53%) and *Potamogeton* sp., fine-leaved pondweeds (47%).

Table 3. Frequency of Macrophytes in Treatment Area

	% Frequency
Myriophyllum spicatum	73
Vallisneria americana	67
Potamogeton crispus	53
Potamogeton sp. (fine-leaf)	47
Potamogeton pectinatus	40
Ceratophyllum sp.	27
Potamogeton richardsonii	20
Potamogeton natans	13
Lily pads	7
Potamogeton amplifolius	7
Potamogeton zosteriformis	7
Zosterella dubia	7

Comparison with the Previous Surveys

The 1997 pre-treatment assessment was probably more thorough than the assessments in the past. There were several species found in 1997 that did not show up in previous years (Table 4). It appears that Eurasian milfoil (*Myriophyllum spicatum*) may have invaded the lake sometime between 1953 and 1956 and that curly-leaf pondweed (*Potamogeton crispus*) may have invaded between 1963 and 1965.

V. DISCUSSION

Based on the clarity, chlorophyll and phosphorus levels in 1997, Nepco Lake is a eutrophic lake with fair/poor water quality. The trophic status would favor macrophyte growth.

Ther has been a long history of chemical treatments in Nepco Lake. Chemical treatments and drawdowns were used since 1929 to control plant and algae growth in the lake. Some of these treatments may have caused problems in the past: fish kills and snail die-offs.

The algae growth in the lake may be promoting turbid conditions that are impacting the plant community. Many of the species in Nepco Lake in 1997 (*Ceratophyllum demersum, Myriophyllum demersum, Potamogeton crispus, P. pectinatus, Vallisneria americana, Zosterella dubia*) tolerate turbid water and have been known to grow to over-abundance when there is an excess of nutrients in the lake (Nichols and Vennie 1991). Two of these species, *M. spicatum* and *P. crispus*, are not native and have grown to nuisance conditions in many lakes.

Because copper used in the algae treatments does not break down, but remains in the lake, the sediments may have a heavy concentration of copper. This is of concern since molluscs (clams and snails) and many zooplankton are sensitive to copper, even at approved treatment levels. The snail die-off may have been related to the application and build-up of copper in the sediments.

Both molluscs and zooplankton are algae-eaters. Their loss could be exacerbating the algae problem in Nepco Lake: eliminating these members of the aquatic community defeats the purpose of algae treatments. A clam can filter up to **1 quart of water an hour, removing algae from the water**. In addition, both are important links in the food chain in the lake. The zooplankton are important food sources for fish and the clams and snails, besides being directly eaten, release pellets of concentrated nutrients that they are unable to digest that fish pick up.

VI. CONCLUSIONS

Nepco Lake is a eutrophic lake. The aquatic macrophyte community in the proposed treatment areas is composed of many turbidity tolerant species. *Myriophyllum spicatum* was the dominant species within the treatment areas. *Vallisneria americana* and *Potamogeton crispus* were also abundant in the treatment areas.

A healthy aquatic plant community plays a vital role within the lake community. This is due to the role plants play in
1) improving water quality 2) providing valuable resources for fish and wildlife 3) resisting invasions of non-native species and 4) checking excessive growth of tolerant species that could crowd out the more sensitive species, therefore reducing the diversity.

1) Macrophyte communities improve water quality in many ways: they trap nutrients, debris, and pollutants entering a water body; they may absorb and break down the pollutants; they reduce erosion by damping wave action and stabilizing shorelines and lake bottoms; they remove nutrients that would otherwise be available for algae blooms (Engel 1985).

2) Aquatic plant communities provide important fishery and wildlife resources. Plants (including algae) start the food chain that supports many levels of wildlife, and at the same time produce oxygen needed by animals. Plants are used as food, cover and nesting/spawning sites by a variety of wildlife and fish. Cover within the littoral zone should be about 25-85% to support a healthy fishery.

Compared to non-vegetated lake bottoms, macrophyte beds support larger, more diverse invertebrate populations that in turn will support larger and more diverse fish and wildlife populations (Engel 1985). Additionally, mixed stands of macrophytes support 3-8 times as many invertebrates and fish as monocultural stands (Engel 1990). Diversity in the plant community creates more microhabitats for the preferences of more species. Macrophyte beds of moderate density support adequate numbers of small fish without restricting the movement of predatory fish (Engel 1990).

It is important to improve and protect the resources and water quality in Nepco Lake. Two important measures should be considered.

1) Since two non-natives are included in the highest frequency plants in the treatment areas and these species reach their maximum growth early in the growing season, control methods should concentrate on early season harvesting to weaken these species and remove the nutrients in their tissues from the lake. These species appear to be already well established in the lake. Chemical treatments for these species would cover too large of an area and would result in loss of dissolved oxygen and a large release of nutrients in the lake as the plant material decays. The loss of dissolved oxygen may result in fish kills and the release of nutrients would promote increased algae blooms.

2) The heavy use of copper over the years may have negatively impacted the sediments. Zooplankton and mollusc populations may be seriously depressed due to both the exposure during treatments and the continuing exposure from copper built-up in the sediments. There should be testing on the copper level in the sediments, the ability of the sediments to support life, the zooplankton population in Nepco Lake and the clam population in Nepco Lake.

METHODS

Field Methods

The methods usually followed in macrophyte surveys are based primarily on the rake-sampling method developed by Jessen and Lound (1962), using stratified random placement of the transect lines.

The shoreline is divided into equal segments and a transect, perpendicular to the shoreline, is randomly placed within each segment, using a random numbers table.

One sampling site is randomly located in each depth zone (0-1.5ft., 1.5-5ft., 5-10ft., and 10-20ft.) along each transect. Using a long-handled steel thatching rake, four rake samples are taken at each sampling site. The four samples taken from each quarter of a 6-foot square quadrat. The aquatic plant species that are present on each rake sample are recorded. Each species is given a density rating (0-5) based on the number of rake samples on which it is present at each sampling site. (A rating of 1 indicates that a species was present on one rake sample...a rating of 4 indicates that it was present on all four rake samples and a rating of 5 indicates that it was abundantly present on all rake samples at that sampling site.) The sediment type at each sampling site is also recorded.

The type of shoreline cover is recorded at each transect. A section of shoreline, 50 feet on either side of the transect intercept with the shore and 30 feet back from the shore, is evaluated. The percentage of each cover type within this 100' x 30' rectangle is visually estimated.

Visual inspection and periodic samples are taken between transect lines in order to record the presence of any species that does not occur at the sampling sites. Specimens of all plant species present are collected and saved in a cooler for later preparation of voucher specimens.

TABLE 4. SPECIES PRESENT

	1948	1953	1956	1963	1965	1979	1997
Elodea sp.	***	X				X	
Ceratophyllum sp.	X	X	X	X	X	X	X
Myriophyllum sp.			X		X	X	X(EWM)
Najas sp.						X	
Lily pads							X
Pontederia cordata	X	X					
Potamogeton sp.							X
Potamogeton amplifolius							X
Potamogeton crispus					X	X	X
Potamogeton natans							X
Potamogeton pectinatus			X	X			X
Potamogeton richardsonii			X			X	X
Potamogeton zosteriformis							X
Vallisneria americana							X
Zosterella dubia						X	X

(EWM) identified in 1997 as Eurasian water milfoil

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: November 11, 1998

TO: Tom Jerow - Wisconsin Rapids
Jack Zimmerman - Wisconsin Rapids
Dale Kufalk - Wisconsin Rapids
Al Hauber - Wausau
R Dave Paynter - Friendship
Art Bernhardt - Eau Claire

FROM: Mark Hazuga - Eau Claire

SUBJECT: Draft Report for Four and Five Mile Creeks Watershed

Enclosed is the draft report for the Four and Five Mile Creeks Watershed pre-appraisal monitoring. Please review the report and provide any comments or suggestions you have and send it back to me. I would like to finalize the report within the next month. If you have any questions, give me a call at 715 - 839 - 2877.

Thanks,
MARK
Mark

10

Pre-Appraisal Monitoring

in the

Four and Fivemile Creeks Watershed

Draft

Completed

November, 1998

Prepared by:

Mark J. Hazuga
Department of Natural Resources
West Central Region

Pre-Appraisal Monitoring in the Four and Five Mile Creeks Watershed

<u>DNR Inventory Work Group</u>

Al Hauber - Wausau
Mark Hazuga - Eau Claire
Tom Jerow - Wisconsin Rapids
Erik Kampa - Eau Claire
Deb Konkel - Eau Claire
Dale Kufalk - Wisconsin Rapids
Dave Paynter - Friendship
Ken Schreiber - Eau Claire
Jack Zimmerman - Wisconsin Rapids

INTRODUCTION

The Four and Fivemile Creeks Watershed was scheduled to become a candidate as a Priority Watershed Project in 1997 under the Department of Natural Resources NonPoint Source Pollution Abatement Program. The groundwater and surface water of the watershed was ranked "high" and "medium" respectively, for Nonpoint Source Pollution (NPS) control work. However, budget shortfalls in the program eliminated the selection of any new watershed projects in the state. Appraisal monitoring in the watershed was initiated before the decision to eliminate new projects was decided; therefore, monitoring continued since recent baseline data was not available on surface waters. The Water Quality Management Plan also recommended NPS assessment should be conducted on several streams and ditches in the watershed.

The purpose of this report is to summarize the conditions of water resources in the Four and Fivemile Creeks Watershed. The monitoring will be referred to as pre-appraisal monitoring and not appraisal, since the watershed was not selected as a Priority Watershed Project.

Background

The Four and Fivemile Creeks Watershed is 211 square miles and is located in the sand plain of central Wisconsin in Wood and Portage Counties (Figure 1). The watershed lies in the Buena Vista Marsh which is comprised of glacial outwash sand and gravel. Impermeable rock of Precambrian age underlies the outwash which forms an aquifer with and average thickness of 100 feet. The extensive deposits of well-sorted sand and gravel, which form a slightly westward sloping outwash plain, provide the area with abundant groundwater. During the Wisconsin Age, glacial deposits formed a terminal moraine just east of the present-day marsh. While the glacier withdrew, great quantities of water carrying silt, sand and gravel were released to the west. These suspended materials were deposited in the form of a gently sloping outwash plain which now underlies the marsh. Due to the high water table, rapid permeability and low available water capacity of soils in the watershed, they must be drained and irrigated to make them suitable for agricultural crops (Schreiber, 1978).

Historically, the Buena Vista Marsh was drained by Buena Vista Creek and a number of smaller natural streams. During the early 1900s, a network of east - west ditches were constructed to drain the marsh for agricultural purposes. The ditches were drained to Buena Vista Creek and a small unnamed tributary to the stream, now called Fourmile Creek (Kruger et.al., 1986). The close proximity of groundwater to the land surface provides cold water and near steady streamflow to the ditches and streams, especially in the headwater reaches. Consequently, many of the ditches have favorable conditions for supporting natural brook trout populations.

According to land survey records from the mid-1800s, original vegetation in the watershed consisted primarily of woodlands (65%) and wetlands (30%). The current land use in the watershed consists primarily of agriculture (52%), woodlands (34%), wetlands (5%) and urban areas (5%) (Laedlein, 1993). There is approximately 6,700 acres of land in the watershed is managed as prairie chicken habitat which was not included in the land use mapping. Comparing original vegetative cover to current land use indicates approximately 49% of the original woodland and wetland areas are now used for agriculture. Agricultural use in the upper watershed includes; commercial vegetable farming (potatoes, corn, etc...), livestock pasturing and cranberry production. Many of the cropfields are irrigated with self-propelled overhead sprinkler systems which use water from high capacity wells.

Using groundwater for irrigation, that would normally discharge to streams, reduces streamflow. Some estimates indicate that approximately 70% of water applied to irrigated land is lost to evapotranspiration (includes direct evaporation and transpiration of vegetation) and about 30% is returned to the water table. The reduction of groundwater inputs to streams could affect trout and other organisms by increasing water temperatures, decreasing living space or habitat and reducing streamflow (WDNR, 1970).

Wind eroded soil from agricultural cropfields is a source of sediment, nutrients and pesticides to surface waters in the Four and Fivemile Creeks Watershed. Much of the agricultural activity includes potato and processing vegetable production. Typically, these farming activities result in smooth, flat seed beds that are free of residues and are susceptible to wind erosion. Wind erosion removes nutrient rich soils from the fields depositing them into the ditches which increases sediment and nutrient loading to downstream lakes (Oberhofer et.al., 1993).

SUMMARY OF WATER RESOURCE CONDITIONS

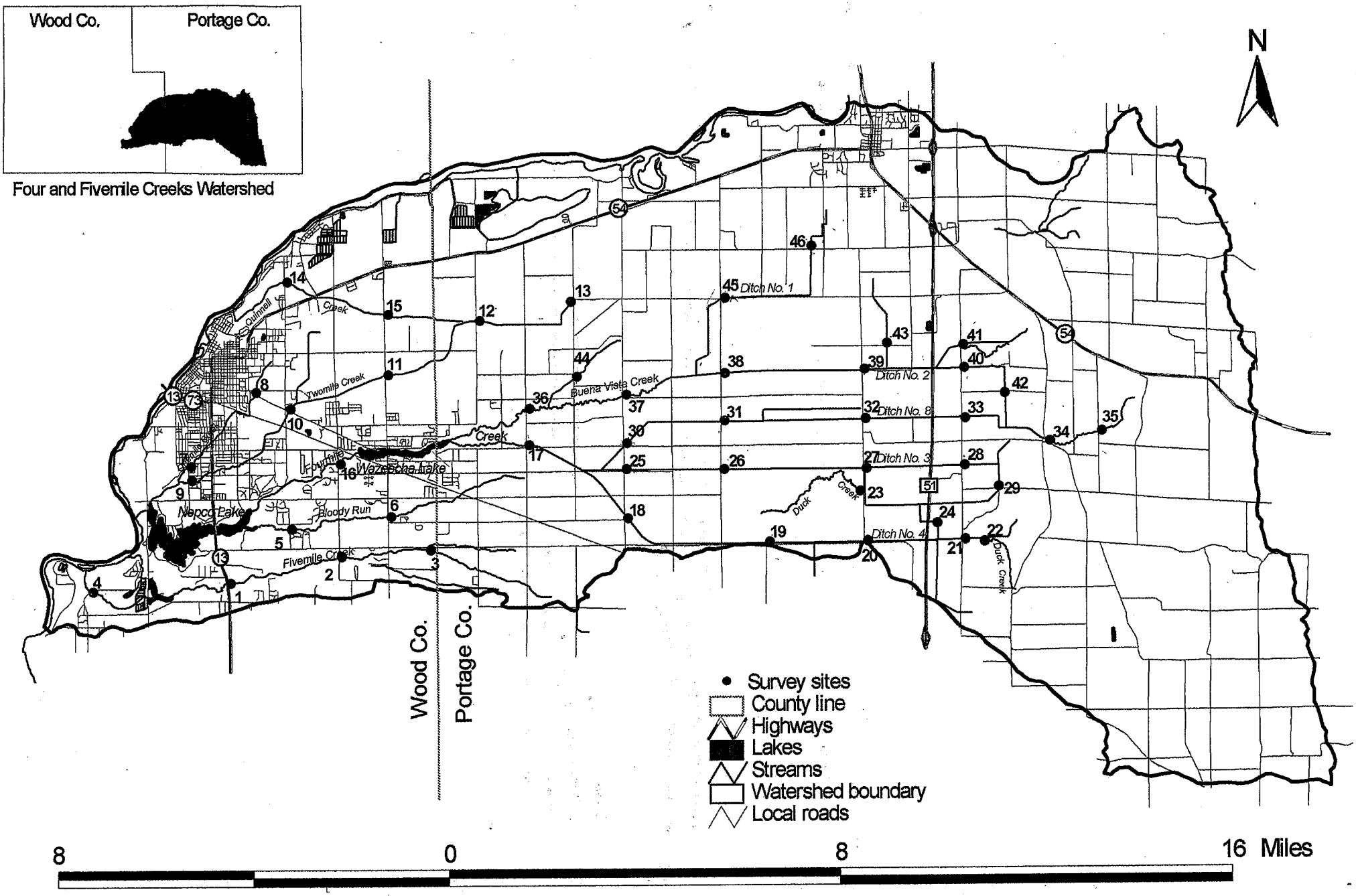
Stream and ditches in the Four and Fivemile Creeks Watershed supports both warm and cold water fisheries. Generally, cold water streams are found in upstream reaches of the watershed while most warm water streams are located in the lower reaches, around the City of Wisconsin Rapids. Brook trout were the dominate cold water species found throughout the watershed. A few streams contained stocked brown trout with a rainbow trout found in one stream. Brook trout densities ranged from low to very high in the ditches with natural reproduction occurring mostly in headwater reaches. Cold water IBI ratings ranged from "fair" to "excellent" suggesting some areas have degraded habitat and/ or water quality impacts. Forage fish were the dominate species found in the warm water streams, including; mudminnows, brook sticklebacks, pearl dace, creek chubs, white suckers, northern red bellied dace and fathead minnows. Warm water IBI ratings ranged from "very poor" to "good" suggesting some streams have degraded habitat and/or water quality problems.

Most of the warm water streams flow through the City of Wisconsin Rapids and are impacted by storm water runoff and weak baseflow. Storm water travels over impervious areas in the city carrying sediment and other pollutants to the streams. Storm sewers deliver high volumes of water to the streams causing rapid increases in streamflow. The flashy streamflow causes streambed scouring and streambank erosion creating poor habitat conditions. The impervious areas surrounding the streams also prevent adequate groundwater recharge from precipitation.

The dominate substrate of watershed streams consist of sands that were deposited in the region by glaciers. Streambeds typically have shifting sand bottoms and lack coarse substrate and riffles. Most of the cold water streams in the watershed were either ditched or created through ditching in the early 1900's. Fivemile and Bloody Run Creeks appear to be the only perennial cold water streams without signs of ditching. Ditching can impact stream habitat by reducing the variability of stream morphometry, decreasing the amount of fish cover and increasing peak flood runoff rates. Many of the ditches have not been excavated for several years and provide suitable habitat for brook trout. Ditches supporting higher densities of brook trout had optimal cold water temperatures, were relatively deep and narrow and had adequate fish cover.

Water resource problems to the streams and ditches in the watershed include sediment deposited from wind erosion, streambank erosion, organic and nutrient loading and elevated stream temperatures.

Figure 1. Habitat and fishery survey sites in the Four and Fivemile Creeks Watershed (Summer 1997)



Sedimentation from wind and streambank erosion can cause filling-in of spawning and pool areas. Sediments deposited in spawning areas impairs reproductive success of fish by reducing inter-substrate flow that is necessary to maintain suitable temperatures and dissolved oxygen concentrations for eggs and larval fish. Sedimentation in pools or deeper runs reduces stream depth and decreases the amount of cover available to fish. Wind eroded sediment from the cropfields also deposits nutrients, pesticides and herbicides into streams and ditches which increases loading to downstream lakes. Other possible sediment sources to surface waters include maintenance dredging of the ditches and discharges from cranberry marshes.

Elevated water temperatures were documented in several cold water streams and ditches in the watershed. Higher stream temperatures may occur as a result of several factors including; reduced groundwater inputs, lack of canopy shading, wide and shallow stream channels, beaver activity and warm water discharges. Irrigation of cropfields with high capacity wells may use groundwater that would normally discharge to streams and ditches causing reduced streamflow and higher water temperatures. The lack of bank vegetation and canopy shading increases solar radiation which may cause higher stream temperatures. Stream temperatures may increase from warm water discharges from beaver ponds, cranberry marshes and impoundments. Elevated water temperatures that occur as a result of these factors may decrease the ability of a stream to support cold water species.

Most monitored streams and ditches in the watershed had good dissolved oxygen levels, however, a few had signs of reduced oxygen concentrations. Many of the ditches have abundant aquatic plant growth from high nutrient concentrations in the water and sediment. Abundant plant growth produces oxygen during the day (photosynthesis) and consumes oxygen at night (respiration). Extreme fluctuations in oxygen concentrations can stress fish and other aquatic life.

Some ditches are chemically treated to control aquatic plant growth. Decomposition of plants can also reduce dissolved oxygen concentrations in streams. Other sources of organic loading to the ditches may include animal waste from barnyards, pastures and cropland runoff.

Other impacts to surface water includes; water control structures, maintenance dredging and chemical spraying of crops. Concrete stoplog structures were installed during the 1930s for controlling water levels and bank erosion. These structures can impact the cold water fishery by preventing upstream migration, causing streamflow fluctuations and increasing water temperatures. Maintenance dredging of the ditches and lateral ditch construction causes turbidity, sedimentation, streambank erosion and loss of fish cover. Chemical spraying of pesticides on cropfields may be impacting surface waters in the watershed. Pesticides are sometimes applied to cropfields using pivot sprinkler systems and aerial spraying. Chemicals applied using these methods can reach the surface waters from wind drift and by spraying directly across the ditch channels.

Groundwater contamination has been a documented problem throughout the central sands region. Contaminants commonly detected in groundwater of this area include nitrates and pesticides. Nitrate concentrations over ten ppm have been detected in groundwater which exceeds the Wisconsin state standard (10 parts per million). The pesticide aldicarb has received the most attention in the central sands region because of levels found in groundwater. The central sands region has high groundwater tables and soils consisting of sand and gravel allowing for greater contamination potential. The intensely irrigated and fertilized cropland increases the likelihood of groundwater contamination.

The Four and Fivemile Creeks Watershed has four named lakes including; Nepco, Wazeecha, Tamarack and Patterson Lakes. ~~Nepco Lake is a 494 acre impoundment created in 1926 by the Nekoosa-Edwards Paper Company. The lake supports a warm water sport fishery and has two public boat landings.~~ Wazeecha Lake is a 148 acre impoundment created in 1936 for recreational purposes. The lake also supports a warm water fishery and is the location of the Wisconsin State Waterskiing Tournament. Tamarack and Patterson Lakes are small internally drained lakes located in the eastern part of the watershed. The fishery of the lakes is unknown.

METHODS

Pre-appraisal monitoring in the Four and Fivemile Creeks watershed started in February, 1997 and continued through October, 1997. Following is a summary of methods used for the monitoring.

Habitat Evaluations

Habitat evaluations were completed at 39 sites in the Four and Five Mile Creeks Watershed, following guidelines developed by Ball (1982) and Simonson et.al. (1994). Evaluations were completed at each fishery survey site identified in the watershed (Figure 1).

The Ball method requires an evaluation of habitat by walking a section of stream and assessing conditions through personal observations. The evaluation assesses stream habitat characteristics as they relate to the watershed, streambanks, stream bottom, stream morphology and flow. The process involved walking a representative section of stream that included a variety of habitat conditions. A final score and rating was calculated from observations made by the biologist.

The Simonson method evaluates habitat conditions based on measurements. The method requires establishing a station 35 times the mean stream width, and recording measurements of stream conditions (ie, width, depth, bank erosion, substrate, riparian land use, etc...) at 12 - 15 equally spaced transects. A final score and rating is calculated from the data collected during the survey.

Macroinvertebrate Sampling

Macroinvertebrate samples were collected at 11 sites on nine streams in the watershed using artificial "rock baskets" placed on the stream bed. The substrate of streams in the watershed are dominated by sand and lack gravel riffles necessary to collect aquatic insects with a "kick" net. A six by ten inch cylindrical wire rotisserie basket was mounted to a concrete block and filled with one to three inch diameter gravel. The baskets were placed on the stream beds for six weeks during September and October to collect macroinvertebrates through colonization of drifting or swimming organisms. A minimum of two "rock baskets" were placed at each site for collecting composite samples (if necessary) and safeguarding against loss or vandalism (Klemm et.al., 1990).

Upon retrieval, the samplers were lifted from the stream bed and gently shaken to remove insects from the gravel and basket. A large net was placed downstream of the samplers for collecting dislodged insects. Each basket was inspected for attached invertebrates which were removed with a soft bristle paint brush. Two five gallon pails were used to separate the remaining organisms from the gravel. The bottom of one pail was cut out and re-placed with 1/2 inch wire hardware cloth and inserted inside the other. The gravel with attached insects was then placed inside the top pail (pail with

hardware cloth). The insects were removed by gently shaking the pails and pouring water over the gravel, forcing the insects to fall into the outside pail. The gravel was inspected for attached insects and then discarded into the stream. The collected insects were preserved with 70% isopropyl alcohol and delivered to the University of Stevens Point for sorting and identification.

The macroinvertebrate samples were evaluated using the Hilsenhoff Biotic Index (HBI) which measures the relative amount of organic pollution in a stream (Hilsenhoff, 1987). The index uses a 0 to 10 scale where water quality improves as the value decreases. The HBI considers the number of individuals by species and tolerance values of the individual species in a sample.

Fishery Surveys

Electro-fishing surveys were conducted at 38 sites on 18 streams during July and August in the Four and Five Mile Creeks Watershed (Figure 1). Fishery stations were established one week prior to the surveys following methods described by Engel (1997). Station lengths were determined by the average stream width. Streams with an average width less than 10 meters had station lengths of 900 feet. All fish species encountered in the first 300 feet were collected and identified for calculating an Index of Biotic Integrity (IBI). Game fish were the only species collected and identified in the final 600 feet. Streams greater than 10 meters wide had station lengths of 1800 feet. The IBI and game fish stations were 600 and 1200 feet, respectively.

Fishery results were summarized using two methods including; the Index of Biotic Integrity (IBI) and Catch Per Unit Effort (CPUE). A CPUE was calculated for the total number and young of the year (YOY) trout for each site surveyed in the watershed. The number of trout found at sites was expressed as fish per mile of stream. Trout CPUE densities were given a qualitative rating that was based on trout numbers found in the western part of the state (Table 1).

Table 1. Regional Brook Trout Densities for Western Wisconsin Streams (Engel, 1996)

Trout Densities*	Brook Trout CPUE (no./mile)	Relative Population Rating
	< 250	Low
	250 - 1,500	Moderate
	1,500 - 2,500	High
	> 2,500	Very High

* Includes total CPUE of brook trout

The IBI assesses the biotic integrity and environmental quality of streams and rivers using ecological attributes of fish communities (Lyons, 1992). The cold water IBI is calculated using five metrics including; number of intolerant species, percent tolerant species, percent top carnivore species, percent cool water/cold water species and percent salmonid individuals that are brook trout. A total IBI score is determined by summing the score of each metric. The IBI score ranges from 0 to 100 where the biotic integrity improves as the score increases (Lyons et.al, 1996). The warm water IBI is calculated

using ten metrics that reflect basic structural and functional characteristics of biotic assemblages (Lyons, 1992).

Continuous Monitoring

Continuous temperature monitoring was completed at 14 sites in the watershed using HOBO HTI temperature loggers. Baseline temperature data was collected on seven streams for 13-15 day deployment periods during July and August. Temperature data was also collected above and below four cranberry marshes within the watershed. Deployment periods ranged from May through October at three marshes and August through October at one. The HOBOs measured and recorded temperatures at 30 minute intervals for each deployment period.

Temperature is an important limiting factor to brook trout populations. As water temperature in streams exceed the optimal range for brook trout, their densities begin to decrease. The optimal temperature range for growth and survival of brook trout is 11-16 degrees Celsius (52 to 61 degrees Fahrenheit) and the maximum limiting temperature is 24 degrees Celsius (75 degrees Fahrenheit) (Raleigh, 1982). Recorded stream temperatures were evaluated based on these ranges to determine if streams were meeting or exceeding the temperature criteria for brook trout.

Continuous dissolved oxygen monitoring was conducted at three sites for a 3 day period during August using a YSI 6000 multi-parameter meter. The meter measured dissolved oxygen, temperature, pH and specific conductance at 30 minute intervals.

Lake Monitoring

Water quality monitoring was conducted on Nepco and Wazeecha Lakes following methods of the Long Term Trend Lake Monitoring Protocol for Wisconsin (Appendix 1) (WDNR, 1987). A macrophyte survey was conducted on Wazeecha Lake using the Jessen and Lound rake-sampling method (1962).

RESULTS AND DISCUSSION

The Four and Fivemile Creeks Watershed was delineated into four sub-watersheds for interpreting the results of this study. The four sub-watersheds include; Fivemile Creek, Lower Fourmile Creek, Upper Fourmile Creek and Buena Vista Creek.

A summary of physical characteristics and water resource problems for monitored streams in the watershed are found in Table 2. Results of fishery surveys are summarized in Figure 3 and Appendix 2. Habitat assessments and macroinvertebrate sampling results are found in Appendix 3. Continuous temperature and dissolved oxygen monitoring results are found in Appendixes 4 and 5, respectively. Appendix 6 summarizes water quality monitoring on Lake Wazeecha and Nepco Lake.

Fivemile Creek Sub-Watershed

The Fivemile Creek sub-watershed is approximately 9,809 acres and has two perennial streams including; Fivemile Creek and Harvey Creek. The land use is predominantly woodland with

Table 2. Summary of Stream Classifications and Water Resource Problems for Monitored Streams in the Four and Fivemile Creeks Watershed

Sub-watershed	Stream	Length (miles)	Current Classification Use/Miles	*Proposed Classification Use/Miles	*Potential Classification Use/Miles	Use Problems Source/Impact
Fivemile Creek	Fivemile Creek	11	Cold (I) / 2** Cold (II) / 2** Cold (III) / 4.9**	WWSF / 2.1 Cold (II) 3.7 Cold (III) 5.2	WWSF / 2.1 Cold (II) 3.7 Cold (III) 5.2	SB, CM, BAS / HAB, SED, TEMP, TURB, FLOW
	Harvey Creek	2	Unknown / 2	WWSF / 2	WWSF / 2	CM, SB / HAB, SED, TEMP
~~Lower Fourmile Creek~~	~~Bloody Run Creek~~	7	Cold (I) / 3.2** Unknown / 3.8	Cold (I) / 3.2 Cold / 3.8	Cold (I) / 3.2 Unknown / 3.8	SB, BAS / HAB, SED, FLOW
	~~Onemile Creek~~	~~3~~	~~WWSF / 3***~~	WWFF / 3	WWFF / 3	DCH, URB, BAS, SB / HAB, SED, FLOW
	~~Twomile Creek~~	~~11~~	~~WWSF / 11***~~	WWFF / 7 ~~Cold / 4~~	WWFF / 7 Cold / 4	SB, URB, CM, DCH, BAS / HAB, SED, FLOW
	Quinnell Creek	5	WWSF / 5***	WWSF / 0.5 WWFF / 4.5	WWSF / 0.5 WWFF / 4.5	BAS, SB, URB / HAB, SED, FLOW
	Fourmile Creek	8	WWSF / 8***	WWSF / 8	WWSF / 8	SB, HM / HAB, SED
Upper Fourmile Creek	Fourmile Creek	2	Cold (II) / 2***	Cold (I) / 2	Cold (I) / 2	SB, PSB, BY, DCH, WD / HAB, SED, TEMP
	Ditch No. 4	11	Unknown / 4.5 Cold (II) / 3.9** Cold (I) / 2.6**	Cold (I) / 11	Cold (I) / 11	DCH, WD, CE, HM, CM, IRR / HAB, FLOW, SED, TEMP, NUT
	Duck Creek	2	Cold (I) / .8** WWFF / 1.2***	Cold (I) / .8 WWFF / 1.2	Cold (I) / .8 WWFF / 1.2	BAS, WD, IRR, CE, DCH/ HAB, SED, FLOW
	Ditch No. 3	8	Unknown / 5.4 Cold (I) / 2.6**	Cold (II) / 5.4 Cold (I) / 2.6	Cold (II) / 5.4 Cold (I) / 2.6	DCH, IRR, WD, CE / HAB, TEMP, SED, NUT
	Ditch No. 8	12	Unknown / 9 Cold (II) / 1** Cold (I) / 2**	Cold (II) / 3 Cold (I) / 9	Cold (II) / 3 Cold (I) / 9	DCH, SB, BDAM, IRR, WD, CE / HAB, TEMP, SED, NUT
Buena Vista Creek	Buena Vista Creek	10	Cold (II) / 10**	Cold (II) / 8 Cold (I) / 2	Cold (II) / 8 Cold (I) / 2	DCH, IRR, WD, CE, SB / HAB, TEMP, SED, NUT
	Ditch No. 2	2	Cold (II) / 2**	Cold (I) / 2	Cold (I) / 2	DCH, IRR, WD, CE / HAB, SED, NUT

	Isherwod Lateral	2	Cold (I) / 2**	Cold (I) / 2	Cold (I) / 2	DCH, IRR / HAB, SED
	Unnamed Ditch 15-3	2	Cold / 2***	Cold (II) / 2	Cold (II) / 2	DCH, IRR, WD, CE, BAS / HAB, NUT, SED, FLOW
	Unnamed Ditch 21-5	2	Unknown / 2	Cold (I) / 2	Cold (I) / 2	DCH, IRR, WD, CE / HAB, NUT, SED
	Ditch No. 1	4	Unknown / 2 Cold (II) / 2**	Cold (II) / 1 Cold (I) / 3	Cold (II) / 1 Cold (I) / 3	DCH, IRR, WD, CE / HAB, NUT, SED, DO
	Unnamed Ditch 5-16	2	Cold / 2***	Cold (I) / 2	Cold (I) / 2	DCH, IRR, WD, CE / HAB, NUT, SED

*Professional judgment of Fish Manager and Biologist using data collected during 1997 surveys
**Trout stream identified in the "blue" Trout Stream Book (DNR, 1980)
***Water Quality Management Plan "Upper Wisconsin River Southern Sub-Basin" (DNR, 1992)

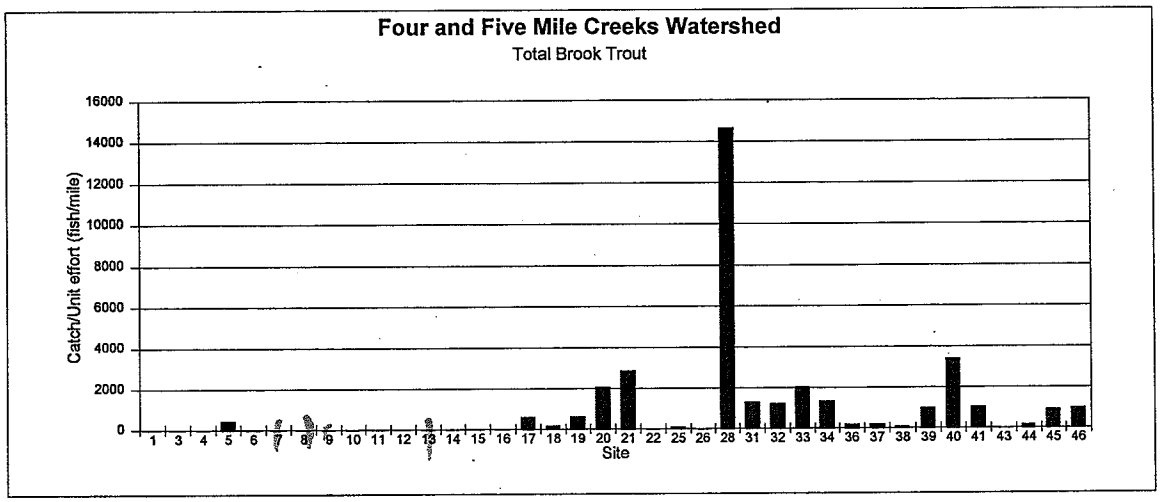
WWSF = warm water sport fishery
WWFF = warm water forage fishery
Cold = cold water fishery

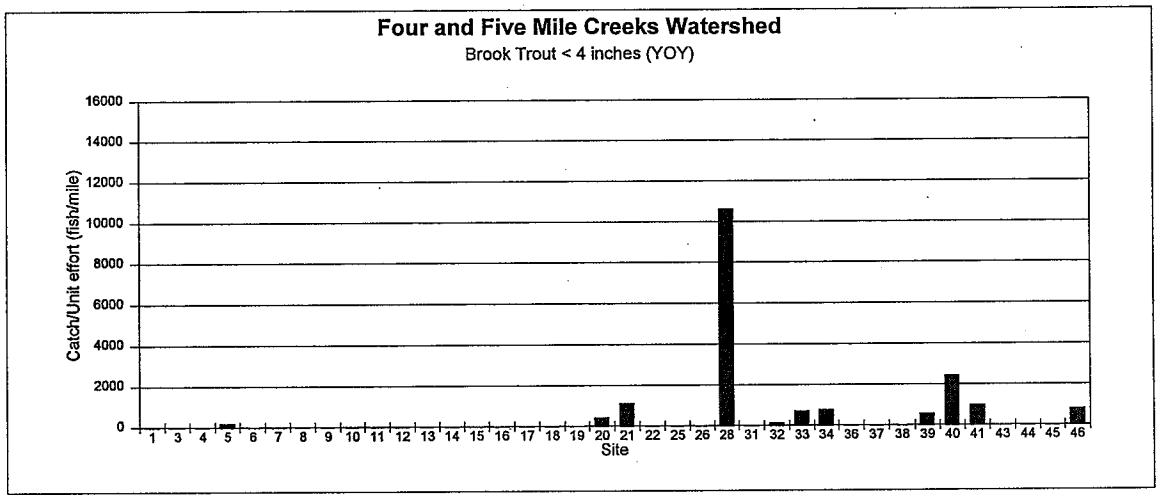
(I) = Class I - sufficient natural reproduction to sustain populations of wild trout at or near carrying capacity
(II) = Class II - some natural reproduction of trout, good survival and carryover of adult trout
(III) = Class III - no natural reproduction of trout, marginal trout habitat

Use Problems:

Sources:
SB - streambank erosion
CM - cranberry marsh
BAS - baseflow
DCH - ditching
WD - wind erosion
CE - cropland erosion
HM - hydrologic modification
IRR - irrigation

Impacts:
HAB - habitat
SED - sedimentation
TEMP - temperature
TURB - turbidity
FLOW - streamflow fluctuations
NUT - nutrient enrichment
DO - dissolved oxygen





Stream	Site	Continued	
Fivemile Creek	1	Ditch No. 4	21
Fivemile Creek	3	Duck Creek	22
Harvey Creek	4	Ditch No. 3	25
Bloody Run Creek	5	Ditch No. 3	26
Bloody Run Creek	6	Ditch No. 3	28
One Mile Creek	~~7~~	Ditch No. 8	31
One Mile Creek	~~8~~	Ditch No. 8	32
Two Mile Creek	9	Ditch No. 8	33
Two Mile Creek	10	Ditch No. 8	34
Two Mile Creek	11	Buena Vista Creek	36
Two Mile Creek	12	Buena Vista Creek	37
Two Mile Creek	13	Buena Vista Creek	38
Quinnell Creek	14	Buena Vista Creek	39
Quinnell Creek	15	Ditch No. 2	40
Four Mile Creek	16	Isherwod Lateral	41
Four Mile Creek	17	Unnamed Ditch 15-3	43
Ditch No. 4	18	Unnamed Ditch 21-5	44
Ditch No. 4	19	Ditch No. 1	45
Ditch No. 4	20	Unnamed Ditch 5-16	46

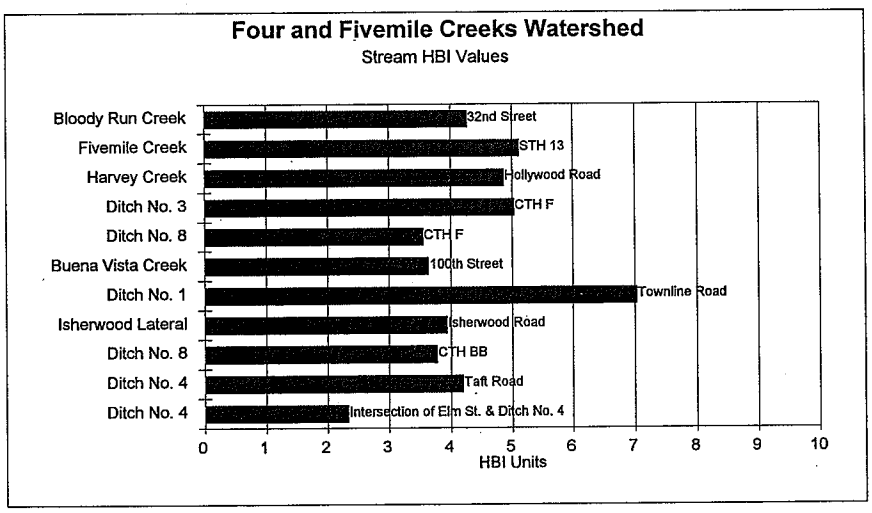
Figure 3. Catch/Unit Effort of Brook Trout for Monitored Streams in the Four and Fivemile Creeks Watershed

residential homes. The lower end of the sub-watershed is located in the southern part of Wisconsin Rapids where a cranberry operation exists.

Fivemile Creek

Fivemile Creek is an eleven mile stream that flows into a cranberry flowage south of Wisconsin Rapids. The lower portion of the stream is classified as a warm water sport fishery (WWSF) with the middle and upper portion classified as a class II and III trout stream, respectively. Land use surrounding the stream is primarily woodland with residential homes.

The habitat rating was "fair" to "good" and the IBI was "fair". The stream has low brook trout densities and young of the year (YOY) trout were absent during the surveys. In-stream habitat is limited by moderate streambank erosion, excessive fine sediments and the lack of fish cover, pools and riffles. During low precipitation years the upstream reaches of the stream are dry. The stream HBI was "good" indicating some organic loading (Figure 4).



Hilsenhoff Biotic Index (1987)

Biotic Index	Water Quality	Degree of Organic Pollution
0.00-3.50	Excellent	No apparent organic pollution
3.51-4.50	Very Good	Possible slight organic pollution
4.51-5.50	Good	Some organic pollution
5.51-6.50	Fair	Fairly significant organic pollution
6.51-7.50	Fairly Poor	Significant organic pollution
7.51-8.50	Poor	Very significant organic pollution
8.51-10.00	Very Poor	Severe organic Pollution

Figure 4. Hilsenhoff Biotic Index Results for Monitored Streams

Harvey Creek

Harvey Creek is a two mile stream that travels from the upstream cranberry operation to the Wisconsin River. The stream classification is not known, however the fishery survey suggests its a warm water stream.

The habitat rating was "good" and the IBI was "fair". The stream fishery consists of forage fish and a few game fish that probably migrate up from the Wisconsin River. Limiting factors of habitat include the lack of pools, coarse substrate, riffles and fish cover. The stream HBI was "good" indicating some organic loading.

Continuous temperature monitoring was conducted during August and September on Fivemile (above cranberry marsh) and Harvey (below cranberry marsh) Creeks. Temperature analysis indicates Fivemile Creek exceeded the optimal range for brook trout 9% of the time while Harvey Creek exceeded the optimal range 35% of the time (Figure 5). These frequency numbers do not include the months of June and July when some of the highest water temperatures would be expected.

The maximum temperature recorded for Fivemile and Harvey Creeks was 19.8 and 26.8 celsius (68 and 80 fahrenheit), respectively. Harvey Creek exceeded the maximum limiting range 3% of the time, indicating water temperatures become too high to support brook trout.

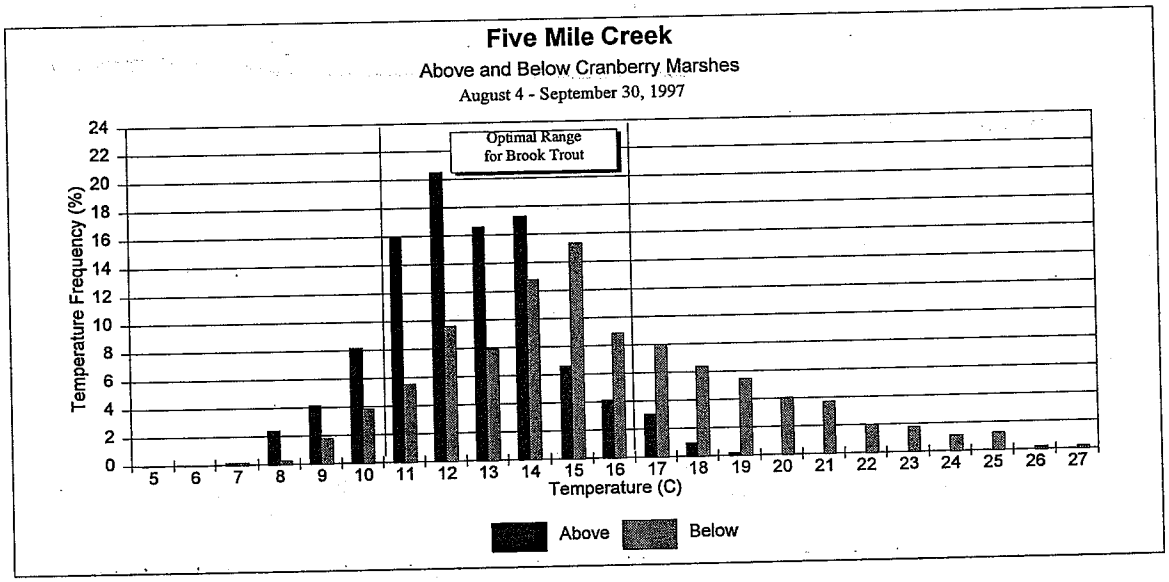


Figure 5. Temperature Frequency Analysis for Fivemile and Harvey Creeks

Lower Fourmile Creek Sub-Watershed

The Lower Fourmile Creek sub-Watershed is approximately 36,132 acres and has five perennial streams including; Bloody Run Creek, Onemile Creek, Twomile Creek, Quinnell Creek and a portion of Fourmile Creek. Nepco and Wazeecha Lakes are also located in the sub-watershed. Land use in the sub-watershed consists of woodlands, agriculture and urban areas including the City of Wisconsin Rapids.

Bloody Run Creek

Bloody Run Creek is a seven mile stream that flows into Nepco Lake. The lower three miles of the stream supports a Class I brook trout fishery while the classification of the remaining four miles is unknown.

The habitat rating was "poor" to "fair" and the IBI was "good". Limiting factors to habitat include; moderate streambank erosion, shallow channel depth and the lack of pools, riffles, coarse substrate and fish cover. During low precipitation years, baseflow of the stream is reduced and the upstream reach is sometimes dry. The stream HBI was "very good" indicating slight organic loading to the stream.

The lower stream reach has moderate brook trout densities with some natural reproduction. Brook trout were not found in the upstream reach due to reduced stream flow and available cover. The stream has cold water temperatures that are optimal for brook trout growth and survival. Stream temperatures exceeded the optimal range 13% of the time.

Onemile Creek

Onemile Creek is a three mile warm water sport fishery that flows through the City of Wisconsin Rapids and empties into Nepco Lake. The habitat rating was "poor" to "fair" and the IBI was "very poor". Limiting factors to habitat include the lack of pools, riffles, fish cover, coarse substrate and low stream flow. Electro-fishing surveys only found fish in the lower stream reach consisting of forage species and one largemouth bass. ~~Based on this data, the stream classification should be changed to a warm water forage fishery.~~

The stream is also impacted by storm water runoff from the City of Wisconsin Rapids. Storm water travels over the impervious areas of the city carrying sediment and other pollutants to the stream. Storm sewers emptying into the stream deliver large volumes of water causing rapid increases in stream flow. The increased flows cause streambed scouring and streambank erosion creating poor habitat conditions. Impervious areas of the city probably reduces infiltration, thus reducing groundwater recharge to the stream.

Twomile Creek

Twomile Creek is an 11 mile warm water sport fishery that flows through a cranberry marsh and the City of Wisconsin Rapids before emptying into Nepco Lake. Land use in the upper drainage area is primarily irrigated croplands.

Habitat and IBI ratings were "poor" to "fair" at monitored sites. Factors limiting habitat include; streambank erosion, weak baseflow, low velocity, channel ditching, sedimentation and the lack of fish cover, pools and riffles. Reduced current velocity may be a result of low stream gradient and inadequate groundwater recharge to the stream. During winter months, lower reaches of the stream occasionally stop flowing leaving small pockets of water in the stream channel. Other factors limiting habitat include; elevated road culverts preventing fish migration upstream, stormwater runoff and inputs of trash and yard debris into the stream.

Substrate composition at the habitat sites was different above and below the cranberry operation. The dominate substrate types at the upstream site was sand followed by silt, while the downstream site had mostly detritus and silt.

Electro-fishing results on Twomile Creek indicate the entire stream supports a forage fishery. Based on this data, the ~~stream classification should be changed to a warm water forage fishery in the~~ lower reaches.

Continuous temperature monitoring was conducted from June through September above (Site 13) and below (Site 14) the cranberry operation. Temperature analysis indicates the upstream site exceeded the optimal range for brook trout 16% of the time while the downstream site exceeded the optimal range 8% (Figure 6). The average water temperature at both sites was approximately 13 degrees celsius (55.4 degrees fahrenheit). Temperatures at both sites are capable of supporting trout, however, other habitat variables were less than optimal. The low gradient and reduced current velocity causes the ditch to become stagnate during baseflow conditions. These factors prevent adequate aeration of the stream that is necessary for supporting trout.

Factors contributing to the slightly warmer water at the upstream site may include; reduced groundwater inputs and the lack of stream shading and flow. The upstream site was located where canopy shading was absent along the ditch allowing the water to warm slightly through solar radiation. The extremely low stream discharge causes stagnation allowing the water to become warmer. Canopy shading increases moving downstream along the ditch from this site and may help cool the water slightly. Groundwater inputs could have also been reduced near the upstream site from the irrigation of cropfields with high capacity wells.

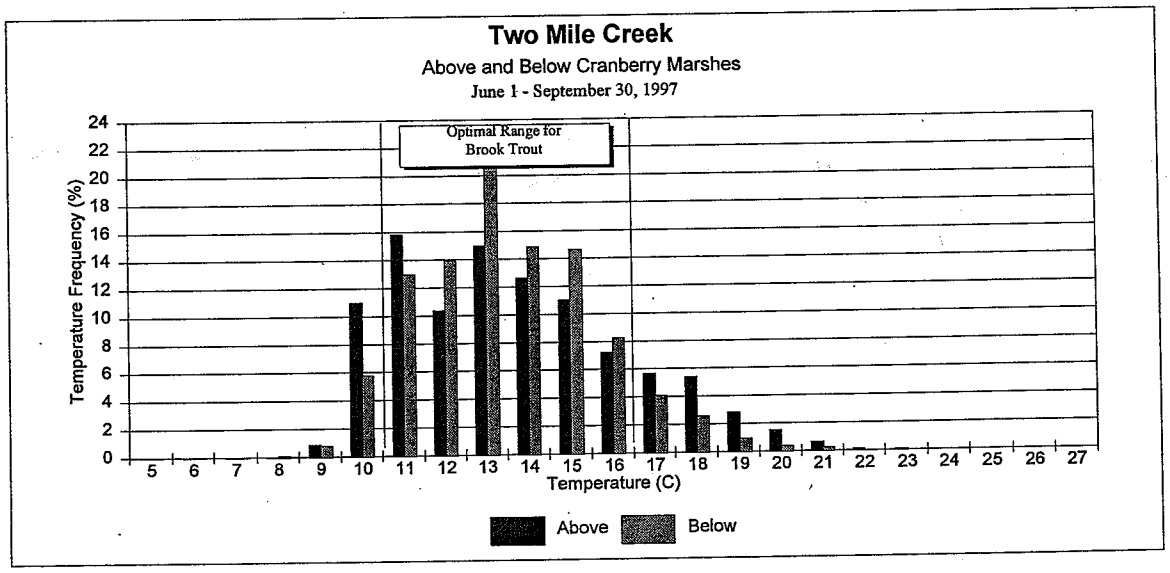


Figure 6. Temperature Frequency Analysis on Twomile Creek

Quinnell Creek

Quinnell Creek is a five mile tributary to the Wisconsin River and is classified as a warm water sport fishery. The habitat rating was "fair" to "poor" and the IBI was "fair". Stream habitat is limited by weak base flow and a lack of pools, riffles, coarse substrate, and fish cover. During the time of these surveys, the upper stream reach was dry.

The fishery of the stream consists of forage species, however one rainbow trout was captured during electro-fishing surveys. The trout was eight inches long and was probably planted in the stream. The stream classification should be changed to a warm water forage fishery based on information collected during the surveys.

Fourmile Creek

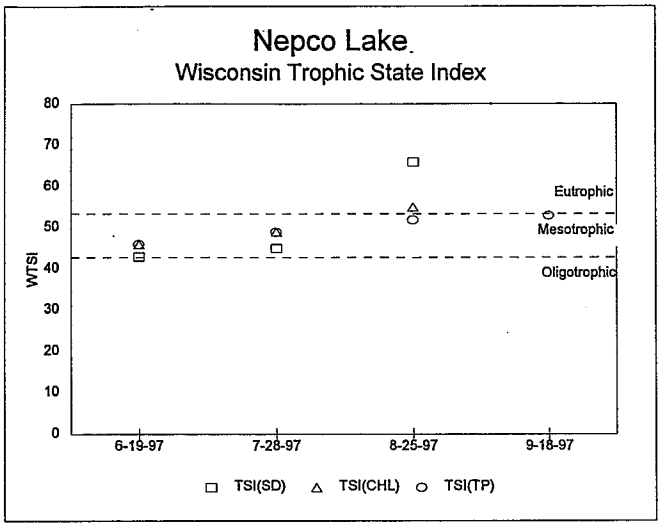
Fourmile Creek is a 20 mile tributary to the Wisconsin River. The stream is impounded at two locations creating Wazeecha and Nepco Lakes. The upper 11 miles of the stream have been ditched to drain the land for farming and is now called Ditch No. 4. Approximately, five miles of Fourmile Creek exists as a natural flowing stream.

Fourmile Creek is three miles long in this sub-watershed and is classified as a warm water sport fishery. The habitat rating was "fair" and the warm water IBI was "good". The stream is impacted by streambank erosion, sedimentation and lack of suitable cover for fish. Electro-fishing results found moderate numbers of forage species and some game fish including brown trout, walleye, smallmouth bass and northern pike. The brown trout measured approximately ten inches in length and were probably stocked in the stream.

Wazeecha Lake

Wazeecha Lake is a 148 acre impoundment on Fourmile Creek that was created between 1936 and 1938 for recreation purposes. The fishery consists of largemouth bass, panfish, northern pike and walleye (Zimmerman, 1997). The Wood County Parks and Forestry Department dredged the lake in 1994 and removed approximately 450,000 cubic yards of sediment (Arendt, 1998). The dredging project was completed in conjunction with dam repair as directed by the Department of Natural Resources.

The Trophic Status Index (TSI) indicates the lake is eutrophic with moderate to high chlorophyll*a* and total phosphorus levels during the growing season (Figure 7). The lake also had a mean nitrate + nitrite concentration of 3.94 mg/l. Groundwater fed streams and ditches emptying into the lake are known to have elevated nitrate levels of four to six ppm. The watershed ranks "high" for groundwater NPS pollution control because of documented impacts from nonpoint sources (WDNR, 1992). Nutrient and sediment loading is high to Wazeecha Lake from the Buena Vista and Fourmile Creeks sub-watersheds. The Buena Vista Creek sub-watershed had higher nitrate concentrations, while Fourmile had higher total phosphorus and suspended solids concentrations (Kruger et.al., 1986). Lake profiles indicate the lake mixes and occasionally stratifies weakly during the summer months (Figure 8).



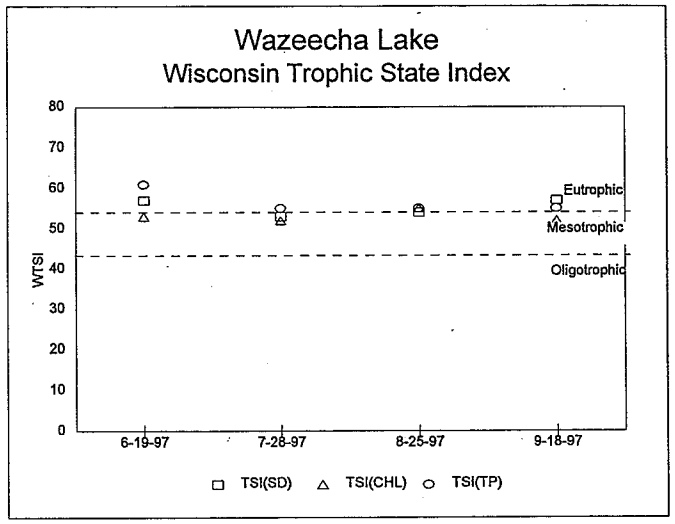


Figure 7. Trophic State Indexes (TSIs) for Wazeecha and Nepco Lakes

TSI levels on Wazeecha Lake were higher than levels on Nepco Lake indicating the lake may act as a "sink", trapping some of the nutrients and sediments before they travel downstream.

A macrophyte survey found the lake to have very sparse and limited macrophyte growth. The aquatic plant community had moderate diversity, but was below the average for Wisconsin lakes. Macrophyte growth was abundant in 1992, but the removal of sediments and plants through dredging in 1994, probably limited the amount of plant growth observed in 1997 (Konkel, 1997).

Nepco Lake

Nepco Lake is a 494 acre impoundment on Fourmile Creek and is located approximately three miles downstream of Wazeecha Lake. The lake was created in 1926 by the Nekoosa-Edwards Paper Company for operating their paper mill operation. ~~The lake supports a fishery that is similar to Wazeecha Lake (Zimmerman, 1997).~~

The Trophic Status Index (TSI) indicates the lake is mesotrophic - eutrophic with moderate to high chlorophyll a and total phosphorus levels during the growing season (Figure 7). The highest phosphorus levels were found in May and were probably a result of spring runoff from the watershed. The lake had a mean nitrate + nitrite concentration of 2.54 mg/l. Lake profiles indicate the lake mixes and occasionally stratifies during the summer months (Figure 8).

The lake is known to have excessive aquatic plant growth, however a quantitative macrophyte survey was not completed because of chemical treatment during the scheduled time of the survey. A qualitative assessment was completed in the treatment areas before chemicals were applied. The pre-treatment assessment indicates the treatment areas contain 12 species of plants with *Myriophyllum spicatum* (Eurasian water milfoil) being the most dominant. Many of the species in Nepco Lake tolerate turbid water conditions and have been known to grow abundantly when excess nutrients are

available. Chemical treatments and drawdowns have been used since 1929 to control plant and algae growth in the lake (Konkel, 1997).

Upper Fourmile Creek Sub-watershed

The upper Fourmile Creek sub-watershed is 47,317 acres and contains an extensive network of ditches that were dug in the early 1900s to drain the Buena Vista Marsh for agricultural use. Much of the agricultural land consists of large irrigated cropfields. The sub-watershed has two perennial streams and three named ditches including; Fourmile Creek, Duck Creek, Ditch No. 4, Ditch No. 3 and Ditch No. 8.

The shallow groundwater aquifers maintain nearly steady streamflow and temperature in the streams (WDNR, 1970). Many of the artificial channels constructed in the early 1900s have steady flow and temperatures through groundwater recharge, providing favorable conditions for trout. A terminal moraine exists in the eastern part of the sub-watershed. Streams and ditches are absent and the area appears to drain internally. Patterson and Tamarack Lakes are two small internally drained lakes that are located in the moraine.

The sub-watershed contributes nutrients and sediment to Wazeecha Lake (Kruger et.al., 1986). Monitoring completed in 1986, suggests the Fourmile Creek sub-watershed had the highest total phosphorus and suspended sediment loading to the lake with Ditches Three and Eight contributing the most.

Fourmile Creek

Fourmile Creek is two miles long in this sub-watershed and is managed as a Class II brook trout stream. The habitat rating was "poor" and the cold water IBI was "good". The stream is impacted by cattle pasturing, streambank erosion, sedimentation and the lack of pools, riffles and fish cover. Brook trout densities were moderate with some natural reproduction. The stream classification should be changed to a Class I brook trout stream.

Ditch No. 4

Ditch No. 4 is 11 miles long and is managed as a Class I and II brook trout stream. Currently, two cranberry farms are located along Ditch No. 4 that draw and discharge ditch water for cultivating cranberries.

Habitat ratings ranged from "fair" to "good" and cold water IBIs from "fair" to "excellent". Brook trout densities were low at downstream reaches and moderate to very high moving upstream. The ditch is impacted by channel ditching, sedimentation and the lack of pools and riffles. Overall, the ditch has a good riparian buffer with vegetated streambanks. Fish cover is provided by overhanging vegetation and submerged macrophytes. The ditch is a continuous run that is relatively deep and narrow. Meandering within the ditch creates some habitat variety through scouring and undercutting of the channel and banks. Based on data collected in 1997, the entire ditch should be re-classified as a Class I brook trout stream.

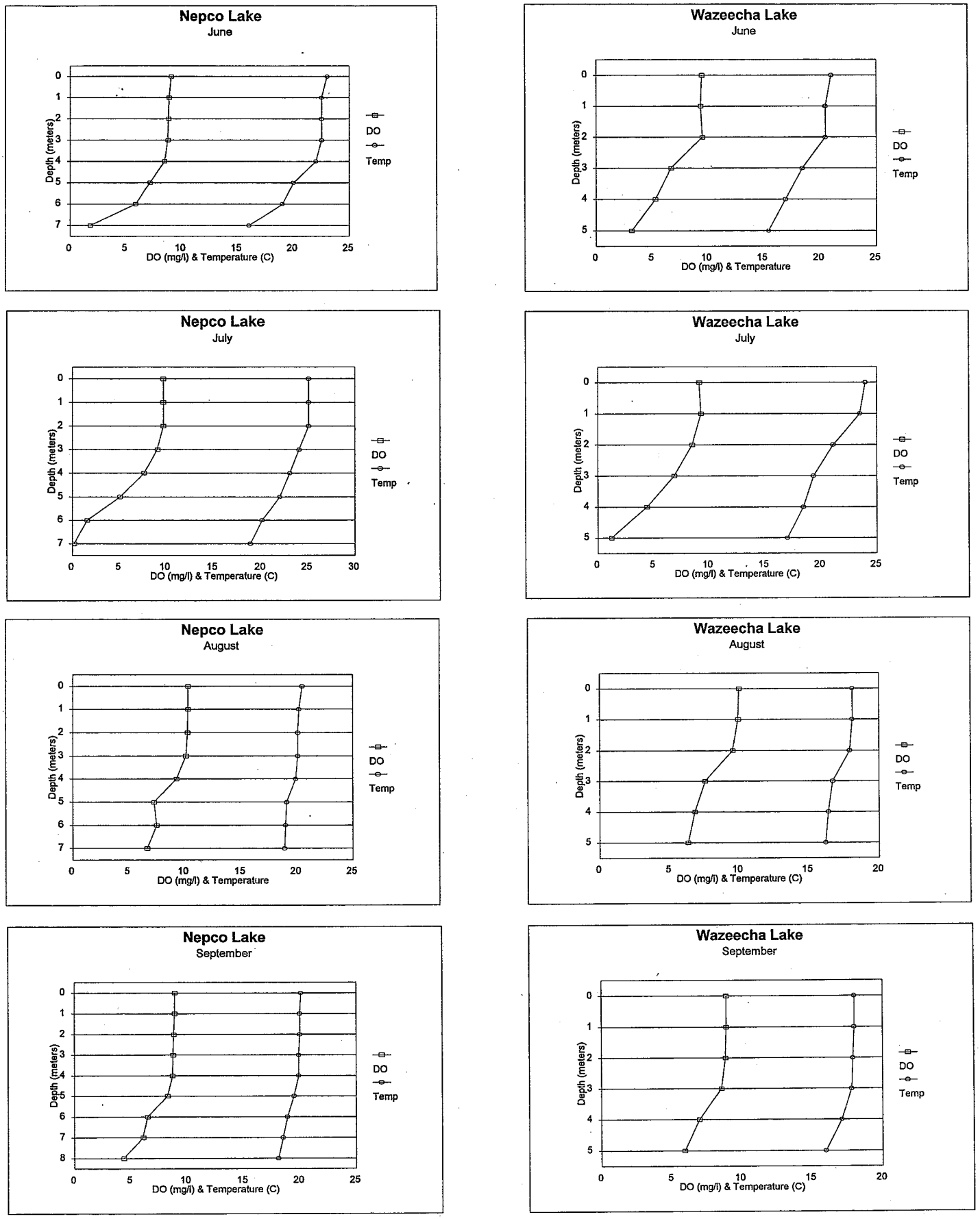


Figure 8. 1997 Summer Temperature and Dissolved Oxygen Profiles of Nepco and Wazeecha Lakes

The level of natural reproduction and overall brook trout densities was higher at sites immediately upstream of the cranberry marshes. The total and YOY brook trout numbers at Taft Road (~ one mile upstream of the marshes) were 2,077 and 458 fish/mile (CPUE), respectively. The total number of brook trout at the intersection with Elm Street (immediately downstream of the marshes) was 613 fish/mile with zero YOY trout. This trend was also observed in ditches without discharges from cranberry marshes, however, trout densities generally decreased more gradually moving downstream. The decrease in trout densities above and below the cranberry marshes occurred within a two mile reach of Ditch No. 4. IBI scores were lower at sites below the cranberry marshes as a result of higher numbers of tolerant species and fewer numbers of cool and cold water species.

Continuous temperature monitoring was conducted at three sites on Ditch No. 4 from June through September. Sites one, two and three were located upstream, between and downstream of the two cranberry marshes, respectively. Temperature analysis indicates site one exceeded the optimal range 20% of the time, while sites two and three exceeded the optimal range 28% and 41% of the time, respectively (Figure 9). Higher temperatures at site three likely resulted from warm water discharges from the marshes.

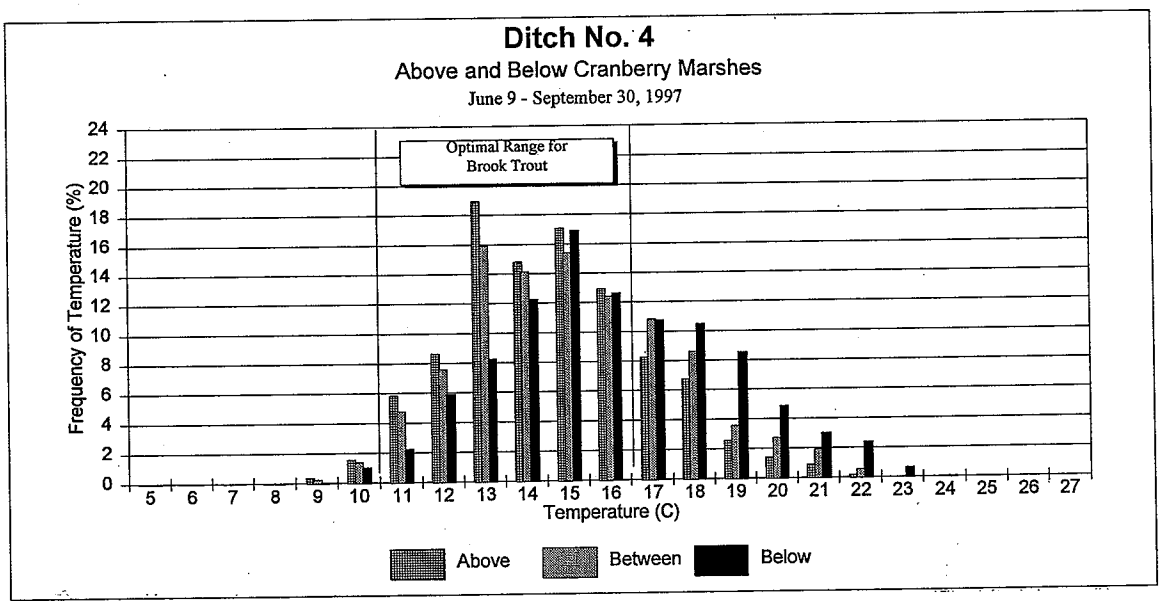


Figure 9. Temperature Frequency Analysis on Ditch No. 4

Staff gauges were installed at three sites located above, between and below two cranberry marshes on Ditch No. 4. Water levels and in-stream flow measurements were recorded 11 days from September 9 - October 14, 1997. Water levels and streamflow substantially decreased between and below the cranberry marshes during the last week of September and first week of October. During this time, cranberry beds were probably flooded with water from Ditch No. 4 for fall harvesting. Streamflow measurements recorded on September 25 and October 1, between and below the cranberry marshes, indicate streamflow decreased during this time by 60% and 48%, respectively (Figure 10). Measurements recorded on October 10 and 14 indicate water levels and streamflow at all sites returned to baseflow conditions recorded earlier in September.

Decreased streamflow impacts stream habitat by reducing stream depth, decreasing the amount of fish cover and may increase water temperatures.

HBI ratings were "very good" and "excellent" upstream and downstream of the marshes, respectively. The upstream sample was dominated by *Gammurus* (tolerance value 4) and the downstream sample was dominated by *Brachycentrus occidentalis* (tolerance value of 1). *Gammurus* are free swimming cold stenotherms that use aquatic vegetation, debris and rocks as cover. They are often abundant in unpolluted spring brooks that have high densities of rooted aquatic vegetation (Pennak, 1978). The upstream site had colder water temperatures and more macrophyte growth than the downstream site which may explain the dominance of *Gammurus* upstream.

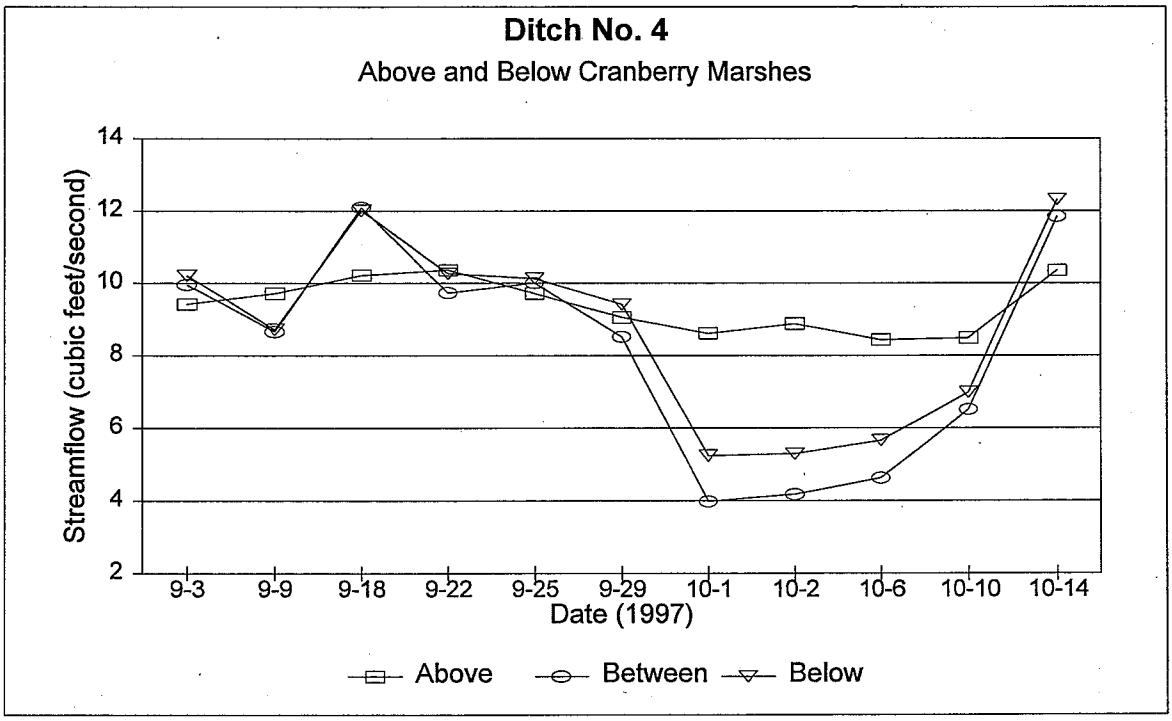


Figure 10. Streamflow Measurements Recorded Above, Between and Below Cranberry Marshes on Ditch No. 4

Duck Creek

Duck Creek is a small two mile tributary to Ditch No. 4. Historical data indicates the stream existed approximately where Ditch No. 4 was dug and that is flowed into Fivemile Creek (Kruger, 1986). Topographic maps indicate the stream is separated by a series of lateral ditches connecting Ditches Three and Four. The two separate reaches of Duck Creek have two classifications; 1) a Class I trout stream and 2) a warm water forage fishery.

Two sites were selected for monitoring on each portion of the stream. However, the site identified at Taft Road where the stream flows east to the lateral ditches was dry. Duck Creek at the confluence with Ditch No. 4 had a habitat rating of "poor". Limiting factors to habitat include; shallow channel depth, low base flow, sedimentation and lack of cover. Electro-fishing surveys found two species of fish including mudminnows and brook sticklebacks at low densities. The fishery survey failed to find the minimum number of fish (50) needed to calculate an IBI rating for the site.

Ditch No. 3

Ditch No. 3 is an eight mile tributary to Ditch No. 4 with the upper three miles managed as a Class I trout stream. The classification of the lower five miles is unknown. Habitat ratings were "fair" and IBIs were "fair" to "excellent" moving upstream. The HBI rating was "good" indicating some organic loading. In-stream habitat was limited by sedimentation, lack of pools and riffles, wide stream channels, ditching and warm temperatures at downstream sites. Temperature analysis at CTH F (farthest downstream site) indicates water temperatures exceeded the optimal range for brook trout 95% of the time.

Electro-fishing results indicate brook trout densities were low at downstream sites and very high at the head water site. Ditch No. 3, at the Isherwood Road crossing, had the highest trout densities of sites surveyed in the watershed. The total and YOY brook trout densities were 14,631 and 10,636 fish/mile (CPUE), respectively. Habitat conditions at this site appear to favor brook trout reproduction and growth. The stream is relatively deep and narrow with overhanging vegetation and macrophytes providing cover for fish. The high densities of brook trout in Ditch No. 3 at this site suggest water temperatures are optimal for growth and survival of trout.

Based on data collected in 1997, the lower five miles of the ditch should be classified as Class II brook trout water.

Ditch No. 8

Ditch No. 8 is a 12 mile tributary to Ditch No. 3 with an unknown stream classification for the lower nine miles and a Class II and I classification for the upper three miles. Habitat ratings were "fair" at four sites and "good" at the farthest upstream site where the stream is not ditched. HBI ratings were "very good" at upstream and downstream reaches, indicating slight organic loading. Limiting factors of habitat include; moderate streambank erosion, channel ditching, warmer temperatures at downstream sites, beaver dams and the lack of riffles, pools, coarse substrate and fish cover.

IBI ratings were "good" to "excellent" and brook trout densities were moderate to high moving upstream. The number of YOY brook trout also increased moving upstream indicating natural reproduction was better towards the headwaters. YOY trout were not found in the lower reaches probably due to the warmer stream temperatures caused by reduced groundwater inputs and beaver activity. Temperature analysis at CTH F (farthest downstream site) indicates water temperatures exceeded the optimal range for brook trout 100% of the time.

Based on data collected, the lower three miles should be classified as Class II brook trout water and the upper nine miles as Class I.

Buena Vista Creek Sub-watershed

Buena Vista Creek sub-watershed is 43,675 acres and like the Fourmile Creek sub-watershed, was ditched to drain the Buena Vista Marsh for farming. The amount of irrigated farmland is nearly twice the level found in the Fourmile Creek sub-watershed. The sub-watershed has one perennial stream and three named ditches including; Buena Vista Creek, Ditch No. 2, Isherwood Lateral and Ditch No. 1. There are also three unnamed ditches that were monitored in the sub-watershed.

The sub-watershed contributes nutrients and sediment to Wazeecha Lake located in Wood County (Kruger et.al., 1986). Stream monitoring in 1986 suggests the highest nitrate concentrations were found in this sub-watershed.

Buena Vista Creek

Buena Vista Creek is a 10 mile stream that flows into Wazeecha Lake. The upper two miles of the stream is also known as Ditch No. 2, which will be discussed separately. Buena Vista Creek is classified as a Class II trout stream. Habitat and IBI ratings were "fair" to "good". Limiting factors of habitat include; channel ditching, warm stream temperatures at lower reaches, streambank erosion, sedimentation and the lack of riffles, pools and fish cover. Temperature analysis at CTH F (lower downstream site) indicates water temperatures exceeded the optimal range for brook trout 96% of the time.

Brook trout densities were low at downstream sites and moderate at Taft Road, the farthest upstream site (site 39). A few brown trout were found at lower sites that appear to be stocked fish. YOY brook trout were only found at the upstream site suggesting natural reproduction is limited to upstream reaches. The HBI rating was "very good" indicating slight organic loading.

Based on data collected in 1997, the upper two miles of the stream should be re-classified as a Class I brook trout stream.

Ditch No. 2

Ditch No. 2 is actually the upper two miles of Buena Vista Creek and is managed as a Class II trout stream. The habitat rating was "fair" and the IBI was "excellent". Limiting factors to habitat include; sedimentation, channel ditching and the lack of pools and riffles. The ditch has very high brook trout densities with good natural reproduction. The number of YOY brook trout was 2,417 fish/mile, the second highest level found in the watershed. The ditch apparently has cold water temperatures and habitat conditions that favor brook trout reproduction. The ditch should be re-classified as a Class I brook trout stream.

Isherwood Lateral

The Isherwood Lateral is a two mile tributary to Ditch No. 2 and is managed as a Class I trout stream. Based on topographic maps, the ditch was constructed through a wetland where a natural stream had flowed. The habitat rating was "poor" and the IBI was "good". The stream is impacted by sedimentation, ditching, shallow channel depth and the lack of pools, riffles and adult fish cover.

The ditch has moderate brook trout densities that are mostly YOY trout. Survey results suggest habitat conditions favor brook trout reproduction and not growth of adult fish. The shallow channel depth and lack of adult fish cover probably limits populations of larger trout. Temperature analysis indicates water temperatures exceeded the optimal range for brook trout only 3% of the time. The Isherwood Lateral has cold water, good current velocity and small scour holes that provides good habitat for YOY trout. The HBI rating was "very good" indicating slight organic loading.

Unnamed Ditch 15-3 (T22N R8E sec 15)

Unnamed Ditch 15-3 is a cold water two mile tributary to Buena Vista Creek. The habitat and IBI rating was "fair". Electro-fishing surveys found one fingerling brook trout and four forage species in low numbers. The stream is impacted by sedimentation, shallow channel depth, low flow discharge, ditching and the lack of pools, riffles and fish cover. The ditch should be classified as a Class II brook trout stream.

Unnamed Ditch 21-5 (T22N R7E sec 21)

Unnamed Ditch 21-5 is a two mile tributary of Buena Vista Creek and currently is not classified. Based on topographic maps, the ditch is intermittent and drains a small wetland area. The habitat rating was "fair" and the IBI was "good". The ditch has low brook trout densities with some natural reproduction. Limiting factors of habitat include; sedimentation, ditching, cropland runoff and the lack of pools and riffles. Based on data collected in 1997, the ditch should be classified as a Class I brook trout stream.

Ditch No. 1

Ditch No. 1 is a four mile tributary to Buena Vista Creek and has two stream classifications. The lower two miles is not classified and the upper two miles are managed as a Class II trout stream. The habitat rating was "good" and the IBI was "excellent". Limiting factors to habitat include; sedimentation, channel ditching, and the lack of pools and riffles. The ditch has moderate brook trout densities with no apparent natural reproduction. YOY brook trout were not found during the surveys suggesting reproduction either occurs farther upstream or in tributaries to the ditch.

The ditch is a continuous deep run with good baseflow and cold water temperatures. Water temperatures from July 21-August 4 exceeded the optimal range for brook trout 16% of the time. There is no significant streambank erosion and macrophytes provide abundant fish cover.

The HBI rating was "fairly poor" indicating a significant amount of organic loading to the ditch. The ditch has abundant macrophyte growth and is chemically treated during the summer. Dissolved oxygen concentrations in the ditch may be impacted by plant respiration and/or decomposition of plant material.

Unnamed Ditch 5-16 (T22N R8E sec5)

Unnamed Ditch 5-16 is a two mile cold water tributary to Ditch No. 1. The habitat rating was "good" and the IBI was excellent. The ditch has moderate brook trout densities with high levels of natural

reproduction. Based on this data, Unnamed Ditch 5-16 probably provides both spawning and nursery areas for reproducing brook trout in Ditch No. 1.

The ditch is relatively deep and narrow with apparent cold water temperatures (number of YOY brook trout) and abundant fish cover. The streambanks are densely vegetated and a stable grassy buffer exists between the ditch and cultivated croplands.

Ditch No. 1 and Unnamed Ditch 5-16 should be re-classified based on data collected during 1997 surveys. Unnamed Ditch 5-16 should be classified as a Class I brook trout stream due to high densities on YOY brook trout. Ditch No. 1 should be re-classified as a Class I brook trout stream in the upper three miles and a Class II brook trout stream in the lower mile.

RECOMMENDATIONS

1) Based on electro-fishing results, the use classification of several streams and ditches does not reflect the fishery found during 1997 surveys. Fish management should consider classifying or re-classifying these water bodies to accurately reflect the fishery present in the streams.

2) Additional temperature and dissolved oxygen monitoring should be completed on ditches in the watershed. Dissolved oxygen fluctuations in ditches with abundant macrophyte growth may be impacting aquatic organisms. Chemical treatment of macrophytes in the ditches may also be causing oxygen depletion during the decomposition process. Ditches with abundant macrophyte growth that have been chemically treated include; Ditch No. 1, Ditch No. 3 and Ditch No. 8. Elevated water temperatures have been documented in most streams in the watershed. Additional monitoring should be conducted to document temperature fluctuations on streams and ditches from land use impacts.

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Appendix 1. Lake Monitoring Protocol for Nepco and Wazeecha Lakes

Approximate date of sample collection

Parameter	Late Winter	Spring Turnover	June	July	August	Fall Turnover	Remarks
Complete Water Chemistry		X				X	1 depth, 0.5m from surface, Parameter: Cl, diss. P, Ca, Mg, Na, Mn, Fe, color, turbidity and volatle solids
Total P, pH, Suspended Solids Nitrogen Series	X**	X*	X***	X***	X***	X*	* 1 depth, 0.5m from surface, ** 2 depths; 0.5m from surface and 1m from bottom, *** third depth at top of hypolimnion, if stratified
Water Temp. D.O. Profile	X	X	X	X	X	X	Profile: 0.5m from surface and proceed to bottom using 1m intervals
Chlorophyll a	X	X	X	X	X	X	One depth; composite from 0-2m
Secchi depth		X	X	X	X	X	One depth

* Source - WDNR Long Term Trend Lake Monitoring Methods

Appendix 2. Trout Densities and Index of Biotic Integrity (IBI) Results for Monitored Streams in the Four and Five Mile Creeks Watershed

Sub-watershed	Stream	Location	Site Number	Total Rainbow Trout	Total Brown Trout	Total Number Brook Trout	CPUE Total Brook Trout fish/mile	CPUE YOY Brook Trout fish/mile	IBI Score	IBI Rating
Fivemile Creek	Fivemile Creek	STH 13	1			4	23	0	50	Fair
	Fivemile Creek	CTH U	3			0	0	0	na	
	Harvey Creek	Hollywood Road	4			0	0	0	37	Fair*
Lower Fourmile Creek	Bloody Run Creek	32nd Street	5			71	417	29	80	Good
	Bloody Run Creek	64th Street	6			0	0	0	na	
	Onemile Creek	Sampson Road	7			0	0	0	5	Very Poor*
	Onemile Creek	CTH W	8			0	0	0	na	
	Twomile Creek	Sampson Road	9			0	0	0	29	Poor*
	Twomile Creek	Reber Street	10			0	0	0	40	Fair*
	Twomile Creek	64th Street	11			0	0	0	32	Fair*
	Twomile Creek	90th Street	12			0	0	0	na	
	Twomile Creek	110th Street	13			0	0	0	30	Fair*
	Quinnell Creek	32nd Street	14	1		1	7	0	35	Fair*
	Quinnell Creek	64th Street	15			0	0	0	na	
	Fourmile Creek	48th Street	16		4	4	12	0	55	Good*
	Fourmile Creek	100th Street	17			102	598	12	70	Good
Upper Fourmile Creek	Ditch No. 4	CTH F	18			47	180	0	50	Fair
	Ditch No. 4	Inter. w/ Elm Street	19			209	613	0	70	Good
	Ditch No. 4	Taft Road	20			354	2077	458	100	Excellent
	Ditch No. 4	Isherwood Road	21			489	2869	1115	100	Excellent
	Duck Creek	Confl. w/ Ditch No. 4	22			0	0	0	na	
	Ditch No. 3	CTH F	25			18	106	0	50	Fair
	Ditch No. 3	Townline Road	26			1	6	0	60	Good
	Ditch No. 3	Isherwood Road	28			2494	14631	10636	90	Excellent
	Ditch No. 8	Townline Road	31			222	1302	0	60	Good
	Ditch No. 8	Taft Road	32			209	1226	129	60	Good
	Ditch No. 8	Isherwood Road	33			349	2047	698	90	Excellent
	Ditch No. 8	CTH BB	34			229	1343	763	90	Excellent
Buena Vista Creek	Buena Vista Creek	100th Street	36		3	32	188	0	50	Fair
	Buena Vista Creek	CTH F	37		2	34	199	0	60	Good
	Buena Vista Creek	Townline Road	38			14	82	0	40	Fair
	Buena Vista Creek	Taft Road	39			171	1003	557	70	Good
	Ditch No. 2	Isherwood Road	40			581	3409	2417	90	Excellent
	Isherwod Lateral	Isherwood Road	41			176	1033	974	80	Good

Unnamed Ditch 15-3	Marsh Road	43	1	6	0	30	Fair
Unnamed Ditch 21-5	110th Street	44	29	170	6	80	Good
Ditch No. 1	Townline Road	45	156	915	0	100	Excellent
Unnamed Ditch 5-16	Prairie Drive	46	170	997	804	90	Excellent

Index of Biotic Integrity (IBI)

*Warm Water IBI (1992): 100-65 = Excellent, 64-50 = Good, 49-30 = Fair, 29-20 = Poor, 19-0 = Very Poor

Cold Water IBI (1996): 100-90 = Excellent, 80-60 = Good, 50-30 = Fair, 20-10 = Poor, 0 or no score = Very Poor

na = lack of fish, IBI not calculated

CPUE = Catch Per Unit Effort - expressed as fish/mile
YOY = Young of Year - brook trout < 4 inches in length

Appendix 3. Summary of Habitat and Macroinvertebrate Results for Monitored Streams in the Four and Fivemile Creeks Watershed

Sub-Watershed	Stream	Location	Site No.	Habitat Score	Habitat Rating	HBI*** Score	HBI*** Rating
Fivemile Creek	Fivemile Creek	STH 13	1	54	Good	5.11	Good
	Fivemile Creek	48th Street	2	156	Fair**		
	Fivemile Creek	CTH U	3	no survey	no survey		
	Harvey Creek	Hollywood Road	4	58	Good	4.86	Good
Lower Fourmile Creek	Bloody Run Creek	32nd Street	5	43	Fair	4.26	Very Good
	Bloody Run Creek	64th Street	6	204	Poor**		
	Onemile Creek	Sampson Road	7	42	Fair		
	Onemile Creek	Wazeecha Avenue	8	194	Poor**		
	Twomile Creek	Sampson Road	9	189	Poor**		
	Twomile Creek	Reber Street	10	20	Poor		
	Twomile Creek	64th Street	11	169	Fair**		
	Twomile Creek	90th Street	12	26	Fair		
	Twomile Creek	110th Street	13	40	Fair		
	Quinnell Creek	32nd Street	14	28	Fair		
	Quinnell Creek	64th Street	15	197	Poor**		
	Fourmile Creek	48th Street	16	43	Fair		
	Fourmile Creek	100th Street	17	15	Poor		
Upper Fourmile Creek	Ditch No. 4	CTH F	18	115	Fair**		
	Ditch No. 4	Inter.w/ Elm Street	19	58	Good	2.32	Excellent
	Ditch No. 4	Taft Road	20	54	Good	4.19	Very Good
	Ditch No. 4	Isherwood Road	21	118	Fair**		
	Duck Creek	Confl. w/ Ditch No. 4	22	193	Poor**		
	Ditch No. 3	CTH F	25	141	Fair**	5.03	Good
	Ditch No. 3	Townline Road	26	42	Fair		
	Ditch No. 3	Taft Road	27	129	Fair**		
	Ditch No. 3	Isherwood Road	28	111	Fair**		
	Ditch No. 8	CTH F	30	111	Fair**	3.55	Very Good
	Ditch No. 8	Townline Road	31	27	Fair	3.77	Very Good
	Ditch No. 8	Taft Road	32	140	Fair**		
	Ditch No. 8	Isherwood Road	33	140	Fair**		
	Ditch No. 8	CTH BB	34	55	Good		
Buena Vista Creek	Buena Vista Creek	100th Street	36	57	Good	3.63	Very Good
	Buena Vista Creek	CTH F	37	140	Fair**		
	Buena Vista Creek	Townline Road	38	56	Good		
	Buena Vista Creek	Taft Road	39	138	Fair**		

Ditch No. 2	Isherwood Road	40	167	Fair**		
Isherwod Lateral	Isherwood Road	41	21	Poor	3.94	Very Good
Unnamed Ditch 15-3	Marsh Road	43	32	Fair		
Unnamed Ditch 21-5	110th Street	44	45	Fair		
Ditch No. 1	Townline Road	45	55	Good	7.02	Fairly Poor
Unnamed Ditch 5-16	Prairie Drive	46	53	Good		

Habitat Surveys

**Ball Habitat Surveys (1982): < 51 = Excellent, 52-109 = Good, 110-172 = Fair, > 172 = Poor

Simonson Habitat Surveys (1994): > 75 = Excellent, 50-74 = Good, 25-49 = Fair, < 25 = Poor

***Macroinvertebrate Sampling - Hilsenhoff Biotic Index 1987 (HBI)**

Biotic Index	Water Quality	Degree of Organic Pollution
0.00-3.50	Excellent	No apparent organic pollution
3.51-4.50	Very Good	Possible slight organic pollution
4.51-5.50	Good	Some organic pollution
5.51-6.50	Fair	Fairly significant organic pollution
6.51-7.50	Fairly Poor	Significant organic pollution
7.51-8.50	Poor	Very significant organic pollution
8.51-10.00	Very Poor	Severe organic Pollution

Appendix 4. Summary of Continuous Temperature Monitoring Results for Monitored Streams

Stream	Site No.	Location	Deployment Period	Maximum Temperature (C)	Minimum Temperature (C)	Mean Temperature (C)	*Optimal Temperature Exceedance (%)
Ditch No. 4	1	upstream cranberry operations	6/9/97 - 9/30/97	21.6	8.6	14.1	20
Ditch No. 4	2	between cranberry operations	6/9/97 - 9/30/97	21.9	8.8	14.6	28
Ditch No. 4	3	downstream cranberry operations	6/9/97 - 9/30/97	23.1	8.8	15.5	41
Twomile Creek	1	upstream cranberry operation	6/1/97 - 9/30/97	22.1	8.3	13.1	16
Twomile Creek	2	downstream cranberry operation	6/1/97 - 9/30/97	20.9	7.8	13	8
Fivemile Creek	1	upstream cranberry operation	8/4/97 - 9/30/97	19.8	7.7	13.2	9
Harvey Creek	2	downstream cranberry operation	8/4/97 - 9/30/97	26.8	7.7	15	35
Buena Vista Creek	1	CTH F	7/21/97 - 8/4/97	21.7	15.2	18.4	96
Ditch No. 1	1	Townline Road	7/21/97 - 8/4/97	18.4	10.8	14.3	16
Ditch No. 3	1	CTH F	7/21/97 - 8/4/97	25.2	14.3	19.7	96
Ditch No. 8	1	CTH F	7/21/97 - 8/4/97	21.1	15.9	17.8	100
Ditch No. 4	1	.5 miles below Taft Road	7/21/97 - 8/4/97	19.3	12.2	15.7	47
Isherwood Lateral	1	Isherwood Road	8/4/97 - 8/19/97	17.4	8.6	12.3	3
Bloody Run Creek	1	32nd Street	8/4/97 - 8/19/97	17.8	10	13.7	13
Ditch No. 4	1	.5 miles below Taft Road	8/4/97 - 8/19/97	17.5	11.4	14.6	21
Fivemile Creek	1	STH 13	8/4/97 - 8/19/97	19.8	10.5	14.3	23

*optimal range for brook trout = 11 - 16 C or 52 - 61 F (Raleigh, 1982)

Appendix 5. Continuous Monitoring Results using the YSI Multi-probe Meter

Ditch No. 4 - near intersection of Elm St. and CTH W (below cranberry marshes)

	Temp (C)	SpCond (uS/cm)	DO (mg/l)	Depth (m)	pH
Max	15.0	174.0	11.5	1.2	8.3
Min	12.7	162.0	7.5	0.9	7.8
Mean	13.7	168.9	9.0	1.1	8.0

Ditch No. 4 - .5 miles downstream of Taft Road (above cranberry marshes)

	Temp (C)	SpCond (uS/cm)	DO (mg/l)	Depth (m)	pH
Max	13.3	229.0	11.4	0.5	8.4
Min	12.1	211.0	7.8	0.2	7.9
Mean	12.9	222.0	9.2	0.4	8.1

Buena Vista Creek - @ 130th Street

	Temp (C)	SpCond (uS/cm)	DO (mg/l)	Depth (m)	pH
Max	14.7	126.0	11.0	0.5	8.3
Min	12.6	121.0	7.4	0.4	7.9
Mean	13.7	123.5	8.9	0.4	8.1

* meters deployed August 19 - 21, 1997

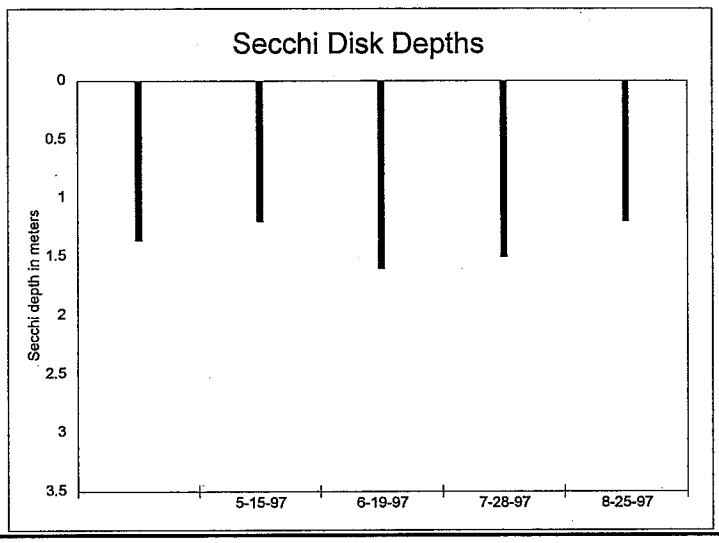
Appendix 6. Trophic State Index Results for Wazeecha and Nepco Lakes

Wazeecha Lake

DATE	SD(m)	CHL (ug/l)	TP (ug/l)	TSI(SD)	TSI(CHL)	TSI(TP)
5-15-97	1.4	4.63	57	56	46	60
6-19-97	1.2	11	66	57	53	61
7-28-97	1.6	10.2	33	53	52	55
8-25-97	1.5	14.8	31	54	55	55
9-18-97	1.2	10.2	33	57	52	55

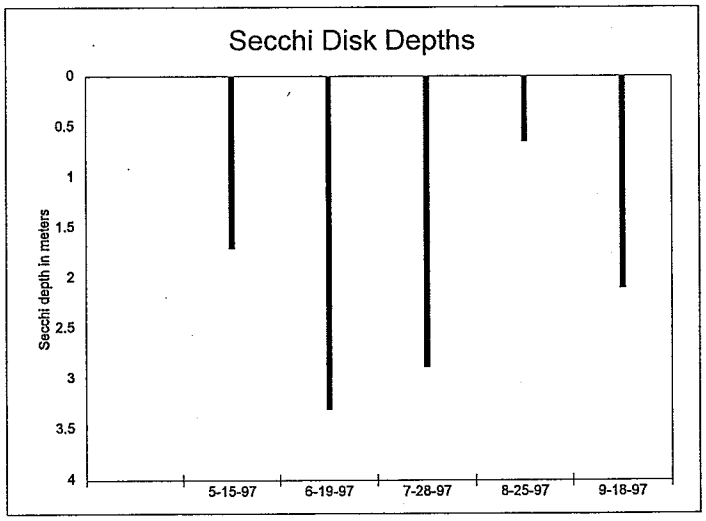
DATA SUMMARY:	
Average SD (m):	1.4
Minimum SD (m):	1.2
Maximum SD (m):	1.6
Average CHL (ug/l):	10.17
Minimum CHL (ug/l):	4.63
Maximum CHL (ug/l):	14.80
Sp. Turn. TP (ug/l):	57
GSE* Ave TP (ug/l):	41

* Growing Season Epilimnetic



Nepko Lake

DATE	SD(m)	CHL	TP	TSI(SD)	TSI(CHL)	TSI(TP)
5-15-97	1.7	5.9	54	52	48	59
6-19-97	3.3	4.38	10	43	46	46
7-28-97	2.9	6.6	14	45	49	49
8-25-97	0.6	15.1	21	66	55	52
9-18-97	2.1	5.61	23	49	48	53

DATA SUMMARY:	
Average SD (m):	2.1
Minimum SD (m):	0.6
Maximum SD (m):	3.3
Average CHL (ug/l):	7.52
Minimum CHL (ug/l):	4.38
Maximum CHL (ug/l):	15.10
Sp. Turn. TP (ug/l):	54
GSE* Ave TP (ug/l):	17

* Growing Season Epilimnetic