# Fox River Multi-Modal Bridge Crossings Feasibility Study

*Neenah and Menasha Crossing Locations*

## Neenah, WI

Prepared for

**City of Neenah Department of Parks and Recreation**
211 Walnut Street
Neenah, WI 54956

**February 2015**

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**Project No. 2014-2050.00**

**City of Neenah**

**2014-2050.00**

Prepared for: City of Neenah

Site Address:

Neenah Crossing:
Fox River – West of Commercial Street
Near Railroad Trestle at River Street

Menasha Crossing:
Fox River – North of Fox Street
At Terminus of Mathewson St. or Lawson St.

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- Future Multi-Modal Trail Loop Exhibit
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- Menasha Crossings Existing Site Photographs
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# 1. INTRODUCTION

The Cities of Neenah and Menasha continue to be leaders in providing and improving bicycle and pedestrian access around their communities. Multiple projects linking the downtowns with neighboring areas have provided valuable connections within the Cities and between them and have greatly improved multi-modal access in the area. Both Cities are looking to further expand this network by investigating the feasibility of multi-modal bridge crossings of the Fox River at its confluence with Little Lake Butte des Morts. Alternative alignments and structure types for the crossings were evaluated. This report documents the results of this investigation, and identifies alternatives and associated budgets at the respective locations.

# 2. EXISTING 2014 CONDITIONS

## 2.1. City of Neenah Crossing Sites

The land use south of the Fox River in the vicinity of the proposed trail crossing consists of downtown commercial and office properties as well as some industrial areas. An active Canadian National railroad line crosses the Fox River in this location. The Plexus Global Headquarters building lies immediately to the southeast of the rail line along the Fox River, with an existing asphalt trail located on the property near the river. This trail has a width of 8 feet with access from the Plexus parking lot east of the building. An existing 6-foot concrete walk and marked crossings allow for access to the trail. Future plans will extend this sidewalk to the existing sidewalk along Main Street. Additional multi-modal trail work has also taken place across railroad line on the south bank of Little Lake Butte des Morts, with a portion of the trail currently under construction through Park Site #1. The asphalt trail in this location is 10-feet wide and upon completion this fall will connect to an existing ¼-mile trail segment accessing a parking facility, park shelter and canoe/kayak launch at Herb and Dolly Smith Park. As part of the former paper mill operations in the project vicinity, a diversion channel draws water from the river, passing underneath the Plexus building through an underground storm channel. This channel discharges west of the existing railroad crossing. The water velocity at the discharge point is high, creating turbulent conditions in the downstream channel area.

Approximately 10 trains per day use the rail line in this area. A railroad crossing has been constructed in this area to provide trail access to the downtown. The railroad bridge in the vicinity of the crossing consists of a 17-span steel girder structure with concrete piers. It crosses the Fox River near the confluence with Little Lake Butte des Morts. The existing structure has an overall length of approximately 514 feet. The 100-year flood elevation is

742.9 at the structure per the Fox River – Neenah Channel Flood Insurance Study No. 55139CV000A. For the 100-year storm, the entire flow passes through the structure, but submerges the low chord.

The land use north of the Fox River in the project vicinity consists primarily of residential properties. Existing homes line the river, with the rear yards directly abutting the waterway. West of the existing railroad bridge on the north shore, a narrow public street, River Street, serves the adjacent residential parcel. This drive is located on right-of-way owned by the City of Neenah and extends to the water edge. Private property directly abuts the railroad right-of-way east of the existing railroad bridge.

### 2.2. City of Menasha Crossing Sites

At the Menasha site, the land use south of the Fox River in the immediate vicinity of the proposed trail crossing consists of primarily residential homes. Shepard Park is just west of Mathewson Street and south of Fox Street. To the east of Lawson Street is the Mondi Akrosil, LLC manufacturing plant. As you continue south on Lawson Street, the area continues to be a mix of residential homes and industrial facilities. On north side of the Fox River Menasha Channel, there are a handful of homes along the river south of River Street, however the majority of the area consists of industrial facilities. The facilities include the George Whiting Paper Co., Exopack, LLC; and Menasha Warehouse, LLC. A railroad bridge is approximately 300 feet upstream of Lawson Street and 600 feet upstream of Mathweson Street. On the north shoreline, a railroad spur line runs along River Street parallel to the river bank approximately 100 feet off the shoreline.

There is no trail system in the immediate vicinity of the crossing site(s). The Friendship Trail/Trestle Trail Bridge is less than 1000 feet west, depending on the crossing location selected. The south landings at both crossing sites are located in public right-of-way. At the north landings, the areas are privately owned and are unimproved at the targeted landing locations along the bank.

The railroad bridge upstream of the targeted crossing locations consists of a 13-span steel girder structure with concrete pile cap on multiple pile bents. The existing structure has an overall length of approximately 300 feet. The 100-year flood elevation is 742.7 at the structure per the Fox River – Menasha Channel Flood Insurance Study No. 55139CV000A. For the 100-year storm, the entire flow passes through the structure, and does not submerge the low chord.

## 3. TRAIL ALIGNMENT ALTERNATIVES

Two potential locations for the multi-modal crossing of the Fox River were evaluated at both the Neenah and Menasha crossing sites. The alternatives were evaluated with respect to environmental impacts, right-of-way needs, permitting, and cost. Following is a summary of the alternatives:

### 3.1. City of Neenah Crossing Sites

#### 3.1.1. Alternative #1 – West of Existing Railroad Bridge

Alternative #1 is located west of existing railroad bridge. The structure is approximately 130-feet downstream of the existing railroad bridge at the south landing and 30-feet downstream of the existing railroad at the north landing. In this location, the south end of the new structure would be located on the Park Site #1 property and the north end would be located at the termination of River Street in public right-of-way. The approximate overall length of the structure would be 740 feet. Bridge construction in this location would provide an easy connection with the existing trail on Park Site #1, and would allow trail users to cross the Fox River without first crossing the adjacent railroad tracks. This will allow for less restricted movement along the corridor and also provides significant safety benefits by reducing the number of at-grade railroad crossings along the route. The north termination of the bridge will be located at the existing River Street, on public right-of-way. The existing right-of-way width for River St. is 60-feet and It is anticipated that adequate public right-of-way width is available to make the connection to the public street. The south structure landing would be directly downstream of the discharge for the underground channel that passes beneath the Plexus Global Headquarters building. Abutment and pier design would need to withstand the higher velocities and scour potential of the discharge water.

#### 3.1.2. Alternative #2 – East of Existing Railroad Bridge

Alternative #2 is located east of the existing railroad bridge approximately 120-feet upstream at the south landing and 30-feet upstream at the north landing. In this location, the south end of the new structure would be located north of the Plexus office building on a City owned parcel; and the north end would be located on an existing residential parcel. The approximate overall length of the structure would be 460 feet. A crossing at this location would have a more direct connection to the downtown district prior to crossing the river. However, trail users coming from the

parking lot located at Park Site #1 or approaching from western portions of the trail system in Park Site #1, through Arrowhead Park, and along Lake Street would be required to cross the active railroad line. A connection would be needed between Park Site #1 and the bridge location for this alternative.

At the railroad crossing on the Park Site #1 side of the tracks, a fenced switchback, meeting ADA guidelines for maximum slopes (5% max.), exists as required by Canadian National Railway and meeting their design parameters. This design forces users to look both directions down the track prior to crossing the track itself. It also is of a width that requires bicyclists to dismount, by design, to force a controlled and aware crossing of the active rail line. On the Gateway Plaza Park side of the tracks, an ADA compliant switchback also exists.

Once the railroad tracks are crossed, one of two possible connections to the bridge will need to be completed. One option requires users to navigate through Gateway Plaza Park and portions of the Plexus campus. A sidewalk connection would need to be completed within a public pedestrian access easement from the W. Wisconsin Avenue sidewalk through the Plexus parcel. A second option would be to construct a boardwalk from Gateway Plaza Park, along and parallel to the railroad behind the Plexus office building, to the City owned parcel behind Plexus. For either connection, clear directional signs would need to be added along the route to guide users from the Park Site #1 trail and parking area to the bridge.

In addition, the north landing of the bridge for this alternative will be located on a private residential parcel. This parcel will need to be purchased to construct the bridge and trail approach. This location avoids the underground channel discharge, reducing concerns of scour potential for the south abutment and piers.

## 3.2. City of Menasha Crossing Sites

### 3.2.1. Alternative #1 – Bridge Construction at Lawson Street

Alternative #1 is located at the north end of Lawson Street where it terminates at the Fox River Menasha Channel. The south end of the bridge would be within the Lawson St. right-of-way. The north end of the structure would be located on a vacant parcel owned by Chicago Northwestern Transportation Co. The approximate overall length of the structure would be 356 feet. The structure would run roughly parallel and adjacent to an existing power line slated to be upgraded in the coming

months. Minor approach work would be needed to connect the bridge to Lawson Street. On the north approach, a railroad track runs along River Street. The approach work is more substantial here and would either need to cross the railroad tracks to access River Street; or turn immediately west and run parallel to the railroad tracks and continue west toward the Friendship Trail. This pathway connection to the Friendship Trail would require some property acquisition either via easement or fee taking. A railroad track crossing would still be necessary at a selected location to the west of the bridge.

#### 3.2.2. Alternative #2 – Bridge Construction at Mathewson Street

Alternative #2 is located at the north end of Mathewson Street where it terminates at the Fox River Menasha Channel. The south end of the bridge would be within the Mathewson St. right-of-way. The north end of the structure would be located on a publically owned right-of-way. The approximate overall length of the structure would be 640 feet. Minor approach work would be needed to connect the bridge to Mathewson Street on the south end. On the north end, more substantial approach work would be needed with grading, fill, paving and a railroad crossing all necessary to connect to the Friendship Trail. Property acquisition needs should be minor, if any.

## 4. STRUCTURE ALTERNATIVES

Three structure types were evaluated for the project sites to determine the most appropriate application for the sites to accommodate desired trail components and maintain hydraulic conditions of the Fox River. The difference structure types are applicable to both the Neenah and Menasha crossing sites since the Fox River Neenah and Menasha Channels both exhibit similar characteristics. Following is a summary of the alternatives investigated:

### 4.1. Superstructure Alternatives

#### 4.1.1. Steel Girder Bridge (Boardwalk A)

This alternative consists of a multi-span steel girder bridge with a composite wood deck. The typical span would be 50’-0”. The girders would be approximately 24” deep supporting approximately 12” of depth for timber framing and decking. The superstructure could either be supported on a pile bent or a concrete pier on spread footing foundation. The railing for this option is cable railing similar to the Herb & Dolly Smith Park Boardwalk Bridge. Other railing options can be considered in final design.

#### 4.1.2. Prefabricated Steel Truss Bridge (Boardwalk B)

This alternative consists of a multi-span prefabricated steel trusses with either wood or composite wood decking. The typical span would be 100'-0". The overall depth of truss would be approximately 6'-6". The superstructure could either be supported on a pile bent or a concrete pier on spread footing foundation. The railing for the steel trusses is the typical angle rails for prefabricated bridges. Other railings can be installed for additional cost.

#### 4.1.3. Concrete Girder Bridge (Boardwalk C)

This alternative consists of a multi-span concrete girder bridge with a concrete deck. The typical span would be 100'-0". The girders would be WisDOT 45W precast girders supporting an 8" thick concrete deck. The superstructure could either be supported on a pile bent or a concrete pier on spread footing foundation. The railing used on this structure is a steel framed cable railing. Other railing options can be considered in final design.

### 4.2. Pier Alternatives

#### 4.2.1. Pile Bent

This alternative consists of a multi-pile pile bent with concrete pile cap. The pile bent would be a feasible substructure in soils that would allow driven piles. Piles are able to be driven from a barge or causeway in the water without needing to provide a cofferdam at the piers.

#### 4.2.2. Concrete Pier With Spread Footing

This alternative consists of a concrete pier with spread footing foundation. This option would be a feasible substructure for the foundation to be supported on bedrock. A cofferdam would need to be constructed for construction.

**The current soil conditions at the crossing locations are not identified at this time and require further study and investigation, including borings. Per our review of nearby structures, the river bed material and depth to bedrock is variable. The foundations of the nearby bridges on STH 114 are primarily spread footings supported on bedrock. A recommendation of substructure can be identified upon further field analysis of the river bed.**

### 4.3. Superstructure Decking Alternatives

#### 4.3.1. Composite Wood Decking

This alternative consists of Trex or similar wood and plastic decking supported by timber members. The decking is non-structural for wheel loads, therefore, the timber framing below is designed to carry the wheel loads. The decking is decay resistant and provides a surface that typically has a higher coefficient of friction when wet. This decking has been used on other nearby boardwalks – Trestle Trail and Herb and Dolly Smith Park Boardwalk Bridge. This decking will be used for the cost estimate of Boardwalk A. This would be an increased cost for Boardwalk B.

#### 4.3.2. IPE Hardwood

This alternative consists of a tropical hardwood decking. The decking is structural and resistant to decay. The decking can carry wheel loads between structural members and would thus minimize structural members. This decking is typically used on prefabricated steel truss bridges and will be used for the cost estimate for Boardwalk B.

#### 4.3.3. Concrete

This alternative consists of a typical concrete deck for bridges. Concrete decking would be low maintenance and durable with an extended service life. However, a concrete deck could create additional construction challenges over the water. Concrete is the only decking option for Boardwalk C.

## 5. SPECIAL CONSIDERATIONS

Several characteristics unique to the project areas impact the feasibility of the work. Following is a discussion of the project in relation to these considerations:

### 5.1. Environmental Conditions

#### 5.1.1. City of Neenah Crossing Sites

Both Park Site #1 and the Plexus Global Headquarters parcel are identified as closed remediation sites for soil and groundwater contamination and are listed on the Wisconsin DNR's remediation and redevelopment inventory. Both sites are capped with either pavement material, old building foundations or a 2-foot thick landfill grade clay cap. Disturbance to the cap will require permitting through the WDNR. Soil excavated from the site must be analyzed and characterized, and likely disposed of at a licensed landfill. Replacement of the cap will be required upon completion of the

work. The Kimberly Clark X-Mill site is listed as an open remediation site for groundwater contamination of VOC's. In addition, soil within the river bed may contain contaminated material. Disturbance of this material and excavation of the soil may require special handling and treatment.

Mapping provided by the Wisconsin DNR shows the presence of wetland indicator soils (UoA – Udorthents) along both the north and south banks of the Fox River west of the existing railroad tracks. Investigation into the presence of wetlands may be necessary to ensure no impacts to wetlands would result from this alternative. Based on a site observation of the area, wetlands are likely not present at the connection location.

#### 5.1.2. City of Menasha Crossing Sites

At the Menasha crossing sites, there are no listed properties on the Wisconsin DNR's remediation and redevelopment inventory where the structures or landings are located. Adjacent parcels are listed, however, so care must be taken during the work. In addition, soil within the river bed may contain contaminated material. Disturbance of this material and excavation of the soil may require special handling and treatment.

Mapping provided by the Wisconsin DNR shows the presence of wetland indicator soils (UoA – Udorthents) along both the north and south banks of the Fox River west of the existing railroad tracks. Investigation into the presence of wetlands may be necessary to ensure no impacts to wetlands would result from this alternative. Based on a site observation of the area, wetlands are likely not present at the connection location.

### 5.2. Permitting

The permitting requirements are similar for both the Neenah and Menasha crossing sites. The projects were briefly discussed with Sarah Adkins, Water Management Specialist with WDNR. WDNR permitting needs for this project include a Water Resources Application for Project Permits (WRAPP). The WRAPP will address the Waterway Individual Permit for structure construction, as well as grading on the bank of a navigable waterway. The U.S. Army Corp of Engineers permit will also be part of the WRAPP for work within the waters of the U.S. The projects were also discussed with Nick Domer of the USACOE. A hydrologic and hydraulic model analysis and report of the crossing will be required for the WRAPP.

The hydraulic model will utilize the existing Flood Insurance Study model for this segment of the river and add the new structure to verify that there is no increase to the Regulatory Flood Elevation and that the required freeboard is maintained during the 100-year flood event. In addition, a Development at Historic Fill Site or Licensed Landfill Exemption will likely be needed for work taking place on the south side of the river at the Neenah location.

The Individual Permit process can be quite lengthy and involved and includes a Public Notice, likely Public Hearing, and Public Comment period. Upon completion of the Public Comment period, WDNR has up to 50 days to complete their final review and make a decision. The quickest turnaround is 135 days (4.5 months) and in this case, we anticipate it to be a longer timeframe, closer to 6 months or more. This is in part due to the anticipated need for a causeway for construction. Causeways are further discussion in Section 5.5 Construction Feasibility. Part of the Individual Permit requirement will be to maintain navigational clearance, typically 5- feet from the normal water surface. A 2-foot freeboard clearance will also be needed from the 100-year flood elevation.

The USACOE Permit will look at similar items as the WDNR Individual Permit. The WRAPP application package is a combination application for both WDNR IP and the USACOE for Work in the Waters of the US. The Corp is particularly interested in any deposits in the waterway, such as bridge piers. The application will need to address minimizing and avoidance of deposits, particularly how the project investigated other less impactful alternative and/or try to minimize the number of bridge piers. An Environmental Site Assessment will be necessary.

The US Coast Guard was also contacted to understand if there are any navigational issues with the structure that would require federal permitting by the Coast Guard. Mr. Blair Stanifer of the Coast Guard Bridge Administration Branch reviewed the project proposals at both locations for jurisdictional coverage by the Coast Guard. Per Mr. Stanifer's review, neither location falls under USCG jurisdiction nor is any permitting necessary.

## 5.3. Property Acquisition

### 5.3.1. City of Neenah Crossing Sites

#### 5.3.1.1. Alternative #1 – West of Existing Railroad Bridge

The southerly landing for this bridge location is on Park Site #1 owned and maintained by the City of Neenah. The northerly landing for this bridge

location is at the southern terminus of the River Street right-of-way where it intersects the Neenah Channel of the Fox River. Property acquisition is not expected to be necessary at either structure landing. Temporary Limited Easement (TLE) and/or Construction Easements may be necessary at the northerly landing.

#### 5.3.1.2. Alternative #2 – East of Existing Railroad Bridge

Alignment Alternative #2 will require acquisition of Parcel 80301220000 located at the north landing. Property records and tax information were consulted to determine the cost for this acquisition, however, a full appraisal is recommended. Total Assessed Value (2011) for the parcel per the Winnebago County Geographic Information System is $78,700.

### 5.3.2. City of Menasha Crossing Sites

#### 5.3.2.1. Alternative #1 – Bridge Construction at Lawson Street

The southerly landing for this bridge location is at the northern terminus of the Lawson Street right-of-way where it intersects the Menasha Channel of the Fox River. Property acquisition is not expected to be necessary at southerly landing. The northerly landing for this bridge location is on a privately parcel owned by Chicago Northwestern Transportation Co. At the northerly landing, a portion of property will need to be acquired from Parcel 730087500 for the structure and approaches including connection to the River Street right-of-way. A full appraisal is recommended. In addition, if a pathway connection to the Friendship Trail is desired, additional property acquisition will be necessary west of the structure.

#### 5.3.2.2. Alternative #2 – Bridge Construction at Mathewson Street

The southerly landing for this bridge location is at the northern terminus of the Mathewson Street right-of-way where it intersects the Menasha Channel of the Fox River. Property acquisition is not expected to be necessary at southerly landing. The northerly landing for this bridge location is on publically owned right-of-way. If a pathway connection to the Friendship Trail is desired, a minor amount of additional property acquisition will be necessary northwest of the structure landing.

## 5.4. Construction Site Access

### 5.4.1. City of Neenah Crossing Sites

Site access during construction varies significantly based on alternative. For Alignment Alternative #1, access to the site for construction will be gained through Park Site #1 on the south end of the new structure and from the River Street at the north end of the new structure. A large staging area will be available for use within Park Site #1. Limited staging area will be available on the north end of the structure, since access to the residential driveways must be maintained.

For Alignment Alternative #2, access for construction would be gained through the acquired parcel on the north end of the new structure. Staging area on this parcel will be available for contractor use. Limited access to the site will be available from the south end of the new structure, due to the proximity of the Plexus office building and the Kimberly-Clark Mill.

### 5.4.2. City of Menasha Crossing Sites

For Alignment Alternative #1, access to the site for construction will be gained through the Lawson Street right-of-way on the south end of the new structure and from River Street via Parcel 730087500 at the north end of the new structure. A staging area will likely be available for use within Parcel 730087500. Limited staging area will be available on the south end of the structure, since access to the residential driveways and public roadway must be maintained.

For Alignment Alternative #2, access for construction would be gained through the City owned right-of-way on the north end of the new structure. This area is very narrow with the adjacent railroad clear area and nearby residential buildings and private drive. We anticipate limited staging area on this parcel for contractor use. Limited staging area will be available on the south end of the structure, since access to the residential driveways and public roadway must be maintained.

## 5.5. Construction Feasibility

The construction feasibility of each option of the structure crossings at both the Neenah and Menasha sites creates some additional challenges. Construction will take place in/over water which requires different construction access methods. All structures options will require construction from a causeway or from barges.

### 5.5.1. Causeway Construction Access

A causeway would be created by filling the river in with material to create a road from which the boardwalk can be constructed. Once constructed, the causeway would need to be removed. A causeway involves a significant permitting process and could add significant cost to the project. This would be applicable at both the Neenah and Menasha crossings

### 5.5.2. Barge Construction Access

The water depth will determine whether or not construction can be done from a barge. Typically a minimum water depth of 3 ft to 4 ft is needed to utilize a barge. This would make the permit process a bit easier and may be more feasible for construction of the boardwalk. The normal depth of the water for both the Neenah Channel and Menasha Channels in the vicinity of the respective crossing sites, based on the Fox River FIS, is approximately 4-feet. This normal water depth can decrease significantly during the dry weather months when construction is likely to take place.

## 5.6. Railroad Coordination

### 5.6.1. City of Neenah Crossing Sites

Both alignment alternatives are located near an active Canadian National Railway railroad line. Discussions have taken place with Jackie Macewicz, Canadian National Railway – Manager Public Works, regarding the possibility of connecting a cantilevered trail to the existing active railroad trestle as well as crossing requirements, if needed. Canadian National does not allow attaching any feature to active railroad line under any circumstance, even one with a low number of trains such as this location. There may be horizontal clearance requirements; however, that typically is 25-feet from center of track. Railroad approvals and flagging is required when work takes place within the safety zone of the railway, also typically 25-feet from the center of track. Although construction work will likely be occurring outside of this zone, coordination with the railroad may be necessary, particularly on the north end of the new structure. Particular care will need to be taken if piles will be driven near the railroad line.

### 5.6.2. City of Menasha Crossing Sites

Both alignment alternatives are located near a privately owned spur railroad line on their north landings. While this spur line does not experience significant use, the

normal railroad approvals and flagging would be required when work takes place within the safety zone of the railway, typically 25-feet from the center of track. For these sites, it is anticipated that construction work will likely be occurring within this zone. Coordination and permitting with the railroad will be necessary. Any crossing of the railroad line on the approaches or trail connection to the Friendship Trail will need to be permitted.

## 6. DISCUSSION OF COSTS

The investigated alternatives were compared with respect to anticipated construction costs. The trail approach work at each location in both Neenah and Menasha is anticipated to be minor and very similar between the alternatives. The approach work is limited to the immediate vicinity of the structures and only that which is necessary to reach existing grade or connect to immediately adjacent roadways. Completion of the trail loop to connect the Neenah and Menasha crossings to link up with the Friendship Trail are not included in this cost information.

### 6.1. Structure Alternatives

Boardwalk A: $800 LF
Boardwalk B: $1,200 LF
Boardwalk C: $1,200 LF

Pile Bent: $15,000 EA
Concrete Pier: $40,000 EA
Abutments: $50,000 PER STRUCTURE

### 6.2. Approach Path Alternatives

6.2.1. City of Neenah Crossing Sites

**6.2.1.1. Alignment Alternative #1:**

| | |
|---|---|
| South Approach | $30,000 |
| North Approach | $10,000 |
| Lighting | $100,000 |

**6.2.1.2. Alignment Alternative #2:**

| | |
|---|---|
| South Approach | $10,000 |
| North Approach | $20,000 |
| Lighting | $60,000 |
| Property Acquisition | $100,000 |

6.2.2. City of Menasha Crossing Sites

**6.2.2.1. Alignment Alternative #1:**

| | |
|---|---|
| South Approach | $10,000 |
| North Approach | $50,000 |
| Lighting | $50,000 |
| Property Acquisition | $40,000 |

**6.2.2.2. Alignment Alternative #2:**

| | |
|---|---|
| South Approach | $10,000 |
| North Approach | $20,000 |
| Lighting | $90,000 |

## 6.3. Construction Mobilization/Methodology Costs

6.3.1. Causeway Construction Access

Cost Range: $300,000 to $400,000 estimated

Note that this is a highly variable cost and each contractor may have a different approach to the construction methodology and sequencing of work.

6.3.2. Barge Construction Access

Cost Range: $50,000 per month; $200,000 to $300,000 total estimated

We estimate 4 – 6 months of use necessary and the time needed is dependent on the type of superstructure used for the boardwalk, construction approach by the contractor, and construction sequencing.

## 6.4. Engineer's Opinion of Probable Construction Cost Summary

Multiple superstructure and pier alternatives are possible for each of these locations. The alternatives are dependent on budget considerations, aesthetics, and the findings of soil investigations/borings to be completed in a future phase. For the purposes of comparison and budgeting, we have identified three typical superstructure assemblies; including decking, railings. The below tables provide a summary of the Engineer's Opinion of Probable Construction Costs for several combinations, including limited approach work. The Property Acquisition costs noted are highly variable and dependent on formal appraisal offers to property owners, and ultimately the negotiated and accepted price; thus the values presented for that item in this report should be used with caution. The Costs noted below include design engineering and construction oversight. They also include preliminary investigation of soils and environmental impacts. Construction mobilization/methodology for barge or causeway construction is also included.

Below is a summary of the total Engineer's Opinion of Probable Construction Costs for each location. For a more detailed breakdown, refer to the Exhibits.

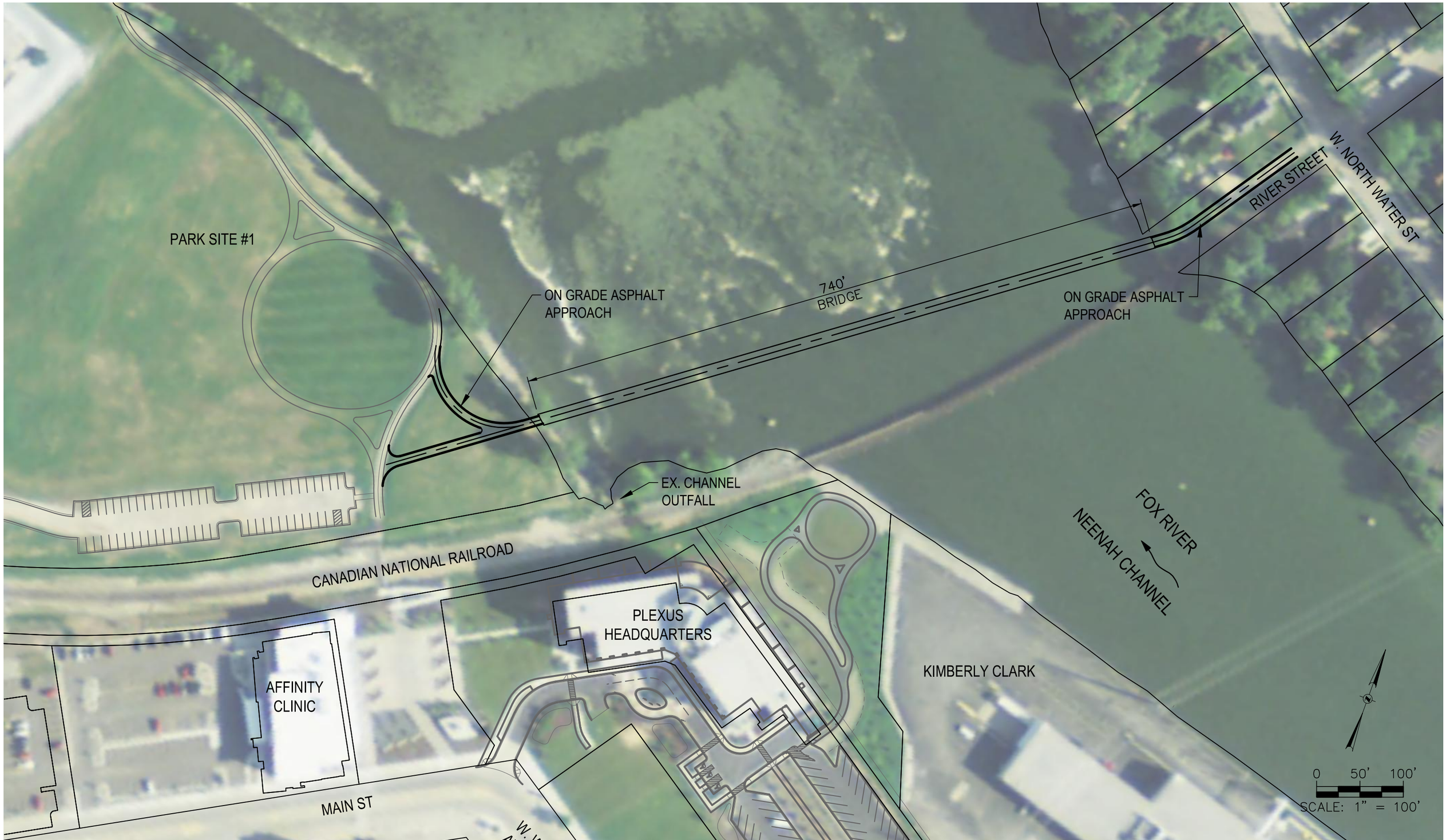
| | NEENAH SITES – COST SUMMARY TOTALS | | | | | |
|---|---|---|---|---|---|---|
| | Boardwalk A | | Boardwalk B | | Boardwalk C | |
| Pier Types | Pile Bents | Concrete Pier w/ Spread Footing | Pile Bents | Concrete Pier w/ Spread Footing | Pile Bents | Concrete Pier w/ Spread Footing |
| Alternative #1 | $1,555,800 | $1,636,300 | $1,896,200 | $1,976,700 | $1,288,000 | $1,358,000 |
| Alternative #2 | $1,152,200 | $1,198,200 | $1,363,800 | $1,409,800 | $1,363,800 | $1,409,800 |

| | MENASHA SITES – COST SUMMARY TOTALS | | | | | |
|---|---|---|---|---|---|---|
| | Boardwalk A | | Boardwalk B | | Boardwalk C | |
| Pier Types | Pile Bents | Concrete Pier w/ Spread Footing | Pile Bents | Concrete Pier w/ Spread Footing | Pile Bents | Concrete Pier w/ Spread Footing |
| Alternative #1 | $976,000 | $1,010,500 | $1,139,800 | $1,174,300 | $1,139,800 | $1,174,300 |
| Alternative #2 | $1,406,300 | $1,475,300 | $1,700,700 | $1,769,700 | $1,700,700 | $1,769,700 |

## 7. SUMMARY

A multi-modal crossing of the Fox River in downtown Neenah and downtown Menasha will provide a valuable amenity to both communities and the surrounding residents. Several alignment and structure alternatives for each crossing were evaluated based on constructability, cost, and ability to meet current needs. Each option presents its own set of challenges some of which include railroad considerations, property impacts and acquisitions, permitting, and construction access and methodology. Some of these items will become clearer as additional due diligence work is undertaken such as property appraisals and geotechnical investigations. The structure types also vary in both appearance and cost. All of these factors need to be weighed by the respective City officials and community members. The goal of this study is to provide additional information needed to make an educated decision regarding the path forward.

# NEENAH ALIGNMENT ALTERNATIVES




GRÄEF

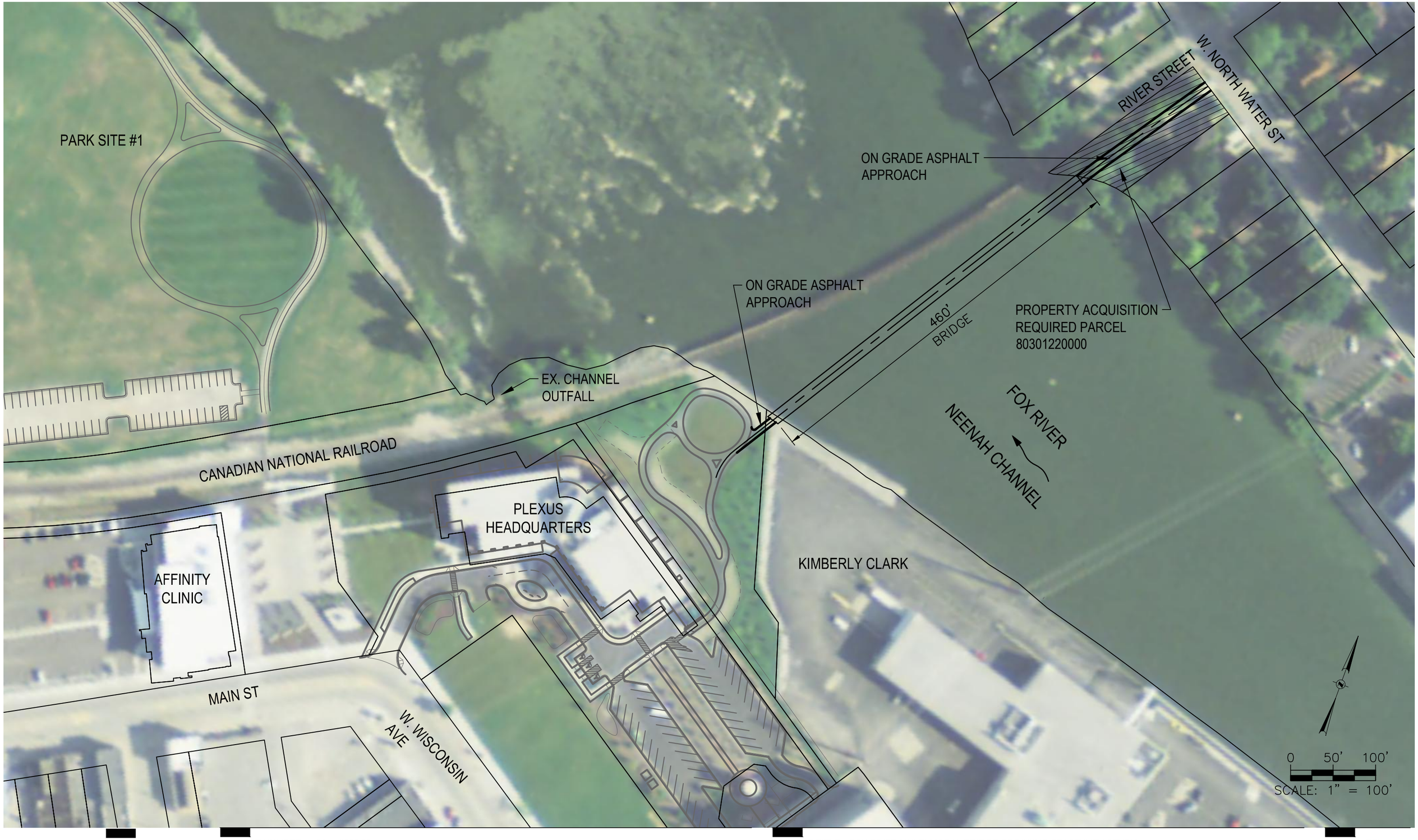
PROJECT NUMBER: 2014-2050.00
DATE: 12-12-2014
SCALE: 1"=100'
REFERENCE SHEET: N/A

PROJECT TITLE: FOX RIVER MULTI-MODAL BRIDGE CROSSING FEASIBILITY STUDY

SHEET TITLE: NEENAH ALTERNATIVE 1

ADD, CB, RFI #
NEENAH

ALT 1




GRÄEF

PROJECT NUMBER: 2014-2050.00
DATE: 12-12-2014
SCALE: 1"=100'
REFERENCE SHEET: N/A

PROJECT TITLE: FOX RIVER MULTI-MODAL BRIDGE CROSSING FEASIBILITY STUDY

SHEET TITLE: NEENAH ALTERNATIVE 2

ADD, CB, RFI #
NEENAH

ALT 2

# MENASHA ALIGNMENT ALTERNATIVES

GRAEF

PROJECT NUMBER: 2014-2050.00
DATE: 12-12-2014
SCALE: 1"=100'
REFERENCE SHEET: N/A

PROJECT TITLE: FOX RIVER MULTI-MODAL BRIDGE CROSSING FEASIBILITY STUDY

SHEET TITLE: MENASHA ALTERNATIVE 1

ADD, CB, RFI #
MENASHA

ALT 1

GRAEF

PROJECT NUMBER: 2014-2050.00
DATE: 12-12-2014
SCALE: 1"=100'
REFERENCE SHEET: N/A

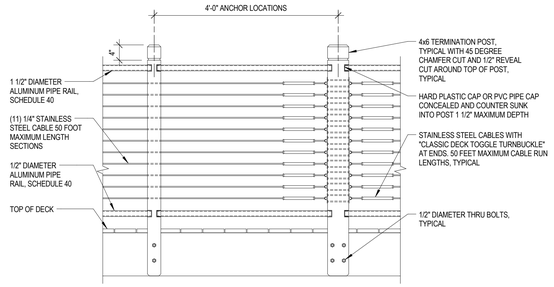
PROJECT TITLE: FOX RIVER MULTI-MODAL BRIDGE CROSSING FEASIBILITY STUDY

SHEET TITLE: MENASHA ALTERNATIVE 2

ADD, CB, RFI #
MENASHA

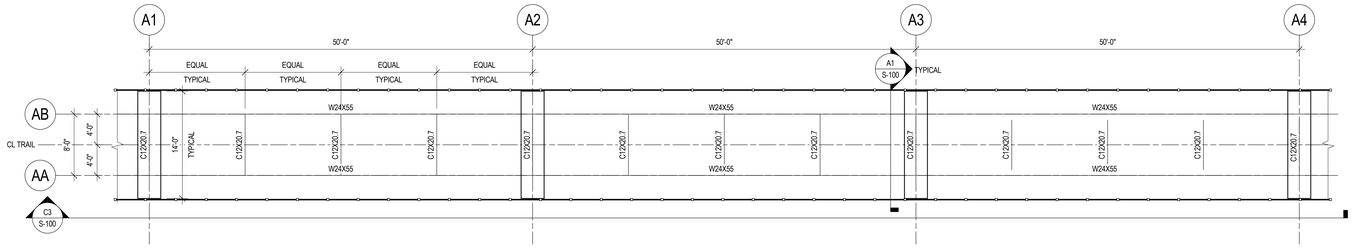
ALT2

# STRUCTURAL ALTERNATIVE SECTIONS AND DETAILS



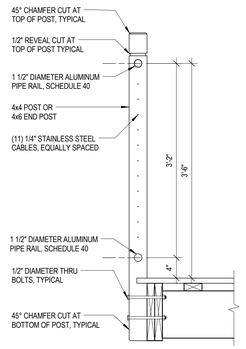

## D1 TYPICAL RAILING ELEVATION

3/4" = 1'-0"



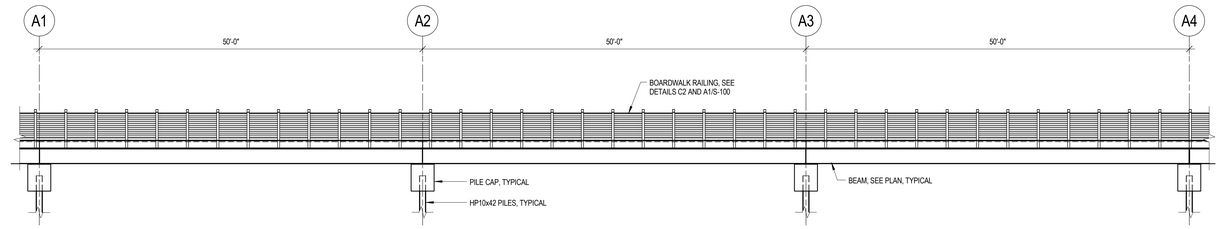

## D3 PLAN

1/8" = 1'-0"



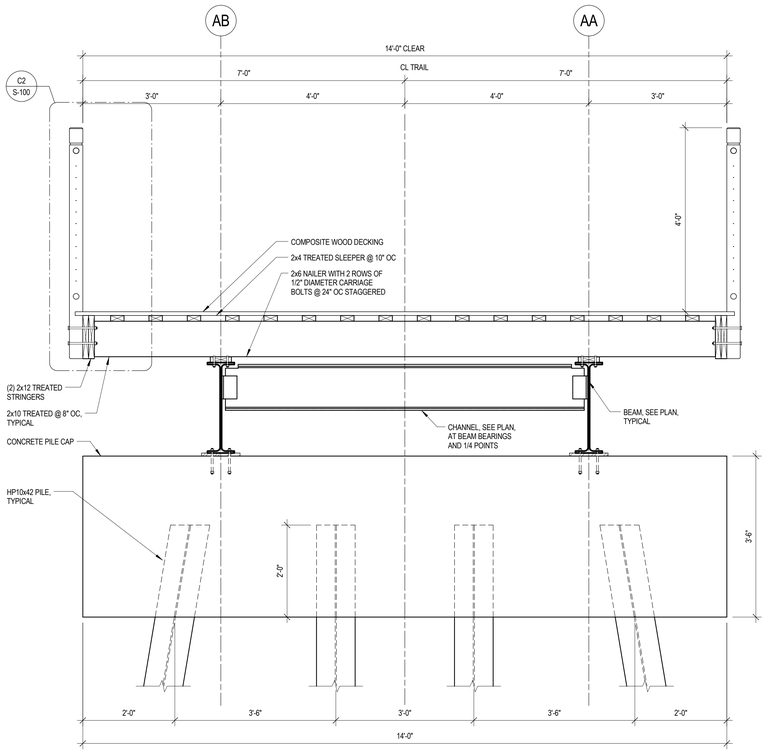

## C2 RAILING DETAIL

1" = 1'-0"



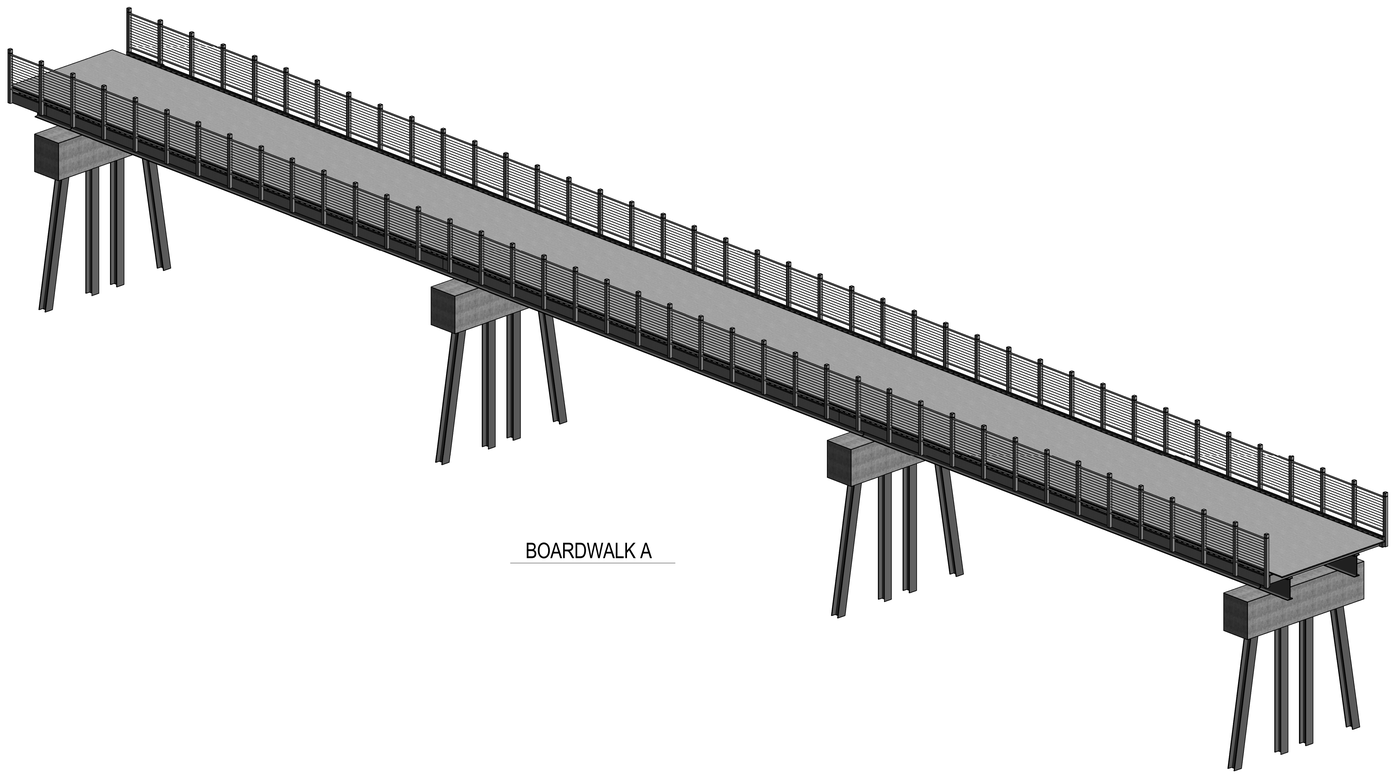

## C3 ELEVATION

1/8" = 1'-0"




## A1 SECTION

3/4" = 1'-0"



## BOARDWALK A


GRAEF
1150 SPRINGHURST DRIVE
SUITE 201
GREEN BAY, WI 53404
920 / 592 9440
www.graef-usa.com


PROJECT TITLE:

FOX RIVER PEDESTRIAN BRIDGE CROSSING STUDY

NEENAH, WISCONSIN

PROJECT STATUS:

NOT FOR CONSTRUCTION

REVISIONS:

| NUMBER | DATE | DESCRIPTION |
|---|---|---|

SHEET INFORMATION:

| | |
|---|---|
| PROJECT NUMBER: | 20142050.00 |
| DATE: | 10/15/2014 |
| DRAWN BY: | AMZ |
| CHECKED BY: | JSR |
| APPROVED BY: | JSR |
| SCALE: | AS NOTED |

SHEET TITLE:

BOARDWALK A

SHEET NUMBER:

S-100

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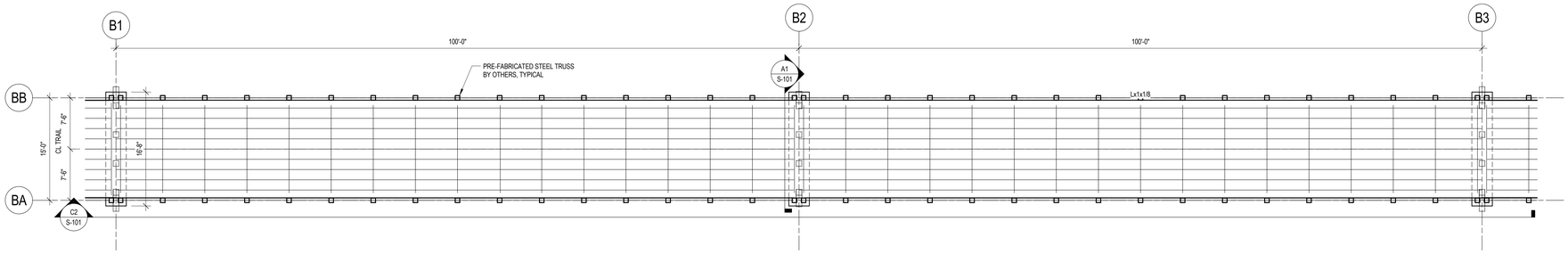
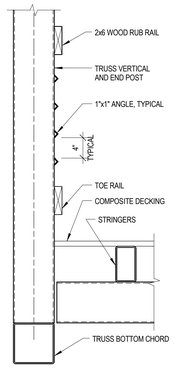
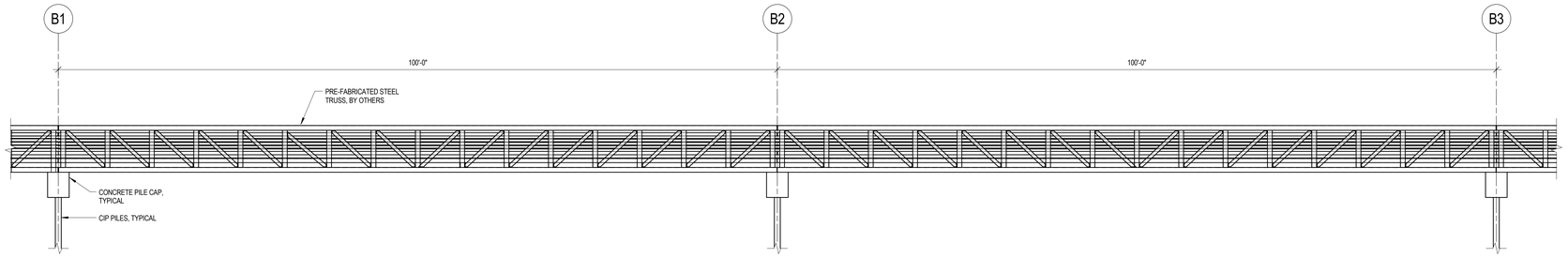


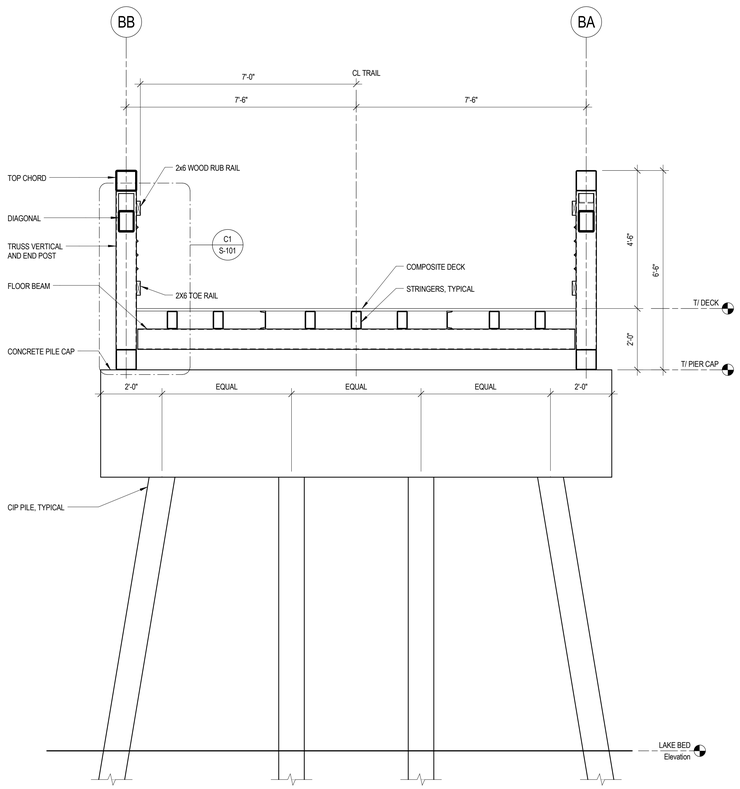

D2 PLAN
1/8" = 1'-0"



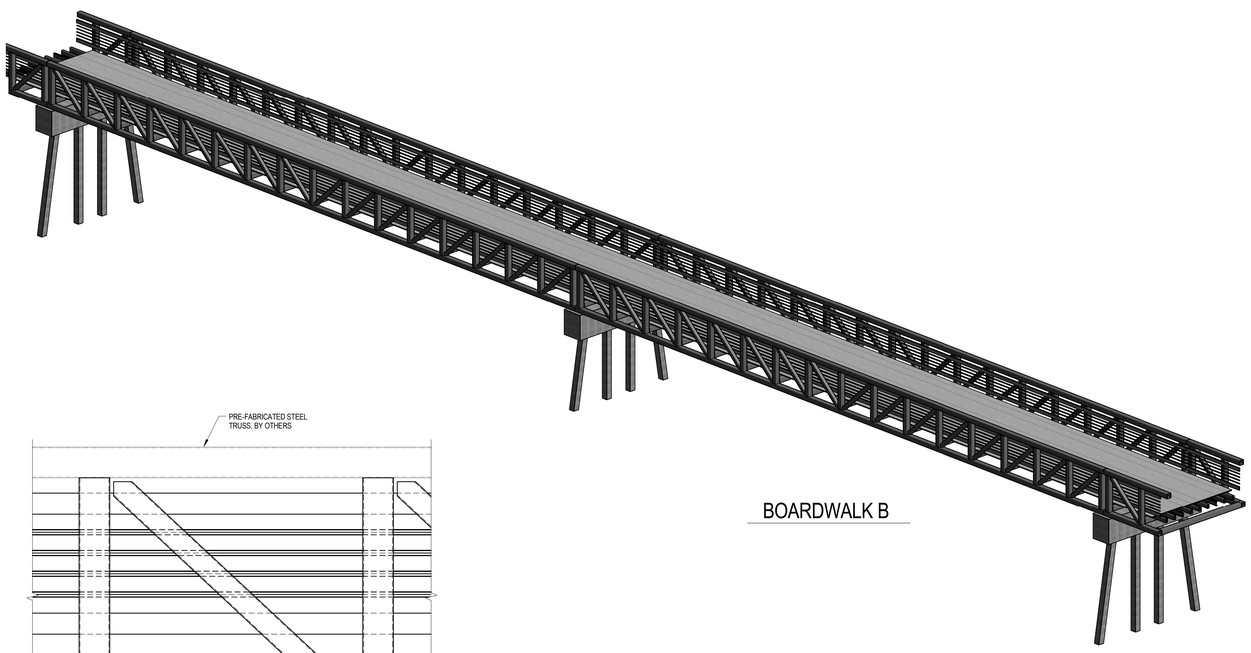

C1 RAIING DETAIL
1" = 1'-0"



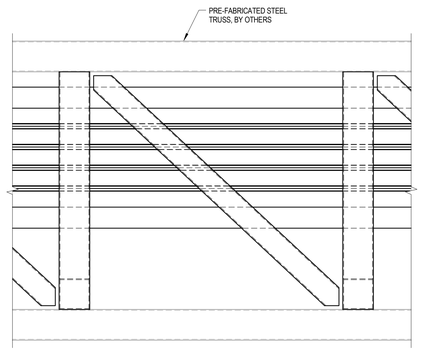

C2 ELEVATION
1/8" = 1'-0"




A1 SECTION
1/2" = 1'-0"



BOARDWALK B




A3 TYPICAL RAILING ELEVATION
3/4" = 1'-0"

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1150 SPRINGHURST DRIVE
SUITE 201
GREEN BAY, WI 53404
920 / 592 9440
www.graef-usa.com

PROJECT TITLE:
FOX RIVER
PEDESTRIAN BRIDGE
CROSSING STUDY

NEENAH, WISCONSIN

PROJECT STATUS:
NOT FOR
CONSTRUCTION

REVISIONS:

| NUMBER | DATE | DESCRIPTION |
|---|---|---|

SHEET INFORMATION:

| | |
|---|---|
| PROJECT NUMBER: | 20142050.00 |
| DATE: | 10/15/2014 |
| DRAWN BY: | AMZ |
| CHECKED BY: | JSR |
| APPROVED BY: | JSR |
| SCALE: | AS NOTED |

SHEET TITLE:
BOARDWALK B

SHEET NUMBER:
S-101

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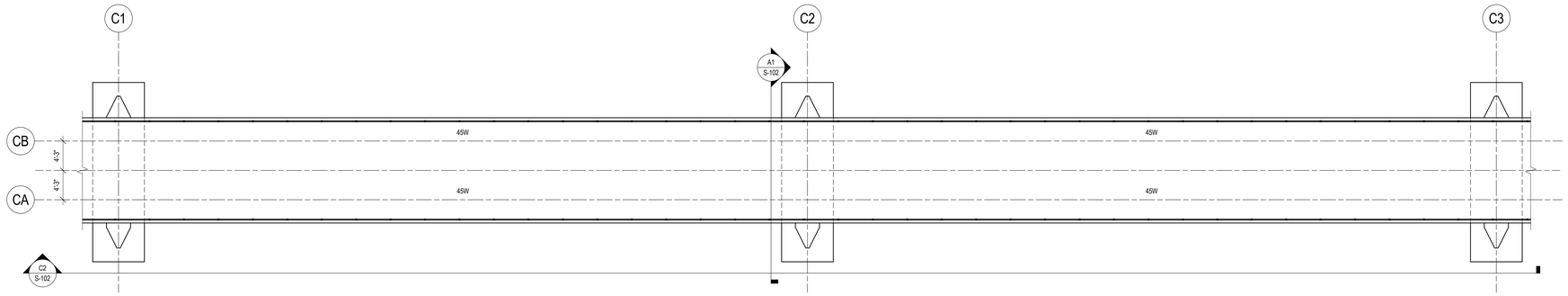
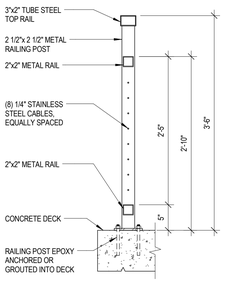
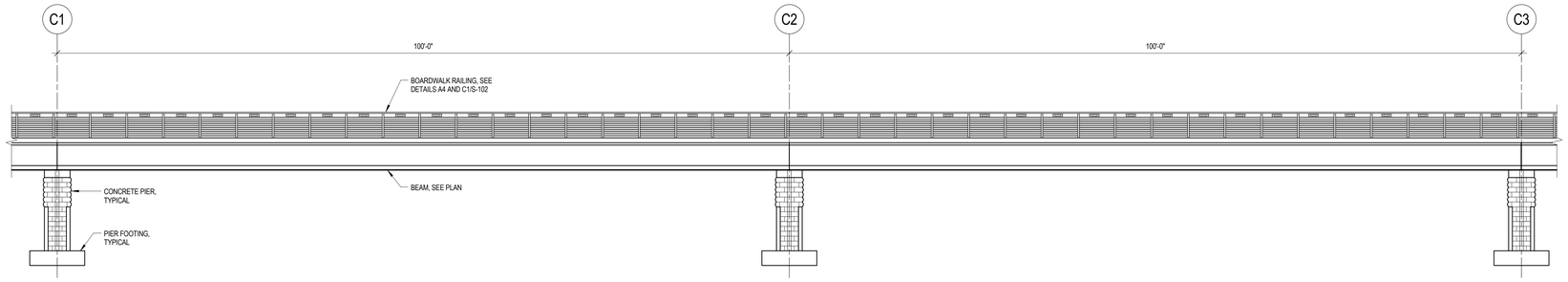


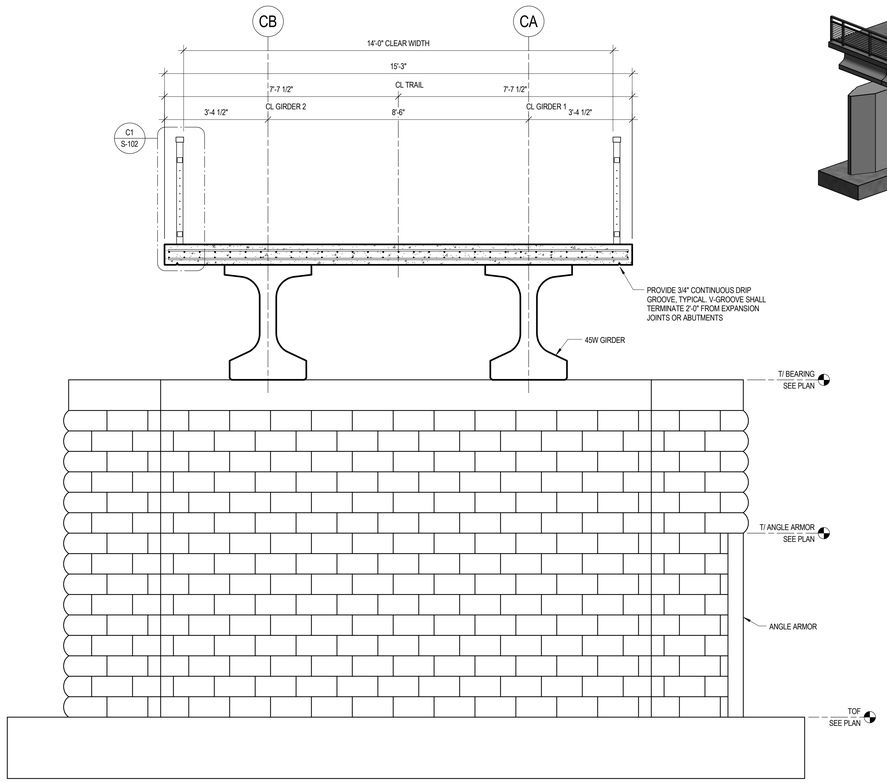

D2 PLAN
1/8" = 1'-0"



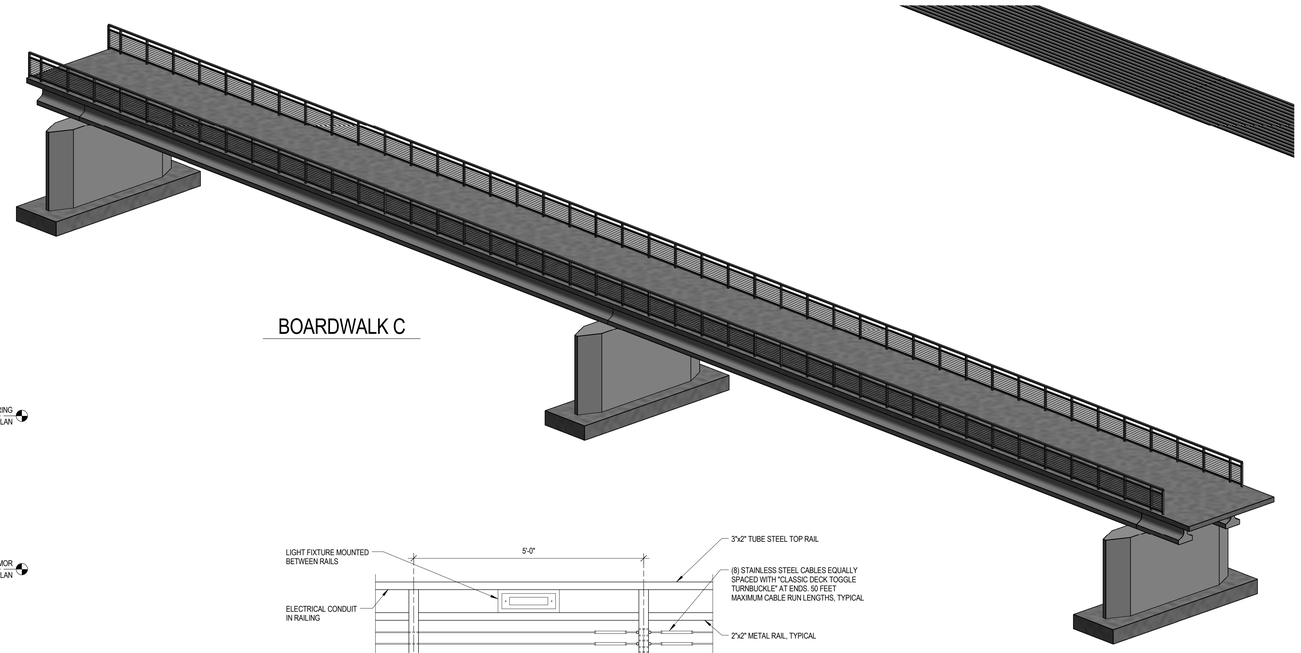

C1 RAILING DETAIL
1" = 1'-0"



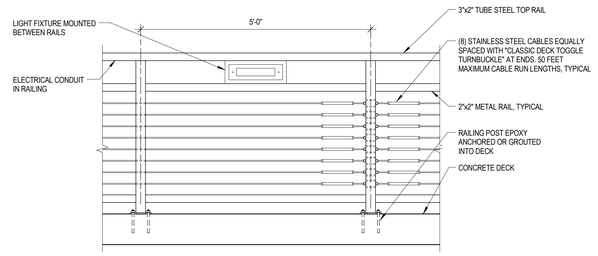

C2 ELEVATION
1/8" = 1'-0"




A1 SECTION
1/2" = 1'-0"



BOARDWALK C




A4 TYPICAL RAILING ELEVATION
3/4" = 1'-0"

GRAEF
1150 SPRINGHURST DRIVE
SUITE 201
GREEN BAY, WI 53404
920 / 592 9440
www.graef-usa.com

PROJECT TITLE:
FOX RIVER PEDESTRIAN BRIDGE CROSSING STUDY

NEENAH, WISCONSIN

PROJECT STATUS:
NOT FOR CONSTRUCTION

REVISIONS:

| NUMBER | DATE | DESCRIPTION |
|---|---|---|

SHEET INFORMATION:

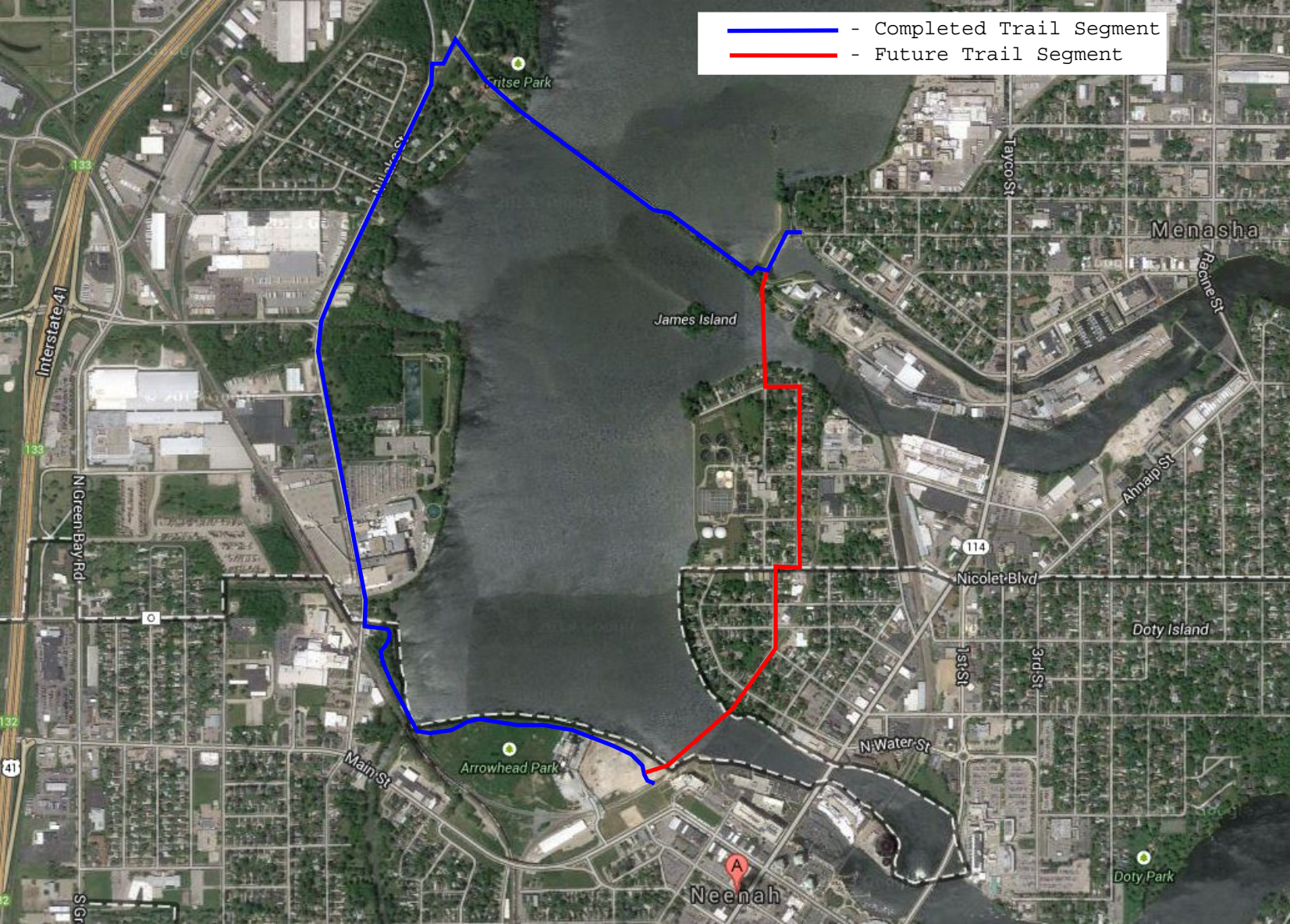
| | |
|---|---|
| PROJECT NUMBER: | 20142050.00 |
| DATE: | 10/15/2014 |
| DRAWN BY: | AMZ |
| CHECKED BY: | JSR |
| APPROVED BY: | JSR |
| SCALE: | AS NOTED |

SHEET TITLE:
BOARDWALK C

SHEET NUMBER:
S-102

© 2014 GRAEF

# FUTURE MULTI-MODAL TRAIL LOOP EXHIBIT


- Completed Trail Segment
- Future Trail Segment
Kritse Park
James Island
Menasha
Tayco St
Racine St
Ahnaip St
Nicolet Blvd
Doty Island
1st St
3rd St
N Water St
Doty Park
Arrowhead Park
Main St
Neenah
Interstate 41
N Green Bay Rd
133
114
41

# NEENAH CROSSINGS EXISTING SITE PHOTOGRAPHS

# Neenah Crossing – Existing Site Photos

Alternative #1 – Crossing

Alternative #1 – South Landing

# Neenah Crossing – Existing Site Photos

Alternative #1 – North Landing

Alternative #1 – North Approach

# Neenah Crossing – Existing Site Photos

Alternative #2 – Crossing

Alternative #2 – South Landing

# MENASHA CROSSINGS EXISTING SITE PHOTOGRAPHS

# Menasha Crossing – Existing Site Photos

Alternative #1 – Crossing

Alternative #1 – South Approach

# Menasha Crossing – Existing Site Photos

Alternative #1 – North Approach

Alternative #1 – North Landing

# Menasha Crossing – Existing Site Photos

Alternative #1 – On Grade Path Route to Friendship Trail

Alternative #2 – South Approach

# Menasha Crossing – Existing Site Photos

Alternative #2 – Crossing

Alternative #2 – Crossing

# ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

# DETAILED BREAKDOWN TABLES

Fox River Multi-Modal Bridge Crossings Feasibility Study
Neenah and Menasha Crossing Locations
Engineer's Opinion of Probable Construction Costs
2/9/2015

## NEENAH SITES

| | Alternative #1 | | | | | |
|---|---|---|---|---|---|---|
| | Boardwalk A | | Boardwalk B | | Boardwalk C | |
| | Pile Bents | Concrete Pier w/ Spread Footings | Pile Bents | Concrete Pier w/ Spread Footings | Pile Bents | Concrete Pier w/ Spread Footings |
| Length (ft) | 740 | 740 | 740 | 740 | 740 | 740 |
| Boardwalk A | $ 592,000.00 | | | | | |
| Boardwalk A | | $ 592,000.00 | | | | |
| Boardwalk B | | | $ 888,000.00 | | | |
| Boardwalk B | | | | $ 888,000.00 | | |
| Boardwalk C | | | | | $ 888,000.00 | |
| Boardwalk C | | | | | | $ 888,000.00 |
| Pile Bents (14) | $ 210,000.00 | | $ 210,000.00 | | $ 210,000.00 | |
| Concrete Pier (7) | | $ 280,000.00 | | $ 280,000.00 | | $ 280,000.00 |
| Abutments | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 |
| Approach Work | $ 40,000.00 | $ 40,000.00 | $ 40,000.00 | $ 40,000.00 | $ 40,000.00 | $ 40,000.00 |
| Lighting | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 |
| Property Acquistion | $ - | $ - | $ - | $ - | $ - | $ - |
| SUBTOTAL | $ 992,000.00 | $ 1,062,000.00 | $ 1,288,000.00 | $ 1,358,000.00 | $ 1,288,000.00 | $ 1,358,000.00 |
| Geotech/Environmental | $ 15,000.00 | $ 15,000.00 | $ 15,000.00 | $ 15,000.00 | $ 15,000.00 | $ 15,000.00 |
| Construction Mobilization | $ 400,000.00 | $ 400,000.00 | $ 400,000.00 | $ 400,000.00 | $ 400,000.00 | $ 400,000.00 |
| Engineering/Delivery (15%) | $ 148,800.00 | $ 159,300.00 | $ 193,200.00 | $ 203,700.00 | $ 193,200.00 | $ 203,700.00 |
| TOTAL | $ 1,555,800.00 | $ 1,636,300.00 | $ 1,896,200.00 | $ 1,976,700.00 | $ 1,896,200.00 | $ 1,976,700.00 |

| | Alternative #2 | | | | | |
|---|---|---|---|---|---|---|
| | Boardwalk A | | Boardwalk B | | Boardwalk C | |
| | Pile Bents | Concrete Pier w/ Spread Footings | Pile Bents | Concrete Pier w/ Spread Footings | Pile Bents | Concrete Pier w/ Spread Footings |
| Length (ft) | 460 | 460 | 460 | 460 | 460 | 460 |
| Boardwalk A | $ 368,000.00 | | | | | |
| Boardwalk A | | $ 368,000.00 | | | | |
| Boardwalk B | | | $ 552,000.00 | | | |
| Boardwalk B | | | | $ 552,000.00 | | |
| Boardwalk C | | | | | $ 552,000.00 | |
| Boardwalk C | | | | | | $ 552,000.00 |
| Pile Bents (8) | $ 120,000.00 | | $ 120,000.00 | | $ 120,000.00 | |
| Concrete Pier (4) | | $ 160,000.00 | | $ 160,000.00 | | $ 160,000.00 |
| Abutments | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 |
| Approach Work | $ 30,000.00 | $ 30,000.00 | $ 30,000.00 | $ 30,000.00 | $ 30,000.00 | $ 30,000.00 |
| Lighting | $ 60,000.00 | $ 60,000.00 | $ 60,000.00 | $ 60,000.00 | $ 60,000.00 | $ 60,000.00 |
| Property Acquistion | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 | $ 100,000.00 |
| SUBTOTAL | $ 728,000.00 | $ 768,000.00 | $ 912,000.00 | $ 952,000.00 | $ 912,000.00 | $ 952,000.00 |
| Geotech/Environmental | $ 15,000.00 | $ 15,000.00 | $ 15,000.00 | $ 15,000.00 | $ 15,000.00 | $ 15,000.00 |
| Construction Mobilization | $ 300,000.00 | $ 300,000.00 | $ 300,000.00 | $ 300,000.00 | $ 300,000.00 | $ 300,000.00 |
| Engineering/Delivery (15%) | $ 109,200.00 | $ 115,200.00 | $ 136,800.00 | $ 142,800.00 | $ 136,800.00 | $ 142,800.00 |
| TOTAL | $ 1,152,200.00 | $ 1,198,200.00 | $ 1,363,800.00 | $ 1,409,800.00 | $ 1,363,800.00 | $ 1,409,800.00 |

Notes:
Boardwalk A = $800/LF
Boardwalk B = $1,200/LF
Boardwalk C = $1,200/LF
Pile Bent = $15,000/ EA
Concrete Pier = $40,000/EA
Property Acquisition is a rough estimate only and is not reflective of an appraisal or formal accepted offer.
Geotech/Environmental includes borings at the structure abutments and in waterway, as well as a Phase I ESA
Construction Mobilization/Methodology costs for causeway construction or barge use can range from $200,000 to $400,000.

Fox River Multi-Modal Bridge Crossings Feasibility Study
Neenah and Menasha Crossing Locations
Engineer's Opinion of Probable Construction Costs
2/9/2015

**MENASHA SITES**

| | Alternative #1 | | | | | |
|---|---|---|---|---|---|---|
| | Boardwalk A | | Boardwalk B | | Boardwalk C | |
| | Pile Bents | Concrete Pier w/ Spread Footings | Pile Bents | Concrete Pier w/ Spread Footings | Pile Bents | Concrete Pier w/ Spread Footings |
| Length (ft) | 356 | 356 | 356 | 356 | 356 | 356 |
| Boardwalk A | $ 284,800.00 | | | | | |
| Boardwalk A | | $ 284,800.00 | | | | |
| Boardwalk B | | | $ 427,200.00 | | | |
| Boardwalk B | | | | $ 427,200.00 | | |
| Boardwalk C | | | | | $ 427,200.00 | |
| Boardwalk C | | | | | | $ 427,200.00 |
| Pile Bents (6) | $ 90,000.00 | | $ 90,000.00 | | $ 90,000.00 | |
| Concrete Pier (3) | | $ 120,000.00 | | $ 120,000.00 | | $ 120,000.00 |
| Abutments | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 |
| Approach Work | $ 60,000.00 | $ 60,000.00 | $ 60,000.00 | $ 60,000.00 | $ 60,000.00 | $ 60,000.00 |
| Lighting | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 |
| Property Acquistion | $ 40,000.00 | $ 40,000.00 | $ 40,000.00 | $ 40,000.00 | $ 40,000.00 | $ 40,000.00 |
| SUBTOTAL | $ 574,800.00 | $ 604,800.00 | $ 717,200.00 | $ 747,200.00 | $ 717,200.00 | $ 747,200.00 |
| Geotech/Environmental | $ 15,000.00 | $ 15,000.00 | $ 15,000.00 | $ 15,000.00 | $ 15,000.00 | $ 15,000.00 |
| Construction Mobilization | $ 300,000.00 | $ 300,000.00 | $ 300,000.00 | $ 300,000.00 | $ 300,000.00 | $ 300,000.00 |
| Engineering/Delivery (15% | $ 86,200.00 | $ 90,700.00 | $ 107,600.00 | $ 112,100.00 | $ 107,600.00 | $ 112,100.00 |
| TOTAL | $ 976,000.00 | $ 1,010,500.00 | $ 1,139,800.00 | $ 1,174,300.00 | $ 1,139,800.00 | $ 1,174,300.00 |

| | Alternative #2 | | | | | |
|---|---|---|---|---|---|---|
| | Boardwalk A | | Boardwalk B | | Boardwalk C | |
| | Pile Bents | Concrete Pier w/ Spread Footings | Pile Bents | Concrete Pier w/ Spread Footings | Pile Bents | Concrete Pier w/ Spread Footings |
| Length (ft) | 640 | 640 | 640 | 640 | 640 | 640 |
| Boardwalk A | $ 512,000.00 | | | | | |
| Boardwalk A | | $ 512,000.00 | | | | |
| Boardwalk B | | | $ 768,000.00 | | | |
| Boardwalk B | | | | $ 768,000.00 | | |
| Boardwalk C | | | | | $ 768,000.00 | |
| Boardwalk C | | | | | | $ 768,000.00 |
| Pile Bents (12) | $ 180,000.00 | | $ 180,000.00 | | $ 180,000.00 | |
| Concrete Pier (6) | | $ 240,000.00 | | $ 240,000.00 | | $ 240,000.00 |
| Abutments | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 | $ 50,000.00 |
| Approach Work | $ 30,000.00 | $ 30,000.00 | $ 30,000.00 | $ 30,000.00 | $ 30,000.00 | $ 30,000.00 |
| Lighting | $ 90,000.00 | $ 90,000.00 | $ 90,000.00 | $ 90,000.00 | $ 90,000.00 | $ 90,000.00 |
| Property Acquistion | $ - | $ - | $ - | $ - | $ - | $ - |
| SUBTOTAL | $ 862,000.00 | $ 922,000.00 | $ 1,118,000.00 | $ 1,178,000.00 | $ 1,118,000.00 | $ 1,178,000.00 |
| Geotech/Environmental | $ 15,000.00 | $ 15,000.00 | $ 15,000.00 | $ 15,000.00 | $ 15,000.00 | $ 15,000.00 |
| Construction Mobilization | $ 400,000.00 | $ 400,000.00 | $ 400,000.00 | $ 400,000.00 | $ 400,000.00 | $ 400,000.00 |
| Engineering/Delivery (15%) | $ 129,300.00 | $ 138,300.00 | $ 167,700.00 | $ 176,700.00 | $ 167,700.00 | $ 176,700.00 |
| TOTAL | $ 1,406,300.00 | $ 1,475,300.00 | $ 1,700,700.00 | $ 1,769,700.00 | $ 1,700,700.00 | $ 1,769,700.00 |

Notes:
Boardwalk A = $800/LF
Boardwalk B = $1,200/LF
Boardwalk C = $1,200/LF
Pile Bent = $15,000/ EA
Concrete Pier = $40,000/EA
Property Acquisition is a rough estimate only and is not reflective of an appraisal or formal accepted offer.
Geotech/Environmental includes borings at the structure abutments and in waterway, as well as a Phase I ESA
Construction Mobilization/Methodology costs for causeway construction or barge use can range from $200,000 to $400,000.