Design Award

STH 60 Reconstruction

Design ID: 2310-10-00
USH 41 – USH 45
Washington County

Category:
Rural Design – WisDOT

Project Data:

Project ID	**2310-10-00**
Roadway	**STH 60**
Municipality	**Village of Slinger** **Town of Polk** **Village of Jackson**
County	**Washington**
WisDOT Region	**SE Region**
Category	**Rural Design**
Construction ID	**2310-10-70**
Project Dates	**PSE - May 1, 2011** **Let – November 8, 2011**
Region Contact	**Doug Cain** **Project Manager** **262-548-5603** **douglas.cain@dot.wi.gov**

Award Ceremony (if selected):

Names to show on certificate	**Doug Cain, WisDOT Project Manager** **Nguyen Ly, WisDOT Design Leader** **R. A. Smith National, Inc.** **MTJ Engineering, LLC** **Omnni Associates, Inc.**
Persons accepting award	**Olubunmi Olapo, WisDOT PDS Chief** **Doug Cain, WisDOT Project Manager** **Nguyen Ly, WisDOT Design Leader** **R. A. Smith National, Inc.**

Nomination for the Rural Design – WisDOT Category
STH 60 Reconstruction
USH 41 – USH 45
Washington County

Executive Summary

State Trunk Highway (STH) 60 is an east – west arterial crossing Wisconsin. It crosses Washington County on the northern fringes of the Milwaukee metropolitan area. This 3.24 mile section of roadway, which extends from USH 41 to USH 45, is a vital link in the transportation system and serves as a major truck route and commuter route for the communities of Grafton, Cedarburg, Jackson, Slinger, Hartford and West Bend. The corridor is also unique in the fact that it provides direct access to separate freeway systems, USH 41 and USH 45.

The existing corridor was a 2 lane roadway with 11 foot lanes and was experiencing substantial increases in traffic volume, development, and congestion. The Village of Slinger on the west end of the project and Village of Jackson on the east end are experiencing substantial growth in residential and commercial development. The Village of Slinger has a large mixed use development planned at Hillside Road/County Trunk Highway (CTH) C which will add a significant amount of traffic at the intersection. Due to the large increase in projected traffic a grade separated structure with jug-handle connections was evaluated as well as a traffic signal requiring a triple left turn lane and a triple lane roundabout. The roundabout was ultimately chosen after an extensive public outreach campaign.

The purpose of the design was to reduce congestion being experienced along the route and improve the safety of the corridor. Increased traffic and development, a deteriorating roadway, access management, and safety issues all needed to be addressed with the design. The goals of the project were to improve capacity with additional lanes, improve safety by upgrading the roadway to current design standards, improve safety at the intersections by adding turn lanes and manage access along the corridor. The design was developed to avoid and minimize impacts to the natural environment and fit into the surrounding communities.

The STH 60 design had many unique design elements incorporated including 5 multi lane roundabouts, storm water management utilizing a rock filter bed, 2 stream crossings enhancing the fish passages, MSE walls to avoid an unmarked grave site and wetlands along both sides of the corridor.

A. Plan and Contract Quality

1. Project cost. Final construction cost (excluding E&C) of project(s)
    a. **$16,037,593 is the final costs**
2. Quantity variations
    a. Total number of bid items on project(s)
    b. **374**
    c. Number of items for which the final quantity was within 2% of the quantity as let
    d. **177**
3. Contract Change Orders
    a. Number and value of change orders. Why were the changes needed?
    b. General nature and change in construction cost for each addenda:

Change Order #	Changes Needed	Amount
1	**Added additional galvanized railings, bar couplers culvert pipes & endwalls and construction staking items. Also, modified diversion channel and removing old structure (72-inch pipe).**	**$68,024.35**
2	**Accounted for various storm sewer items: removed old structure/storm sewer, added culvert pipe/endwalls, inlet covers and erosion mat. Modified concrete curb & gutter and sidewalk. Also, added various lighting items.**	**$102,972.16**
3	**Accounted for Fuel Cost Adjustment.**	**$111,250.00**
4	**Added 8 days to the contract at zero cost.**	**$0.00**
5	**Changed in contract completion date at zero cost.**	**$0.00**
6	**Added various new items: sand barrels, construction staking Electrical installations, crash cushions and removal & replacement of curb backfill. In addition, adjusted prices to items: Removing asphaltic surface milling and concrete staining multi-color to six structures.**	**$15,404.79**
7	**Added new items traffic control paddles & bases. Additional mobilization and grading required to amend the rock filter bed from a heavy storm damage. Also, added time and material for asphaltic pavement repair.**	**$15,404.79**
Total		**$314,100.45**

    c. Number of design related changes. Why were the changes needed?
    2 design changes were made in the field.
        - **WisDOT's policy on oversize overweight (OSOW) vehicles was updated after the letting so the roundabouts at the US 45 ramp termini required OSOW accommodations. No changes to the geometric layout were required but several island curbs were changed to a 3" curb height.**
        - **A crash cushion in the median protecting a sign bridge footing was changed to concrete barrier wall due to the narrow median section.**
    d. Dollar change from "as let" cost due to CCO's and quantity revisions
    $314,100.45
    e. Cost change as percentage of as let cost

2.1%

B. Bidability and Constructability

1. Addenda
   a. Number of addenda issued prior to letting.
      One
   b. General nature and change in construction cost for each addenda.
      The addendum was required to modify the traffic control staging plan at the new concrete slab bridge. False work in stage 2 needed to remain into stage 3 and temporary concrete barrier added to stage 3. This required quantity revisions in the estimated quantities also. Since an addendum was being processed other various quantity updates were included.
      1. **Concrete Barrier Temporary Precast Delivered = (+) 200 LF**
      2. **Concrete Barrier Temporary Precast Installed = (+) 200 LF**
      3. **Storm Sewer Pipe Reinforced Concrete Class III 12-Inch = (+) 187 LF**
      4. **Crash Cushions Temporary = (+) 2 EA**
      5. **Pavement Marking Arrows Epoxy Type 2 = (-) 11 EA**
      6. **Pavement Marking Words Epoxy = (-) 11 EA**

      The addendum increased the construction costs by $1,278.00. This was a 0.21% increase to the original estimate.

2. Low Bid compared to estimate.
   a. Number of bids received.
      Six
   b. Final cost estimate prior to letting.
      $14,539,214.85
   c. Amount of low bid.
      $14,897,790.00
   d. Difference between estimate and low bid as a percent of estimate.
      $358,575.15; 2.4%
   e. Spread between low bids.
      The difference from the low bid to the high bid was $2,978,847.00
   f. Cost for each of three (3) low bids.
      $14,897,790.32
      $16,342,513.21
      $16,354,303.86
   g. Difference between low and third low bid as a percent of estimate.
      $1,456,513.54; 8.9%

C. Alignment and Location Design

1. Describe the number and general nature of alternative alignments including relationship to location of existing roadway. Identify location selected.
   The proposed alignments for STH 60 were all along the existing roadway corridor. Efforts were made to minimize right of way impacts to adjacent property owners by centering the

proposed 4 lane expansion on the existing roadway. In three locations shifts in the alignment were made to minimize impacts along the route.

- **Just east of Hillside Road/CTH C the alignment was shifted to the south to avoid impacts to an existing communication tower located at a substandard crest vertical curve which needed to be cut down.**
- **In the middle of the project Lehner Creek runs parallel to the existing roadway and required the alignment to be shifted to the north to avoid impacts to the creek.**
- **Between Mayfield Road and Tillie Lake Road the alignment was shifted to the south to minimize impacts to wetlands on both sides of the corridor.**

See attachment A.

2. Alignment fit. Describe efforts to fit to topography thereby minimizing cuts and fills, allowing flatter backslopes, more gradual driveway slopes, etc.

   There is 225 feet of elevation change from the west end of the project to the east end. The design provided for a "best fit" alignment ensuring both vertical and horizontal design standards were met. An urban section was used at each end of the project and at various locations on the outside shoulder to better fit the topography while minimizing impacts to adjacent properties.

3. Design practices. Describe safety and maintenance related considerations incorporated into design. (Improving vision, raising grade through marshes, etc.)

   The purpose of the STH 60 design was to improve the safety and efficiency of the current roadway. The following design decisions were implemented in the final design.

   - **Although a 50 foot wide median was evaluated a 36 foot raised median was chosen allowing the median ditch to be eliminated. This also fit the sub-urban setting and matched into the typical sections at each end of the project.**
   - **A detailed intersection analysis was performed at the Hillside Road\CTH C intersection. The Village of Slinger has a proposed high-intensity development planned for the northwest corner and traffic projections from this corner along could be as high as 10,000 to 20,000 vehicles per day under full build out. The initial design proposed a grade separated design with jug-handles for this intersection. Strong opposition to this layout due to the large amount of right of way and indirect access required additional public outreach and an intersection analysis. The analysis looked at the jug-handles, a signal with triple left turn lanes, and a multi lane roundabout. It was determined the most economical, efficient and the best anticipated safety performance would be the multi lane roundabouts. See attachment B and C.**
   - **3 rural intersections were improved with turn lanes, adequate sight lines and vision corners. Including one intersection that was realigned from a 55 degree intersecting angle to 90 degrees.**
   - **The Tillie Lake Road intersection and the USH 45 northbound and southbound ramp termini also were evaluated due to their close proximity and width restrictions under the USH 45 bridges. The CTH P signalized intersection is just outside the project limits to the east. These four intersections were experiencing congestion during the peak hours leading to increased accidents. A system analysis was performed to ensure the control type and delay would be acceptable for the design life of the project. It was determined the control on the new intersections should all be the same type and not cause the existing signal at CTH P to fail. The final decision was to incorporate multi lane**

roundabouts at Tillie Lake Road and the USH 45 ramp termini not requiring the USH 45 bridge to be widened to provide for left turn lanes at the ramp termini under the bridge. This option also worked well with the existing signal at CTH P. See attachment D.

- **Residential and commercial access was reviewed and adjusted to eliminate driveways near intersections or to align with proposed median openings. 4 residential driveways were adjusted to align with median openings and 2 driveways at intersections were relocated to the side road.**
- **A total of 5 multi lane roundabouts were utilized due to the safety advantage of reducing higher speed right angle crashes and the severity of injuries.**

D. Cost Effective Design.

1. Total design cost expressed as percentage of final construction cost.

   Design cost: = $2,618,054
   Final Construction Cost: = $16,037,593
   Design percent of final: = 16.32%

2. Describe design elements which reduced costs. Identify this impact in terms of WisDOT construction cost, cost to traveling public, or cost to entire public.

   The initial design proposed a grade separated jug-handle interchange at CTH C. Further alternatives analysis ultimately resulted in the recommendation of a multi lane roundabout. A roundabout intersection reduced construction and real estate costs and also minimized impacts. Eliminating the grade separation structure, the extra earthwork required to create the grade separation, the jug-handle ramps and one business relocation reduced the total project cost by approximately $2.8 million.

   The existing USH 45 structures over STH 60 were in good condition. Constructing a traditional signalized intersection would have required the replacement of both of the USH 45 structures to accommodate the wider STH 60 roadway section and the necessary left turn lanes. The design team chose to construct a multi-lane roundabout at each ramp terminal to preserve the existing structures and reduce the project scope and cost. This reduced the total project cost by approximately $400,000.

3. Project Maintainability.

   The goal of the STH 60 design was to utilize conventional maintenance procedures and have minimal costs.

   - **Provided guardrail mow strips around new guardrail to reduce maintenance.**
   - **Eliminated the depressed median, which increases median cross pipes which tend to clog.**
   - **Utilized No Mow Fescue seed at the roundabout interiors to minimize mowing.**

E. Complexity of Design.

1. Unusual, Non-Standard, or Innovative Design Features and Practices

   After the project was let the design team was directed to adjust the design to accommodate oversize/overweight (OSOW) vehicles for through movements on the USH 45 ramps crossing STH 60. This would accommodate a vehicle that was not able to cross the USH 45 bridges over STH 60. This change was the result of WisDOT updating its policy on OSOW and

roundabouts after the project was let for bids. Three-dimensional truck turning templates were run at each roundabout and the design was modified to include a 3-Inch high mountable curb on the truck apron and bypass islands so that a lowboy trailer could traverse the intersection without hanging up on the pavement. The use of the shorter curb height allowed the pavement grades and raised islands shown in the plans to remain unchanged from the as-let plans.

A wide concrete corrugated median was used on STH 60 just east of CTH C to provide full access to three residential parcels along STH 60. The preliminary plans showed a raised median along these parcels with a median opening approximately 900 feet to the east. Several alternatives including a shared driveway were evaluated. Ultimately the design team implemented a corrugated concrete median in the design to provide full access to all the residential driveways. The parcels included access restrictions for residential use only to preclude commercial redevelopment of these parcels with this median configuration.

A rock filter basin was designed to treat water on the west end of the project where the new storm sewer discharged. After leaving the right of way the natural drainage patterns allowed drainage to spread out and flow across an existing driving range in the southwest corner of STH 60 and Hillside Road/CTH C.

At the Lehner Creek crossing the existing 60 inch culvert was replaced with a 68" X 108" elliptical pipe to provide for enhanced fish passage. The pipe was buried below grade 1 foot and filled with course aggregate and boulders to form a more natural bottom and provide areas for fish to rest. A grate was added in the roadway median to provide light in the pipe as the crossing was over 160 feet in length. See attachment E.

At Cedar Creek a bridge was designed to replace the two large steel arch culvert pipes. Special attention was given to creating a channel under the bridge to match the adjacent stream conditions as it is classified as a high quality waterway. Heavy rip rap was used to armor the channel with a course aggregate filling in the voids. Five field stone vanes (rock arches) were created in the channel to control flows and assist with fish passage. See attachment F.

2. New Technology and products used.

   The local municipalities would not accept the maintenance of plantings in the central islands of the roundabouts. Traditional seed mixes require regular mowing to provide a maintained look for the central island turf areas. The design team implemented a low mow grass seed mix for the central islands to provide a cleaner look without added maintenance.

3. Degree of coordination and timing.

   There was an extensive public outreach plan for the project. 5 public information meetings and local officials meetings were held to get input into the different intersection alternatives. 1 public information meeting primarily dealt with familiarizing the public on roundabouts.

   Lehner Creek and Cedar Creek required additional coordination with the WDNR to develop a plan for the creek crossings and restoration. Experts from the Southeastern Wisconsin Regional Planning Commission also provided input into the restorations.

Two utility coordination meetings were held during design to coordinate utility relocations and timing. During construction there were no utility delays impacting the project completion date.

4. Number and type of controls governing.

There were four critical time frames included in the construction contract documents:

- **A maximum 21 calendar day closure and detour for CTH C through traffic. This closure was included to facilitate the completion of the CTH C/American Eagle roundabout construction. The contract included interim liquidated damages of $5,000 per calendar day if CTH C was not reopened to through traffic after the specified duration.**
- **A maximum 200 calendar day closure and detour for STH 60 through traffic between CTH C and Tillie Lake Road. This closure was included to limit the amount of traffic within the work zone to improve worker safety and construction operations. The contract included interim liquidated damages of $5,000 per calendar day if STH 60 was not reopened to through traffic after the specified duration.**
- **A maximum 60 calendar day closure and detour for each of the USH 45 interchange ramps. The contract also required that the northbound off ramp remain open during the Washington County Fair since this provides a primary access route to this event. These closures were required to facilitate reconstruction of the ramps without building extensive temporary ramps. The contract included interim liquidated damages of $5,000 per calendar day if STH 60 was not reopened to through traffic after the specified duration.**
- **The project completion date of November 15, 2012.**

5. Number of traffic control stages.

The project used a combination of detours and staged construction to complete the project in one construction season. The project was constructed using the following traffic control:

- **USH 41 to CTH C/Hillside Road – Staged Construction with four stages**
- **CTH C/Hillside Road to Tillie Lake Road – Detoured through traffic for up to 200 days maintaining local traffic on a paved surface.**
- **Tillie Lake Road to USH 45 – Staged Construction with four stages**

Staged construction was required at the east and west portions of the project to maintain access to businesses that had no other access. This included a large food distributor that needed access for semi-trucks to USH 45 24 hours a day. A paved two lane roadway was provided through the detoured segment of the project to define a safe location for local traffic and emergency vehicles within the work zone rather than letting local traffic drive on the unpaved roadway grade.

The bridge over Cedar Creek was constructed using staged construction which not only maintained local access to STH 60, but also maintained the flow of Cedar Creek without the use of a separate temporary diversion channel. Four stages with multiple substages were used to replace the existing metal culvert pipes with a new slab span bridge over Cedar Creek.

F. Community Sensitive Design

1. Mitigation of Adverse Impact on Public During Construction

   STH 60, Hillside Road/CTH C and the USH 45 ramps all had limited time frames for closures requiring the contractor to expedite the work. This limited the inconvenience to the traveling public .

   The project was staged from USH 41 to CTH C and from Tillie Lake Road to the east project limits to minimize the impact to businesses and residents. Staging a portion of the project allowed customers to access the businesses near the USH 41 and USH 45 interchanges and allowed trucks from the adjacent industrial park to access USH 45 throughout construction. This approach provided an equitable balance between public mobility, construction safety, and efficiency in construction operations.

2. Preservation of Natural Areas

   At Lehner Creek and Cedar Creek field stone was incorporated along the banks and areas that would have required riprap to better fit the natural area. WDNR did not what to have limestone riprap in natural areas as it would contrast with the existing visual setting. See attachment G.

   Efforts were made to protect Lehner Creek which is a cold water trout stream by maintaining ditches 200 feet either side of the creek and not allowing storm sewer or culverts to directly discharge into the creek.
   It was determined in coordination with WDNR to replace the existing twin culvert pipe arches at Cedar Creek with a bridge to enhance the natural light to the stream and provide a natural stream bed bottom.

   Wetlands are located primarily along the east half of the corridor. Wetland impacts were reduced from 8.5 acres to 5.9 acres by reducing the median width, shifting the alignment, lowering the profile, providing steeper slopes outside the clear zone and maintaining guardrail with steep slopes in certain locations. Water quality and peak discharges into the wetlands was improved by constructing swale ditches with ditch checks prior to entering wetlands.

3. Reestablishment of Natural Vegetation or Wetlands

   Several locations were found for on or near site restoration but unwilling sellers prevented this. Wetland impacts for the project total 5.952 acres. 8.93 acres will be mitigated at the Gundrum and STH 33 mitigation sites.

4. Preservation of Historical and Archeological Features

   Archeological investigations during the study phase of the project identified a cemetery with unmarked graves adjacent to the CTH C and American Eagle Drive intersection. A mechanically stabilized earth (MSE) concrete panel wall was constructed in the southeast corner of the CTH C and American Eagle Drive intersection to completely avoid the archeological site. Exclusion fencing was installed around the site to help ensure that the area was not disturbed during construction.

5. Enhancement of Cultural Resources

   The design focused on matching the natural surroundings along the project corridor, maintaining the rural setting and country feeling.

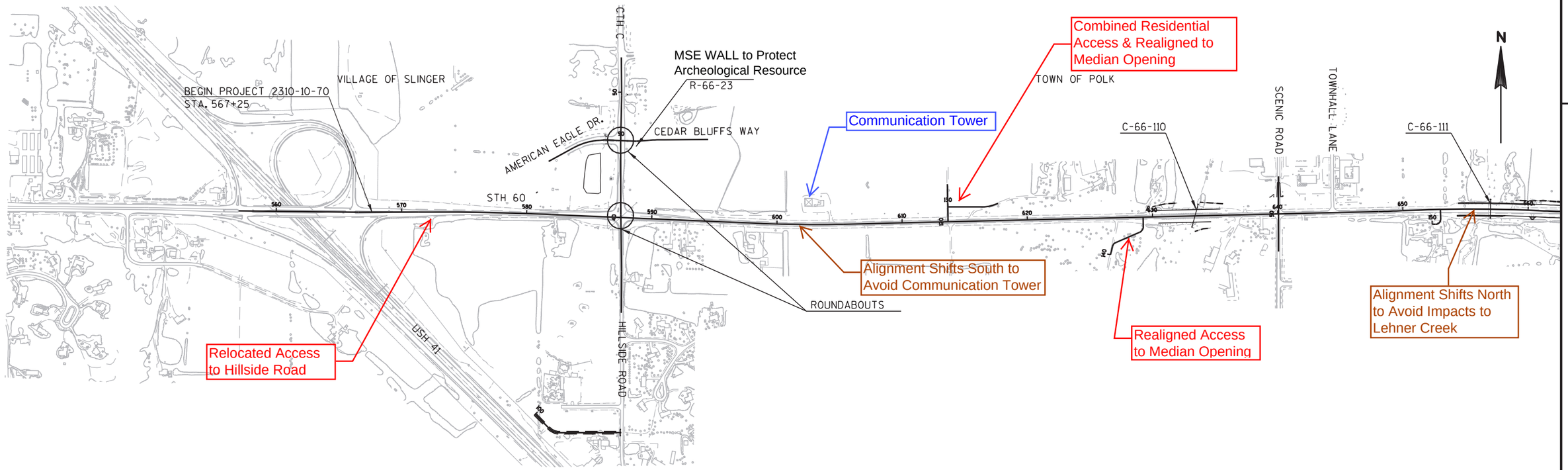
6. Community Sensitive Design

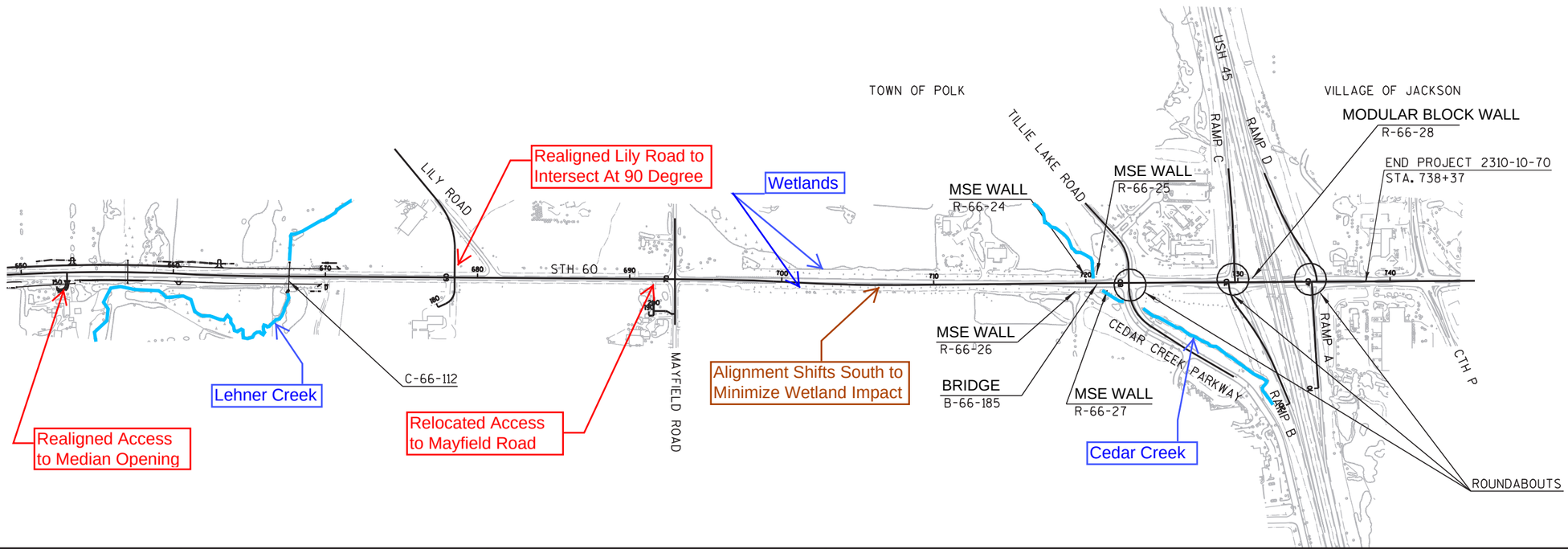
   The Village of Jackson had plans to connect the commercial area west of USH 45 near Tillie Lake Road to the rest of the Village east of USH 45. A shared use path connection was included in the project along the north side of STH 60 under USH 45 to provide a pedestrian and bicycle connection consistent with the Village's plan. This segment of shared use path has since been connected with other paths by the Village. An MSE block retaining wall was constructed under the USH 45 bridges to provide the room needed to construct the path without reconstructing the structure or abutment.

   Aesthetic features constructed with the project were limited because the local municipalities were unwilling to accept maintenance of these enhancements. As previously mentioned low mow grass was seeded in the central islands of the roundabouts. Limited amounts of colored concrete were paved in the roundabout splitter islands and truck aprons. The Cedar Creek Bridge also included some decorative railings and field stone form liners with multi-color staining to enhance the aesthetic appeal of the project. See attachment H.

7. Overall Aesthetic Appeal

   The project maintained the rural character of the area while yet providing a safe and efficient roadway. The sub-urban setting matching each end of the project transitions to a more open, rural character through the middle 2.5 miles of the project. Upgraded intersections fit into the existing topography and provide for open sight lines to provide for driver comfort. See attachment I.





PROJECT NO: 2310-10-70	HWY: STH 60	COUNTY: WASHINGTON	PROJECT OVERVIEW	SHEET	E

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WISDOT/CADDS SHEET 42

ATTACHMENT - A

100 SCALE

PRELIMINARY JUG-DEVELOPED ALTERNATIVE

1/26/07

AMERICAN EAGLE DR

NORTH ACCESS ROAD

CTH C

STH 60

HILLSIDE RD

SOUTH ACCESS ROAD

PI 22+67.72

PI 32+49.78

PC 29+61.56

PT 34+06.44

PC 598+55.62

PI 576+67.99

PI 581+96.36

PI 601+97.77

PC 7+20.50

PT 11+61.09

PI 10+04.26

PI 18+30.59

PI 50+21.26

PI 37+16.39

575 580 585 590 595 600

RUINS

GOLF GREEN

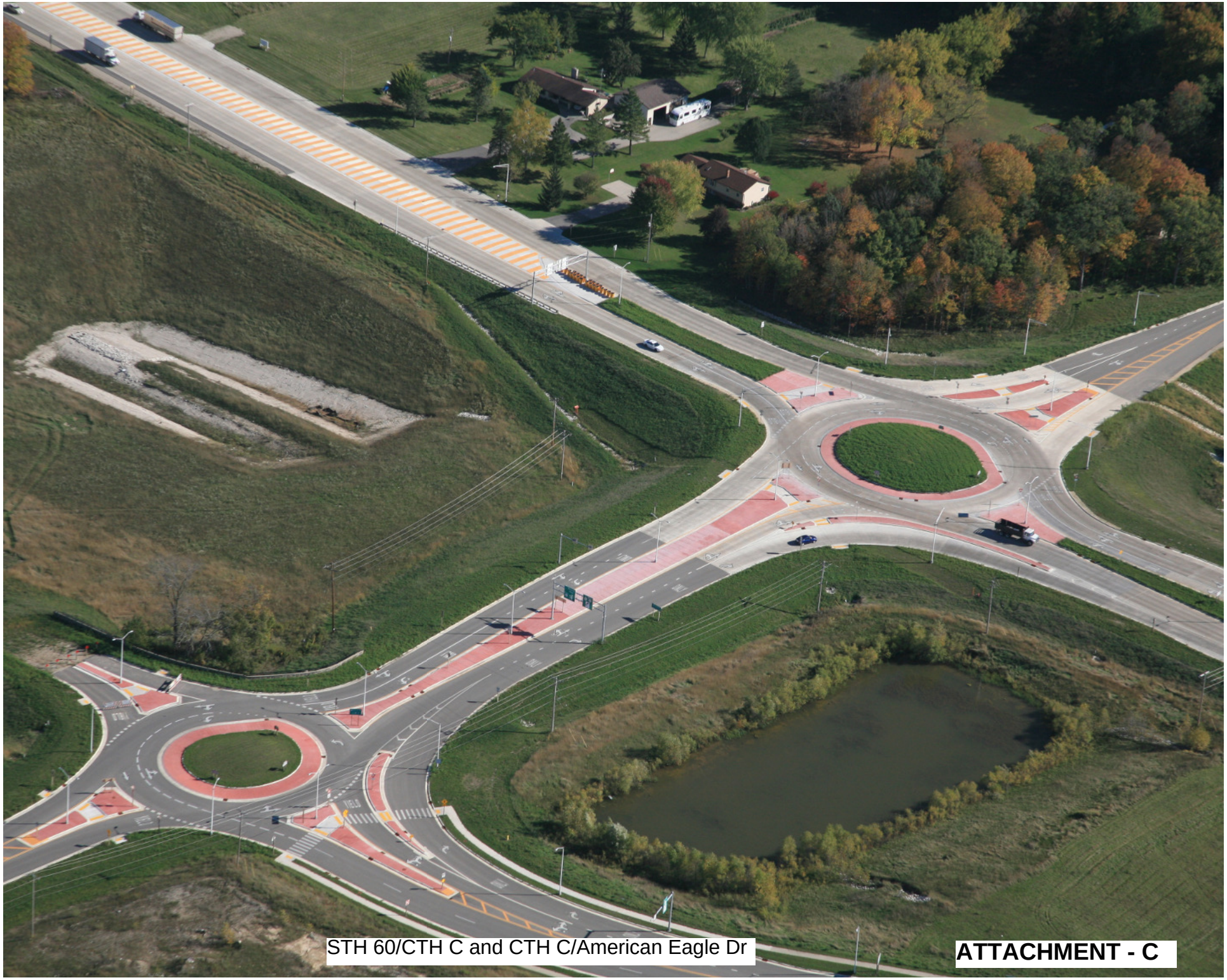
DRIVING RANGE

SEPTIC

MINI-GOLF COURSE

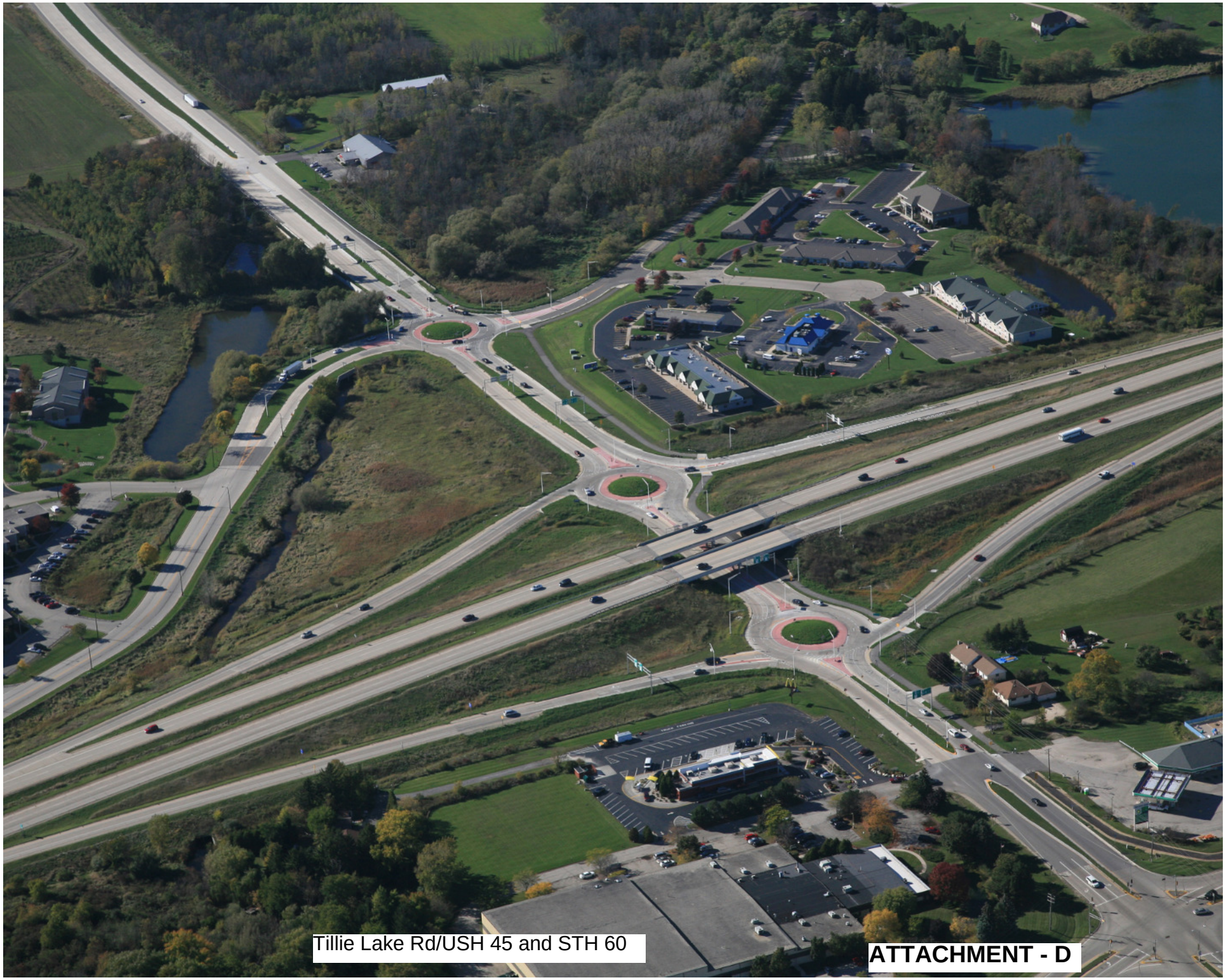
SIGN

ATTACHMENT - B

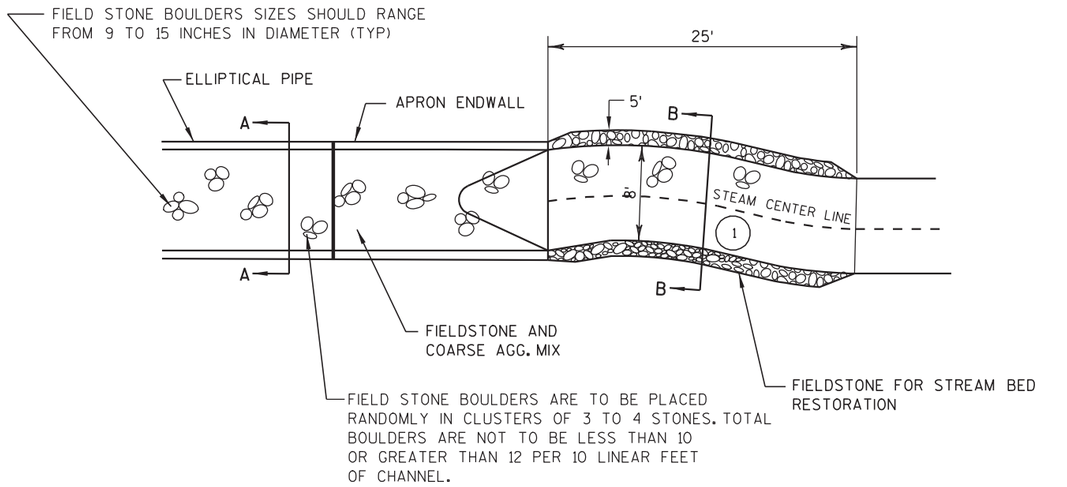


STH 60/CTH C and CTH C/American Eagle Dr

ATTACHMENT - C

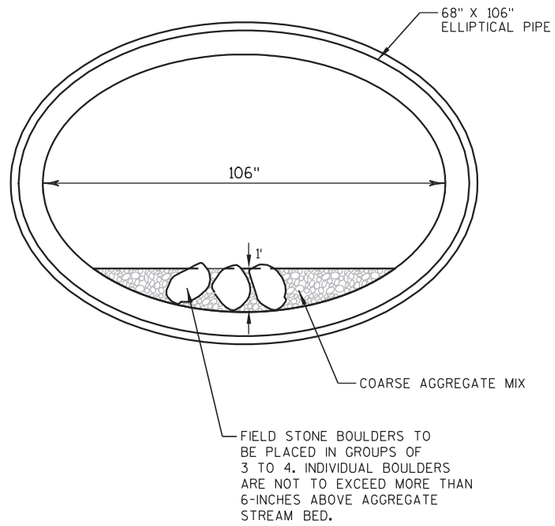


ATTACHMENT - D



68" X 106" ELLIPTICAL PIPE
PLAN VIEW

STA. 667+62
C66-112
LEHNER CREEK

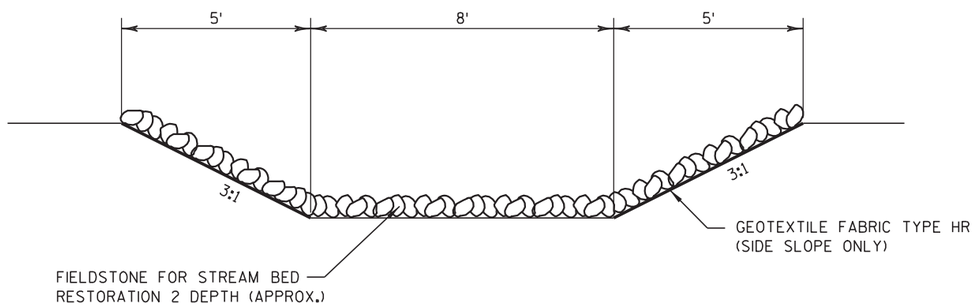


68" X 106" ELLIPTICAL PIPE
SECTION VIEW A-A

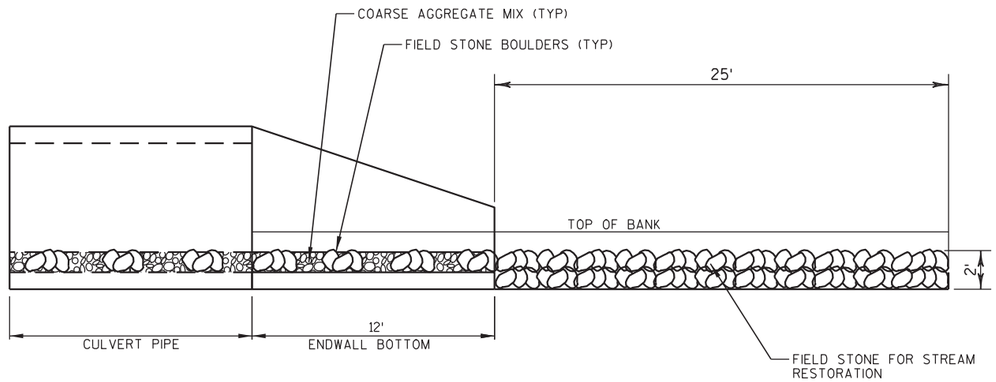
GLOSSARY OF TERMS:

COARSE AGGREGATE MIX: NATURAL, ROUNDED UNCRUSHED COURSE AGGREGATE CONSISTING OF ROUGHLY THREE PARTS NO 2 STONE AND ONE PART 3/8-INCH PEA GRAVEL, THOUROUGHLY MIXED.

FIELDSTONE BOULDERS: NATURAL, ROUNDED FIELD STONE WITH A MAXIMUM DIAMETER OF 15 INCHES AND MINIMUM DIAMETER OF 9 INCHES.



FIELDSTONE FOR STREAM BED RESTORATION
SECTION VIEW B-B

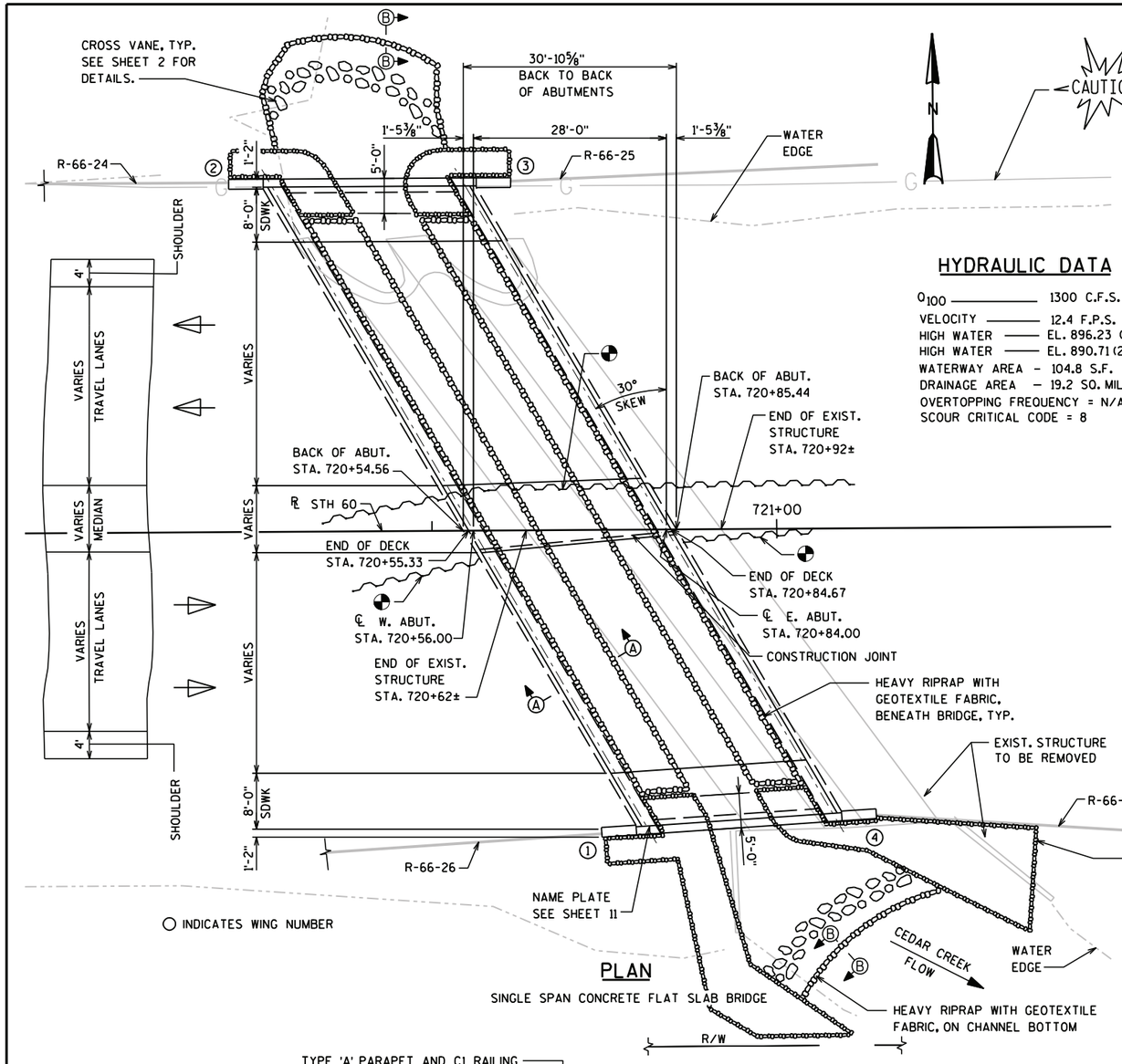


EROSION CONTROL AT 68" X 106" ELLIPTICAL PIPE
PROFILE VIEW

PROJECT NO: 2310-10-70	HWY: STH 60	COUNTY: WASHINGTON	CONSTRUCTION DETAILS	SHEET	E

FILE NAME : j:\projects\d2_23101060\V8\021001_cd.dgn PLOT DATE : 29-APR-2011 17:49 PLOT BY : dotr3h PLOT NAME : PLOT SCALE : 200:1
WISDOT/CADDS SHEET 42

ATTACHMENT - E

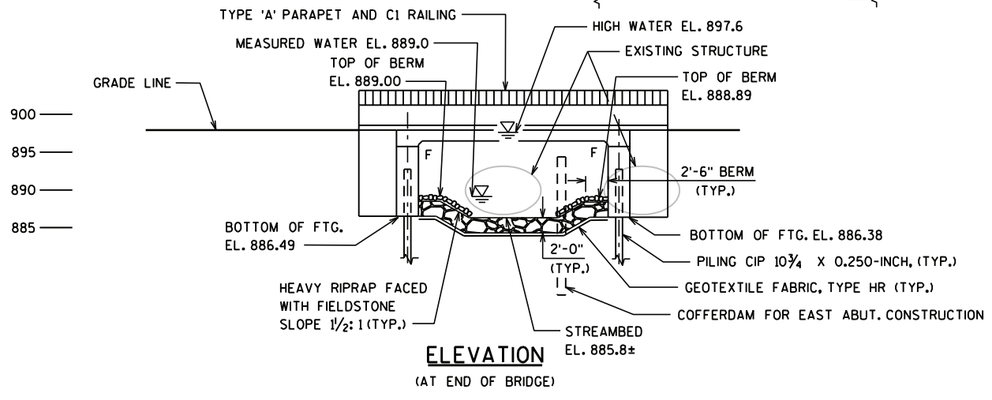


PLAN

SINGLE SPAN CONCRETE FLAT SLAB BRIDGE

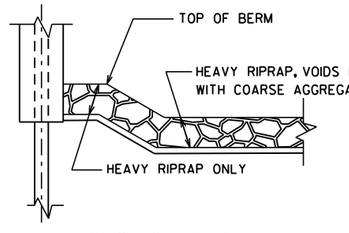
HYDRAULIC DATA

Q_{100}	1300 C.F.S.
VELOCITY	12.4 F.P.S.
HIGH WATER	EL. 896.23 (100 YEAR)
HIGH WATER	EL. 890.71 (2 YEAR)
WATERWAY AREA	104.8 S.F.
DRAINAGE AREA	19.2 SQ. MILES
OVERTOPPING FREQUENCY	N/A
SCOUR CRITICAL CODE	8



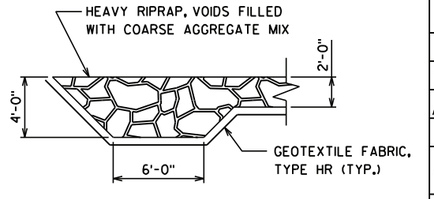
ELEVATION

(AT END OF BRIDGE)



SECTION A-A

RIPRAP DETAIL BENEATH BRIDGE



SECTION B-B

RIPRAP DETAIL AT INLET AND OUTLET

DESIGN DATA

STRUCTURE IS DESIGNED FOR FUTURE WEARING SURFACE OF 20#/SQ. FT.

LIVE LOAD:

DESIGN LOADING	HL-93
INVENTORY RATING FACTOR	RF= 1.23
OPERATING RATING FACTOR	RF= 1.59
MAX. STD. PERMIT VEHICLE LOAD	250 KIPS

ULTIMATE DESIGN STRESSES:

CONCRETE MASONRY SUPERSTRUCTURE	f'c = 4,000 psi
ALL OTHER	f'c = 3,500 psi
HIGH STRENGTH BAR STEEL REINFORCEMENT, GRADE 60	fy = 60,000 psi

TRAFFIC DATA

ADT = 18,800 (2010)
26,300 (2030)

RDS = 45 M.P.H.

LIST OF DRAWINGS

1. GENERAL PLAN
2. CROSS SECTION AND QUANTITES
3. SUBSURFACE EXPLORATION
4. WEST ABUTMENT
5. WEST ABUTMENT DETAILS
6. EAST ABUTMENT
7. EAST ABUTMENT DETAILS
8. GENERAL ABUTMENT DETAILS
9. SUPERSTRUCTURE LAYOUT
10. SUPERSTRUCTURE CROSS SECTION
11. SUPERSTRUCTURE DETAILS
12. VERTICAL FACE PARAPET
13. STEEL RAILING, TYPE C1

CONSULTANT CONTACT

KRISTOFER OLSON
OMNNI ASSOCIATES, INC.
(920) 735-6900

BRIDGE OFFICE CONTACT

WILLIAM DREHER
(608) 266-8489

GENERAL NOTES

DRAWINGS SHALL NOT BE SCALED.

BAR STEEL REINFORCEMENT SHALL BE EMBEDDED 2" CLEAR UNLESS OTHERWISE SHOWN OR NOTED.

SLAB FALSEWORK SHALL BE SUPPORTED ON PILES OR SUBSTRUCTURE, UNLESS ALTERNATE METHOD IS APPROVED BY THE ENGINEER.

THE SLOPE OF FILL IN FRONT OF THE ABUTMENTS AND THE STREAMBED SHALL BE COVERED WITH HEAVY RIPRAP AND GEOTEXTILE FABRIC TO THE EXTENT SHOWN ON THIS SHEET, ON THE CROSS SECTION AND IN THE ABUTMENT DETAILS.

THIS STRUCTURE WILL REPLACE THE EXISTING CULVERT WITH TWIN MULTIPLATE ARCHES. THE CULVERT WAS BUILT IN 1984 AND EXTENDED 10 FEET TO THE SOUTH IN 1995.

THE FIRST OR FIRST TWO DIGITS OF THE BAR MARK SIGNIFIES THE BAR SIZE.

BENDING DIMENSIONS FOR REINFORCING BARS ARE OUT TO OUT.

AT THE BACKFACE OF ABUTMENTS, ALL EXCAVATED VOLUME NOT OCCUPIED BY THE NEW STRUCTURE SHALL BE BACKFILLED WITH STRUCTURE BACKFILL.

THE EXISTING GROUND LINE SHALL BE USED AS THE UPPER LIMITS OF EXCAVATION.

◓ TEMPORARY SHORING B-66-185, SEE ROADWAY PLANS FOR ADDITIONAL DETAILS "CEDAR CREEK BRIDGE STAGING".

CEDAR CREEK FLOW WILL BE DIVERTED BETWEEN THE EAST AND WEST EXISTING CULVERTS FOR CONSTRUCTION OF THE NEW CHANNEL AND REMOVAL OF THE EXISTING CULVERTS. SEE THE ROADWAY PLANS FOR "CEDAR CREEK BRIDGE STAGING". DIVERSION OF FLOW WILL BE PAID FOR UNDER "STREAM FLOW DIVERSION OF CEDAR CREEK".

FOUNDATION DATA

ABUTMENTS TO BE SUPPORTED ON 10 3/4-INCH CIP PILING DRIVEN TO A REQUIRED DRIVING RESISTANCE OF 130 TONS ** PER PILE. ESTIMATED LENGTH = 71 FEET AT EAST ABUTMENT AND 60 FEET AT WEST ABUTMENT.

** THE FACTORED AXIAL RESISTANCE OF PILES IN COMPRESSION USED FOR DESIGN IS THE REQUIRED DRIVING RESISTANCE MULTIPLIED BY A RESISTANCE FACTOR OF 0.5 USING MODIFIED GATES TO DETERMINE DRIVEN PILE CAPACITY.

BENCH MARKS (NAVD 88)

NO.	DESCRIPTION	ELEV.
BM106	CHISELED SQUARE ON NE WING WALL B-66-80-84, STA. 78-07.30 CEDAR PKWY, 44.16' RT.	896.48
BM107	CAP ON SB USH 45, NW PARAPET WALL B-66-49-89, STA. 731+56.49, 85.33' LT.	918.20

WISCONSIN
KRISTOFER R. OLSON
E-35236
APPLETON, WI
PROFESSIONAL ENGINEER

4/27/11

NO.	DATE	REVISION	BY

ORIGINAL PLANS PREPARED BY
OMNNI ASSOCIATES

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN SECTION

STATE PROJECT NUMBER
2310-10-70

STRUCTURE B-66-185

STH 60 OVER CEDAR CREEK

COUNTY WASHINGTON		TOWN POLK	
DESIGN SPEC. AASHTO LRFD 4TH EDITION		LOAD HL-93	CONST. SPEC. 2012
DESIGNED BY KRO	DESIGN CK'D. JAW	DRAWN BY SSO	PLANS CK'D. KRO

APPROVED William C. Dreher FOR 08/01/11
CHIEF STRUCTURAL DESIGN ENGINEER — DATE

GENERAL PLAN

SHEET 1 OF 13

708

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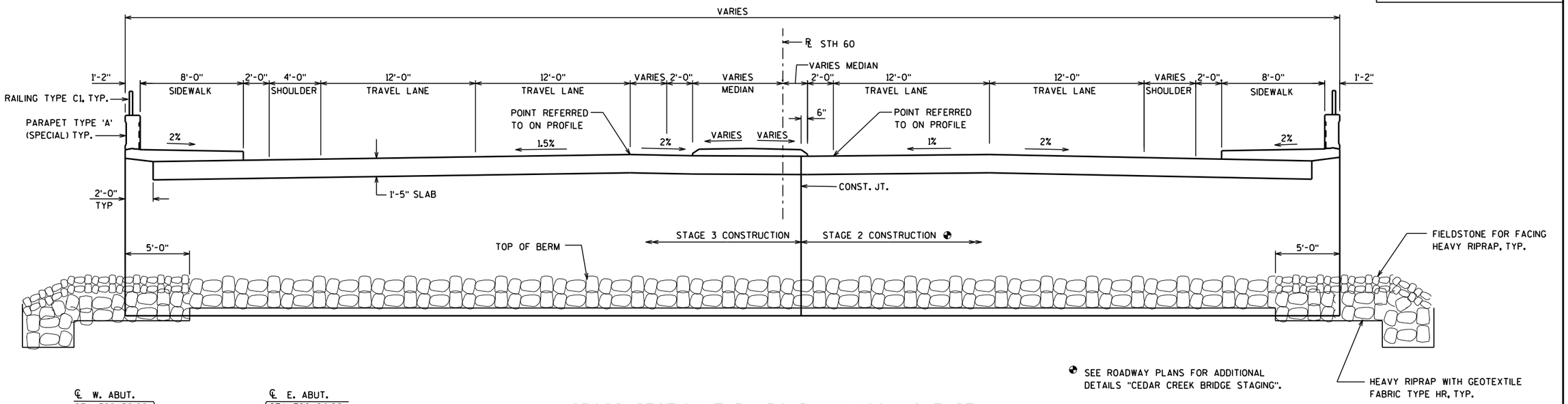
FILE NAME : F:±TR±JOBS±E1951A10±Sheets±B-66-185±B-66-185 01 gp.dgn PLOT BY : olsonk PLOT DATE: 4/27/2011 3:43:44 PM

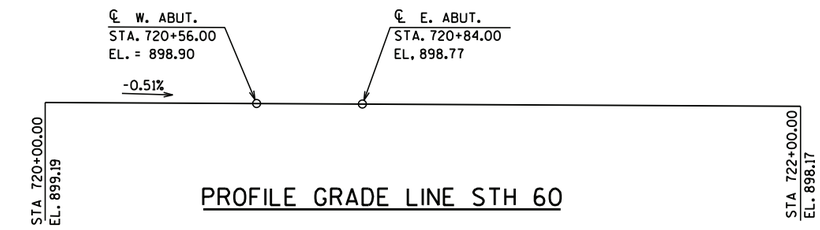
ATTACHMENT - F

STATE PROJECT NUMBER
2310-10-70



✣ SEE ROADWAY PLANS FOR ADDITIONAL DETAILS "CEDAR CREEK BRIDGE STAGING".

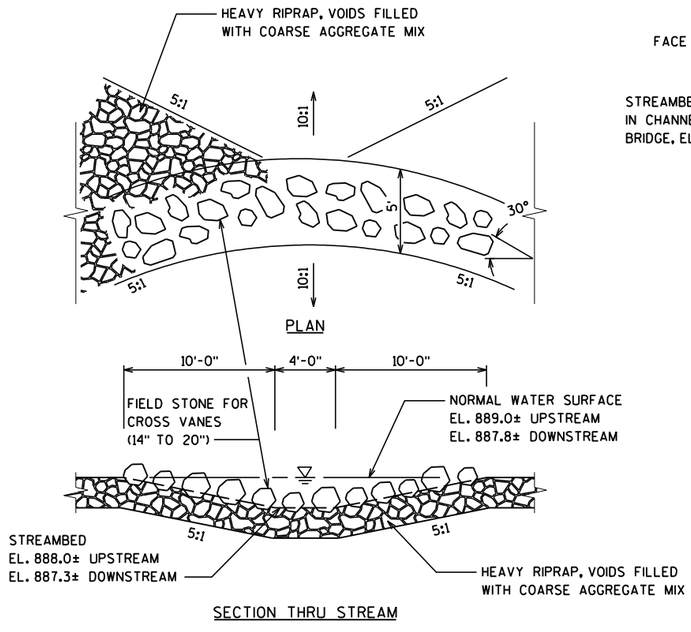
CROSS SECTION THRU ROADWAY LOOKING EAST



PROFILE GRADE LINE STH 60

TOTAL ESTIMATED QUANTITIES

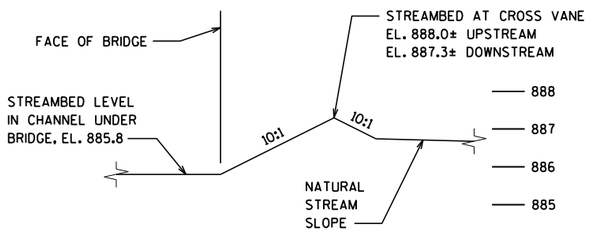
ITEMS NO.	BID ITEMS	UNIT	SUPER.	WEST ABUT.	EAST ABUT.	TOTALS
203.0200.01	REMOVING OLD STRUCTURE (STA 720+68)	LS	——	——	——	1
203.0200.02	REMOVING OLD STRUCTURE (STA 720+85)	LS	——	——	——	1
206.1000	EXCAVATION FOR STRUCTURES BRIDGES (B-66-185)	LS	——	——	——	1
206.5000	COFFERDAMS (B-66-185)	LS	——	——	——	1
210.0100	BACKFILL STRUCTURE	CY	——	490	480	970
502.0100	CONCRETE MASONRY BRIDGES	CY	186.8	117.3	114.9	419
502.3200	PROTECTIVE SURFACE TREATMENT	SY	321	——	——	321
502.6102	MASONRY ANCHORS TYPE S 1/2-INCH	EA	40	——	——	40
505.0405	BAR STEEL REINFORCEMENT HS BRIDGES	LB	——	6740	6660	13400
505.0605	BAR STEEL REINFORCEMENT HS COATED BRIDGES	LB	29620	2350	2270	34240
513.7005	RAILING STEEL TYPE C1 (B-66-185)	LS	——	——	——	1
550.2104.S	PILING CIP CONCRETE 10¾ X 0.250-INCH	LF	——	840	994	1834
516.0500	RUBBERIZED MEMBRANE WATERPROOFING	SY	——	23	22	45
517.1015.S	CONCRETE STAINING MULTI-COLOR (B-66-185)	SF	161	——	——	161
517.1050.S	ARCHITECTURAL SURFACE TREATMENT (B-66-185)	SF	161	——	——	161
606.0300	RIPRAP HEAVY	CY	——	180	180	360
612.0206	PIPE UNDERDRAIN UNPERFORATED 6-INCH	LF	——	30	30	60
612.0406	PIPE UNDERDRAIN WRAPPED 6-INCH	LF	——	113	111	224
645.0120	GEOTEXTILE FABRIC TYPE HR	SY	——	240	240	480
SPV.0035.02	FIELDSTONE FOR FACING HEAVY RIPRAP	CY	——	35	35	70
SPV.0035.04	FIELDSTONE FOR CROSS VANES	CY	——	5	5	10
SPV.0035.05	COARSE AGGREGATE MIX, STRUCTURE B-66-185	CY	——	25	25	50
SPV.0105.04	STREAM FLOW DIVERSION OF CEDAR CREEK, STA 720+70	LS	——	——	——	1
SPV.0165.02	TEMPORARY SHORING B-66-185	SF	——	500	500	1000
	NON-BID ITEMS					
	FILLER	SIZE	——	——	——	½"&¾"



SECTION THRU STREAM

CROSS VANE DETAILS

(AT ENDS OF BRIDGE)



STREAM PROFILE

AT CROSS VANES
(DOWNSTREAM SHOWN)

NO.	DATE	REVISION	BY

ORIGINAL PLANS PREPARED BY

OMNI ASSOCIATES

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN SECTION

STRUCTURE B-66-185

CONST. SPEC.	2011	DRAWN BY	SSO	PLANS CK'D.	KRO

CROSS SECTION AND QUANTITIES

SHEET 2 OF 13

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ATTACHMENT - F

Cedar Creek Bridge - MSE Walls Exterior Aesthetic Treatments

ATTACHMENT - G

Cedar Creek Bridge - Interior Parapets Fieldstone form-liner Aesthetic Treatments

ATTACHMENT - H

On STH 60 Looking West at Communication Tower - Before Construction

On STH 60 Looking West at Communication Tower - During Construction

On STH 60 Looking West at Communication Tower - After Construction

ATTACHMENT - I