



AGENDA
CHARTER TOWNSHIP OF MERIDIAN
TOWNSHIP BOARD – SPECIAL MEETING
April 16, 2019 6:00 pm

1. CALL MEETING TO ORDER
2. PLEDGE OF ALLEGIANCE/INTRODUCTIONS
3. ROLL CALL
4. PRESENTATION
5. CITIZENS ADDRESS AGENDA ITEMS AND NON-AGENDA ITEMS
6. APPROVAL OF AGENDA
7. BOARD DISCUSSION ITEMS
 - A. Local Street Improvement Program & Funding
 - B. Okemos Road Camelback Bridge
 - C. Electronic Board Packets
8. COMMENTS FROM THE PUBLIC
9. OTHER MATTERS AND BOARD MEMBER COMMENTS
10. ADJOURNMENT

All comments limited to 3 minutes, unless prior approval for additional time for good cause is obtained from the Supervisor.
Appointment of Supervisor Pro Tem and/ or Temporary Clerk if necessary.

Individuals with disabilities requiring auxiliary aids or services should contact the Meridian Township Board by contacting:
Township Manager Frank L. Walsh, 5151 Marsh Road, Okemos, MI 48864 or 517.853.4258 - Ten Day Notice is Required.
Meeting Location: 5151 Marsh Road, Okemos, MI 48864 Township Hall



7. A.

To: Township Board Members
**From: Derek N. Perry, Assistant Township Manager
Director of Public Works & Engineering**
Date: April 16, 2019
Re: Local Street Improvement Program & Funding

One of our Action Plan Goals for 2019, is to develop and implement a strategic plan to increase our annual funding for local streets in conjunction with the Township Transportation Commission. As the Board is aware, the Transportation Commission reviewed and discussed the existing local street pavement program and its associated funding in September and October of 2018.

Based on their review, they recommended that the Township Board pursue a consistent and level source of funding that would bring all 147 miles of local streets within the Township to a “good” rating (PASER 8). They also recommended that the funding source provide enough ongoing financial support to maintain the entire road network at that rating every year.

As we have discussed in the past, in order to reach a condition rating of “8” on all of the local streets in Meridian, it would require a funding level of \$3.5 million annually over a ten (10) year period. As a point of reference, our system average PASER rating is a 4.48. With our current dedicated local street millage of 0.2479 generating only \$425,400 per year, the funding source is not adequate to rehabilitate and maintain the existing pavement in the neighborhoods.

On Tuesday night, we will present several options for the Township Board to consider as we evaluate the local street improvement program going forward.



7. B.

To: Township Board Members
**From: Derek N. Perry, Assistant Township Manager
Director of Public Works & Engineering**
Date: April 16, 2019
Re: Okemos Road Camelback Bridge

In 2020, the Ingham County Road Department (ICRD) will be replacing the existing Okemos Road vehicular bridges over the Red Cedar River. Both bridges are functionally obsolete and structurally deficient and funding for this project has been secured by the ICRD.

As part of the replacement project, the ICRD is required to perform an environmental assessment and programmatic Section 4(f) evaluation because of the existing bridges location and the camelback's historical nature.

On January 24, 2019, the ICRD and its consultant, DLZ, held a stakeholder meeting at the Meridian Township Hall. In attendance were members of the Meridian Parks and Recreation Commission, Friends of Historic Meridian, and members of the Township M-Team.

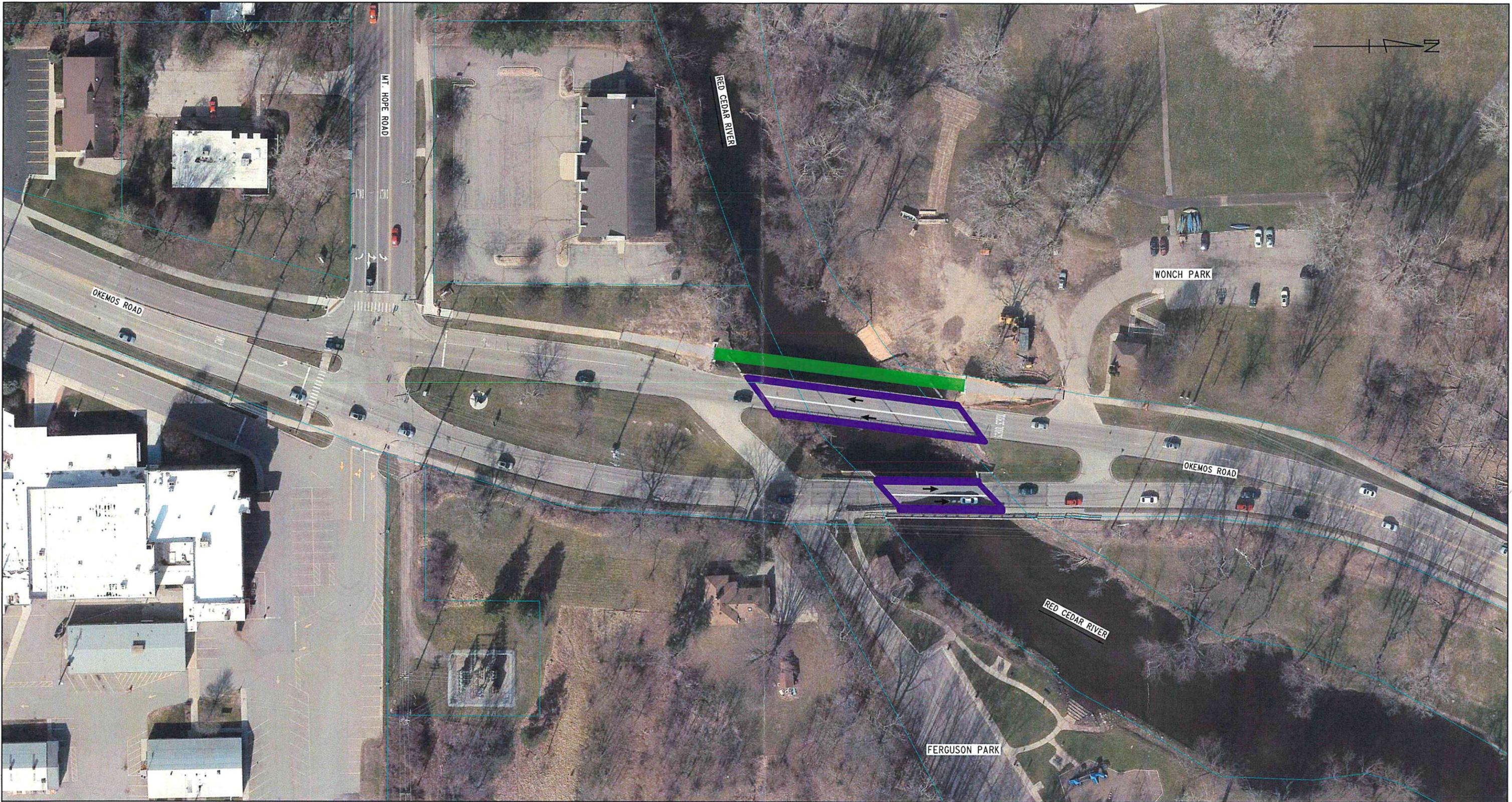
During the stakeholder meeting four (4) alternatives were presented: (1) Reconstruct and Rehabilitate Bridges on existing alignment, (2) Build New Bridge on New Alignment- Maintain Historical Bridge, (3) Build New Bridge on New Alignment- Remove Historical Bridge, and (4) No build.

To assist with our decision making process, we contracted with DLZ to inspect and prepare a report of their findings on the current condition of the camelback bridge, the cost to make the necessary repairs to serve as a pedestrian bridge and potential future costs to maintain it.

The scoping report has been completed and is attached. According to the engineers at DLZ, it is estimated that \$497,000 would be required for making the needed repairs. The results of the scoping report were also shared with the Friends of Historic Meridian in mid-March.

The next step in the process will be a public meeting held by the Ingham County Road Department at the Township Municipal Building on April 25, 2019. The public involvement meeting will be from 4 to 8 pm in the Town Hall Room. Our Team will attend and participate.

Attachment(s):
Bridge concept drawings
Purpose and Need Document
DLZ Bridge Scoping Report
ICRD Information Meeting Press Release



OKEMOS ROAD BRIDGE
IMPROVEMENT PROJECT
ENVIRONMENTAL ASSESSMENT

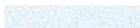


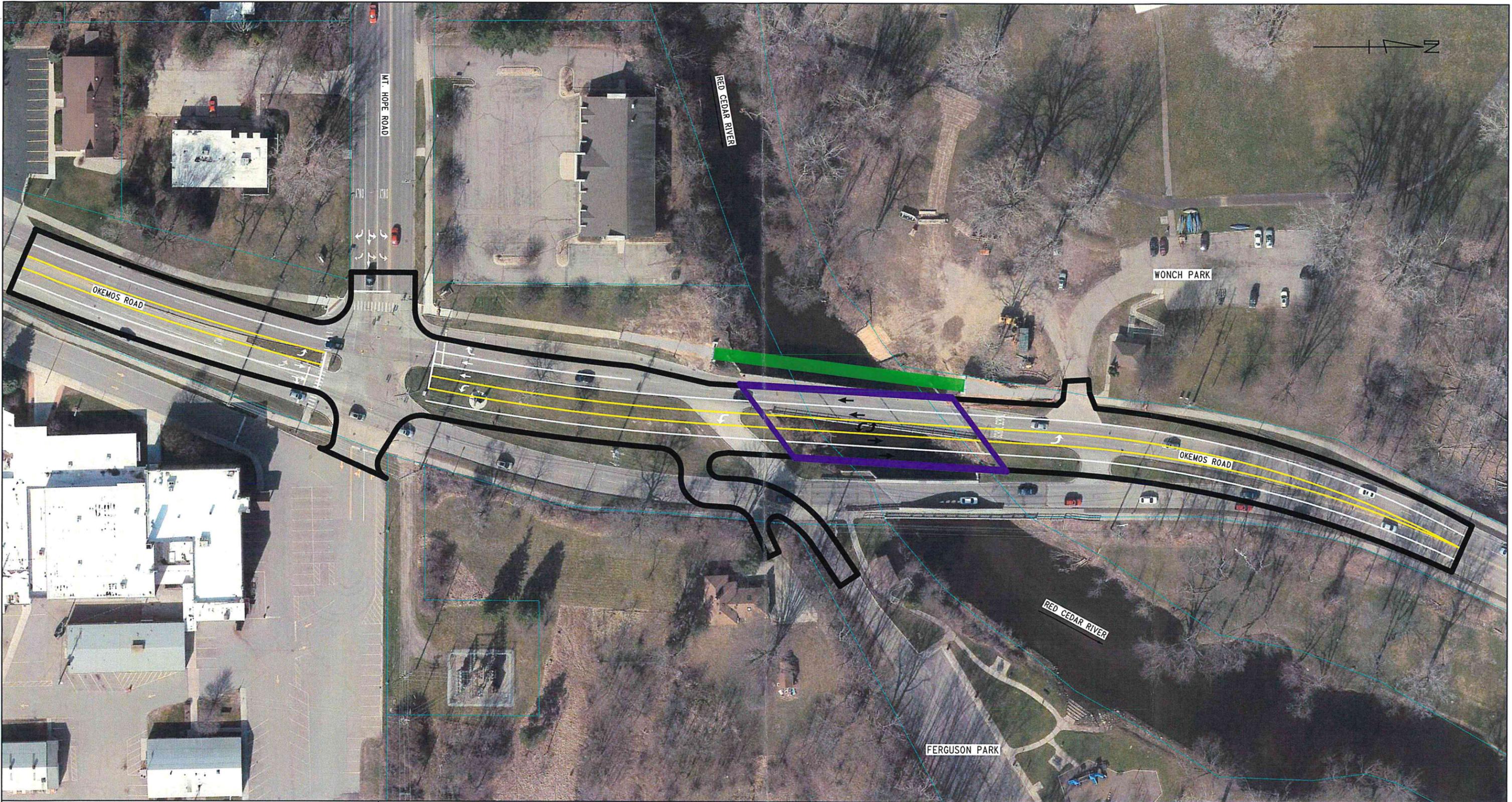
FIGURE 1
ALTERNATIVE 1
RECONSTRUCT AND REHABILITATE BRIDGES
ON EXISTING ALIGNMENT



NOVEMBER 2018

LEGEND

- | | |
|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
|  PROPOSED BRIDGE WORK |  PROPOSED SIDEWALK |
|  PROPOSED ROADWAY |  EXISTING SIDEWALK |
|  PROPOSED PAVEMENT MARKING |  EXISTING PEDESTRIAN BRIDGE |
|  PROPOSED PAVEMENT MARKING |  PARCEL BOUNDARY |



OKEMOS ROAD BRIDGE
IMPROVEMENT PROJECT
ENVIRONMENTAL ASSESSMENT



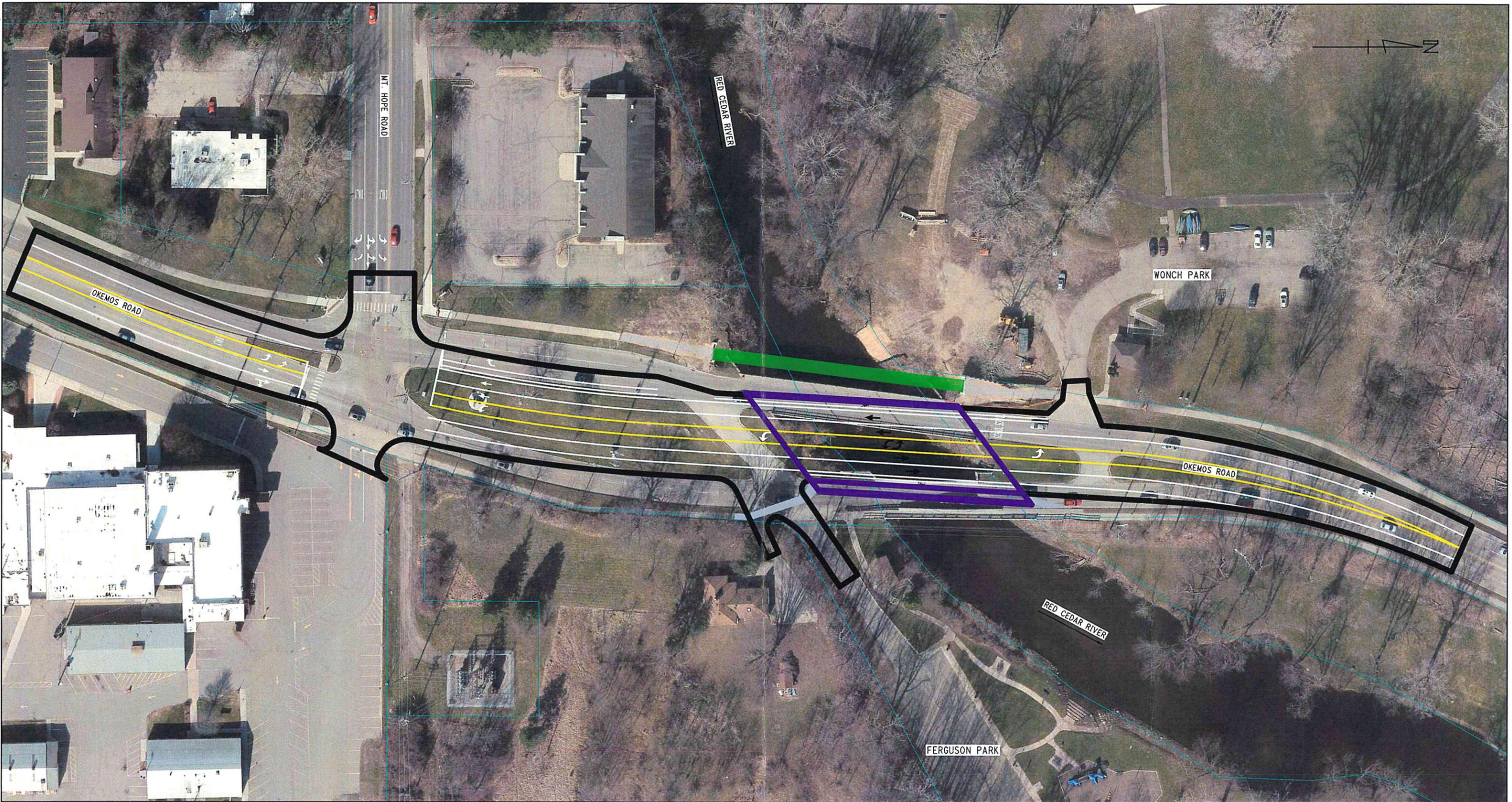
FIGURE 2
ALTERNATIVE 2
BUILD NEW BRIDGE ON NEW ALIGNMENT
(MAINTAIN HISTORICAL BRIDGE)



NOVEMBER 2018

LEGEND

- | | | | |
|---------------------------------------------------------------------------------------|---------------------------|---------------------------------------------------------------------------------------|----------------------------|
|  | PROPOSED BRIDGE WORK |  | PROPOSED SIDEWALK |
|  | PROPOSED ROADWAY |  | EXISTING SIDEWALK |
|  | PROPOSED PAVEMENT MARKING |  | EXISTING PEDESTRIAN BRIDGE |
|  | PROPOSED PAVEMENT MARKING |  | PARCEL BOUNDARY |



OKEMOS ROAD BRIDGE
IMPROVEMENT PROJECT
ENVIRONMENTAL ASSESSMENT



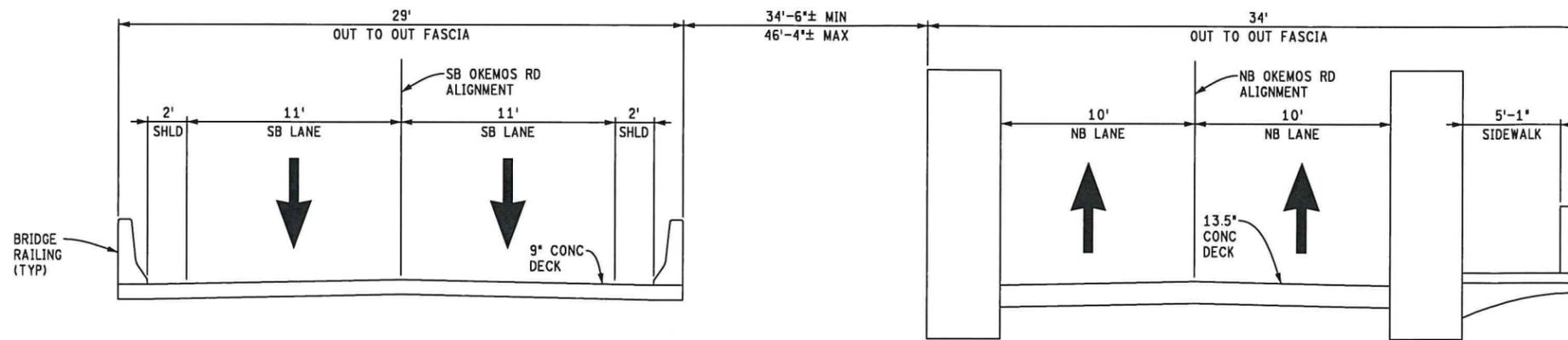
FIGURE 3
ALTERNATIVE 3
BUILD NEW BRIDGE ON NEW ALIGNMENT
(REMOVE HISTORICAL BRIDGE)



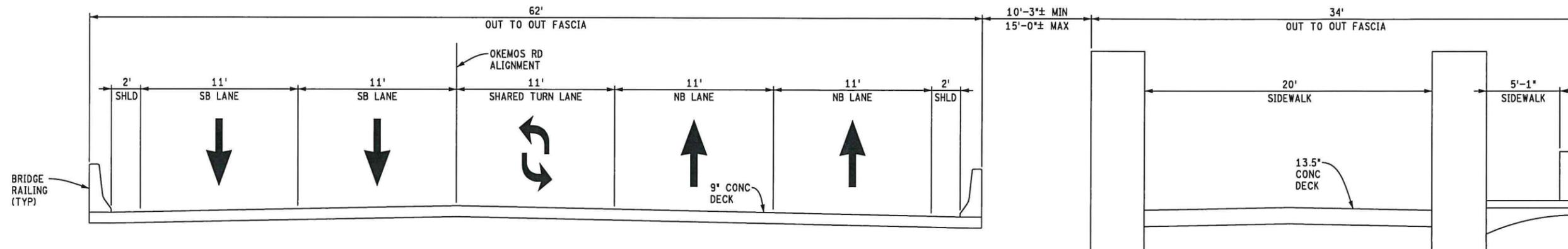
NOVEMBER 2018

LEGEND

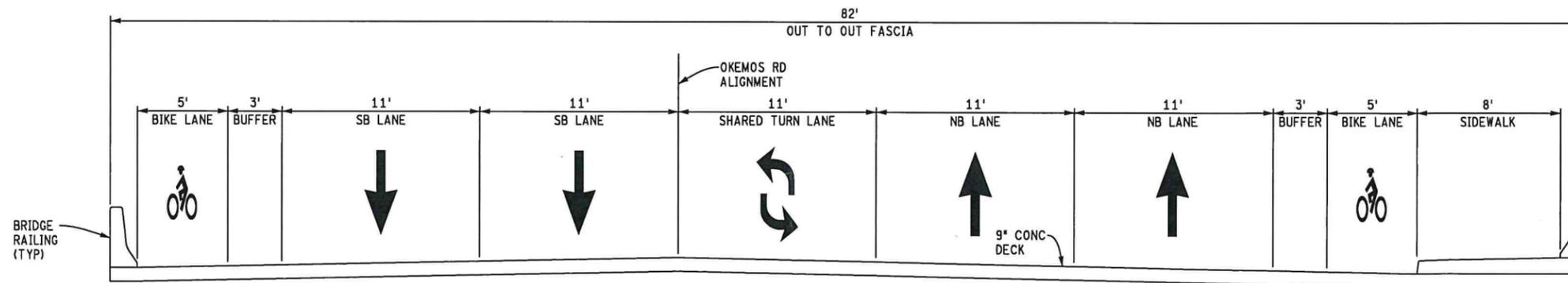
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|---------------------------------------------------------------------------------------|---------------------------|---------------------------------------------------------------------------------------|----------------------------|
|  | PROPOSED BRIDGE WORK |  | PROPOSED SIDEWALK |
|  | PROPOSED ROADWAY |  | EXISTING SIDEWALK |
|  | PROPOSED PAVEMENT MARKING |  | EXISTING PEDESTRIAN BRIDGE |
|  | PROPOSED PAVEMENT MARKING |  | PARCEL BOUNDARY |



ALTERNATIVE 1
LOOKING NORTH



ALTERNATIVE 2
LOOKING NORTH



ALTERNATIVE 3
LOOKING NORTH

OKEMOS ROAD BRIDGE
IMPROVEMENT PROJECT
ENVIRONMENTAL ASSESSMENT



FIGURE 4
PROPOSED ALTERNATIVE CROSS SECTIONS



NOVEMBER 2018

1.0 – PURPOSE AND NEED

1.2 Project Purpose

The primary purpose of the proposed project is to replace the functionally obsolete and structurally deficient bridges over the Red Cedar River to maintain safe and efficient traffic flow of vehicles, bicycles, and pedestrians along the Okemos Road corridor between West Grand River Avenue and I-96. A secondary purpose is to address the existing undesirable hydraulic conditions relating to bridges' geometry and skew in relation to the river channel.

1.3 Project Need

This section provides information about the existing bridge and hydraulic deficiencies and evaluates potential safety and hydraulic enhancements. Information supporting the need for the project is discussed in detail below.

1.3.1 Northbound Bridge

The need to replace the existing northbound bridge is driven by deteriorating condition and its functional deficiencies. Additionally, the clear travel way is only 20 feet wide and no shoulders are present on the bridge. The current width is below current design standards for this type of roadway per the American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets*. This width does not adequately accommodate wide vehicles, such as trucks, busses, and recreational vehicles, passing side by side. The northbound bridge cannot be rehabilitated to increase the width due to the nature of camelback bridges. The two camelback shaped stringers support the entire load of the bridge with traffic driving between the two stringers. The stringers were designed to support a 20-foot-wide roadway. Widening the bridge would increase the dead load and further restrict the allowable vehicle weights.

The reinforced concrete structure has been deteriorated by almost 100 years of weather and wear. As a result, the bridge is currently posted for vehicle weight restrictions. If structural deterioration is not corrected, further restrictions or bridge closure may be necessary. The structural concrete is heavily delaminated including the girders, deck, and sidewalks. Delamination is a failure that develops inside of the concrete without being obvious on the surface. Numerous delaminations have spalled (i.e., chipped) allowing steel reinforcement to be exposed and potentially deteriorated. Many concrete surfaces also have significant cracking. Cracks on the bottom surface of the deck have leachate and stalactites, particularly along the centerline joint. This is evidence of moisture leaking through the deck.

The most recent bridge inspection found heavy deterioration in the tension zones of the camelback stringers. Both stringers have deep spalls and exposed steel reinforcement along the bottoms. The bottom row of steel reinforcement is exposed in two critical areas: midspan of the bridge and at the steel reinforcement overlap locations. This steel reinforcement provides a majority of the bridge's ability to support vehicle loads and is critical to the bridge's strength. Because of the location and depth to which a concrete repair would be required on both stringers, it would be unrealistic to expect the stringers to withstand the necessary amount of material removal to allow for a sound structural repair. Patching new material to inferior 100-year-old concrete would be required and may not result in a structurally sound repair. The lifespan of such repairs would be difficult to predict and would do nothing to slow the continuing decline of the remaining original concrete. The stringers have previous patches that have started to crack and delaminate.

The concrete deck also has heavy deterioration both in the roadway and on the sidewalks. The top surface has longitudinal and transverse cracking throughout. The bottom surface also has longitudinal and transverse cracking throughout. The transverse cracks have leachate and stalactites. Delaminations are scattered throughout. Many delaminations have spalled and steel reinforcement is exposed. Exposed steel is susceptible corrosion and section loss. According to the original plans, the deck has only one layer of steel reinforcement, located in the lower portion of the deck. This steel reinforcement is responsible for transferring the vehicle loads from the deck to the stringers. Section loss will decrease the deck's ability to transfer the vehicle loads resulting in further restrictions to vehicles. The deck has previous patches that have started to crack and delaminate.

Scour is not currently an issue and the bridge footings are considered stable based on the July 2018 bridge inspection. Scour is the removal of sediment (sand, topsoil, etc.) by moving water, such as a stream. Bridge abutments are ideally located outside of the stream's influence and parallel to the stream. When that is not feasible, scour protection measures, such as cofferdams, rock (riprap), or other materials are installed to keep the bridge safe. The northbound bridge has a total length of 90 feet compared to the 180-foot southbound bridge with the same amount of water passing beneath. Both abutments are within the stream. The south abutment footing has exposed areas making it susceptible to future scour. No scour protection is in place.

1.3.2 Southbound Bridge

The need to replace the existing southbound bridge is driven by deteriorating condition and its functional deficiencies. Additionally, no shoulders are present on the bridge. Per AASHTO's *A Policy on Geometric Design of Highways and Streets*, shoulders are required. The southbound bridge underwent emergency superstructure repairs in 2016 to keep the bridge open. The 2016 rehabilitation included expansion joint replacement, pin and hanger replacement, diaphragm replacement, and steel beam repairs totaling approximately \$400,000. Not all structural issues were addressed by this emergency project. Even after the repairs, the bridge is still in poor condition and nearing the end of its service life.

The bridge is currently posted for vehicle weight restrictions. If structural deterioration is not corrected, further restrictions or closure may be necessary. Numerous holes were found in the structural steel beams in 2015. In 2016, new flange and web plates were bolted to the existing beams where holes in the beams were found. The north expansion joint is leaking, leaving the beam ends below the bridge deck susceptible to future deterioration. Approximately half of the paint system (three layers of paint: primer, intermediate coat, and top coat) on the steel beams is failing. Only the steel immediately adjacent to the repairs was repainted. Other local areas of paint system failure were not repainted leaving the steel beams susceptible to further deterioration. The concrete deck has mild delamination and spalling. The deck has been previously patched, particularly along the centerline and transverse joints. The transverse cracks on the bottom surface of the deck are leaching. The deck fascia also has leaching cracks.

1.3.3 Hydraulics

The northbound bridge crosses the Red Cedar River at a skew, resulting in the bridge abutments protruding from the natural stream bank into the river channel, disrupting and restricting the natural flow of the river and leaving the abutments susceptible to scour. This restriction has a lesser hydraulic area than the natural stream, resulting in higher backwater surface elevations, which increase the potential of upstream flooding. The Red Cedar River is prone to flooding and would benefit from a greater hydraulic area at the Okemos Road crossing. Scour is the removal of stream material (soil) by moving water. Scour generally occurs during flood events when a larger amount of water is flowing faster than normal. Abutments and piers obstruct the flow of the stream causing the water to flow even faster around them. The south abutment of the northbound bridge has already been exposed by scour. Most bridge failures in the United States are related to scour/hydraulics.

2.0 – ALTERNATIVES

Alternative 1: Reconstruct and Rehabilitate Bridges on Existing Alignment

Alternative 1 included reconstruction of a new two-lane southbound bridge and rehabilitation of the existing two-lane northbound bridge. See Figures 1 and 4. Both bridges would continue to be used for vehicles and the Okemos Road alignment would not change. The existing pedestrian bridge on the west side of Okemos Road would remain in place.

Under this alternative, the structural and aesthetics deficiencies of the northbound bridge would be rehabilitated and restored. Rehabilitation and restoration would include: concrete chipping and patching of delaminated or spalled concrete areas; clean and inject cracks in concrete members; replacement of roadway approach slabs; place riprap (large stone) at the south abutment; place healer/sealer or epoxy overlay on the top surface of the bridge deck and sidewalk; remove brush along approaches near the bridge; and, seal or replace all roadway/deck joints.

The proposed southbound bridge would carry two 11-foot lanes of traffic with two-foot shoulders. The total width of the proposed southbound bridge would be 29 feet. New abutments would be placed behind the existing abutments increasing the length to approximately 186 feet long. The existing steel beams are approximately 36 inches deep. To minimize the grade impacts on the approaches, proposed beams would be of similar depth. A two-span bridge with 42-inch prestressed concrete bulb-tee beams or a three-span bridge with 36-inch prestressed concrete bulb-tee beams would be sufficient.

It is estimated that this alternative would cost approximately \$3,635,000.

This alternative was eliminated from consideration as it would not address the functional obsolescence of the existing northbound bridge (i.e., the bridge cannot be widened to meet the minimum required widths without affecting the historic integrity of the bridge). Additionally, the bridge is so structurally deficient that it cannot be rehabilitated to meet minimum acceptable load requirements without affecting the historic integrity of the bridge. Finally, this alternative would perpetuate the undesirable hydraulic conditions caused by the existing substructure's geometry.

2.2.3 Alternative 2: Build New Bridge on New Alignment - Maintain Historical Bridge

Alternative 2 included construction of a single five-lane bridge to carry both northbound and southbound traffic. Under this alternative, the southbound bridge would be demolished, and the northbound bridge would be converted for pedestrian use. The new bridge would consist of two travel lanes in each direction and a center left turn lane to provide left turns in either directions (i.e., two-way left-turn lane (TWLTL)). See Figures 2 and 4. The existing pedestrian bridge on the west side of Okemos Road would remain in place. Under this alternative, Meridian Township (or another entity) would be required to take ownership of the northbound (historic camelback bridge) and would be responsible for future maintenance.

The bridge would carry five 11-foot lanes of traffic with two-foot shoulders. The total width of the bridge would be 62 feet. New abutments would be placed behind the existing abutments of the southbound bridge for a total length to approximately 186 feet. The existing steel beams are approximately 36 inches deep. To minimize the grade impacts on the approaches, proposed beams should be of similar depth. A two-span bridge with 42-inch prestressed concrete bulb-tee beams or a three-span bridge with 36-inch prestressed concrete bulb-tee beams would be sufficient. The bridge abutments outside of the river channel greatly improving the hydraulics and less susceptible to scour.

Under this alternative, the location of the camelback bridge would restrict the new bridge width and prevent the addition of an attached non-motorized facility on the east side of the new bridge (Figure 4). Therefore, pedestrian and bicycle traffic would use the camelback bridge as a non-motorized path.

This alternative would require realignment of Okemos Road and the Okemos Road/Mt. Hope intersection and removal of the grass median to account for the new single bridge location. The northbound roadway would be shifted to the west of the existing northbound bridge, while the southbound roadway would be shifted slightly to the east of the existing southbound bridge. The existing laneage at the intersection would remain unchanged except for the TWLTL, which would run from Mt. Hope Road to the Wonch Park entrance. The entrances to both Wonch Park and Ferguson Park may require minor grading depending on the magnitude of grade changes.

It is estimated that this alternative would cost approximately \$5,995,000.

2.2.4 Alternative 3: Build New Bridge on New Alignment – Remove Historical Bridge

Alternative 3 is the same as Alternative 2 except both existing bridges would be demolished, and five-foot bike lanes with three-foot buffers would be added to both sides of the new bridge. Additionally, a non-motorized facility would be incorporated on the east side of the new bridge for a total width of 82 feet. See Figures 3 and 4.

It is estimated that this alternative would cost approximately \$6,700,000.

2.2.1 Alternative 4: No Build

The "No Build" alternative assumes no work beyond standard repair and maintenance. The existing deteriorated conditions documented in the bridge inspection report would not be addressed and the existing structure would provide an estimated remaining life of only 10-20 years. This alternative does not meet the Purpose and Need for the proposed project as it does not address the functional obsolescence or structural deficiencies or improve the hydraulic conditions of the river. Per NEPA guidance, the No Build Alternative is carried through the environmental study to provide a baseline comparison against the Preferred Alternative.



INNOVATIVE IDEAS
EXCEPTIONAL DESIGN
UNMATCHED CLIENT SERVICE

DRAFT BRIDGE SCOPING REPORT

NORTHBOUND OKEMOS ROAD OVER RED CEDAR RIVER

*MERIDIAN TOWNSHIP, MICHIGAN
INGHAM COUNTY ROAD DEPARTMENT*

Mark T. Lessens, P.E.
Registered Professional Engineer
State of Michigan No. 36092

Prepared For:

MERIDIAN TOWNSHIP, MICHIGAN

Prepared By:



DLZ Job No. 1841-6819-01

March 8, 2019

1425 Keystone Ave, Lansing, MI 48911-4039 | OFFICE 517.393.6800 | ONLINE WWW.DLZ.COM

Akron Burns Harbor Chicago Cincinnati Cleveland Columbus Detroit Fort Wayne Frankfort Indianapolis Joliet Kalamazoo Lansing
Louisville Madison Melvindale Munster Pittsburgh Saint Joseph South Bend Toledo



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Bridge Scoping Report
NB Okemos Road over
Red Cedar River

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Structure Description

The existing structure carries northbound Okemos Road over the Red Cedar River in Meridian Township, Michigan. The structure is located approximately 500 feet north of E. Mt. Hope Road, and approximately 75 feet east of the SB Okemos Road Bridge over the Red Cedar River. The driveway entrance to Ferguson Park is located approximately 80 feet south of the bridge, along the east side of the road.

The single-span structure was constructed in 1924 and consists of two, reinforced concrete arches (one along each side), supporting a reinforced concrete deck. The roadway clear-width is 20'-0" between the curbs, and 21'-9" face-to-face of arches. A reinforced concrete sidewalk is cantilevered from the exterior side of the east arch. The structure length is 90'-0" between abutment reference points. The sidewalk clear-width is 5'-1". The concrete arches serve as the vehicle bridge railings on the structure. The sidewalk railing and the railing on top of the bridge abutments on the west side of the structure consist of a reinforced concrete brush block, vertical concrete spindles and a reinforced concrete top rail.

The existing abutments are reinforced concrete and may be supported on timber piles.

Scoping Findings

The bridge scoping was completed by DLZ personnel on March 1, 2019. The work consisted of sounding all exposed concrete surfaces that were reachable by either the MDOT Reach-All or ladders. The top surface of the vehicle lanes was also sounded. The term "sounding" means that a hammer or piece of rebar was tapped or dropped against a concrete surface. The "sound" that results is either a high-pitch "tinging" sound, indicating intact or "sound" concrete is present (not delaminated), or, a lower, "thud" sound, which indicates concrete that is "loose" or "debonded" from the surrounding or underlying concrete (i.e. delaminated). The areas of delaminated concrete, whether original concrete or patching material, were quantified as requiring rehabilitation or repair work. The top surface of the sidewalk was covered with snow and was not sounded. The MDOT Reach-All was utilized to sound the exterior face of the west arch and the underside of the deck and sidewalk. The overall condition of the structure is poor.

DECK

The top surface of the deck consists of a concrete overlay that was placed in 2000. The surface is map cracked, along with several wider cracks. Two delaminated concrete areas were found, totaling 12.5 square feet.

The underside of the deck slab is in poor condition, with numerous failed concrete patches and areas of delaminated, spalled and cracked concrete, with exposed and corroded reinforcing steel (**Photos 15 through 20**).

ARCHES/STRINGERS

The portions of the concrete arches above the deck have many areas of concrete patches from the 2000 rehabilitation project. Most of the patched areas are still intact and bonded to the original concrete. Several

areas of delaminated concrete were found on the inside and outside of both arches, including areas on the concrete columns on the west arch (**Photos 3, 4 and 5**). The arches, above the deck surface level, are in fair condition.

The lower portion of the arches (stringers), below the deck level, have several areas of failed concrete patches, as well as spalled, cracked and delaminated concrete, with exposed and corroded reinforcing steel (**Photos 23 through 30**). The arches/stringers, below the deck level, are in poor condition.

SIDEWALK

The top sidewalk surface was covered with snow and could not be inspected. From the most recent bridge inspection report, there are numerous hairline transverse and longitudinal cracks present. The bottom of the sidewalk has numerous areas of delaminated and spalled concrete, with exposed and corroded reinforcing steel (**Photos 21 and 22**). The sidewalk fascia is highly deteriorated, with cracked, spalled, delaminated and highly deteriorated concrete present along much of its length (**Photos 9, 10 and 11**).

RAILINGS

The railings along the east edge of the sidewalk and on top of the return walls on the west side of the structure consist of concrete, horizontal top and bottom rails and vertical spindles. Portions of these railing sections are in good/fair condition (**Photo 6**), while most of the railing sections are in fair/poor condition or highly deteriorated condition (**Photos 7, 8, 12 through 14**).

ABUTMENTS

The abutments have several leaching, vertical cracks, and one delaminated concrete area in the southwest return wall. The joint between the backwall and return wall is leaking in the southwest quadrant. There is a minor scour area in front of the south abutment that should be repaired. The abutments are in poor condition.

Load Capacity

The existing load posting for vehicles is 42 tons for a 1 Unit Truck, 65 tons for a 2 Unit Truck, and 71 tons for a 3 Unit truck.

Recommendations

To maintain the historical significance of the bridge and allow it to carry pedestrian loading in the future, the following rehabilitation work is recommended:

- Removal and replacement of the existing sidewalk fascia area below the existing sidewalk railing
 - Removal and replacement of the existing railings on top of the abutment walls in the northwest and southwest quadrants
 - Chipping and patching of the deteriorated concrete areas on the arches above the deck level, and on the stringers, below the deck level
-

- Chipping and patching of the top of the deck and sidewalk surfaces, followed by placement of an epoxy overlay
- Chipping and patching of the underside of the deck and sidewalk slabs
- Chipping, patching and concrete crack injection on the abutments and return walls
- Placement of riprap at abutment scour area
- Placement of silane treatment on all exposed concrete surfaces

Summary of Repair Costs

A breakdown of the cost of the recommended rehabilitation work is shown in Appendix B. The estimated cost to complete all the recommended repairs noted above is \$497,000 in current year (2019) dollars. The cost estimate includes a 20% contingency, 10% for mobilization and 6% for inflation.

In 2000, a contractor completed similar concrete repair work as recommended above at a cost of approximately \$350,000. The concrete conditions noted during this bridge scoping are consistent with the life expectancy of concrete patching work of approximately 20 years. The Township anticipate that an expenditure of approximately \$500,000 every 20 years will be required to maintain the bridge in serviceable condition, even for pedestrian only usage.

In addition to concrete repair work being required approximately every 20 years, aesthetic and routine maintenance work will likely be necessary every 5-10 years to maintain the aesthetic value and other items at the structure. These may include concrete coatings, repairs to approaches, fences, railings, etc. These costs would be in addition to concrete repair costs.



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APPENDIX A - Photographs



Photograph No. 1
West Elevation Looking Northeast



Photograph No. 2
West Elevation Looking Southeast



Photograph No. 3
Area on West Side of East Arch Near North End with Delaminated Concrete



Photograph No. 4
Area on West Side of East Arch Near North End with Delaminated Concrete



Photograph No. 5

West and South Faces of West Arch Column Near North End with Cracked and Delaminated Concrete Patch



Photograph No. 6

Portions of East Sidewalk Railing, Interior Face, in Good/Fair Condition



Photograph No. 7
Portions of East Sidewalk Railing, Interior Face, in Fair/Poor Condition



Photograph No. 8
Portions of East Sidewalk Railing, Interior Face, in Poor Condition with Advanced Deterioration



Photograph No. 9
Elevation of East Sidewalk Fascia with Heavy Spalling - South Portion



Photograph No. 10
Elevation of East Sidewalk Fascia with Heavy Spalling - North Portion



Photograph No. 11

Close-up of East Sidewalk Fascia with Advanced Deterioration



Photograph No. 12

Elevation of Railing in Southwest Quadrant (Interior Face) with Delaminated and Spalled Concrete with Exposed, Corroded Reinforcing Steel



Photograph No. 13

Elevation of Railing in Southwest Quadrant (Exterior Face) with Delaminated and Spalled Concrete with Exposed, Corroded Reinforcing Steel



Photograph No. 14

Elevation of Railing in Northwest Quadrant (Exterior Face) with Delaminated and Spalled Concrete with Exposed, Corroded Reinforcing Steel



Photograph No. 15

Large Area of Failed Patch Material with Exposed, Corroded Reinforcing Steel and Large Delaminated Concrete Area on Underside of Deck Slab Along East Arch. Note Spalled Concrete with Exposed, Corroded Reinforcing Steel on Bottom of East Arch at Left.



Photograph No. 16

Multiple Failed Patches and Exposed Reinforcing Steel on Underside of Deck Slab, East Side, North End



Photograph No. 17

Delaminated and Spalled Concrete, with Exposed and Corroded Reinforcing Steel on Underside of Deck Slab



Photograph No. 18

Delaminated Concrete and Delaminated Patches on Underside of Deck Slab



Photograph No. 19

Failed Patch on Underside of Deck Slab, West Side, North End



Photograph No. 20

Close-up of Heavily Delaminated and Spalled Concrete Area on Underside of Deck Slab, with Corroded and Exposed Reinforcing Steel, Middle of Deck, North End



Photograph No. 21

General Condition of Underside of Sidewalk Along East Fascia, with Leaching Cracks



Photograph No. 22

Area of Spalled Concrete with Exposed, Corroded Reinforcing Steel on Underside of Sidewalk



Photograph No. 23
*Delaminated and Cracked Concrete, and Concrete Patch, on East Side of West Arch,
Below Deck Level, Near North End*



Photograph No. 24
*Delaminated Concrete with Exposed, Corroded Reinforcing Steel on West Side of East Arch,
Below Deck Level, Near North End*



Photograph No. 25
*Delaminated Concrete with Exposed, Corroded Reinforcing Steel on West Side of East Arch
Below Deck Level, Near Mid-Span*



Photograph No. 26
Cracked and Delaminated Concrete on East Side of West Arch, Below Deck Level, North End



Photograph No. 27

Large Area of Delaminated, Cracked and Spalled Concrete on East Side of West Arch, Below Deck Level, Near South End, with Exposed and Corroded Reinforcing Steel



Photograph No. 28

Area of Delaminated, Cracked and Spalled Concrete on East Side of West Arch, Below Deck Level, Near South End, with Exposed and Corroded Reinforcing Steel



Photograph No. 29

*Looking South at Underside of West Arch, Below Deck Level, Near Mid-Span.
Cracked, Delaminated and Spalled Concrete along East Edge.*



Photograph No. 30

Crack in Patch Material on East Side of East Arch, Below Deck Level, Near North End



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EXCEPTIONAL DESIGN
UNMATCHED CLIENT SERVICE

APPENDIX B – Cost Estimate

2019

LAP - BRIDGE COST ESTIMATE WORKSHEET
- CPM, REHAB, REPLACE -

REV. 2/1/2019

OWNER: Ingham County Road Dept FISCAL YEAR: 2019 Out to Out Curb to Curb DATE: 3/7/2019
 REGION: University LENGTH WIDTH WIDTH ENGINEER: DLZ Michigan, Inc.
 TSC: Lansing PR: 362602 MP: 9.219 90'-0" 35.875 20'-0" STRUCTURE ID: 3880
 BRIDGE ID: N/A
 LOCATION: NB Okemos Road over Red Cedar River
 PRIMARY WORK ACTIVITY Miscellaneous Rehabilitation DECK AREA: 2,508 SFT STR. TYPE: Concrete
 OTHER WORK: CLEAR ROADWAY: 1,798 SFT Girder - Thru

WORK ACTIVITY	Michigan Bridge Design Manual	QUANTITY	UNIT	UNIT COST	TOTAL
NEW BRIDGE (increase deck area based on design standards and hydraulic requirements)					
Single or Multiple Spans, Grade Separation	(add demo, approach, MOT)		SFT	\$220.00 /SFT	
Single Span, Over Water	Length < 100ft (add demo, approach, MOT)		SFT	\$300.00 /SFT	
Multiple Spans, Over Water	Length > 100ft (add demo, approach, MOT)		SFT	\$220.00 /SFT	
Precast Culvert	Length < 40ft (add demo, approach, MOT)		SFT	\$350.00 /SFT	
NEW SUPERSTRUCTURE					
New Superstructure, Grade Separation	(incl. remove exist deck/super; add MOT & approach)		SFT	\$160.00 /SFT	
New Superstructure, Over Water	(incl. remove exist deck/super; add MOT & approach)		SFT	\$200.00 /SFT	
WIDENING					
Structure Widening, _____ ft	(incl. deck/super/sub widening, add approach transition)		SFT	\$270.00 /SFT	
NEW DECK					
New Bridge Deck & Barrier	(incl. remove exist deck/railing, add approach, MOT)		SFT	\$75.00 /SFT	
DEMOLITION					
Entire Structure, Grade Separation			SFT	\$33.00 /SFT	
Entire Structure, Over Water			SFT	\$46.00 /SFT	
DECK & ARCH REPAIR / TREATMENTS					
Sidewalk Railing and Other Railing Replacement	(incl. removal and replacement)	187.0	FT	\$750.00 /FT	\$140,250
Concrete Brush Block / Curb Patch	(incl. hand chipping and formwork)	187.0	FT	\$75.00 /FT	\$14,025
Concrete Barrier Patch	(incl. hand chipping and formwork)		SFT	\$60.00 /SFT	
Concrete Patching - Arches and Deck Bottom	(incl. hand chipping)	450.0	CFT	\$300.00 /CFT	\$135,000
Deep Overlay	(incl. joint repl & hydro)		SFT	\$32.00 /SFT	
Epoxy Overlay	(incl. warranty)	251.0	SYD	\$40.00 /SYD	\$10,040
Expansion Joint Gland Replacement	(remove and replace elastomeric gland)		FT	\$85.00 /FT	
Expansion Joint Replacement	(incl. removal)		FT	\$550.00 /FT	
Full Depth Patch			SFT	\$65.00 /SFT	
Healer / Sealer	(penetrates cracks in bridge deck)		SYD	\$15.00 /SYD	
HMA Overlay with WP membrane			SYD	\$52.00 /SYD	
Overlay Removal	(Epoxy: \$8/syd Latex: \$16/syd HMA: \$7/syd)		SYD	\$16.00 /SYD	
Reseal Bridge Joints			FT	\$16.00 /FT	
Shallow Overlay	(incl. joint repl & hydro)		SFT	\$22.00 /SFT	
SUPERSTRUCTURE REPAIR					
Bearing Realignment / Replacement	(incl. temporary supports)		EA	\$5,000.00 EA	
Heat Straightening	(incl. clean and coat)		EA	\$50,000.00 EA	
Pack Rust Repair	(greater than 3/8" separation)		FT	\$500.00 /FT	
Paint - Complete	(incl. clean & coat)		SFT	\$20.00 /SFT	
Paint - Partial / Spot / Zone	(incl. clean & coat - \$20k minimum)		SFT	\$40.00 /SFT	
PCI Beam End Blockout	(incl. temporary supports)		EA	\$7,200.00 EA	
Pin & Hanger Replacement	(incl. temporary supports)		EA	\$7,000.00 EA	
Structural Steel Repair	(based on 6ft length; for stiffeners use \$1,200 ea)		EA	\$3,000.00 EA	
SUBSTRUCTURE REPAIR					
Substructure Patching and Crack Injection	(measured x 2) replace if repair area > 30%	45.0	CFT	\$260.00 /CFT	\$11,700
Substructure Replacement	(incl. temporary supports, excavation)		CFT	\$140.00 /CFT	
Substructure Horizontal Surface Sealer			SYD	\$35.00 /SYD	
Temporary Supports	(add \$1,200 for ea steel beam - stiffeners)		EA	\$2,000.00 EA	
MISCELLANEOUS					
Articulating Concrete Block System (ACB)			SYD	\$200.00 /SYD	
Concrete Surface Coating			SYD	\$24.00 /SYD	
Culvert Cleanout			FT	\$30.00 /FT	
Epoxy Crack Injection	(structural crack repair)		FT	\$40.00 /FT	
Metal Mesh Panels	(48" width, max 6'-6" length)		SFT	\$15.00 /SFT	
Pressure Relief Joint	(use when approach concrete roadway exceeds 1,000ft)		FT	\$100.00 /FT	
Riprap	(assume 10ft distance around perimeter of substructure)	20.0	SYD	\$160.00 /SYD	\$3,200
Silane Treatment	(penetrating sealer for concrete surfaces)	5,835.0	SFT	\$3.50 /SFT	\$20,423
Slope Protection Repairs			SYD	\$100.00 /SYD	
Other					
STRUCTURE CONSTRUCTION BUDGET					\$334,638
ROAD WORK					
Approach Pavement, 12" RC	(incl. removal; add curb, gutter, guardrail) 20' ea. end		SYD	\$175.00 /SYD	
Approach Curb & Gutter	(incl. removal) 20' ea. quadrant		FT	\$54.00 /FT	
Guardrail Anchorage to Bridge	(each quadrant)		EA	\$1,500.00 /EA	
Guardrail	(incl. removal) < 200ft beyond reference line		FT	\$22.00 /FT	
Guardrail Terminal	(each quadrant)		EA	\$2,200.00 /EA	
Roadway Approach Work	(beyond approach pavement)	1.0	LSUM	\$20,000.00 /LSUM	\$20,000
Utilities			LSUM		
TRAFFIC CONTROL <i>Unit Cost to be determined by Region or TSC Traffic & Safety</i>					
Part Width Construction			LSUM		LSUM
Crossovers			EA	\$300,000.00 /EA	
Temporary Traffic Signals			set	\$25,000.00 /set	
RR Flagging			LSUM		LSUM
Detour			LSUM		LSUM
RELATED ROAD/TRAFFIC CONSTRUCTION BUDGET					\$20,000
CONTINGENCY	(10% - 20%) (use higher contingency for small projects)	20	%	\$355,000.00	\$71,000
MOBILIZATION	(estimate at 10%)	10	%	\$426,000.00	\$43,000
INFLATION	(assume 3% per year, beginning in 2020)	6	%	\$469,000.00	\$28,000

(Does not include PE or CE)

TOTAL CONSTRUCTION BUDGET **\$497,000**



INNOVATIVE IDEAS
EXCEPTIONAL DESIGN
UNMATCHED CLIENT SERVICE

APPENDIX C – Current Bridge Inspection Report (07/19/2018)

MICHIGAN DEPARTMENT OF TRANSPORTATION

STR 3880

BRIDGE SAFETY INSPECTION REPORT

Facility OKEMOS ROAD NB	Latitude / Longitude 42.713 / -84.4309	MDOT Structure ID 33200082000B010	Structure Condition Poor Condition(4)	
Feature RED CEDAR RIVER	Length / Width / Spans 89.9 / 27.9 / 1	Owner County: Ingham(33)		
Location 0.1 MI N OF S LMETS OF OKE	Built / Recon. / Paint / Ovly. 1924 / / / 2000	TSC Lansing(17)	Operational Status P Posted for load(426571)	
Region / County University(6) / Ingham(33)	Material / Design 1 Concrete / 25 Girder- Thru	Last NBI Inspection 07/19/2018 / ZOYR	Scour Evaluation 8 Stable Above Footing	

NBI INSPECTION

ZOYR

Inspector Name	Agency / Company Name	Insp. Freq.	Insp. Date
Evan Currie	Great Lakes Engineering Group	12	07/19/2018

GENERAL NOTES

Posting signs in place on both ends of bridge YES

DECK

07/16 07/17 07/18

	07/16	07/17	07/18	
1. Surface (SIA-58A)	5	5	5	Concrete surface. Open map cracking throughout surface. 1 sft open spall at center. There is an open crack at the south reference line. Abrasion along reference lines. (07/18) Concrete surface. Open map cracking throughout surface. There are open transverse and longitudinal cracks that begin at the south reference line and extend 30' into Span 1s. There is an open crack in the south refernce line. Abrasion along reference lines. (07/17) Concrete surface. Open map cracking throughout surface. There are open transverse and longitudinal cracks that begin at the south reference line and extend 30' into Span 1s. There is an open crack in the south reference line. Damage to the end due to plows. (07/16)
2. Expansion Joints	5	N	N	(07/18) End joints are unsealed. Comments moved to "Other Joints" section. (07/17) Material missing from reference line joints, debris has filled in joint with vegetation growth. (07/16)
3. Other Joints	N	5	4	No seal between concrete deck and HMA approaches. HMA patches along both reference lines. Vegetation at north end joint. (07/18) No seal between concrete deck and HMA approaches. HMA patches along both reference lines. (07/17) N/A. (07/16)
4. Railings	5	5	5	Concrete through girders act as bridge railings. Cracks, delamination, and scaled concrete in both. Decorative concrete railing along outside of east sidewalk is spalled at north end (40 lft). (07/18) Concrete through girders act as bridge railings. Cracks, delamination, and scaled concrete in both. Decorative concrete railing along outside of east sidewalk is spalled at north end (40 lft). (07/17) Vehicular railings are the reinforced concrete through arch girders. Both girders have map cracking and small spalls. There is a decorative concrete railing along the outside of the east girder between the sidewalk. Some panels of the pedestrian railing are heavily cracked, delaminated and spalled along the top rail and spindles. There is 50 lft of scaling and deterioration along the east railing fascia. There is a 2 sft spall in the west girder located at the north end, inside. (07/16)
5. Sidewalks or Curbs	6	5	5	Concrete sidewalk along the outside of the east through girder. Sidewalk has numerous hairline transverse and longitudinal cracks. Areas of spalling along the sidewalk fascia. Heavy leaching on the underside of the sidewalk. (07/18) Concrete sidewalk along the outside of the east through girder. Sidewalk has numerous hairline transverse and longitudinal cracks. Areas of spalling along the sidewalk fascia. Heavy leaching on the underside of the sidewalk. (07/17) Concrete sidewalk along the outside of the east through girder. Sidewalk has numerous hairline transverse and longitudinal cracks. Areas of STS's along the sidewalk fascia. Heavy leaching on the underside of the sidewalk. (07/16)

MICHIGAN DEPARTMENT OF TRANSPORTATION

STR 3880

BRIDGE SAFETY INSPECTION REPORT

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OKEMOS ROAD NB	42.713 / -84.4309	33200082000B010	Poor Condition(4)	
Feature	Length / Width / Spans	Owner		
RED CEDAR RIVER	89.9 / 27.9 / 1	County: Ingham(33)		
Location	Built / Recon. / Paint / Ovly.	TSC	Operational Status	
0.1 MI N OF S LMETS OF OKE	1924 / / / 2000	Lansing(17)	P Posted for load(426571)	
Region / County	Material / Design	Last NBI Inspection	Scour Evaluation	
University(6) / Ingham(33)	1 Concrete / 25 Girder- Thru	07/19/2018 / ZOYR	8 Stable Above Footing	

6. Deck Bottom Surface (SIA-58B) 5 4 4 Concrete underside has transverse cracks with leachate and stalactites spaced at every 10'. Scattered unsound concrete patches throughout. Leachate and stalactites along the centerline joint full length of the structure. Scattered incipient spalls throughout and spalls to steel along bottom of girders. Heavy leaching on the underside of the east sidewalk. (07/18)
 Concrete underside has transverse cracks with leachate and stalactites spaced at every 10'. Scattered concrete patches throughout. Leachate and stalactites along the centerline joint full length of the structure. Scattered incipient spalls throughout and spalls to steel along east girder (25 sft total). Heavy leaching on the underside of the sidewalk. in the bottom of the sidewalk area. (07/17)
 Concrete underside has transverse cracks with leachate and stalactites spaced at every 10'. Scattered concrete patches throughout. Leachate and stalactites along the centerline joint full length of the structure. (1) 4 sft spall at the northwest portion of the concrete underside. Heavy leaching on the underside of the sidewalk. There is 12 sft total of incipient spalls in the bottom of the sidewalk area. (07/16)

7. Deck Surface (SIA-58) 5 4 4 Surface: Concrete surface. Open map cracking throughout surface. 1 sft open spall at center. There is an open crack at the south reference line. Abrasion along reference lines. Soffit: Concrete underside has transverse cracks with leachate and stalactites spaced at every 10'. Scattered unsound concrete patches throughout. Leachate and stalactites along the centerline joint full length of the structure. Scattered incipient spalls throughout and spalls to steel along bottom of girders. Heavy leaching on the underside of the east sidewalk. (07/18)
 Surface: Concrete surface. Open map cracking throughout surface. There are open transverse and longitudinal cracks that begin at the south reference line and extend 30' into Span 1s. There is an open crack in the south reference line. Abrasion along reference lines. Soffit: Concrete underside has transverse cracks with leachate and stalactites spaced at every 10'. Scattered concrete patches throughout. Leachate and stalactites along the centerline joint full length of the structure. Scattered incipient spalls throughout and spalls to steel along east girder (25 sft total). Heavy leaching on the underside of the sidewalk. in the bottom of the sidewalk area. (07/17)
 East fascia has heavy leaching and STS's in areas. West fascia has no deficiencies noted. Concrete surface has tight transverse and map cracking. Deck underside has cracks with leachate and stalactites. (4 sft) spall in the northwest corner of the deck underside. There is 12 sft total of incipient spalls in the bottom of the sidewalk area. (07/16)

8. Drainage There are four deck drains with PVC extensions along each side of the bridge. Open deck drains along the east sidewalk fascia. (07/18)
 There are four deck drains per edge of through girders with extensions collect runoff from bridge. Drain extensions through deck consist of PVC pipe. Open deck drains along the east sidewalk fascia. (07/17)
 There are (4) Deck drains per edge of through girders with extensions collect runoff from bridge. Drain extensions through deck consist of PVC pipe. Open deck drains along the east sidewal/fascia. (07/16)

SUPERSTRUCTURE

07/16 07/17 07/18

MICHIGAN DEPARTMENT OF TRANSPORTATION

STR 3880

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Region / County	Material / Design	Last NBI Inspection	Scour Evaluation	
University(6) / Ingham(33)	1 Concrete / 25 Girder- Thru	07/19/2018 / ZOYR	8 Stable Above Footing	

9. Stringer (SIA-59)	5	4	4	<p>Top side: Shallow spall on the inside of the west girder at the north end (2sft). Wet map cracks in the north and south ends of both through girders. Concrete patches on girders. Bottom side: Longitudinal cracks, delamination, and exposed steel at the bottom surface of girders. West girder: Full length of patch is failing along bottom of beam. Spalls and delamination expose 20 lft of steel at midspan (loss of section on exposed steel). Delaminated patches along bottom of girder at ends. East girder: Two failed patches with delamination and exposed steel plus additional delamination away from patches. (07/18)</p> <p>Top side: Shallow spall on the inside of the west girder at the north end (2sft). Wet map cracks in the north and south ends of both through girders. Concrete patches on girders. Bottom side: Longitudinal cracks, delamination, and exposed steel at the bottom surface of girders. West girder: Full length of patch is failing along bottom of beam. Spalls and delamination expose 20 lft of steel at midspan. Delaminated patches along bottom of girder at ends. East girder: Two failed patches with delamination and exposed steel plus additional delamination away from patches. (07/17)</p> <p>Shallow spall on the inside of the west girder at the north end (2sft). Wet map cracks in the north and south ends of both through girders. Concrete patches on girders. Some longitudinal cracks, delamination, and some exposed steel at the bottom surface of girders. (1.5") open longitudinal crack near midspan of the west girder, approximately 30' long, There is 15' of exposed steel in the west girder. The middle portion of the west girder is delaminated along the bottom surface. Rust stains present at midspan of the east girder. 6' of exposed steel along the bottom of the east girder near midspan. Patches along the bottom of both girders are failing. (07/16)</p>
10. Paint (SIA-59A)	N	N	N	<p>(07/18) (07/17) None present. (07/16)</p>
11. Section Loss	N	1	1	<p>Delamination and spalls in concrete through girders. Loss of section in exposed steel at bottom of girders. (07/18) Delamination and spalls in concrete through girders. (07/17) N/A (07/16)</p>
12. Bearings	N	N	N	<p>(07/18) (07/17) None present. (07/16)</p>

SUBSTRUCTURE

07/16 07/17 07/18

13. Abutments (SIA-60)	4	4	4	<p>Concrete abutment walls. Open vertical crack at west quarter point of south abutment plus two cracks in SW returnwall. 3/4" wide wet vertical crack at the east end of the north abutment wall near the returnwall. Crack opens into a spall near the waterline. Leaching vertical cracks present in both abutments. Leaching cracks in all returnwalls. South footing is exposed up to 20" at center. (07/18)</p> <p>Concrete abutment walls. Vertical crack at west quarter point of south abutment plus two cracks in SW returnwall. 3/4" wide open wet vertical crack at the east end of the north abutment wall near the returnwall. Crack opens into a spall near the waterline. Leaching vertical cracks present in both abutments. Leaching cracks in all returnwalls. 18" of footing face exposed at the southeast corner, 16" near midspan and 0" near the west end at the south abutment (less exposure than last inspection). (07/17)</p> <p>Concrete abutment walls. (3/4" wide) open wet vertical crack at the east end of the north abutment wall near the returnwall. Crack opens into a spall near the waterline. Leaching vertical cracks present in both abutments. Leaching cracks in all returnwalls. (16") of footing face exposed at the southeast corner, (25") near midspan and (0") near the west end at the south abutment. (07/16)</p>
14. Piers (SIA-60)	N	N	N	<p>(07/18) (07/17) None present. (07/16)</p>
15. Slope Protection	N	N	N	<p>(07/18) (07/17) No slope protection under the structure protecting the abutment walls. (07/16)</p>

MICHIGAN DEPARTMENT OF TRANSPORTATION

STR 3880

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RED CEDAR RIVER	89.9 / 27.9 / 1	County: Ingham(33)		
Location	Built / Recon. / Paint / Ovly.	TSC	Operational Status	
0.1 MI N OF S LMETS OF OKE	1924 / / / 2000	Lansing(17)	P Posted for load(426571)	
Region / County	Material / Design	Last NBI Inspection	Scour Evaluation	
University(6) / Ingham(33)	1 Concrete / 25 Girder- Thru	07/19/2018 / ZOYR	8 Stable Above Footing	

16. Channel (SIA-61)	5	5	5	Vegetation growth over interlocking blocks along the southeast bank. Up to 20" of footing face exposed at the south abutment. No scour protection. (07/18) Vegetation growth over interlocking blocks along the southeast bank. Up to 18" of footing face exposed at the south abutment. (07/17) Vegetation growth over Interlocking blocks along the southeast bank. Northeast bank has minor erosion. Scour hole with 2' of footing face exposed at the south abutment. (07/16)
17. Scour Inspection	4	4	4	South footing exposed up to 20" at center. No scour protection. (07/18) South footing exposed 18" at east end, 16" in middle, 0" at west end. (07/17) There is observed scour at the south abutment; (16") of footing face exposed at the southeast corner, (25") near midspan and (0") near the west end at the south abutment. (07/16)

APPROACH

07/16 07/17 07/18

18. Approach Pavement	4	4	4	HMA approach pavement over old concrete approaches. Up to 1" wide open transverse and longitudinal cracks in each approach. Scattered spalls and HMA patches. Up to 1" of settlement at the reference lines. (07/18) HMA approach pavement over old concrete approaches, off each end of the structure. Up to 1" wide open transverse and longitudinal cracks in each approach. Scattered spalls along the HMA pavement. Minor spalling of HMA along the south end joint. Up to 1" of settlement at the reference lines. (07/17) HMA approach pavement over old concrete approaches, off each end of the structure. Up to 1" wide open transverse and longitudinal cracks in each approach. Scattered spalls along the HMA pavement. Minor spalling of HMA along the south end joint. Up to 1" of settlement at the reference lines. There is a 4sft open pothole in the outside lane of the south approach. (07/16)
19. Approach Shoulders Sidewalks	5	5	5	Approach sidewalk along the east side of the roadway with minor transverse cracks. Buckled area in sidewalk at the east girder, north end. (07/18) Approach sidewalk along the east side of the roadway with minor transverse cracks. Buckled area in sidewalk at the east girder, north end. (07/17) Approach sidewalk along the east side of the roadway with minor transverse cracks. Buckled area at the east girder, north end. (07/16)
20. Approach Slopes				Heavy brush in all four quadrants. Minor erosion in the NWQ near the returnwall. Heavy erosion in SWQ covered with vegetation. (07/18) Heavy brush in all four quadrants. Minor erosion in the NWQ near the returnwall. (07/17) Heavy brush in all four quadrants. Minor erosion in the NWQ near the returnwall. (07/16)
21. Utilities				None on structure. Overhead lines east, north, and south. (07/18) None on structure. Overhead lines east and north. (07/17) None on structure. (07/16)
22. Drainage Culverts				(1) 12" CSP in the NWQ. (07/18) (1) 12" CSP in the NWQ. (07/17) (1) 12" CSP in the NWQ. (07/16)

MISCELLANEOUS

Guard Rail		Other Items	
Item	Rating	Item	Rating
36A. Bridge Railings	1	71. Water Adequacy	8
36B. Transitions	1	72. Approach Alignment	6
36C. Approach Guardrail	1	Temporary Support	0 No Temporary Supports
36D. Approach Guardrail Ends	1	High Load Hit (M)	No
		Special Insp. Equipment	2
		Underwater Insp. Method	1
False Decking (Timber) Removed to Complete Inspection		N/A - No False Decking	

MICHIGAN DEPARTMENT OF TRANSPORTATION

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Location 0.1 MI N OF S LMTS OF OKE	Built / Recon. / Paint / Ovly. 1924 / / / 2000	TSC Lansing(17)	Operational Status P Posted for load(426571)	
Region / County University(6) / Ingham(33)	Material / Design 1 Concrete / 25 Girder- Thru	Last NBI Inspection 07/19/2018 / ZOYR	Scour Evaluation 8 Stable Above Footing	

Critical Feature Inspections (SIA-92)

	<u>Freq</u>	<u>Date</u>
92A. Fracture Critical		
92B. Underwater		
92C. Other Special		
92D. Fatigue Sensitive		

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SUPPORTING IMAGES

ZOYR 07/19/2018



Document Name: 042.JPG
Category: Elevation
Span Number:
Comments: West elevation



Document Name: 046.JPG
Category: Elevation
Span Number:
Comments: East elevation



Document Name: 018.JPG
Category: Posting
Span Number:
Comments: Northbound advance posting sign (one way bridge, no sign for SB traffic)



Document Name: 020.JPG
Category: Posting
Span Number:
Comments: Northbound posting sign at bridge

MICHIGAN DEPARTMENT OF TRANSPORTATION

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Document Name: 022.JPG
 Category: Approach
 Span Number:
 Comments: South approach



Document Name: 032.JPG
 Category: Approach
 Span Number:
 Comments: Buckled area in northeast approach sidewalk



Document Name: 028.JPG
 Category: Railing
 Span Number:
 Comments: East railing (inside of through girder)



Document Name: 030.JPG
 Category: Railing
 Span Number:
 Comments: East pedestrian railing

MICHIGAN DEPARTMENT OF TRANSPORTATION

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Document Name: 023.JPG
 Category: Deck
 Span Number:
 Comments: Deck surface



Document Name: 041.JPG
 Category: Deck
 Span Number:
 Comments: Underside of east sidewalk



Document Name: 045.JPG
 Category: Deck
 Span Number:
 Comments: Deck bottom



Document Name: 039.JPG
 Category: Superstructure
 Span Number:
 Comments: West girder

MICHIGAN DEPARTMENT OF TRANSPORTATION

STR 3880

BRIDGE SAFETY INSPECTION REPORT

Facility OKEMOS ROAD NB	Latitude / Longitude 42.713 / -84.4309	MDOT Structure ID 33200082000B010	Structure Condition Poor Condition(4)	
Feature RED CEDAR RIVER	Length / Width / Spans 89.9 / 27.9 / 1	Owner County: Ingham(33)		
Location 0.1 MI N OF S LMTS OF OKE	Built / Recon. / Paint / Ovly. 1924 / / / 2000	TSC Lansing(17)	Operational Status P Posted for load(426571)	
Region / County University(6) / Ingham(33)	Material / Design 1 Concrete / 25 Girder- Thru	Last NBI Inspection 07/19/2018 / ZOYR	Scour Evaluation 8 Stable Above Footing	



Document Name: 040.JPG
 Category: Superstructure
 Span Number:
 Comments: East girder



Document Name: 034.JPG
 Category: Substructure
 Span Number:
 Comments: South abutment



Document Name: 035.JPG
 Category: Substructure
 Span Number:
 Comments: North abutment



Document Name: 029.JPG
 Category: Other
 Span Number:
 Comments: Sidewalk along east side

MICHIGAN DEPARTMENT OF TRANSPORTATION

STR 3880

STRUCTURE INVENTORY AND APPRAISAL

Facility OKEMOS ROAD NB	Latitude / Longitude 42.713 / -84.4309	MDOT Structure ID 33200082000B010	Structure Condition Poor Condition(4)	
Feature RED CEDAR RIVER	Length / Width / Spans 89.9 / 27.9 / 1	Owner County: Ingham(33)		
Location 0.1 MI N OF S LMETS OF OKE	Built / Recon. / Paint / Ovly. 1924 / / / 2000	TSC Lansing(17)	Operational Status P Posted for load(426571)	
Region / County University(6) / Ingham(33)	Material / Design 1 Concrete / 25 Girder- Thru	Last NBI Inspection 07/19/2018 / ZOYR	Scour Evaluation 8 Stable Above Footing	

Bridge History, Type, Materials	
27 - Year Built	1924
106 - Year Reconstructed	
202 - Year Painted	
203 - Year Overlay	2000
43 - Main Span Bridge Type	1 25
44 - Appr Span Bridge Type	
77 - Steel Type	0
78 - Paint Type	0
79 - Rail Type	5
80 - Post Type	0
107 - Deck Type	1
108A - Wearing Surface	3
108B - Membrane	0
108C - Deck Protection	0

Structure Dimensions	
34 - Skew	45
35 - Struct Flared	0
45 - Num Main Spans	1
46 - Num Apprs Spans	0
48 - Max Span Length	89.9
49 - Structure Length	89.9
50A - Width Left Curb/SW	0
50B - Width Right Curb/SW	4.9
33 - Median	0
51 - Width Curb to Curb	20
52 - Width Out to Out	27.9
112 - NBIS Length	Y

Inspection Data	
90 - Inspection Date	07/19/2018
91 - Inspection Freq	12
92A - Frac Crit Req/Freq	N
93A - Frac Crit Insp Date	
92B - Und Water Req/Freq	N
93B - Und Water Insp Date	
92C - Oth Spec Insp Req/Freq	N
93C - Oth Spec Insp Date	
92D - Fatigue Req/Freq	N
93D - Fatigue Insp Date	
176A - Und Water Insp Method	1
58 - Deck Rating	4
58A/B - Deck Surface/Bottom	5 4
59 - Superstructure Rating	4
59A - Paint Rating	N
60 - Substructure Rating	4
61 - Channel Rating	5
62 - Culvert Rating	N

Navigation Data	
38 - Navigation Control	0
39 - Vertical Clearance	0
40 - Horizontal Clearance	0
111 - Pier Protection	
116 - Lift Brgd Vert Clear	

Route Carried By Structure(ON Record)	
5A - Record Type	1
5B - Route Signing	4
5C - Level of Service	1
5D - Route Number	02003
5E - Direction Suffix	0
10L - Best 3m Unclr-Lt	0 0
10R - Best 3m Unclr-Rt	99 99
PR Number	
Control Section	
11 - Mile Point	0
12 - Base Highway Network	1
13 - LRS Route-Subroute	0000003626 02
19 - Detour Length	2
20 - Toll Facility	3
26 - Functional Class	16
28A - Lanes On	2
29 - ADT	26332
30 - Year of ADT	2010
32 - Appr Roadway Width	24
32A/B - Ap Pvt Type/Width	6 24.02
42A - Service Type On	5
47L - Left Horizontal Clear	0.0
47R - Right Horizontal Clear	19.7
53 - Min Vert Clr Ov Deck	99 99
100 - STRAHNET	0
102 - Traffic Direct	2
109 - Truck %	0
110 - Truck Network	0
114 - Future ADT	28500
115 - Year Future ADT	2027
Freeway	0

Structure Appraisal	
36A - Bridge Railing	1
36B - Rail Transition	1
36C - Approach Rail	1
36D - Rail Termination	1
67 - Structure Evaluation	4
68 - Deck Geometry	2
69 - Underclearance	N
71 - Waterway Adequacy	8
72 - Approach Alignment	6
103 - Temporary Structure	
113 - Scour Criticality	8

Miscellaneous	
37 - Historical Significance	1
98A - Border Bridge State	
98B - Border Bridge %	
101 - Parallel Structure	N
EPA ID	
Stay in Place Forms	0
143 - Pin & Hanger Code	
148 - No. of Pin & Hangers	

Route Under Structure (UNDER Record)	
5A - Record Type	
5B - Route Signing	
5C - Level of Service	
5D - Route Number	
5E - Direction Suffix	
10L - Best 3m Unclr-Lt	
10R - Best 3m Unclr-Rt	
PR Number	
Control Section	
11 - Mile Point	
12 - Base Highway Network	
13 - LRS Route-Subroute	
19 - Detour Length	
20 - Toll Facility	
26 - Functional Class	
28B - Lanes Under	
29 - ADT	
30 - Year of ADT	
42B - Service Type Under	5
47L - Left Horizontal Clear	
47R - Right Horizontal Clear	
54A - Left Feature	
54B - Left Underclearance	99 99
54C - Right Feature	
54D - Right Clearance	99 99
Under Clearance Year	
55A - Reference Feature	N
55B - Right Horiz Clearance	99.9
56 - Left Horiz Clearance	0
100 - STRAHNET	
102 - Traffic Direct	
109 - Truck %	
110 - Truck Network	
114 - Future ADT	
115 - Year Future ADT	
Freeway	

Proposed Improvements	
75 - Type of Work	36 1
76 - Length of Improvement	90
94 - Bridge Cost	20
95 - Roadway Cost	0
96 - Total Cost	20
97 - Year of Cost Estimate	2007

Load Rating and Posting	
31 - Design Load	4
41 - Open, Posted, Closed	P
63 - Fed Oper Rtg Method	6
64F - Fed Oper Rtg Load	1.65
64MA - Mich Oper Rtg Method	6
64MB - Mich Oper Rtg	.89
64MC - Mich Oper Truck	6
65 - Inv Rtg Method	6
66 - Inventory Load	.99
70 - Posting	3
141 - Posted Loading	426571
193 - Overload Class	

MICHIGAN DEPARTMENT OF TRANSPORTATION

STR 3880

SAFETY INSPECTION REPORT - AASHTO ELEMENTS

Facility OKEMOS ROAD NB	Latitude / Longitude 42.713 / -84.4309	MDOT Structure ID 33200082000B010	Structure Condition Poor Condition(4)	
Feature RED CEDAR RIVER	Length / Width / Spans 89.9 / 27.9 / 1	Owner County: Ingham(33)		
Location 0.1 MI N OF S LMITS OF OKE	Built / Recon. / Paint / Ovly. 1924 / / / 2000	TSC Lansing(17)	Operational Status P Posted for load(426571)	
Region / County University(6) / Ingham(33)	Material / Design 1 Concrete / 25 Girder- Thru	Last NBI Inspection 07/19/2018 / ZOYR	Scour Evaluation 8 Stable Above Footing	

NBI INSPECTION

DWCJ

Inspector Name Evan Currie	Agency / Company Name Great Lakes Engineering Group	Insp. Freq. 12	Insp. Date 07/31/2017
--------------------------------------	---------------------------------------------------------------	--------------------------	---------------------------------

AASHTO ELEMENTS

(English Units)

Element Number	Element Name	Total Quantity	Unit	Good CS1	Fair CS2	Poor CS3	Severe CS4
Decks/Slabs							
800	Conc Deck - Black Bars	2508	sq.ft	2012 80%	376 15%	120 5%	0 0%
815	Rigid Overlay	1799	sq.ft	1709 95%	20 1%	70 4%	0 0%
811	Conc Deck - Btm Surface	2508	sq.ft	2082 83%	376 15%	50 2%	0 0%
Joints							
301	Pourable Joint Seal	56	ft	0 0%	21 38%	35 62%	0 0%
Superstructure							
142	Other Arch	180	ft	31 17%	90 50%	59 33%	0 0%
Substructure							
215	Reinf Conc Abutment	66	ft	18 27%	22 33%	26 39%	0 0%
Other Elements							
333	Other Bridge Railing	90	ft	58 64%	20 22%	12 13%	0 0%
840	Reinf Conc Sidewalk	360	sq.ft	312 87%	42 12%	6 2%	0 0%

MICHIGAN DEPARTMENT OF TRANSPORTATION

STR 3880

WORK RECOMMENDATIONS

Facility OKEMOS ROAD NB	Latitude / Longitude 42.713 / -84.4309	MDOT Structure ID 33200082000B010	Structure Condition Poor Condition(4)	
Feature RED CEDAR RIVER	Length / Width / Spans 89.9 / 27.9 / 1	Owner County: Ingham(33)		
Location 0.1 MI N OF S LMETS OF OKE	Built / Recon. / Paint / Ovly. 1924 / / / 2000	TSC Lansing(17)	Operational Status P Posted for load(426571)	
Region / County University(6) / Ingham(33)	Material / Design 1 Concrete / 25 Girder- Thru	Last NBI Inspection 07/19/2018 / ZOYR	Scour Evaluation 8 Stable Above Footing	

WORK RECOMMENDATIONS

ZOYR

Inspector Name	Agency / Company Name	Insp. Freq.	Insp. Date
Evan Currie	Great Lakes Engineering Group	12	07/19/2018

RECOMMENDATIONS & ACTION ITEMS

Recommendation Type	Priority	Description
Detailed Insp.	M	Monitor cracks in bottom of beams at midspan.
Appr. Pavement	H	Replace both approach slabs. Short term - patch potholes.
Scour / Channel	M	Add riprap at south abutment to protect exposed footing.
Deck Patching	H	Apply healer/sealer or epoxy overlay to deck.
Bridge Repl.	M	Replace bridge.

MICHIGAN DEPARTMENT OF TRANSPORTATION

STR 3880

SCOUR CRITICAL BRIDGE ACTION PLAN

Facility	Latitude / Longitude	MDOT Structure ID	Structure Condition	
OKEMOS ROAD NB	42.713 / -84.4309	33200082000B010	Poor Condition(4)	
Feature	Length / Width / Spans	Owner		
RED CEDAR RIVER	89.9 / 27.9 / 1	County: Ingham(33)		
Location	Built / Recon. / Paint / Ovly.	TSC	Operational Status	
0.1 MI N OF S LMETS OF OKE	1924 / / / 2000	Lansing(17)	P Posted for load(426571)	
Region / County	Material / Design	Last NBI Inspection	Scour Evaluation	
University(6) / Ingham(33)	1 Concrete / 25 Girder- Thru	07/19/2018 / ZOYR	8 Stable Above Footing	

No plan available for bridge key 33200082000B010

MICHIGAN DEPARTMENT OF TRANSPORTATION

STR 3880

LOAD RATING ASSUMPTIONS

Facility OKEMOS ROAD NB	Latitude / Longitude 42.713 / -84.4309	MDOT Structure ID 33200082000B010	Structure Condition Poor Condition(4)	
Feature RED CEDAR RIVER	Length / Width / Spans 89.9 / 27.9 / 1	Owner County: Ingham(33)		
Location 0.1 MI N OF S LMETS OF OKE	Built / Recon. / Paint / Ovly. 1924 / / / 2000	TSC Lansing(17)	Operational Status P Posted for load(426571)	
Region / County University(6) / Ingham(33)	Material / Design 1 Concrete / 25 Girder- Thru	Last NBI Inspection 07/19/2018 / ZOYR	Scour Evaluation 8 Stable Above Footing	

Rating Considers Field Condition of Members: Yes Inspection Date: 07/11/2013

Deterioration:

Open longitudinal crack in bottom of beam at midspan with one rebar exposed

Most Recent Year Construct / Reconstruct / Overlay: 1924

History of work that impacts Load rating:

Constructed

Superstructure Component: 1 Concrete Beam fy: ksi Beam f'c / fb: 3.0 ksi

Composite: No Number of Beams: 2 Shop Drawings Verified: No

Size of Beams/Beam #'s and spans: 90' span camelback through girder

Deck: Thickness (in.): 16.0 Fy / fc': / 3.0 ksi Deck Design Load > H15: Yes

Wearing Surface: Mat'l: Thickness (in.): Unit Weight (pcf.):

	LEFT	CENTER	RIGHT
--	------	--------	-------

Barrier: Type / Weight (plf.): / / /

Sidewalk: Width / Thick (in.): / / /

Clear Roadway (ft.): 20.0

Additional Loads:

Unique Factors That Affect Capacity:

Analyzed By: Amanda Hemeyer, PE

Date: 12/09/2014

MICHIGAN DEPARTMENT OF TRANSPORTATION

STR 3880

LOAD RATING SUMMARY

Facility OKEMOS ROAD NB	Latitude / Longitude 42.713 / -84.4309	MDOT Structure ID 33200082000B010	Structure Condition Poor Condition(4)	
Feature RED CEDAR RIVER	Length / Width / Spans 89.9 / 27.9 / 1	Owner County: Ingham(33)		
Location 0.1 MI N OF S LMETS OF OKE	Built / Recon. / Paint / Ovly. 1924 / / / 2000	TSC Lansing(17)	Operational Status P Posted for load(426571)	
Region / County University(6) / Ingham(33)	Material / Design 1 Concrete / 25 Girder- Thru	Last NBI Inspection 07/19/2018 / ZOYR	Scour Evaluation 8 Stable Above Footing	

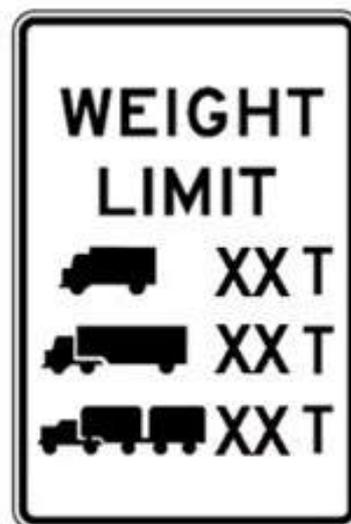
Compliance Issue: None
Compliance Verified: No
The above structure was analyzed using: Virtis/AASHTOWARE Bridge Rating
Version or Other: 6.6
Rating Considers Field Condition of Members: Yes **Inspection Date:** 07/11/2013
Controlling component and failure mode:

Girder, moment

NEW INVENTORY CODING

NBI Item 63 - Operating Rating Method	6 LFR in Rating Factor
NBI Item 64F - Federal Operating Rating	1.65
MDOT Item 64MA - Michigan Operating Method	6 LFR in Rating Factor
MDOT Item 64MB - Michigan Operating Rating	0.89
MDOT Item 64MC - Michigan Operating Truck	6
NBI Item 65 - Inventory Rating Method	6 LFR in Rating Factor
NBI Item 66 - Federal Inventory Rating	0.99
NBI Item 41 - Structure Open Posted Closed	P P Posted for load
NBI Item 70 - Bridge Posting	3 3 - 89% - 80%
Posted By	Truck Type
MDOT Item 141 - Posted Loading	426571
MDOT Item 193A - Michigan Overload Class	
MDOT Item 193C - Overload Status	

Sample Sign



R12-5

Analyzed By: Amanda Hemeyer, PE **Date:** 12/09/2014
Checked By: Mark Helinski, PE **Date:** 12/10/2014

MICHIGAN DEPARTMENT OF TRANSPORTATION

STR 3880

REQUEST FOR ACTION

Facility	Latitude / Longitude	MDOT Structure ID	Structure Condition	
OKEMOS ROAD NB	42.713 / -84.4309	33200082000B010	Poor Condition(4)	
Feature	Length / Width / Spans	Owner		
RED CEDAR RIVER	89.9 / 27.9 / 1	County: Ingham(33)		
Location	Built / Recon. / Paint / Ovly.	TSC	Operational Status	
0.1 MI N OF S LMTS OF OKE	1924 / / / 2000	Lansing(17)	P Posted for load(426571)	
Region / County	Material / Design	Last NBI Inspection	Scour Evaluation	
University(6) / Ingham(33)	1 Concrete / 25 Girder- Thru	07/19/2018 / ZOYR	8 Stable Above Footing	

No inspections available for bridge key 33200082000B010

MICHIGAN DEPARTMENT OF TRANSPORTATION

STR 3880

OUTSTANDING WORK

Facility OKEMOS ROAD NB	Latitude / Longitude 42.713 / -84.4309	MDOT Structure ID 33200082000B010	Structure Condition Poor Condition(4)	
Feature RED CEDAR RIVER	Length / Width / Spans 89.9 / 27.9 / 1	Owner County: Ingham(33)		
Location 0.1 MI N OF S LMETS OF OKE	Built / Recon. / Paint / Ovly. 1924 / / / 2000	TSC Lansing(17)	Operational Status P Posted for load(426571)	
Region / County University(6) / Ingham(33)	Material / Design 1 Concrete / 25 Girder- Thru	Last NBI Inspection 07/19/2018 / ZOYR	Scour Evaluation 8 Stable Above Footing	

WORK RECOMMENDATIONS

DECKSLABS

Request For	Contact/User	Agency/Company Name	Estimated Quantity	Unit
Deck Patching				
Activity	Material	Other Material	Actual Quantity	Unit
Personnel Hours	Equipment			Complete Date
Comments Apply healer/sealer or epoxy overlay to deck. (Evan Currie 07/23/2018)				

CHANNEL/SCOUR

Request For	Contact/User	Agency/Company Name	Estimated Quantity	Unit
Scour / Channel				
Activity	Material	Other Material	Actual Quantity	Unit
Personnel Hours	Equipment			Complete Date
Comments Add riprap at south abutment to protect exposed footing. (Evan Currie 07/23/2018)				

OTHER

Request For	Contact/User	Agency/Company Name	Estimated Quantity	Unit
Apr. Pavement				
Activity	Material	Other Material	Actual Quantity	Unit
Personnel Hours	Equipment			Complete Date
Comments Replace both approach slabs. Short term - patch potholes. (Evan Currie 07/23/2018)				

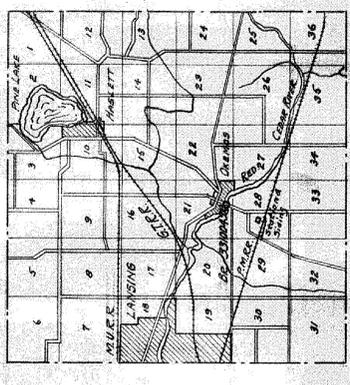
Request For	Contact/User	Agency/Company Name	Estimated Quantity	Unit
Bridge Repl.				
Activity	Material	Other Material	Actual Quantity	Unit
Personnel Hours	Equipment			Complete Date
Comments Replace bridge. (Evan Currie 07/23/2018)				



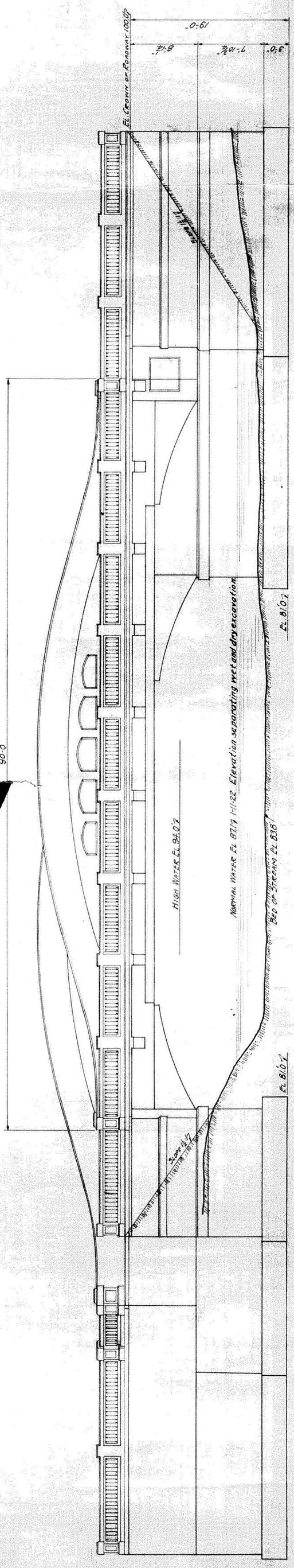
INNOVATIVE IDEAS
EXCEPTIONAL DESIGN
UNMATCHED CLIENT SERVICE

APPENDIX D – Existing Drawings

P/W



MERIDIAN TWP, INGHAM CO.
LOCATION SKETCH

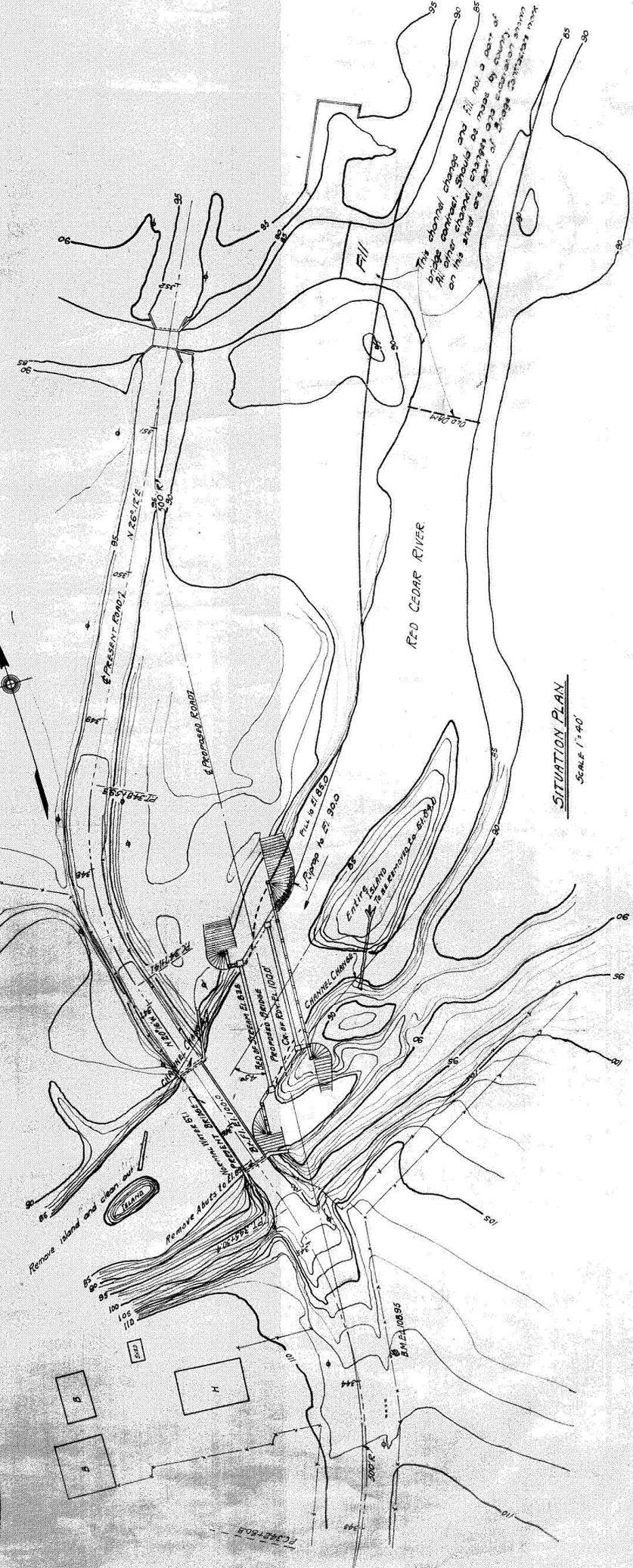


ABUTMENT A (SOUTH)

SIDE ELEVATION

ABUTMENT B (NORTH)

Notes:
 1. All material and workmanship to be in accordance with Michigan State Highway Department Specifications for Steel and Concrete Highway Bridges (1922 Edition) (Revised).
 2. All sections shown as distinct units on these plans are to be placed in one continuous run.
 3. No unseasoned gravel will be permitted.
 4. Grade 'A' concrete to be used in the substructure. Grade 'C' concrete to be used in the superstructure.
 5. Piles will not be required unless ordered by the Engineer after excavations are made. If required, steel will be permitted, unless it can be shown that sections called for cannot be purchased in the open market.
 6. The contractor will sort and pile reinforcing steel on the ground in such a manner as to be accessible for checking by the Inspector.
 7. The top of the floor slab is to be supported and leveled to produce a smooth hard surface true to the section shown.
 8. The reinforcing steel in the girders is to be supported on 1/2" diameter or an approved pattern, spaced not more than 6" apart. The reinforcing steel in the floor slab is to be supported on metal bar chairs spaced not more than 6" apart in either direction.
 9. Bars referred to as 'B-16' furnished by the State Highway Department are to be carefully placed by the Inspector in the positions shown so as to project out from the surface. After placing the bars, the Inspector is to furnish a drawing showing the elevations of the bars and their distances from reference lines using MOMENT PLAN FURNISHED BY THE DISTRICT ENGINEER.
 10. The contractor will maintain clear the present structure.
 11. Traffic will be maintained both in front and behind the abutments to the natural ground surface. Any excess material excavated is to be placed on the site or in the immediate vicinity.
 12. All excavated surfaces are to be paved with macadam, with the top 2" and 1/2" of the surface prescribed by Class 11120 of the Specifications.
 13. The use of mud shells will be permitted only with the written permission of the State Highway Commissioner following filing to be given to the capacity of the bridge contractor approximately excavation of 650 cu yds. Material from the channel change to be used in making fill on north bank and grading the approaches.
 14. The contractor will dismantle the old superstructure and remove the present abutments, using all salvaged material nearby on the bank adjacent to the channel. The old masonry is to be placed on a bench as shown or above by the Engineer.
 15. Bench Mark located on line with and 10' east of south of east track pile in 24' Walnut, El. 108.95 at El. 1102 of Cap Survey.
 16. WET EXCAVATION 350 CU YDS. APPROX.
 17. DRY EXCAVATION 50 CU YDS. APPROX.



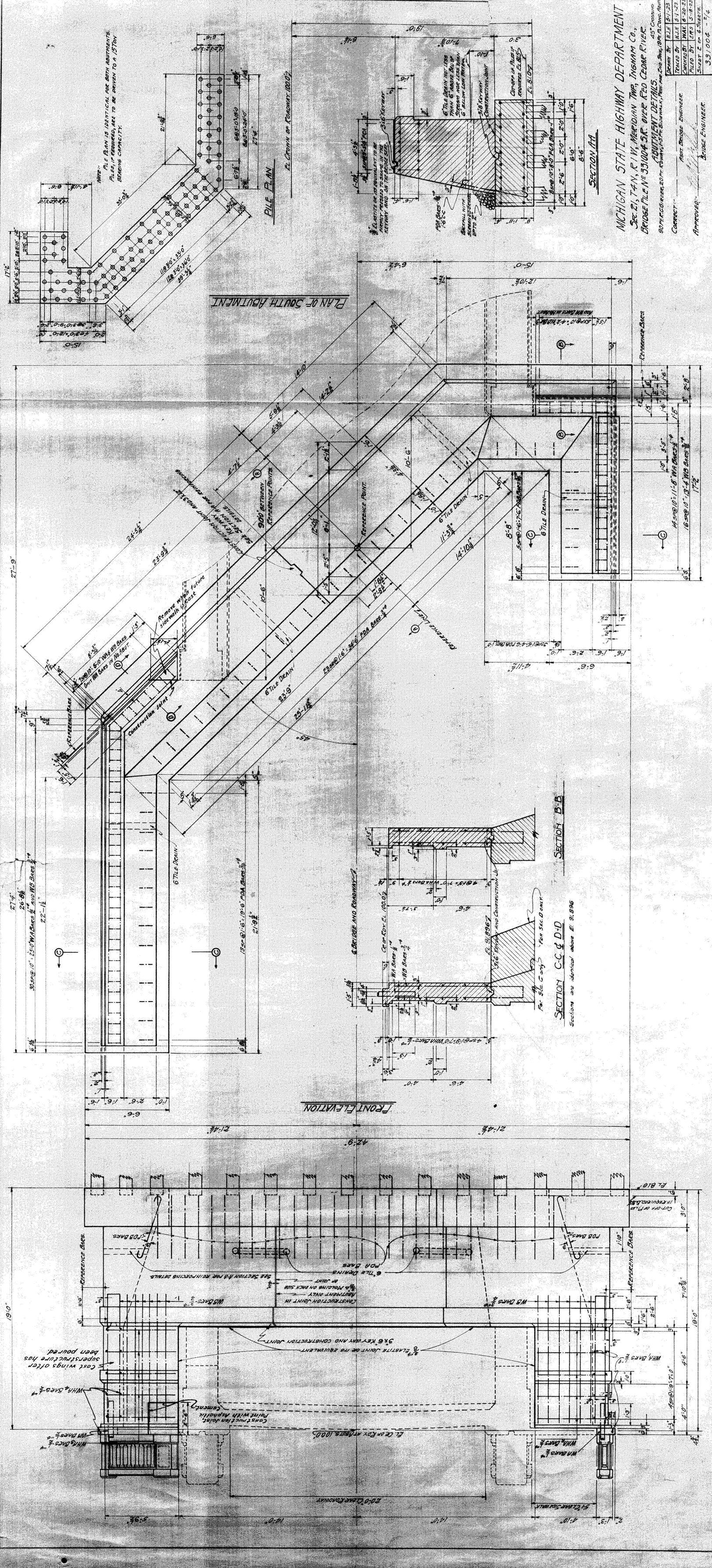
SITUATION PLAN
SCALE 1" = 40'

TABLE OF QUANTITIES

LOCATION	APPROXIMATE CUBIC YDS. OF CONCRETE TO GRADE 1'	NO. OF PILES TO BE DRIVEN	STEEL IN REINFORCING	FOR DETAILS SEE
ABUTMENT A	198.2	93	4210	331004-2
ABUTMENT B	198.2	93	4210	331004-2
PILE PLAN				331004-2
STANDARD GRADE				A-3-B-6-1-7-8
GRADE ADJUSTMENT	312.4		82,260	331004-3
STATION PLAN				331004-1
BAR LISTS				331004-4
TOTAL	312.4	3976	186	90680
GRAND TOTAL FOR CONCRETE = 710.0 cu yd				
Net Excavation = 350 cu yd				
Dry Excavation = 50 cu yd				
Channel Change, estimated = 650 cu yd				

Extra excavation and concrete when piles are used, none.

MICHIGAN STATE HIGHWAY DEPARTMENT
 SEC 21, T4N, R1W, MERIDIAN TWP, INGHAM CO.
 BRIDGE FILE NO 331004 SE OVER RED CEDAR RIVER.
 SITUATION PLAN
 50 FT. CROSSING, 20 FT. CROWN, 15 FT. SIDEWALK, NEW PAVEMENT, 1921 P. C. CONC. BRIDGE
 DESIGNED BY: MAY 15-1923
 CHECKED BY: MAY 15-1923
 FILED BY: MAY 15-1923
 SHEET 1 OF 2 SHEETS
 APPROVED: [Signature]
 BRIDGE ENGINEER



NOTE: PILE PLAN IS IDENTICAL FOR BOTH ABUTMENTS. PILES, IF REQUIRED, ARE TO BE DRIVEN TO A 15-TON BEARING CAPACITY.

PILE PLAN

PLAN OF SOUTH ABUTMENT

FRONT ELEVATION

SECTION B-B

SECTION C-C & D-D

SECTION A-A

MICHIGAN STATE HIGHWAY DEPARTMENT
 SEC. 21, T. 41 N., R. 11 W., MERIDIAN TWP., INGHAM CO.,
 BRIDGE FILE NO. 331004-5R OVER RED CEDAR RIVER
 ABUTMENT DETAILS
 90 FT. APPROX. 20 FT. CROWN OF CONCR. 100.02
 45° CRASS
 DRAWN BY: T.L.H. 5-1-23
 CHECKED BY: I.W.A. 5-1-23
 FILED BY: L.F.S. 5-1-23
 SHEET 2 OF 4 SHEETS
 331004-5R

APPROVED: [Signature]
 BRIDGE ENGINEER

Cost wings often been poured.
 W10 Bars
 W8 Bars
 W6 Bars
 Print with asphalt
 Construction joints
 Elastite joint or its equivalent
 3x6 Key way and construction joint
 Construction joint in
 mortar only
 1/2" mauling on each side
 6" tile drains
 See Section A-A for reinforcing details
 W10 Bars
 W8 Bars
 W6 Bars
 Reference Bars
 1'-10" REFERENCE BARS
 2'-13" REFERENCE BARS
 4'-0" REFERENCE BARS
 8'-0" REFERENCE BARS
 16'-0" REFERENCE BARS
 3'-0" REFERENCE BARS
 CURB OR FLEET IF REQUIRED

Sections are identical above E.I. 91.896

For Sec. Copy - For Section

5/16" Keyway and construction joint

E.I. 91.8967

W10 Bars
 W8 Bars
 W6 Bars

BRIDGE AND ROADWAY

CONCRETE EL. 100.02

4" @ 10" W10 BARS

3" @ 10" W8 BARS

2" @ 10" W6 BARS

15'-0"

4'-0"

4'-6"

5'-0"

5'-6"

6'-0"

6'-6"

7'-0"

7'-6"

8'-0"

8'-6"

9'-0"

9'-6"

10'-0"

10'-6"

11'-0"

11'-6"

12'-0"

12'-6"

13'-0"

13'-6"

14'-0"

14'-6"

15'-0"

15'-6"

16'-0"

16'-6"

17'-0"

17'-6"

18'-0"

18'-6"

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28'-0"

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35'-6"

36'-0"

36'-6"

37'-0"

37'-6"

38'-0"

38'-6"

39'-0"

39'-6"

40'-0"

40'-6"

41'-0"

41'-6"

42'-0"

42'-6"

43'-0"

43'-6"

44'-0"

44'-6"

45'-0"

45'-6"

46'-0"

46'-6"

47'-0"

47'-6"

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56'-0"

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**INGHAM COUNTY ROAD DEPARTMENT
AUSTIN E. CAVANAUGH ADMINISTRATION BUILDING
301 Bush Street, P.O. Box 38, Mason, MI 48854-0038**

**William M. Conklin, P.E.
Managing Director**



FOR IMMEDIATE RELEASE

April 8, 2019

Public Information Meeting – Okemos Road Bridge Project

The Ingham County Road Department has hired DLZ, Inc., a transportation planning firm, to conduct an Environmental Assessment for planned replacement and/or repair of the aging Okemos Road Bridges over the Red Cedar River north of Mount Hope Road in Meridian Township, Ingham County, Michigan.

The intent of the project will be to replace and/or repair the separate roadway bridges to maintain safe and efficient flow of vehicles, bicycles, and pedestrians along Okemos Road. Both bridges are functionally obsolete per current bridge design standards and have reduced structural capacity for heavy truck traffic as indicated by posted signs due to advancing age and normal deterioration despite prior maintenance efforts.

The purpose of the Environmental Assessment is to collect, analyze, and present information on the environmental and historical features of and adjacent to the project, and to obtain public and community input on feasible alternatives.

The next step in this process provides an opportunity for all interested parties and the community to attend a public information meeting regarding the project scope, potential impacts, development process, anticipated schedule, and to provide input on the potential bridge alternatives.

The public information meeting will be drop-in style from 4:00 p.m. to 8:00 p.m. on Thursday, April 25, 2019, at the Meridian Township Board Room, 5151 Marsh Road, Okemos, MI 48864. Interested persons may attend anytime between 4:00 p.m. and 8:00 p.m. to view project information, have questions answered by project representatives in attendance and provide input.

The meeting facility is accessible as required by the Americans with Disabilities Act (ADA). Ingham County will provide necessary reasonable aids and services to accommodate non-English speaking persons and/or persons with disabilities upon five (5) working days notice to the Ingham County Road Department.

For more information contact the Road Department at 517-676-9722.

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**Telephone: (517) 676-9722 Fax: (517) 676-2085 TDD: (517) 676-7798
E-Mail: roads@ingham.org Web Site: <http://rc.ingham.org> An
Equal Opportunity Employer**



7. C.

To: Township Board Members
From: Frank L. Walsh, Township Manager
Date: April 16, 2019
Re: Electronic Board Packets

Over the past several years, we have discussed the potential for eliminating the paper Board and Commission packets and moving towards an electronic option. Not only would it save a significant amount of paper, but it would also stop the need to copy thousands of pages every month by our Team members.

Our most recent Township Board packet is the best example as it was 470 pages and required 5,640 copies for just one meeting.

On Tuesday night, we will start the discussion on an additional way we can move towards a more “green” and sustainable way of doing business in the Township.