Detroit River
INTERNATIONAL CROSSING
PROJECT

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DETROIT RIVER INTERNATIONAL CROSSING

Engineering Report

VOLUME 4: INTERCHANGE STRUCTURE STUDY

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Springwells Avenue over I-75
Structure Study

General

The purpose of this study is to investigate different structure types for the replacement of the Springwells Avenue Bridge over I-75. The Springwells Avenue Bridge requires replacement due to realignment of Springwells Avenue, the northbound and southbound service drives and the revised I-75 lane configuration due to the proposed Detroit River International Crossing (DRIC) Plaza Ramps.

The existing structure carries 4 lanes of traffic accommodating bi-directional movement along Springwells Avenue over I-75 (12' inner lanes and 17'-0" outer lanes). A single 17'-9" Service Drive U-turn lane, on the east side of the bridge, accommodates movements from the northbound and southbound service drives. This lane is separated from the Springwells Avenue traffic by a 10' wide median. A 10' wide sidewalk exists on the west side of the bridge. A 1'-9" brush block with a concrete parapet and bridge railing is present along the east edge of the bridge and a 1'-0" concrete parapet with a bridge railing and pedestrian fencing is present along the west edge of the bridge. The out-to-out deck width of the existing structure is 98'-8 ½". The bridge crosses I-75 on a skewed alignment to join Springwells Avenue, north of I-75 with West End Avenue south of I-75. The structure is a four span rolled steel beam structure with a 9" reinforced concrete deck. The span lengths are 64'-3 1/16"- 83'-4 ¼" – 83'-4 ¼"– 72'-0 7/16". Top and bottom flange cover plates are located over the center pier. Pin and link hangers support the end spans at the exterior pier locations. The substructure consists of cap and column piers and stub abutments. Lightweight backfill was used behind the existing abutments because of poor soil conditions. All substructure units are founded on 60 ton cylindrical piles. The front row of the existing abutment piles have been driven at a 1H:3V batter. All existing pier piles have been driven vertically. There are concrete struts, under I-75 roadway, between the existing piers to resist lateral loads.

The new alignment of Springwells Avenue crosses I-75 at approximately a 0º skew. The proposed bridge will also carry 4 lanes of Springwells traffic (12' inner lanes and 14' outer lanes). A 20' Service Drive U-turn lane is proposed along the east side of the bridge. It is separated from through traffic by a 10' median. The median also functions as a sidewalk to handle pedestrian traffic. A 10' sidewalk is proposed on the west side of the bridge. A 1'-6" concrete parapet, with a bridge railing and pedestrian fencing is proposed along both the west and east sides of the bridge. The out-to-out deck width of the proposed structure is 95'-3". Springwells Avenue is posted 25 MPH and designed for 30 MPH traffic. Therefore, 2' wide shy distances are provided between the through lanes and the median/sidewalk. See the General Plan of Site Plan and Cross Sections in Appendix A for details and geometry. The structure design is to be completed based on current AASHTO LRFD specifications. The design live load is the AASHTO HL-93 Modified used by MDOT.

Replacement of the Springwells Avenue Bridge is to be coordinated with the planned improvements to the I-75 ramp alignments, the service drive work and the realignment of Springwells Avenue. The structure requires replacement do to the realignment of Springwells Avenue, the realignment of the north and south service roads and modifications to the I-75 ramps.

Currently, geotechnical information is not available for the bridge. From the existing soil information it seems that there is soft clay for approximately 70 feet below the existing pile caps.

Preliminary soils investigations propose that a lightweight fill, Expanded Polystyrene (EPS) blocks be placed as backfill behind the abutments. The use of EPS blocks will minimize settlement of the bridge approach pavement and reduce the lateral earth pressure on the high wall abutment allowing the lateral earth pressure to be resisted by the pile batter and not depend on the stiffness of the soil below the footing.

Additional soil borings and the geotechnical report will confirm the backfill and foundation assumptions used to compute the preliminary cost of the structure.

The high wall abutments will be supported on piles. The front row of piles will be battered to resist the lateral loads. The proposed pier is located in the I-75 median at the existing Pier 2 location. The existing piles may be reused and supplemented with additional battered piles, driven between existing piles to resist lateral loads. The use of semi-integral or independent back wall with sliding approach slabs abutments can be investigated during preliminary design to eliminate expansion joints on the bridge.

Under Clearance and Grade Raise

The existing structure currently has a minimum vertical under clearance of 15'-8" based on the vertical under clearance posted on the bridge. I-75 at the project location is considered a special route. In this case, a 14'-9" minimum under clearance is required for the proposed bridge. Currently, the I-75 roadway is posted for 55 MPH; however, based on the current vertical geometry, the roadway is designed for 50 MPH. MDOT has requested that the preferred alignment for the Detroit River International Crossing (DRIC) accommodate a 60 MPH design speed on I-75, so that I-75 can be upgraded with future improvements to a 60 MPH design speed. Therefore, the vertical profile was set at 15'-3" to account for these future modifications to the I-75 vertical geometry. The following characteristics of the proposed road and bridge design affect the underclearance:

1. Springwells Avenue is being realigned.
2. The existing grade on Springwells Avenue is 5.0%. The grade will be improved to 3%.
3. The existing bridge is skewed compounding the problem of improving the grade since the existing total length of the existing bridge is longer than the proposed.
4. The structure depth has increased slightly due to longer span lengths from the elimination of the piers.
5. Accommodation of future I-75 improvements to upgrade the vertical design speed from 50 MPH to 60 MPH.

The proposed profile currently shown on the General Plan of Site accommodates the expected Springwells Avenue profile grade. A 2.0% deck cross slope is recommended.

Maintaining Traffic

Springwells Avenue traffic, one lane in each direction, will be maintained during reconstruction of the proposed Springwells Avenue Bridge over I-75. Earth retention will be required to stage the removal of existing abutments and construct the new abutments while maintaining traffic. Due to the abutment height, the earth retention will need to be braced or tied-back with earth anchors. As mentioned earlier, lightweight cellular concrete will be required as backfill behind the abutment. In addition to reducing lateral loads, the cellular concrete will provide a stable base for traffic during staged construction.

Traffic control along I-75 for the structure replacement will require shoulder and temporary single lane closures to remove the existing piers and construct the new pier. Temporary freeway closures will be necessary during removal and erection of the beams.

Structure Options

Three superstructure alternatives were investigated in this study:

- 39" Spread PPC Box Beam
- 39" Side-by-Side PPC Box Beam
- 34' Web Steel Plate Girder

Two-span arrangements with full-height abutments were considered for the three alternatives listed above. See Appendix A for the span arrangement and cross sections of the alternatives listed above.

Preliminary beam design was completed for each superstructure type utilizing AASHTO LRFD, 2007 Edition as directed by MDOT. The MDOT HL-93 Modified loading was used for the design loading for each alternative.

A single span option was not investigated based on the significant increase in construction depth required and the limited increase available due to the vertical geometric constraints of the nearby service drives.

The 39" Spread PPC Box Beam Alternative will result in a slightly deeper construction depth than the 39" Side-by-Side PPC Box Beam or the 34" Web Steel Plate Girder Alternatives. However, the greater construction depth will have a negligible impact to the Springwells Avenue profile and will not impact the adjacent service drive intersections with Springwells Avenue.

Cost

The cost for the 39" Spread PPC Box Beam Alternative is less than the cost for the 39" Side-by-Side PPC Box Beam or the 34" Web Steel Plate Girder Alternatives.

Cost estimates for each alternative are included in Appendix B.

The cost estimates assume full-height cantilever abutments supported on piles. The median pier is a multi-column concrete pier supported on piles. Geotechnical investigation will need to confirm these recommendations.

The following is a cost comparison between the different alternatives:

Alternative	Superstructure Depth	Total Cost	Cost/SF Deck
39" Spread PPC Box Beam	52"	$ 4,447,800	$240
39" Side-by-Side PPC Box Beam	48"	$5,015,880	$279
34" Web Steel Plate Girder	44"	$ 5,456,670	$308

The costs shown are for the bridge only and do not include approach cost associated with raising the Springwells Avenue profile. The Total Cost includes the removal of the existing structure. The Cost/SF does not include removal of the existing structure. Also, a 15% design contingency has been added to costs above.

Utilities

Several utilities are attached to the Springwells Street structure. PLD conduits are located in the west sidewalk and the median of the existing structure. These conduits feed the street lighting masts located on sidewalk and median. A 12" gas main is located below the deck under the west sidewalk. 12-4" diameter Detroit Edison ducts are supported by diaphragms under the northbound lanes, 6-4" diameter PLD ducts are supported on diaphragms under the median. These 6 ducts are encased with concrete and carry live electric service with voltage between 110 and 220 volts.

Relocation of the gas main will be required prior to construction. If the relocation of this gas main is restricted based on seasonal usage this information will be provided to the contractor in the specifications for coordination during construction. The spread box beam alternative can accommodate the relocation of all the existing utilities by supporting the utilities from the underside of the deck between the beams. The Detroit Edison Conduits and PLD ducts can be embedded in the sidewalk or median. The gas main would need to be relocated off the structure if the side-by-side box beam alternative was used.

Bridge lighting conduits can be placed in the concrete parapet or the raised median, depending on the location of the street lighting. The location of the lighting will be investigated during preliminary design.

Drainage

It is assumed that drainage will be collected off the bridge on the roadway and scuppers will not be required on the bridge based on the following:

1. The tributary width of bridge deck is relatively small.
2. The longitudinal grades are relatively steep.
3. Scuppers are not present on the existing bridge, which has a longer total span length and a wider pavement than the proposed bridge.

Aesthetics

Aesthetic treatments, including concrete texturing of the concrete parapet and concrete surface coating, are anticipated for the proposed structure. The aesthetic treatment can be accommodated by both alternatives and will have approximately the same cost. The limits of the texturing are unknown at this time. However, an aesthetic cost equaling 1% of the bridge cost was included in the Preliminary Cost Estimate for all bridges. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

Recommendations

Based on estimated costs the 39" Spread PPC Box Beam Alternative is the recommended alternative for the Springwells Avenue Bridge over I-75. Also, the recommended alternative will accommodate the existing 12" diameter gas main attached to the existing Springwells Avenue Bridge.

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Green Avenue over I-75
Structure Study

General

The purpose of this study is to investigate different structure types for the replacement of the Green Avenue Bridge over I-75. The preferred alignment of the Detroit River International Crossing (DRIC) Project requires reconfiguration of the existing I-75 interchange at Livernois/Dragoon. The Northbound and Southbound I-75 exit ramps are to be relocated and will be located under Green Avenue, which will conflict with the existing piers.

The existing structure carries 2 through lanes in each direction (44' face-to-face curb), two 10' sidewalks, and a 1'-0" concrete barrier with a bridge railing and pedestrian fencing along each side of the bridge. The out-to-out width of the existing bridge is 66'-5". Intersections with the Northbound and Southbound Service Drives are present south and north of the bridge. The existing superstructure is four spans consisting of 36" Wide Flange rolled steel beam section with an 8" composite reinforced concrete deck. The spans are 68'-10", 74'-11", 74'-11" and 68'-10" for a total length of 287'-6". Top and bottom flange cover plates are located over the center pier. Pin and link hangers support the end spans at the exterior pier locations. The substructure consists of cap and column piers and stub abutments. Lightweight backfill was used behind the existing abutments because of poor soil conditions. All substructure units are supported on 60-ton cylindrical piles. The pier piles are driven vertically. The front row of abutment piles are driven at a 1H:3V batter. There are existing reinforced concrete struts, under I-75 roadway, between the existing piers to resist lateral loads.

The alignment of Green Avenue will not change. The proposed bridge will carry two through lanes in each direction (52' clear roadway width). A 20' Service Drive U-turn lane is proposed along the east side of the bridge to accommodate the Northbound and Southbound Service Drive traffic movements. The U-turn lane is separated from the through lanes with a 10' wide raised median. The raised median will function as a sidewalk to handle the pedestrian traffic. A 10' sidewalk is proposed on the west side of the bridge. 1'-6" concrete parapets with bridge railing and pedestrian fencing is present along the west and east sides of the bridge. The proposed structure has an out-to-out deck width of 95'-3". The proposed bridge will be a two span structure with high wall abutments. The span arrangement will accommodate tapers and standard shoulders for the new plaza ramps. See the General Plan of Site Plan and Cross Sections, in Appendix A for details and geometry. The structure design is to be completed based on current AASHTO LRFD specifications. The design live load is the AASHTO HL-93 Modified used by MDOT.

Replacement of the Green Avenue Bridge is to be coordinated with the planned improvements to the I-75 ramp alignments and the service drive work. The structure requires replacement based on the elimination of the exterior columns due to the proposed I-75 ramp modifications.

Green Avenue traffic will be detoured during reconstruction of the proposed Green Avenue Bridge.

Currently, geotechnical information is not available for the bridge. From the soil information shown on the existing bridge record plans there is soft clay for approximately 70 feet below the existing pile caps.

Preliminary soils investigations propose that a lightweight fill, Expanded Polystyrene (EPS) blocks be placed as backfill behind the abutments. The use of EPS blocks will minimize settlement of the bridge approach pavement and reduce the lateral earth pressure on the high wall abutment allowing the lateral earth pressure to be resisted by the pile batter and not depend on the stiffness of the soil below the footing.

Additional soil borings and the geotechnical report will confirm the backfill and foundation assumptions used to compute the preliminary cost of the structure.

The high wall abutment will be supported on piles. The front row of piles will be battered to resist the lateral loads. The proposed pier is located in the I-75 median at the existing Pier 2 location. The existing piles may be reused and supplemented with additional battered piles, driven between existing piles to resist lateral loads. High wall abutments are proposed. The use of semi-integral or independent back wall with sliding approach slabs abutments can be investigated during preliminary design to eliminate expansion joints on the bridge.

Under Clearance and Grade Raise

The existing structure currently has a minimum vertical under clearance of 14'-10" based on the vertical under clearance posted on the bridge. I-75 at the project location is considered a special route. In this case, a 14'-9" minimum under clearance is required for the proposed bridge. Currently, the I-75 roadway is posted for 55 MPH; however, based on the current vertical geometry, the roadway is designed for 50 MPH. MDOT has requested that the preferred alignment for the DRIC accommodate a 60 MPH design speed on I-75, so that I-75 can be upgraded with future improvements to a 60 MPH design speed. Therefore, the vertical profile was set at 15'-3" to account for these future modifications to the I-75 vertical geometry.

The following characteristics of the proposed road and bridge design affect the underclearance:

1. The existing vertical clearance is less than 15'-3".
2. The proposed structure depth increase due to the increased span length.
3. Accommodation of future I-75 improvements to upgrade the vertical design speed from 50 MPH to 60 MPH.

The proposed profile currently shown on the General Plan of Site accommodates the expected Green Avenue profile grade. A 2.0% deck cross slope is recommended.

Maintaining Traffic

Traffic along Green Avenue traffic will be detoured during the reconstruction of the Green Avenue Bridge.

Traffic control along I-75 for the structure replacement will require shoulder and temporary single lane closures to remove the existing pier and abutments and to construct the new pier and abutments. Temporary freeway closures will be necessary during removal of the existing and erection of the new beams.

Structure Options

Three superstructure alternatives were investigated in this study:

- 42" Spread PPC Box Beam
- 39" Side-by-Side PPC Box Beam
- 34" Web Steel Plate Girder

Two-span arrangements with full-height abutments were considered for the three alternatives listed above. See Appendix A for the span arrangement of the alternatives listed above.

Preliminary beam design was completed for each superstructure type utilizing AASHTO LRFD, 2007 Edition as directed by MDOT. The MDOT HL-93 Modified loading was used for the design loading for each alternative.

A single span option was not investigated based on the significant increase in construction depth required and the limited increase available due to the vertical geometric constraints of the nearby service drives.

The 42" Spread PPC Box Beam Alternative will result in a slightly deeper construction depth than the 39" Side-by-Side PPC Box Beam and 34" Web Steel Plate Girder Alternatives. However, the greater construction depth will have a negligible impact to the Green Avenue profile and will not impact the adjacent service drive intersections with Green Avenue.

Cost

The cost for the 42" Spread PPC Box Beam Alternative is less than the cost for the 39" Side-by-Side PPC Box Beam and 34" Web Steel Plate Girder Alternatives.

Cost estimates for each alternative are included in Appendix B.

The cost estimates assume full-height cantilever abutments supported on piles. The median pier is a multi-column concrete pier supported on piles. Geotechnical investigation will need to confirm these recommendations.

The following is a cost comparison between the different alternatives:

Alternative	Superstructure Depth	Total Cost	Cost/SF Deck
42" Spread PPC Box Beam	55"	$4,207,360	$208
39" Side-by-Side PPC Box Beam	48"	$4,523,630	$226
34" Web Steel Plate Girder	51"	$5,379,840	$275

The costs shown are for the bridge only and do not include approach cost associated with raising the Green Avenue profile. The Total Cost includes the removal of the existing structure. The Cost/SF does not include removal of the existing structure. Also, a 15% design contingency has been added to costs above.

Utilities

Several utilities are attached to the Green Avenue Bridge. An existing 12" diameter MichCon Gas main is attached to the structural steel under the southbound lanes of the bridge. Twelve - 4" diameter and a 120kV Detroit Edison conduit are attached to the underside of the deck under the southbound lanes. Four Public Lighting Department (P.L.D.) conduits are attached to the underside of the deck under the east sidewalk.

Relocation of the gas main will be required prior to construction. If the relocation of this gas main is restricted based on seasonal usage, this information will be provided to the contractor in the specifications for coordination during construction. The spread box alternative can accommodate the relocation of the existing gas main, while the side-by-side box beam alternative cannot accommodate the relocation of the gas main, requiring the gas main to be relocated off the bridge.

The Detroit Edison Conduits can be accommodated by attaching to the underside of the slab for the spread box beam alternative or can be embedded in the sidewalk for the side-by-side box beam alternative.

Bridge lighting conduits can be placed in the concrete parapet or the raised median, depending on the location of the street lighting. The location of the lighting will be investigated during preliminary design.

PLD conduits can be can be accommodated by attaching to the underside of the slab for the spread box beam alternative or can be embedded in the raised median for the side-by-side box beam alternative.

An abandoned 24" diameter sewer exists under the I-75 pavement at Clark Avenue. Piles for the pier and abutment footings should be spaced to miss this sewer.

Drainage

It is assumed that drainage will be collected off the bridge on the roadway and scuppers will not be required on the bridge based on the following:

4. The tributary width of bridge deck is relatively small.
5. The longitudinal grades are relatively steep.
6. Scuppers are not present on the existing bridge, which has a longer total span length than the proposed bridge.

Aesthetics

Aesthetic treatments, including concrete texturing of the concrete parapet and concrete surface coating, are anticipated for the proposed structure. The aesthetic treatment can be accommodated by all four alternatives and will have approximately the same cost. The limits of the texturing are unknown at this time. However, an aesthetic cost equaling 1% of the bridge cost was included in the Preliminary Cost Estimate for all bridges. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

Recommendations

Based on costs the 42" Spread PPC Box Beam Alternative is the recommended alternative for the Green Avenue Bridge over I-75. Also, the recommended alternative will accommodate the existing 12" diameter gas main attached to the existing Green Avenue Bridge.

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Livernois Avenue over I-75
Structure Study

General

The purpose of this study is to investigate different structure types for the replacement of the Livernois Avenue Bridge over I-75. The Preferred Alignment of the Detroit River International Crossing (DRIC) Project requires reconfiguration of the existing I-75 interchange at Livernois/Dragoon. The Northbound and Southbound I-75 exit ramps are to be relocated and will be located under Livernois, which will conflict with the existing piers.

The existing structure carries 4 (12' wide) lanes of southbound traffic along Livernois Avenue over I-75. A 10'-wide sidewalk with a 1'-0" concrete parapet, a bridge railing and pedestrian fencing is present along both the west and east sides of the bridge. The out-to-out deck width of the existing structure is 70'-5". The bridge crosses I-75 on a skewed alignment (approximately 8.5 degrees). Intersections with the Northbound and Southbound Service Drives are present south and north of the bridge. The superstructure consists of a four span rolled steel beam with a 9" composite reinforced concrete deck. The spans are 37'-8 7/8", 75'-9", 75'-9", 37'-8 7/8". The end spans are W27's and the interior spans are W36 rolled sections. Top and bottom flange cover plates are located over the center pier. Pin and link hangers support the end spans at the exterior pier locations. The substructure consists of cap and column piers and stub abutments. Lightweight backfill was used behind the existing abutments because of poor soil conditions. All substructure units are supported on 60 ton cylindrical piles. The front row of the existing abutment piles have been driven at a 1H:3V batter. All existing pier piles have been driven vertically. There are existing concrete struts, under the I-75 roadway, between the existing piers to resist lateral loads.

The alignment of Livernois Avenue will not change. The proposed bridge will carry one 12' wide lane in each direction with 12' wide median left hand turn lane at the each end of the bridge. Service drive U-turn lanes are present along the west and east sides of the bridge to accommodate the Northbound and Southbound Service Drive traffic movements. The U-turn lanes are separated from the through lanes with 10' wide raised medians. The medians function as sidewalks to handle the pedestrian traffic. The proposed structure has an out-to-out deck width of 103'-5". Livernois Avenue is posted 25 MPH and designed for 30 MPH traffic. Therefore, 2' wide shy distances are provided between the through lanes and the medians. See the General Plan of Site Plan and Cross Sections for details and geometry located in Appendix A. The structure design is to be completed based on current AASHTO LRFD specifications. The design live load is the AASHTO HL-93 Modified used by MDOT.

Replacement of the Livernois Avenue Bridge is to be coordinated with improvements to the I-75 ramp alignments and the service drive work. The structure requires replacement based on the elimination of the exterior piers due to the proposed I-75 ramp modifications.

Currently, geotechnical information is not available for the bridge. From the soil information shown on the existing bridge record plans there is soft clay for approximately 80 feet below the existing pile caps.

Preliminary soils investigations propose that a lightweight fill (Lightweight Aggregate, Slag, LM) be placed as backfill behind the abutments. The use of the lightweight fill will reduce the lateral earth pressure on the high wall abutment allowing the lateral earth pressure to be resisted by the pile batter and not depend on the stiffness of the soil below the footing.

Additional soil borings and the geotechnical report will confirm the backfill and foundation assumptions used to compute the preliminary cost of the structure.

The high wall abutment will be supported on piles. The front row of piles will be battered to resist the lateral loads. The proposed pier is located in the I-75 median at the existing Pier 2 location. The existing piles may be reused and supplemented with additional battered piles, driven between existing piles to resist lateral loads. High wall abutments are proposed. The use of semi-integral or independent back wall with sliding approach slabs abutments can be investigated during preliminary design to eliminate expansion joints on the bridge.

Under Clearance and Grade Raise

The existing structure currently has a minimum vertical under clearance of 15'-4" based on the existing record plans and the clearance posted on the bridge. I-75 at the project location is considered a special route. In this case, a 14'-9" minimum under clearance is required for the proposed bridge. Currently, the I-75 roadway is posted for 55 MPH; however, based on the current vertical geometry, the roadway is designed for 50 MPH. MDOT has requested that the preferred alignment for the DRIC accommodate a 60 MPH design speed on I-75, so that I-75 can be upgraded with future improvements to a 60 MPH design speed. Therefore, the vertical profile was set at 15'-3" to account for these future modifications to the I-75 vertical geometry. The following characteristics of the proposed road and bridge design affect the under clearance:

1. The proposed deck is being widened to accommodate two additional 20-foot U-turn lanes.
2. The proposed structure depth increase due to the increased span length.
3. Accommodation of future I-75 improvements to upgrade the vertical design speed from 50 MPH to 60 MPH.

The proposed profile currently shown on the General Plan of Site accommodates the expected Livernois Avenue profile grade. A 2.0% deck cross slope is recommended.

Maintaining Traffic

Livernois Avenue traffic will be detoured to allow for full width construction of the bridge.

Traffic control along I-75 for the structure replacement will require shoulder and temporary single lane closures to remove the existing piers and construct the new pier. Temporary freeway closures will be necessary during removal and erection of the beams.

Structure Options

Four superstructure alternatives were investigated in this study:

- 36" Wide Flange Steel Beam
- 34" Web Steel Plate Girder
- 42" Spread PPC Box Beam
- 42" Side-by-Side PPC Box Beam

Two-span arrangements with full-height abutments were considered for the four superstructure alternatives listed above. See Appendix A for cross sections of the alternatives listed above.

Preliminary beam design was completed for each superstructure type utilizing AASHTO LRFD, 2007 Edition as directed by MDOT. The MDOT HL-93 Modified loading was used for the design loading for each alternative.

A single span option was not investigated based on the significant increase in construction depth required and the limited increase available due to the vertical geometric constraints of the nearby service drives.

The required construction depth for the steel (Wide Flange or Plate Girder) and 42" Side-by-Side PPC Box Beam alternatives are approximately the same. The 42" Spread PPC Box Beam Alternative will result in a slightly deeper construction depth due to a thicker deck than the side-by-side alternative.

The proposed deck width is 103'-5". This width is slightly greater than the maximum deck width of 100'-0" which requires a longitudinal/open expansion joint as stated in the MDOT Bridge Design Manual. If a joint is used, it should be placed in the median or at the crown of the roadway. If it is placed in the median, it would pose a tripping hazard to pedestrians. If it is placed at the crown, it would be subject to traffic passing over the joint, requiring the joint to be armored with steel plates to protect the edge of the deck. Regardless of the location, the joint will become a long-term maintenance issue. Furthermore, the longitudinal joint would require two stages of post tensioning the beams due to the discontinuity of the superstructure caused by the longitudinal joint. It is recommended to omit the longitudinal joint in the deck for these reasons.

Cost

The cost for the 42" Spread PPC Box Beam Alternative is lower than the cost for the 42" Side-by-Side PPC Box Beam Alternative and significantly lower than the Steel Alternatives listed above.

Cost estimates for each alternative are included in Appendix B.

The cost estimates assume full-height cantilever abutments supported on piles and backfilled with a lightweight fill (Lightweight Aggregate, Slag, LM). The median pier is a multi-column concrete pier supported on piles. Geotechnical investigation will need to confirm these recommendations.

Because painting is not required for the concrete alternatives, long-term maintenance costs are lower for the recommended alternative than for the steel alternatives.

The following is a cost comparison between the different alternatives:

Alternative	Superstructure Depth	Total Cost	Cost/SF Deck
36" Wide Flange Steel Beam	51"	$5,817,530	$258
34" Web Steel Plate Girder	51"	$5,639,440	$250
42" Spread PPC Box Beam	55"	$4,450,990	$192
42" Side-by-Side PPC Box Beam	51"	$4,682,320	$204

The costs shown are for the bridge only and do not include cost associated with raising the Livernois Avenue profile. The Total Cost includes the removal of the existing structure. The Cost/SF does not include removal of the existing structure. Also, a 15% design contingency has been added to costs above.

Utilities

Several utilities are attached to the existing Livernois Avenue Bridge. An existing 12" diameter MichCon Gas main is attached to the structural steel under the east sidewalk. Four - 4" diameter Detroit Public Lighting Department (P.L.D.) ducts are attached to the bottom of the slab under the easternmost lane and four - 4" P.L.D. ducts are attached to the bottom of the slab under the west sidewalk.

A 3" diameter conduit that feeds the bridge mounted street lights is located in the west sidewalk in spans 1 and 4.

Relocation of the gas main is assumed prior to construction. If the relocation of this gas main is restricted based on seasonal usage, this information shall be provided to the contractor in the specifications for coordination during construction. Any of the options investigated, with the exception of the side-by-side box beam can accommodate the gas main if the utility is to be attached to the new structure. If the side-by-side box beam alternative is used, the gas main needs to be bored or jacked under I-75 with the current recommendation, if it is to remain in service.

Bridge lighting conduits can be placed in the concrete parapet or the raised median, depending on the location of the street lighting. The location of the lighting will be investigated during preliminary design.

PLD conduits can be relocated in the raised median.

Drainage

It is assumed that drainage will be collected off the bridge on the roadway and scuppers will not be required on the bridge based on the following:

1. The tributary width of bridge deck is relatively small.
2. The longitudinal grades are relatively steep.
3. Scuppers are not present on the existing bridge, which has a longer total span length and a wider pavement than the proposed bridge.

Aesthetics

Aesthetic treatments, including concrete texturing of the concrete parapet and concrete surface coating, are anticipated for the proposed structure. The aesthetic treatment can be accommodated by all four alternatives and will have approximately the same cost. Concrete surface sealer will be slightly greater for the concrete beam alternatives. The limits of the texturing are unknown at this time. However, an aesthetic cost equaling 1% of the bridge cost was included in the Preliminary Cost Estimate for all bridges. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

Recommendations

Based on costs the 42" Spread PPC Box Beam Alternative is the recommended alternative for the Livernois Avenue Bridge over I-75. The 42" Spread PPC Box Beam Alternative will accommodate the relocation of the 12" diameter gas main attached to the existing Livernois Avenue Bridge.

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Clark Avenue over I-75
Structure Study

General

The purpose of this study is to investigate different structure types for the replacement of the Clark Avenue Bridge over I-75. The Preferred Alignment of the Detroit River International Crossing (DRIC) Project requires reconfiguration of the existing I-75 interchange at Livernois/Dragoon. The I-75 Northbound entrance and I-75 Southbound exit plaza ramps will be located under Clark Avenue, which will conflict with the existing abutments.

The existing structure carries 2 through lanes in each direction (52' face-to-face curb), two 10' medians, and two 16' U-turn lanes. A 3'-8 ½" brush block with bridge railings and pedestrian fencing is present along the west and east sides of the bridge. The total width of the bridge is 117'-5". Intersections with the Northbound and Southbound Service Drives are present south and north of the bridge. The existing superstructure consists of a two span continuous 36" Wide Flange rolled steel beam section with an 8" composite reinforced concrete deck. The spans are 74'-0", 74'-0". Top and bottom flange cover plates are located over the center pier. The substructure consists of a cap and column pier and high wall abutments. All substructure units are supported on 60-ton cylindrical piles driven vertically. There are existing reinforced concrete struts, under I-75 roadway, between the existing abutments and the center pier to resist lateral loads.

The alignment of Clark Avenue will not change. The proposed bridge will carry two through lanes and one bike lane in each direction for a clear roadway width of 60'-0". Two 20'-0" U-turn lanes, to accommodate the Northbound and Southbound Service Drive traffic movements and 1'-6" concrete parapets with bridge railing and pedestrian fencing are present along the west and east sides of the bridge. The U-turn lanes are separated from the through lanes with 10' wide medians. The medians function as sidewalks to handle the pedestrian traffic. The proposed structure has an out-to-out deck width of 123'-5". Clark Avenue is posted 25 MPH and designed for 30 MPH traffic. Therefore, 2' wide shy distances are provided between the through lanes and the medians. A longitudinal open joint is required. The proposed bridge will be lengthened to accommodate tapers and standard shoulders for the new plaza ramps. See the attached General Plan of Site Plan and Cross Sections, in Appendix A for details and geometry. The structure design is to be completed based on current AASHTO LRFD specifications. The design live load is the AASHTO HL-93 Modified used by MDOT.

Replacement of the Clark Avenue Bridge is to be coordinated with the planned improvements to the I-75 ramp alignments and the service drive work. The structure requires replacement based on the elimination of the exterior columns due to the proposed I-75 ramp modifications.

Clark Avenue traffic, one lane in each direction, will be maintained during reconstruction of the proposed Clark Avenue Bridge.

Earth retention will be required to stage the removal of existing abutments and construct the new abutments while maintaining traffic. Due to the abutment height, the earth retention will need to be braced or tied-back with earth anchors.

Preliminary soils investigations propose that a lightweight fill (Lightweight Aggregate, Slag, LM) be placed as backfill behind the abutments. The use of the lightweight fill will reduce the lateral earth pressure on the high wall abutment allowing the lateral earth pressure to be resisted by the pile batter and not depend on the stiffness of the soil below the footing.

Additional soil borings and the geotechnical report will confirm the backfill and foundation assumptions used to compute the preliminary cost of the structure.

The high wall abutment will be supported on piles. The front row of piles will be battered to resist the lateral loads. The proposed pier is located in the I-75 median at the existing Pier 2 location. The existing piles may be reused and supplemented with additional battered piles, driven between existing piles to resist lateral loads. High wall abutments are proposed. The use of semi-integral or independent back wall with sliding approach slabs abutments can be investigated during preliminary design to eliminate expansion joints on the bridge.

Under Clearance and Grade Raise

The existing structure currently has a minimum vertical under clearance of 14'-11" based on the vertical under clearance posted on the bridge. I-75 at the project location is considered a special route. In this case, a 14'-9" minimum under clearance is required for the proposed bridge. Currently, the I-75 roadway is posted for 55 MPH; however, based on the current vertical geometry, the roadway is designed for 50 MPH. MDOT has requested that the preferred alignment for the DRIC accommodate a 60 MPH design speed on I-75, so that I-75 can be upgraded with future improvements to a 60 MPH design speed. Therefore, the vertical profile was set at 15'-3" to account for these future modifications to the I-75 vertical geometry.

The following characteristics of the proposed road and bridge design affect the underclearance:

1. The existing vertical clearance is less than 15'-3".
2. The proposed structure depth increase due to the increased span length.
3. Accommodation of future I-75 improvements to upgrade the vertical design speed from 50 MPH to 60 MPH.

The proposed profile currently shown on the General Plan of Site accommodates the expected Clark Avenue profile grade. A 2.0% deck cross slope is recommended.

Maintaining Traffic

One lane of traffic in each direction along Clark Avenue traffic will be maintained during the reconstruction of the Clark Avenue Bridge. See Appendix A for the staging configuration.

Traffic control along I-75 for the structure replacement will require shoulder and temporary single lane closures to remove the existing pier and abutments and to construct the new pier and abutments. Temporary freeway closures will be necessary during removal of the existing and erection of the new beams.

Structure Options

Three superstructure alternatives were investigated in this study:

- 42" Spread PPC Box Beam
- 42" Side-by-Side PPC Box Beam
- 34" Web Steel Plate Girder

Two-span arrangements with full-height abutments were considered for the three alternatives listed above. See Appendix A for the span arrangement of the alternatives listed above.

Preliminary beam design was completed for each superstructure type utilizing AASHTO LRFD, 2007 Edition as directed by MDOT. The MDOT HL-93 Modified loading was used for the design loading for each alternative.

A single span option was not investigated based on the significant increase in construction depth required and the limited increase available due to the vertical geometric constraints of the nearby service drives.

The 42" Spread PPC Box Beam Alternative will result in a slightly deeper construction depth than the 42" Side-by-Side PPC Box Beam and the 33" Wide Flange Steel Beam Alternatives. However, the greater construction depth will have a negligible impact to the Clark Avenue profile and will not impact the adjacent service drive intersections with Clark Avenue.

Cost

The cost for the 42" Spread PPC Box Beam Alternative is less than the cost for the 42" Side-by-Side PPC Box Beam and 34" Web Steel Plate Girder Alternative.

Cost estimates for each alternative are included in Appendix B.

The cost estimates assume full-height cantilever abutments supported on piles. The median pier is a multi-column concrete pier supported on piles. Geotechnical investigation will need to confirm these recommendations.

The following is a cost comparison between the different alternatives:

Alternative	Superstructure Depth	Total Cost	Cost/SF Deck
42" Spread PPC Box Beam	55"	$4,586,380	$193
42" Side-by-Side PPC Box Beam	51"	$5,395,720	$231
34" Web Steel Plate Girder	47"	$5,941,250	$257

The costs shown are for the bridge only and do not include approach cost associated with raising the Clark Avenue profile. The Total Cost includes the removal of the existing structure. The Cost/SF does not include removal of the existing structure. Also, a 15% design contingency has been added to costs above.

Utilities

Several utilities are attached to the Clark Avenue Bridge. An existing 16" diameter MichCon Gas main is attached to the structural steel under the southbound lanes of the bridge. Twelve - 4" diameter Detroit Edison conduits are attached to the underside of the deck under the northbound lanes. Six - 4" diameter Public Lighting Department (P.L.D.) are attached to the underside of the deck under the median on the east side of the bridge.

Relocation of the gas main will be required prior to construction. If the relocation of this gas main is restricted based on seasonal usage, this information will be provided to the contractor in the specifications for coordination during construction. The spread box alternative can accommodate the relocation of the existing gas main, while the side-by-side box beam alternative cannot accommodate the relocation of the gas main, requiring the gas main to be relocated off the bridge.

Bridge lighting conduits can be placed in the concrete parapet or the raised median, depending on the location of the street lighting. The location of the lighting will be investigated during preliminary design.

Detroit Edison and P.L.D. conduits can be relocated in the raised median.

Drainage

It is assumed that drainage will be collected off the bridge on the roadway and scuppers will not be required on the bridge based on the following:

1. The tributary width of bridge deck is relatively small.
2. The longitudinal grades are relatively steep.
3. Scuppers are not present on the existing bridge, which have longer spans and wider pavement than the proposed bridge.

Aesthetics

Aesthetic treatments, including concrete texturing of the concrete parapet and concrete surface coating, are anticipated for the proposed structure. The aesthetic treatment can be accommodated by both alternatives and will have approximately the same cost. The limits of the texturing are unknown at this time. However, an aesthetic cost equaling 1% of the bridge cost was included in the Preliminary Cost Estimate for all bridges. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

Recommendations

Based on costs the 42" Spread PPC Box Beam Alternative is the recommended alternative for the Clark Avenue Bridge over I-75. Also, the recommended alternative will accommodate the existing 16" diameter gas main attached to the existing Clark Avenue Bridge.

S37 of 82194 JN 802330
Ramp A over Fort Street and Ramp F
Structure Study

General

The purpose of this study is to investigate different structure types for the proposed Ramp A over Fort Street and Ramp F. Ramp A is part of the Detroit River International Crossing (DRIC) Plaza Project which requires reconfiguration of the existing I-75 interchange at Livernois/Dragoon. Ramp A exits the DRIC Plaza, crosses over the Norfolk Southern railroad tracks Fort Street and Ramp F. Ramp A then enters northbound I-75. This study investigated the spans over the Fort Street and Ramp F. The structure over the Norfolk Southern Railroad is not included in this study.

For details and geometry of the proposed Ramp A Bridge, see the General Plan of Site Plan and Cross Sections included in Appendix A.

The structure design is to be completed based on current AASHTO LRFD specifications. The design live load is the AASHTO HL-93 Modified used by MDOT.

Construction of the Ramp A Bridge is to be coordinated with improvements to the I-75 ramp alignments, the cross road bridge replacements and the service drive work.

Currently, the geotechnical study is not available for the bridge.

Lightweight backfill was used behind the abutments of existing bridges (Livernois and Dragoon Avenue Bridges) in the vicinity of Ramp A because of poor soil conditions. From the soil information shown on the existing bridge record plans there is soft clay for approximately 80 feet below the existing pile caps.

Preliminary soils investigations propose that a lightweight fill (Lightweight Aggregate, Slag, LM) be placed as backfill behind the abutments. The use of the lightweight fill will reduce the lateral earth pressure on the high wall abutment allowing the lateral earth pressure to be resisted by the pile batter and not depend on the stiffness of the soil below the footing.

Additional soil borings and the geotechnical report will confirm the backfill and foundation assumptions used to compute the preliminary cost of the structure.

The proposed abutment and pier foundations will likely be supported on piles due to large loads from the long span lengths.

Under Clearance

The vertical profile for Ramp A was set at 14’-9” minimum over Fort Street and Ramp F.

Maintaining Traffic

Temporary closure of Fort Street may be necessary during construction of the proposed piers and erection of the proposed girders. Ramp F will be under construction during the construction of Ramp F.

Structure Options

Several span arrangements have been investigated. The alignment is on curve (1340’ radius). Precast concrete beams have been eliminated from consideration due to curvature and span lengths. Concrete Segmental box girders have also been eliminated from consideration because it is considered a non-redundant structure by MDOT. Tub girders have been investigated for the Ramp D flyover structure and were not recommended for economic reasons.

The superstructure will consist of a four-span continuous plate girder section. The span lengths are 166'-0", 166’-0”, 212’-0” and 166’-0”. The web depth is 84”. The girders will be composite with a nine inch concrete deck for live load and superimposed dead load.

The ground can slope up from Fort Street at a 1 on 3 to allow the use of a stub abutment for Abutment A.

Retaining walls are present at Abutment B. Abutment B is shown as a high wall abutment. See the General Plan of Site – Elevation in Appendix A. The walls and abutments types should be studied after soil information is obtained and the geotechnical investigation is performed. Since the abutments are located in areas of fill, an MSE wall with a pile bent abutment should be investigated. If poor soils are present at the abutment and wall locations, soil modifications such as stone columns, vibro-compacted concrete columns or preloading soil with wick drains should be investigated to mitigate poor soils.

Due to large loads from the long span lengths and poor soils present, it is assumed that all piers and abutments will be supported on piles. Geotechnical Investigation needs to be performed to confirm these assumptions.

The General Plan of Site for the proposed span arrangement is included in Appendix A.

Preliminary superstructure designs were completed utilizing AASHTO LRFD, 2007 Edition as directed by MDOT. The MDOT HL-93 Modified loading was used for the design loading for each structure.

Utilities

Several utilities are present at the proposed substructure locations. There are many existing utilities that service existing buildings within the footprint of the proposed Ramp A. The utilities servicing existing buildings will be removed or abandoned; while utilities passing through the area will be relocated. The utilities located along existing streets that interfere with the bridge foundations will be relocated. See Appendix A for existing utility locations.

Drainage

Due to the length of the bridge and the span lengths, it is assumed that a closed drainage system is required. Downspouts located at the piers will empty into catch basins below that are tied into the local storm sewer system. Scupper locations and outlets will be determined during preliminary engineering design phase.

Aesthetics

Aesthetic treatments, including concrete texturing of the concrete parapet and concrete surface coating, are anticipated for the proposed structure. The limits of the texturing are unknown at this time. However, an aesthetic cost equaling 1% of the bridge cost was included in the Preliminary Cost Estimate for all bridges. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

Construction

The construction of the proposed bridge will be complex due to the span lengths, curvature and location of the bridge with respect to traffic. False work will be required for the steel plate girder erection to minimize deformations. The false work may need to remain in place until all the girders and cross frames are in place.

Recommendations

Based on cost comparison between the Curved Steel Plate Girder and the Dual Tub Girder Alternative, from the Ramp D Structure Study, the Curved Steel Plate Girder Alternative is recommended over the Tub Girder Alternative. The Curved Plate Girder is more typical and will allow more fabricators to bid on the fabricating contract. Also, more contractors are familiar with erection of the curved steel plate girder alternative than with the tub girder alternative.

The construction depth of the Curved Steel Plate Girder Alternative is 8'-6". The estimated cost for the Curved Steel Plate Girder Alternative is $9,146,000. The cost per square foot is $ 289. A 20% design contingency has been added to costs above. A Preliminary Cost Estimate is included in Appendix B.

S38 of 82194 JN 802330
Ramp B over the NB Service Drive, Livernois Avenue and Fort Street
Structure Study

General

The purpose of this study is to investigate different structure types for the proposed Ramp B Bridge over the NB Service Drive, Livernois Avenue and Fort Street. Ramp B is part of the Detroit River International Crossing (DRIC) Plaza Project which requires reconfiguration of the existing I-75 interchange at Livernois/Dragoon. Ramp B exits northbound I-75 crosses over the northbound Service Drive, the Livernois Avenue / Fort Street intersection, Norfolk Southern railroad tracks and enters the DRIC Plaza. This study investigated the spans over the NB Service Drive, Livernois Avenue and Fort Street. The structure over the Norfolk Southern Railroad is not included in this study.

For details and geometry of the proposed Ramp B Bridge, see the General Plan of Site Plan and Cross Sections included in Appendix A.

The structure design is to be completed based on current AASHTO LRFD specifications. The design live load is the AASHTO HL-93 Modified used by MDOT.

Construction of the Ramp B Bridge is to be coordinated with improvements to the I-75 ramp alignments, the cross road bridge replacements and the service drive work.

Currently, the geotechnical study is not available for the bridge.

Lightweight backfill was used behind the abutments of existing bridges (Livernois and Dragoon Avenue Bridges) in the vicinity of Ramp B because of poor soil conditions. From the soil information shown on the existing bridge record plans there is soft clay for approximately 80 feet below the existing pile caps.

Preliminary soils investigations propose that a lightweight fill (Lightweight Aggregate, Slag, LM) be placed as backfill behind Abutment A and Expanded Polystyrene (EPS) blocks be placed as backfill behind Abutment B. The use of EPS blocks will minimize settlement of the bridge approach pavement and reduce the lateral earth pressure on the high wall abutment allowing the lateral earth pressure to be resisted by the pile batter and not depend on the stiffness of the soil below the footing. The use of the lightweight fill will reduce the lateral earth pressure on the high wall abutment.

Additional soil borings and the geotechnical report will confirm the backfill and foundation assumptions used to compute the preliminary cost of the structure.

The proposed abutment and pier foundations will likely be supported on piles due to large loads from the long span lengths.

Under Clearance

The vertical profile for Ramp B was set at 14’-9” minimum over, Livernois Avenue and Fort Street. The vertical profile for Ramp B over the Northbound Service Drive was set at 17’-3” minimum vertical under clearance at the straddle bent location. A 14’-9” minimum clearance is required at girder locations.

Maintaining Traffic

Traffic control along I-75 for the structure replacement will require shoulder and temporary single lane closures to construct Abutment A, Pier 1 and place the girders.

Temporary closure of local streets such as Livernois Avenue and Fort Street may be necessary during construction of the proposed piers and erection of the proposed girders.

Structure Options

Several span arrangements have been investigated. The alignment is on curve (1500’ radius). Precast concrete beams have been eliminated from consideration due to curvature and span lengths. Concrete Segmental box girders have also been eliminated from consideration because it is considered a non-redundant structure by MDOT. Tub girders have been investigated for the Ramp D flyover structure and were not recommended for economic reasons.

Due to the angle of intersection between Ramp B and the Northbound Service Drive and the geometry of the Livernois Avenue/Fort Street intersection, excessive span lengths would be required to span the Northbound Service Drive and the Livernois Avenue/Fort Street intersection. By locating only one pier in the southwest quadrant of Livernois/Fort Street, spans would approach 350’. Locating two piers in the southwest quadrant of Livernois/Fort Street would result in unbalanced spans for a continuous girder.

To avoid these excessive lengths and unbalanced spans, a straddle bent is proposed over the Northbound Service Drive. The superstructure will be divided into two units. Unit 1 will consist of a four-span continuous plate girder section. The span lengths are 127’-6", 158’-9”, 150’-3” and 110’-0”. The web depth is 54”. Unit 2 will consist of a two-span continuous plate girder section. The span lengths are 251’-6" and 151’-6”. The web depth is 84”. The girders for both units will be composite with a nine inch concrete deck for live load and superimposed dead load.

An expansion joint will be located above Pier 4 and the superstructure depth will increase to the south. Due to the lengths and the curvature, modular joints are required between Unit 1 and Unit 2 and at the abutments.

A deeper beam is required to span the Livernois Avenue / Fort Street intersection.

A high wall abutment is proposed for Abutment A. The bridge can be terminated south of Fort Street. The ground can slope up from Fort Street at a 1 on 3 to allow the use of a stub abutment for Abutment B.

Due to long spans and poor soils, it is assumed that all piers and abutments will be supported on piles. Geotechnical Investigation needs to be performed to confirm these assumptions.

A straddle bent would be required to reduce the span lengths. A minimum vertical of clearance of 17’-3” is required at the straddle bent due to the straddle bent being non-redundant. To achieve a minimum 17’-3” minimum vertical under clearance, the horizontal element of the straddle bent is included within the depth of the superstructure. A minimum vertical clearance of 14’-9” is required for the girders.

Retaining walls are present at Abutment A. Abutment A is shown as a high wall abutment as shown on the General Plan of Site – Elevation in Appendix A. The walls and abutments types should be studied after soil information is obtained and the geotechnical investigation is performed. Since the abutments are located in areas of fill, an MSE wall with a pile bent abutment should be investigated. If poor soils are present at the abutment and wall locations, soil

modifications such as stone columns, vibro-compacted concrete columns or preloading soil with wick drains should be investigated to mitigate poor soils.

The General Plan of Site for the proposed span arrangement for the proposed alternative is included in Appendix A.

Preliminary superstructure designs were completed utilizing AASHTO LRFD, 2007 Edition as directed by MDOT. The MDOT HL-93 Modified loading was used for the design loading for each structure.

Utilities

Several utilities are present at the proposed substructure locations. There are many existing utilities that service existing buildings within the footprint of the proposed Ramp B. The utilities servicing existing buildings will be removed or abandoned while utilities passing through the area will be relocated. The utilities located along existing streets that interfere with the bridge foundations will be relocated. See Appendix A for existing utility locations.

Drainage

Due to the length of the bridge and the span lengths, it is assumed that a closed drainage system is required. Downspouts located at the piers will empty into catch basins below that are tied into the local storm sewer system. Scupper locations and outlets will be determined during preliminary engineering design phase.

Aesthetics

Aesthetic treatments, including concrete texturing of the concrete parapet and concrete surface coating, are anticipated for the proposed structure. Concrete surface sealer will be slightly greater for the concrete beam alternatives. The limits of the texturing are unknown at this time. However, an aesthetic cost equaling 1% of the bridge cost was included in the Preliminary Cost Estimate for all bridges. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

Construction

The construction of the proposed bridge will be complex due to the span lengths, curvature and location of the bridge with respect to traffic. False work will be required for the steel plate girder erection to minimize deformations. The false work may need to remain in place until all the girders and cross frames are in place.

Recommendations

Based on cost comparison between the Curved Steel Plate Girder and the Dual Tub Girder Alternative, from the Ramp D Structure Study, the Curved Steel Plate Girder Alternative is recommended over the Tub Girder Alternative. The Curved Plate Girder is more typical and will allow more fabricators to bid on the fabricating contract. Also, more contractors are familiar with erection of the curved steel plate girder alternative than with the tub girder alternative.

The construction depth of the Curved Steel Plate Girder Alternative is 6’-0” for Unit 1 and 8’-6” for Unit 2. The estimated cost for the Curved Steel Plate Girder Alternative is $13,410,000. The cost per square foot is $ 310. A 20% design contingency has been added to costs above. A Preliminary Cost Estimate is included in Appendix B.

S39 of 82194 and S40 of 82194 JN 802330
S39 of 82194: Ramp C over I-75, Livernois Avenue, Ramp E and Fort Street
S40 of 82194: Ramp C over Ramp D
Structure Study

General

The purpose of this study is to investigate different structure types for the proposed Ramp C Bridges over I-75, Livernois Avenue, Ramp E, Fort Street and Ramp D. Ramp C is part of the Detroit River International Crossing (DRIC) Plaza Project which requires reconfiguration of the existing I-75 interchange at Livernois/Dragoon. Ramp C exits the DRIC Plaza crosses over the Norfolk Southern railroad tracks Plaza Ramp D, Fort Street, Ramp E, Livernois Avenue and I-75. Ramp C then enters southbound I-75. This study will investigate two structures:

1. Structure No. S39 of 82194: Ramp C over I-75, Livernois Ave., NB Service Drive and Fort Street
2. Structure No. S40 of 82194: Ramp C over Ramp D

The structures are separated with 400 feet of embankment.

The structure over the Norfolk Southern Railroad is not included in this study.

For details and geometry of the proposed Ramp C Bridge, see the General Plan of Site Plan and Cross Sections included in Appendix A.

The structure design is to be completed based on current AASHTO LRFD specifications. The design live load is the AASHTO HL-93 Modified used by MDOT.

Construction of the Ramp C Bridge is to be coordinated with improvements to the I-75 ramp alignments, the cross road bridge replacements and the service drive work.

Currently, the geotechnical study is not available for the bridge.

Lightweight backfill was used behind the abutments of existing bridges (Livernois and Dragoon Avenue Bridges) in the vicinity of Ramp C because of poor soil conditions. From the soil information shown on the existing bridge record plans there is soft clay for approximately 80 feet below the existing pile caps.

Preliminary soils investigations propose that a lightweight fill (Lightweight Aggregate, Slag, LM) be placed as backfill behind the abutments for Structure No. S39 of 82194 and Expanded Polystyrene (EPS) blocks be placed as backfill behind the abutments for Structure No. S40 of 82194. The use of EPS blocks will minimize settlement of the bridge approach pavement and reduce the lateral earth pressure on the high wall abutment allowing the lateral earth pressure to be resisted by the pile batter and not depend on the stiffness of the soil below the footing. The use of the lightweight fill will reduce the lateral earth pressure on the abutment.

Additional soil borings and the geotechnical report will confirm the backfill and foundation assumptions used to compute the preliminary cost of the structure.

The proposed abutment and pier foundations will likely be supported on piles due to large loads from the long span lengths.

Under Clearance

I-75 at the project location is considered a special route. In this case, a 14'-9" minimum under clearance is required for the proposed bridge. Currently, the I-75 roadway is posted for 55 MPH; however, based on the current vertical geometry, the roadway is designed for 50 MPH. MDOT has requested that the preferred alignment for the DRIC accommodate a 60 MPH design speed on I-75, so that I-75 can be upgraded with future improvements to a 60 MPH design speed. Therefore, the vertical profile was set at 15'-3" to account for these future modifications to the I-75 vertical geometry. The vertical profile for Ramp C was set at 14'-9" minimum over Fort Street, Ramp E and Livernois Avenue. The vertical profile for Ramp D over Ramp C was set at 17'-3" minimum vertical underclearance at the straddle bent location.

Maintaining Traffic

Traffic control along I-75 for the structure replacement will require shoulder and temporary single lane closures to construct the new piers and the abutments. Temporary freeway night closures will be necessary during erection of the proposed girders.

Temporary closure of local streets such as Livernois Avenue and Fort Street may be necessary during erection of the proposed girders.

Structure Options

Structure No. S39 of 82194

Several span arrangements have been investigated. The alignment is on curve (1641' radius). Precast concrete beams have been eliminated from consideration due to curvature and span lengths. Concrete Segmental box girders have also been eliminated from consideration because it is considered a non-redundant structure by MDOT. Tub girders have been investigated for the Ramp D flyover structure and were not recommended for economic reasons.

Due to the angle of intersection between the ramp and the I-75 mainline and acceptable pier placement, the spans over I-75 become very long. Proposed piers are located within the clear zone and will require protection from traffic using concrete barriers. For the vertical clearance criteria, the minimum vertical clearance to a pier cap is 17'-6" while the minimum vertical clearance to a girder is 15'-3". The minimum vertical clearance for the pier cap is larger than a beam because the pier cap is considered non-redundant. Vehicular impact to the pier cap is much more likely to result in the loss of a span than impact to a girder. To reduce the construction depth the pier cap can be built integral with the superstructure. If the integral pier cap is located over traffic the effective maximum beam depth is reduced 2'-3" (the difference between 17'-6" and 15'-3"). When the beam depth is reduced, the maximum span length is reduced.

To minimize span lengths (and girder depth), straddle bents were investigated. The straddle bent will allow the superstructure to be supported at a point where a conventional pier cannot be located due to horizontal constraints. The straddle bent would be a viable option under different conditions but was not recommended based on the following reasons:

1. The straddle bent will need to span the entire I-75 southbound lanes and shoulders. The span of the straddle bent will approach 100'.
2. The benefit from reducing span length by using a straddle bent would be offset by the reduction in the allowable construction depth due to increased vertical clearance requirements as stated above.
3. The superstructure would need to be built integrally with the straddle bent. Details would be complex and construction would not be typical.
4. Costs for the straddle bent would add a substantial cost to the bridge.
5. Construction of the straddle bent would require longer complete closure of I-75 due to placement of the straddle bent and time required to complete connections of the superstructure to the straddle bent.

The proposed span arrangement consists of six spans crossing Fort Street and Ramp E. The span lengths are 153'-0", 257'-8", 192'-6", 159'-6", 198'-6" and 142'-0". The girders are composite for live load and superimposed dead load with the 9" concrete deck. Expansion joints are located at each abutment. Due to large movements and curvature, modular expansion joints are proposed.

Pile bent abutments are proposed. The piers will be conventional piers or single column hammerhead piers when required. All piers will be supported on piles.

The minimum clearance point occurs over the southbound outside shoulder of I-75 just before Ramp C enters I-75. Pier 1 is located as close as possible to I-75 without encroaching over the I-75 SB outside shoulder. Pier 2 will be a single column pier located in the median of I-75. The column width is limited to six feet in diameter to maintain standard median shoulders. The median barrier will transition into the pier. The pier cap will support the superstructure and will be located over the I-75 median shoulders. A minimum vertical under clearance greater than 17'- 6" will be maintained. Pier 3 will also be a single column pier and will be pulled in as close as possible to the I-75 northbound outside shoulder to minimize span lengths. The column of the pier will be protected from traffic with a concrete barrier. The pier cap will overhang the I-75 NB outside shoulder. A minimum vertical under clearance to the pier cap greater than 17'- 6" will be maintained.

A constant web depth of 84 inches for Structure No. S39 of 82194 is feasible for the proposed profile.

Structure No. S40 of 82194

A single span and a two-span structure were investigated. The alignment is on curve with an 818' radius. The south abutment is skewed due to the geometry of Ramps A, B, C and D converging at that location. If a single span is proposed; the skew would result in potential construction and long term maintenance problems due rotation caused by the length of the simple span and the tight curvature.

A straddle bent would be required to reduce the span lengths. A minimum vertical of clearance of 17'-3" is required at the straddle bent due to the straddle bent being non-redundant. A minimum vertical clearance of 14'-9" is required for the girders.
The General Plan of Site for the proposed span arrangement for the alternatives listed above is included in Appendix A.

Retaining walls are present at each of the abutments for S40 of 82194. High wall abutments are shown on the General Plan of Site – Elevation. The walls and alternate abutments types should be studied after soil information is obtained and the geotechnical investigation is performed. Since the abutments are located in areas of fill, an MSE wall with a pile bent abutment should be investigated. If poor soils are present at the abutment and wall locations, soil modifications such as stone columns, vibro-compacted concrete columns or preloading soil with wick drains should be investigated to mitigate poor soils.

Preliminary superstructure designs were completed for both structures utilizing AASHTO LRFD, 2007 Edition as directed by MDOT. The MDOT HL-93 Modified loading was used for the design loading for each structure.

Utilities

Several utilities are present at the proposed substructure locations. There are many existing utilities that service existing buildings within the footprint of the proposed Ramp C. The utilities servicing existing buildings will be removed or abandoned while utilities passing through the area will be relocated. The utilities located along existing streets that interfere with the bridge foundations will be relocated. See Appendix A for existing utility locations.

Drainage

Due to the length of the bridge and the span lengths, it is assumed that a closed drainage system is required. Downspouts located at the piers will empty into catch basins below that are tied into the local storm sewer system. Scupper locations and outlets will be determined during preliminary engineering design phase.

Aesthetics

Aesthetic treatments, including concrete texturing of the concrete parapet and concrete surface coating, are anticipated for the proposed structure. Concrete surface sealer will be slightly greater for the concrete beam alternatives. The limits of the texturing are unknown at this time. However, an aesthetic cost equaling 1% of the bridge cost was included in the Preliminary Cost Estimate for all bridges. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

Construction

The construction of proposed Structure No. S39 of 82194 will be complex due to the span lengths, curvature and location of the bridge with respect to traffic. Falsework will be required for the steel plate girder option to reduce deformations during erection. The falsework may need to remain in place until all the girders and cross frames are in place.

Recommendations

Based on cost comparison between the Curved Steel Plate Girder and the Dual Tub Girder Alternative, from the Ramp D Structure Study, the Curved Steel Plate Girder Alternative is the recommended over the Tub Girder Alternative. The Curved Plate Girder is more typical and will allow more fabricators to bid on the fabricating contract. Also, more contractors are familiar with erection of the curved steel plate girder alternative than with the tub girder alternative.
The construction depth of the Curved Steel Plate Girder Alternative is 8'-6" for Structure No. S39 of 82194 and 6'-0" for Structure No. S40 of 82194. The estimated cost for the Curved Steel Plate Girder Alternative is $22,463,000. The cost per square foot is $317. A 20% design contingency has been added to costs above. A Preliminary Cost Estimate is included in Appendix B.

S41 of 82194 JN 802330
Ramp D over I-75, Ramp F and Fort Street
Structure Study

General

The purpose of this study is to investigate different structure types for the proposed Ramp D Bridge over I-75, Ramp F and Fort Street. Ramp D is part of the Detroit River International Crossing (DRIC) Plaza Project which requires reconfiguration of the existing I-75 interchange at Livernois/Dragoon. Ramp D exits I-75 SB and crosses over I-75 SB and NB, proposed Ramp F and Fort Street then proceeds over the Norfolk Southern railroad tracks and enters the DRIC Plaza. For details and geometry of the proposed Ramp D Bridge, see the General Plan of Site Plan and Cross Sections included in Appendix A.

The structure design is to be completed based on current AASHTO LRFD specifications. The design live load is the AASHTO HL-93 Modified used by MDOT.

Construction of the Ramp D Bridge is to be coordinated with improvements to the I-75 ramp alignments, the cross road bridge replacements and the service drive work.

Currently, the geotechnical study is not available for the bridge.

Lightweight backfill was used behind the abutments of existing bridges (Livernois and Dragoon Avenue Bridges) in the vicinity of Ramp D because of poor soil conditions. From the soil information shown on the existing bridge record plans there is soft clay for approximately 80 feet below the existing pile caps.

Preliminary soils investigations propose that a lightweight fill (Lightweight Aggregate, Slag, LM) be placed as backfill behind the abutments. The use of the lightweight fill will reduce the lateral earth pressure on the high wall abutment allowing the lateral earth pressure to be resisted by the pile batter and not depend on the stiffness of the soil below the footing.

Additional soil borings and the geotechnical report will confirm the backfill and foundation assumptions used to compute the preliminary cost of the structure.

Stub abutments will be supported on piles. Proposed piers will likely be supported on piles due to large loads from the long span lengths.

Under Clearance

I-75 at the project location is considered a special route. In this case, a 14'-9" minimum under clearance is required for the proposed bridge. Currently, the I-75 roadway is posted for 55 MPH; however, based on the current vertical geometry, the roadway is designed for 50 MPH. MDOT has requested that the preferred alignment for the DRIC accommodate a 60 MPH design speed on I-75, so that I-75 can be upgraded with future improvements to a 60 MPH design speed. Therefore, the vertical profile was set at 15'-3" to account for these future modifications to the I-75 vertical geometry. The vertical profile for Ramp D was set at 14'-9" minimum over Ramp F and Fort Street.

Maintaining Traffic

Traffic control along I-75 for the structure replacement will require shoulder and temporary single lane closures to construct the new piers and the abutments. Temporary freeway night closures will be necessary during erection of the proposed girders.

Structure Options

Several span arrangements have been investigated. The alignment is on curve (1574' radius). Precast concrete beams have been eliminated from consideration due to curvature and span lengths. Concrete Segmental box girders have also been eliminated from consideration because it is considered a non-redundant structure by MDOT.

Due to the angle of intersection between the ramp and the I-75 mainline and acceptable pier placement, the spans over I-75 become very long. Proposed piers are located within the clear zone and will require protection from traffic using concrete barriers. For the vertical clearance criteria, the minimum vertical clearance to a pier cap is 17'-6" while the minimum vertical clearance to a girder is 15'-3". The minimum vertical clearance for the pier cap is larger than a beam because the pier cap is considered non-redundant. Vehicular impact to the pier cap is much more likely to result in the loss of a span than impact to a girder. To reduce the construction depth the pier cap can be built integral with the superstructure. If the integral pier cap is located over traffic the effective maximum beam depth is reduced 2'-3" (the difference between 17'-6" and 15'-3"). When the beam depth is reduced, the maximum span length is reduced.

To minimize span lengths (and girder depth), straddle bents were investigated. The straddle bent will allow the superstructure to be supported at a point where a conventional pier cannot be located due to horizontal constraints. The straddle bent would be a viable option under different conditions but was not recommended based on the following reasons:

1. The straddle bent will need to span the entire I-75 southbound lanes and shoulders. The span of the straddle bent will approach 100'.
2. The benefit from reducing span length by using a straddle bent would be offset by the reduction in the allowable construction depth due to increased vertical clearance requirements as stated above.
3. The superstructure would need to be built integrally with the straddle bent. Details would be complex and construction would not be typical.
4. Costs for the straddle bent would add a substantial cost to the bridge.
5. Construction of the straddle bent would require longer complete closure of I-75 due to placement of the straddle bent and time required to complete connections of the superstructure to the straddle bent.

The proposed span arrangement of the structure consists of two units. Unit 1 consists of six spans crossing Fort Street and Ramp E. The span lengths of Unit 1 are 181'-2", 170'-10", 170'-10", 170'-10" and 149'-10". Unit 2 consists of three spans crossing I-75. The span lengths of Unit 2 are 241'-6", 357'-6" and 241'-6". The girders are composite for live load and superimposed dead load with the 9" concrete deck. Expansion joints are located at each abutment and between Unit 1 and Unit 2. Due to large movements and curvature, modular expansion joints are proposed.

Pile bent abutments are proposed. The piers will be conventional piers or single column hammerhead piers when required. All piers will be supported on piles.

The minimum clearance point occurs as the ramp ascends and starts to cross I-75. Pier 7 is located as close as possible to I-75 without encroaching over the I-75 SB outside shoulder. Pier 6 will be a single column pier that will be in the median of I-75. The column width is limited to six feet in diameter to maintain standard median shoulders. The median barrier will transition into the pier. A conventional cantilevered pier cap will support the superstructure and will be located over the I-75 median. A minimum vertical under clearance greater than 17'- 6" will be maintained. Pier 5 will

also be a single column pier and will be pulled in as close as possible to the I-75 northbound outside shoulder to minimize span lengths. The column of the pier will be protected from traffic with a concrete barrier. The pier cap will overhang the I-75 NB outside shoulder. Since the ramp is still ascending, a minimum vertical under clearance greater than 17'- 6" will be maintained. An expansion joint will be located above Pier 5 and the superstructure depth will decrease to the south. For economy, shorter spans are recommended south of Pier 5.

Two superstructure alternatives were investigated in this study:

- 114" Web Curved Steel Plate Girder
- 110" Dual Tub Girders (with a longitudinal flange splice)

Curved steel plate girders and tub girders are both feasible alternatives for the proposed span lengths. Tub girders have been used on select projects in the state of Michigan. For a dual tub girder bridge, MDOT requires a continuous longitudinal bottom flange splice to insure redundancy. The longitudinal bottom flange splice is also required for transportation to the site. The General Plan of Site for the proposed span arrangement for the alternatives listed above is included in Appendix A.

Preliminary superstructure designs were completed for each superstructure alternative type for Unit 2, utilizing AASHTO LRFD, 2007 Edition as directed by MDOT. The MDOT HL-93 Modified loading was used for the design loading for each alternative.

Comparative Cost

A comparative cost analysis for the fabrication and delivery of the structural steel was prepared for both alternatives for Unit 2 and are included in Appendix C. Unit 2 was chosen due to the longest span lengths and the location of the point of minimum vertical clearance over I-75. For shorter spans, steel plate girders are typically more economical than tub girders.

The estimated fabrication cost for the Curved Steel Plate Girder is $6,539,415. The estimate fabrication cost for the steel tub girder is $8,278,767. Erection costs can vary based on several factors. While the weight of steel for the Tub Girder Alternative is lower, the pick for each girder is heavier which would require heavier equipment and more room for crane placement. Installation of the longitudinal bottom flange splice would also increase erection costs. Deck forming costs and deck reinforcement would be greater for the tub girder option due to much greater flange spacing.

Utilities

Several utilities are present at the proposed substructure locations. There are many existing utilities that service existing buildings within the footprint of the proposed Ramp D. The utilities servicing existing buildings will be removed or abandoned while utilities passing through the area will be relocated. The utilities located along existing streets that interfere with the bridge foundations will be relocated. See Appendix A for existing utility locations.

Drainage

Due to the length of the bridge and the span lengths, it is assumed that a closed drainage system is required. Downspouts located at the piers will empty into catch basins below that are tied into the local storm sewer system. Scupper locations and outlets will be determined during preliminary engineering design phase.

Aesthetics

Aesthetic treatments, including concrete texturing of the concrete parapet and concrete surface coating, are anticipated for the proposed structure. Concrete surface sealer will be slightly greater for the concrete beam alternatives. The limits of the texturing are unknown at this time. However, an aesthetic cost equaling 1% of the bridge cost was included in the Preliminary Cost Estimate for all bridges. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

Construction

The construction of both alternatives proposed will be complex due to the span lengths, curvature and location of the bridge with respect to traffic. Falsework will be required for the steel plate girder option to reduce deformations during erection. The falsework may need to remain in place until all the girders and cross frames are in place. Falsework may be required for erection of the tub girders. While the tub girders are more rigid than plate girders, due to the long spans, the curved boxes may rotate or warp making sequential field erection difficult.

Erection of the plate girders is more typical than erection of tub girders. More contractors are likely to bid on a curved steel plate girder bridge than a curved tub girder bridge. As discussed previously, the pick for a tub girder is much heavier than a pick for a steel plate girder requiring larger equipment and more space for crane placement.

Recommendations

Based on cost comparison between the Curved Steel Plate Girder and the Dual Tub Girder Alternative the Curved Steel Plate Girder Alternative is the recommended over the Tub Girder Alternative. The Curved Plate Girder is more typical and will allow more fabricators to bid on the fabricating contract. Also, more contractors are familiar with erection of the curved steel plate girder alternative than with the tub girder alternative. The Ramp D profile will accommodate both alternatives.

The construction depth of the Curved Steel Plate Girder Alternative is 8'-6" for unit 1 and 11'-6" for Unit 2. The estimated cost for the Curved Steel Plate Girder Alternative is $23,163,000. The cost per square foot is $ 306. A 20% design contingency has been added to costs above. A Preliminary Cost Estimate is included in Appendix B.

S42 of 82194 JN 802330
Ramps E and Ramp F
Structure Study

General

The purpose of this study is to investigate different structure types for proposed Ramp E over Ramp F. Ramps E and F are part of the Detroit River International Crossing (DRIC) Plaza Project which requires reconfiguration of the existing I-75 interchange at Livernois/Dragoon. Ramp E is braided with Ramp F. Ramp E is an I-75 NB entrance ramp. It enters I-75 from Livernois Avenue, passes over Ramp F and then enters I-75. Ramp F exits I-75 NB at Livernois Avenue and passes under Ramp F, and then enters the plaza. Ramp E enters I-75 NB from Livernois Avenue and passes under Ramp E and enters the plaza.

For details and geometry of the proposed Ramp E over Ramp F, see the General Plan of Site Plan and Cross Sections included in Appendix A.

The structure design is to be completed based on current AASHTO LRFD specifications. The design live load is the AASHTO HL-93 Modified used by MDOT.

Construction of the Ramp E Bridge over Ramp F is to be coordinated with improvements to the I-75 ramp alignments, the cross road bridge replacements and the service drive work.

Currently, the geotechnical study is not available for the bridge.

Lightweight backfill was used behind the abutments of existing bridges (Livernois and Green Avenue Bridges) in the vicinity of the Ramp E / Ramp F crossing because of poor soil conditions. From the soil information shown on the existing bridge record plans there is soft clay for approximately 80 feet below the existing pile caps.

Preliminary soils investigations propose that a lightweight fill (Lightweight Aggregate, Slag, LM) be placed as backfill behind the abutments. The use of the lightweight fill will reduce the lateral earth pressure on the high wall abutment allowing the lateral earth pressure to be resisted by the pile batter and not depend on the stiffness of the soil below the footing.

Additional soil borings and the geotechnical report will confirm the backfill and foundation assumptions used to compute the preliminary cost of the structure.

The proposed abutments will likely be supported on piles due to superstructure loads large overturning forces due the abutment height.

Under Clearance

The vertical profile for Ramp E was set at 14’-9” minimum over Ramp F.

Structure Options

Two alternatives were investigated in this study:

- 42” Spread PPC Box Beam
- 42’ Wide 3-Sided Precast Concrete Culvert

The two alternatives listed above have been studied. The 42” Spread Box Beam Alternative is a bridge that carries Ramp E over Ramp F. The bridge is a single span bridge. The abutments can be skewed slightly to reduce the span length without affecting the performance of the bridge. The Ramp E alignment is tangent along approximately three quarters of the bridge length. A 1265-foot radius is introduced on the bridge. The deck can be slightly widened to allow the use of straight, parallel beams with constant bridge overhangs. Minimum shoulder widths will be maintained.

Due to the severe skew, the 42’ Wide 3-Sided Precast Concrete Culvert Alternative was investigated. The culvert would allow ramp F to be tunneled under Ramp E. Structurally, the culvert would span Ramp F at right angles. It would span Ramp F at right angles. The precast section offers the advantage of speedy erection. However, the alternative has the following disadvantages:

- Segment lengths are limited to six feet due to transportation limitations
- Because of the short culvert segment length, the ends segments cannot be skewed.
- The difference between the point of minimum clearance and the top of the precast culvert is in excess of 4’-6”. This will required Ramp F to be lowered to accommodate this difference and provide a minimum clearance between the top of the culvert and Ramp E roadway to allow a roadway cross slope, pavement, sub-base, under drains and roadway drainage.
- Ramp F is in cut. The more that Ramp F is lowered, the wing walls become longer. Lowering Ramp F also compounds the drainage issues for Ramp F pavement.
- The clear width of the precast sections comes in standard widths. The smallest standard section that meets the roadway clear width minimum requirements is 4’-10” wider than required.

Cost

The cost for the 42” Spread PPC Box Beam Alternative is less than the cost for the 42’ Wide 3-sided Precast Concrete Culvert Alternative.

Cost estimates for each alternative are included in Appendix B.

The cost estimate assumes full-height cantilever abutments supported on piles for the 42” Spread PPC Box Beam Alternative. The cost estimate for the 42’ Wide 3-Sided Precast Concrete Culvert Alternative assumes a pile supported pedestal for the culvert. Both alternatives require wing walls. The wing walls for the 42” Spread PPC Box Beam Alternative are shorter due to a shallower effective construction depth.

Geotechnical investigation will need to confirm these recommendations.

The following is a cost comparison between the different alternatives:

Alternative	Superstructure Depth	Total Cost	Cost/SF Deck
42" Spread PPC Box Beam	55"	$1,394,770	$323
42' Wide Three-Sided Precast Concrete Culvert	78"	$1,573,300	$365

The costs shown are for the bridge only and do not include approach cost. The Cost/SF for the culvert alternative does not include the cost of the roadway above the culvert. The Cost/SF for the 42' Wide Three-Sided Precast Concrete Culvert Alternative is based on the 42" Spread PPC Box Beam Alternative Bridge Area. The costs for the wing walls are included in the cost estimate for both alternatives. A 20% design contingency has been added to costs above.

Utilities

Several utilities are present near the proposed substructure location. The utilities interfering with the proposed substructure shall be relocated. See Appendix A for existing utility locations.

Drainage

It is assumed that drainage will be collected off the bridge on the roadway and scuppers will not be required on the bridge based on the following:

1. The tributary width of bridge deck is relatively small.
2. The longitudinal grades are relatively steep.

Aesthetics

Aesthetic treatments, including concrete texturing of the concrete parapet and concrete surface coating, are anticipated for the proposed structure. The aesthetic treatment can be accommodated by both alternatives (wing walls only for the 42' Wide 3-Sided Precast Concrete Culvert Alternative). The limits of the texturing are unknown at this time. However, an aesthetic cost equaling 1% of the estimated cost was included in the Preliminary Cost Estimate for all bridges. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

Recommendations

Based on lower estimated costs, the 42" Spread PPC Box Beam Alternative is the recommended for the Ramp E Bridge over Ramp F. The 42" Spread PPC Box Beam Alternative will also minimize the cut for Ramp F required to maintain a 14'-9" minimum vertical clearance.

R01-3 of 82194 JN 802330
Ramps B and D over the Norfolk Southern Railroad
Structure Study

General

The purpose of this study is to investigate different structure types for the proposed Ramps B and D Bridge over the Norfolk Southern Railroad and the Plaza Drive. Ramps B and D are part of the Detroit River International Crossing (DRIC) Plaza Project which requires reconfiguration of the existing interchange at Livernois/Dragoon. Ramp D exits I-75 SB and crosses over I-75 SB and NB, proposed Ramp F and Fort Street then proceeds over the Norfolk Southern Railroad tracks and enters the DRIC Plaza. Ramp B exits northbound I-75 crosses over the northbound Service Drive, the Livernois Avenue / Fort Street intersection, Norfolk Southern railroad tracks and enters the DRIC Plaza.

A separate Structure Study has been prepared for the Ramp B Bridge over the NB Service Drive, Livernois Avenue and Fort Street and for the Ramp D Bridge over I-75, Ramp F and Fort Street. For details and geometry of the proposed Ramps B and D Bridge over the Norfolk Southern Railroad, see the General Plan of Site Plan and Cross Sections included in Appendix A.

The structure design is to be completed based on current AASHTO LRFD specifications. The design live load is the AASHTO HL-93 Modified used by MDOT.

Construction of the Ramps B and D Bridge is to be coordinated with improvements to the I-75 ramp alignments, the cross road bridge replacements and the service drive work.

Currently, the geotechnical study is not available for the bridge.

Lightweight backfill was used behind the abutments of existing bridges (Livernois and Green Avenue Bridges) in the vicinity of Ramps B and D because of poor soil conditions. From the soil information shown on the existing bridge record plans there is soft clay for approximately 80 feet below the existing pile caps.

Preliminary soils investigations propose that a lightweight fill, Expanded Polystyrene (EPS) blocks be placed as backfill behind the abutments. The use of EPS blocks will minimize settlement of the bridge approach pavement and reduce the lateral earth pressure on the high wall abutment allowing the lateral earth pressure to be resisted by the pile batter and not depend on the stiffness of the soil below the footing.

Additional soil borings and the geotechnical report will confirm the backfill and foundation assumptions used to compute the preliminary cost of the structure.

The proposed abutments will likely be supported on piles due to superstructure loads large overturning forces due the abutment height.

Under Clearance

The vertical profile for Ramps B and D were at 23’-0” minimum over the Norfolk Southern Railroad.

Maintaining Traffic

Railroad traffic must be maintained at all times. Flaggers will be required when constructing Abutment A and when erecting the steel girders.

Structure Options

Based on the tight minimum vertical clearance and the span lengths, concrete beams were not considered. Ramp B has a tighter radius than Ramp D at the bridge. Curved girders would result in complex framing due to different curvature of each ramp and their divergence.

The proposed configuration consists of chorded fascias. 10’ minimum wide shoulders along Ramp B (west side) and along Ramp D (east side) are maintained. The fascia beams are set parallel with the deck fascia to maintain a constant overhang. The girders are flared between the fascia beams, allowing straight girders to be utilized. The out-to-out length of each line of diaphragms will be different. However, the length of each diaphragm within its corresponding line will be the same length. Each girder will be a different length.

The General Plan of Site for the proposed span arrangement and Cross Sections is included in Appendix A.

A standard expansion joint is proposed.

MDOT requires an open longitudinal joint for decks wider than 90’. The deck flares from 81’-2 ¼” along Reference Line A to 125’-9 5/8” along Reference Line B. To allow for lateral expansion of the deck, non guided (floating) bearings for the two exterior beams along each edge of the bridge at Abutment B will be used. The substructure will be required to be poured in stages to allow for shrinkage, eliminating the need for an expansion joint in the abutment. A longitudinal construction joint can be added to minimize the effects of shrinkage during construction of the deck.

An expansion joint will be located in the substructure between this bridge and the Structure R01-4 of 82194 (Ramps A & C Bridge over the Norfolk Southern Railroad).

Utilities

Several utilities are present near the proposed substructure locations. The utilities interfering with the proposed substructure shall be relocated. See Appendix A for existing utility locations.

Drainage

Due to the length and width of the bridge and the railroads requirements for overhead bridge deck drainage, it is assumed that closed drainage system will be required on the bridge. Downspouts located at each abutment and will empty into catch basins below that are tied into the local storm sewer system. Scupper locations and outlets will be determined during preliminary engineering design phase.

Aesthetics

Aesthetic treatments, including concrete texturing of the concrete parapet and concrete surface coating, are anticipated for the proposed structure. The limits of the texturing are unknown at this time. However, an aesthetic cost equaling 1% of the bridge cost was included in the Preliminary Cost Estimate for all bridges. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

Recommendations

Straight steel girders are proposed for the structure. The bridge will be slightly wider than required by utilizing chorded fascias rather than curved girders. Minimum required shoulder widths will be maintained.

The construction depth of the proposed section is 4'-6". The estimated cost for the proposed structure is $5,315,000. The cost per square foot is $ 440. A 15% design contingency has been added to costs above. Wing walls have been included in the cost estimate and in the cost per square foot. A Preliminary Cost Estimate is included in Appendix B.

R01-4 of 82194 JN 802330
Ramps A and C over the Norfolk Southern Railroad
Structure Study

General

The purpose of this study is to investigate different structure types for the proposed Ramps A and C Bridge over the Norfolk Southern Railroad and the Plaza Drive. Ramps A and C are part of the Detroit River International Crossing (DRIC) Plaza Project which requires reconfiguration of the existing I-75 interchange at Livernois/Dragoon. Ramp A exits the DRIC Plaza, crosses over the Norfolk Southern Railroad, Fort Street and Ramp F, and then enters I-75 Northbound. Ramp C exits the DRIC Plaza, crosses over the Norfolk Southern Railroad, Ramp D, Fort Street, Ramp E, Livernois Avenue and I-75 NB and SB then enters I-75 SB.

A separate Structure Study has been prepared for the Ramp A Bridge over Fort Street and Ramp F and for the Ramp C Bridge over Ramp D, Fort Street, Ramp E, Livernois Avenue and I-75 NB and SB. For details and geometry of the proposed Ramps A and C Bridge over the Norfolk Southern Railroad, see the General Plan of Site Plan and Cross Sections included in Appendix A.

The structure design is to be completed based on current AASHTO LRFD specifications. The design live load is the AASHTO HL-93 Modified used by MDOT.

Construction of the Ramps A and C Bridge is to be coordinated with improvements to the I-75 ramp alignments, the cross road bridge replacements and the service drive work.

Currently, the geotechnical study is not available for the bridge.

Lightweight backfill was used behind the abutments of existing bridges (Livernois and Green Avenue Bridges) in the vicinity of Ramps A and C because of poor soil conditions. From the soil information shown on the existing bridge record plans there is soft clay for approximately 80 feet below the existing pile caps.

Preliminary soils investigations propose that a lightweight fill, Expanded Polystyrene (EPS) blocks be placed as backfill behind the abutments. The use of EPS blocks will minimize settlement of the bridge approach pavement and reduce the lateral earth pressure on the high wall abutment allowing the lateral earth pressure to be resisted by the pile batter and not depend on the stiffness of the soil below the footing.

Additional soil borings and the geotechnical report will confirm the backfill and foundation assumptions used to compute the preliminary cost of the structure.

The proposed abutments will likely be supported on piles due to large loads from the long span length and to resist the large overturning forces due the abutment height.

Under Clearance

The vertical profile for Ramps A and C were set at 23’-0” minimum over the Norfolk Southern Railroad.

Maintaining Traffic

Railroad traffic must be maintained at all times. Flaggers will be required when constructing Abutment A and when erecting the steel girders.

Structure Options

Based on the tight minimum vertical clearance and the span lengths, concrete beams were not considered. The adjacent Ramps B & D Bridge over the Norfolk Southern Railroad is a steel bridge due to complex geometrics.

The proposed configuration consists of chorded fascias. An 8’-0” minimum wide shoulder along Ramp C (west side) and a 10’-0” minimum wide shoulder along Ramp A (east side) are maintained. The deck fascias are set parallel to each other and the fascia beams are set parallel with the deck fascia to maintain a constant overhang. Shoulder widths are greater than required but allow straight, parallel girders to be utilized. The out-to-out width of the bridge will remain constant.

The General Plan of Site for the proposed span arrangement and Cross Sections is included in Appendix A.

Standard expansion joints are proposed.

The width of the deck is less than 100’ width required for longitudinal open joints. An expansion joint will be located in the substructure between this bridge and the R01-3 of 82194 (Ramps B & D Bridge over the Norfolk Southern Railroad).

Utilities

Several utilities are present near the proposed substructure locations. The utilities interfering with the proposed substructure shall be relocated. See Appendix A for existing utility locations.

Drainage

Due to the length and width of the bridge and the railroads requirements for overhead bridge deck drainage, it is assumed that closed drainage system will be required on the bridge. Downspouts located at each abutment and will empty into catch basins below that are tied into the local storm sewer system. Scupper locations and outlets will be determined during preliminary engineering design phase.

Aesthetics

Aesthetic treatments, including concrete texturing of the concrete parapet and concrete surface coating, are anticipated for the proposed structure. The limits of the texturing are unknown at this time. However, an aesthetic cost equaling 1% of the bridge cost was included in the Preliminary Cost Estimate for all bridges. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

Recommendations

Straight steel girders are proposed for the structure based on the tight vertical clearances and the span length. Also, straight steel girders are proposed for the adjacent structure, Ramps B and D over the Norfolk Southern Railroad. The bridge will be slightly wider than required by utilizing chorded fascias rather than curved girders. Shoulder widths will vary; however, a minimum shoulder width will be maintained.

The construction depth of the proposed section is 4'-6". The estimated cost for the proposed structure is $ $3,907,000. The cost per square foot is $ 462. A 15% design contingency has been added to costs above. Wing walls have been included in the cost estimate and in the cost per square foot. A Preliminary Cost Estimate is included in Appendix B.

P01 of 82194 JN 802330
Solvay Avenue Pedestrian Bridge over I-75
Structure Study

General

Built in 1966, the existing structure is a two-span pedestrian bridge (90'-0", 90'-0") with a multi-span ramp at either end. The main bridge consists of three lines of WF33x130 rolled beams on concrete piers and spread footings. The deck thickness is 6" and the total width is 9'-6" (8'-0" clear). The minimum vertical clearance is 14'-6". Ramp A consists of five concrete slab spans (41'-9", 19'-0", 19'-0", 19'-0", 19'-0"). Ramp B consists of four concrete slab spans (68'-9" - 19'-0" - 19'-0" - 19'-0"). Both ramps have a deck thickness of 9" and the first spans are on fill.

The existing structure does not meet the current minimum vertical clearance requirements over I-75 and its ramps do not meet the current ADA requirements. The replacement structure of the Solvay Avenue Pedestrian Bridge is to be coordinated with improvements to the I-75 ramp alignments and the service drive work. The location of the proposed structure is to the east of the existing structure in order to accommodate the northbound and southbound service drive ramps.

The proposed structure has an out-to-out deck width of 15'-0". See the General Plan of Site sheets for details and geometry located in Appendix A. The structure design is to be completed based on current AASHTO standard specifications. The design live load is the AASHTO H-10 or AASHTO Pedestrian Loading (65 psf min.).

Currently, geotechnical information is not available for the bridge. From the soil information shown on the existing bridge record plans there is soft clay for approximately 80 feet below the existing footings. Additional soil borings and geotechnical information will be required for the preparation of preliminary design plans.

Under Clearance and Grade Raise

The existing structure currently has a minimum vertical under clearance of 14'-6" based on the existing record plans and the clearance posted on the bridge. I-75 at the project location is considered a special route. In this case, a 17'-0" minimum under clearance is required for the proposed bridge. The proposed profile currently shown on the General Plan of Site accommodates the expected minimum vertical clearance along with a structural depth of 3'-6".

Maintaining Traffic

Solvay Avenue pedestrian traffic will be detoured to allow for removal of existing and construction of proposed bridge. Traffic control along I-75 for the structure replacement will require shoulder and temporary single lane closures to remove the existing piers and construct the new pier. Temporary night time freeway closures will be necessary during removal and erection of the beams.

Structure Design

Preliminary beam design was completed utilizing AASHTO Standard Specifications. The H-10 loading or AASHTO Pedestrian Loading (65 psf min.) was used for the design loading. This resulted in the use of a plate girder with a web depth of 28" for the 2 spans crossing I-75. This meets the required 3'-6" construction depth. The ramps will consist of 9" slab spans on monolithic piers and spread footings. Rest benches will be placed on the ramps per Context Sensitive Solutions (CSS) process with the community.

A wide flange rolled beams was investigated. Due to the excessive dead load deflection and the inability for rolled beams to hold the required camber this option was not carried further.

A concrete option was investigated. 48" PPC beams will be required for this option with the same span layout as for the steel. The 2 foot increase in the construction depth will require raising the profile which will in turn lengthen the ramps which is undesirable. Therefore, this option was not carried further.

A single span option was not investigated based on the significant increase in construction depth required and the limited increase available due to the vertical geometric constraints.

Cost

Detailed cost estimate is included in Appendix B.

The cost estimates assume two column piers on spread footings. Geotechnical investigation will need to confirm this recommendation.

The following is a cost summary:

Beam Type	Superstructure Depth	Total Cost	Cost/SF Deck
28" Web Steel Plate Girder	42"	$1,047,040	$108

The Total Cost includes the removal of the existing structure. The Cost/SF does not include removal of the existing structure. Also, a 20% design contingency has been added to costs above to account for the preliminary nature of the design and the fluctuation of prices.

Utilities

There are no utilities present under the main spans over I-75. There is a north-south 15" sanitary sewer under the ramps of the pedestrian bridge. The piers for the ramps are located to avoid interference with the sewer pipe.

Drainage

It is assumed that drainage will be collected at the expansion joints at Piers 1 and 3. Scuppers will not be required on the bridge based on the following:

1. The tributary width of bridge deck is relatively small.
2. The longitudinal grades are relatively steep.
3. Scuppers are not present on the existing bridge, which has a similar total span length and width as the proposed bridge.

Aesthetics

Aesthetic treatments, including concrete texturing of the concrete are anticipated for the proposed structure. The limits of the texturing are unknown at this time. However, an aesthetic cost equaling 1% of the bridge cost was included in the Preliminary Cost Estimate for all bridges. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

P02 of 82194 JN 802330
Beard Avenue Pedestrian Bridge over I-75
Structure Study

General

Built in 1966, the existing structure is a two-span pedestrian bridge (75'-6", 75'-6") with a multi-span ramp at either end. The main bridge consists of three lines of WF30x108 rolled beams on concrete piers and spread footings. The deck thickness is 6" and the total width is 9'-6" (8'-0" clear). The minimum vertical clearance is 14'-6". Ramp A consists of five concrete slab spans (31'-9", 24'-9", 19'-0", 19'-0", 25'-0"). Ramp B consists of four concrete slab spans (56'-6" - 19'-0" - 19'-0" - 19'-0"). Both ramps have a deck thickness of 9" and the first spans are on fill.

The existing structure does not meet the current minimum vertical clearance requirements over I-75 and its ramps do not meet the current ADA requirements. The replacement structure of the Beard Avenue Pedestrian Bridge is to be coordinated with improvements to the I-75 ramp alignments and the service drive work. The location of the proposed structure is to the west of the existing structure.

The proposed structure has an out-to-out deck width of 15'-0". See the General Plan of Site sheets for details and geometry located in Appendix A. The structure design is to be completed based on current AASHTO standard specifications. The design live load is the AASHTO H-10 or AASHTO Pedestrian Loading (65 psf min.).

Currently, geotechnical information is not available for the bridge. From the soil information shown on the existing bridge record plans there is soft clay for approximately 80 feet below the existing footings. Additional soil borings and geotechnical information will be required for the preparation of preliminary design plans.

Under Clearance and Grade Raise

The existing structure currently has a minimum vertical under clearance of 14'-6" based on the existing record plans and the clearance posted on the bridge. I-75 at the project location is considered a special route. In this case, a 17'-0" minimum under clearance is required for the proposed bridge. The proposed profile currently shown on the General Plan of Site accommodates the expected minimum vertical clearance along with a structural depth of 3'-6".

Maintaining Traffic

Beard Avenue pedestrian traffic will be detoured to allow for removal of existing and construction of proposed bridge. Traffic control along I-75 for the structure replacement will require shoulder and temporary single lane closures to remove the existing piers and construct the new pier. Temporary night time freeway closures will be necessary during removal and erection of the beams.

Structure Design

Preliminary beam design was completed utilizing AASHTO Standard Specifications. The H-10 loading or AASHTO Pedestrian Loading (65 psf min.) was used for the design loading. This resulted in the use of a plate girder with a web depth of 28" for the 2 spans crossing I-75. This meets the required 3'-6" construction depth. The ramps will consist of 9" slab spans on monolithic piers and spread footings. Rest benches will be placed on the ramps per Context Sensitive Solutions (CSS) process with the community.

A wide flange rolled beams was investigated. Due to the excessive dead load deflection and the inability for rolled beams to hold the required camber this option was not carried further.

A concrete option was investigated. 48" PPC beams will be required for this option with the same span layout as for the steel. The 2 foot increase in the construction depth will require raising the profile which will in turn lengthen the ramps which is undesirable. Therefore, this option was not carried further.

A single span option was not investigated based on the significant increase in construction depth required and the limited increase available due to the vertical geometric constraints.

Cost

Detailed cost estimate is included in Appendix B.

The cost estimates assume two column piers on spread footings. Geotechnical investigation will need to confirm this recommendation.

The following is a cost summary:

Beam Type	Superstructure Depth	Total Cost	Cost/SF Deck
28" Web Steel Plate Girder	42"	$1,147,200	$104

The Total Cost includes the removal of the existing structure. The Cost/SF does not include removal of the existing structure. Also, a 20% design contingency has been added to costs above to account for the preliminary nature of the design and the fluctuation of prices.

Utilities

An existing 54" water main is located under I-75 under the proposed structure. A 12" diameter water main is located under Ramp B. These utilities shall be relocated prior to construction of the bridge. An existing 15" sanitary sewer is located under Ramp B. There is also a 24" sanitary sewer as well as a 3" Michcon pipe that run parallel with an offset to the west of the main spans. These utilities pass under Ramp B. The piers for the ramps are located to avoid interference with these utilities.

Drainage

It is assumed that drainage will be collected at the expansion joints at Piers 1 and 3. Scuppers will not be required on the bridge based on the following:

1. The tributary width of bridge deck is relatively small.
2. The longitudinal grades are relatively steep.
3. Scuppers are not present on the existing bridge, which has a similar total span length and width as the proposed bridge.

Aesthetics

Aesthetic treatments, including concrete texturing of the concrete are anticipated for the proposed structure. The limits of the texturing are unknown at this time. However, an aesthetic cost equaling 1% of the bridge cost was included in the Preliminary Cost Estimate for all bridges. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

P10 of 82194 JN 802330
Waterman Avenue Pedestrian Bridge over I-75
Structure Study

General

The existing structure is a highway bridge that was built in 1966. The existing bridge superstructure consists of a four span steel beam section with a composite reinforced concrete deck. The substructure consists of column piers and stub abutments.

The existing structure will be removed and replaced with a pedestrian bridge. The new structure is to be coordinated with improvements to the I-75 ramp alignments and the service drive work. The location of the proposed structure is at the east end existing structure.

The proposed structure has an out-to-out deck width of 15'-0". See the General Plan of Site sheets for details and geometry located in Appendix A. The structure design is to be completed based on current AASHTO standard specifications. The design live load is the AASHTO H-10 or AASHTO Pedestrian Loading (65 psf min.).

Currently, geotechnical information is not available for the bridge. Soil borings and geotechnical information will be required for the preparation of preliminary design plans.

Under Clearance and Grade Raise

I-75 at the project location is considered a special route. In this case, a 17'-0" minimum under clearance is required for the proposed bridge. The proposed profile currently shown on the General Plan of Site accommodates the expected minimum vertical clearance along with a structural depth of 3'-6".

Maintaining Traffic

Waterman Avenue traffic will be detoured to allow for removal of existing and construction of proposed bridge. Traffic control along I-75 for the structure replacement will require shoulder and temporary single lane closures to remove the existing piers and construct the new pier. Temporary night time freeway closures will be necessary during removal and erection of the beams.

Structure Design

Preliminary beam design was completed utilizing AASHTO Standard Specifications. The H-10 loading or AASHTO Pedestrian Loading (65 psf min.) was used for the design loading. This resulted in the use of a plate girder with a web depth of 28" for the 2 spans crossing I-75. This meets the required 3'-6" construction depth. The ramps will consist of 9" slab spans on monolithic piers and spread footings. Rest benches will be placed on the ramps per Context Sensitive Solutions (CSS) process with the community.

A wide flange rolled beams was investigated. Due to the excessive dead load deflection and the inability for rolled beams to hold the required camber this option was not carried further.

A concrete option was investigated. 48" PPC beams will be required for this option with the same span layout as for the steel. The 2 foot increase in the construction depth will require raising the profile which will in turn lengthen the ramps which is undesirable. Therefore, this option was not carried further.

A single span option was not investigated based on the significant increase in construction depth required and the limited increase available due to the vertical geometric constraints.

Cost

Detailed cost estimate is included in Appendix B.

The cost estimates assume two column piers on spread footings. Geotechnical investigation will need to confirm this recommendation.

The following is a cost summary:

Beam Type	Superstructure Depth	Total Cost	Cost/SF Deck
28" Web Steel Plate Girder	42"	$955,850	$118

The Total Cost and Cost/SF does not include the removal of the existing structure. Also, a 20% design contingency has been added to costs above to account for the preliminary nature of the design and the fluctuation of prices.

Utilities

An existing north-south 72" diameter sanitary sewer is located under I-75 just east of the main span and passes under Ramp A. An existing 12" water main is located under Ramp B. Existing Detroit Edison underground utilities are located east of the main span. The piers for the ramps are located to avoid interference with the pipes. However, these utilities should be field located during preliminary design to avoid potential interference with proposed piers or foundations.

Drainage

It is assumed that drainage will be collected at the expansion joints at Piers 1 and 3. Scuppers will not be required on the bridge based on the following:

1. The tributary width of bridge deck is relatively small.
2. The longitudinal grades are relatively steep.
3. Scuppers are not present on the existing bridge, which has a similar total span length and width as the proposed bridge.

Aesthetics

Aesthetic treatments, including concrete texturing of the concrete are anticipated for the proposed structure. The limits of the texturing are unknown at this time. However, an aesthetic cost equaling 1% of the bridge cost was included in the Preliminary Cost Estimate for all bridges. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

P11 of 82194 JN 802330
Morrell Avenue Pedestrian Bridge over I-75
Structure Study

General

The structure of the Morrell Avenue Pedestrian Bridge is to be coordinated with improvements to the I-75 ramp alignments and the service drive work. Currently, there is no existing structure at the location of the proposed bridge.

The proposed structure has an out-to-out deck width of 9'-0". See the General Plan of Site sheets for details and geometry located in Appendix A. The structure design is to be completed based on current AASHTO standard specifications. The design live load is the AASHTO H-10 or AASHTO Pedestrian Loading (65 psf min.).

Currently, geotechnical information is not available for the bridge. Additional soil borings and geotechnical information will be required for the preparation of preliminary design plans.

Under Clearance and Grade Raise

I-75 at the project location is considered a special route. In this case, a 17'-0" minimum under clearance is required for the proposed bridge. The proposed profile currently shown on the General Plan of Site accommodates the expected minimum vertical clearance along with a structural depth of 4'-0".

Maintaining Traffic

Traffic control along I-75 for the structure replacement will require shoulder and temporary single lane closures to remove the existing piers and construct the new pier. Temporary night time freeway closures will be necessary during removal and erection of the beams.

Structure Design

Preliminary beam design was completed utilizing AASHTO Standard Specifications. The H-10 loading or AASHTO Pedestrian Loading (65 psf min.) was used for the design loading. This resulted in the use of a plate girder with a web depth of 30" for the 2 spans crossing I-75. This meets the required 4'-0" construction depth. The ramps will consist of 9" slab spans on monolithic piers and spread footings. Rest benches will be placed on the ramps per Context Sensitive Solutions (CSS) process with the community.

A wide flange rolled beams was investigated. Due to the excessive dead load deflection and the inability for rolled beams to hold the required camber this option was not carried further.

A concrete option was investigated. 48" PPC beams will be required for this option with the same span layout as for the steel. The 2 foot increase in the construction depth will require raising the profile which will in turn lengthen the ramps which is undesirable. Therefore, this option was not carried further.

A single span option was not investigated based on the significant increase in construction depth required and the limited increase available due to the vertical geometric constraints.

Cost

Detailed cost estimate is included in Appendix B.

The cost estimates assume two column piers on spread footings. Geotechnical investigation will need to confirm this recommendation.

The following is a cost summary:

Beam Type	Superstructure Depth	Total Cost	Cost/SF Deck
30" Web Steel Plate Girder	44"	$593,310	$148

A 20% design contingency has been added to costs above to account for the preliminary nature of the design and the fluctuation of prices.

Utilities

An existing 8'x9' sanitary box sewer is located under I-75 just east of the main span. Existing conduits for MCI, SBC and ITC are located near Ramp B running east-west. Also, an existing DWSD 15" sanitary sewer and 8" water main and an 8" Michcon gas line are located under Ramp B. These utilities need to be field located during the Preliminary engineering phase to determine if they need to be relocated.

Drainage

It is assumed that drainage will be collected at the expansion joints at Piers 1 and 3. Scuppers will not be required on the bridge based on the following:

1. The tributary width of bridge deck is relatively small.
2. The longitudinal grades are relatively steep.
3. Scuppers are not present on the existing bridge, which has a similar total span length and width as the proposed bridge.

Aesthetics

Aesthetic treatments, including concrete texturing of the concrete are anticipated for the proposed structure. The limits of the texturing are unknown at this time. However, an aesthetic cost equaling 1% of the bridge cost was included in the Preliminary Cost Estimate for all bridges. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

P12 of 82194 JN 802330
McKinstry Avenue Pedestrian Bridge over I-75
Structure Study

General

The structure of the McKinstry Avenue Pedestrian Bridge is to be coordinated with improvements to the I-75 ramp alignments and the service drive work. Currently, there is no existing structure at the location of the proposed bridge.

The proposed structure has an out-to-out deck width of 15'-0". See the General Plan of Site sheets for details and geometry located in Appendix A. The structure design is to be completed based on current AASHTO standard specifications. The design live load is the AASHTO H-10 or AASHTO Pedestrian Loading (65 psf min.).

Currently, geotechnical information is not available for the bridge. Soil borings and geotechnical information will be required for the preparation of preliminary design plans.

Under Clearance and Grade Raise

I-75 at the project location is considered a special route. In this case, a 17'-0" minimum under clearance is required for the proposed bridge. The proposed profile currently shown on the General Plan of Site accommodates the expected minimum vertical clearance along with a structural depth of 3'-6".

Maintaining Traffic

Traffic control along I-75 for the structure replacement will require shoulder and temporary single lane closures to remove the existing piers and construct the new pier. Temporary night time freeway closures will be necessary during removal and erection of the beams.

Structure Design

Preliminary beam design was completed utilizing AASHTO Standard Specifications. The H-10 loading or AASHTO Pedestrian Loading (65 psf min.) was used for the design loading. This resulted in the use of a plate girder with a web depth of 28" for the 2 spans crossing I-75. This meets the required 3'-6" construction depth. The ramps will consist of 9" slab spans on monolithic piers and spread footings. Rest benches will be placed on the ramps per Context Sensitive Solutions (CSS) process with the community.

A wide flange rolled beams was investigated. Due to the excessive dead load deflection and the inability for rolled beams to hold the required camber this option was not carried further.

A concrete option was investigated. 48" PPC beams will be required for this option with the same span layout as for the steel. The 2 foot increase in the construction depth will require raising the profile which will in turn lengthen the ramps which is undesirable. Therefore, this option was not carried further.

A single span option was not investigated based on the significant increase in construction depth required and the limited increase available due to the vertical geometric constraints.

Cost

Detailed cost estimate is included in Appendix B.

The cost estimates assume two column piers on spread footings. Geotechnical investigation will need to confirm this recommendation.

The following is a cost summary:

Beam Type	Superstructure Depth	Total Cost	Cost/SF Deck
28" Web Steel Plate Girder	42"	$1,033,890	$106

A 20% design contingency has been added to costs above to account for the preliminary nature of the design and the fluctuation of prices.

Utilities

There is a north-south Comcast utility that runs parallel with an offset to the east of the main spans. These pipes go under the proposed ramps. The locations of the piers for the ramps are located to avoid interference with the pipes. At the north end of the proposed structure, there are Detroit Edison, Michcon and 6" Water main utilities that shall be avoided.

Drainage

It is assumed that drainage will be collected at the expansion joints at Piers 1 and 3. Scuppers will not be required on the bridge based on the following:

1. The tributary width of bridge deck is relatively small.
2. The longitudinal grades are relatively steep.
3. Scuppers are not present on the existing bridge, which has a similar total span length and width as the proposed bridge.

Aesthetics

Aesthetic treatments, including concrete texturing of the concrete are anticipated for the proposed structure. The limits of the texturing are unknown at this time. However, an aesthetic cost equaling 1% of the bridge cost was included in the Preliminary Cost Estimate for all bridges. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

Retaining Walls & Soundwalls

Various retaining wall systems have been evaluated for the proposed retaining walls. The wall systems were evaluated base on performance and risk, relative cost, aesthetics, and constructability. There are advantages and disadvantages for each retaining wall system. We have considered the following retaining wall systems:

- Mechanically Stabilized Earth Wall
- Cast-in-place Concrete Retaining Wall
- Precast Concrete Cantilever Retaining Wall
- Steel sheet piling with a concrete face
- Soldier Pile and Lagging with a concrete face

Mechanically stabilized earth (MSE) and concrete cantilever walls are typically easier to construct in areas that are to be filled rather than in areas to be cut. This is because in areas that are to be cut, an excavation would be required to be able to construct either a concrete or MSE retaining wall. This excavation would have to be either sloped to applicable local, state, and federal safety regulations, including current OSHA excavation and trench safety standards or a temporary earth retention system installed, which would increase the cost of either a concrete or MSE retaining wall in cut areas. Various aesthetic treatments can be performed with either a concrete or MSE retaining wall.

Precast concrete retaining walls cost less than MSE walls or cast-in-place concrete retaining walls. This type of wall system is installed vibration-free and can typically be placed safely over underlying impediments such as sanitary sewers. Since the precast walls and footings are fabricated at the casting yard, and therefore, removed from the critical path of the project, the precast concrete cantilever retaining wall system would expedite the construction of the interchange and minimize disruption to the I-75 traffic. It is anticipated that 250 feet long of the precast retaining walls may be erected in two days. In this case, the precast footings will be erected in one day followed directly by the erection of the precast walls. Emulative design method is used for the precast units. In this method, the precast walls are designed and detailed like cast-in-place. Full moment connections are provided between the precast walls and the precast footings through grout-filled mechanical splicers. At the precast plant, the splicers are embedded in the precast element on one end of the main reinforcing bars to be connected. The bars protrude from the other end of the precast member. At the construction site, the precast members are joined by inserting the protruding bars from the end of one precast member into the splicers of the adjacent member. The splicers are then grouted, in effect making the reinforcing bars continuous through the connection.

Steel sheet piling walls are typically installed in areas that are to be cut. They are relatively simple to install by either driving or vibrating steel sheets to a design tip elevation. The sheet piling can either be cantilevered, which requires the steel sheets to penetrate deep into the underlying soil, or, for taller walls, can be tied-back in order to control deflection and applied moment to within acceptable levels. Steel sheet pile walls are typically used where aesthetics are not an issue due to the rust that will develop. A concrete face, either plain or textured, may be installed in order to improve the aesthetics. A disadvantage is the sheets are continuously installed and vibrated, therefore, not conducive to working around impediments such a sanitary sewers.

Soldier pile and lagging walls are typically installed in areas that are to be cut. They are constructed by either driving or drilling and installing vertical steel beams (typically HP sections). As the excavation proceeds, wood lagging is installed between the steel beams. For taller walls, the soldier piles should be tied-back to control deflection and applied moments to acceptable levels. For a permanent wall system, a concrete face should be installed and designed to retain the soil in the event the wood lagging deteriorates and fails. The concrete face may either have a plain or textured finish.

When the retaining walls meet the bridge abutments, 1 inch joint filler will be placed between the wingwall of the abutment and the retaining wall.

Cost

Detailed cost estimate is included in Appendix B. For each retaining wall, a summary of wall systems with an estimated cost for each is presented. The retaining walls are identified by letter (e.g., A, B, etc.) on the plans in Appendix A of this report. The total estimated construction cost for all retaining walls is approximately $16,250,000. The estimated construction costs include 30% design contingency. For the precast concrete cantilever walls and cast-in-place cantilever walls, light weight aggregate (slag) will be placed behind the walls when wall heights exceed 22 feet. Sheet piling without tie back is assumed feasible up to wall heights of 12 feet while soldier piles and lagging are assumed feasible up to wall heights of 18 feet.

Aesthetics

Aesthetic treatments are anticipated for all retaining walls. Any specific aesthetic requirements are to be determined by MDOT through the Context Sensitive Solutions (CSS) process with the public and in consultation with the City of Detroit and will be incorporated into the Final Design plans.

Recommendation

The following table summarizes the preferred option for each wall based on the lowest estimated construction cost. However, most of the steel sheet pile walls are interfering with existing utilities. Therefore, it is recommended that precast concrete retaining walls be used for all retaining walls. If precast concrete cantilever retaining wall system is selected for all the walls, the total estimated construction cost for retaining walls will be approximately $16,800,000.

Wall	Preferred Option	Construction Cost	Wall	Preferred Option	Construction Cost
A	Steel Sheet Pile w/ Conc Face	$86,710	P	Precast Cantilever Wall	$2,588,986
B	Steel Sheet Pile w/ Conc Face	$31,668	Q	Precast Cantilever Wall	$226,739
C	Precast Cantilever Wall	$267,941	R	Steel Sheet Pile w/ Conc Face	$15,834
D	Steel Sheet Pile w/ Conc Face	$165,880	S	Steel Sheet Pile w/ Conc Face	$95,004
E	Precast Cantilever Wall	$1,784,009	T	Precast Cantilever Wall	$1,738,054
F	Precast Cantilever Wall	$1,164,309	U	Precast Cantilever Wall	$2,178,410
G	Steel Sheet Pile w/ Conc Face	$106,880	V	Precast Cantilever Wall	$224,098
H	Precast Cantilever Wall	$1,431,112	W	Precast Cantilever Wall	$802,315
J	Precast Cantilever Wall	$246,661	X	Precast Cantilever Wall	$289,608
K	Precast Cantilever Wall	$381,755	Y	Precast Cantilever Wall	$554,361
L	Steel Sheet Pile w/ Conc Face	$128,180	Z	Precast Cantilever Wall	$72,339
M	Precast Cantilever Wall	$589,272	AA	Precast Cantilever Wall	$160,786
N	Precast Cantilever Wall	$899,102			

Total construction cost = $16,250,000

Appendix A

WITNESSES

CONTROL PT# 720
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON THE SIDEWALK ON EAST SIDE OF SPRING WELLS ST.

WITNESSES:
1. N00°E 21.00′ TALL SIGN
2. N60°E 11.00′ LOW SIGN WITH CONCRETE PAD
3. S70°W 15.00′ BACK OF CURB
4. S30°E 35.00′ PED. CROSSING SIGN POST

CONTROL PT# 768
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON THE EAST SIDE OF WEST END RD.

WITNESSES:
1. N55°E 15.00′ FACE OF WALL
2. N30°W 51.00′ POWER POLE
3. S45°E 51.00′ FIRE HYDRANT
4. S50°W 15.00′ CL OF WEST END RD

BENCHMARKS

BM 308
DESCRIPTION: CHISELED 'X' ON NORTH BOLT OF METAL POWER POLE IN THE SW QUADRANT OF FORT STREET AND SPRINGWELLS AVENUE
ELEVATION: 588.18
BM 309
DESCRIPTION: CHISELED 'X' ON SW BOLT OF AN ABANDONED SIGN POST ON A CONCRETE BASE IN THE NW QUADRANT OF FORT STREET AND GREEN STREET NORTH IN THE PARKING LOT OF "KING MOTZ BURGERS"
ELEVATION: 591.85

EXISTING STRUCTURE

BUILT IN 1964, THE EXISTING STRUCTURE IS A FOUR-SPAN BRIDGE (64′-3 1/16″, 83′-4 1/4″, 83′-4 1/4″, 72′-0 7/16″) WITH A TOTAL LENGTH OF 302′-11 1/2″. THE CLEAR ROADWAY IS 58′-0″ AND THE TOTAL BRIDGE WIDTH IS 98′-8 1/2″. THE EXISTING SUPERSTRUCTURE CONSISTS OF W36 ROLLED BEAMS. TOP AND BOTTOM FLANGE COVER PLATES ARE LOCATED OVER THE CENTER PIER. PIN AND LINK HANGERS SUPPORT THE END SPANS AT THE EXTERIOR PIER LOCATIONS. THE SUPERSTRUCTURE IS COMPOSITE WITH AN 8″ CONCRETE DECK SLAB. EXPANSION JOINTS ARE LOCATED AT THE PIERS. THE BRIDGE WAS RE-DECKED IN 1987 WITH A 9″ DECK. THE SUBSTRUCTURE CONSISTS OF CONVENTIONAL CIP CONCRETE COLUMN AND CAP PIERS AND STUB ABUTMENTS. THE PIERS AND ABUTMENT ARE SUPPORTED ON PILE FOUNDATIONS.

UTILITIES

MICHIGAN CONSOLIDATED GAS CO.

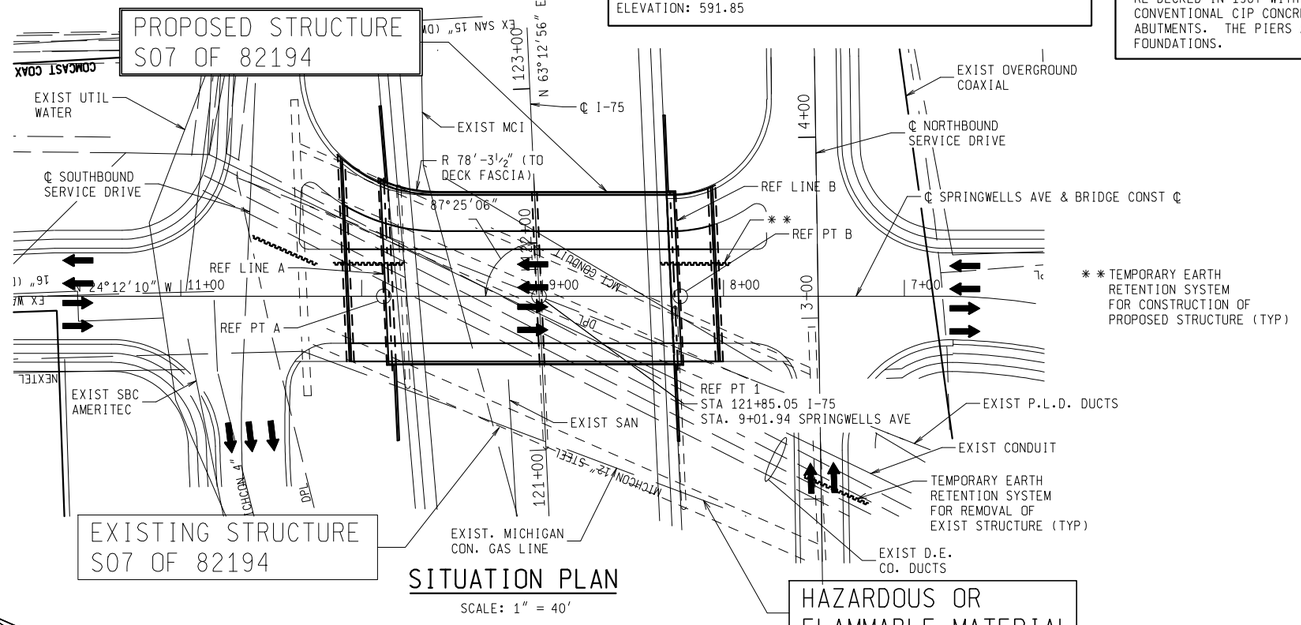
PUBLIC LIGHTING DETROIT
PLD LIGHTING CONDUITS

DETROIT EDISON COMPANY
PUBLIC LIGHTING COMMISSION

REVISIONS			
NO.	DESCRIPTION	DATE	BY

CURVE DATA

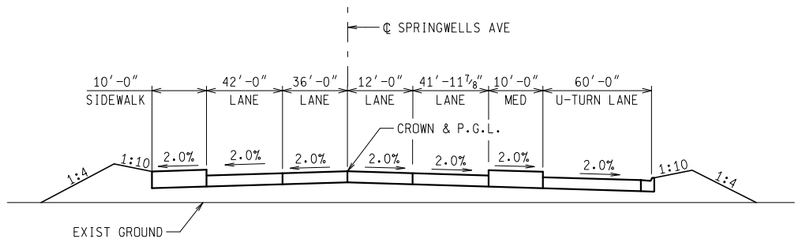
NONE



SITUATION PLAN

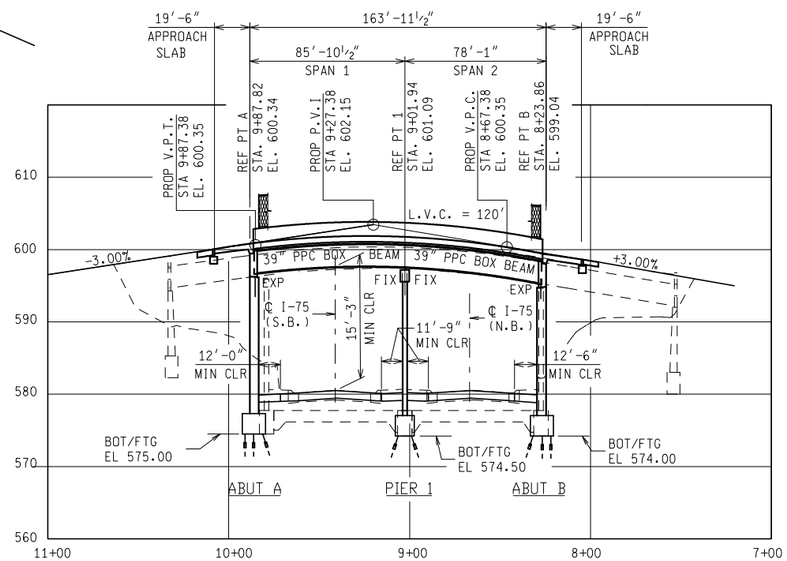
SCALE: 1″ = 40′

HAZARDOUS OR FLAMMABLE MATERIAL



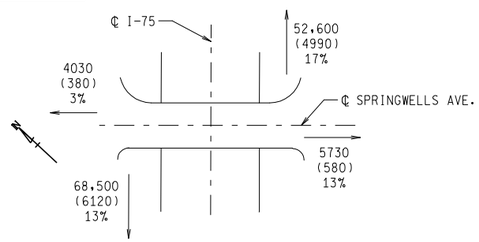
APPROACH SECTION

(LOOKING UPSTATION)



ELEVATION

VERT SCALE: 1″ = 10′
HORIZ SCALE: 1″ = 40′



2035 ESTIMATED TRAFFIC DISTRIBUTION

0000	AVERAGE DAILY TRAFFIC
(000)	DESIGN HOURLY VOLUME
%	COMMERCIAL
⟶	DIRECTIONAL TRAFFIC
⟷	TOTAL TRAFFIC

POSTED SPEED SPRINGWELLS AVE	25 mph
DESIGN SPEED SPRINGWELLS AVE	30 mph
POSTED SPEED I-75	55 mph
DESIGN SPEED I-75	60 mph

NOTES

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES HL-93 MOD LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/1000 OF SPAN LENGTH. THE LOAD AND RESISTANCE FACTOR METHOD OF DESIGN WAS USED FOR THIS STRUCTURE.

THE WORK COVERED BY THESE PLANS INCLUDES REMOVAL OF THE EXISTING BRIDGE AND CONSTRUCTION OF THE PROPOSED BRIDGE. ALL OTHER WORK IS INCLUDED IN THE ROAD PLANS THAT ARE A PART OF THIS CONTRACT.

THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

PLAN ELEVATIONS REFER TO NAVD 88 DATUM.

SPRINGWELLS AVE TRAFFIC IS TO BE MAINTAINED OVER THE BRIDGE BY PART-WIDTH CONSTRUCTION.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE.

THIS BRIDGE IS PART OF AN INTERCHANGE AND ALL AREA SHOWN IS WITHIN MDOT RIGHT-OF-WAY.

THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY 48 HOURS IN ADVANCE OF WORK IMPACTING THAT COMPANY'S CONDUITS OR FACILITIES.

MINIMUM VERTICAL CLEARANCE COMPUTED BY PARSONS ENGINEERING.

APPROVED _____
CONSULTANT COORDINATING ENGINEER

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alfred benesch & company
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Lansing, Michigan 48933

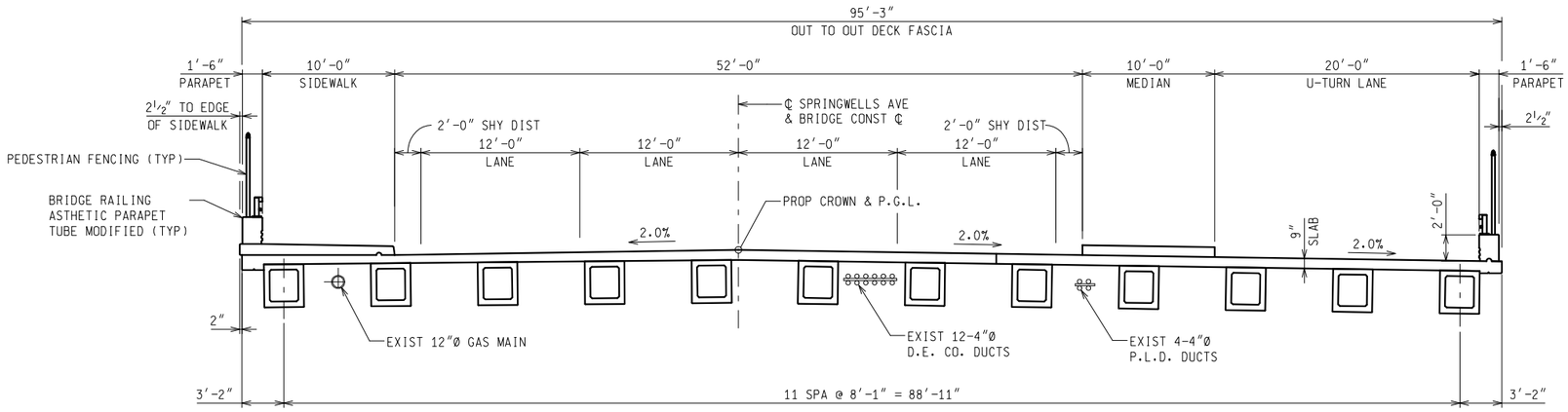
MDOT Michigan Department of Transportation

GENERAL PLAN OF SITE
SPRINGWELLS AVENUE OVER I-75

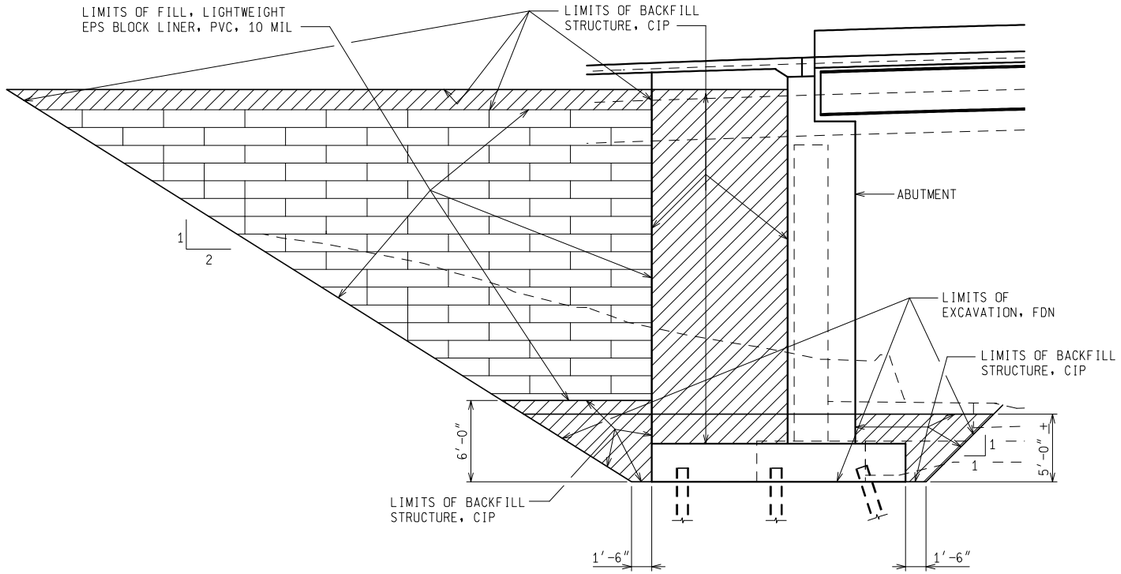
DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S07 OF 82194	802330		1 OF 3

FILE NAME: Springwells-pos.dgn DRAWN BY: RMG DATE: 08/22/08 CHECKED BY: KMP DATE: 08/22/08

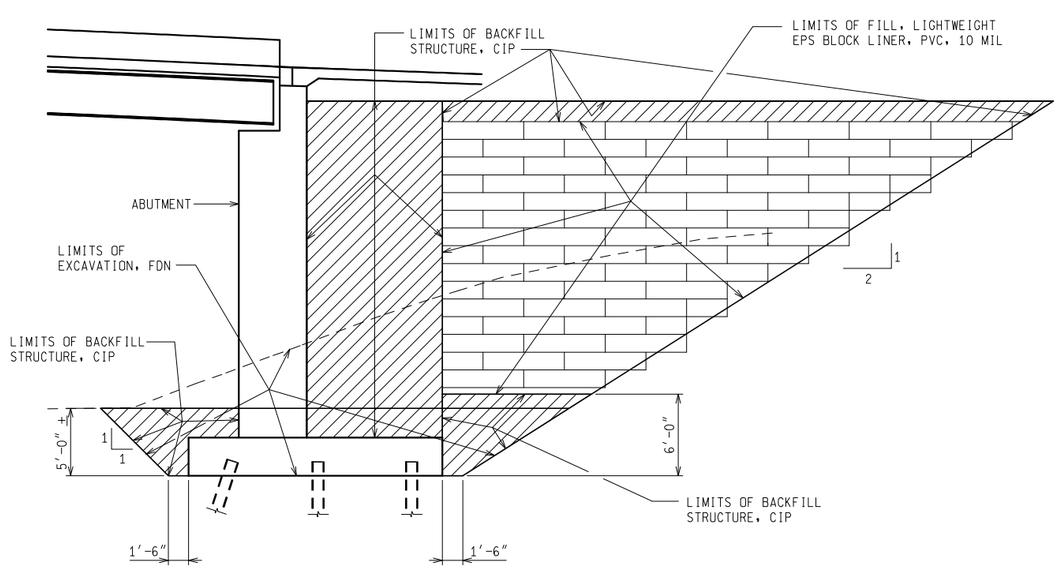
REVISIONS			
NO.	DESCRIPTION	DATE	BY



DECK SECTION
36″W x 39″H SPREAD PPC BOX BEAM
(LOOKING UPSTATION)



SECTION THRU ABUTMENT A
(SHOWING LIMITS OF EXCAVATION AND BACKFILL)



SECTION THRU ABUTMENT B
(SHOWING LIMITS OF EXCAVATION AND BACKFILL)

APPROVED_____
CONSULTANT COORDINATING ENGINEER

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Suite 200
Lansing, Michigan 48933

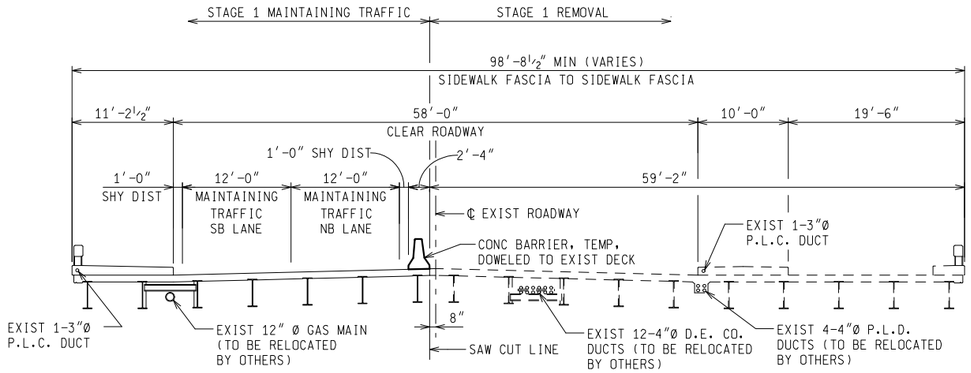
MDOT
Michigan Department of Transportation

GENERAL PLAN OF SITE - DECK SECTIONS
SPRINGWELLS AVE. OVER I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S07 OF 82194	802330		2 OF 3

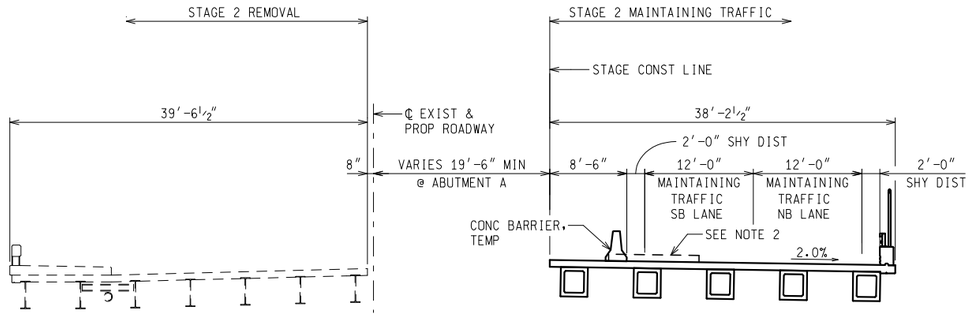
FILE NAME: Springwells-xs.dgn DRAWN BY: RMG DATE: 08/22/08 CHECKED BY: KMP DATE: 08/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



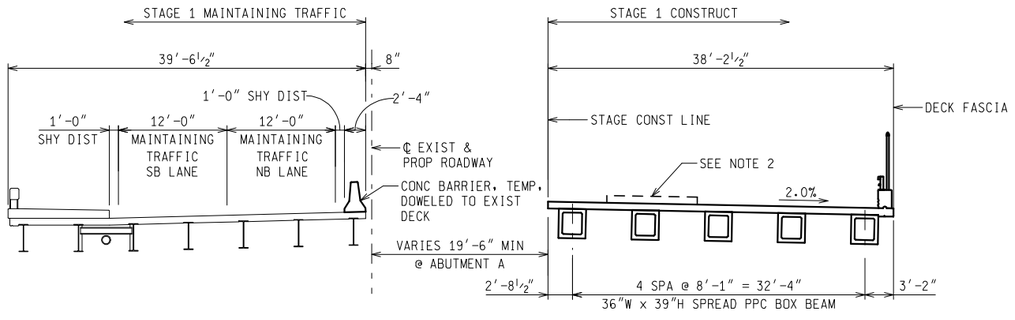
STAGE 1 REMOVAL

(LOOKING UPSTATION TOWARDS ABUTMENT A)



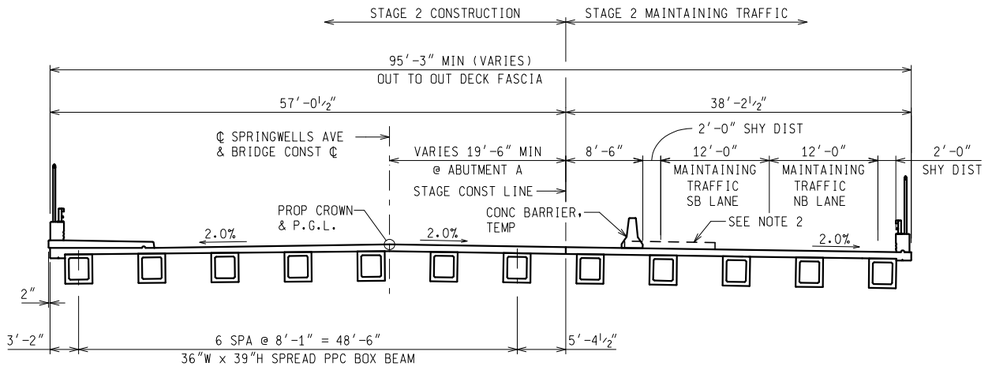
STAGE 2 REMOVAL

(LOOKING UPSTATION TOWARDS ABUTMENT A)



STAGE 1 CONSTRUCTION

(LOOKING UPSTATION TOWARDS ABUTMENT A)



STAGE 2 CONSTRUCTION

(LOOKING UPSTATION TOWARDS ABUTMENT A)

NOTES:

1. PLACEMENT OF CONC. BARRIER, TEMP, SHALL BE ACCORDING TO SPECIAL DETAIL R-126-E OR AS APPROVED BY THE ENGINEER. IN STAGE 1 THE TEMP BARRIER SHALL BE DOWELED INTO THE EXISTING DECK ACCORDING TO SPECIAL DETAIL R-126-E. INCLUDED IN THE PAY ITEM "Conc. Barrier. Temp, Furn".
2. MEDIAN TO BE POURED AFTER COMPLETION OF STAGE 2 CONSTRUCTION.

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CONSTRUCTION STAGING
SPRINGWELLS AVE. OVER I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S07 OF 82194	802330		3 OF 3

FILE NAME: Springwells STAGE.dgn DRAWN BY: RMG DATE: 08/22/08 CHECKED BY: KMP DATE: 08/22/08

BENCHMARKS

BM 309
DESCRIPTION: CHISELED 'X' ON SW BOLT OF AN ABANDONED SIGN POST ON A CONCRETE BASE IN THE NW QUADRANT OF FORT STREET AND GREEN STREET NORTH IN THE PARKING LOT OF "KING MOTZ BURGERS" ELEVATION: 591.85

BM 310
DESCRIPTION: CHISELED 'X' ON NW BOLT OF A LIGHT POST ON THE SOUTH SIDE OF FORT STREET ACROSS FROM BUILDING #6628 150' WEST OF RADEMACHER STREET ELEVATION: 588.29

UTILITIES

MICHIGAN CONSOLIDATED GAS COMPANY, 12" DIA. DETROIT EDISON CO. DUCTS

PUBLIC LIGHTING DETROIT
4 P.L.D. DUCTS

WITNESSES

CONTROL PT# 904
DESCRIPTION: SET MAG NAIL IN CENTER OF ARIAL TARGET AT NW CORNER INTERSECTION OF FISHER W AND ALLEY BETWEEN WEELOCK AND GREEN.

WITNESSES:
1. S25°E 11.00' BACK OF CURB
2. S60°W 28.00' LIGHT POLE
3. N45°E 18.00' FENCE CORNER
4. S50°E 27.00' MANHOLE

CONTROL PT# 764
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON EDGE OF FISHER W ST. AND GREEN ST. INTERSEECTION

WITNESSES:
1. N20°W 15.00' CL OF FISHER W ST
2. S70°W 18.00' CL OF GREEN ST.
3. N70°E 5.00' LIGHT POLE
4. S30°E 15.00' STOP SIGN

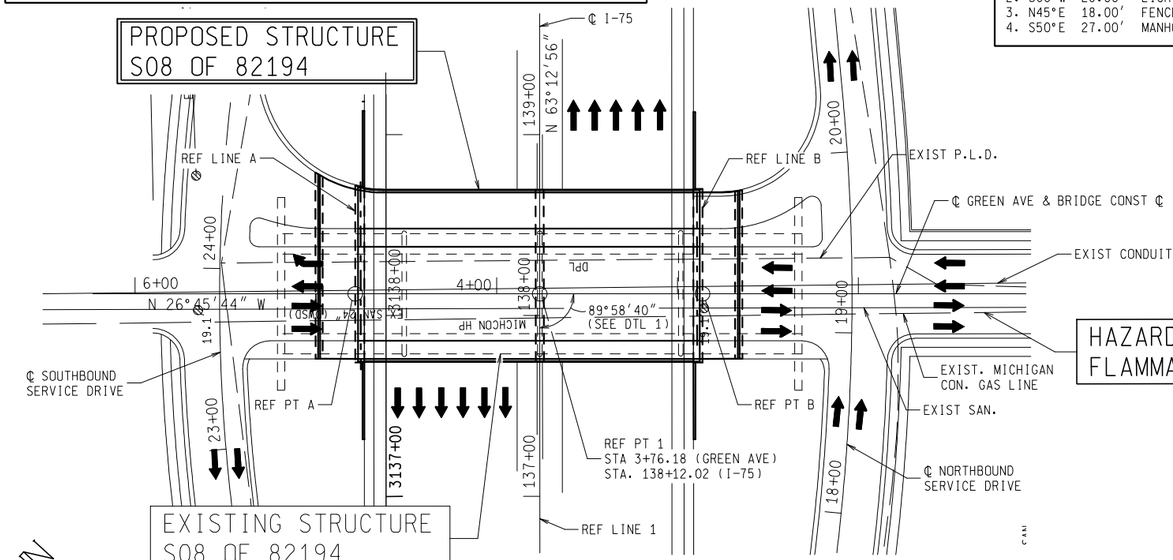
EXISTING STRUCTURE

BUILT IN 1965, THE EXISTING STRUCTURE IS A FOUR-SPAN BRIDGE (68' -10", 74'-11", 74'-11", 68'-10") WITH A TOTAL LENGTH OF 287'-6". THE CLEAR ROADWAY IS 44'-0" AND THE TOTAL BRIDGE WIDTH IS 66'-5". THE EXISTING SUPERSTRUCTURE CONSISTS OF 36" WIDE FLANGE ROLLED BEAMS. TOP AND BOTTOM FLANGE COVER PLATES ARE LOCATED OVER THE CENTER PIER. PIN AND LINK HANGERS SUPPORT THE END SPANS AT THE EXTERIOR PIER LOCATIONS. THE SUPERSTRUCTURE IS COMPOSITE WITH AN 8" CONCRETE DECK SLAB. EXPANSION JOINTS ARE LOCATED AT THE PIERS. THE SUBSTRUCTURE CONSISTS OF CONVENTIONAL CIP CONCRETE COLUMN AND CAP PIERS AND STUB ABUTMENTS. THE PIERS AND ABUTMENTS ARE SUPPORTED ON PILE FOUNDATIONS.

REVISIONS			
NO.	DESCRIPTION	DATE	BY

CURVE DATA

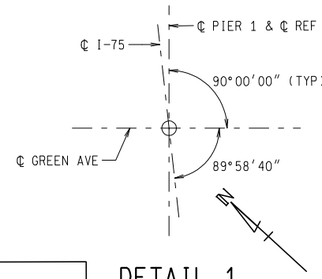
NONE



SITUATION PLAN

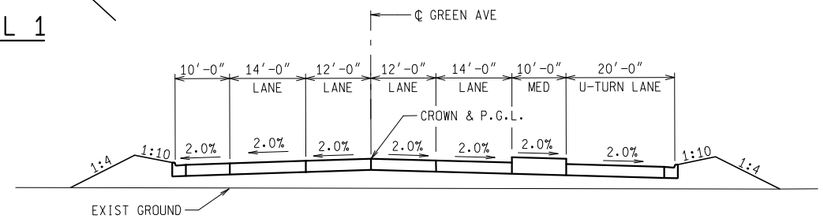
SCALE: 1" = 40'

HAZARDOUS OR FLAMMABLE MATERIAL



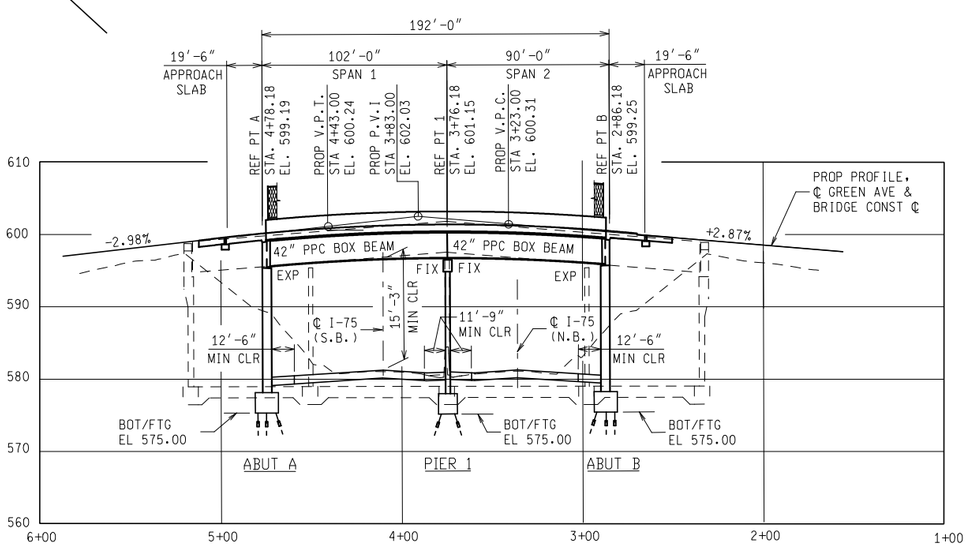
DETAIL 1

NTS



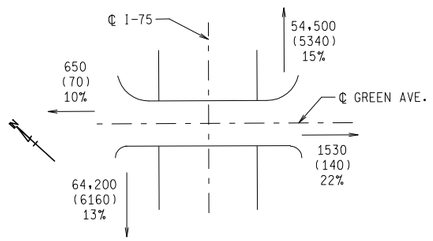
APPROACH SECTION

(LOOKING UPSTATION)



ELEVATION

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'



2035 ESTIMATED TRAFFIC DISTRIBUTION

0000 AVERAGE DAILY TRAFFIC
(000) DESIGN HOURLY VOLUME
% COMMERCIAL
→ DIRECTIONAL TRAFFIC
←→ TOTAL TRAFFIC

POSTED SPEED GREEN AVE	25 mph
DESIGN SPEED GREEN AVE	30 mph
POSTED SPEED I-75	55 mph
DESIGN SPEED I-75	60 mph

NOTES

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES HL-93 MOD LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/1000 OF SPAN LENGTH. THE LOAD AND RESISTANCE FACTOR METHOD OF DESIGN WAS USED FOR THIS STRUCTURE.

THE WORK COVERED BY THESE PLANS INCLUDES REMOVAL OF THE EXISTING BRIDGE, CONSTRUCTION OF THE PROPOSED BRIDGE. ALL OTHER WORK IS INCLUDED IN THE ROAD PLANS THAT ARE A PART OF THIS CONTRACT.

THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

PLAN ELEVATIONS REFER TO NAVD 88 DATUM.

GREEN AVE TRAFFIC IS TO BE DETOURED DURING CONSTRUCTION.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE.

THIS BRIDGE IS PART OF AN INTERCHANGE AND ALL AREA SHOWN IS WITHIN MDOT RIGHT-OF-WAY.

THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY 48 HOURS IN ADVANCE OF WORK IMPACTING THAT COMPANY'S CONDUITS OR FACILITIES.

THE MINIMUM VERTICAL CLEARANCE WAS COMPUTED BY PARSONS ENGINEERS.

APPROVED_____
CONSULTANT COORDINATING ENGINEER

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Lansing, Michigan 48933

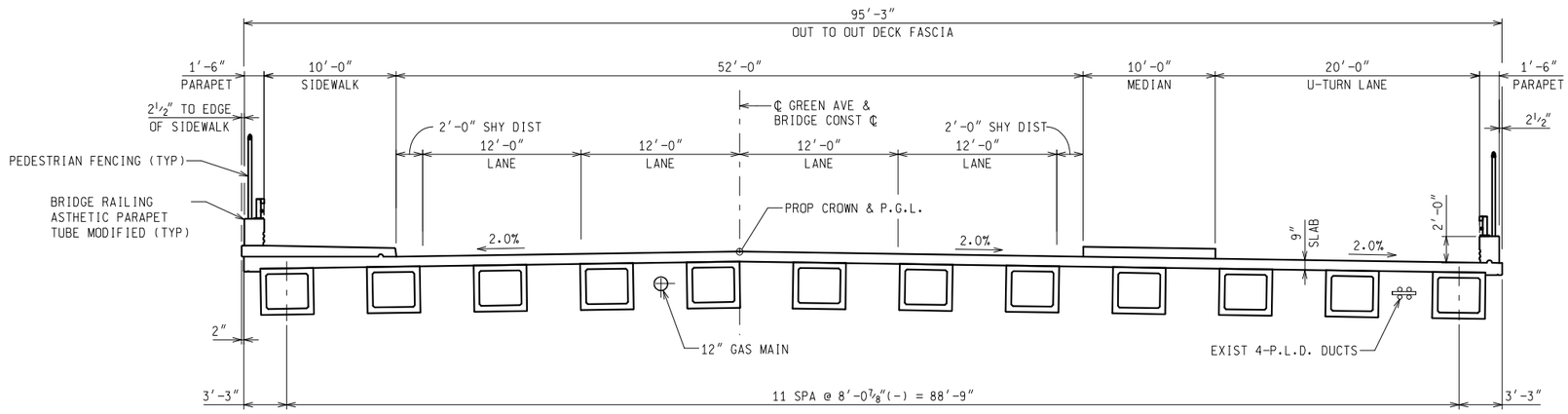
MDOT Michigan Department of Transportation

GENERAL PLAN OF SITE
GREEN AVENUE OVER I-75

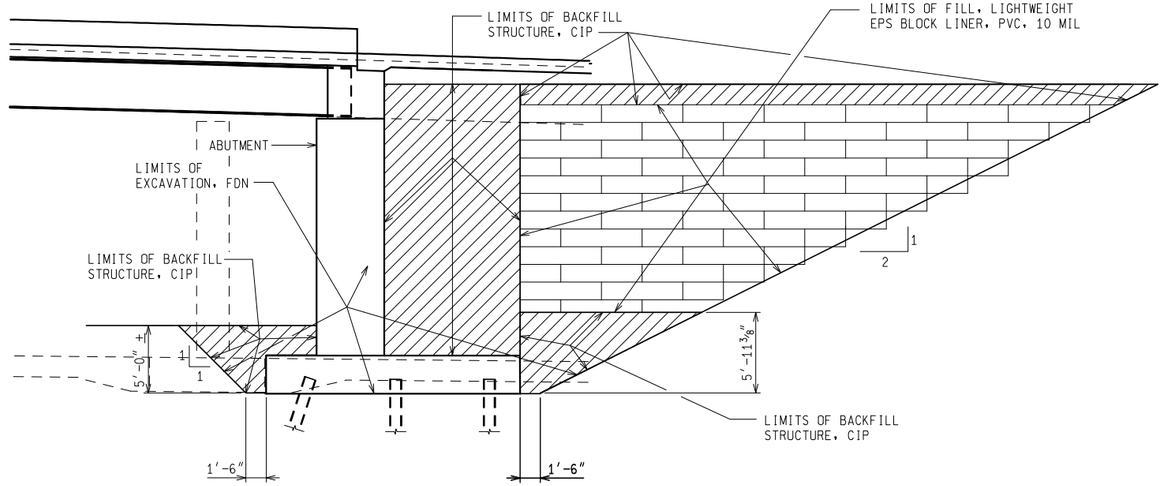
DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S08 OF 82194	802330		1 OF 2

FILE NAME: Green-pos.dgn DRAWN BY: RMG DATE: 08/22/08 CHECKED BY: KMP DATE: 08/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



DECK SECTION
48″W x 42″H SPREAD PPC BOX BEAM
(LOOKING UPSTATION)



SECTION THRU ABUTMENT B
(SHOWING LIMITS OF EXCAVATION AND BACKFILL)
(ABUTMENT B SHOWN, ABUTMENT A SIMILAR)

APPROVED _____
CONSULTANT COORDINATING ENGINEER

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Michigan Department of Transportation

GENERAL PLAN OF SITE - DECK SECTIONS
GREEN AVENUE OVER I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S08 OF 82194	802330		2 OF 2

FILE NAME: Green st-xs.dgn DRAWN BY: RMG DATE: 08/22/08 CHECKED BY: KMP DATE: 08/22/08

WITNESSES

CONTROL PT# 785
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON THE SIDEWALK IN THE NORTHWEST QUADRANT OF CRAWFORD AND FISHER ST.

WITNESSES:
1. N75°E 7.00′ STOP SIGN
2. S60°W 4.00′ SIDEWALK INTERSECTION
3. S10°E 13.00′ LIGHT POLE
4. S20°E 15.00′ BACK OF CURB OF FISHER ST.

CONTROL PT# 907
DESCRIPTION: SET MAG NAIL IN CENTER OF ARIAL TARGET IN THE CONVERGENCE OF THE EXIT RAMP OF I-75 AND FISHER, NORTH OF CRAWFORD.

WITNESSES:
1. S75°W 15.00′ FENCE POST
2. N20°W 2.50′ EDGE CONCRETE
3. S20°E 12.00′ CENTERLINE FISHER
4. S05°W 51.00′ POWER POLE

BENCHMARKS

BM 310
DESCRIPTION: CHISELED 'X' ON NW BOLT OF LIGHT POST ON THE SOUTH SIDE OF FORT STREET ACROSS FROM BUILDING #6628 150′ WEST OF RADEMACHER STREET.
ELEVATION: 588.29

BM 311
DESCRIPTION: CHISELED 'X' ON NW BOLT OF LIGHT POST ON THE SOUTH SIDE OF FORT STREET ACROSS FROM BUILDING #6142 "FERGUSON FUNERAL HOME" 100′ EAST OF DRAGON STREET.
ELEVATION: 587.33

EXISTING STRUCTURE

BUILT IN 1964, THE EXISTING STRUCTURE IS A FOUR-SPAN BRIDGE (37′-8⅞″, 75′-9″, 75′-9″, 37′-8⅞″) WITH A TOTAL LENGTH OF 226′-11¾″. THE CLEAR ROADWAY IS 48′-0″ AND THE TOTAL BRIDGE WIDTH IS 70′-5″. THE EXISTING SUPERSTRUCTURE CONSISTS OF W36 (INTERIOR SPANS) AND W27 (EXTERIOR SPANS) ROLLED BEAMS. TOP AND BOTTOM FLANGE COVER PLATES ARE LOCATED OVER THE CENTER PIER. PIN AND LINK HANGERS SUPPORT THE END SPANS AT THE EXTERIOR PIER LOCATIONS. THE SUPERSTRUCTURE IS COMPOSITE WITH AN 9″ CONCRETE DECK SLAB. EXPANSION JOINTS ARE LOCATED AT THE PIERS. THE BRIDGE WAS RE-DECKED IN 1990. THE SUBSTRUCTURE CONSISTS OF CONVENTIONAL CIP. CONCRETE COLUMN AND CAP PIERS AND STUB ABUTMENTS. THE PIERS AND ABUTMENT ARE SUPPORTED ON PILE FOUNDATIONS.

UTILITIES

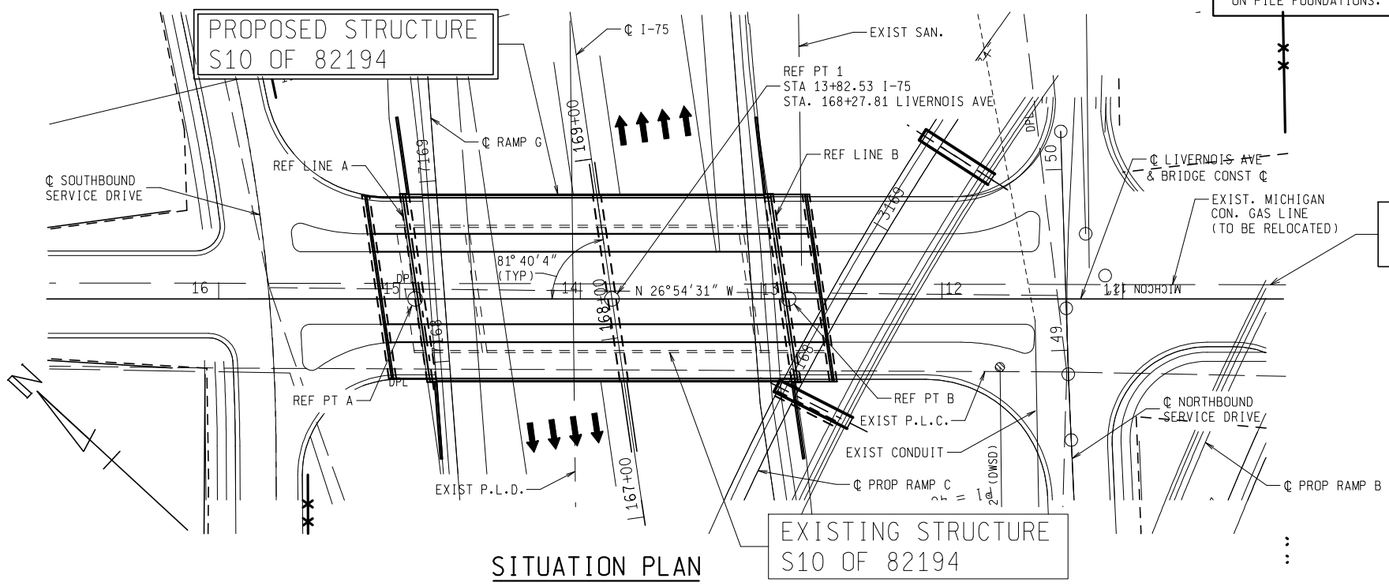
MICHIGAN GAS MAIN

PLD LIGHTING CONDUITS

REVISIONS			
NO.	DESCRIPTION	DATE	BY

CURVE DATA

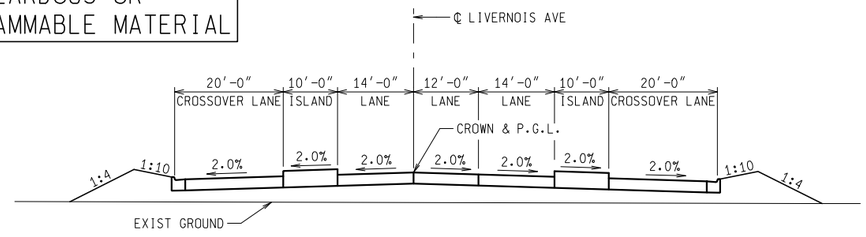
NONE



SITUATION PLAN

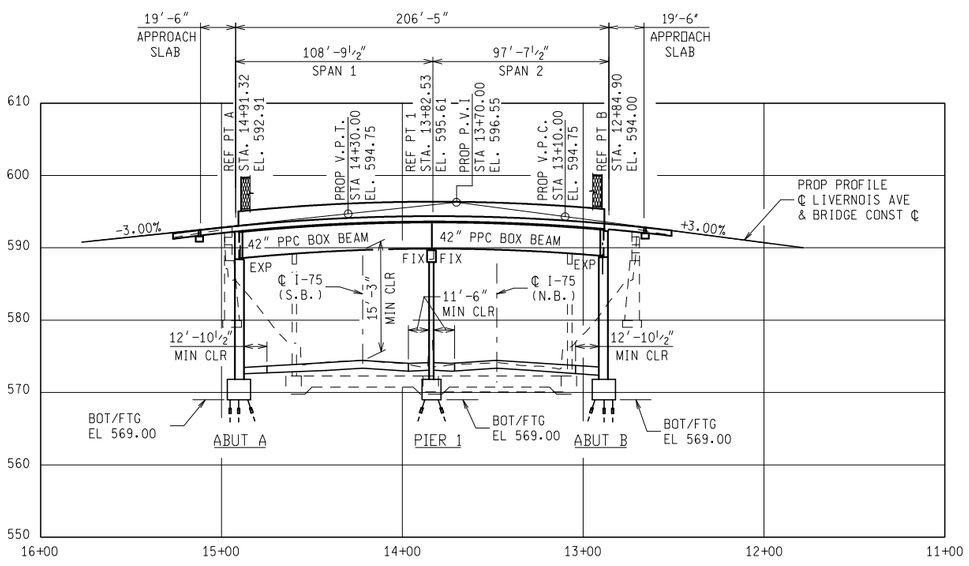
SCALE: 1″ = 40′

HAZARDOUS OR FLAMMABLE MATERIAL



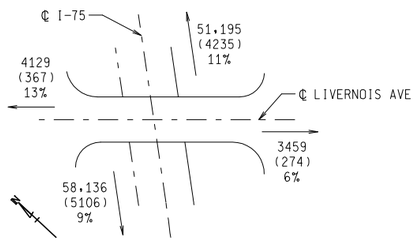
APPROACH SECTION

LOOKING UPSTATION



ELEVATION

VERT SCALE: 1″ = 10′
HORIZ SCALE: 1″ = 40′



2035 ESTIMATED TRAFFIC DISTRIBUTION

0000	AVERAGE DAILY TRAFFIC
(000)	DESIGN HOURLY VOLUME
%	COMMERCIAL
→	DIRECTIONAL TRAFFIC
←→	TOTAL TRAFFIC

POSTED SPEED LIVERNOIS AVE	25 mph
DESIGN SPEED LIVERNOIS AVE	30 mph
POSTED SPEED I-75	55 mph
DESIGN SPEED I-75	60 mph

NOTES

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES HL-93 MOD LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/1000 OF SPAN LENGTH. THE LOAD AND RESISTANCE FACTOR METHOD OF DESIGN WAS USED FOR THIS STRUCTURE.

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PLAN ELEVATIONS REFER TO NAVD 88 DATUM.

LIVERNOIS AVE TRAFFIC IS TO BE DETOURED DURING CONSTRUCTION.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE.

THIS BRIDGE IS PART OF AN INTERCHANGE AND ALL AREA SHOWN IS WITHIN MDOT RIGHT-OF-WAY.

THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY 48 HOURS IN ADVANCE OF WORK IMPACTING THAT COMPANY'S CONDUITS OR FACILITIES.

MINIMUM VERTICAL UNDERCLEARANCE COMPUTED BY PARSONS ENGINEERS.

APPROVED _____
CONSULTANT COORDINATING ENGINEER

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alfred benesch & company
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Lansing, Michigan 48933

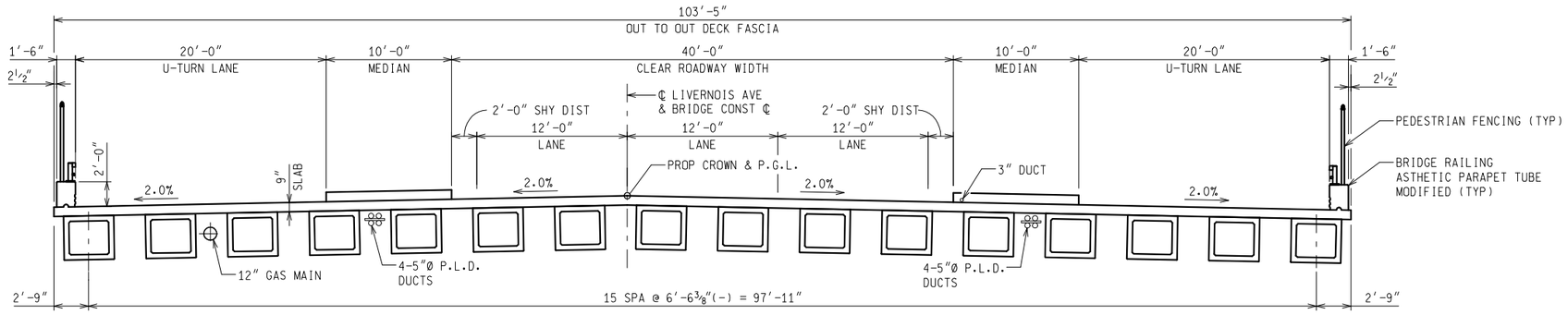
MDOT Michigan Department of Transportation

GENERAL PLAN OF SITE
LIVERNOIS AVENUE OVER I-75

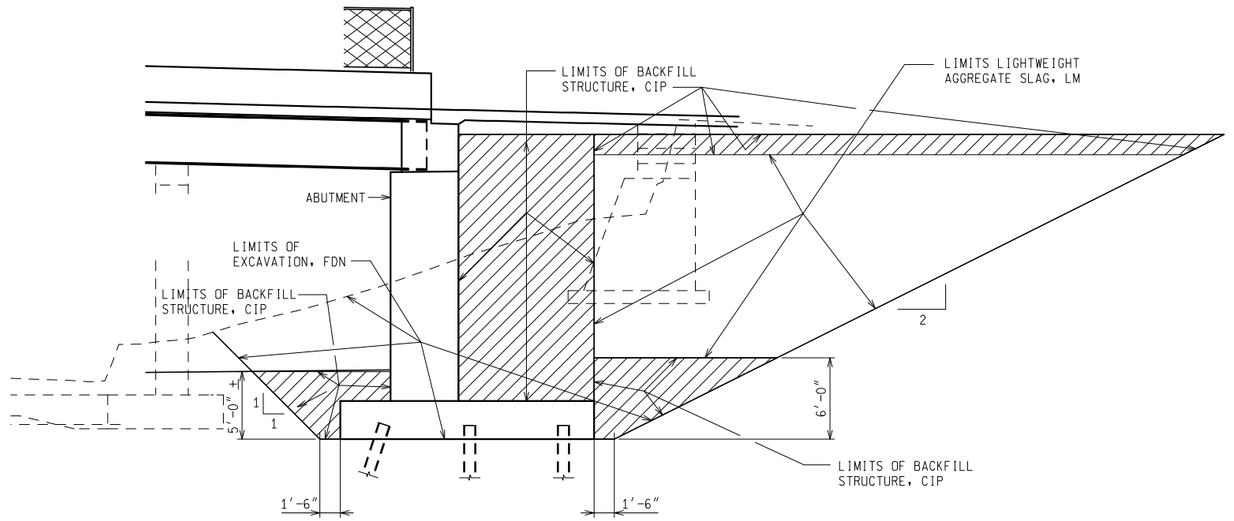
DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S10 OF 82194	802330		1 OF 2

FILE NAME: LIVERNOIS pos.dgn DRAWN BY: RMG DATE: 08/22/08 CHECKED BY: KMP DATE: 08/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



DECK SECTION
48″W x 42″H SPREAD PPC BOX BEAM
(LOOKING UPSTATION)



SECTION THRU ABUTMENT B
(SHOWING LIMITS OF EXCAVATION AND BACKFILL)
(ABUTMENT B SHOWN, ABUTMENT A SIMILAR)

APPROVED _____
CONSULTANT COORDINATING ENGINEER

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Suite 200
Lansing, Michigan 48933

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Michigan Department of Transportation

GENERAL PLAN OF SITE - DECK SECTIONS
LIVERNOIS AVE. OVER I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S10 OF 82194	802330		2 OF 2

FILE NAME: Livernois-xs.dgn DRAWN BY: RMG DATE: 08/22/08 CHECKED BY: KMP DATE: 08/22/08

WITNESSES

CONTROL PT# 909
DESCRIPTION: SET MAG NAIL IN CENTER OF ARIAL TARGET IN THE NORTH SIDEWALK FISHER W BETWEEN ADDRESS #4450 AND #4432, W OF CLARK.

WITNESSES:
1. N80°E 12.00′ LIGHT POLE
2. N40°E 9.00′ FENCE CORNER
3. N50°W 7.00′ FENCE POST AT GATE
4. S05°E 1.00′ BACK OF CURB

CONTROL PT# 749
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON THE SIDEWALK SOUTH OF FISHER WEST AND EAST OF CLARK ST.

WITNESSES:
1. S20°W 7.00′ LIGHT POLE
2. S05°W 39.00′ STRAIN POLE
3. S20°E 36.00′ BILLBOARD POST
4. N10°W 9.00′ BACK OF CURB

BENCHMARKS

BM 312
DESCRIPTION: CHISELED 'X' ON THE NW BOLT OF LIGHT POLE ON THE SOUTH SIDE OF FORT STREET 30 FEET EAST OF THE VISITOR AND EMPLOYEE ENTRANCE TO "BRIDGE WATER INETRIORS" BUILDING #4617
ELEVATION: 585.33

BM 313
DESCRIPTION: CHISELED 'X' ON THE NW BOLT OF A LIGHT POLE ON THE SOUTH SIDE OF FORT STREET 200 FEET WEST OF "MOTOR CITY INTERMODAL DISTRIBUTION" BUILDING #4005 ELEVATION: 593.16

EXISTING STRUCTURE

BUILT IN 1966, THE EXISTING STRUCTURE IS A TWO-SPAN BRIDGE (74′-0", 74′-0") WITH A TOTAL LENGTH OF 148′-0". THE CLEAR ROADWAY IS 58′-0", 2-10′ -0" MEDIANS, 2-16′-0" U-TURN LANES AND 3′ -8½" BRUSH BLOCKS/BARRIERS FOR A TOTAL BRIDGE WIDTH IS 117′-5". THE EXISTING SUPERSTRUCTURE CONSISTS OF 36" WIDE FLANGE ROLLED BEAMS. TOP AND BOTTOM FLANGE COVER PLATES ARE LOCATED OVER THE PIER. THE SUPERSTRUCTURE IS COMPOSITE WITH AN 8" REINFORCED CONCRETE DECK SLAB. THE SUBSTRUCTURE CONSISTS OF A CONVENTIONAL CIP CONCRETE COLUMN AND CAP PIER AND TALL WALL ABUTMENTS. THE PIER AND ABUTMENTS ARE SUPPORTED ON PILE FOUNDATIONS.

UTILITIES

MICHIGAN CONSOLIDATED GAS CO.
16" DIA. GAS MAIN

DETROIT EDISON
12- 4" DIA. DUCTS

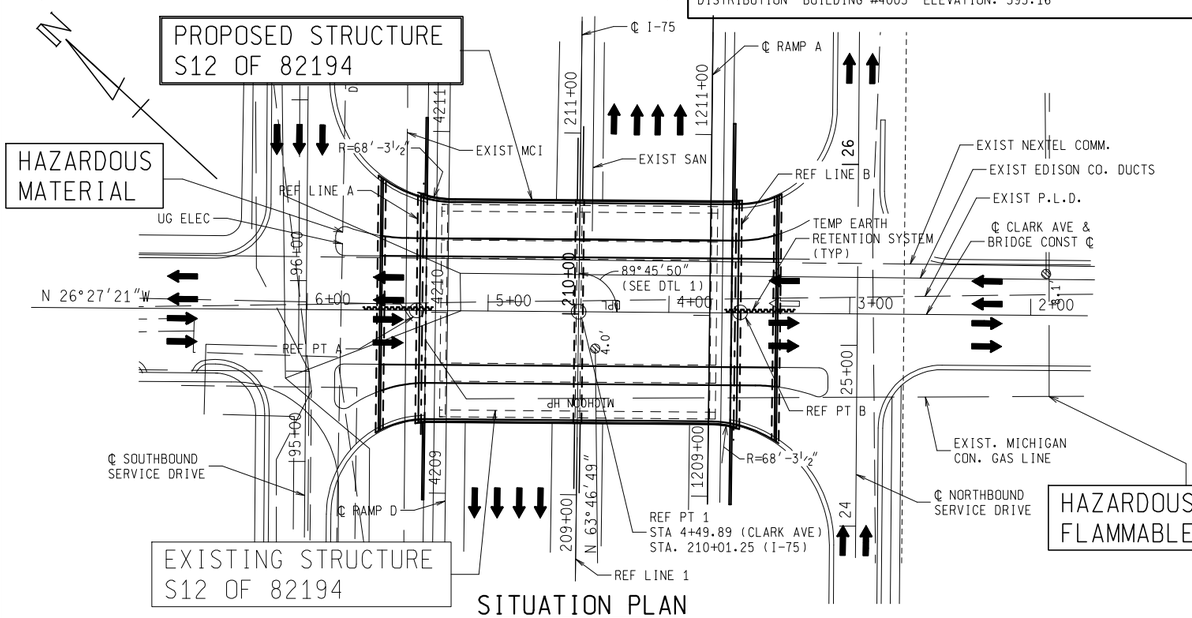
PUBLIC LIGHTING DETROIT
6 -4" DIA. PLD DUCTS

REVISIONS

NO.	DESCRIPTION	DATE	BY

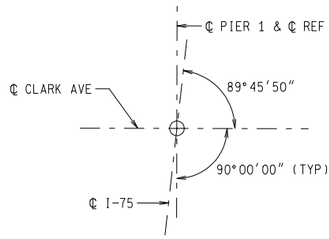
CURVE DATA

NONE



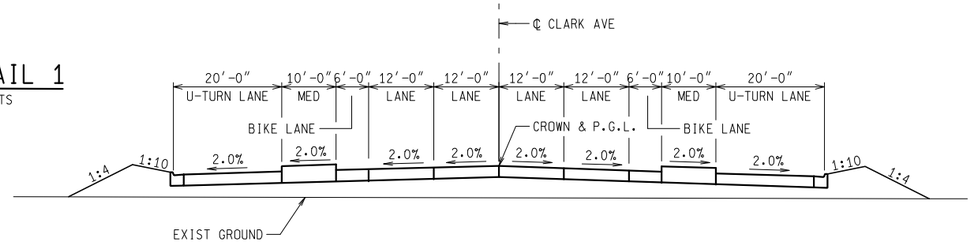
SITUATION PLAN

SCALE: 1" = 40′



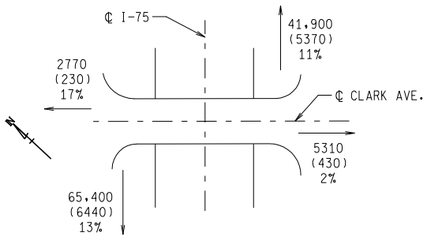
DETAIL 1

NTS



APPROACH SECTION

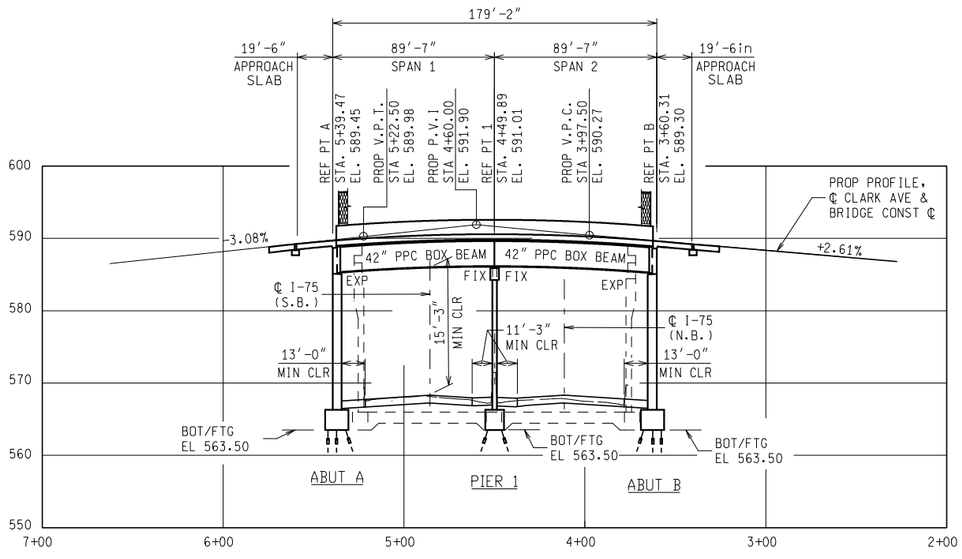
(LOOKING UPSTATION)



2035 ESTIMATED TRAFFIC DISTRIBUTION

0000	AVERAGE DAILY TRAFFIC
(000)	DESIGN HOURLY VOLUME
%	COMMERCIAL
⟶	DIRECTIONAL TRAFFIC
⟷	TOTAL TRAFFIC

POSTED SPEED CLARK AVE	25 mph
DESIGN SPEED CLARK AVE	30 mph
POSTED SPEED I-75	55 mph
DESIGN SPEED I-75	60 mph



ELEVATION

VERT SCALE: 1" = 10′
HORIZ SCALE: 1" = 40′

NOTES

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES HL-93 MOD LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/1000 OF SPAN LENGTH. THE LOAD AND RESISTANCE FACTOR METHOD OF DESIGN WAS USED FOR THIS STRUCTURE.

THE WORK COVERED BY THESE PLANS INCLUDES REMOVAL OF THE EXISTING BRIDGE, CONSTRUCTION OF THE PROPOSED BRIDGE, AND PLACING SLOPE PAVING TO THE LIMITS SHOWN. ALL OTHER WORK IS INCLUDED IN THE ROAD PLANS THAT ARE A PART OF THIS CONTRACT.

THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

PLAN ELEVATIONS REFER TO NAVD 88 DATUM.

CLARK AVE TRAFFIC IS TO BE MAINTAINED OVER THE BRIDGE BY PART-WIDTH CONSTRUCTION.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE.

THIS BRIDGE IS PART OF AN INTERCHANGE AND ALL AREA SHOWN IS WITHIN MDOT RIGHT-OF-WAY.

THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY 48 HOURS IN ADVANCE OF WORK IMPACTING THAT COMPANY'S CONDUITS OR FACILITIES.

THE VERTICAL MINIMUM CLEARANCE COMPUTATIONS WERE PREPARED BY PARSONS ENGINEERS.

APPROVED_____
CONSULTANT COORDINATING ENGINEER

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alfred benesch & company
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Lansing, Michigan 48933

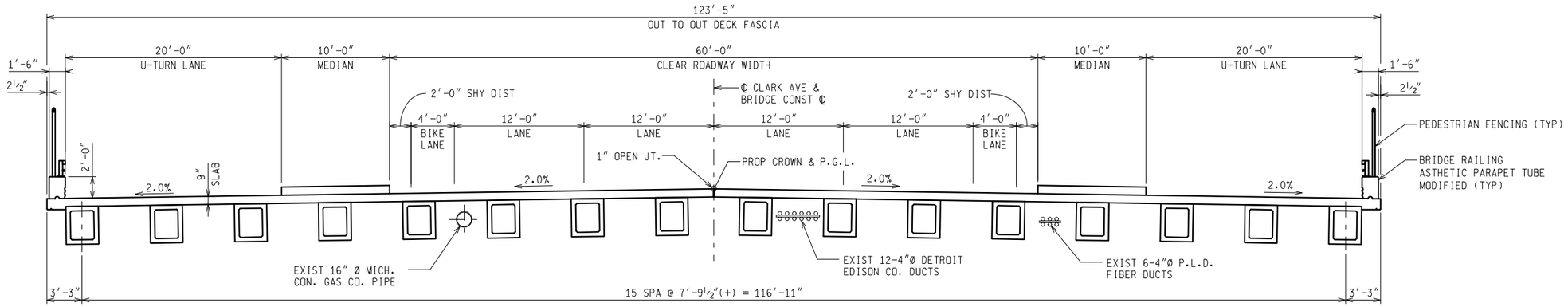
MDOT Michigan Department of Transportation

GENERAL PLAN OF SITE CLARK AVENUE OVER I-75

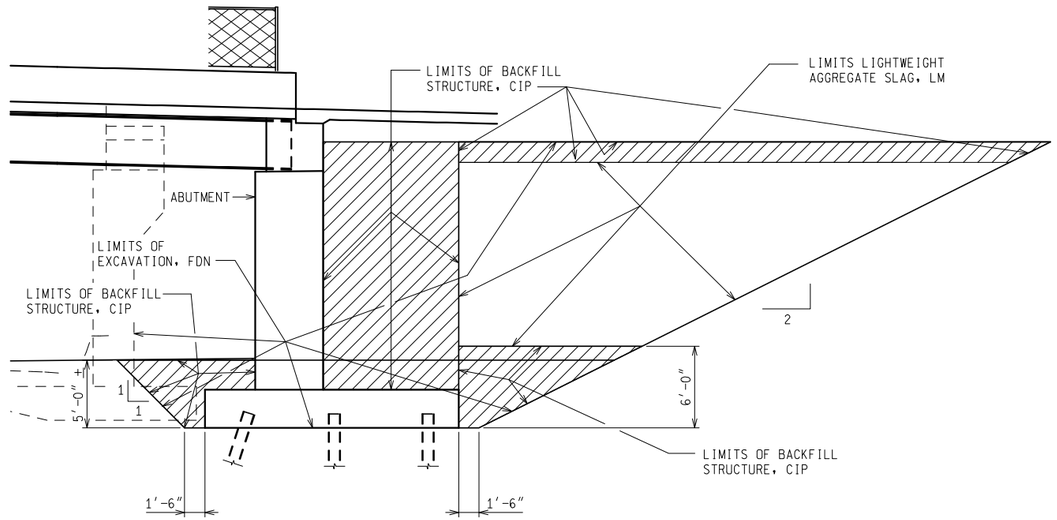
DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S12 OF 82194	802330		1 OF 3

FILE NAME: Clark-pos.dgn DRAWN BY: RMG DATE: 08/22/08 CHECKED BY: KMP DATE: 08/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



DECK SECTION
36″W x 42″H SPREAD PPC BOX BEAM
(LOOKING UPSTATION)



SECTION THRU ABUTMENT B
(SHOWING LIMITS OF EXCAVATION AND BACKFILL)
(ABUTMENT B SHOWN, ABUTMENT A SIMILAR)

APPROVED_____
CONSULTANT COORDINATING ENGINEER

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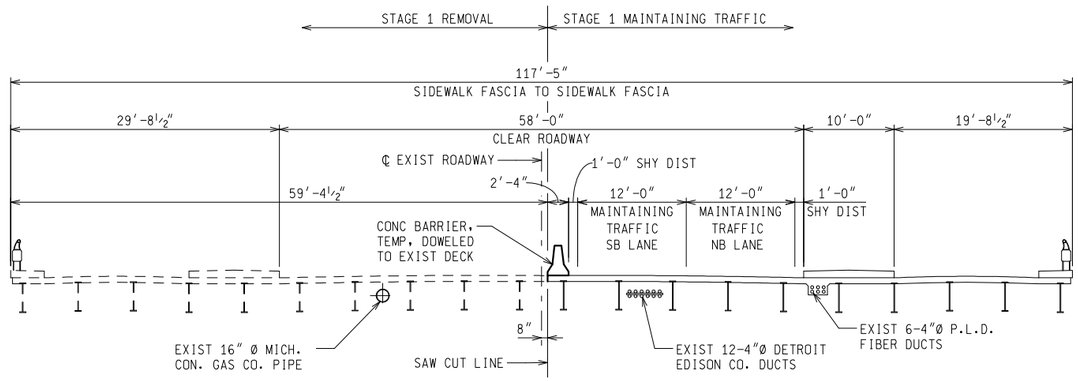
Michigan Department of Transportation

GENERAL PLAN OF SITE - DECK SECTIONS
CLARK AVENUE OVER I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S12 OF 82194	802330		2 OF 3

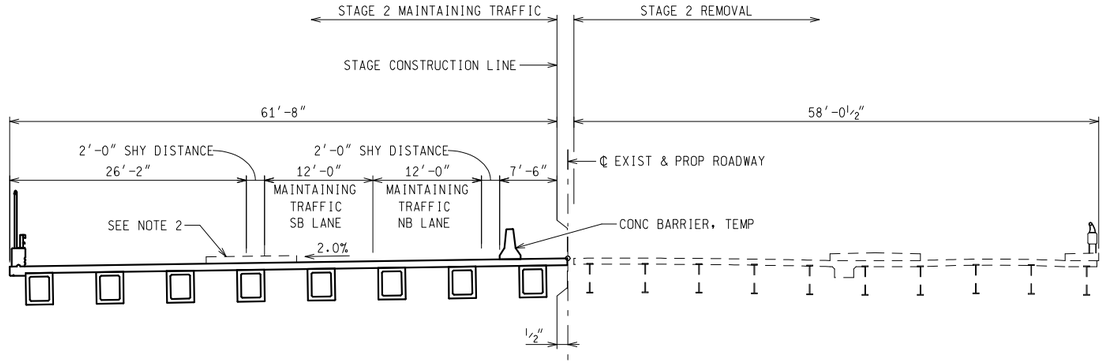
FILE NAME: Clark st-xs.dgn DRAWN BY: RMG DATE: 08/22/08 CHECKED BY: KMP DATE: 08/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



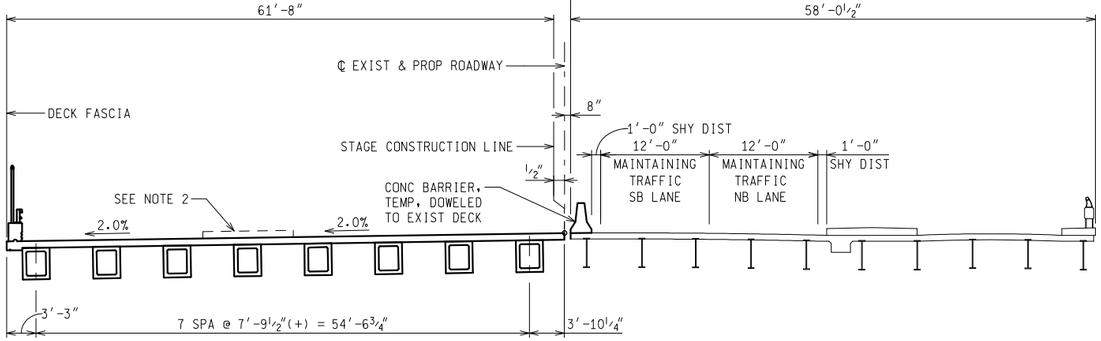
STAGE 1 REMOVAL

(LOOKING UPSTATION TOWARDS ABUTMENT A)



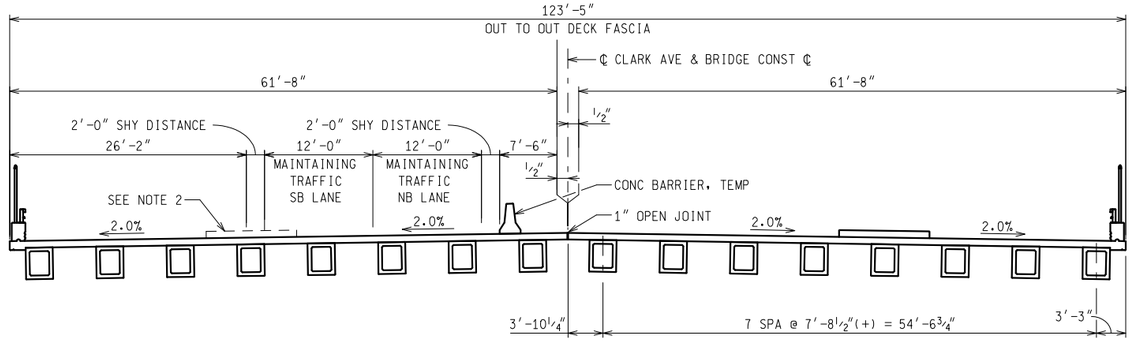
STAGE 2 REMOVAL

(LOOKING UPSTATION TOWARDS ABUTMENT A)



STAGE 1 CONSTRUCTION

(LOOKING UPSTATION TOWARDS ABUTMENT A)



STAGE 2 CONSTRUCTION

(LOOKING UPSTATION TOWARDS ABUTMENT A)

NOTES:

1. PLACEMENT OF CONC. BARRIER, TEMP, SHALL BE ACCORDING TO SPECIAL DETAIL R-126-E OR AS APPROVED BY THE ENGINEER. IN STAGE 1 THE TEMP BARRIER SHALL BE DOWELED INTO THE EXISTING DECK ACCORDING TO SPECIAL DETAIL R-126-E. INCLUDED IN THE PAY ITEM "Conc. Barrier, Temp, Furn".

2. MEDIAN TO BE POURED AFTER COMPLETION OF STAGE 2 CONSTRUCTION.

APPROVED_____
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Michigan Department of Transportation

CONSTRUCTION STAGING
CLARK AVENUE OVER I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S12 OF 82194	802330		3 OF 3

FILE NAME: Clark STAGE.dgn DRAWN BY: RMG DATE: 08/22/08 CHECKED BY: KMP DATE: 08/22/08

WITNESSES

CONTROL PT# 785
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON THE SIDEWALK IN THE NORTHWEST QUADRANT OF CRAWFORD AND FISHER ST.

WITNESSES:
1. N75°E 7.00′ STOP SIGN
2. S60°W 4.00′ SIDEWALK INTERSECTION
3. S10°E 13.00′ LIGHT POLE
4. S20°E 15.00′ BACK OF CURB OF FISHER ST.

CONTROL PT# 758
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON FENCED-IN ASPHALT PARKING LOT EAST OF LIVERNOIS ST.

WITNESSES:
1. S70°W 80.00′ CL OF LIVERNOIS ST.
2. S20°E 9.00′ FENCE
3. N60°W 85.00′ FIRE HYDRANT
4. N90°W 60.00′ POWER POLE

CONTROL PT# 907
DESCRIPTION: SET MAG NAIL IN CENTER OF ARIAL TARGET IN THE CONVERGENCE OF THE EXIT RAMP OF I-75 AND FISHER, NORTH OF CRAWFORD.

WITNESSES:
1. S75°W 15.00′ FENCE POST
2. N20°W 2.50′ EDGE CONCRETE
3. S20°E 12.00′ CENTERLINE FISHER
4. S05°W 51.00′ POWER POLE

BENCHMARKS

BM 310
DESCRIPTION: CHISELED 'X' ON NW BOLT OF A LIGHT POST ON THE SOUTH SIDE OF FORT STREET ACROSS FROM BUILDING #6628 150′ WEST OF RADEMACHER STREET ELEVATION: 588.29

BM 311
DESCRIPTION: CHISELED 'X' ON NW BOLT OF A LIGHT POLE ON THE SOUTH SIDE OF FORT STREET ACRESS FROM BUILDING #6142 "FERGUSON FUNERAL HOME" 100 FEET EAST OF DRAGON STREET ELEVATION: 587.33

BM 312
DESCRIPTION: CHISELED 'X' ON THE NW BOLT OF LIGHT POLE ON THE SOUTH SIDE OF FORT STREET 30 FEET EAST OF THE VISITOR AND EMPLOYEE ENTRANCE TO "BRIDGE WATER INETRIORS" BUILDING #4617 ELEVATION: 585.33

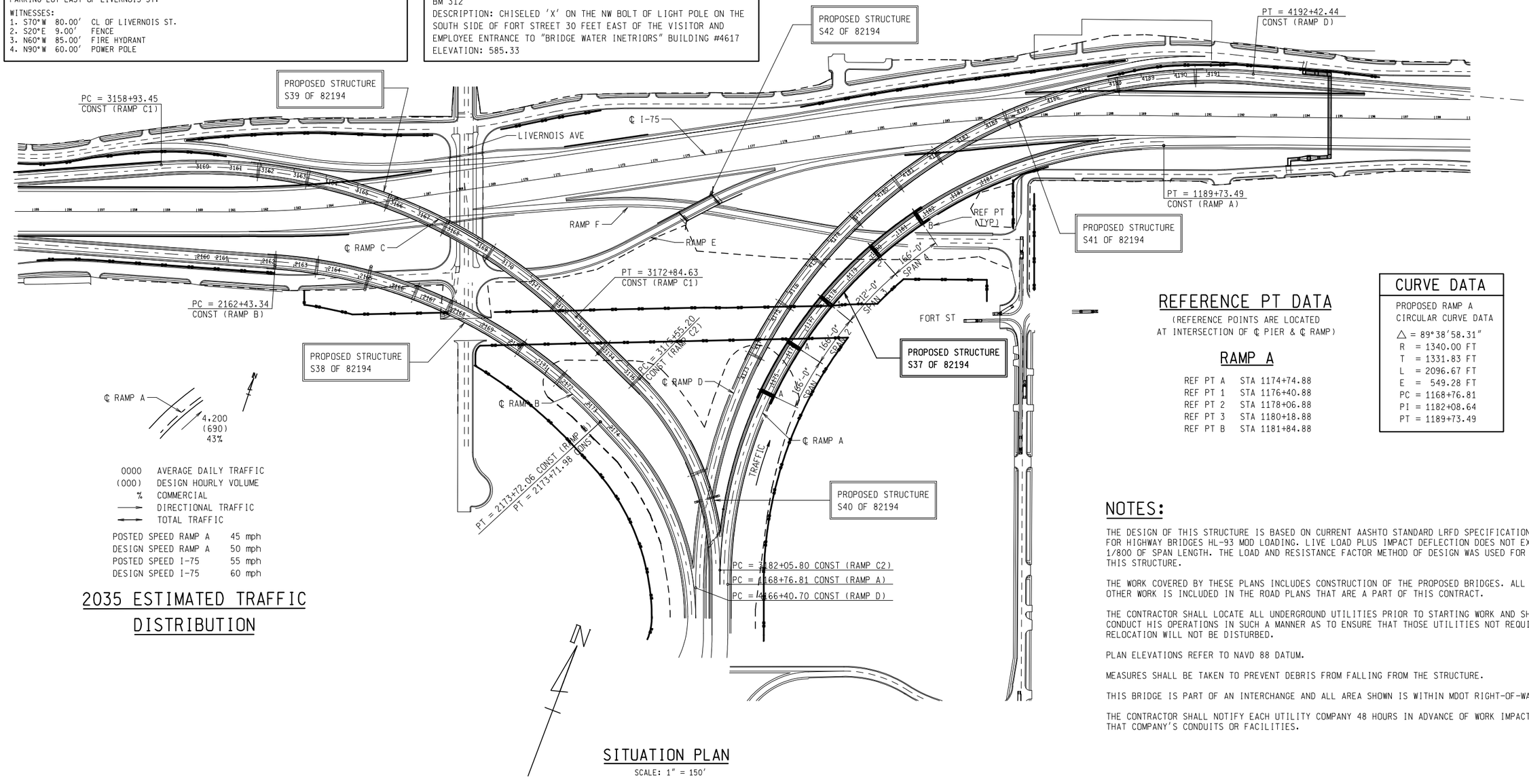
UTILITIES

SEE UTILITY PLAN, SHEET 2.

STATION EQUATIONS

STA 1180+79.22 (RAMP A) = STA 6181+35.97 (RAMP F)

REVISIONS			
NO.	DESCRIPTION	DATE	BY



SITUATION PLAN

SCALE: 1" = 150′

0000 AVERAGE DAILY TRAFFIC
(000) DESIGN HOURLY VOLUME
% COMMERCIAL
DIRECTIONAL TRAFFIC
TOTAL TRAFFIC

POSTED SPEED RAMP A 45 mph
DESIGN SPEED RAMP A 50 mph
POSTED SPEED I-75 55 mph
DESIGN SPEED I-75 60 mph

2035 ESTIMATED TRAFFIC DISTRIBUTION

REFERENCE PT DATA

(REFERENCE POINTS ARE LOCATED AT INTERSECTION OF ℄ PIER & ℄ RAMP)

RAMP A

REF PT A	STA 1174+74.88
REF PT 1	STA 1176+40.88
REF PT 2	STA 1178+06.88
REF PT 3	STA 1180+18.88
REF PT B	STA 1181+84.88

CURVE DATA

PROPOSED RAMP A
CIRCULAR CURVE DATA

△ = 89°38′58.31″
R = 1340.00 FT
T = 1331.83 FT
L = 2096.67 FT
E = 549.28 FT
PC = 1168+76.81
PI = 1182+08.64
PT = 1189+73.49

NOTES:

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES HL-93 MOD LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH. THE LOAD AND RESISTANCE FACTOR METHOD OF DESIGN WAS USED FOR THIS STRUCTURE.

THE WORK COVERED BY THESE PLANS INCLUDES CONSTRUCTION OF THE PROPOSED BRIDGES. ALL OTHER WORK IS INCLUDED IN THE ROAD PLANS THAT ARE A PART OF THIS CONTRACT.

THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

PLAN ELEVATIONS REFER TO NAVD 88 DATUM.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE.

THIS BRIDGE IS PART OF AN INTERCHANGE AND ALL AREA SHOWN IS WITHIN MDOT RIGHT-OF-WAY.

THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY 48 HOURS IN ADVANCE OF WORK IMPACTING THAT COMPANY'S CONDUITS OR FACILITIES.

APPROVED
CONSULTANT COORDINATING ENGINEER

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GENERAL PLAN OF SITE
RAMP A OVER FORT ST. AND RAMP F

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S37 OF 82194	802330		1 OF 4

FILE NAME: RampABCD pos.dgn DRAWN BY: RMG DATE: 09/22/08 CHECKED BY: KMP DATE: 09/22/08

UTILITIES

MICHIGAN CONSOLIDATED GAS CO.
4", 6", 14" AND H.P. GAS MAINS

AMERITECH – SBC
16 MULTI-DUCT CONDUITS
10 – 4" PC

DEPARTMENT OF PUBLIC LIGHTING

MCI
COMCAST
OVERGROUND CABLE

DETROIT WATER AND SEWER DEPARTMENT
– MULTIPLE SIZE SANITARY SEWERS
– MULTIPLE SIZE WATER MAINS

DETROIT EDISON
UNDERGROUND CABLES
UNDERGROUND DUCTS

REVISIONS			
NO.	DESCRIPTION	DATE	BY

PROPOSED STRUCTURE S39 OF 82194

PROPOSED STRUCTURE S42 OF 82194

PROPOSED STRUCTURE S41 OF 82194

HAZARDOUS OR FLAMABLE MATERIAL

PROPOSED STRUCTURE S38 OF 82194

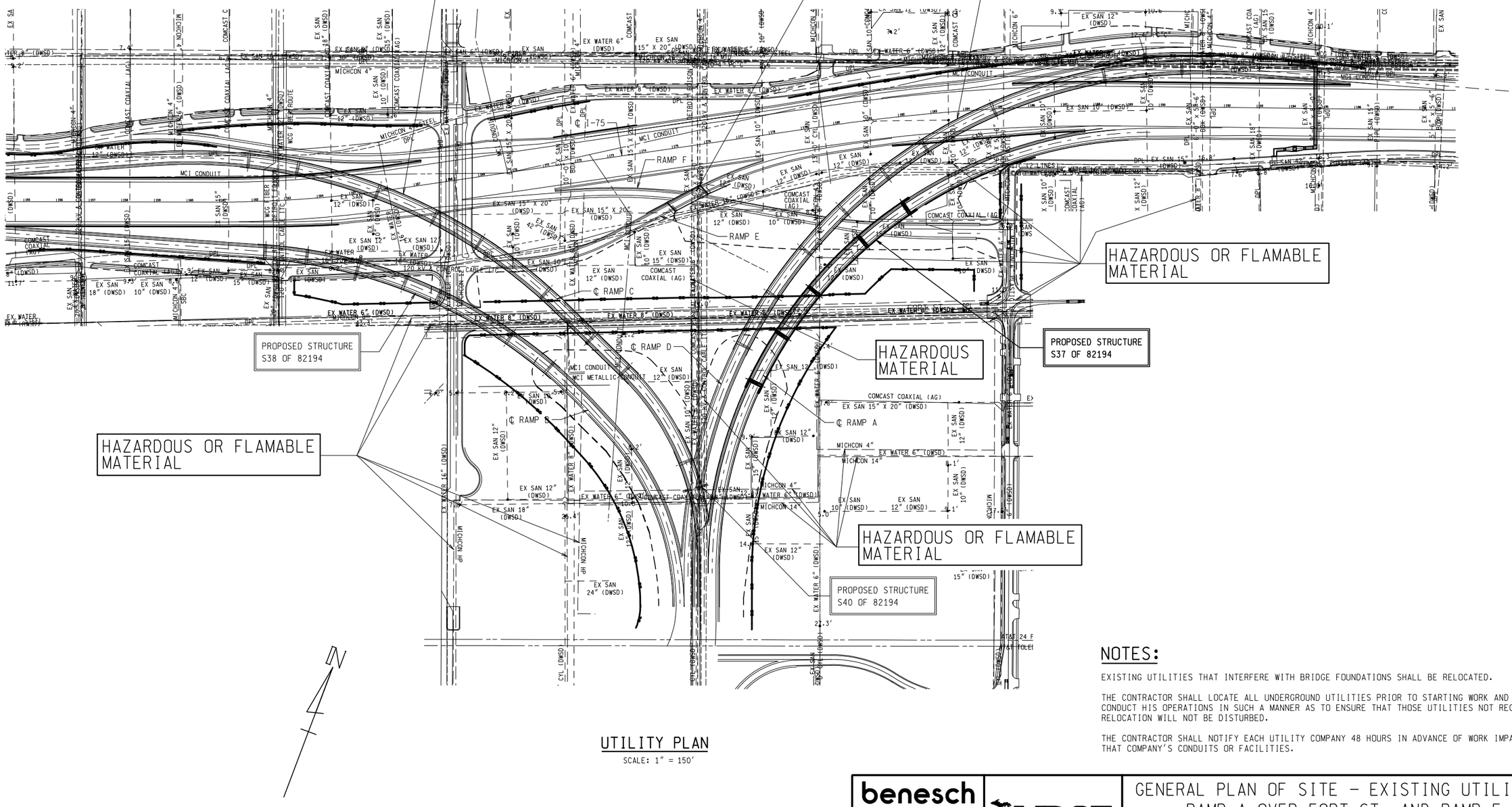
HAZARDOUS MATERIAL

PROPOSED STRUCTURE S37 OF 82194

HAZARDOUS OR FLAMABLE MATERIAL

HAZARDOUS OR FLAMABLE MATERIAL

PROPOSED STRUCTURE S40 OF 82194



UTILITY PLAN

SCALE: 1" = 150'

NOTES:

EXISTING UTILITIES THAT INTERFERE WITH BRIDGE FOUNDATIONS SHALL BE RELOCATED.

THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY 48 HOURS IN ADVANCE OF WORK IMPACTING THAT COMPANY'S CONDUITS OR FACILITIES.

APPROVED_____
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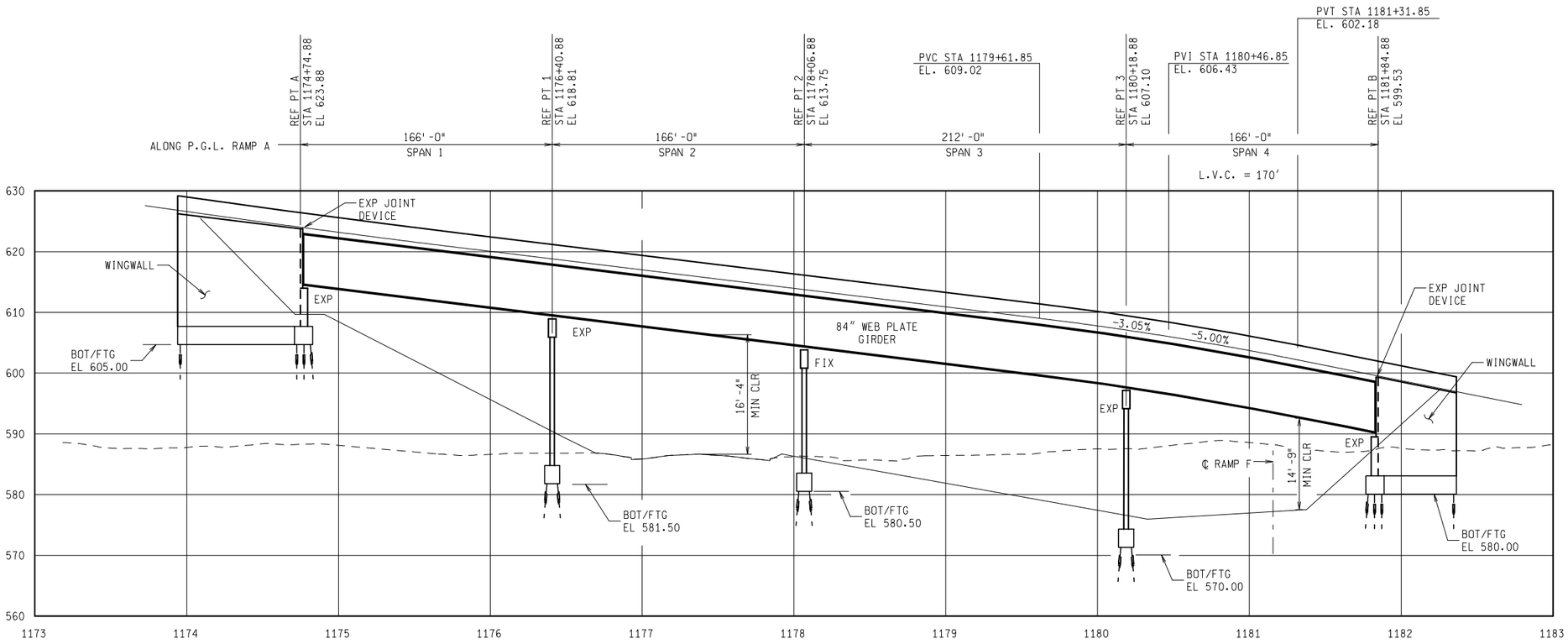
GENERAL PLAN OF SITE – EXISTING UTILITIES RAMP A OVER FORT ST. AND RAMP F

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S37 OF 82194	802330		2 OF 4

FILE NAME: RampUtilities.dgn DRAWN BY: RMG DATE: 09/22/08 CHECKED BY: KMP DATE: 09/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



ELEVATION

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'

NOTES:

1. MIMIMUM VERTICAL CLEARANCE COMPUTED BY PARSONS ENGINEERING.
2. FOR ADDITIONAL NOTES, SEE SHT 1 OF 4.

APPROVED _____
CONSULTANT COORDINATING ENGINEER

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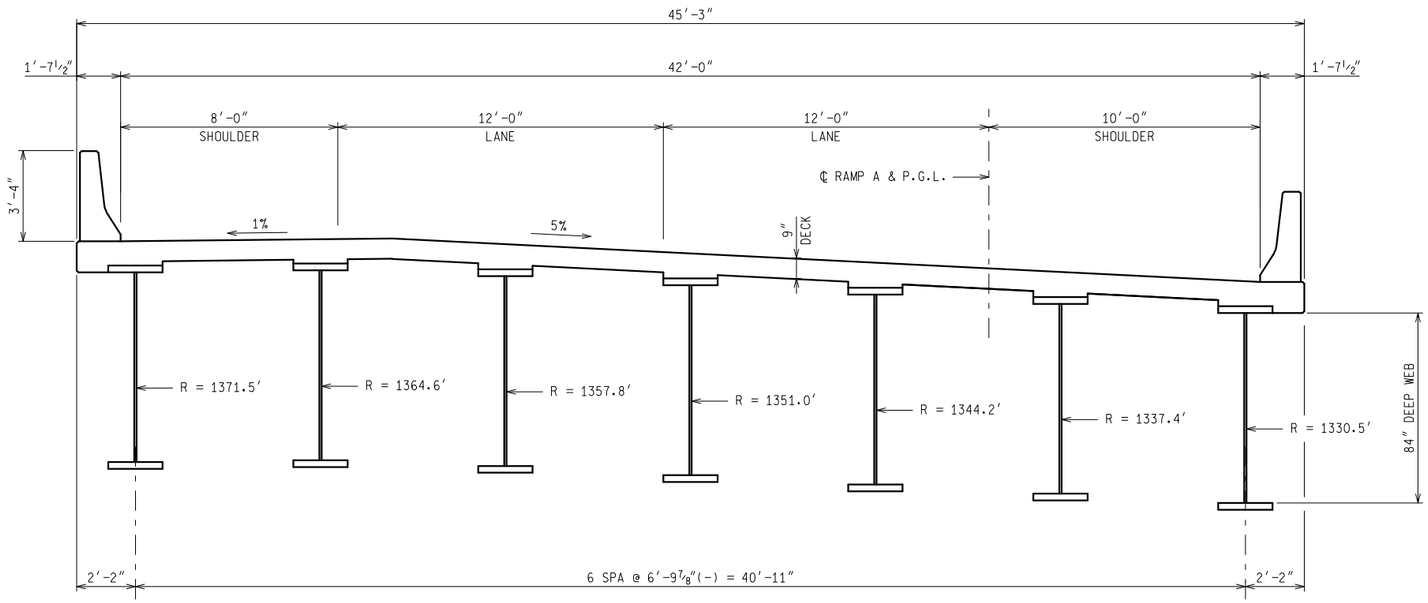
Michigan Department of Transportation

GENERAL PLAN OF SITE - PROFILE
RAMP A OVER FORT ST. AND RAMP F

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S37 OF 82194	802330		3 OF 4

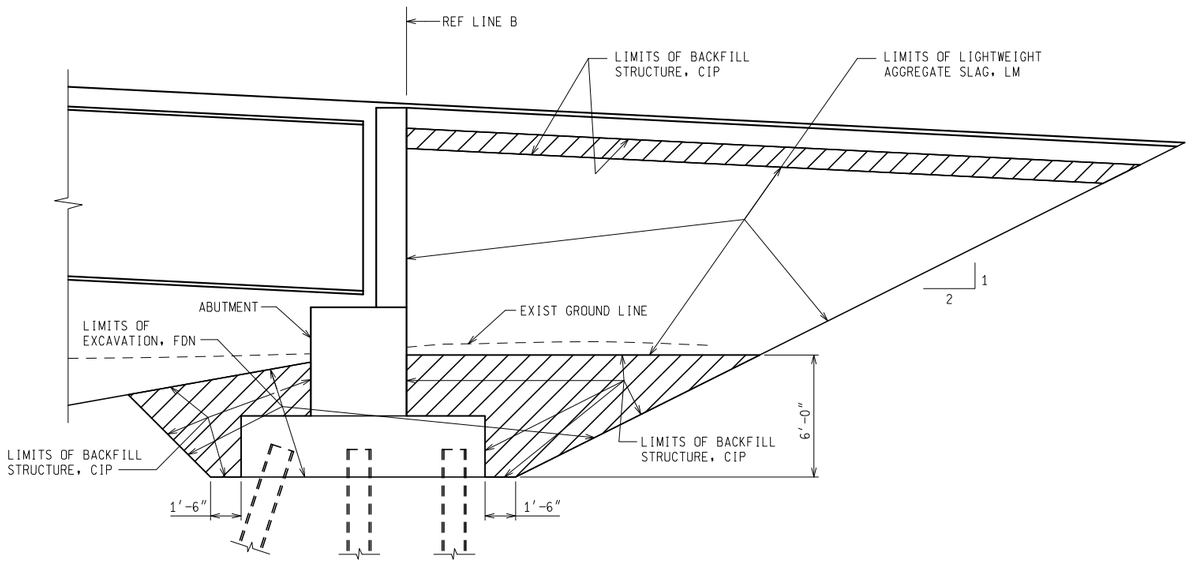
FILE NAME: RampA Prof.dgn DRAWN BY: RMG DATE: 09/22/08 CHECKED BY: KMP DATE: 09/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



RAMP A – CROSS SECTION – STEEL WELDED PLATE GIRDER

(LOOKING UPSTATION)



SECTION THRU ABUTMENT B

(SHOWING LIMITS OF EXCAVATION AND BACKFILL)
(ABUTMENT B SHOWN, ABUTMENT A SIMILAR)

APPROVED_____
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GENERAL PLAN OF SITE – CROSS SECTION
RAMP A OVER FORT ST. AND RAMP F

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S37 OF 82194	802330		4 OF 4

FILE NAME: RampA-xs.dgn DRAWN BY: RMG DATE: 08/22/08 CHECKED BY: KMP DATE: 08/22/08

WITNESSES

CONTROL PT# 785
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON THE SIDEWALK IN THE NORTHWEST QUADRANT OF CRAWFORD AND FISHER ST.

WITNESSES:
1. N75°E 7.00′ STOP SIGN
2. S60°W 4.00′ SIDEWALK INTERSECTION
3. S10°E 13.00′ LIGHT POLE
4. S20°E 15.00′ BACK OF CURB OF FISHER ST.

CONTROL PT# 758
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON FENCED-IN ASPHALT PARKING LOT EAST OF LIVERNOIS ST.

WITNESSES:
1. S70°W 80.00′ CL OF LIVERNOIS ST.
2. S20°E 9.00′ FENCE
3. N60°W 85.00′ FIRE HYDRANT
4. N90°W 60.00′ POWER POLE

CONTROL PT# 907
DESCRIPTION: SET MAG NAIL IN CENTER OF ARIAL TARGET IN THE CONVERGENCE OF THE EXIT RAMP OF I-75 AND FISHER, NORTH OF CRAWFORD.

WITNESSES:
1. S75°W 15.00′ FENCE POST
2. N20°W 2.50′ EDGE CONCRETE
3. S20°E 12.00′ CENTERLINE FISHER
4. S05°W 51.00′ POWER POLE

BENCHMARKS

BM 310
DESCRIPTION: CHISELED 'X' ON NW BOLT OF A LIGHT POST ON THE SOUTH SIDE OF FORT STREET ACROSS FROM BUILDING #6628 150′ WEST OF RADEMACHER STREET ELEVATION: 588.29

BM 311
DESCRIPTION: CHISELED 'X' ON NW BOLT OF A LIGHT POLE ON THE SOUTH SIDE OF FORT STREET ACRESS FROM BUILDING #6142 "FERGUSON FUNERAL HOME" 100 FEET EAST OF DRAGON STREET ELEVATION: 587.33

BM 312
DESCRIPTION: CHISELED 'X' ON THE NW BOLT OF LIGHT POLE ON THE SOUTH SIDE OF FORT STREET 30 FEET EAST OF THE VISITOR AND EMPLOYEE ENTRANCE TO "BRIDGE WATER INETRIORS" BUILDING #4617 ELEVATION: 585.33

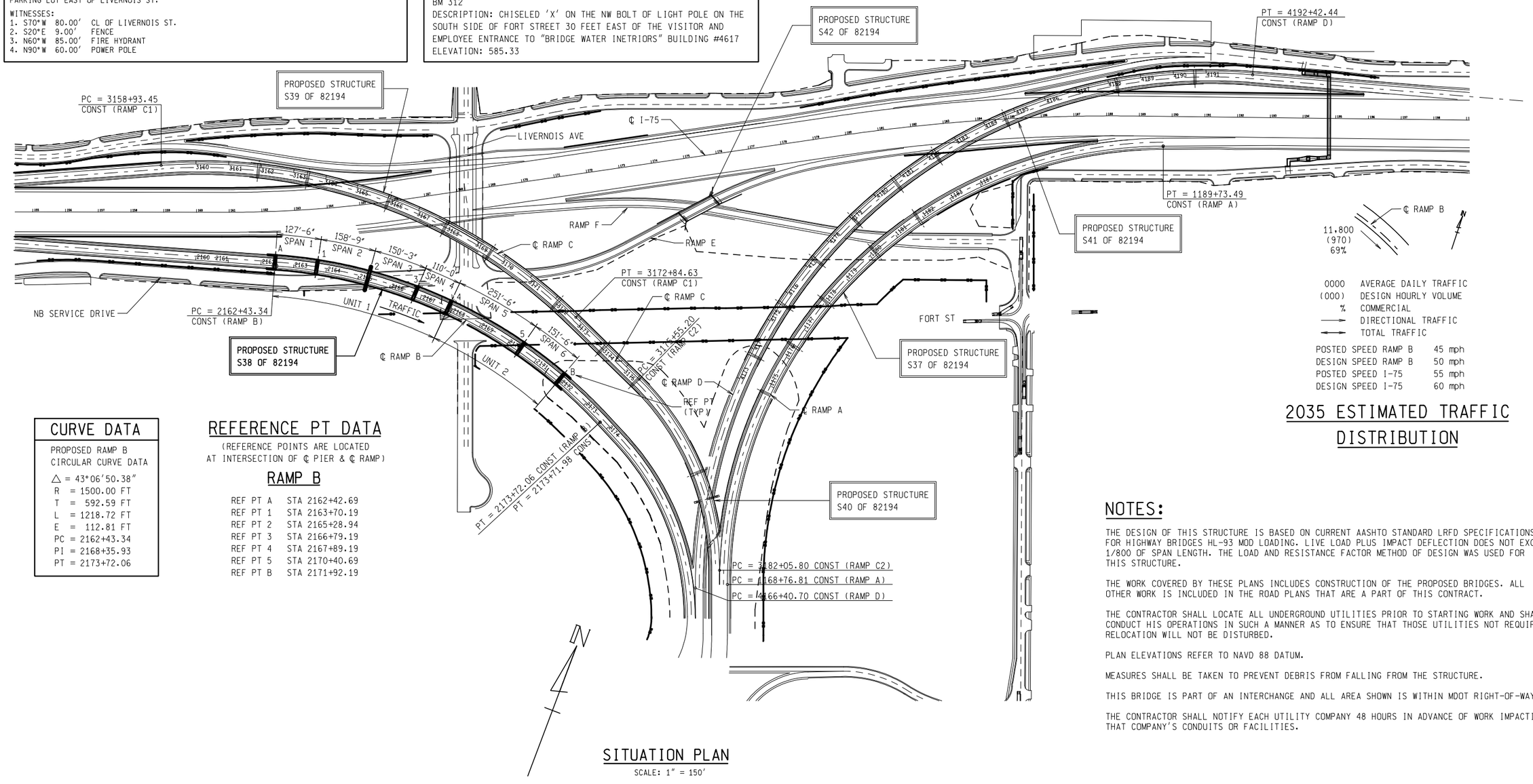
UTILITIES

SEE UTILITY PLAN, SHEET 2.

STATION EQUATIONS

STA 2164+81.44 (RAMP B) = STA 45+85.16 (NB SD)
STA 2168+47.81 (RAMP B) = STA 9+90.24 (LIVERNOIS)

REVISIONS			
NO.	DESCRIPTION	DATE	BY



SITUATION PLAN
SCALE: 1″ = 150′

0000 AVERAGE DAILY TRAFFIC
(000) DESIGN HOURLY VOLUME
% COMMERCIAL
→ DIRECTIONAL TRAFFIC
⟷ TOTAL TRAFFIC

POSTED SPEED RAMP B	45 mph
DESIGN SPEED RAMP B	50 mph
POSTED SPEED I-75	55 mph
DESIGN SPEED I-75	60 mph

2035 ESTIMATED TRAFFIC DISTRIBUTION

CURVE DATA

PROPOSED RAMP B
CIRCULAR CURVE DATA

△ = 43°06′50.38″
R = 1500.00 FT
T = 592.59 FT
L = 1218.72 FT
E = 112.81 FT
PC = 2162+43.34
PI = 2168+35.93
PT = 2173+72.06

REFERENCE PT DATA

(REFERENCE POINTS ARE LOCATED AT INTERSECTION OF ℄ PIER & ℄ RAMP)

RAMP B

REF PT A	STA 2162+42.69
REF PT 1	STA 2163+70.19
REF PT 2	STA 2165+28.94
REF PT 3	STA 2166+79.19
REF PT 4	STA 2167+89.19
REF PT 5	STA 2170+40.69
REF PT B	STA 2171+92.19

NOTES:

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES HL-93 MOD LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH. THE LOAD AND RESISTANCE FACTOR METHOD OF DESIGN WAS USED FOR THIS STRUCTURE.

THE WORK COVERED BY THESE PLANS INCLUDES CONSTRUCTION OF THE PROPOSED BRIDGES. ALL OTHER WORK IS INCLUDED IN THE ROAD PLANS THAT ARE A PART OF THIS CONTRACT.

THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

PLAN ELEVATIONS REFER TO NAVD 88 DATUM.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE.

THIS BRIDGE IS PART OF AN INTERCHANGE AND ALL AREA SHOWN IS WITHIN MDOT RIGHT-OF-WAY.

THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY 48 HOURS IN ADVANCE OF WORK IMPACTING THAT COMPANY'S CONDUITS OR FACILITIES.

APPROVED_____
CONSULTANT COORDINATING ENGINEER

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alfred benesch & company
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Lansing, Michigan 48933

MDOT
Michigan Department of Transportation

GENERAL PLAN OF SITE
RAMP B OVER NB SERVICE DRIVE AND FORT ST.

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S38 OF 82194	802330		1 OF 4

FILE NAME: RampABCD pos.dgn DRAWN BY: RMG DATE: 09/22/08 CHECKED BY: KMP DATE: 09/22/08

UTILITIES

MICHIGAN CONSOLIDATED GAS CO.
4", 6", 14" AND H.P. GAS MAINS

AMERITECH - SBC
16 MULTI-DUCT CONDUITS
10 - 4" PC

DEPARTMENT OF PUBLIC LIGHTING

MCI
COMCAST
OVERGROUND CABLE

DETROIT WATER AND SEWER DEPARTMENT
- MULTIPLE SIZE SANITARY SEWERS
- MULTIPLE SIZE WATER MAINS

DETROIT EDISON
UNDERGROUND CABLES
UNDERGROUND DUCTS

REVISIONS			
NO.	DESCRIPTION	DATE	BY

PROPOSED STRUCTURE S39 OF 82194

PROPOSED STRUCTURE S42 OF 82194

PROPOSED STRUCTURE S41 OF 82194

HAZARDOUS OR FLAMABLE MATERIAL

PROPOSED STRUCTURE S38 OF 82194

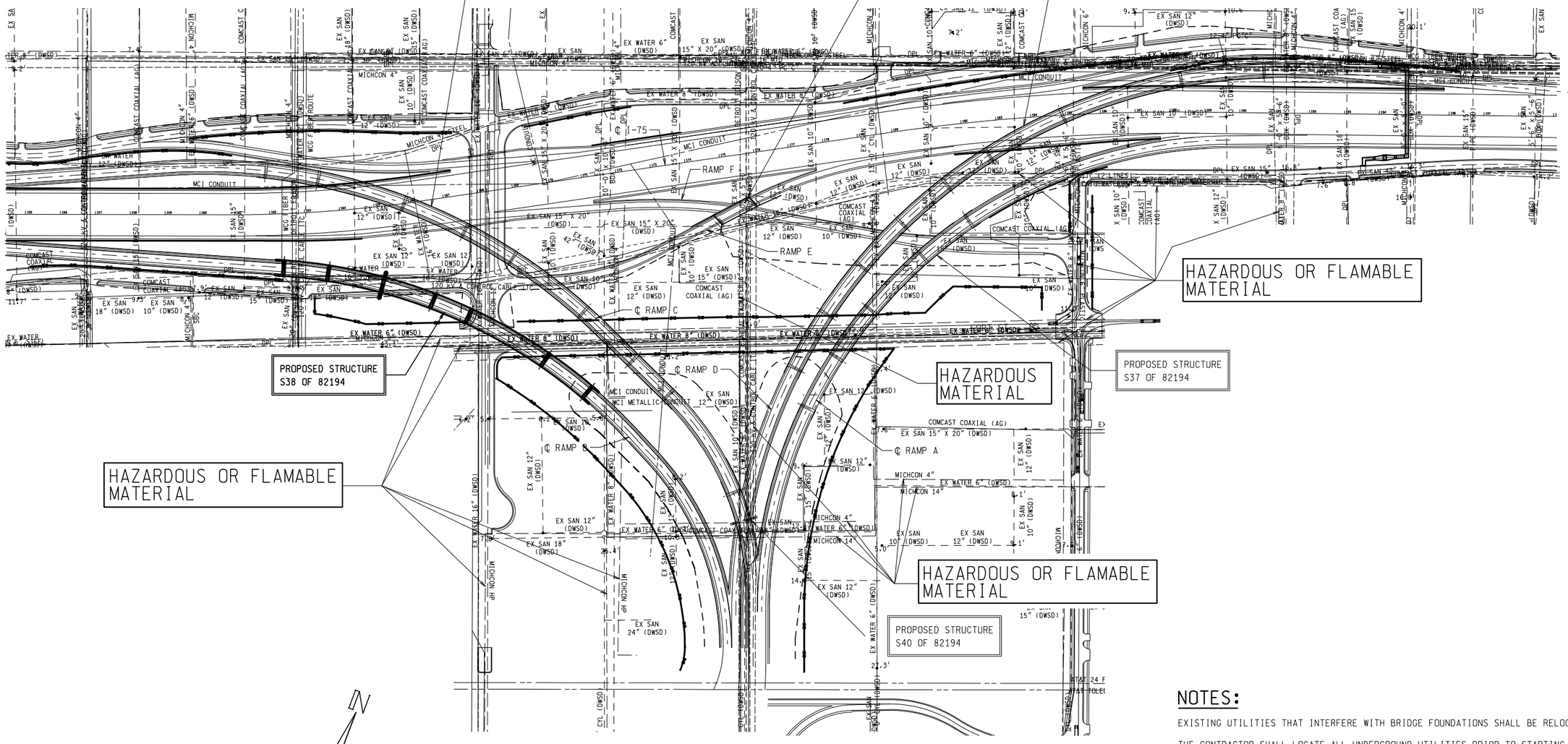
HAZARDOUS OR FLAMABLE MATERIAL

HAZARDOUS MATERIAL

PROPOSED STRUCTURE S37 OF 82194

HAZARDOUS OR FLAMABLE MATERIAL

PROPOSED STRUCTURE S40 OF 82194



UTILITY PLAN

SCALE: 1" = 150'

NOTES:

EXISTING UTILITIES THAT INTERFERE WITH BRIDGE FOUNDATIONS SHALL BE RELOCATED.

THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

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APPROVED_____
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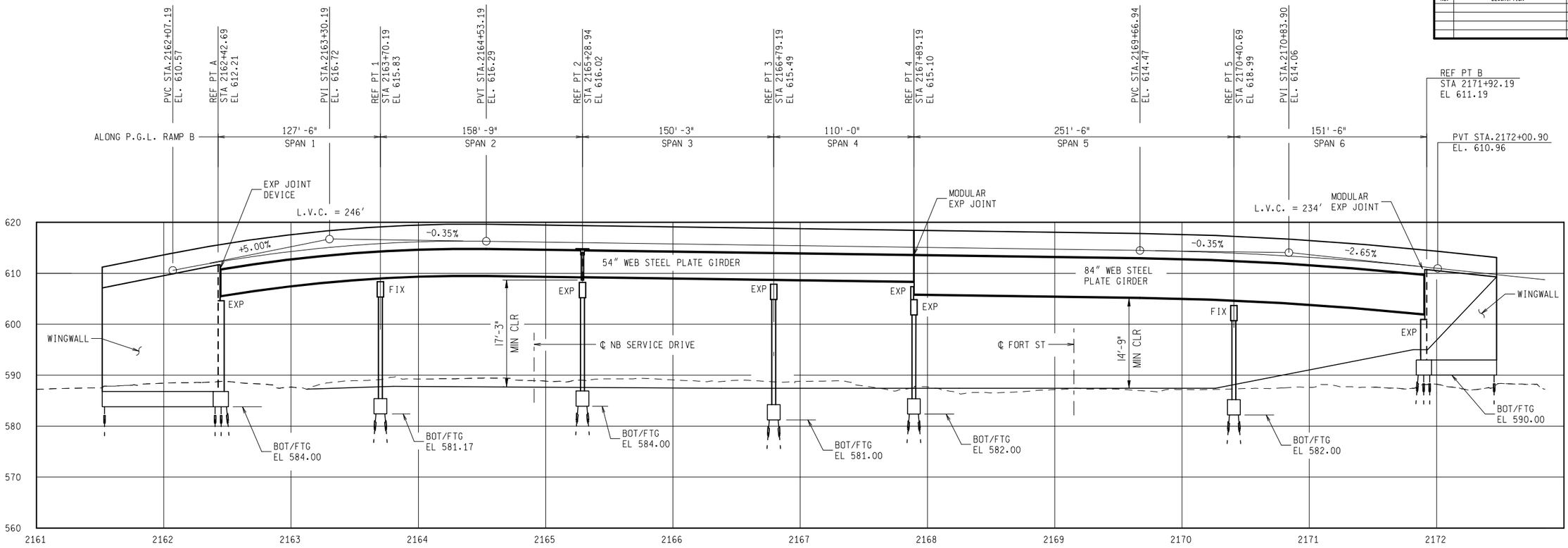
Michigan Department of Transportation

GENERAL PLAN OF SITE - EXISTING UTILITIES RAMP B OVER NB SERVICE DRIVE AND FORT ST.

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S38 OF 82194	802330		2 OF 4

FILE NAME: RampUtilities.dgn DRAWN BY: RMG DATE: 09/22/08 CHECKED BY: KMP DATE: 09/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



ELEVATION

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'

APPROVED _____
CONSULTANT COORDINATING ENGINEER

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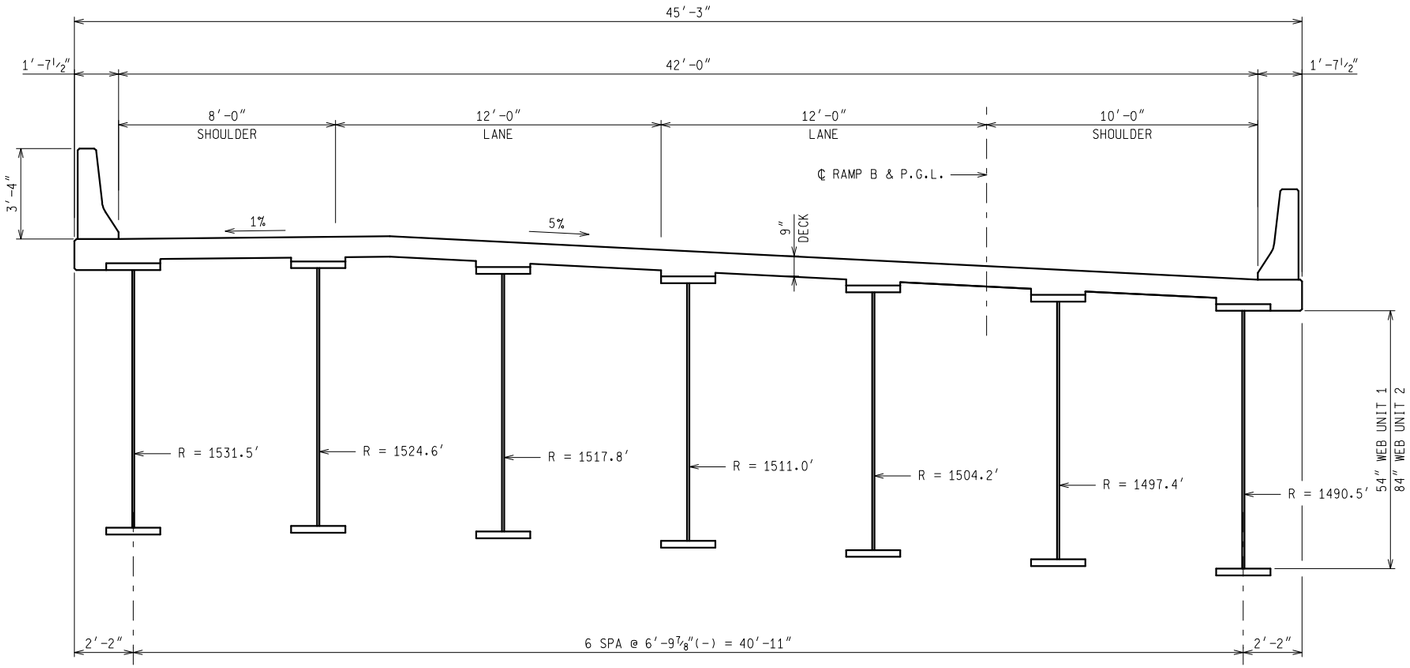
Michigan Department of Transportation

GENERAL PLAN OF SITE - PROFILE
RAMP B OVER NB SERVICE DRIVE AND FORT ST.

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S38 OF 82194	802330		3 OF 4

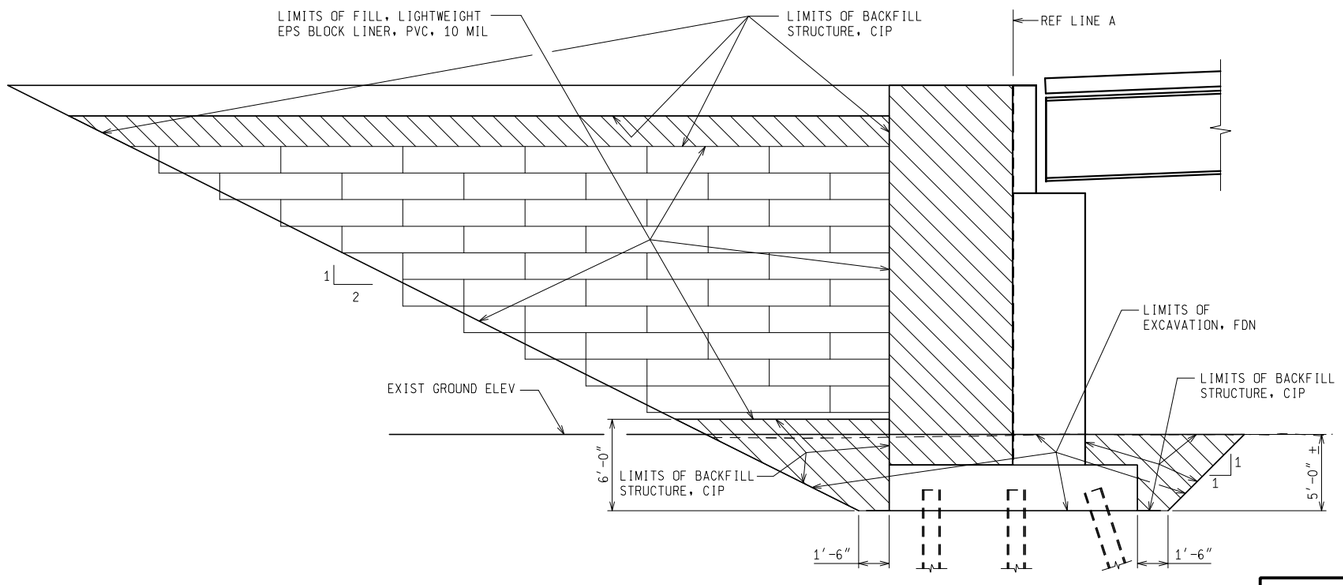
FILE NAME: RampB Prof.dgn DRAWN BY: RMG DATE: 09/22/08 CHECKED BY: KMP DATE: 09/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



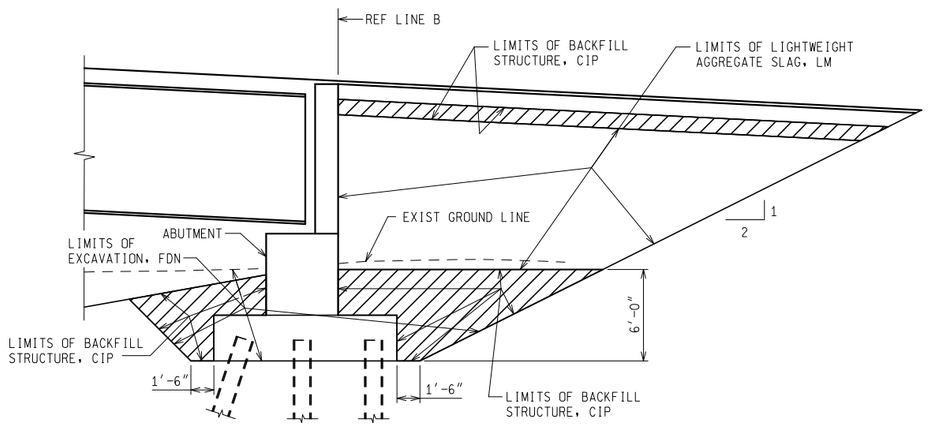
RAMP B – CROSS SECTION – STEEL WELDED PLATE GIRDER

(LOOKING UPSTATION)



SECTION THRU ABUTMENT A

(SHOWING LIMITS OF EXCAVATION AND BACKFILL)



SECTION THRU ABUTMENT B

(SHOWING LIMITS OF EXCAVATION AND BACKFILL)

APPROVED_____
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Michigan Department of Transportation

GENERAL PLAN OF SITE – CROSS SECTION
RAMP B OVER NB SERVICE DRIVE AND FORT ST.

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S38 OF 82194	802330		4 OF 4

FILE NAME: RampB-xs.dgn DRAWN BY: RMG DATE: 08/22/08 CHECKED BY: KMP DATE: 08/22/08

WITNESSES

CONTROL PT# 785
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON THE SIDEWALK IN THE NORTHWEST QUADRANT OF CRAWFORD AND FISHER ST.

WITNESSES:
1. N75°E 7.00′ STOP SIGN
2. S60°W 4.00′ SIDEWALK INTERSECTION
3. S10°E 13.00′ LIGHT POLE
4. S20°E 15.00′ BACK OF CURB OF FISHER ST.

CONTROL PT# 758
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON FENCED-IN ASPHALT PARKING LOT EAST OF LIVERNOIS ST.

WITNESSES:
1. S70°W 80.00′ CL OF LIVERNOIS ST.
2. S20°E 9.00′ FENCE
3. N60°W 85.00′ FIRE HYDRANT
4. N90°W 60.00′ POWER POLE

CONTROL PT# 907
DESCRIPTION: SET MAG NAIL IN CENTER OF ARIAL TARGET IN THE CONVERGENCE OF THE EXIT RAMP OF I-75 AND FISHER, NORTH OF CRAWFORD.

WITNESSES:
1. S75°W 15.00′ FENCE POST
2. N20°W 2.50′ EDGE CONCRETE
3. S20°E 12.00′ CENTERLINE FISHER
4. S05°W 51.00′ POWER POLE

BENCHMARKS

BM 310
DESCRIPTION: CHISELED 'X' ON NW BOLT OF A LIGHT POST ON THE SOUTH SIDE OF FORT STREET ACROSS FROM BUILDING #6628 150′ WEST OF RADEMACHER STREET ELEVATION: 588.29

BM 311
DESCRIPTION: CHISELED 'X' ON NW BOLT OF A LIGHT POLE ON THE SOUTH SIDE OF FORT STREET ACRESS FROM BUILDING #6142 "FERGUSON FUNERAL HOME" 100 FEET EAST OF DRAGON STREET ELEVATION: 587.33

BM 312
DESCRIPTION: CHISELED 'X' ON THE NW BOLT OF LIGHT POLE ON THE SOUTH SIDE OF FORT STREET 30 FEET EAST OF THE VISITOR AND EMPLOYEE ENTRANCE TO "BRIDGE WATER INETRIORS" BUILDING #4617 ELEVATION: 585.33

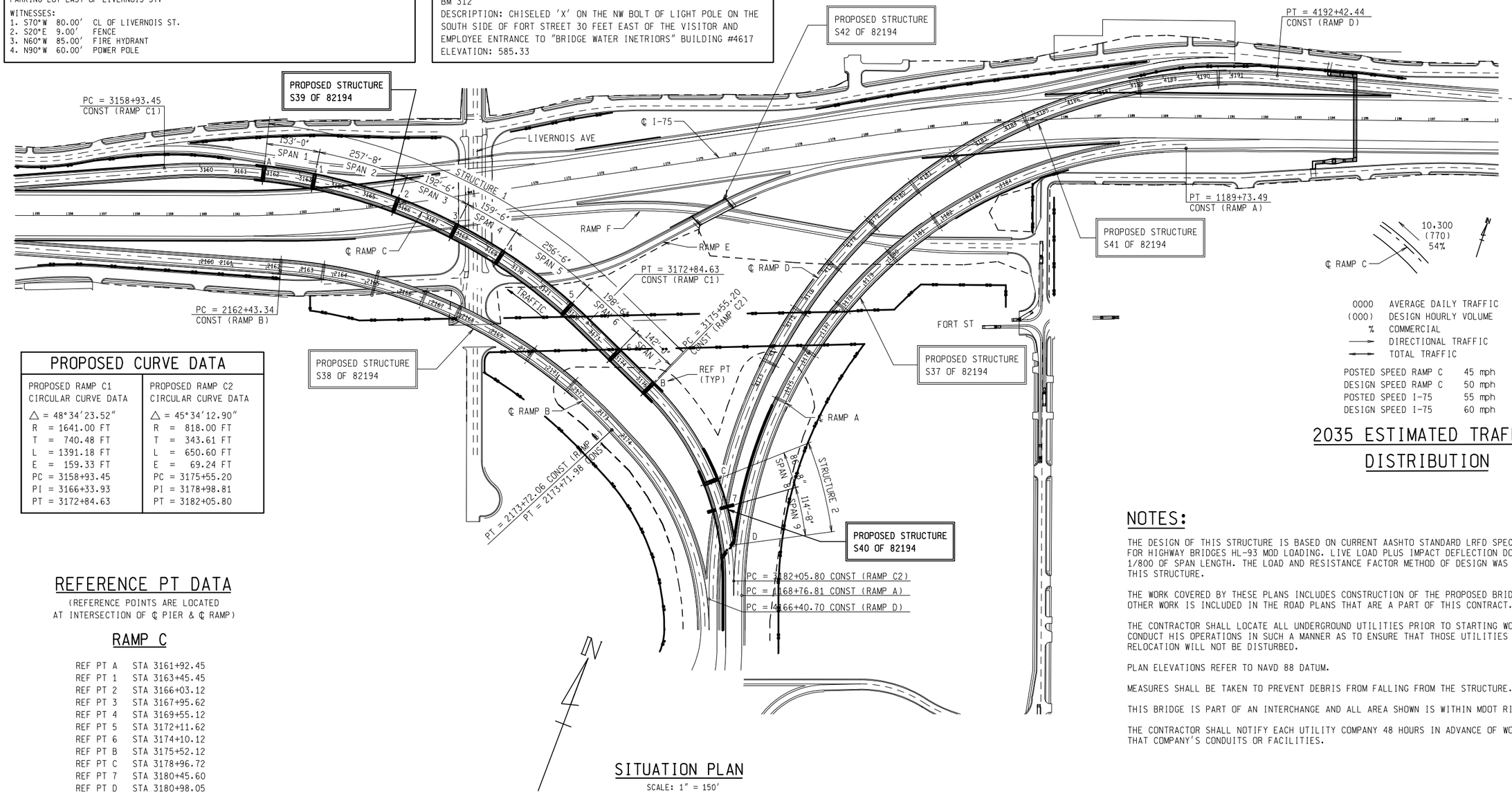
UTILITIES

SEE UTILITY PLAN, SHEET 2.

STATION EQUATIONS

STA 3166+23.32 (RAMP C) = STA 165+09.33 (I-75)
STA 3167+60.74 (RAMP C) = STA 6167+60.74 (RAMP F)
STA 3168+56.28 (RAMP C) = STA 12+52.06 (LIVERNOIS)
STA 3179+41.31 (RAMP C) = STA 4169+56.70 (RAMP D)

REVISIONS			
NO.	DESCRIPTION	DATE	BY



SITUATION PLAN

SCALE: 1" = 150′

PROPOSED CURVE DATA

PROPOSED RAMP C1 CIRCULAR CURVE DATA	PROPOSED RAMP C2 CIRCULAR CURVE DATA
△ = 48°34′23.52″	△ = 45°34′12.90″
R = 1641.00 FT	R = 818.00 FT
T = 740.48 FT	T = 343.61 FT
L = 1391.18 FT	L = 650.60 FT
E = 159.33 FT	E = 69.24 FT
PC = 3158+93.45	PC = 3175+55.20
PI = 3166+33.93	PI = 3178+98.81
PT = 3172+84.63	PT = 3182+05.80

REFERENCE PT DATA

(REFERENCE POINTS ARE LOCATED AT INTERSECTION OF ℄ PIER & ℄ RAMP)

RAMP C

REF PT A	STA 3161+92.45
REF PT 1	STA 3163+45.45
REF PT 2	STA 3166+03.12
REF PT 3	STA 3167+95.62
REF PT 4	STA 3169+55.12
REF PT 5	STA 3172+11.62
REF PT 6	STA 3174+10.12
REF PT B	STA 3175+52.12
REF PT C	STA 3178+96.72
REF PT 7	STA 3180+45.60
REF PT D	STA 3180+98.05

0000 AVERAGE DAILY TRAFFIC
(000) DESIGN HOURLY VOLUME
% COMMERCIAL
→ DIRECTIONAL TRAFFIC
⟷ TOTAL TRAFFIC

POSTED SPEED RAMP C	45 mph
DESIGN SPEED RAMP C	50 mph
POSTED SPEED I-75	55 mph
DESIGN SPEED I-75	60 mph

2035 ESTIMATED TRAFFIC DISTRIBUTION

NOTES:

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES HL-93 MOD LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH. THE LOAD AND RESISTANCE FACTOR METHOD OF DESIGN WAS USED FOR THIS STRUCTURE.

THE WORK COVERED BY THESE PLANS INCLUDES CONSTRUCTION OF THE PROPOSED BRIDGES. ALL OTHER WORK IS INCLUDED IN THE ROAD PLANS THAT ARE A PART OF THIS CONTRACT.

THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

PLAN ELEVATIONS REFER TO NAVD 88 DATUM.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE.

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APPROVED
CONSULTANT COORDINATING ENGINEER

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Michigan Department of Transportation

GENERAL PLAN OF SITE
RAMP C OVER RAMP D, FORT ST., RAMP E, LIVERNOIS AVE. AND I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S39 OF 82194	802330		1 OF 4

FILE NAME: RampABCD pos.dgn DRAWN BY: RMG DATE: 09/22/08 CHECKED BY: KMP DATE: 09/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY

UTILITIES

MICHIGAN CONSOLIDATED GAS CO.
4", 6", 14" AND H.P. GAS MAINS

AMERITECH - SBC
16 MULTI-DUCT CONDUITS
10 - 4" PC

DEPARTMENT OF PUBLIC LIGHTING

MCI
COMCAST
OVERGROUND CABLE

DETROIT WATER AND SEWER DEPARTMENT
- MULTIPLE SIZE SANITARY SEWERS
- MULTIPLE SIZE WATER MAINS

DETROIT EDISON
UNDERGROUND CABLES
UNDERGROUND DUCTS

PROPOSED STRUCTURE S39 OF 82194

PROPOSED STRUCTURE S42 OF 82194

PROPOSED STRUCTURE S41 OF 82194

HAZARDOUS OR FLAMABLE MATERIAL

PROPOSED STRUCTURE S38 OF 82194

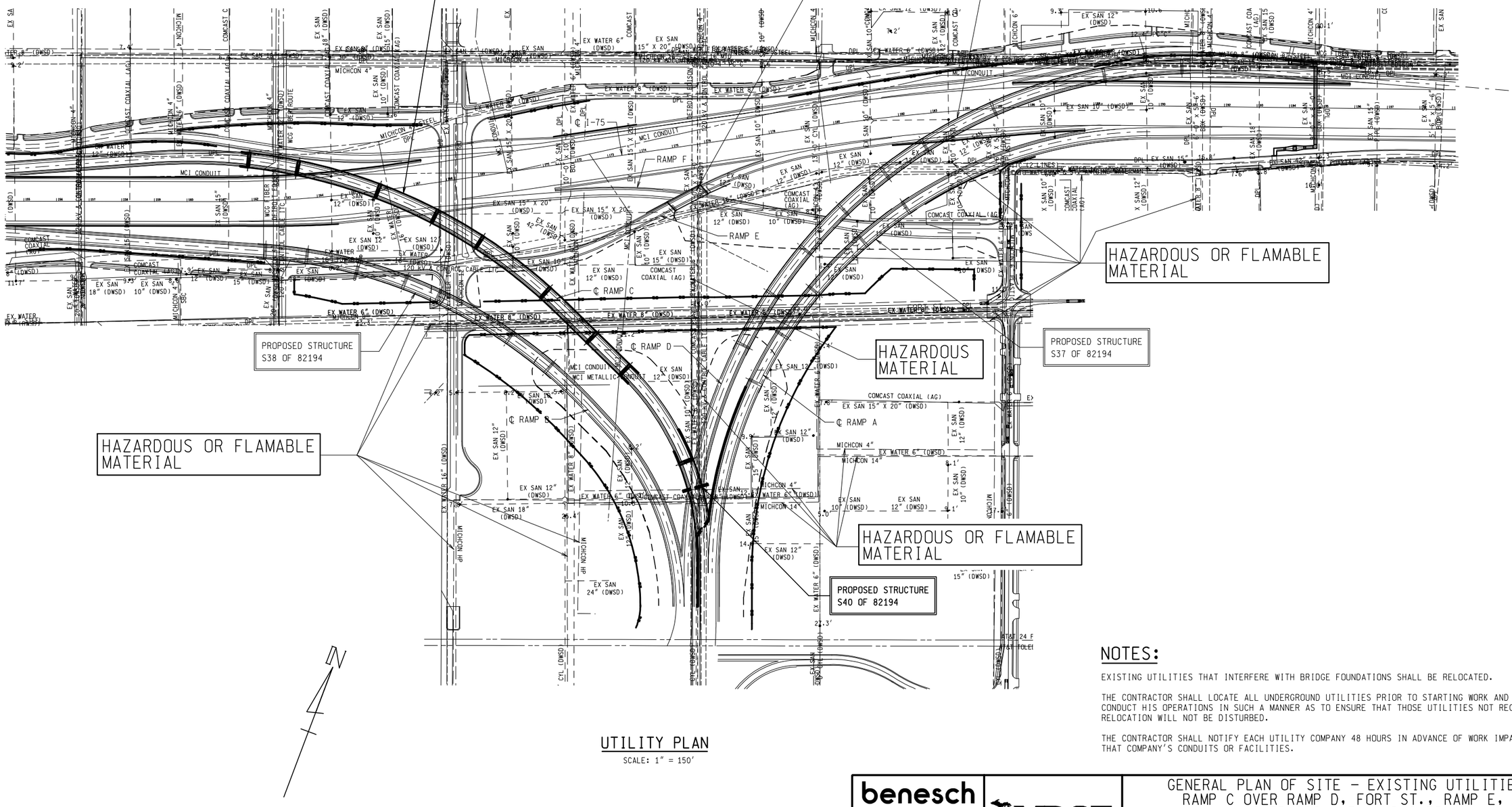
HAZARDOUS MATERIAL

PROPOSED STRUCTURE S37 OF 82194

HAZARDOUS OR FLAMABLE MATERIAL

HAZARDOUS OR FLAMABLE MATERIAL

PROPOSED STRUCTURE S40 OF 82194



UTILITY PLAN

SCALE: 1" = 150'

NOTES:

EXISTING UTILITIES THAT INTERFERE WITH BRIDGE FOUNDATIONS SHALL BE RELOCATED.

THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

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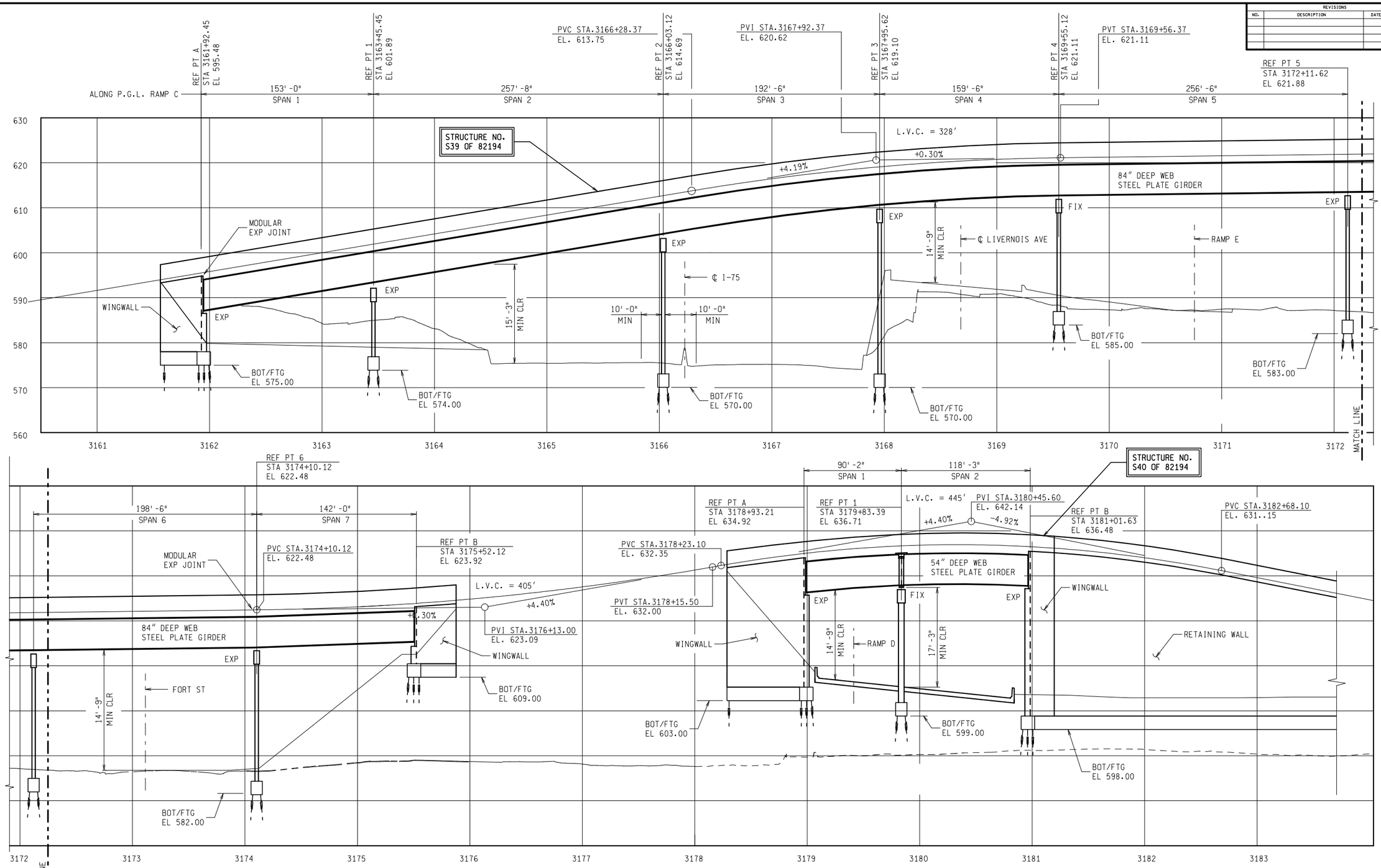
GENERAL PLAN OF SITE - EXISTING UTILITIES RAMP C OVER RAMP D, FORT ST., RAMP E, LIVERNOIS AVE. AND I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S39 OF 82194	802330		2 OF 4

FILE NAME: RampUtilities.dgn DRAWN BY: RMG DATE: 09/22/08 CHECKED BY: KMP DATE: 09/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



ELEVATION

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'

NOTES

1. MINIMUM VERTICAL CLEARANCE COMPUTED BY PARSONS ENGINEERS.
2. SEE SHEET 1 OF 4 FOR ADDITIONAL NOTES.

APPROVED _____
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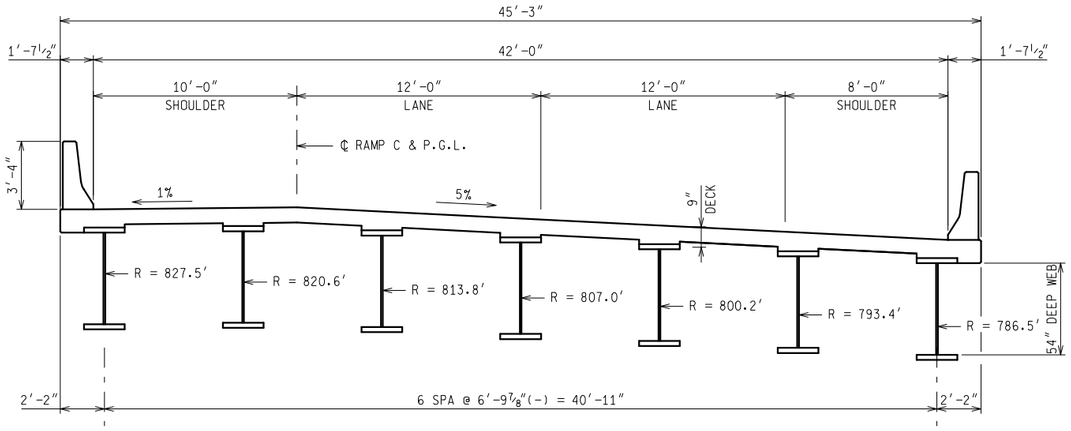
Michigan Department of Transportation

GENERAL PLAN OF SITE - PROFILE
RAMP C OVER RAMP D, FORT ST., RAMP E, LIVERNOIS AVE. AND I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S39 OF 82194	802330		3 OF 4

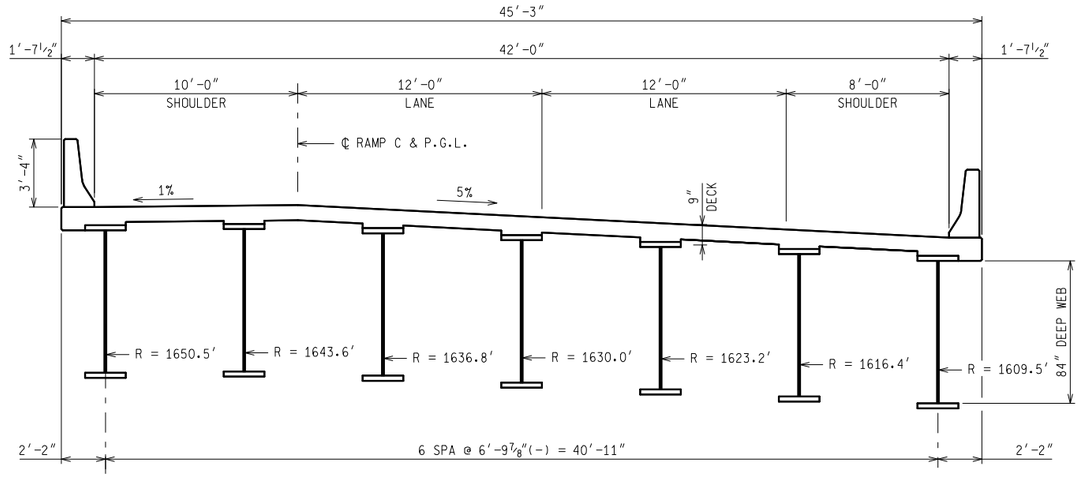
FILE NAME: RampC Prof.dgn DRAWN BY: RMG DATE: 09/22/08 CHECKED BY: KMP DATE: 09/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



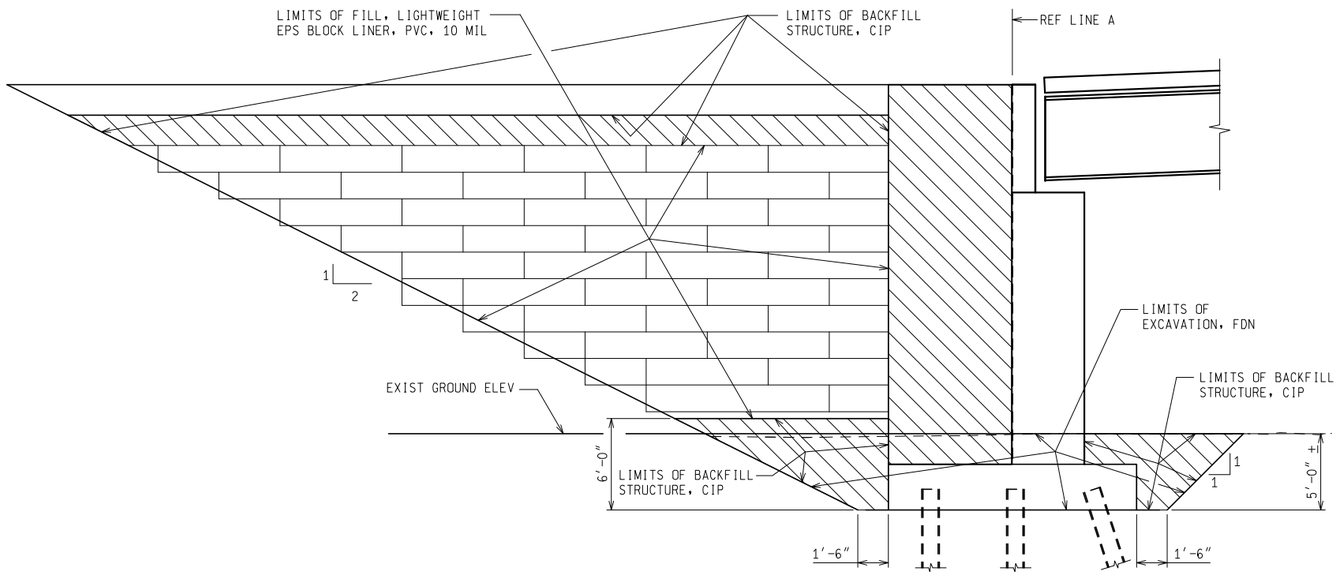
RAMP C – S40 OF 82194 – CROSS SECTION – STEEL WELDED PLATE GIRDER

(LOOKING UPSTATION)



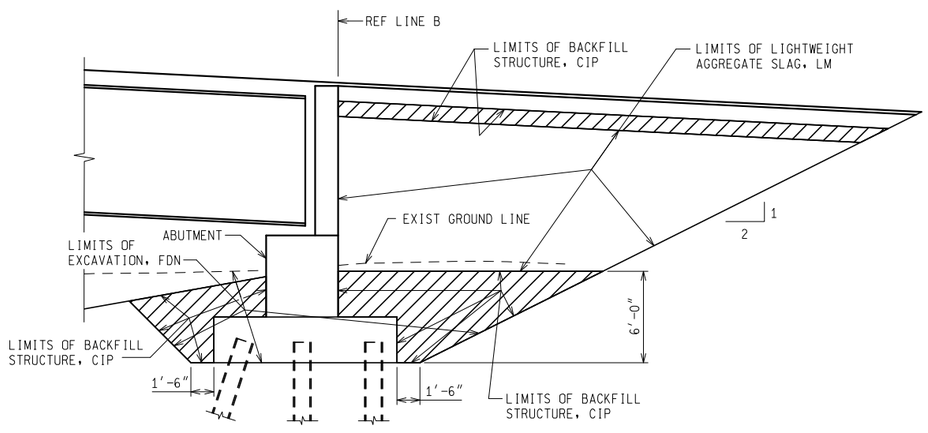
RAMP C – S39 OF 82194 – CROSS SECTION – STEEL WELDED PLATE GIRDER

(LOOKING UPSTATION)



SECTION THRU ABUTMENT A – S40 OF 82194

(SHOWING LIMITS OF EXCAVATION AND BACKFILL)
(ABUTMENT A SHOWN, ABUTMENT B SIMILAR)



SECTION THRU ABUTMENT B – S39 OD 82194

(SHOWING LIMITS OF EXCAVATION AND BACKFILL)
(ABUTMENT B SHOWN, ABUTMENT A SIMILAR)

APPROVED _____
CONSULTANT COORDINATING ENGINEER

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GENERAL PLAN OF SITE – CROSS SECTIONS RAMP C OVER RAMP D, FORT ST., RAMP E, LIVERNOIS AVE. AND I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S39& S40 OF 82194	802330		4 OF 4

DRAWN BY: RMG DATE: 08/22/08 CHECKED BY: KMP DATE: 08/22/08
FILE NAME: RampC-xs.dgn

WITNESSES

CONTROL PT# 785
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON THE SIDEWALK IN THE NORTHWEST QUADRANT OF CRAWFORD AND FISHER ST.

WITNESSES:
1. N75°E 7.00′ STOP SIGN
2. S60°W 4.00′ SIDEWALK INTERSECTION
3. S10°E 13.00′ LIGHT POLE
4. S20°E 15.00′ BACK OF CURB OF FISHER ST.

CONTROL PT# 758
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON FENCED-IN ASPHALT PARKING LOT EAST OF LIVERNOIS ST.

WITNESSES:
1. S70°W 80.00′ CL OF LIVERNOIS ST.
2. S20°E 9.00′ FENCE
3. N60°W 85.00′ FIRE HYDRANT
4. N90°W 60.00′ POWER POLE

CONTROL PT# 907
DESCRIPTION: SET MAG NAIL IN CENTER OF ARIAL TARGET IN THE CONVERGENCE OF THE EXIT RAMP OF I-75 AND FISHER, NORTH OF CRAWFORD.

WITNESSES:
1. S75°W 15.00′ FENCE POST
2. N20°W 2.50′ EDGE CONCRETE
3. S20°E 12.00′ CENTERLINE FISHER
4. S05°W 51.00′ POWER POLE

BENCHMARKS

BM 310
DESCRIPTION: CHISELED 'X' ON NW BOLT OF A LIGHT POST ON THE SOUTH SIDE OF FORT STREET ACROSS FROM BUILDING #6628 150′ WEST OF RADEMACHER STREET ELEVATION: 588.29

BM 311
DESCRIPTION: CHISELED 'X' ON NW BOLT OF A LIGHT POLE ON THE SOUTH SIDE OF FORT STREET ACRESS FROM BUILDING #6142 "FERGUSON FUNERAL HOME" 100 FEET EAST OF DRAGON STREET ELEVATION: 587.33

BM 312
DESCRIPTION: CHISELED 'X' ON THE NW BOLT OF LIGHT POLE ON THE SOUTH SIDE OF FORT STREET 30 FEET EAST OF THE VISITOR AND EMPLOYEE ENTRANCE TO "BRIDGE WATER INETRIORS" BUILDING #4617 ELEVATION: 585.33

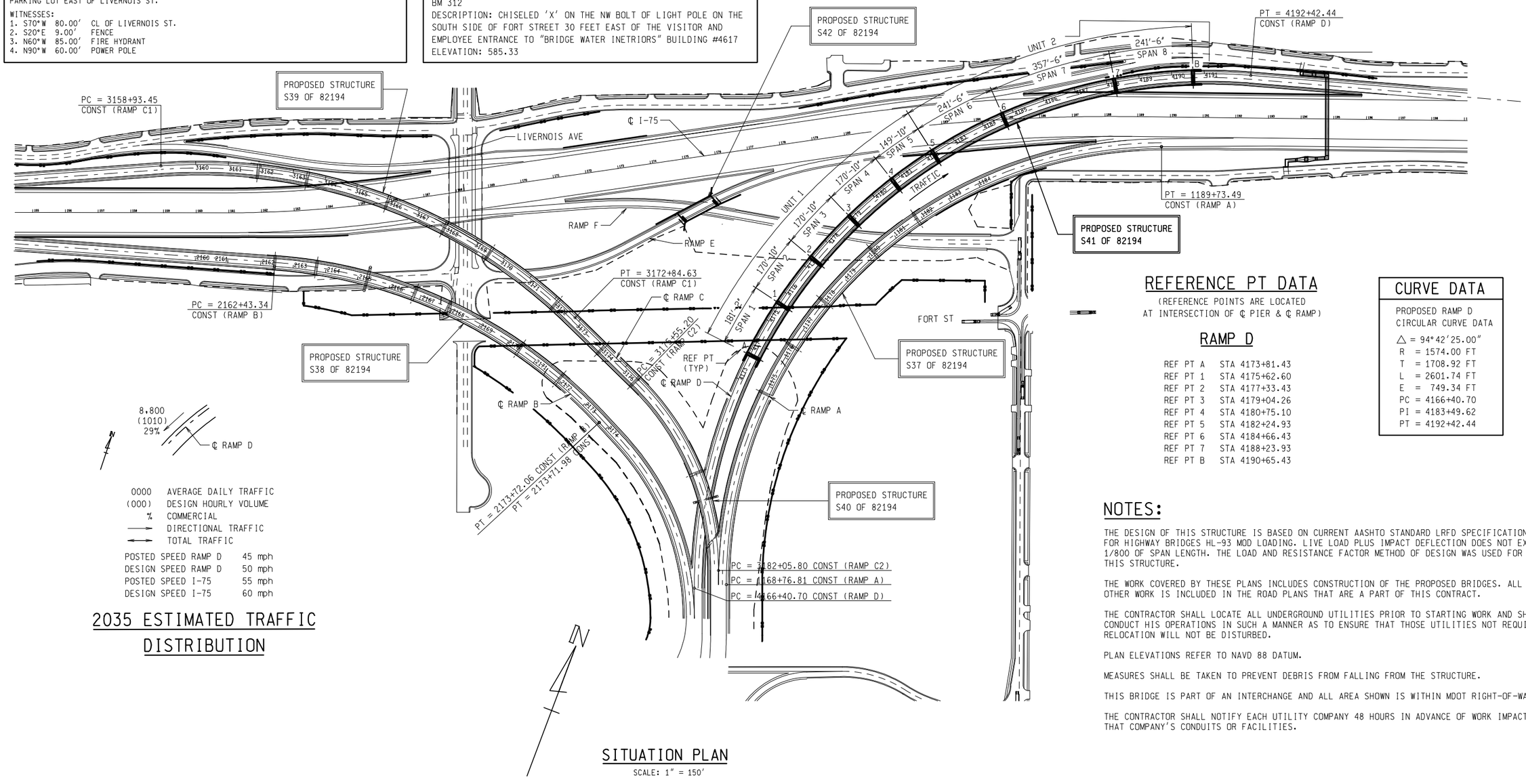
UTILITIES

SEE UTILITY PLAN, SHEET 2.

STATION EQUATIONS

STA 4184+40.05 (RAMP D) = STA 184+63.82 (I-75)
STA 4182+48.45 (RAMP D) = STA 5182+94.07 (RAMP E)
STA 4178+31.23 (RAMP D) = STA 6179+61.39 (RAMP F)
STA 4169+56.70 (RAMP D) = STA 3179+41.31 (RAMP C)

REVISIONS			
NO.	DESCRIPTION	DATE	BY



SITUATION PLAN

SCALE: 1" = 150′

0000 AVERAGE DAILY TRAFFIC
(000) DESIGN HOURLY VOLUME
% COMMERCIAL
DIRECTIONAL TRAFFIC
TOTAL TRAFFIC

POSTED SPEED RAMP D	45 mph
DESIGN SPEED RAMP D	50 mph
POSTED SPEED I-75	55 mph
DESIGN SPEED I-75	60 mph

2035 ESTIMATED TRAFFIC DISTRIBUTION

REFERENCE PT DATA

(REFERENCE POINTS ARE LOCATED AT INTERSECTION OF ℄ PIER & ℄ RAMP)

RAMP D

REF PT A	STA 4173+81.43
REF PT 1	STA 4175+62.60
REF PT 2	STA 4177+33.43
REF PT 3	STA 4179+04.26
REF PT 4	STA 4180+75.10
REF PT 5	STA 4182+24.93
REF PT 6	STA 4184+66.43
REF PT 7	STA 4188+23.93
REF PT B	STA 4190+65.43

CURVE DATA

PROPOSED RAMP D
CIRCULAR CURVE DATA

△ = 94°42′25.00″
R = 1574.00 FT
T = 1708.92 FT
L = 2601.74 FT
E = 749.34 FT
PC = 4166+40.70
PI = 4183+49.62
PT = 4192+42.44

NOTES:

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES HL-93 MOD LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH. THE LOAD AND RESISTANCE FACTOR METHOD OF DESIGN WAS USED FOR THIS STRUCTURE.

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PLAN ELEVATIONS REFER TO NAVD 88 DATUM.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE.

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THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY 48 HOURS IN ADVANCE OF WORK IMPACTING THAT COMPANY'S CONDUITS OR FACILITIES.

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CONSULTANT COORDINATING ENGINEER

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GENERAL PLAN OF SITE
RAMP D OVER I-75, RAMP F AND FORT ST.

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S41 OF 82194	802330		1 OF 4

FILE NAME: RampABCD pos.dgn DRAWN BY: RMG DATE: 09/22/08 CHECKED BY: KMP DATE: 09/22/08

UTILITIES

MICHIGAN CONSOLIDATED GAS CO.
4", 6", 14" AND H.P. GAS MAINS

AMERITECH - SBC
16 MULTI-DUCT CONDUITS
10 - 4" PC

DEPARTMENT OF PUBLIC LIGHTING

MCI
COMCAST
OVERGROUND CABLE

DETROIT WATER AND SEWER DEPARTMENT
- MULTIPLE SIZE SANITARY SEWERS
- MULTIPLE SIZE WATER MAINS

DETROIT EDISON
UNDERGROUND CABLES
UNDERGROUND DUCTS

REVISIONS			
NO.	DESCRIPTION	DATE	BY

PROPOSED STRUCTURE S39 OF 82194

PROPOSED STRUCTURE S42 OF 82194

PROPOSED STRUCTURE S41 OF 82194

HAZARDOUS OR FLAMABLE MATERIAL

PROPOSED STRUCTURE S38 OF 82194

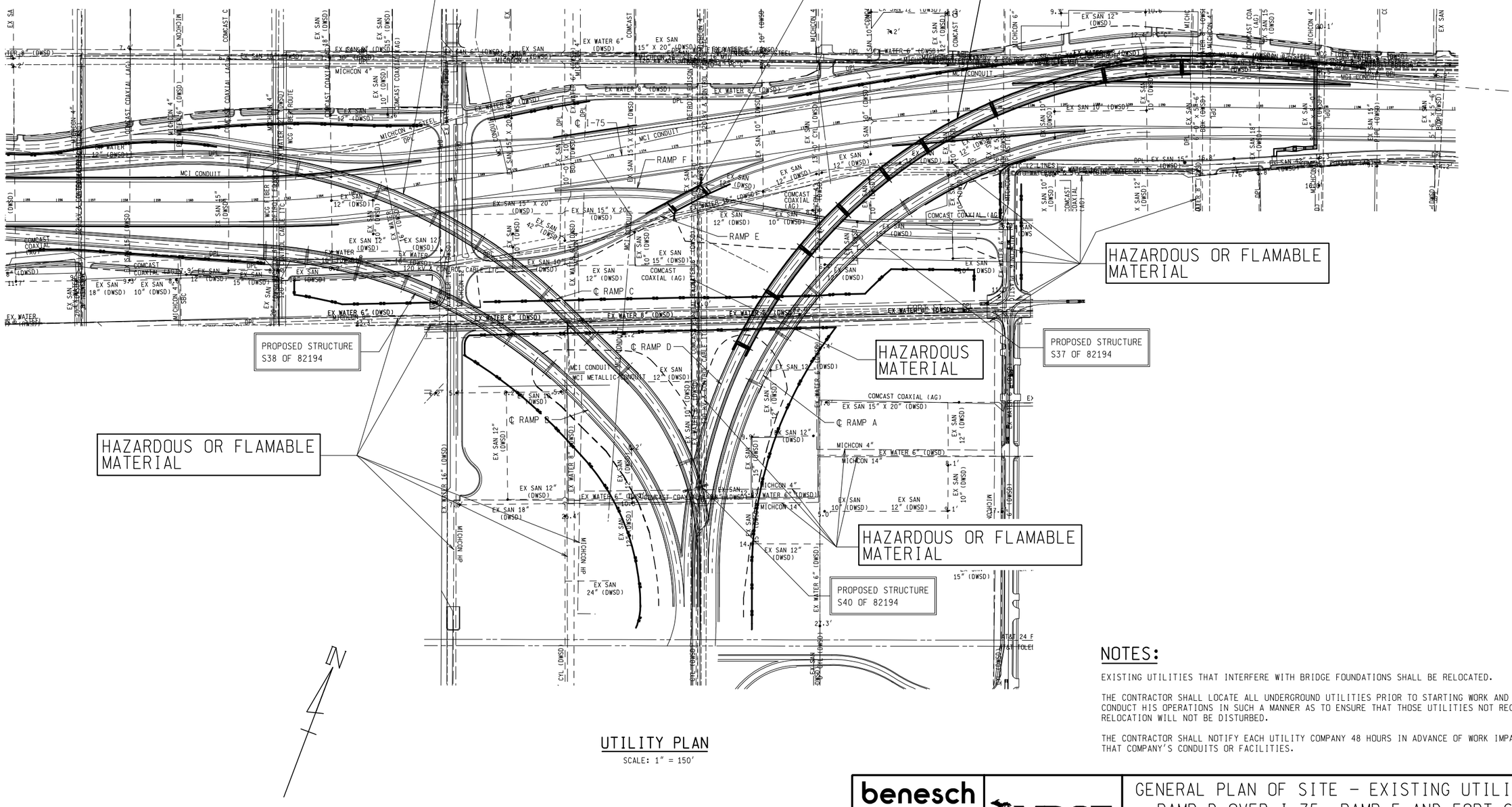
HAZARDOUS OR FLAMABLE MATERIAL

HAZARDOUS MATERIAL

PROPOSED STRUCTURE S37 OF 82194

HAZARDOUS OR FLAMABLE MATERIAL

PROPOSED STRUCTURE S40 OF 82194



UTILITY PLAN

SCALE: 1" = 150'

NOTES:

EXISTING UTILITIES THAT INTERFERE WITH BRIDGE FOUNDATIONS SHALL BE RELOCATED.

THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY 48 HOURS IN ADVANCE OF WORK IMPACTING THAT COMPANY'S CONDUITS OR FACILITIES.

APPROVED_____
CONSULTANT COORDINATING ENGINEER

benesch
alfred benesch & company
Engineers • Surveyors • Planners
222 N. Washington Square, Suite 200
Lansing, Michigan 48933

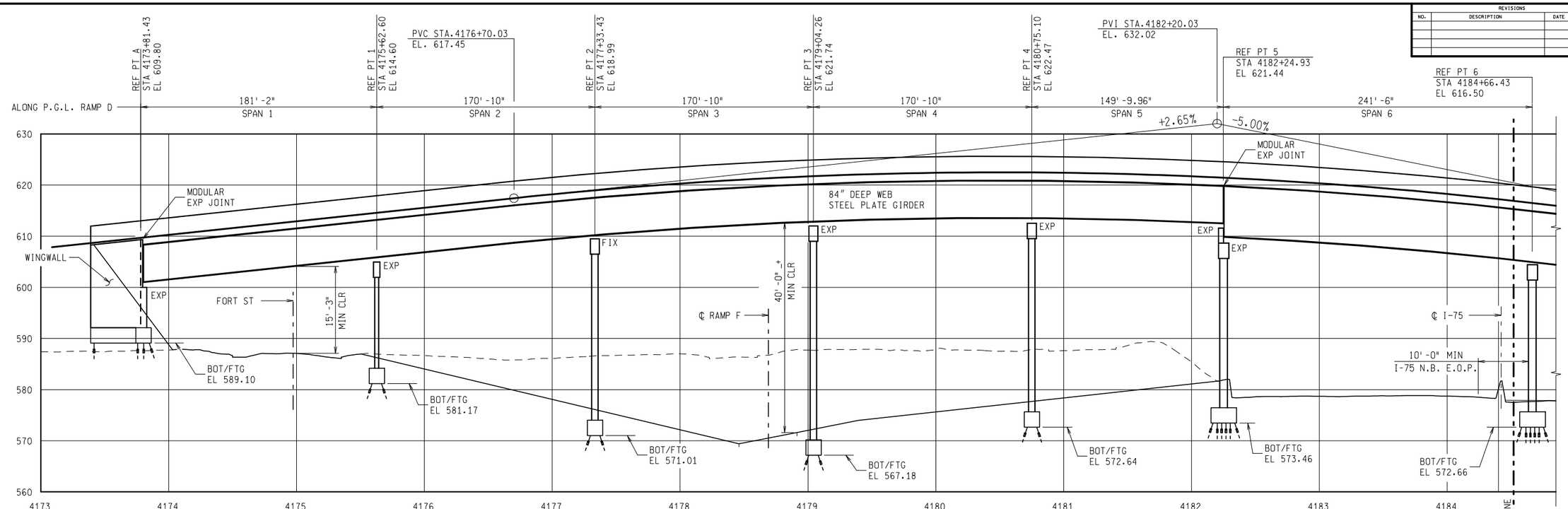
MDOT
Michigan Department of Transportation

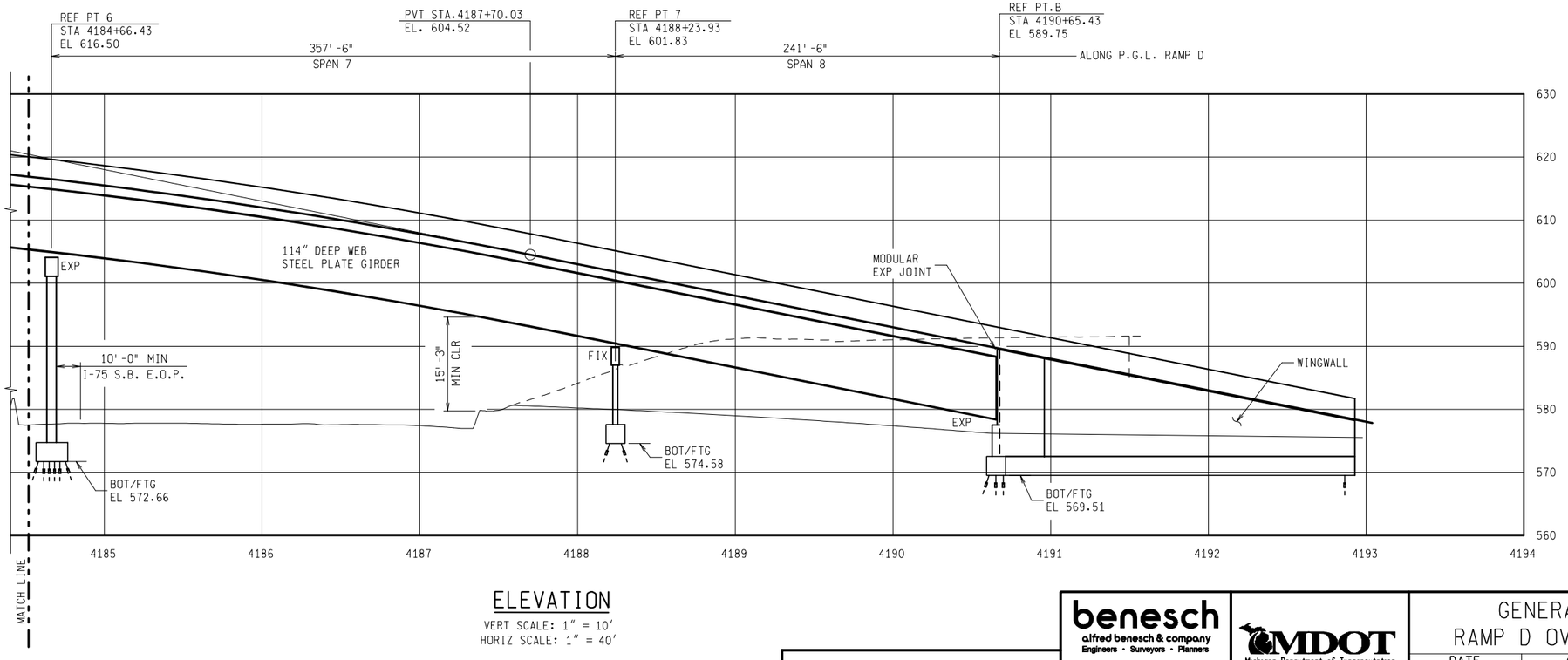
GENERAL PLAN OF SITE - EXISTING UTILITIES RAMP D OVER I-75, RAMP F AND FORT ST.

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S41 OF 82194	802330		2 OF 4

FILE NAME: RampUtilities.dgn DRAWN BY: RMG DATE: 09/22/08 CHECKED BY: KMP DATE: 09/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY





ELEVATION

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'

APPROVED _____
CONSULTANT COORDINATING ENGINEER

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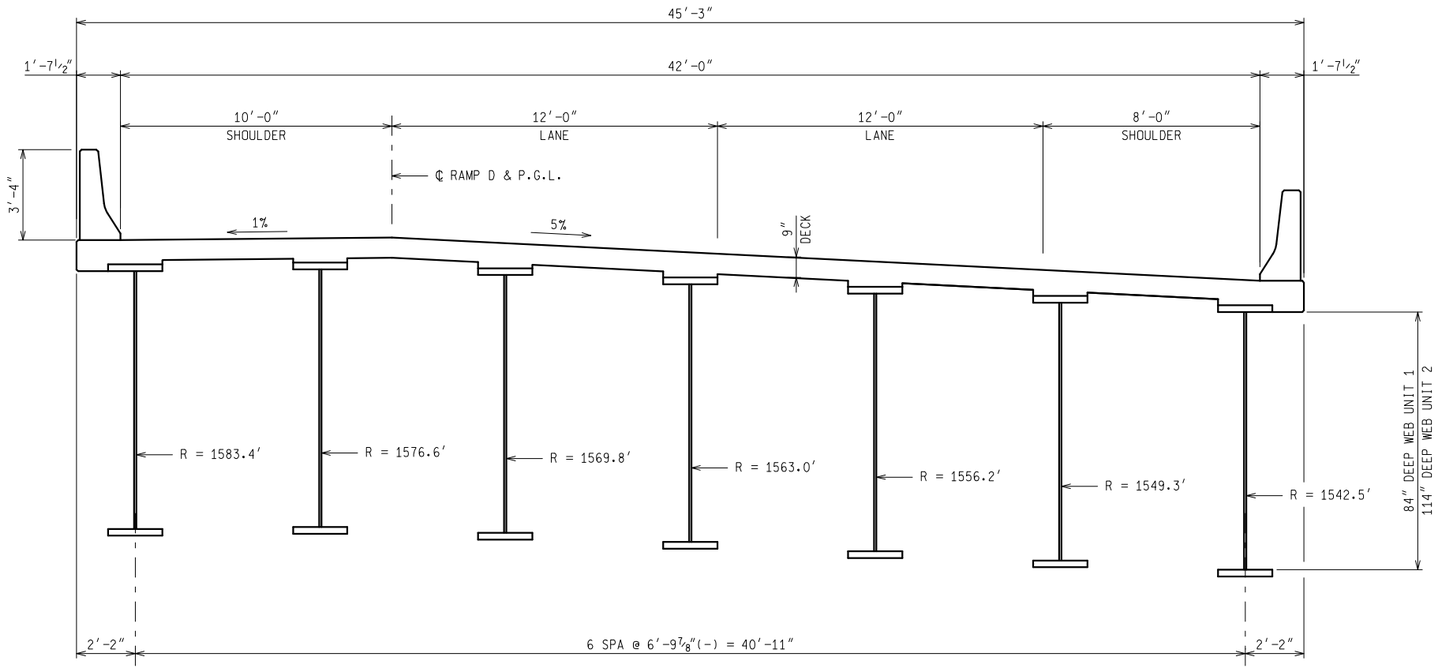
GENERAL PLAN OF SITE - PROFILE
RAMP D OVER I-75, RAMP F AND FORT ST.

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S41 OF 82194	802330		3 OF 4

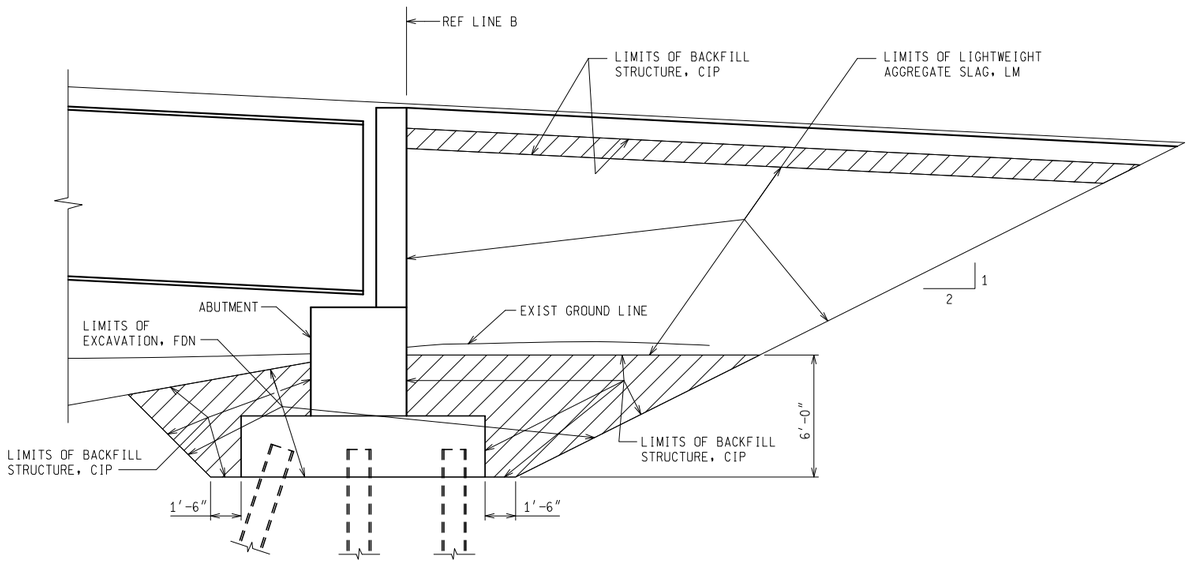
FILE NAME: RampD Prof.dgn DRAWN BY: RMG DATE: 09/22/08 CHECKED BY: KMP DATE: 09/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



RAMP D – CROSS SECTION – STEEL WELDED PLATE GIRDER ALTERNATIVE

(LOOKING UPSTATION)



SECTION THRU ABUTMENT B

(SHOWING LIMITS OF EXCAVATION AND BACKFILL)
(ABUTMENT B SHOWN, ABUTMENT A SIMILAR)

APPROVED_____
CONSULTANT COORDINATING ENGINEER

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Michigan Department of Transportation

GENERAL PLAN OF SITE – CROSS SECTION
RAMP D OVER I-75, RAMP F AND FORT ST.

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S41 OF 82194	802330		4 OF 4

FILE NAME: RampD-xs.dgn DRAWN BY: RMG DATE: 08/22/08 CHECKED BY: KMP DATE: 08/22/08

WITNESSES

CONTROL PT# 758
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON FENCED-IN ASPHALT PARKING LOT EAST OF LIVERNOIS ST.

WITNESSES:

1. S70°W	80.00′	CL OF LIVERNOIS ST.
2. S20°E	9.00′	FENCE
3. N60°W	85.00′	FIRE HYDRANT
4. N90°W	60.00′	POWER POLE

CONTROL PT# 784
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON THE SIDEWALK IN THE NORTHWEST QUADRANT OF DRAGON AND FISHER ST.

WITNESSES:

1. N40°E	8.00′	SIDEWALK INTERSECTION
2. S40°E	8.00′	LIGHT POLE
3. N10°W	54.00′	TREE
4. S45°W	15.00′	HIGHWAY SIGN

BENCHMARKS

BM 310
DESCRIPTION: CHISELED 'X' ON NW BOLT OF LIGHT POST ON THE SOUTH SIDE OF FORT STREET ACROSS FROM BUILDING #6628 150′ WEST OF RADEMACHER STREET.
ELEVATION: 588.29

BM 311
DESCRIPTION: CHISELED 'X' ON NW BOLT OF LIGHT POST ON THE SOUTH SIDE OF FORT STREET ACROSS FROM BUILDING #6142 "FERGUSON FUNERAL HOME" 100′ EAST OF DRAGON STREET.
ELEVATION: 587.33

EXISTING STRUCTURE

NONE

UTILITIES

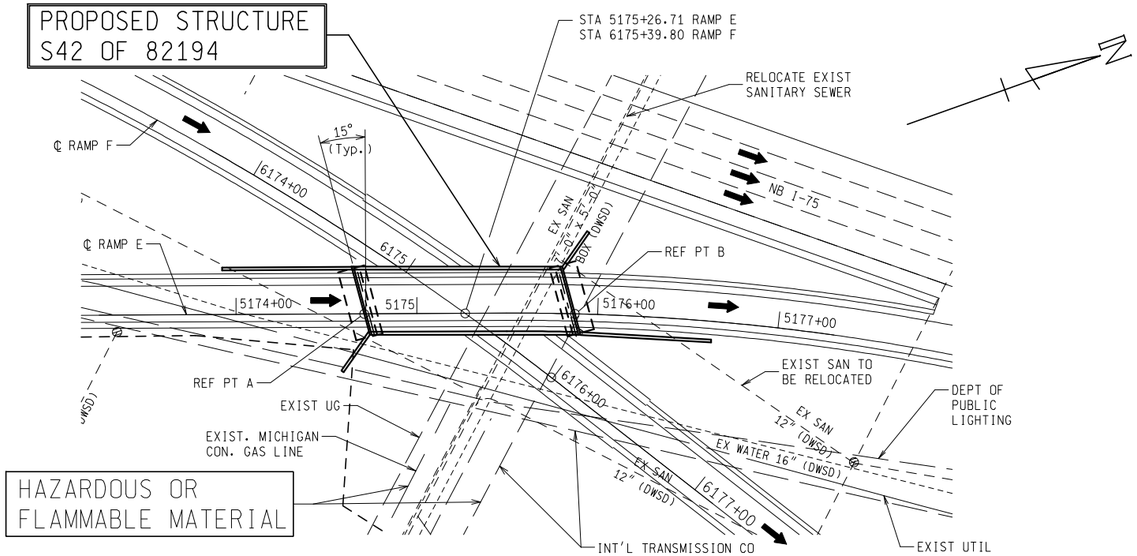
MICHCON GAS MAIN

INTERNATIONAL TRANSMISSION OVERHEAD

DETROIT WATER AND SANITARY DEPARTMENT
16″Ø WATER MAIN
12″Ø SANITARY SEWER

REVISIONS			
NO.	DESCRIPTION	DATE	BY

PROPOSED STRUCTURE
S42 OF 82194



SITUATION PLAN

SCALE: 1″ = 40′

CURVE DATA

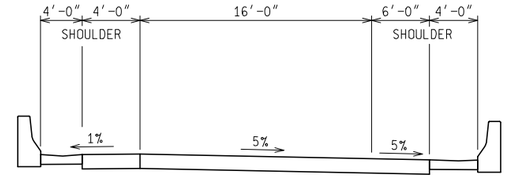
PROPOSED RAMP E
CIRCULAR CURVE DATA

△	= 18°38′09″
R	= 1265.00 FT
T	= 207.56 FT
L	= 411.45 FT
E	= 16.91 FT
PC	= 5175+49.61
PI	= 5177+57.17
PT	= 5179+61.06
SUPER	= 5.0% RT

CURVE DATA

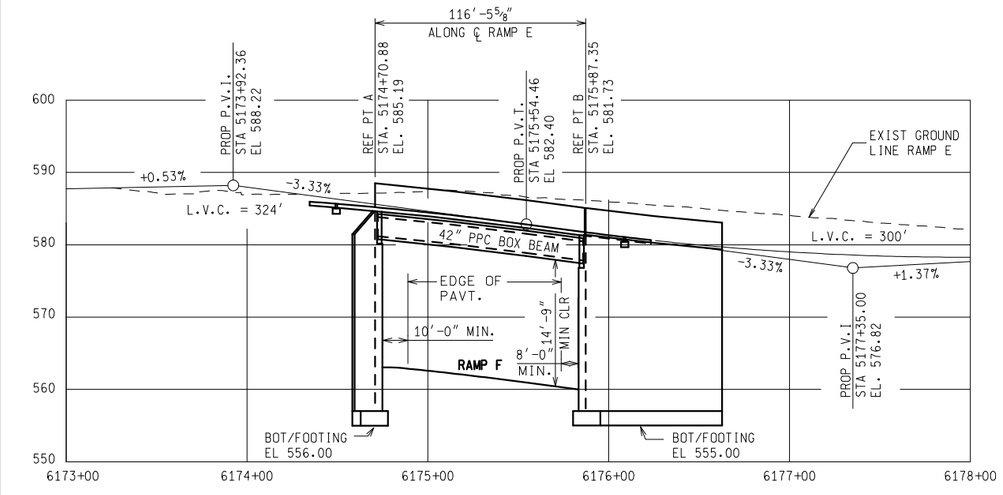
PROPOSED RAMP F
CIRCULAR CURVE DATA

△	= 14°37′07″
R	= 1640.00 FT
T	= 210.36 FT
L	= 418.43 FT
E	= 13.44 FT
PC	= 6171+89.57
PI	= 6173+99.93
PT	= 6176+08.01
SUPER	= 4.9% RT



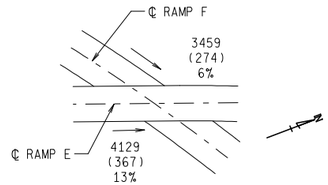
RAMP E SECTION

LOOKING UPSTATION



ELEVATION

VERT SCALE: 1″ = 10′
HORIZ SCALE: 1″ = 40′



2035 ESTIMATED TRAFFIC DISTRIBUTION

0000	AVERAGE DAILY TRAFFIC
(000)	DESIGN HOURLY VOLUME
%	COMMERCIAL
→	DIRECTIONAL TRAFFIC
↔	TOTAL TRAFFIC

POSTED SPEED RAMP E	45 mph
DESIGN SPEED RAMP E	50 mph
POSTED SPEED RAMP F	45 mph
DESIGN SPEED RAMP F	50 mph

NOTES

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES HL-93 MOD LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH. THE LOAD AND RESISTANCE FACTOR METHOD OF DESIGN WAS USED FOR THIS STRUCTURE.

THE WORK COVERED BY THESE PLANS INCLUDES CONSTRUCTION OF THE PROPOSED BRIDGE. ALL OTHER WORK IS INCLUDED IN THE ROAD PLANS THAT ARE A PART OF THIS CONTRACT.

THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

PLAN ELEVATIONS REFER TO NAVD 88 DATUM.

THIS BRIDGE IS PART OF AN INTERCHANGE AND ALL AREA SHOWN IS WITHIN MDOT RIGHT-OF-WAY.

THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY 48 HOURS IN ADVANCE OF WORK IMPACTING THAT COMPANY'S CONDUITS OR FACILITIES.

MINIMUM VERTICAL UNDERCLEARANCE COMPUTED BY PARSONS ENGINEERS.

APPROVED_____
CONSULTANT COORDINATING ENGINEER

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alfred benesch & company
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Lansing, Michigan 48933

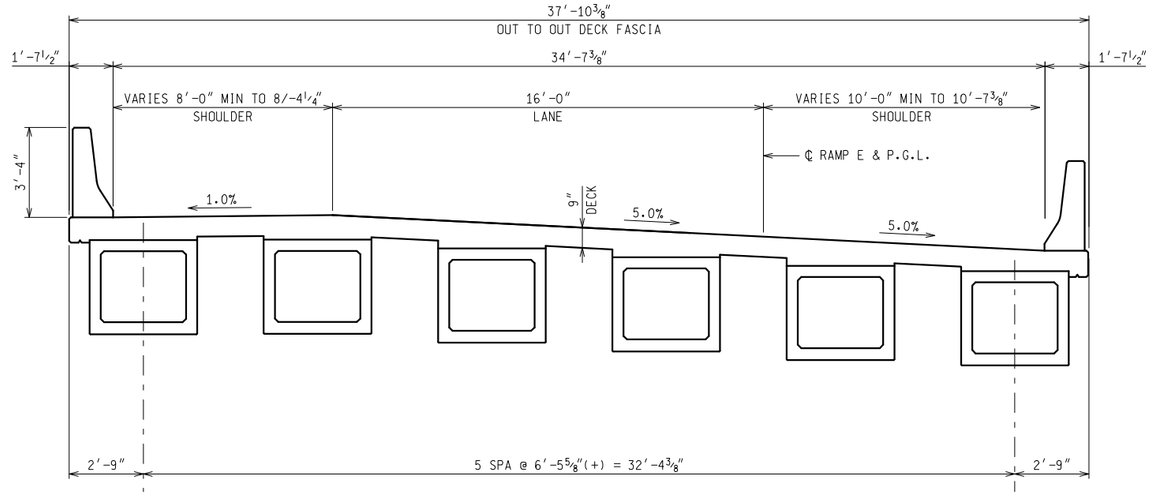
MDOT
Michigan Department of Transportation

GENERAL PLAN OF SITE
RAMP E OVER RAMP F

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S42 OF 82194	802330		1 OF 2

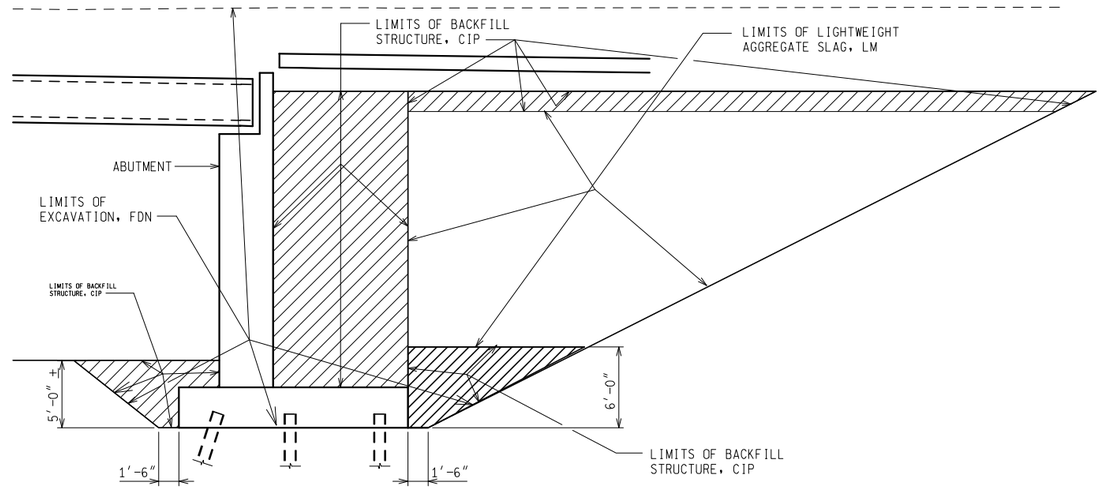
FILE NAME: RampEoverF pos.dgn DRAWN BY: RMG DATE: 10/03/08 CHECKED BY: KMP DATE: 11/07/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



CROSS SECTION
48″W x 42″H SPREAD PPC BOX BEAM

(LOOKING UPSTATION)



SECTION THRU ABUTMENT B

(SHOWING LIMITS OF EXCAVATION AND BACKFILL)
(ABUTMENT B SHOWN, ABUTMENT A SIMILAR)

APPROVED _____
CONSULTANT COORDINATING ENGINEER

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Suite 200
Lansing, Michigan 48933

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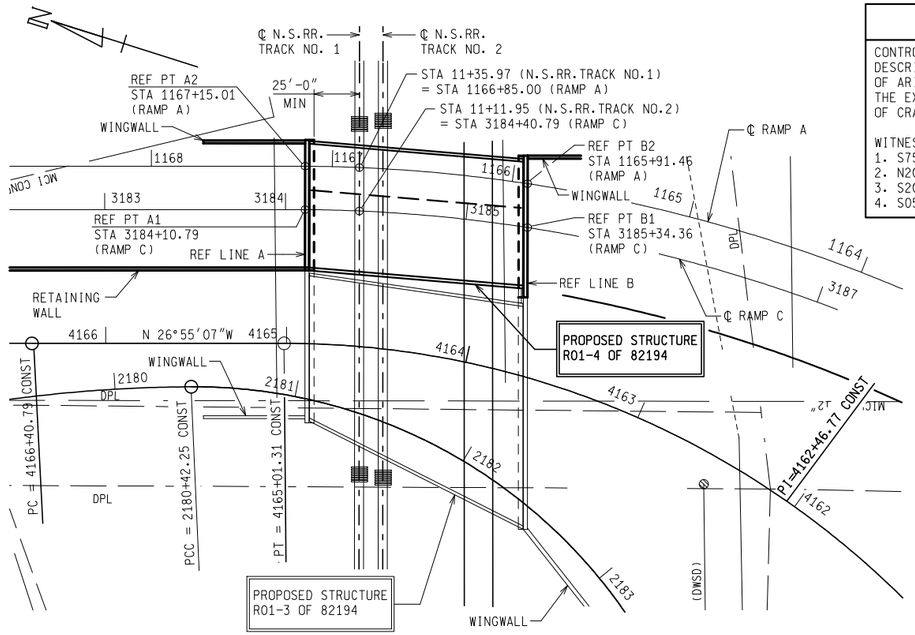
Michigan Department of Transportation

GENERAL PLAN OF SITE - CROSS SECTION
RAMP E OVER RAMP F

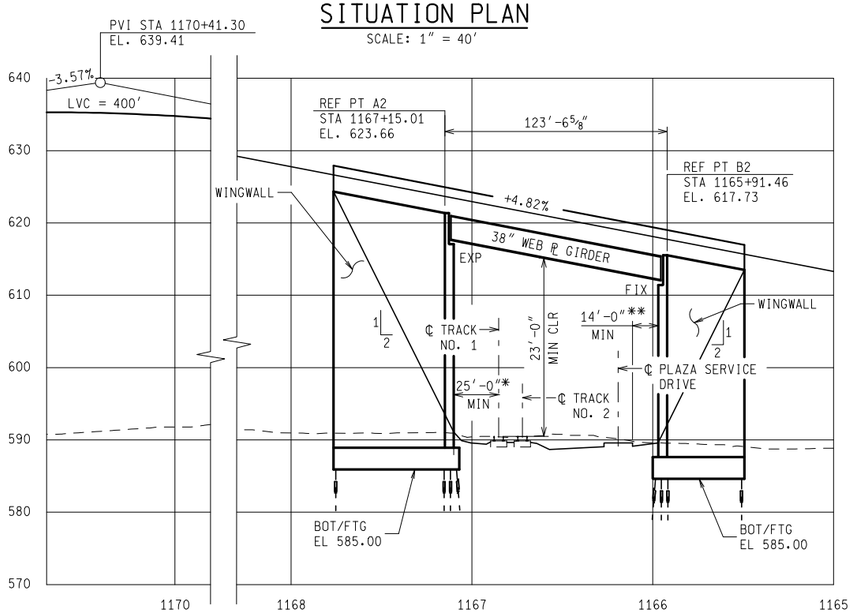
DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	S42 OF 82194	802330		2 OF 2

FILE NAME: RAMPEoverF-xs.dgn DRAWN BY: RMG DATE: 10/03/08 CHECKED BY: MRB DATE: 10/03/08



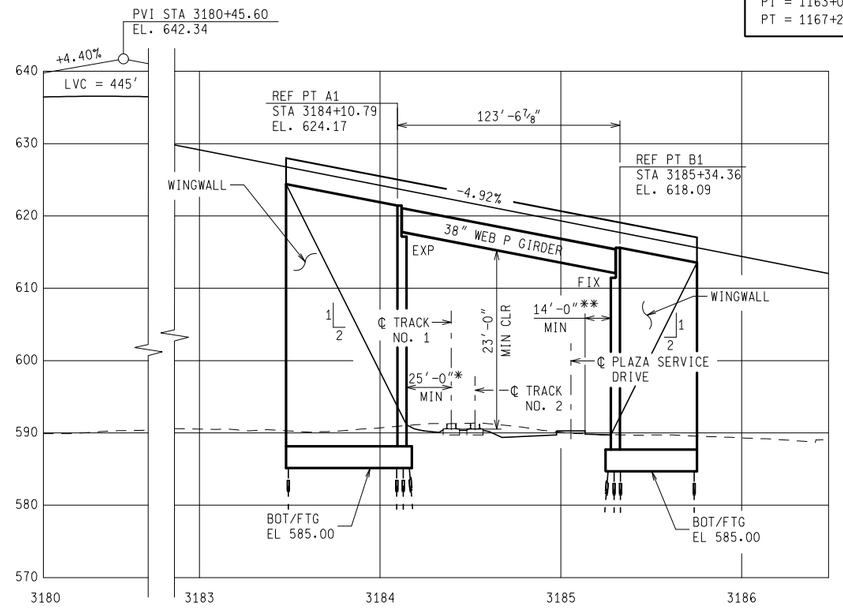
SITUATION PLAN

SCALE: 1″ = 40′



ELEVATION – RAMP A

VERT SCALE: 1″ = 10′
HORIZ SCALE: 1″ = 40′



ELEVATION – RAMP C

VERT SCALE: 1″ = 10′
HORIZ SCALE: 1″ = 40′

* DIMENSIONS AT RIGHT ANGLE TO TRACKS
** DIMENSIONS AT RIGHT ANGLE TO SERVICE DRIVE

WITNESSES

CONTROL PT# 907
DESCRIPTION: SET MAG NAIL IN CENTER OF ARIAL TARGET IN THE CONVERGENCE OF THE EXIT RAMP OF I-75 AND FISHER, NORTH OF CRAWFORD.

WITNESSES:
1. S75°W 15.00′ FENCE POST
2. N20°W 2.50′ EDGE CONCRETE
3. S20°E 12.00′ CENTERLINE FISHER
4. S05°W 51.00′ POWER POLE

CONTROL PT# 758
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON FENCED-IN ASPHALT PARKING LOT EAST OF LIVERNOIS ST.

WITNESSES:
1. S70°W 80.00′ ℄ OF LIVERNOIS ST.
2. S20°E 9.00′ FENCE
3. N60°W 85.00′ FIRE HYDRANT
4. N90°W 60.00′ POWER POLE

BENCHMARKS

BM 310
DESCRIPTION: CHISELED 'X' ON NW BOLT OF LIGHT POST ON THE SOUTH SIDE OF FORT STREET ACROSS FROM BUILDING #6628 150′ WEST OF RADEMACHER STREET.
ELEVATION: 588.29

BM 311
DESCRIPTION: CHISELED 'X' ON NW BOLT OF LIGHT POST ON THE SOUTH SIDE OF FORT STREET ACROSS FROM BUILDING #6142 "FERGUSON FUNERAL HOME" 100′ EAST OF DRAGON STREET.
ELEVATION: 587.33

REVISIONS			
NO.	DESCRIPTION	DATE	BY

UTILITIES

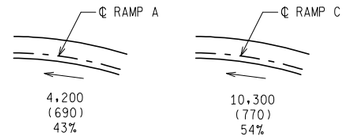
MICHCON 12″ DIA GAS MAIN

DETROIT PUBLIC LIGHTING
DPL LIGHTING CONDUITS

DETROIT WATER AND SANITARY
DISTRICT 15″ x 20″ SANITARY SEWER

PROPOSED CURVE DATA

PROPOSED RAMP A CIRCULAR CURVE DATA	PROPOSED RAMP C CIRCULAR CURVE DATA
△ = 62°02′22″	△ = 62°02′22″
R = 868.00 FT	R = 844.00 FT
T = 521.95 FT	T = 507.52 FT
L = 939.86 FT	L = 913.88 FT
E = 144.85 FT	E = 140.84 FT
PC = 1157+81.46	PC = 3184+04.49
PI = 1163+03.41	PI = 3189+12.01
PT = 1167+21.32	PT = 3193+18.37



2035 ESTIMATED TRAFFIC DISTRIBUTION

0000	AVERAGE DAILY TRAFFIC
(000)	DESIGN HOURLY VOLUME
%	COMMERCIAL
→	DIRECTIONAL TRAFFIC
↔	TOTAL TRAFFIC

POSTED SPEED RAMP A	45 mph
DESIGN SPEED RAMP A	50 mph
POSTED SPEED I-75	55 mph
DESIGN SPEED I-75	60 mph
POSTED SPEED RAMP C	45 mph
DESIGN SPEED RAMP C	50 mph
POSTED SPEED I-75	55 mph
DESIGN SPEED I-75	60 mph

NOTES

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES HL-93 MOD LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH. THE LOAD AND RESISTANCE FACTOR METHOD OF DESIGN WAS USED FOR THIS STRUCTURE.

THE WORK COVERED BY THESE PLANS INCLUDES CONSTRUCTION OF THE PROPOSED BRIDGE. ALL OTHER WORK IS INCLUDED IN THE ROAD PLANS THAT ARE A PART OF THIS CONTRACT.

THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

PLAN ELEVATIONS REFER TO NAVD 88 DATUM.

THE GROUND ADJACENT TO THE TRACKS AND THE STRUCTURE SHALL BE GRADED BY THE CONTRACTOR TO PROVIDE DRAINAGE.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE.

THIS BRIDGE IS PART OF AN INTERCHANGE AND ALL AREA SHOWN IS WITHIN MDOT RIGHT-OF-WAY.

THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY 48 HOURS IN ADVANCE OF WORK IMPACTING THAT COMPANY'S CONDUITS OR FACILITIES.

MINIMUM VERTICAL UNDERCLEARANCE COMPUTED BY PARSONS ENGINEERS.

APPROVED
CONSULTANT COORDINATING ENGINEER

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Lansing, Michigan 48933

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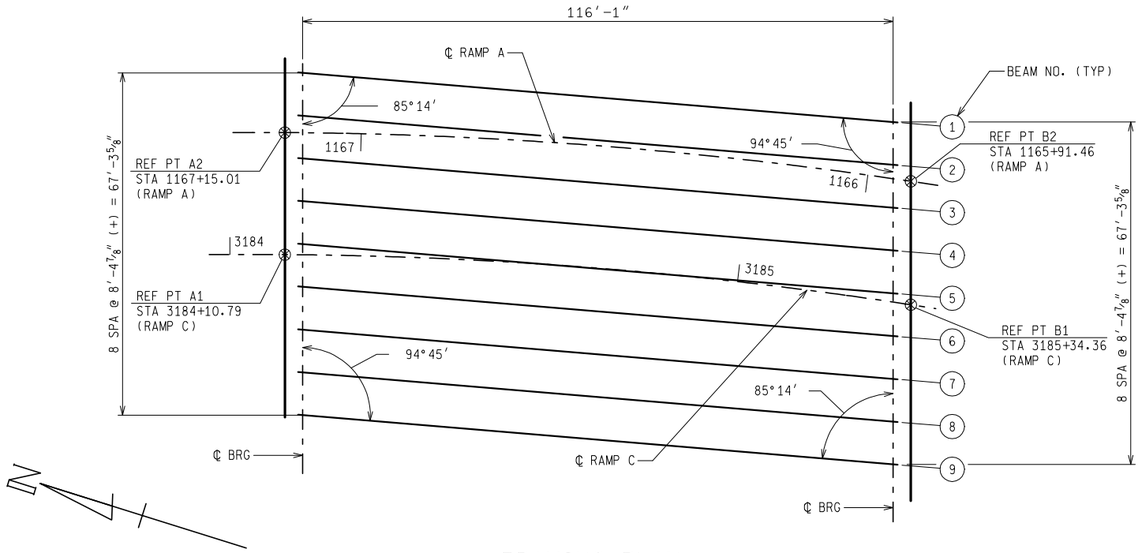
Michigan Department of Transportation

GENERAL PLAN OF SITE
RAMPS A AND C OVER NORFOLK SOUTHERN RR

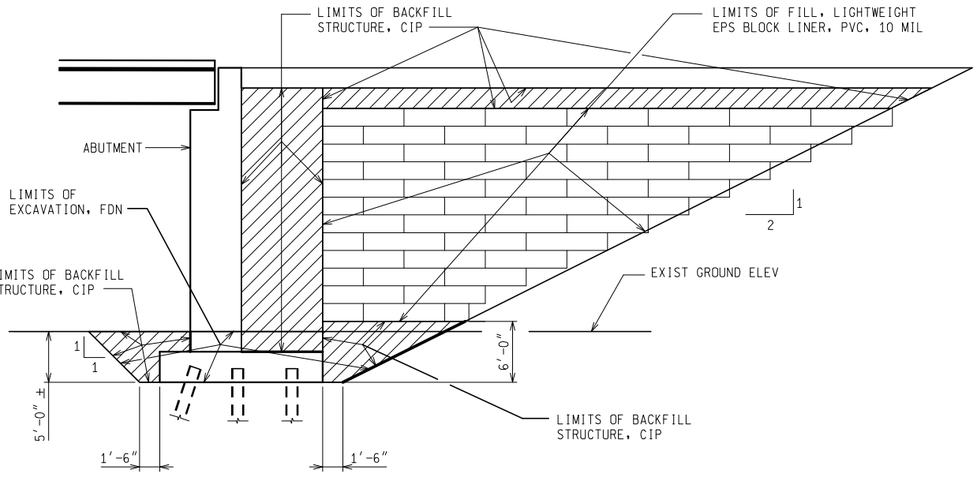
DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	R01-4 OF 82194	802330		1 OF 2

FILE NAME: RAMPAC NSRR pos.dgn DRAWN BY: RMG DATE: 10/09/08 CHECKED BY: KMP DATE: 10/31/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY

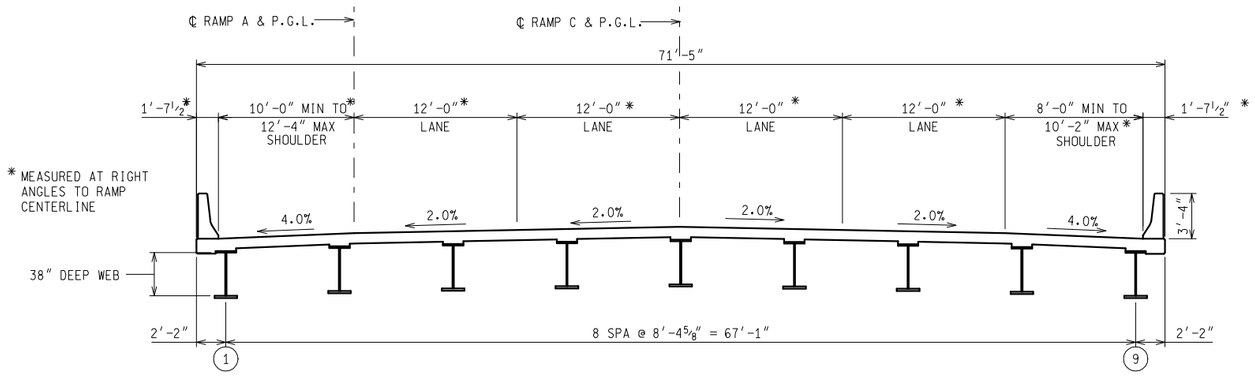


FRAMING PLAN



SECTION THRU ABUTMENT B

(SHOWING LIMITS OF EXCAVATION AND BACKFILL)
(ABUTMENT B SHOWN, ABUTMENT A SIMILAR)



CROSS SECTION

APPROVED_____
CONSULTANT COORDINATING ENGINEER

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Lansing, Michigan 48933

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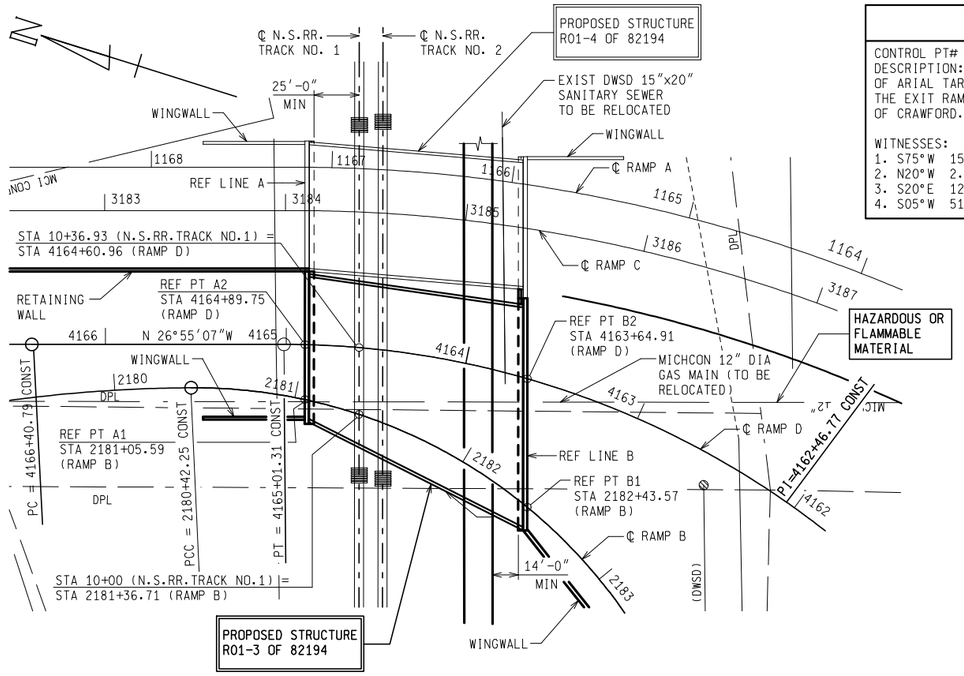
Michigan Department of Transportation

GENERAL PLAN OF SITE - CROSS SECTION
RAMPS A AND C OVER NORFOLK SOUTHERN RR

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	R01-4 OF 82194	802330		2 OF 2

FILE NAME: RampAC-xs.dgn DRAWN BY: RMB DATE: 08/23/08 CHECKED BY: KMP DATE: 10/31/08



SITUATION PLAN

SCALE: 1" = 40'

WITNESSES

CONTROL PT# 907
DESCRIPTION: SET MAG NAIL IN CENTER OF ARIAL TARGET IN THE CONVERGENCE OF THE EXIT RAMP OF I-75 AND FISHER, NORTH OF CRAWFORD.

WITNESSES:

1.	S75°W	15.00'	FENCE POST
2.	N20°W	2.50'	EDGE CONCRETE
3.	S20°E	12.00'	CENTERLINE FISHER
4.	S05°W	51.00'	POWER POLE

CONTROL PT# 758
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON FENCED-IN ASPHALT PARKING LOT EAST OF LIVERNOIS ST.

WITNESSES:

1.	S70°W	80.00'	℄ OF LIVERNOIS ST.
2.	S20°E	9.00'	FENCE
3.	N60°W	85.00'	FIRE HYDRANT
4.	N90°W	60.00'	POWER POLE

BENCHMARKS

BM 310
DESCRIPTION: CHISELED 'X' ON NW BOLT OF LIGHT POST ON THE SOUTH SIDE OF FORT STREET ACROSS FROM BUILDING #6628 150' WEST OF RADEMACHER STREET.
ELEVATION: 588.29

BM 311
DESCRIPTION: CHISELED 'X' ON NW BOLT OF LIGHT POST ON THE SOUTH SIDE OF FORT STREET ACROSS FROM BUILDING #6142 "FERGUSON FUNERAL HOME" 100' EAST OF DRAGON STREET.
ELEVATION: 587.33

PROPOSED CURVE DATA

PROPOSED RAMP B CIRCULAR CURVE DATA	PROPOSED RAMP D CIRCULAR CURVE DATA
△ = 71°01'14.21"	△ = 70°30'26.29"
R = 290.00 FT	R = 486.00 FT
T = 206.93 FT	T = 343.52 FT
L = 359.47 FT	L = 598.06 FT
E = 66.26 FT	E = 109.15 FT
PC = 2180+42.25	PC = 4159+03.25
PI = 2182+49.18	PI = 4162+46.76
PT = 2184+01.71	PT = 4165+01.31

REVISIONS

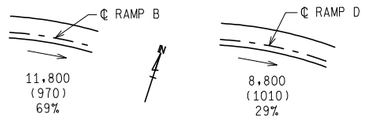
NO.	DESCRIPTION	DATE	BY

UTILITIES

MICHCON 12" DIA GAS MAIN

DETROIT PUBLIC LIGHTING
DPL LIGHTING CONDUITS

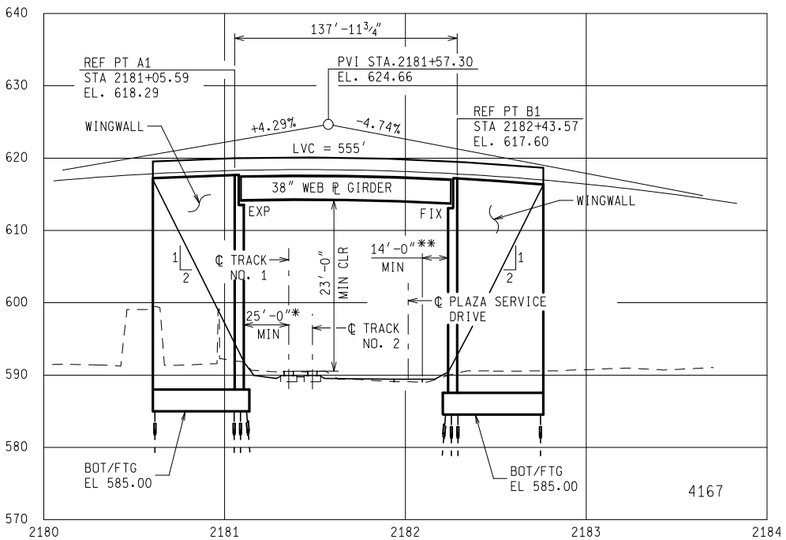
DETROIT WATER AND SANITARY DISTRICT 15" x 20" SANITARY SEWER



2035 ESTIMATED TRAFFIC DISTRIBUTION

0000	AVERAGE DAILY TRAFFIC
(000)	DESIGN HOURLY VOLUME
%	COMMERCIAL
→	DIRECTIONAL TRAFFIC
⟷	TOTAL TRAFFIC

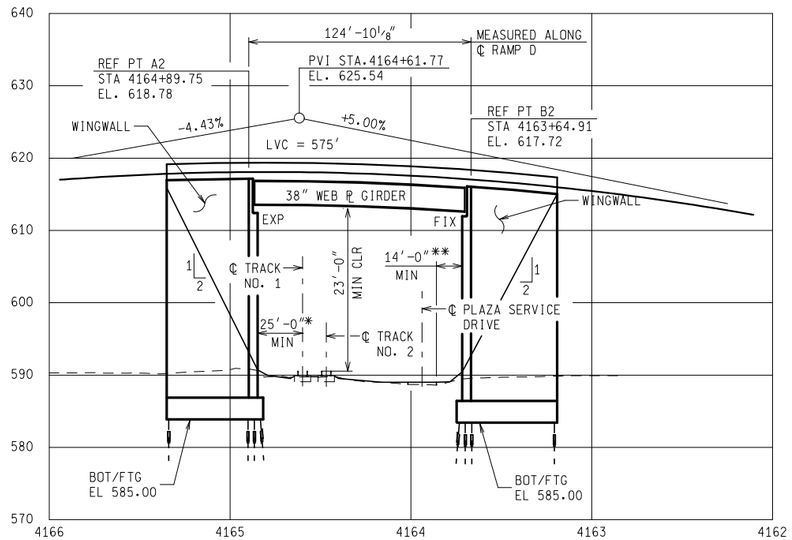
POSTED SPEED RAMP B	45 mph
DESIGN SPEED RAMP B	50 mph
POSTED SPEED I-75	55 mph
DESIGN SPEED I-75	60 mph
POSTED SPEED RAMP D	45 mph
DESIGN SPEED RAMP D	50 mph
POSTED SPEED I-75	55 mph
DESIGN SPEED I-75	60 mph



ELEVATION - RAMP B

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'

* DIMENSIONS AT RIGHT ANGLE TO TRACKS
** DIMENSIONS AT RIGHT ANGLE TO SERVICE DRIVE



ELEVATION - RAMP D

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'

NOTES

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES HL-93 MOD LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH. THE LOAD AND RESISTANCE FACTOR METHOD OF DESIGN WAS USED FOR THIS STRUCTURE.

THE WORK COVERED BY THESE PLANS INCLUDES CONSTRUCTION OF THE PROPOSED BRIDGE. ALL OTHER WORK IS INCLUDED IN THE ROAD PLANS THAT ARE A PART OF THIS CONTRACT.

THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

PLAN ELEVATIONS REFER TO NAVD 88 DATUM.

THE GROUND ADJACENT TO THE TRACKS AND THE STRUCTURE SHALL BE GRADED BY THE CONTRACTOR TO PROVIDE DRAINAGE.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE.

THIS BRIDGE IS PART OF AN INTERCHANGE AND ALL AREA SHOWN IS WITHIN MDOT RIGHT-OF-WAY.

THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY 48 HOURS IN ADVANCE OF WORK IMPACTING THAT COMPANY'S CONDUITS OR FACILITIES.

MINIMUM VERTICAL UNDERCLEARANCE COMPUTED BY PARSONS ENGINEERS.

APPROVED _____
CONSULTANT COORDINATING ENGINEER

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alfred benesch & company
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222 N. Washington Square, Suite 200
Lansing, Michigan 48933

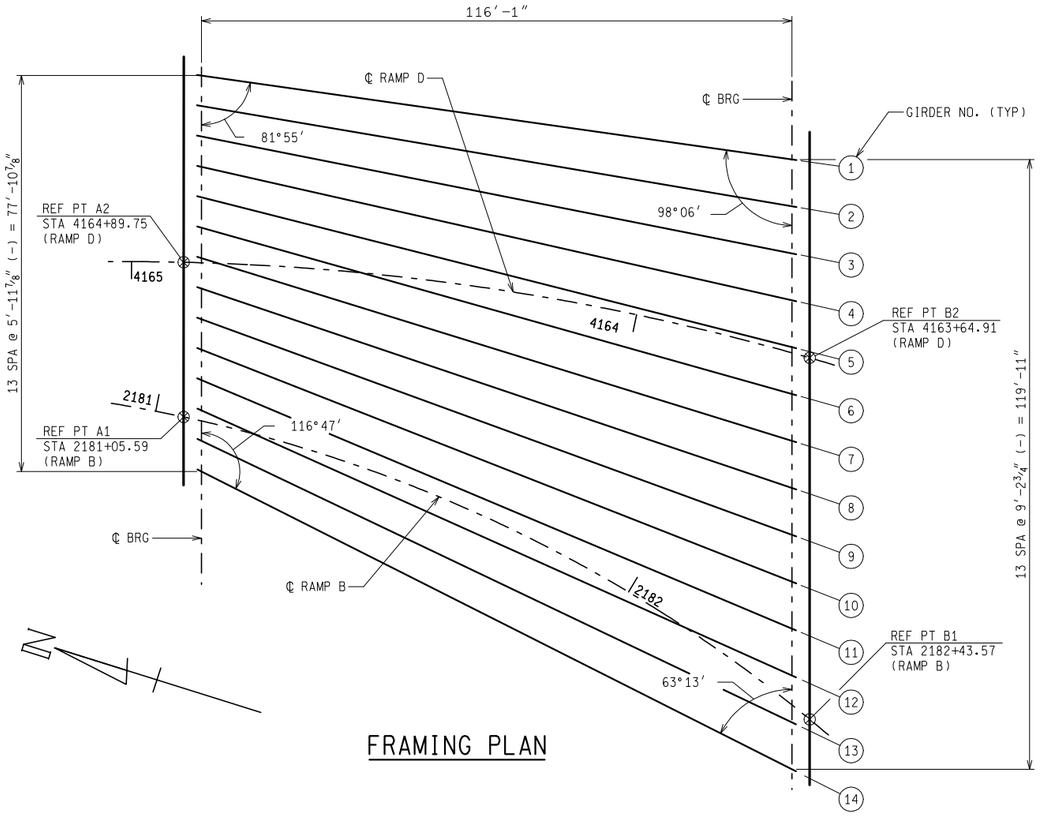
MDOT Michigan Department of Transportation

GENERAL PLAN OF SITE
RAMPS B AND D OVER NORFOLK SOUTHERN RR

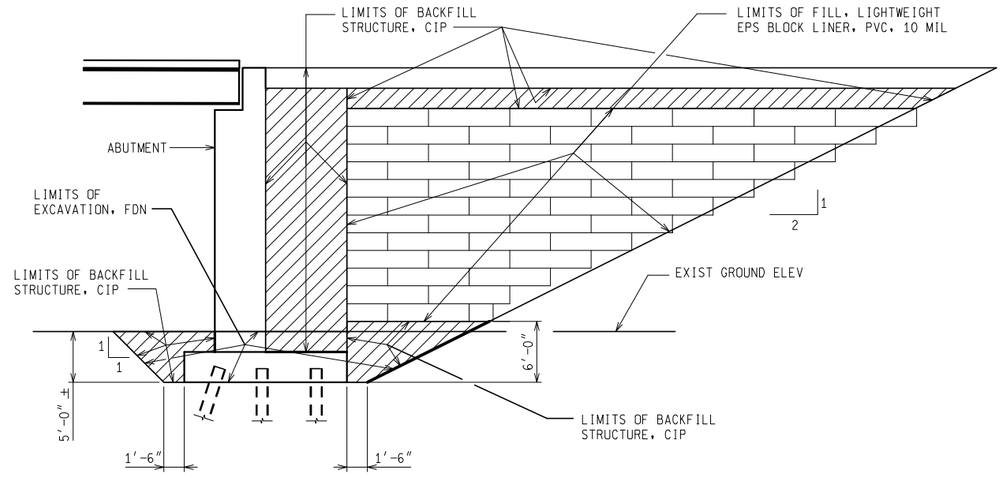
DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	R01-3 OF 82194	802330		1 OF 2

FILE NAME: RAMPBD NSRR pos.dgn DRAWN BY: RMG DATE: 10/09/08 CHECKED BY: KMP DATE: 10/31/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY

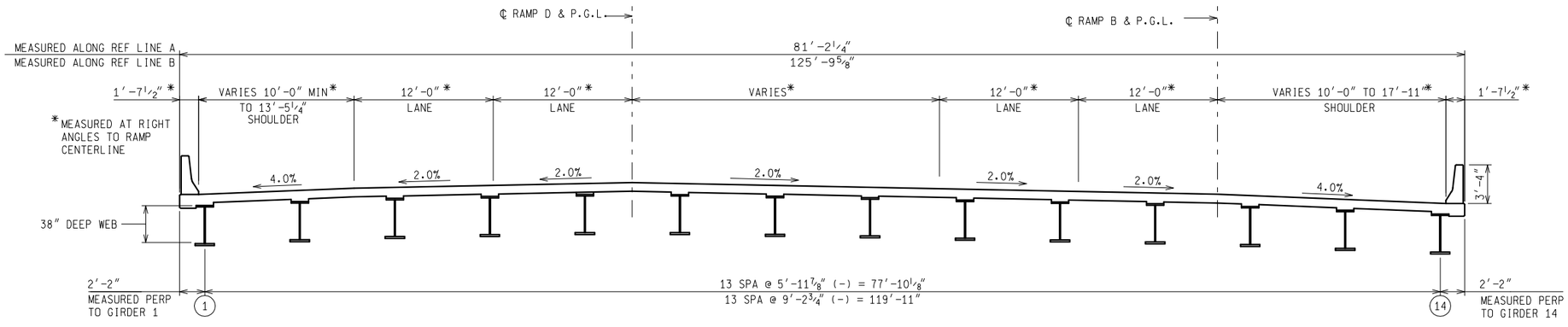


FRAMING PLAN



SECTION THRU ABUTMENT B

(SHOWING LIMITS OF EXCAVATION AND BACKFILL)
(ABUTMENT B SHOWN, ABUTMENT A SIMILAR)



CROSS SECTION

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CONSULTANT COORDINATING ENGINEER

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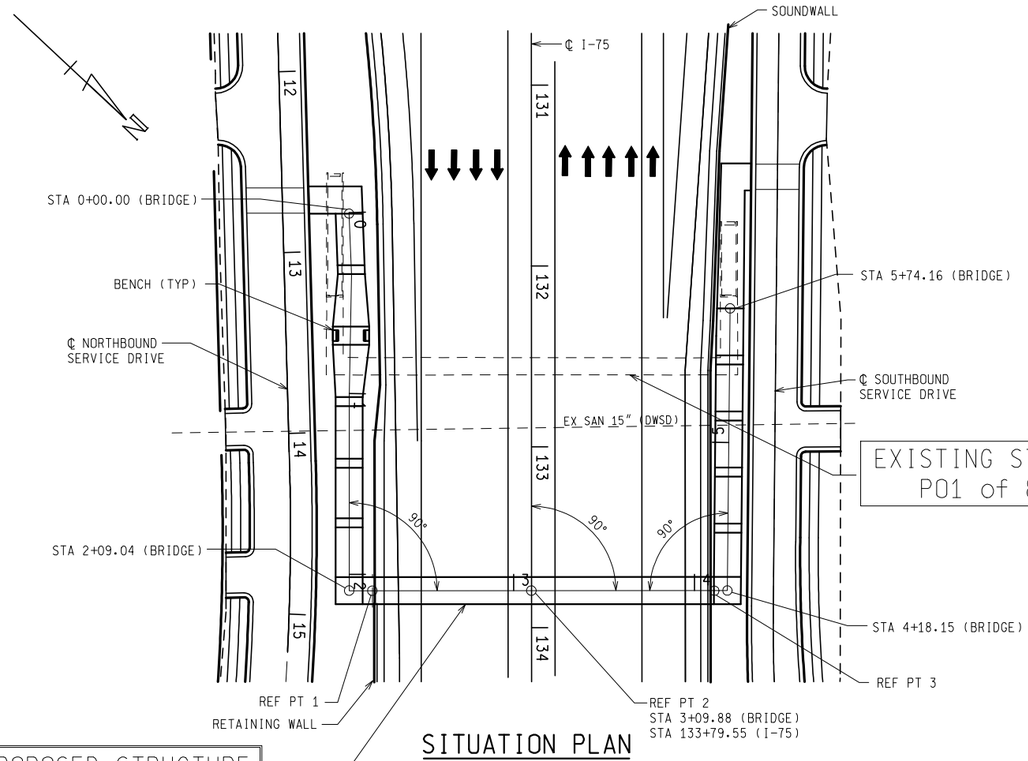
MDOT
Michigan Department of Transportation

GENERAL PLAN OF SITE - CROSS SECTION
RAMPS B AND D OVER NORFOLK SOUTHERN RR

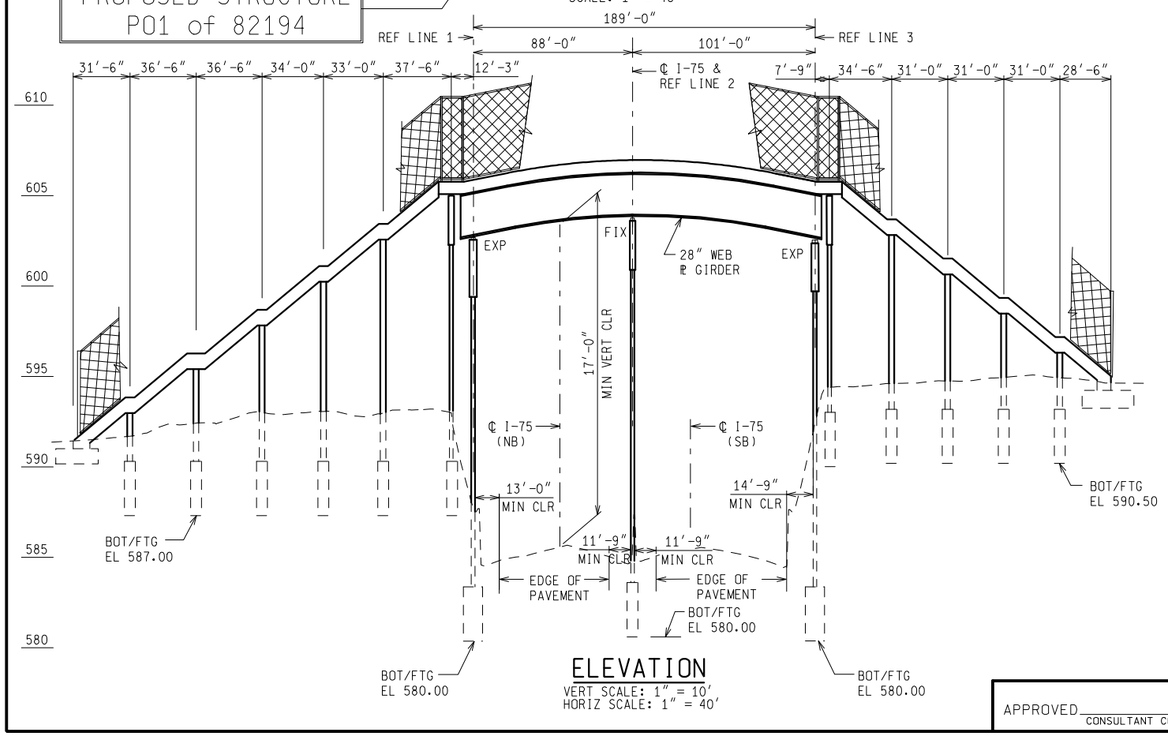
DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	R01-3 OF 82194	802330		2 OF 2

FILE NAME: RampBD-xs.dgn DRAWN BY: RMB DATE: 08/23/08 CHECKED BY: KMP DATE: 08/32/08



SITUATION PLAN

SCALE: 1" = 40'



ELEVATION

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'

APPROVED
CONSULTANT COORDINATING ENGINEER

BENCHMARKS

BM 308
DESCRIPTION: CHISELED 'X' ON NORTH BOLT OF METAL POWER POLE IN THE SW QUADRANT OF FORT STREET AND SPRINGWELLS AVENUE.
ELEVATION: 588.18

BM 309
DESCRIPTION: CHISELED 'X' ON SW BOLT OF AN ABANDONED SIGN POST ON A CONCRETE BASE IN THE NW QUADRANT OF FORT STREET AND GREEN STREET NORTH IN THE PARKING LOT OF "KING MOTZ BURGERS".
ELEVATION: 591.85

WITNESSES

CONTROL PT# 765
DESCRIPTION: SET MAG NAIL IN CENTER F AN AERIAL TARGET AT THE CL OF SOLVAY ST. AND SOUTH OF FISHER W ST.

WITNESSES:

1. N20°W	100.00'	CL OF FISHER W ST.
2. N45°E	24.00'	POWER POLE
3. N70°E	54.00'	NORTHWEST CORNER OF BUILDING
4. S15°W	45.00'	FENCE POST

CONTROL PT# 788
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON THE NORTH SHOULDER OF THE OFF-RAMP FROM I-75 S AT EXIT 45.

WITNESSES:

1. N60°W	15.00'	CONCRETE BASE OF LIGHT POLE
2. N60°E	15.00'	END OF CONCRETE BARRIER
3. N20°W	24.00'	FENCE
4. S20°E	2.00'	BACK OF CURB

EXISTING STRUCTURE

BUILT IN 1966, THE EXISTING STRUCTURE IS A TWO-SPAN PEDESTRIAN BRIDGE (90'-0", 90'-0") WITH A MULTI-SPAN RAMP AT EITHER END. THE MAIN BRIDGE CONSISTS OF THREE LINES OF WF33x130 ROLLED BEAMS ON CONCRETE PIERS AND SPREAD FOOTINGS. THE DECK THICKNESS IS 6" AND THE TOTAL WIDTH IS 9'-6" (8'-0" CLEAR). THE MINIMUM VERTICAL CLEARANCE IS 14'-6". RAMP A CONSISTS OF FIVE CONCRETE SLAB SPANS (41'-9", 19'-0", 19'-0", 19'-0", 19'-0"). RAMP B CONSISTS OF FOUR CONCRETE SLAB SPANS (68'-9" - 19'-0" - 19'-0" - 19'-0"). BOTH RAMPS HAVE A DECK THICKNESS OF 9" AND THE FIRST SPANS ARE ON FILL. THE EXISTING STRUCTURE IS ABOUT 110' SOUTH OF THE PROPOSED STRUCTURE.

UTILITIES

EX SAN 15" (DWSD)

TO BE CONFIRMED

NOTES

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES H-10 LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/500 OF SPAN LENGTH.

THE WORK COVERED BY THESE PLANS INCLUDES REMOVAL OF THE EXISTING PEDESTRIAN BRIDGE, CONSTRUCTION OF THE PROPOSED BRIDGE AND RAMPS, AND PLACING SLOPE PAVING TO THE LIMITS SHOWN. ALL OTHER WORK IS INCLUDED IN THE ROAD PLANS THAT ARE A PART OF THIS CONTRACT.

THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

PLAN ELEVATIONS REFER TO NAVD 88 DATUM.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE.

THIS BRIDGE IS WITHIN MDOT RIGHT-OF-WAY.

THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY 48 HOURS IN ADVANCE OF WORK IMPACTING THAT COMPANY'S CONDUITS OR FACILITIES.

THE VERTICAL MINIMUM CLEARANCE COMPUTATIONS WERE PREPARED BY PARSONS ENGINEERS.

REVISIONS

NO.	DESCRIPTION	DATE	BY

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alfred benesch & company
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Lansing, Michigan 48933

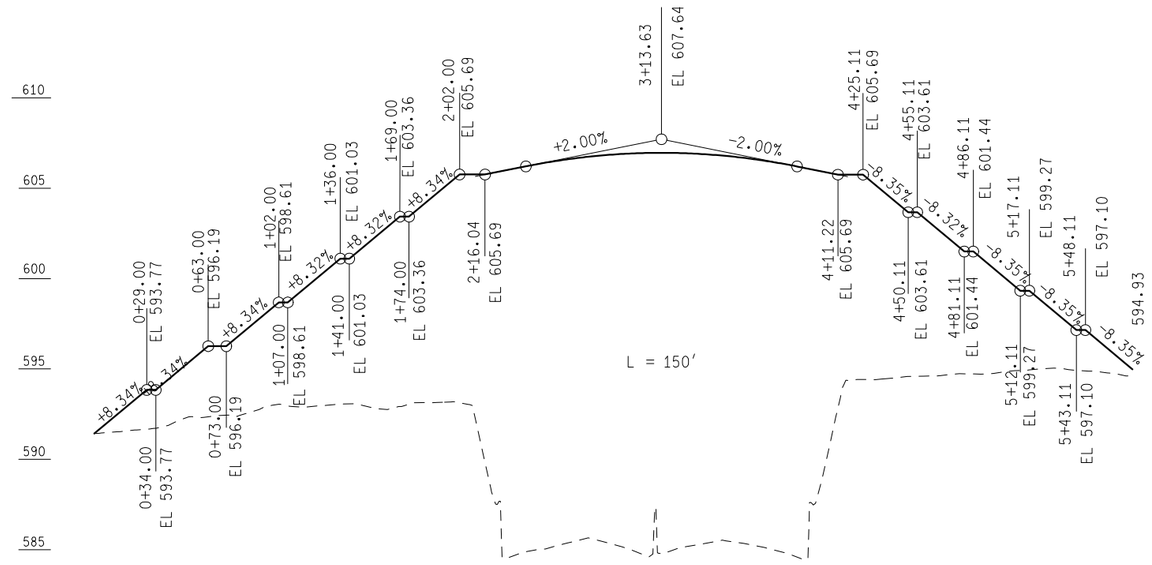
MDOT
Michigan Department of Transportation

GENERAL PLAN OF SITE
SOLVAY AVE PEDESTRIAN BRIDGE OVER I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	P01 OF 82194	802330		1 OF 2

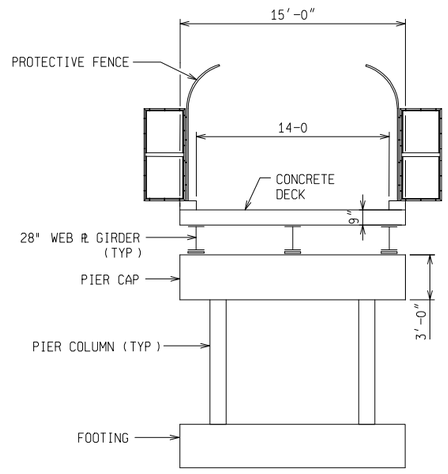
FILE NAME: solvay-pos.dgn DRAWN BY: VH DATE: 09/18/08 CHECKED BY: MRB DATE: 09/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



PROFILE

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'



TYPICAL PEDESTRIAN
BRIDGE SECTION AT SOLVAY AVE

APPROVED _____
CONSULTANT COORDINATING ENGINEER

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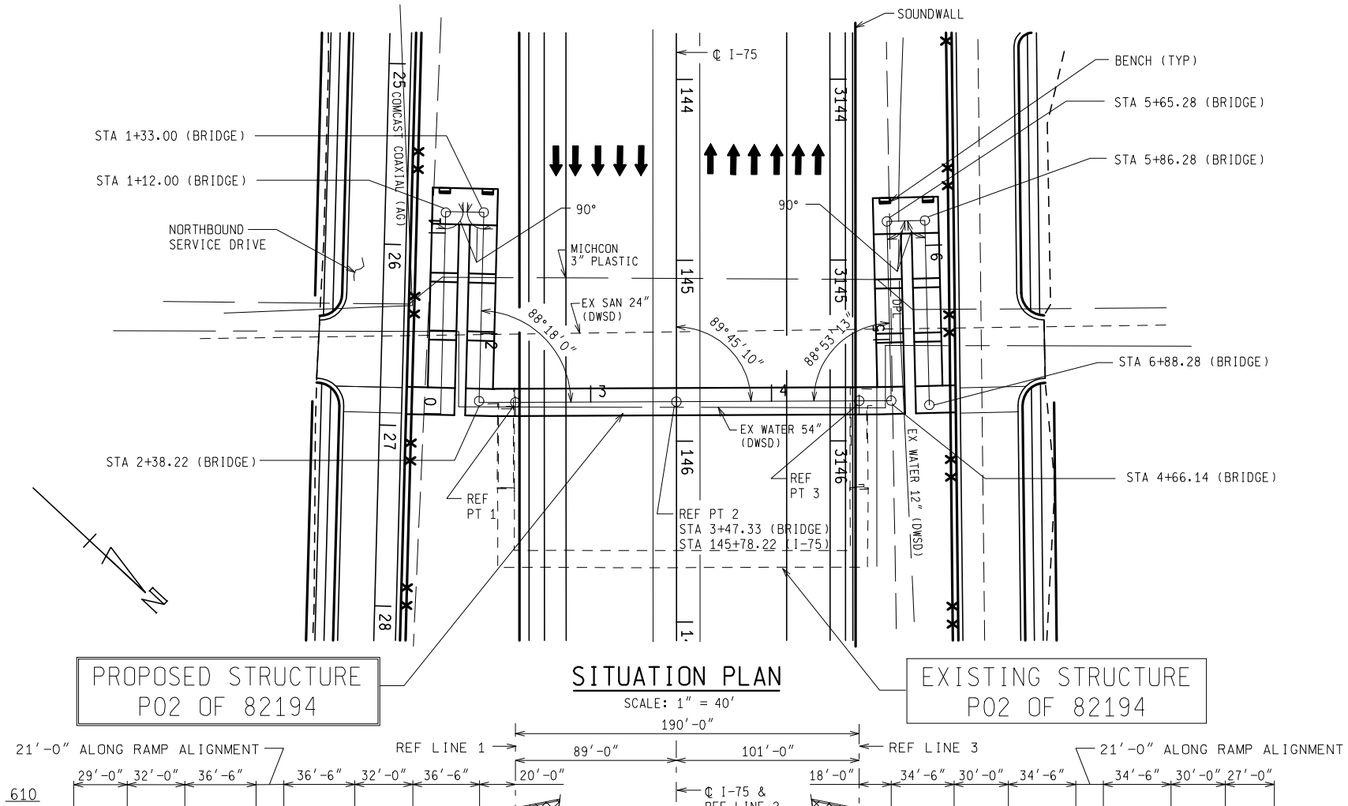
MDOT
Michigan Department of Transportation

GENERAL PLAN OF SITE
SOLVAY AVE PEDESTRIAN BRIDGE OVER I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	P01 OF 82194	802330		2 OF 2

FILE NAME: solvay2-pos.dgn DRAWN BY: VH DATE: 09/18/08 CHECKED BY: MRB DATE: 09/22/08

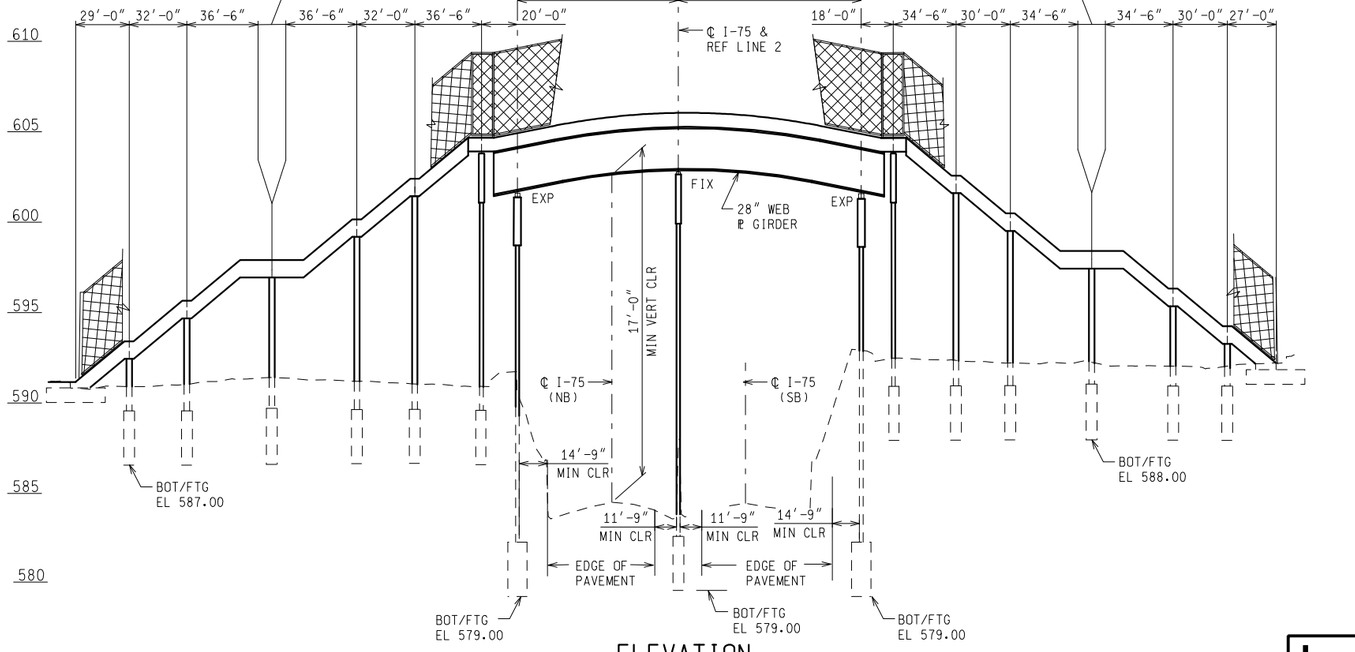


PROPOSED STRUCTURE
P02 OF 82194

SITUATION PLAN

SCALE: 1" = 40'

EXISTING STRUCTURE
P02 OF 82194



ELEVATION

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'

REVISIONS			
NO.	DESCRIPTION	DATE	BY

BENCHMARKS

BM 309
DESCRIPTION: CHISELED 'X' ON SW BOLT OF AN ABANDONED SIGN POST ON A CONCRETE BASE IN THE NW QUADRANT OF FORT STREET AND GREEN STREET NORTH IN THE PARKING LOT OF "KING MOTZ BURGERS".
ELEVATION: 591.85

BM 310
DESCRIPTION: CHISELED 'X' ON NW BOLT OF A LIGHT POST ON THE SOUTH SIDE OF FORT STREET ACROSS FROM BUILDING #6628 150' WEST OF RADEMACHER STREET.
ELEVATION: 588.29

WITNESSES

CONTROL PT# 787
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON THE SIDEWALK ON THE EAST SIDE OF WILDE ST. JUST NORTH OF FISHER ST.

WITNESSES:
1. N15°E 7.00' FIRE HYDRANT
2. N60°E 2.00' EDGE OF PAVEMENT
3. N60°E 24.00' TREE
4. S60°W 45.00' LIGHT POLE

CONTROL PT# 905
DESCRIPTION: SET MAG NAIL IN CENTER OF ARIAL TARGET IN THE WEST SIDE OF BEARD SOUTH OF FISHER W.

WITNESSES:
1. N75°W 15.00' FIRE HYDRANT
2. N80°E 5.00' CENTERLINE BEARD ST
3. N20°W 42.00' CENTERLINE OF FISHER W ST.
4. S70°W 12.00' BACK OF CURB

EXISTING STRUCTURE

BUILT IN 1966, THE EXISTING STRUCTURE IS A TWO-SPAN PEDESTRIAN BRIDGE (75'-6", 75'-6") WITH A MULTI-SPAN RAMP AT EITHER END. THE MAIN BRIDGE CONSISTS OF THREE LINES OF WF30X108 ROLLED BEAMS ON CONCRETE PIERS AND SPREAD FOOTINGS. THE DECK THICKNESS IS 6" AND THE TOTAL WIDTH IS 9'-6" (8'-0" CLEAR). THE MINIMUM VERTICAL CLEARANCE IS 14'-6". RAMP A CONSISTS OF FIVE CONCRETE SLAB SPANS (31'-9", 24'-9", 19'-0", 19'-0", 25'-0"). RAMP B CONSISTS OF FOUR CONCRETE SLAB SPANS (56'-6" - 19'-0" - 19'-0" - 19'-0"). BOTH RAMPS HAVE A DECK THICKNESS OF 9" AND THE FIRST SPANS ARE ON FILL.

UTILITIES

EX SAN 24" (DWSD)
MICHCON 3" PLASTIC
EX WATER 54" (DWSD)
COMCAST COAXIAL (AG)
DPL

TO BE CONFIRMED

NOTES

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES H-10 LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/500 OF SPAN LENGTH.

THE WORK COVERED BY THESE PLANS INCLUDES REMOVAL OF THE EXISTING BRIDGE, CONSTRUCTION OF THE PROPOSED BRIDGE, AND PLACING SLOPE PAVING TO THE LIMITS SHOWN. ALL OTHER WORK IS INCLUDED IN THE ROAD PLANS THAT ARE A PART OF THIS CONTRACT.

THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

PLAN ELEVATIONS REFER TO NAVD 88 DATUM.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE.

THIS BRIDGE IS WITHIN MDOT RIGHT-OF-WAY.

THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY 48 HOURS IN ADVANCE OF WORK IMPACTING THAT COMPANY'S CONDUITS OR FACILITIES.

THE VERTICAL MINIMUM CLEARANCE COMPUTATIONS WERE PREPARED BY PARSONS ENGINEERS.

APPROVED
CONSULTANT COORDINATING ENGINEER

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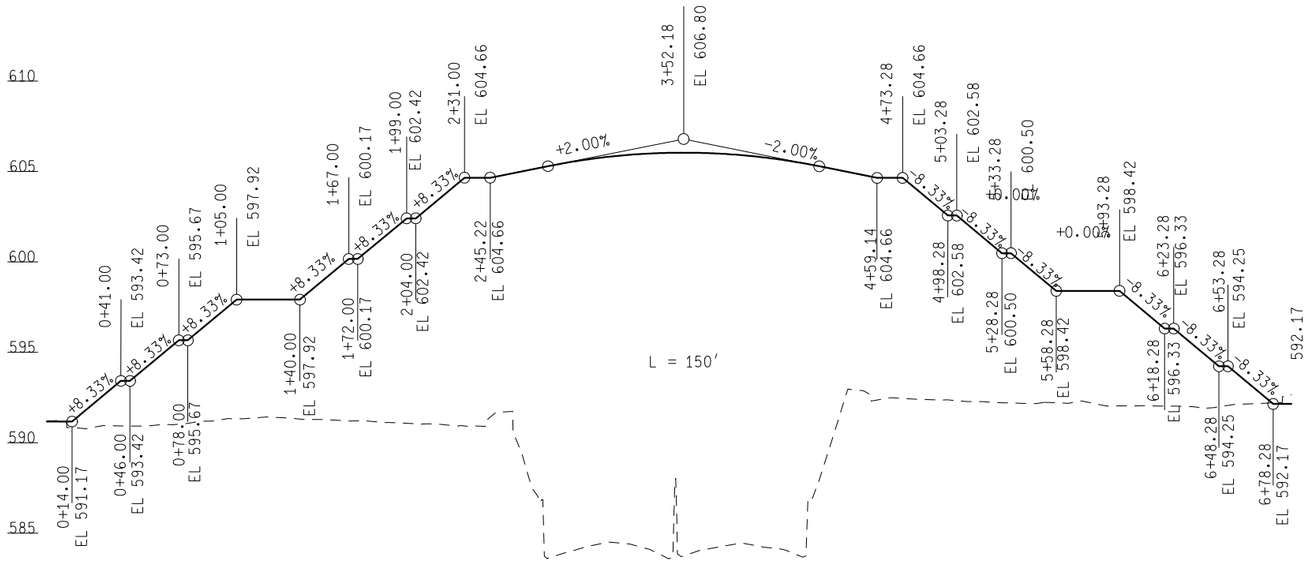
Lansing, Michigan 48933

MDOT
Michigan Department of Transportation

GENERAL PLAN OF SITE
BEARD AVE PEDESTRIAN BRIDGE OVER I-75

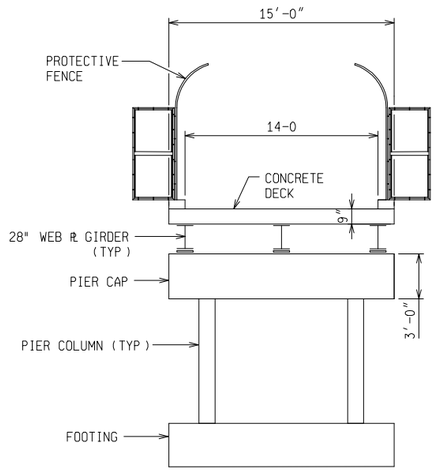
DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	P02 OF 82194	802330		1 OF 2

FILE NAME: Beard1-pos.dgn DRAWN BY: VH DATE: 09/18/08 CHECKED BY: MRB DATE: 09/22/08



PROFILE

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'



TYPICAL PEDESTRIAN BRIDGE SECTION AT BEARD AVE

REVISIONS			
NO.	DESCRIPTION	DATE	BY

APPROVED_____
CONSULTANT COORDINATING ENGINEER

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Suite 200
Lansing, Michigan 48933

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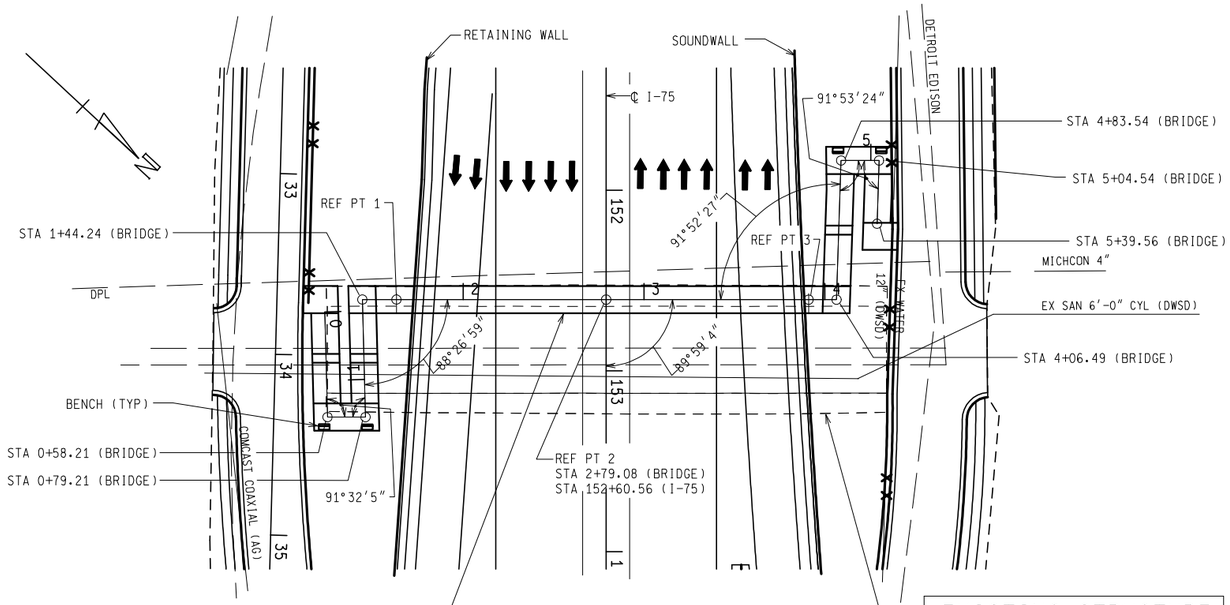
Michigan Department of Transportation

GENERAL PLAN OF SITE
BEARD AVE PEDESTRIAN BRIDGE OVER I-75

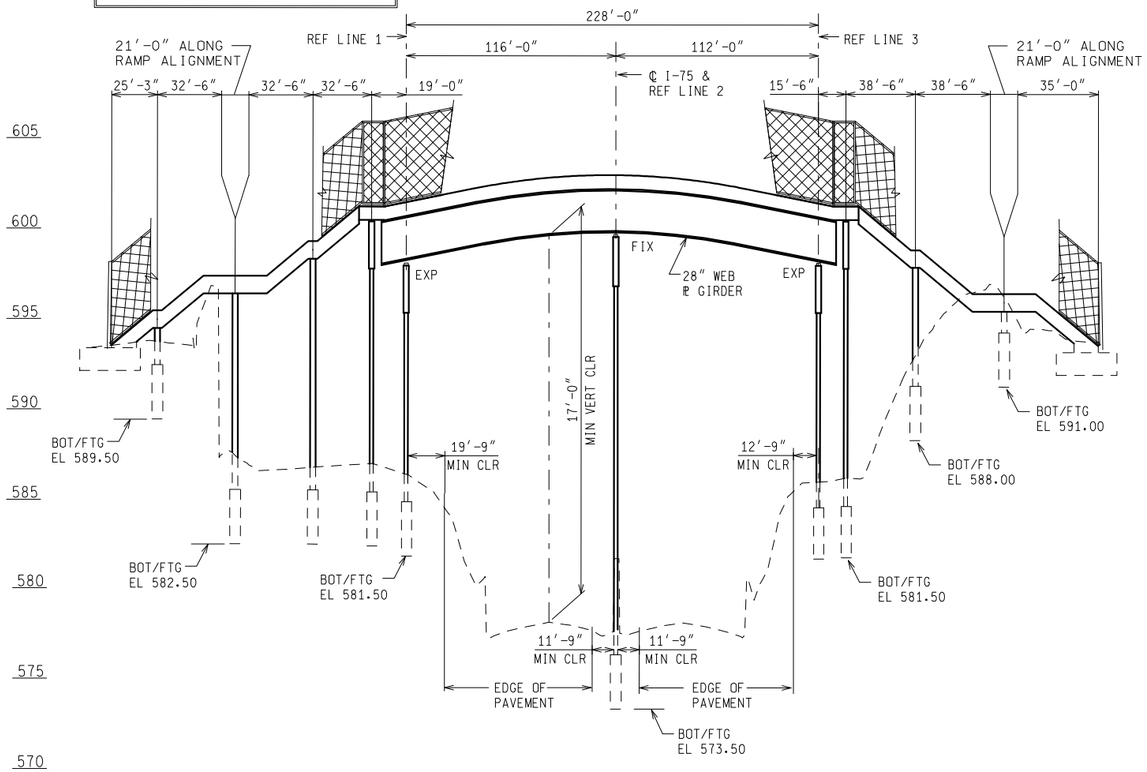
DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	P02 OF 82194	802330		2 OF 2

FILE NAME: Beard2-pos.dgn DRAWN BY: VH DATE: 09/18/08 CHECKED BY: MRB DATE: 09/22/08



SITUATION PLAN

SCALE: 1" = 40'



ELEVATION

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'

APPROVED_____
CONSULTANT COORDINATING ENGINEER

BENCHMARKS

BM 309
DESCRIPTION: CHISELED 'X' ON SW BOLT OF AN ABANDONED SIGN POST ON A CONCRETE BASE IN THE NW QUADRANT OF FORT STREET AND GREEN STREET NORTH IN THE PARKING LOT OF "KING MOTZ BURGERS".
ELEVATION: 591.85

BM 310
DESCRIPTION: CHISELED 'X' ON NW BOLT OF A LIGHT POST ON THE SOUTH SIDE OF FORT STREET ACROSS FROM BUILDING #6628 150' WEST OF RADEMACHER STREET.
ELEVATION: 588.29

WITNESSES

CONTROL PT# 761
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON THE SIDEWALK ON SOUTH SIDE OF FISHER ST.

WITNESSES:
1. S10°E 50.00' FENCE
2. N10°W 2.50' NORTH EDGE OF SIDEWALK
3. N70°E 35.00' 8-INCH TREE
4. S15°W 45.00' POWER POLE

CONTROL PT# 785
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON THE SIDEWALK IN THE NORTHWEST QUADRANT OF CRAWFORD AND FISHER ST.

WITNESSES:
1. N75°E 7.00' STOP SIGN
2. S60°W 4.00' SIDEWALK INTERSECTION
3. S10°E 13.00' LIGHT POLE
4. S20°E 15.00' BACK OF CURB OF FISHER ST.

EXISTING STRUCTURE

TO BE ADDED WHEN INFORMATION IS AVAILABLE

UTILITIES

EX SAN 6'-0" CYL (DWSD)
MICHCON 4" PLASTIC
EX WATER 12" (DWSD)
COMCAST COAXIAL (AG)
DPL
DETROIT EDISON

TO BE CONFIRMED

NOTES

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES H-10 LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/500 OF SPAN LENGTH.

THE WORK COVERED BY THESE PLANS INCLUDES REMOVAL OF THE EXISTING BRIDGE, CONSTRUCTION OF THE PROPOSED BRIDGE, AND PLACING SLOPE PAVING TO THE LIMITS SHOWN. ALL OTHER WORK IS INCLUDED IN THE ROAD PLANS THAT ARE A PART OF THIS CONTRACT.

THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

PLAN ELEVATIONS REFER TO NAVD 88 DATUM.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE.

THIS BRIDGE IS WITHIN MDOT RIGHT-OF-WAY.

THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY 48 HOURS IN ADVANCE OF WORK IMPACTING THAT COMPANY'S CONDUITS OR FACILITIES.

THE VERTICAL MINIMUM CLEARANCE COMPUTATIONS WERE PREPARED BY PARSONS ENGINEERS.

REVISIONS			
NO.	DESCRIPTION	DATE	BY

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222 N. Washington Square, Suite 200
Lansing, Michigan 48933

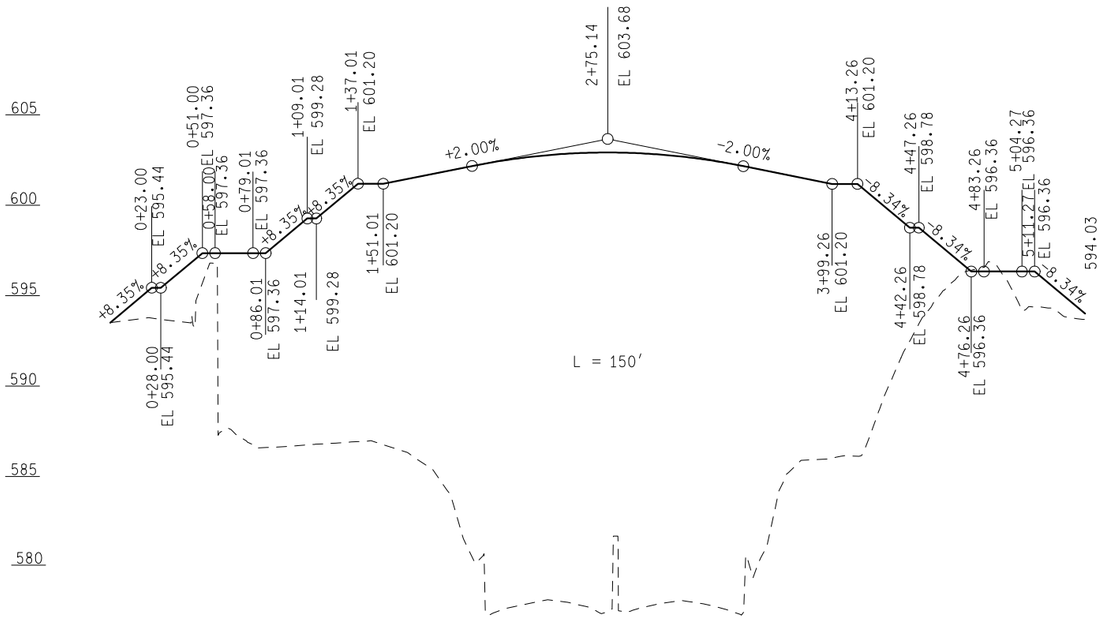
MDOT
Michigan Department of Transportation

GENERAL PLAN OF SITE
WATERMAN AVE PEDESTRIAN BRIDGE OVER I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	P10 OF 82194	802330		1 OF 2

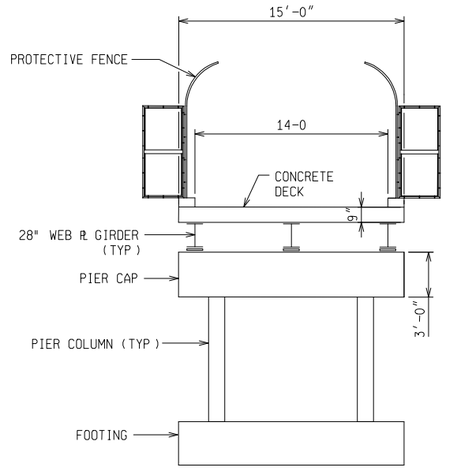
FILE NAME: Waterman-pos.dgn DRAWN BY: VH DATE: 09/18/08 CHECKED BY: MRB DATE: 09/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



PROFILE

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'



TYPICAL PEDESTRIAN
BRIDGE SECTION AT WATERMAN AVE

APPROVED_____
CONSULTANT COORDINATING ENGINEER

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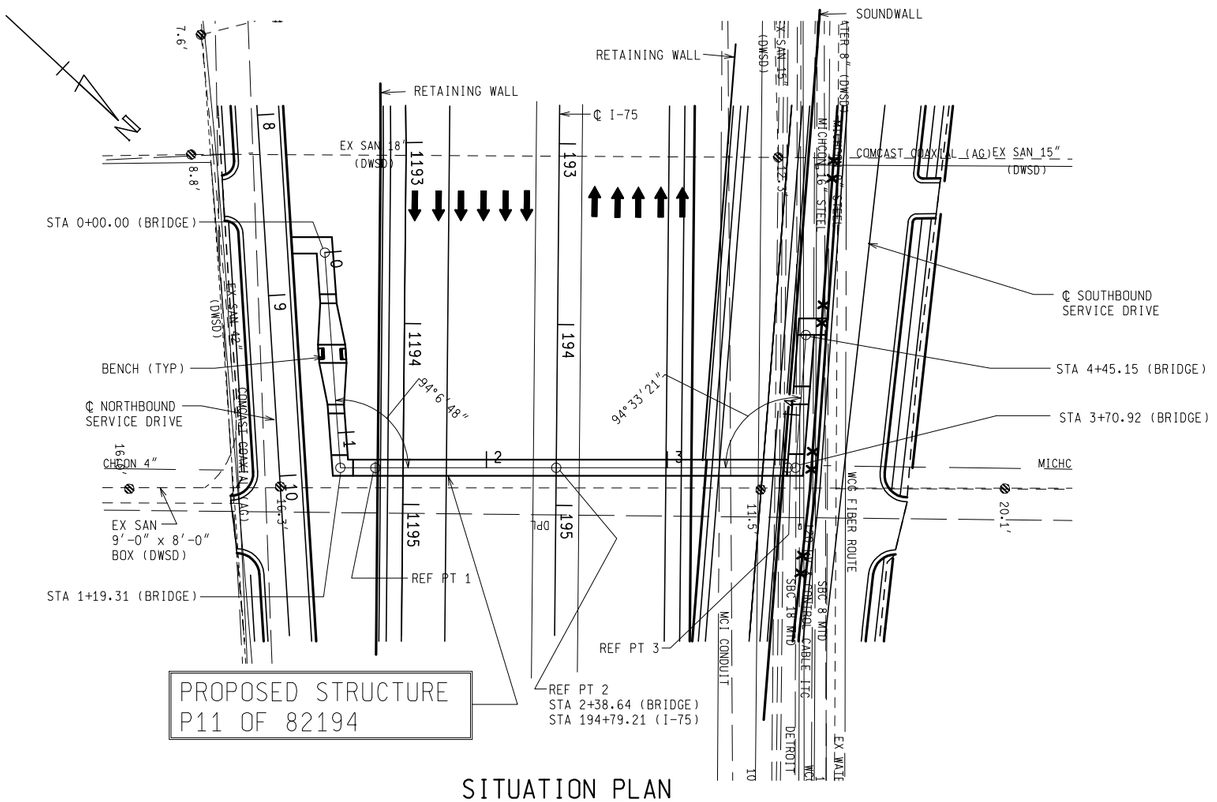
Michigan Department of Transportation

GENERAL PLAN OF SITE
WATERMAN AVE PEDESTRIAN BRIDGE OVER I-75

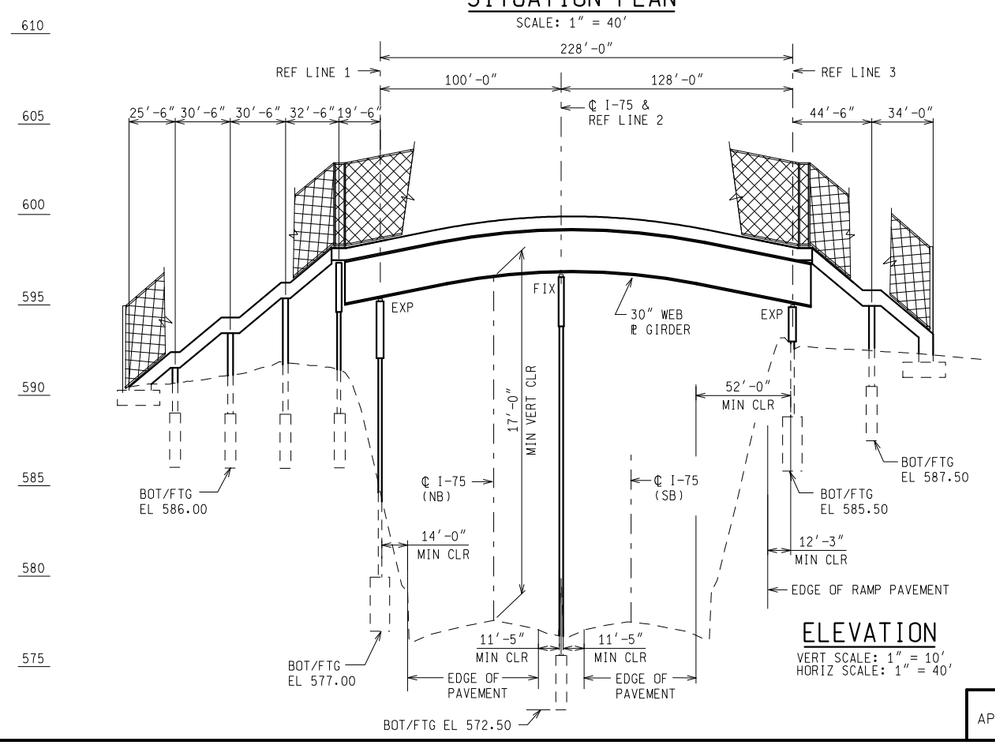
DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	P10 OF 82194	802330		2 OF 2

FILE NAME: Waterman2-pos.dgn DRAWN BY: VH DATE: 09/18/08 CHECKED BY: MRB DATE: 09/22/08



SITUATION PLAN

SCALE: 1" = 40'



ELEVATION

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'

APPROVED _____
CONSULTANT COORDINATING ENGINEER

BENCHMARKS

BM 311
DESCRIPTION: CHISELED 'X' ON NW BOLT OF A LIGHT POLE ON THE SOUTH SIDE OF FORT STREET ACRESS FROM BUILDING #6142 "FERGUSON FUNERAL HOME" 100 FEET EAST OF DRAGON STREET.
ELEVATION: 587.33

BM 312
DESCRIPTION: CHISELED 'X' ON THE NW BOLT OF LIGHT POLE ON THE SOUTH SIDE OF FORT STREET 30 FEET EAST OF THE VISITOR AND EMPLOYEE ENTRANCE TO "BRIDGE WATER INETRIORS" BUILDING #4617.
ELEVATION: 585.33

WITNESSES

CONTROL PT# 908
DESCRIPTION: TSET MAG NAIL IN CENTER OF ARIAL TARGET IN THE PAVEMENT AT THE SE CORNER FISHER W AND MORRELL.

WITNESSES:
1. N25°W 15.00' CENTERLINE FISHER
2. S70°W 12.00' CENTERLINE MORRELL
3. S50°E 12.00' FIRE HYDRANT
4. N70°E 14.00' LIGHT POLE

EXISTING STRUCTURE

NONE

UTILITIES

SBC
ITC
MICHCON
EX SAN 15" (DWSD)
EX SAN 18" (DWSD)
COMCAST
MCI

TO BE CONFIRMED

NOTES

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES H-10 LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/500 OF SPAN LENGTH.

THE WORK COVERED BY THESE PLANS INCLUDES REMOVAL OF THE EXISTING BRIDGE, CONSTRUCTION OF THE PROPOSED BRIDGE, AND PLACING SLOPE PAVING TO THE LIMITS SHOWN. ALL OTHER WORK IS INCLUDED IN THE ROAD PLANS THAT ARE A PART OF THIS CONTRACT.

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PLAN ELEVATIONS REFER TO NAVD 88 DATUM.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE.

THIS BRIDGE IS WITHIN MDOT RIGHT-OF-WAY.

THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY 48 HOURS IN ADVANCE OF WORK IMPACTING THAT COMPANY'S CONDUITS OR FACILITIES.

THE VERTICAL MINIMUM CLEARANCE COMPUTATIONS WERE PREPARED BY PARSONS ENGINEERS.

REVISIONS

NO.	DESCRIPTION	DATE	BY

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alfred benesch & company
Engineers · Surveyors · Planners
222 N. Washington Square, Suite 200
Lansing, Michigan 48933

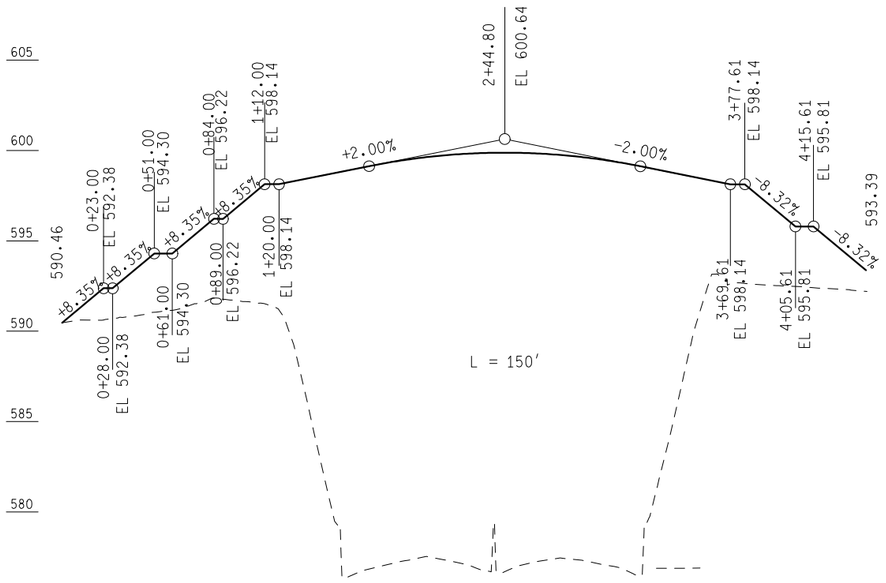
MDOT Michigan Department of Transportation

GENERAL PLAN OF SITE
MORRELL AVE PEDESTRIAN BRIDGE OVER I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	P11 OF 82194	802330		1 OF 2

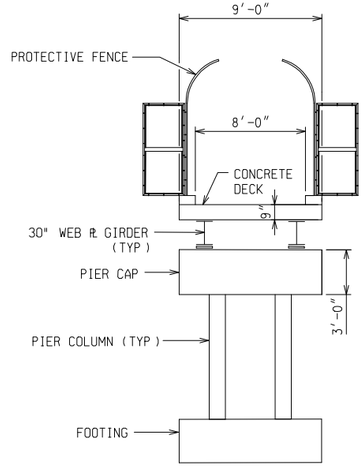
FILE NAME: Morrell-pos.dgn DRAWN BY: VH DATE: 09/18/08 CHECKED BY: MRB DATE: 09/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



PROFILE

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'



TYPICAL PEDESTRIAN
BRIDGE SECTION AT MORRELL AVE

APPROVED_____
CONSULTANT COORDINATING ENGINEER

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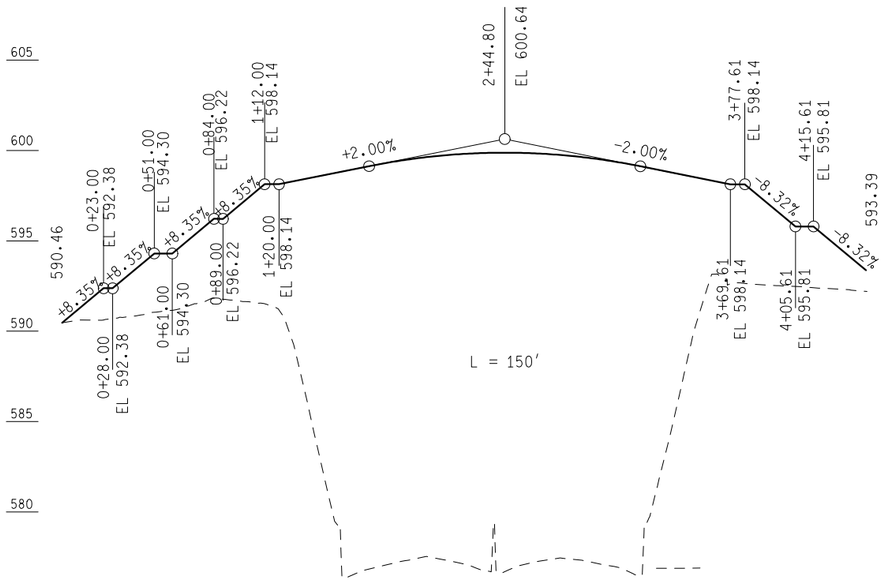
Michigan Department of Transportation

GENERAL PLAN OF SITE
MORRELL AVE PEDESTRIAN BRIDGE OVER I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	P11 OF 82194	802330		2 OF 2

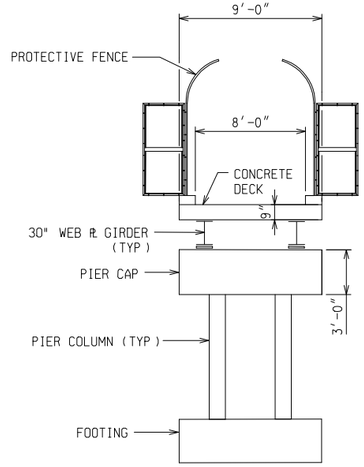
FILE NAME: MORRELL2-pos.dgn DRAWN BY: VH DATE: 09/30/08 CHECKED BY: MRB DATE: 09/30/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



PROFILE

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'



TYPICAL PEDESTRIAN
BRIDGE SECTION AT MORRELL AVE

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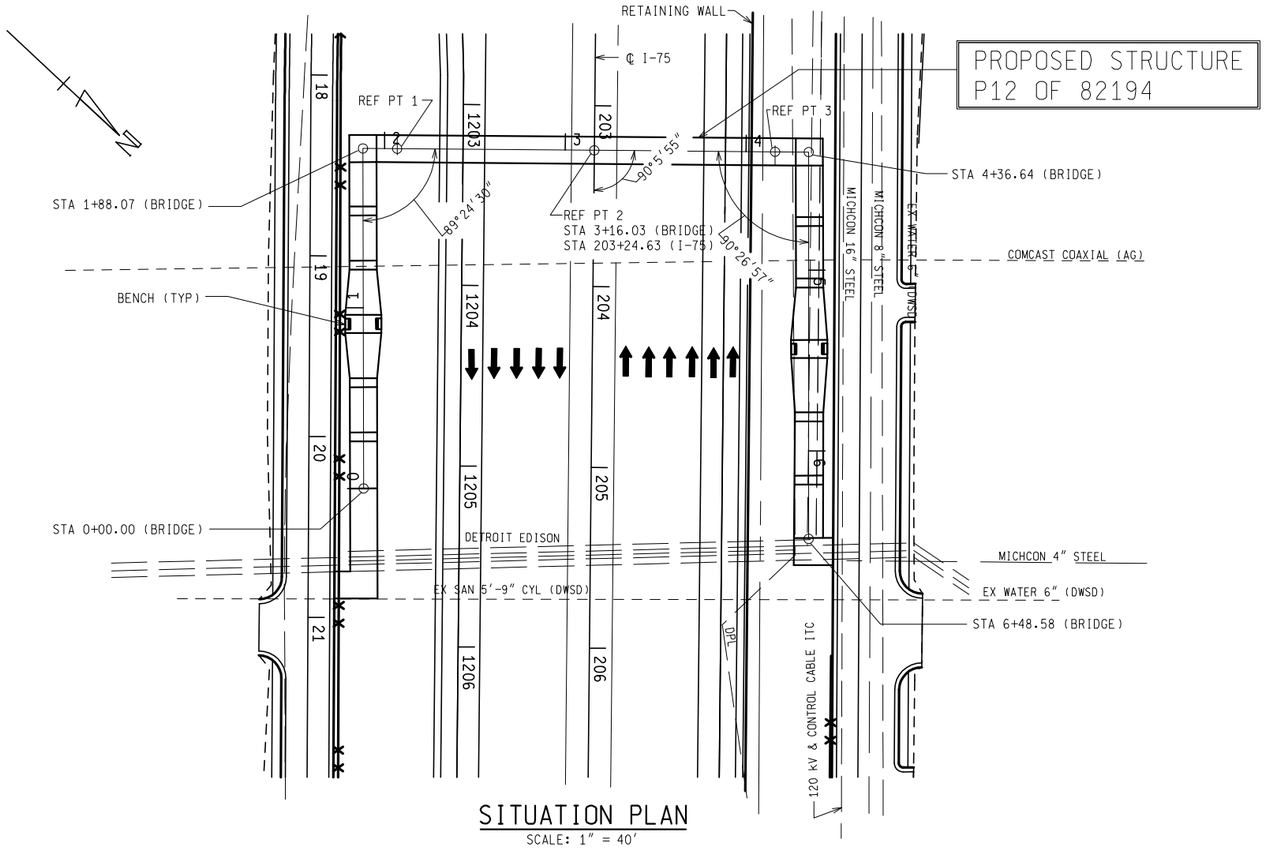
GENERAL PLAN OF SITE
MORRELL AVE PEDESTRIAN BRIDGE OVER I-75

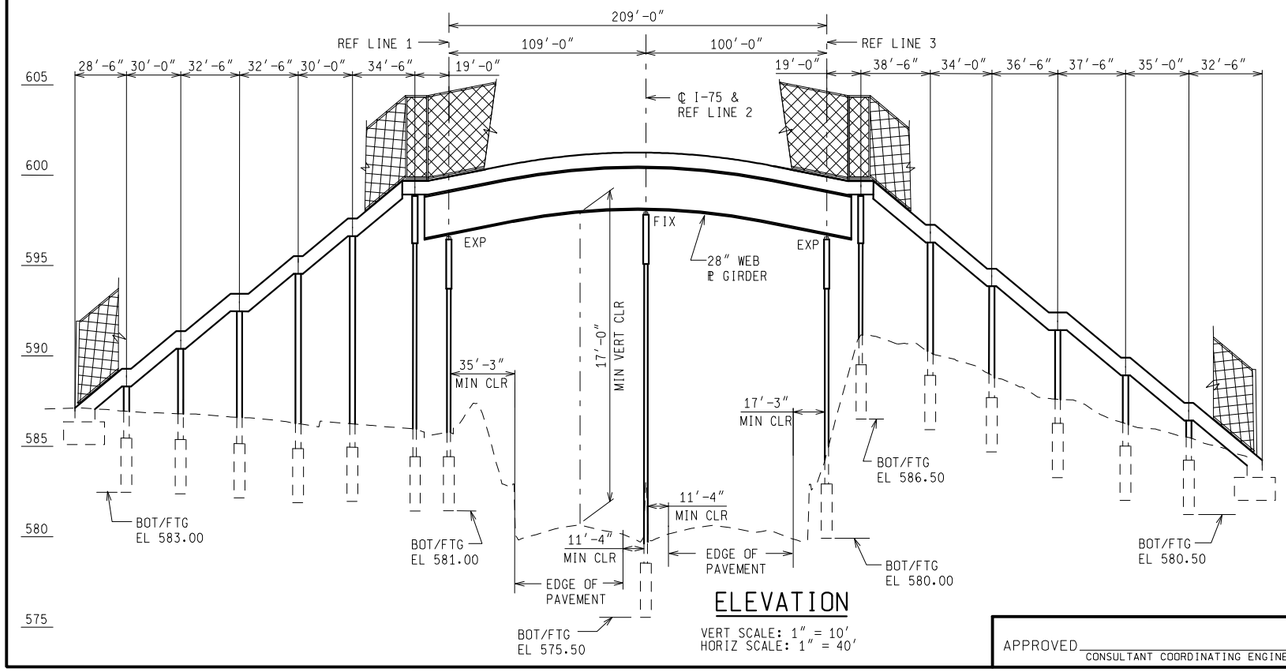
DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	P11 OF 82194	802330		2 OF 2

FILE NAME: MORRELL2-pos.dgn DRAWN BY: VH DATE: 09/30/08 CHECKED BY: MRB DATE: 09/30/08



SITUATION PLAN

SCALE: 1" = 40'



ELEVATION

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 40'

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CONSULTANT COORDINATING ENGINEER

BENCHMARKS

BM 312
DESCRIPTION: CHISELED 'X' ON THE NW BOLT OF LIGHT POLE ON THE SOUTH SIDE OF FORT STREET 30 FEET EAST OF THE VISITOR AND EMPLOYEE ENTRANCE TO "BRIDGE WATER INETRIORS" BUILDING #4617.
ELEVATION: 585.33

BM 313
DESCRIPTION: CHISELED 'X' ON THE NW BOLT OF A LIGHT POLE ON THE SOUTH SIDE OF FORT STREET 200 FEET WEST OF "MOTOR CITY INTERMODAL DISTRIBUTION" BUILDING #4005.
ELEVATION: 593.16

WITNESSES

CONTROL PT# 735
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON AN ASPHALT APRON SOUTH OF FISHER ST.

WITNESSES:
1. N10°E 6.00' MANHOLE
2. N10°W 3.00' BACK OF CURB
3. N90°E 14.00' ONE WAY SIGN
4. S60°W 8.00' FENCE CORNER

CONTROL PT# 781
DESCRIPTION: SET MAG NAIL IN CENTER OF AN AERIAL TARGET ON THE SOUTH SHOULDER OF THE OFF-RAMP FROM I-75 N AT EXIT 47A.

WITNESSES:
1. N30°W 2.00' BACK OF CURB
2. S30°E 39.00' FENCE
3. S30°W 21.00' END OF BARRIER
4. N60°E 72.00' LIGHT POLE

EXISTING STRUCTURE

NONE

UTILITIES

EX SAN 6'-0" CYL (DWSD)
MICHCON 4" PLASTIC
EX WATER 12" (DWSD)
COMCAST COAXIAL (AG)
DPL
DETROIT EDISON

TO BE CONFIRMED

NOTES

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES H-10 LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/500 OF SPAN LENGTH.

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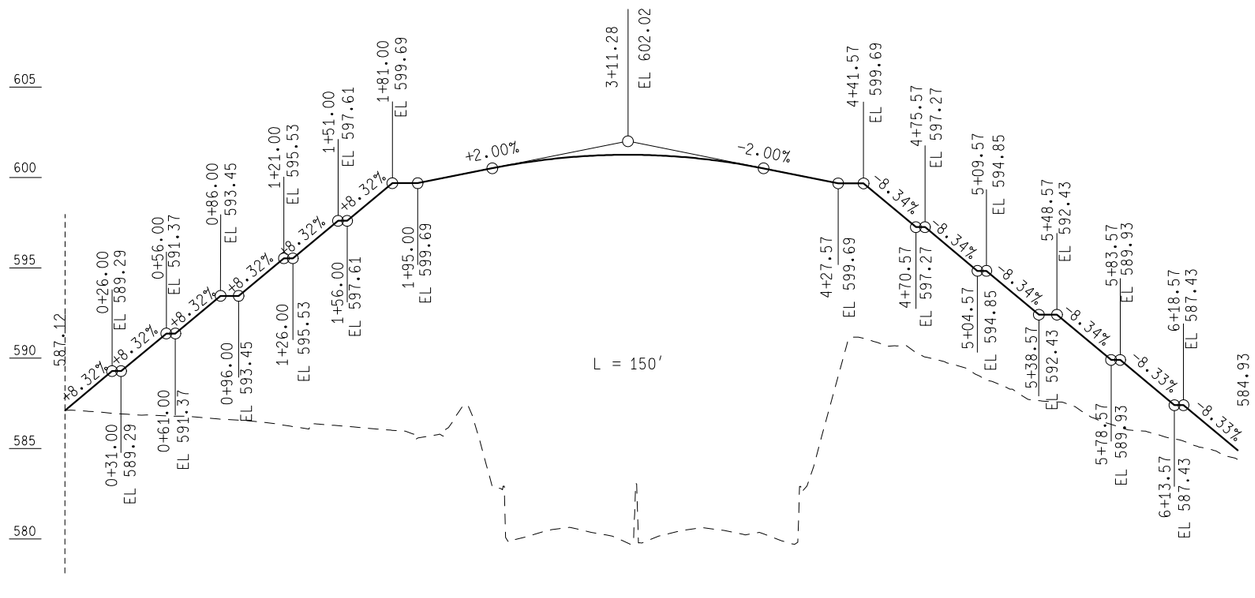
GENERAL PLAN OF SITE
McKINSTRY AVE PEDESTRIAN BRIDGE OVER I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	P12 OF 82194	802330		1 OF 2

FILE NAME: MsKinstry1-pos.dgn DRAWN BY: VH DATE: 09/18/08 CHECKED BY: MRB DATE: 09/22/08

REVISIONS			
NO.	DESCRIPTION	DATE	BY



PROFILE

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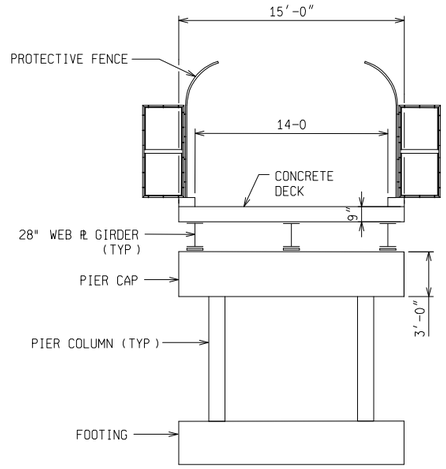
HORIZ SCALE: 1" = 40'



TYPICAL PEDESTRIAN BRIDGE SECTION AT McINSTRY AVE

APPROVED _____
CONSULTANT COORDINATING ENGINEER

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GENERAL PLAN OF SITE
McKINSTRY AVE PEDESTRIAN BRIDGE OVER I-75

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
11/14/08	P12 OF 82194	802330		2 OF 2

FILE NAME: McKinstry2-pos.dgn DRAWN BY: VH DATE: 09/18/08 CHECKED BY: MRB DATE: 09/22/08

REVISIONS			
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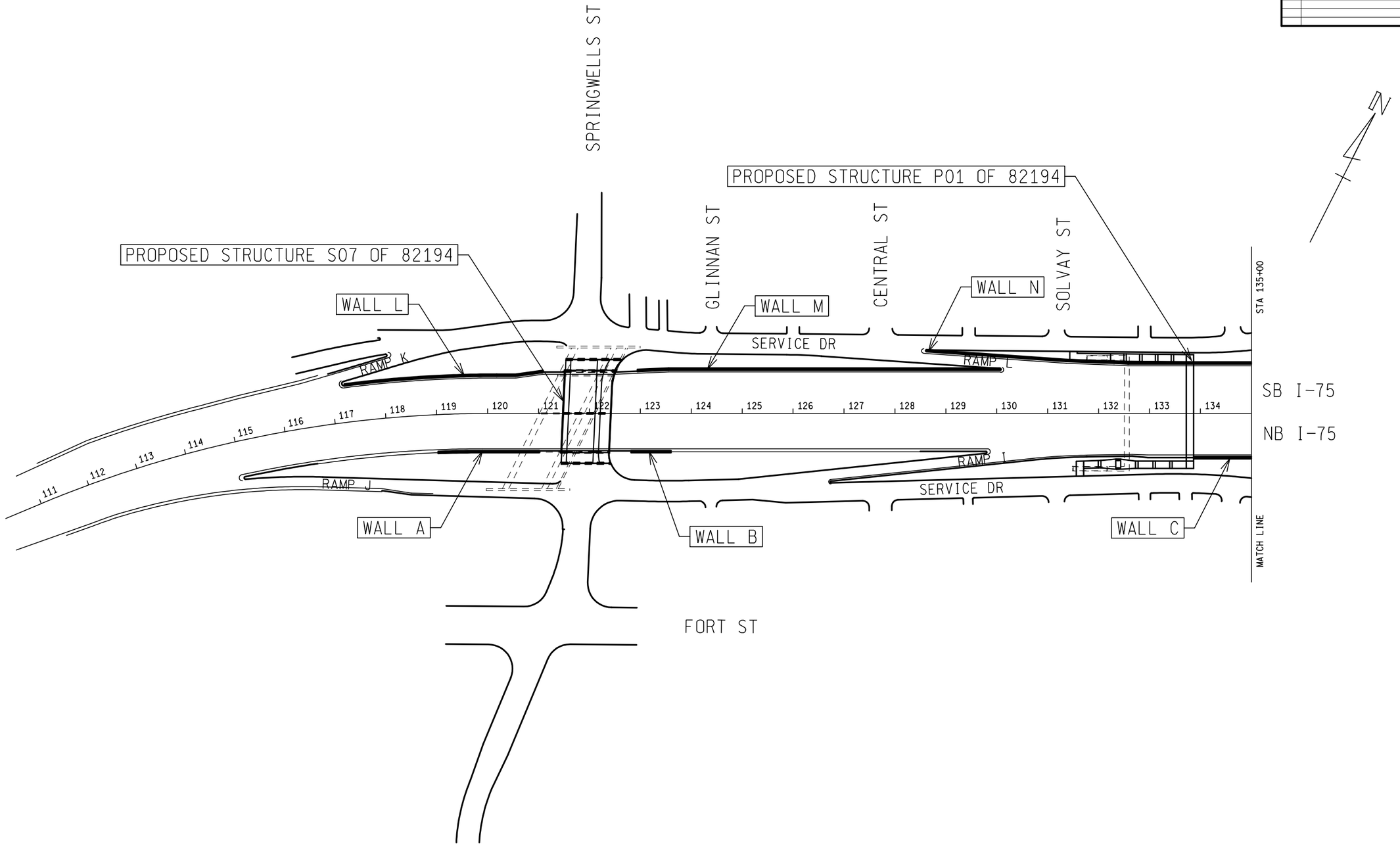

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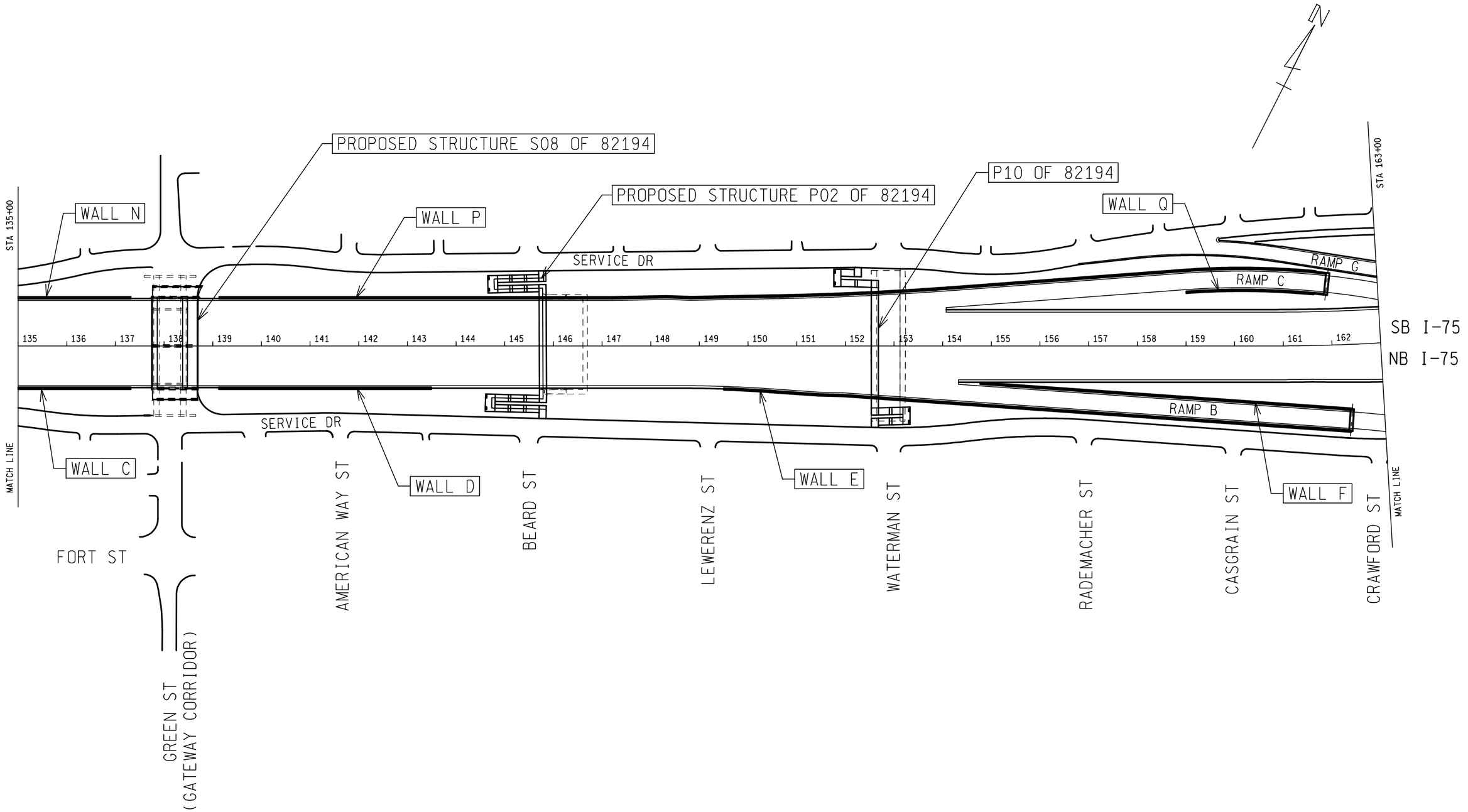
Michigan Department of Transportation

RETAINING WALL PLAN

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET OF
11/14/08		802330		

DRAWN BY: DATE:
CHECKED BY: DATE:
CORRECTED BY: DATE:
FILE NAME:

REVISIONS			
NO.	DESCRIPTION	DATE	BY



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RETAINING WALL PLAN

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET OF
11/14/08		802330		

REVISIONS			
NO.	DESCRIPTION	DATE	BY

PROPOSED STRUCTURE
S10 OF 82194

WALL R

WALL S

WALL T

WALL U

WALL V

WALL G

WALL Z

WALL AA

WALL H

WALL Y

WALL X

DRAGOON ST

MILITARY ST

CAVALRY ST

SERVICE DR

STA 163+00

MATCH LINE

RAMP G

RAMP F

RAMP F

RAMP C

RAMP B

RAMP D

RAMP A

163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192

SB I-75

NB I-75

CELERON ST

JUNCTION ST

MATCH LINE STA 192+00

BERWALT
MANOR APTS

LIVERNOIS AVE

CAMPBELL ST

DETROIT
SAVINGS
BANK

N

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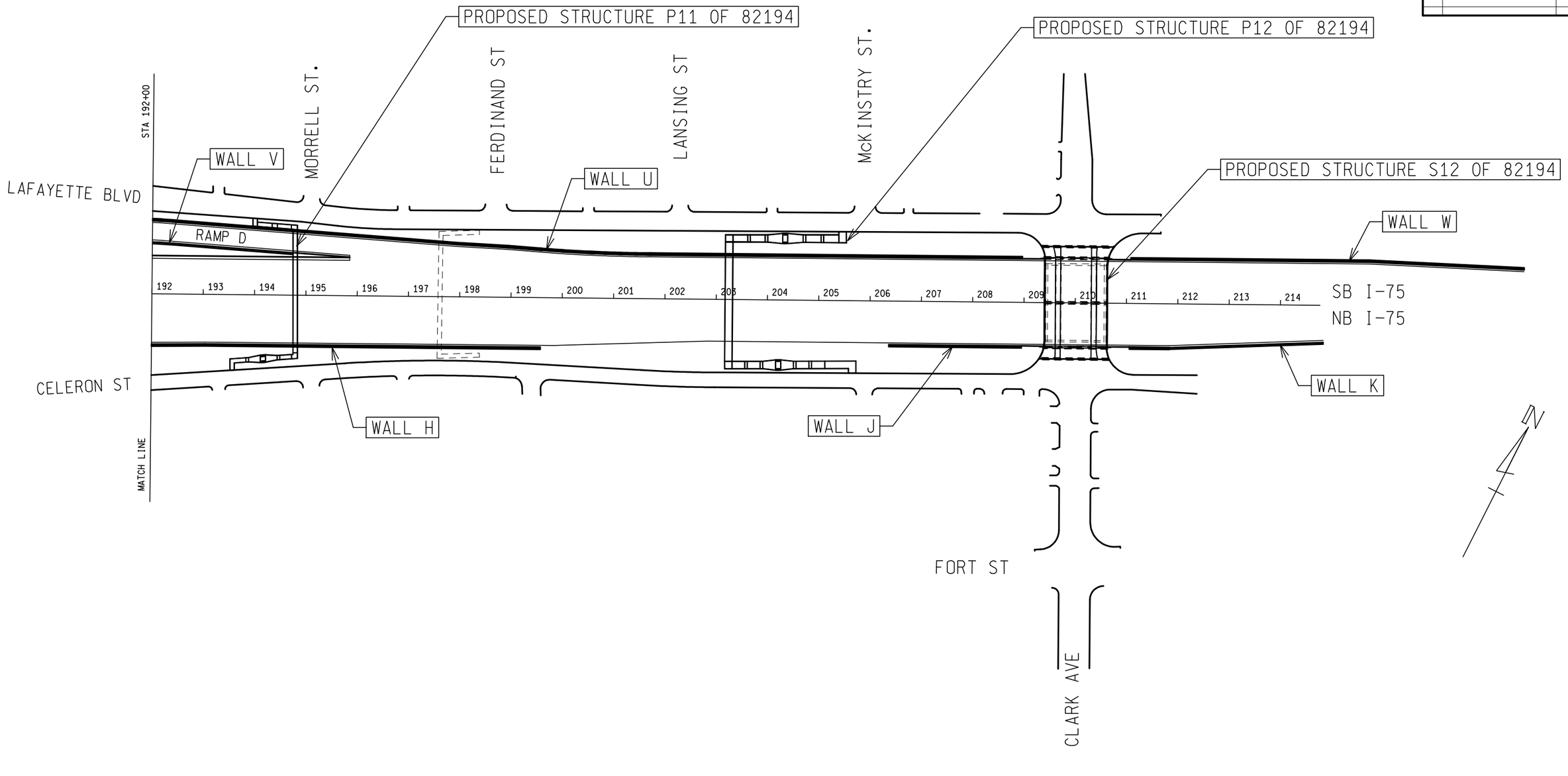

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11/14/08		802330		OF

DATE:
CORRECTED BY:
DATE:
CHECKED BY:
DATE:
DRAWN BY:
FILE NAME:

Appendix B

Cost Estimates (All Structures)

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 8/22/2008

Checked by: KMP Date: 9/5/2008

Springwells Street over I-75
Job # 802330
(in Detroit)

S07 of 82194

Bridge Replacement

12 - 39" Spread PPC Box Beam Alternative

((2) Span - 85'-10.5", 78'-1"), Full Height Abutment

Bridge Width=95'-5" including (1-20' U-turn lanes, 4-13' lanes, 1-10' sidewalk, 1-10' median, two 1'-8 1/2" aesthetic railing)
Bridge Length=163'-11.5"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
2040020	Structures, Rem	30,272	Sft	$25	$756,808.59
7040002	Steel Sheet Piling, Temp	1,314	Sft	$23.98	$31,513.64
7040003	Steel Sheet Piling, Temp, Left in Place	3,630	Sft	$23.48	$85,225.06
2060010	Excavation, Fdn	9,037	Cyd	$8.24	$74,464.74
4040033	Underdrain, Fdn, 6 inch	191	Ft	$7.04	$1,344.83
4040113	Underdrain, Outlet Ending, 6 inch	4	Ea	$115.94	$463.76
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	17,575	Ft	$26.00	$456,952.54
7060010	Substructure Conc	1,443	Cyd	$402.00	$580,005.35
7060035	Reinforcement, Steel, Epoxy Coated	86,428	Lb	$1.10	$95,070.94
2060002	Backfill, Structure, CIP	4,860	Cyd	$9.70	$47,146.76
7060080	Wall Drain	134	Sft	$6.00	$804.00
Z000004	Fill, Lightweight, EPS Block	3,172	Cyd	$77.00	$244,210.79
				SUBTOTAL	**$2,374,010.00**
				Percent of structure cost	53%
Superstructure					
7060020	Superstructure Conc	121	Cyd	$134.50	$16,319.33
7060021	Superstructure Conc, Night Casting	454	Cyd	$178.50	$81,067.10
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$50,960.00	$50,960.00
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$193,016.90	$193,016.90
7060031	Expansion Joint Device	191	Ft	$123.63	$23,616.70
7060032	False Decking	45,157	Sft	$0.56	$25,288.11
7060035	Reinforcement, Steel, Epoxy Coated	147,339	Lb	$1.10	$162,072.63
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	454	Cyd	$2.04	$926.48
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
7070073	Bearing, Elastomeric, 3 inch	35	Sft	$185.00	$6,475.00
7080075	Prest Conc Box Beam, Furn, 39 inch	1,907	Ft	$170.00	$324,274.32
7080076	Prest Conc Box Beam, Erect, 39 inch	1,907	Ft	$12.00	$22,889.95
7110005	Bridge Railing, Aesthetic Parapet Tube	312	Ft	$155.84	$48,622.08
8190159	Conduit, Schedule 80 PVC, 3 inch	312	Ft	$7.50	$2,340.00
7120084	Reinforcement, Mechanical Splice	0	Ea	$41.96	$0.00
8080110	Fence, Structure	3,120	Sft	$10.01	$31,231.20
7160001	Field Repr of Damaged Coating	0	LS	$8,000.00	$0.00
				SUBTOTAL	**$998,970.00**
				Percent of structure cost	22%
Misc.					
6050101	Conc Quality Initiative	13,221	Dlr	$1.00	$13,221.45
7060008	Conc Quality Assurance, Structure	2,323	Cyd	$11.00	$25,552.82
				SUBTOTAL	**$38,770.00**
				Percent of structure cost	0.9%
Maintenance of Traffic				**SUBTOTAL**	**$25,000.00**
					0.6%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$17,183.75	$17,183.75
				SUBTOTAL	**$17,180.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$69,078.60	$69,078.60
				SUBTOTAL	**$69,080.00**
				Percent of structure cost	1.6%
	Aesthetics 1%	1	LS	$35,230.10	$35,230.10
					$35,230.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$3,558,240.00**
	Design Contingency 15%	1	LS	$533,736.00	$533,736.00
				SUBTOTAL	**$533,740.00**
				Percent of project cost	12.0%
1000001	Mobilization, Max, 10%	1	LS	$355,824.00	$355,824.00
				SUBTOTAL	**$355,820.00**
					8.0%
				TOTAL	**$4,447,800.00**

ASSUMPTIONS:

Area of Deck (ft2) = **14885**

(**) Special Provision Required

1) A 15% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new Springwells Avenue approach roadway is not included

3) Cost per square foot of deck does not include the cost of removing the existing bridge

COST PER FT^2 = **$240**

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 8/22/2008

Checked by: KMP Date: 9/5/2008

Springwells Street over I-75
Job # 802330
(in Detroit)

S07 of 82194

Bridge Replacement

30 - 39" Side-by-Side PPC Box Beam Alternative

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Substructure					
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4040033	Underdrain, Fdn, 6 inch	191	Ft	$7.04	$1,344.83
4040113	Underdrain, Outlet Ending, 6 inch	4	Ea	$115.94	$463.76
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2060002	Backfill, Structure, CIP	4,860	Cyd	$9.70	$47,146.76
7060080	Wall Drain	134	Sft	$6.00	$804.00
Z000004	Fill, Lightweight, EPS Block	3,172	Cyd	$77.00	$244,210.79
				SUBTOTAL	**$2,374,010.00**
				Percent of structure cost	47%
Superstructure					
7060020	Superstructure Conc	121	Cyd	$134.50	$16,319.33
7060021	Superstructure Conc, Night Casting	367	Cyd	$178.50	$65,443.26
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$50,960.00	$50,960.00
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$155,817.28	$155,817.28
7060031	Expansion Joint Device	191	Ft	$123.63	$23,616.70
7060032	False Decking	30,272	Sft	$0.56	$16,952.51
7060035	Reinforcement, Steel, Epoxy Coated	89,659	Lb	$1.10	$98,625.31
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	367	Cyd	$2.04	$747.92
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
7070073	Bearing, Elastomeric, 3 inch	112	Sft	$185.00	$20,720.00
7080075	Prest Conc Box Beam, Furn, 39 inch	4,769	Ft	$170.00	$810,685.80
7080076	Prest Conc Box Beam, Erect, 39 inch	4,769	Ft	$12.00	$57,224.88
7110005	Bridge Railing, Aesthetic Parapet Tube	312	Ft	$155.84	$48,622.08
8190159	Conduit, Schedule 80 PVC, 3 inch	312	Ft	$7.50	$2,340.00
7120084	Reinforcement, Mechanical Splice	0	Ea	$41.96	$0.00
8080110	Fence, Structure	3,120	Sft	$10.01	$31,231.20
7160001	Field Repr of Damaged Coating	0	LS	$8,000.00	$0.00
7080015	Post Tensioning	1	LS	$30,000.00	$30,000.00
				SUBTOTAL	**$1,439,180.00**
				Percent of structure cost	29%
Misc.					
6050101	Conc Quality Initiative	12,909	Dlr	$1.00	$12,908.97
7060008	Conc Quality Assurance, Structure	2,235	Cyd	$11.00	$24,590.01
				SUBTOTAL	**$37,500.00**
				Percent of structure cost	0.7%
Maintenance of Traffic				**SUBTOTAL**	**$25,000.00**
					0.5%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$19,378.45	$19,378.45
				SUBTOTAL	**$19,380.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$77,901.40	$77,901.40
				SUBTOTAL	**$77,900.00**
				Percent of structure cost	1.6%
	Aesthetics 1%	1	LS	$39,729.70	$39,729.70
					$39,730.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$4,012,700.00**
	Design Contingency 15%	1	LS	$601,905.00	$601,905.00
				SUBTOTAL	**$601,910.00**
				Percent of project cost	12.0%
1000001	Mobilization, Max, 10%	1	LS	$401,270.00	$401,270.00
				SUBTOTAL	**$401,270.00**
					8.0%
				TOTAL	**$5,015,880.00**

ASSUMPTIONS:

Area of Deck (ft2) = **14885**

(**) Special Provision Required

1) A 15% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new Springwells Avenue approach roadway is not included

3) Cost per square foot of deck does not include the cost of removing the existing bridge

COST PER FT^2 = **$279**

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 8/22/2008

Checked by: KMP Date: 9/5/2008

Springwells Street over I-75
Job # 802330
(in Detroit)

S07 of 82194

Bridge Replacement

34" Web Steel Plate Girder Alternative

((2) Span - 85'-10.5", 78'-1"), Full Height Abutment

Bridge Width=95'-5" including (1-20' U-turn lanes, 4-13' lanes, 1-10' sidewalk, 1-10' median, two 1'-8 1/2" aesthetic railing)
Bridge Length=163'-11.5"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
2040020	Structures, Rem	30,272	Sft	$25	$756,808.59
7040002	Steel Sheet Piling, Temp	1,314	Sft	$23.98	$31,513.64
7040003	Steel Sheet Piling, Temp, Left in Place	3,630	Sft	$23.48	$85,225.06
2060010	Excavation, Fdn	9,037	Cyd	$8.24	$74,464.74
4040033	Underdrain, Fdn, 6 inch	191	Ft	$7.04	$1,344.83
4040113	Underdrain, Outlet Ending, 6 inch	4	Ea	$115.94	$463.76
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	17,575	Ft	$26.00	$456,952.54
7060010	Substructure Conc	1,443	Cyd	$402.00	$580,005.35
7060035	Reinforcement, Steel, Epoxy Coated	86,428	Lb	$1.10	$95,070.94
2060002	Backfill, Structure, CIP	4,860	Cyd	$9.70	$47,146.76
7060080	Wall Drain	134	Sft	$6.00	$804.00
Z000004	Fill, Lightweight, EPS Block	3,172	Cyd	$77.00	$244,210.79
				SUBTOTAL	**$2,374,010.00**
				Percent of structure cost	44%
Superstructure					
7060020	Superstructure Conc	121	Cyd	$134.50	$16,319.33
7060021	Superstructure Conc, Night Casting	443	Cyd	$178.50	$79,018.75
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$50,960.00	$50,960.00
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$188,139.89	$188,139.89
7060031	Expansion Joint Device	191	Ft	$123.63	$23,616.70
7060032	False Decking	45,157	Sft	$0.56	$25,288.11
7060035	Reinforcement, Steel, Epoxy Coated	147,339	Lb	$1.10	$162,072.63
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	443	Cyd	$2.04	$903.07
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
7070073	Bearing, Elastomeric, 3 inch	38	Sft	$185.00	$7,030.00
7070007	Structural Steel, Plate, Furn and Fab	541,087	Lb	$1.87	$1,011,832.19
7070008	Structural Steel, Plate, Erect	541,087	Lb	$0.18	$97,395.61
7110005	Bridge Railing, Aesthetic Parapet Tube	312	Ft	$155.84	$48,622.08
8190159	Conduit, Schedule 80 PVC, 3 inch	312	Ft	$7.50	$2,340.00
7120084	Reinforcement, Mechanical Splice		Ea	$41.96	$0.00
7070080	Shear Developers	1	LS	$24,023.69	$24,023.69
8080110	Fence, Structure	3,120	Sft	$10.01	$31,231.20
7160001	Field Repr of Damaged Coating	0	LS	$8,000.00	$0.00
				SUBTOTAL	**$1,778,670.00**
				Percent of structure cost	33%
Misc.					
6050101	Conc Quality Initiative	13,180	Dlr	$1.00	$13,180.48
7060008	Conc Quality Assurance, Structure	2,312	Cyd	$11.00	$25,426.60
				SUBTOTAL	**$38,610.00**
				Percent of structure cost	0.7%
Maintenance of Traffic				**SUBTOTAL**	**$25,000.00**
					0.5%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$21,081.45	$21,081.45
				SUBTOTAL	**$21,080.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$84,747.40	$84,747.40
				SUBTOTAL	**$84,750.00**
				Percent of structure cost	1.6%
	Aesthetics 1%	1	LS	$43,221.20	$43,221.20
					$43,220.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$4,365,340.00**
	Design Contingency 15%	1	LS	$654,801.00	$654,801.00
				SUBTOTAL	**$654,800.00**
				Percent of project cost	12.0%
1000001	Mobilization, Max, 10%	1	LS	$436,534.00	$436,534.00
				SUBTOTAL	**$436,530.00**
				Percent of project cost	8.0%
				TOTAL	**$5,456,670.00**

ASSUMPTIONS:

Area of Deck (ft2) = **14885**

(**) Special Provision Required

1) A 15% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new Springwells Avenue approach roadway is not included

3) Cost per square foot of deck does not include the cost of removing the existing bridge

COST PER FT^2 = **$308**

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 8/26/2008

Checked by: KMP Date: 9/5/2008

Green Ave. over I-75
Job # 802330
(in Detroit)

S08 of 82194

Bridge Replacement

12 - 42" Spread PPC Box Beam Alternative

((2) Span - 102'-0", 90'-0"), Full Height Abutment

Bridge Width=95'-5" including (1-20' U-turn lanes, 4-13' lanes, 1-10' sidewalk, 1-10' median, two 1'-8 1/2" aesthetic railing)
Bridge Length=192'-0"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
2040020	Structures, Rem	19,261	Sft	$25.00	$481,520.83
7040002	Steel Sheet Piling, Temp	1,313	Sft	$23.98	$31,485.74
7040003	Steel Sheet Piling, Temp, Left in Place	0	Sft	$23.48	$0.00
2060010	Excavation, Fdn	3,717	Cyd	$8.24	$30,628.08
4040033	Underdrain, Fdn, 6 inch	191	Ft	$7.04	$1,343.47
4040113	Underdrain, Outlet Ending, 6 inch	4	Ea	$115.94	$463.76
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	19,745	Ft	$26.00	$513,366.43
7060010	Substructure Conc	1,442	Cyd	$402.00	$579,581.46
7060035	Reinforcement, Steel, Epoxy Coated	86,362	Lb	$1.10	$94,998.08
2060002	Backfill, Structure, CIP	4,858	Cyd	$9.70	$47,119.71
7060080	Wall Drain	134	Sft	$6.00	$804.00
Z000004	Fill, Lightweight, EPS Block	3,169	Cyd	$77.00	$243,980.67
				SUBTOTAL	**$2,025,290.00**
				Percent of structure cost	48%
Superstructure					
7060020	Superstructure Conc	143	Cyd	$134.50	$19,248.44
7060021	Superstructure Conc, Night Casting	549	Cyd	$178.50	$98,050.49
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$60,106.67	$60,106.67
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$233,453.55	$233,453.55
7060031	Expansion Joint Device	191	Ft	$123.63	$23,592.73
7060032	False Decking	36,818	Sft	$0.56	$20,617.80
7060035	Reinforcement, Steel, Epoxy Coated	173,784	Lb	$1.10	$191,162.58
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	549	Cyd	$2.04	$1,120.58
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
7070073	Bearing, Elastomeric, 3 inch	42	Sft	$185.00	$7,770.00
7080081	Prest Conc Box Beam, Furn, 42 inch	2,244	Ft	$176.63	$396,357.72
7080082	Prest Conc Box Beam, Erect, 42 inch	2,244	Ft	$12.00	$26,928.00
7110005	Bridge Railing, Aesthetic Parapet Tube	368	Ft	$155.84	$57,349.12
8190159	Conduit, Schedule 80 PVC, 3 inch	368	Ft	$7.50	$2,760.00
7120084	Reinforcement, Mechanical Splice	0	Ea	$41.96	$0.00
8080110	Fence, Structure	3,680	Sft	$10.01	$36,836.80
7160001	Field Repr of Damaged Coating	0	LS	$8,000.00	$0.00
				SUBTOTAL	**$1,185,230.00**
				Percent of structure cost	28%
Misc.					
6050101	Conc Quality Initiative	13,553	Dlr	$1.00	$13,552.64
7060008	Conc Quality Assurance, Structure	2,445	Cyd	$11.00	$26,894.12
				SUBTOTAL	**$40,450.00**
				Percent of structure cost	1.0%
Maintenance of Traffic				**SUBTOTAL**	**$0.00**
					0.0%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$16,254.85	$16,254.85
				SUBTOTAL	**$16,250.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$65,344.40	$65,344.40
				SUBTOTAL	**$65,340.00**
				Percent of structure cost	1.6%
	Aesthetics 1%	1	LS	$33,325.60	$33,325.60
					$33,330.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$3,365,890.00**
	Design Contingency 15%	1	LS	$504,883.50	$504,883.50
				SUBTOTAL	**$504,880.00**
				Percent of project cost	12.0%
1000001	Mobilization, Max, 10%	1	LS	$336,589.00	$336,589.00
				SUBTOTAL	**$336,590.00**
				Percent of project cost	8.0%
				TOTAL	**$4,207,360.00**

ASSUMPTIONS:

Area of Deck (ft2) = **17557**

(**) Special Provision Required

1) A 15% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new Green Avenue approach roadway is not included

3) Cost per square foot of deck does not include the cost of removing the existing bridge

COST PER FT^2 = **$208**

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 8/26/2008

Checked by: KMP Date: 9/5/2008

Green Ave. over I-75
Job # 802330
(in Detroit)

S08 of 82194

Bridge Replacement

23 - 39" Side-by-Side PPC Box Beam Alternative

((2) Span - 102'-0", 90'-0"), Full Height Abutment

Bridge Width=95'-5" including (1-20' U-turn lanes, 4-13' lanes, 1-10' sidewalk, 1-10' median, two 1'-8 1/2" aesthetic railing)
Bridge Length=192'-0"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
2040020	Structures, Rem	19,261	Sft	$25.00	$481,520.83
7040002	Steel Sheet Piling, Temp	1,313	Sft	$23.98	$31,485.74
7040003	Steel Sheet Piling, Temp, Left in Place	0	Sft	$23.48	$0.00
2060010	Excavation, Fdn	3,717	Cyd	$8.24	$30,628.08
4040033	Underdrain, Fdn, 6 inch	191	Ft	$7.04	$1,343.47
4040113	Underdrain, Outlet Ending, 6 inch	4	Ea	$115.94	$463.76
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	19,745	Ft	$26.00	$513,366.43
7060010	Substructure Conc	1,442	Cyd	$402.00	$579,581.46
7060035	Reinforcement, Steel, Epoxy Coated	86,362	Lb	$1.10	$94,998.08
2060002	Backfill, Structure, CIP	4,858	Cyd	$9.70	$47,119.71
7060080	Wall Drain	134	Sft	$6.00	$804.00
Z000004	Fill, Lightweight, EPS Block	3,169	Cyd	$77.00	$243,980.67
				SUBTOTAL	**$2,025,290.00**
				Percent of structure cost	45%
Superstructure					
7060020	Superstructure Conc	143	Cyd	$134.50	$19,248.44
7060021	Superstructure Conc, Night Casting	432	Cyd	$178.50	$77,024.25
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$60,106.67	$60,106.67
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$183,391.07	$183,391.07
7060031	Expansion Joint Device	191	Ft	$123.63	$23,592.73
7060032	False Decking	19,261	Sft	$0.56	$10,786.07
7060035	Reinforcement, Steel, Epoxy Coated	105,752	Lb	$1.10	$116,327.29
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	432	Cyd	$2.04	$880.28
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
7070073	Bearing, Elastomeric, 3 inch	110	Sft	$185.00	$20,350.00
7080075	Prest Conc Box Beam, Furn, 39 inch	4,301	Ft	$170.00	$731,170.00
7080076	Prest Conc Box Beam, Erect, 39 inch	4,301	Ft	$12.00	$51,612.00
7110005	Bridge Railing, Aesthetic Parapet Tube	368	Ft	$155.84	$57,349.12
8190159	Conduit, Schedule 80 PVC, 3 inch	368	Ft	$7.50	$2,760.00
7120084	Reinforcement, Mechanical Splice	0	Ea	$41.96	$0.00
8080110	Fence, Structure	3,680	Sft	$10.01	$36,836.80
7160001	Field Repr of Damaged Coating	0	LS	$8,000.00	$0.00
7080015	Post Tensioning	1	LS	$30,000.00	$30,000.00
				SUBTOTAL	**$1,431,310.00**
				Percent of structure cost	32%
Misc.					
6050101	Conc Quality Initiative	13,132	Dlr	$1.00	$13,132.11
7060008	Conc Quality Assurance, Structure	2,327	Cyd	$11.00	$25,598.38
				SUBTOTAL	**$38,730.00**
				Percent of structure cost	0.9%
Maintenance of Traffic				**SUBTOTAL**	**$0.00**
					0.0%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$17,476.65	$17,476.65
				SUBTOTAL	**$17,480.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$70,256.20	$70,256.20
				SUBTOTAL	**$70,260.00**
				Percent of structure cost	1.6%
	Aesthetics 1%	1	LS	$35,830.70	$35,830.70
					$35,830.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$3,618,900.00**
	Design Contingency 15%	1	LS	$542,835.00	$542,835.00
				SUBTOTAL	**$542,840.00**
				Percent of project cost	12.0%
1000001	Mobilization, Max, 10%	1	LS	$361,890.00	$361,890.00
				SUBTOTAL	**$361,890.00**
				Percent of project cost	8.0%
				TOTAL	**$4,523,630.00**

ASSUMPTIONS:

Area of Deck (ft2) = 17557

(**) Special Provision Required

1) A 15% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new Green Avenue approach roadway is not included

COST PER FT^2 = **$226**

3) Cost per square foot of deck does not include the cost of removing the existing bridge

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 8/26/2008

Checked by: KMP Date: 9/5/2008

Green Ave. over I-75
Job # 802330
(in Detroit)

S08 of 82194

Bridge Replacement

34" Web Steel Plate Girder Alternative

((2) Span - 102'-0", 90'-0"), Full Height Abutment

Bridge Width=95'-5" including (1-20' U-turn lanes, 4-13' lanes, 1-10' sidewalk, 1-10' median, two 1'-8 1/2" aesthetic railing)
Bridge Length=192'-0"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
2040020	Structures, Rem	19,261	Sft	$25	$481,520.83
7040002	Steel Sheet Piling, Temp	1,313	Sft	$23.98	$31,485.74
7040003	Steel Sheet Piling, Temp, Left in Place	0	Sft	$23.48	$0.00
2060010	Excavation, Fdn	3,717	Cyd	$8.24	$30,628.08
4040033	Underdrain, Fdn, 6 inch	191	Ft	$7.04	$1,343.47
4040113	Underdrain, Outlet Ending, 6 inch	4	Ea	$115.94	$463.76
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	19,745	Ft	$26.00	$513,366.43
7060010	Substructure Conc	1,442	Cyd	$402.00	$579,581.46
7060035	Reinforcement, Steel, Epoxy Coated	86,362	Lb	$1.10	$94,998.08
2060002	Backfill, Structure, CIP	4,858	Cyd	$9.70	$47,119.71
7060080	Wall Drain	134	Sft	$6.00	$804.00
Z000004	Fill, Lightweight, EPS Block	3,169	Cyd	$77.00	$243,980.67
				SUBTOTAL	**$2,025,290.00**
				Percent of structure cost	38%
Superstructure					
7060020	Superstructure Conc	143	Cyd	$134.50	$19,248.44
7060021	Superstructure Conc, Night Casting	522	Cyd	$178.50	$93,201.61
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$60,106.67	$60,106.67
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$221,908.59	$221,908.59
7060031	Expansion Joint Device	191	Ft	$123.63	$23,592.73
7060032	False Decking	36,818	Sft	$0.56	$20,617.80
7060035	Reinforcement, Steel, Epoxy Coated	173,784	Lb	$1.10	$191,162.58
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	522	Cyd	$2.04	$1,065.16
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
7070073	Bearing, Elastomeric, 3 inch	45	Sft	$185.00	$8,325.00
7070007	Structural Steel, Plate, Furn and Fab	642,539	Lb	$1.87	$1,201,547.80
7070008	Structural Steel, Plate, Erect	642,539	Lb	$0.18	$115,657.01
7110005	Bridge Railing, Aesthetic Parapet Tube	368	Ft	$155.84	$57,349.12
8190159	Conduit, Schedule 80 PVC, 3 inch	368	Ft	$7.50	$2,760.00
7120084	Reinforcement, Mechanical Splice		Ea	$41.96	$0.00
7070080	Shear Developers	1	LS	$28,335.64	$28,335.64
8080110	Fence, Structure	3,680	Sft	$10.01	$36,836.80
7160001	Field Repr of Damaged Coating	0	LS	$8,000.00	$0.00
				SUBTOTAL	**$2,091,590.00**
				Percent of structure cost	39%
Misc.					
6050101	Conc Quality Initiative	13,456	Dlr	$1.00	$13,455.66
7060008	Conc Quality Assurance, Structure	2,418	Cyd	$11.00	$26,595.31
				SUBTOTAL	**$40,050.00**
				Percent of structure cost	0.7%
Maintenance of Traffic				**SUBTOTAL**	**$0.00**
					0.0%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$20,784.65	$20,784.65
				SUBTOTAL	**$20,780.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$83,554.20	$83,554.20
				SUBTOTAL	**$83,550.00**
				Percent of structure cost	1.6%
	Aesthetics 1%	1	LS	$42,612.60	$42,612.60
					$42,610.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$4,303,870.00**
	Design Contingency 15%	1	LS	$645,580.50	$645,580.50
				SUBTOTAL	**$645,580.00**
				Percent of project cost	12.0%
1000001	Mobilization, Max, 10%	1	LS	$430,387.00	$430,387.00
				SUBTOTAL	**$430,390.00**
				Percent of project cost	8.0%
				TOTAL	**$5,379,840.00**

ASSUMPTIONS:

Area of Deck (ft2) = 17557

(**) Special Provision Required

1) A 15% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new Green Avenue approach roadway is not included

COST PER FT^2 = **$275**

3) Cost per square foot of deck does not include the cost of removing the existing bridge

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 8/22/2008

Checked by: KMP Date: 9/5/2008

Livernois Avenue over I-75
Job # 802330
(in Detroit)

S10 of 82194

Bridge Replacement

16 - 42" Spread PPC Box Beam Alternative

((2) Span - 108'-9.5", 97'-7.5"), Full Height Abutment

Bridge Width=103'-5" including (2-20' U-turn lanes, 3-13'-4" lanes, 2-10' medians, two 1'-8 1/2" aesthetic railing)
Bridge Length=206'-5"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
2040020	Structures, Rem	16,161	Sft	$25.00	$404,015.63
7040002	Steel Sheet Piling, Temp	1,423	Sft	$23.98	$34,129.36
7040003	Steel Sheet Piling, Temp, Left in Place	0	Sft	$23.48	$0.00
2060010	Excavation, Fdn	9,037	Cyd	$8.24	$74,464.74
4040033	Underdrain, Fdn, 6 inch	209	Ft	$7.04	$1,472.82
4040113	Underdrain, Outlet Ending, 6 inch	4	Ea	$115.94	$463.76
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	19,358	Ft	$26.00	$503,312.04
7060010	Substructure Conc	1,544	Cyd	$402.00	$620,624.36
7060035	Reinforcement, Steel, Epoxy Coated	92,900	Lb	$1.10	$102,189.56
2060002	Backfill, Structure, CIP	4,860	Cyd	$9.70	$47,146.76
7060080	Wall Drain	201	Sft	$6.00	$1,206.00
2067021	Lightweight Aggregate, Slag, LM	3,172	Cyd	$25.00	$79,289.22
				SUBTOTAL	**$1,868,310.00**
				Percent of structure cost	42%
Superstructure					
7060020	Superstructure Conc	156	Cyd	$134.50	$20,957.79
7060021	Superstructure Conc, Night Casting	659	Cyd	$178.50	$117,687.99
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$65,444.40	$65,444.40
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$280,209.50	$280,209.50
7060031	Expansion Joint Device	209	Ft	$123.63	$25,864.28
7060032	False Decking	36,880	Sft	$0.56	$20,652.68
7060035	Reinforcement, Steel, Epoxy Coated	201,643	Lb	$1.10	$221,807.53
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	615	Cyd	$2.04	$1,254.40
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
7070073	Bearing, Elastomeric, 3 inch	50	Sft	$185.00	$9,250.00
7080081	Prest Conc Box Beam, Furn, 42 inch	3,253	Ft	$176.63	$574,626.85
7080082	Prest Conc Box Beam, Erect, 42 inch	3,253	Ft	$12.00	$39,039.36
7110005	Bridge Railing, Aesthetic Parapet Tube	401	Ft	$155.84	$62,441.97
8190159	Conduit, Schedule 80 PVC, 3 inch	401	Ft	$7.50	$3,007.50
7120084	Reinforcement, Mechanical Splice	0	Ea	$41.96	$0.00
8080110	Fence, Structure	4,007	Sft	$10.01	$40,110.07
7160001	Field Repr of Damaged Coating	1	LS	$8,000.00	$8,000.00
				SUBTOTAL	**$1,500,230.00**
				Percent of structure cost	34%
Misc.					
6050101	Conc Quality Initiative	14,766	Dlr	$1.00	$14,766.25
7060008	Conc Quality Assurance, Structure	2,809	Cyd	$11.00	$30,893.93
				SUBTOTAL	**$45,660.00**
				Percent of structure cost	1.0%
Maintenance of Traffic				**SUBTOTAL**	**$25,000.00**
				Percent of structure cost	0.6%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$17,196.00	$17,196.00
				SUBTOTAL	**$17,200.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$69,128.00	$69,128.00
				SUBTOTAL	**$69,130.00**
				Percent of structure cost	1.6%
	Aesthetics 1%	1	LS	35255.3	$35,255.30
					$35,260.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$3,560,790.00**
	Design Contingency 15%	1	LS	$534,118.50	$534,118.50
				SUBTOTAL	**$534,120.00**
				Percent of project cost	12.0%
1000001	Mobilization, Max, 10%	1	LS	$356,079.00	$356,079.00
				SUBTOTAL	**$356,080.00**
				Percent of project cost	8.0%
				TOTAL	**$4,450,990.00**

ASSUMPTIONS:

Area of Deck (ft2) = **20720**

(**) Special Provision Required

1) A 15% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new Livernois Avenue approach roadway is not included

COST PER FT^2 = **$192**

3) Cost per square foot of deck does not include the cost of removing the existing bridge

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 8/22/2008

Checked by: KMP Date: 9/5/2008

Livernois Avenue over I-75
Job # 802330
(in Detroit)

S10 of 82194

Bridge Replacement

25 - 42" Side-by-Side PPC Box Beam Alternative

((2) Span - 108'-9.5", 97'-7.5"), Full Height Abutment

Bridge Width=103'-5" including (2-20' U-turn lanes, 3-13'-4" lanes, 2-10' medians, two 1'-8 1/2" aesthetic railing)
Bridge Length=206'-5"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
2040020	Structures, Rem	16,161	Sft	$25.00	$404,015.63
7040002	Steel Sheet Piling, Temp	1,423	Sft	$23.98	$34,129.36
7040003	Steel Sheet Piling, Temp, Left in Place	0	Sft	$23.48	$0.00
2060010	Excavation, Fdn	9,037	Cyd	$8.24	$74,464.74
4040033	Underdrain, Fdn, 6 inch	209	Ft	$7.04	$1,472.82
4040113	Underdrain, Outlet Ending, 6 inch	4	Ea	$115.94	$463.76
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	19,358	Ft	$26.00	$503,312.04
7060010	Substructure Conc	1,544	Cyd	$402.00	$620,624.36
7060035	Reinforcement, Steel, Epoxy Coated	92,900	Lb	$1.10	$102,189.56
2060002	Backfill, Structure, CIP	4,860	Cyd	$9.70	$47,146.76
7060080	Wall Drain	201	Sft	$6.00	$1,206.00
2067021	Lightweight Aggregate, Slag, LM	3,172	Cyd	$25.00	$79,289.22
				SUBTOTAL	**$1,868,310.00**
				Percent of structure cost	40%
Superstructure					
7060020	Superstructure Conc	156	Cyd	$134.50	$20,957.79
7060021	Superstructure Conc, Night Casting	509	Cyd	$178.50	$90,792.42
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$65,444.40	$65,444.40
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$216,172.43	$216,172.43
7060031	Expansion Joint Device	209	Ft	$123.63	$25,864.28
7060032	False Decking	16,161	Sft	$0.56	$9,049.95
7060035	Reinforcement, Steel, Epoxy Coated	105,830	Lb	$1.10	$116,413.12
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	615	Cyd	$2.04	$1,254.40
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
7070073	Bearing, Elastomeric, 3 inch	124	Sft	$185.00	$22,940.00
7080081	Prest Conc Box Beam, Furn, 42 inch	5,083	Ft	$176.63	$897,854.45
7080082	Prest Conc Box Beam, Erect, 42 inch	5,083	Ft	$12.00	$60,999.00
7110005	Bridge Railing, Aesthetic Parapet Tube	401	Ft	$155.84	$62,441.97
8190159	Conduit, Schedule 80 PVC, 3 inch	401	Ft	$7.50	$3,007.50
7120084	Reinforcement, Mechanical Splice	0	Ea	$41.96	$0.00
8080110	Fence, Structure	4,007	Sft	$10.01	$40,110.07
7160001	Field Repr of Damaged Coating	1	LS	$8,000.00	$8,000.00
7080015	Post Tensioning	1	LS	$30,000.00	$30,000.00
				SUBTOTAL	**$1,681,180.00**
				Percent of structure cost	36%
Misc.					
6050101	Conc Quality Initiative	14,228	Dlr	$1.00	$14,228.34
7060008	Conc Quality Assurance, Structure	2,658	Cyd	$11.00	$29,236.50
				SUBTOTAL	**$43,460.00**
				Percent of structure cost	0.9%
Maintenance of Traffic				**SUBTOTAL**	**$25,000.00**
				Percent of structure cost	0.5%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$18,089.75	$18,089.75
				SUBTOTAL	**$18,090.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$72,720.80	$72,720.80
				SUBTOTAL	**$72,720.00**
				Percent of structure cost	1.6%
	Aesthetics 1%	1	LS	37087.6	$37,087.60
					$37,090.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$3,745,850.00**
	Design Contingency 15%	1	LS	$561,877.50	$561,877.50
				SUBTOTAL	**$561,880.00**
				Percent of project cost	12.0%
1000001	Mobilization, Max, 10%	1	LS	$374,585.00	$374,585.00
				SUBTOTAL	**$374,590.00**
				Percent of project cost	8.0%
				TOTAL	**$4,682,320.00**

ASSUMPTIONS:

Area of Deck (ft2) = **20720**

(**) Special Provision Required

1) A 15% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new Livernois Avenue approach roadway is not included

COST PER FT^2 = **$204**

3) Cost per square foot of deck does not include the cost of removing the existing bridge

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: KMP Date: 8/12/2008

Checked by: MRB Date: 8/22/2008

Livernois Avenue over I-75
Job # 802330
(in Detroit)

S10 of 82194

Bridge Replacement

34" Web Steel Plate Girder Alternative

((2) Span - 108'-9.5", 97'-7.5"), Full Height Abutment

Bridge Width=103'-5" including (2-20' U-turn lanes, 3-13'-4" lanes, 2-10' medians, two 1'-8 1/2" aesthetic railing)
Bridge Length=206'-5"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
2040020	Structures, Rem	16,161	Sft	$25	$404,015.63
7040002	Steel Sheet Piling, Temp	1,423	Sft	$23.98	$34,129.36
7040003	Steel Sheet Piling, Temp, Left in Place	0	Sft	$23.48	$0.00
2060010	Excavation, Fdn	9,037	Cyd	$8.24	$74,464.74
4040033	Underdrain, Fdn, 6 inch	209	Ft	$7.04	$1,472.82
4040113	Underdrain, Outlet Ending, 6 inch	4	Ea	$115.94	$463.76
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	19,358	Ft	$26.00	$503,312.04
7060010	Substructure Conc	1,544	Cyd	$402.00	$620,624.36
7060035	Reinforcement, Steel, Epoxy Coated	92,900	Lb	$1.10	$102,189.56
2060002	Backfill, Structure, CIP	4,860	Cyd	$9.70	$47,146.76
7060080	Wall Drain	201	Sft	$6.00	$1,206.00
2067021	Lightweight Aggregate, Slag, LM	3,172	Cyd	$25.00	$79,289.22
				SUBTOTAL	**$1,868,310.00**
				Percent of structure cost	33%
Superstructure					
7060020	Superstructure Conc	156	Cyd	$134.50	$20,957.79
7060021	Superstructure Conc, Night Casting	615	Cyd	$178.50	$109,759.56
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$65,444.40	$65,444.40
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$261,332.30	$261,332.30
7060031	Expansion Joint Device	209	Ft	$123.63	$25,864.28
7060032	False Decking	36,880	Sft	$0.56	$20,652.68
7060035	Reinforcement, Steel, Epoxy Coated	201,643	Lb	$1.10	$221,807.53
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	615	Cyd	$2.04	$1,254.40
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
7070073	Bearing, Elastomeric, 3 inch	38	Sft	$185.00	$7,030.00
7070007	Structural Steel, Plate, Furn and Fab	746,291	Lb	$1.87	$1,395,564.09
7070008	Structural Steel, Plate, Erect	746,291	Lb	$0.18	$134,332.37
7110005	Bridge Railing, Aesthetic Parapet Tube	401	Ft	$155.84	$62,441.97
8190159	Conduit, Schedule 80 PVC, 3 inch	401	Ft	$7.50	$3,007.50
7120084	Reinforcement, Mechanical Splice		Ea	$41.96	$0.00
7070080	Shear Developers	1	LS	$33,225.19	$33,225.19
8080110	Fence, Structure	4,007	Sft	$10.01	$40,110.07
7160001	Field Repr of Damaged Coating	1	LS	$8,000.00	$8,000.00
				SUBTOTAL	**$2,420,660.00**
				Percent of structure cost	43%
Misc.					
6050101	Conc Quality Initiative	14,608	Dlr	$1.00	$14,607.68
7060008	Conc Quality Assurance, Structure	2,629	Cyd	$11.00	$28,920.19
				SUBTOTAL	**$43,530.00**
				Percent of structure cost	0.8%
Maintenance of Traffic				**SUBTOTAL**	**$25,000.00**
				Percent of structure cost	0.4%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$21,787.50	$21,787.50
				SUBTOTAL	**$21,790.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$87,585.80	$87,585.80
				SUBTOTAL	**$87,590.00**
				Percent of structure cost	1.6%
	Aesthetics 1%	1	LS	$44,668.80	$44,668.80
					$44,670.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$4,511,550.00**
	Design Contingency 15%	1	LS	$676,732.50	$676,732.50
				SUBTOTAL	**$676,730.00**
				Percent of project cost	12.0%
1000001	Mobilization, Max, 10%	1	LS	$451,155.00	$451,155.00
				SUBTOTAL	**$451,160.00**
				Percent of project cost	8.0%
				TOTAL	**$5,639,440.00**

ASSUMPTIONS:

Area of Deck (ft2) = **20720**

(**) Special Provision Required

1) A 15% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new Livernois Avenue approach roadway is not included

COST PER FT^2 = **$250**

3) Cost per square foot of deck does not include the cost of removing the existing bridge

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: KMP Date: 8/12/2008

Checked by: MRB Date: 8/22/2008

Livernois Avenue over I-75
Job # 802330
(in Detroit)

S10 of 82194

Bridge Replacement

36" Wide Flange Steel Beam Alternative

((2) Span - 108'-9.5", 97'-7.5"), Full Height Abutment

Bridge Width=103'-5" including (2-20' U-turn lanes, 3-13'-4" lanes, 2-10' medians, two 1'-8 1/2" aesthetic railing)
Bridge Length=206'-5"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
2040020	Structures, Rem	16,161	Sft	$25	$404,015.63
7040002	Steel Sheet Piling, Temp	1,423	Sft	$23.98	$34,129.36
7040003	Steel Sheet Piling, Temp, Left in Place	0	Sft	$23.48	$0.00
2060010	Excavation, Fdn	9,037	Cyd	$8.24	$74,464.74
4040033	Underdrain, Fdn, 6 inch	209	Ft	$7.04	$1,472.82
4040113	Underdrain, Outlet Ending, 6 inch	4	Ea	$115.94	$463.76
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	19,358	Ft	$26.00	$503,312.04
7060010	Substructure Conc	1,544	Cyd	$402.00	$620,624.36
7060035	Reinforcement, Steel, Epoxy Coated	92,900	Lb	$1.10	$102,189.56
2060002	Backfill, Structure, CIP	4,860	Cyd	$9.70	$47,146.76
7060080	Wall Drain	201	Sft	$6.00	$1,206.00
2067021	Lightweight Aggregate, Slag, LM	3,172	Cyd	$25.00	$79,289.22
				SUBTOTAL	**$1,868,310.00**
				Percent of structure cost	32%
Superstructure					
7060020	Superstructure Conc	156	Cyd	$134.50	$20,957.79
7060021	Superstructure Conc, Night Casting	615	Cyd	$178.50	$109,759.56
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$65,444.40	$65,444.40
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$261,332.30	$261,332.30
7060031	Expansion Joint Device	209	Ft	$123.63	$25,864.28
7060032	False Decking	36,880	Sft	$0.56	$20,652.68
7060035	Reinforcement, Steel, Epoxy Coated	201,643	Lb	$1.10	$221,807.53
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	615	Cyd	$2.04	$1,254.40
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
7070073	Bearing, Elastomeric, 3 inch	38	Sft	$185.00	$7,030.00
7070001	Structural Steel, Rolled Shape, Furn and Fab	974,288	Lb	$1.42	$1,383,489.54
7070002	Structural Steel, Rolled Shape, Erect	974,288	Lb	$0.29	$282,543.64
7110005	Bridge Railing, Aesthetic Parapet Tube	401	Ft	$155.84	$62,441.97
8190159	Conduit, Schedule 80 PVC, 3 inch	401	Ft	$7.50	$3,007.50
7120084	Reinforcement, Mechanical Splice	0	Ea	$41.96	$0.00
7070080	Shear Developers	1	LS	$33,225.19	$33,225.19
8080110	Fence, Structure	4,007	Sft	$10.01	$40,110.07
7160001	Field Repr of Damaged Coating	1	LS	$8,000.00	$8,000.00
				SUBTOTAL	**$2,556,800.00**
				Percent of structure cost	44%
Misc.					
6050101	Conc Quality Initiative	14,608	Dlr	$1.00	$14,607.68
7060008	Conc Quality Assurance, Structure	2,764	Cyd	$11.00	$30,405.34
				SUBTOTAL	**$45,010.00**
				Percent of structure cost	0.8%
Maintenance of Traffic				**SUBTOTAL**	**$25,000.00**
				Percent of structure cost	0.4%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$22,475.60	$22,475.60
				SUBTOTAL	**$22,480.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$90,352.00	$90,352.00
				SUBTOTAL	**$90,350.00**
				Percent of structure cost	1.6%
	Aesthetics 1%	1	LS	46079.5	$46,079.50
					$46,080.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$4,654,030.00**
	Design Contingency 15%	1	LS	$698,104.50	$698,104.50
				SUBTOTAL	**$698,100.00**
				Percent of project cost	12.0%
1000001	Mobilization, Max, 10%	1	LS	$465,403.00	$465,403.00
				SUBTOTAL	**$465,400.00**
				Percent of project cost	8.0%
				TOTAL	**$5,817,530.00**

ASSUMPTIONS:

Area of Deck (ft2) = **20720**

(**) Special Provision Required

1) A 15% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new Livernois Avenue approach roadway is not included

COST PER FT^2 = **$258**

3) Cost per square foot of deck does not include the cost of removing the existing bridge

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 8/26/2008

Checked by: KMP Date: 9/5/2008

Clark Ave. over I-75
Job # 802330
(in Detroit)

S12 of 82194

Bridge Replacement

16 - 42" Spread PPC Box Beam Alternative

((2) Span - 89'-7", 89'-7"), Full Height Abutment

Bridge Width=123'-5" including (2-20' U-turn lanes, 5-12' lanes, 2-10' median, two 1'-8 1/2" aesthetic railing)
Bridge Length=179'-2"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
2040020	Structures, Rem	17,906	Sft	$25.00	$447,651.04
7040002	Steel Sheet Piling, Temp	1,649	Sft	$23.98	$39,543.02
7040003	Steel Sheet Piling, Temp, Left in Place	1,815	Sft	$23.48	$42,612.53
2060010	Excavation, Fdn	9,777	Cyd	$8.24	$80,559.18
4040033	Underdrain, Fdn, 6 inch	247	Ft	$7.04	$1,737.71
4040113	Underdrain, Outlet Ending, 6 inch	4	Ea	$115.94	$463.76
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	20,903	Ft	$26.00	$543,470.92
7060010	Substructure Conc	1,751	Cyd	$402.00	$703,754.24
7060035	Reinforcement, Steel, Epoxy Coated	106,013	Lb	$1.10	$116,614.77
2067021	Lightweight Aggregate, Slag, LM	3,172	Cyd	$25.00	$79,289.22
7060080	Wall Drain	201	Sft	$6.00	$1,206.00
2060002	Backfill, Structure, CIP	4,860	Cyd	$9.70	$47,146.76
				SUBTOTAL	**$2,104,050.00**
				Percent of structure cost	46%
Superstructure					
7060020	Superstructure Conc	133	Cyd	$134.50	$17,888.50
7060021	Superstructure Conc, Night Casting	643	Cyd	$178.50	$114,863.51
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$55,860.00	$55,860.00
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$273,484.55	$273,484.55
7060031	Expansion Joint Device	247	Ft	$123.63	$30,516.01
7060032	False Decking	39,010	Sft	$0.56	$21,845.76
7060035	Reinforcement, Steel, Epoxy Coated	198,613	Lb	$1.10	$218,474.23
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	643	Cyd	$2.04	$1,312.73
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
7070073	Bearing, Elastomeric, 3 inch	48	Sft	$185.00	$8,880.00
7080081	Prest Conc Box Beam, Furn, 42 inch	2,784	Ft	$176.63	$491,737.92
7080082	Prest Conc Box Beam, Erect, 42 inch	2,784	Ft	$12.00	$33,408.00
7110005	Bridge Railing, Aesthetic Parapet Tube	342	Ft	$155.84	$53,297.28
8190159	Conduit, Schedule 80 PVC, 3 inch	342	Ft	$7.50	$2,565.00
7120084	Reinforcement, Mechanical Splice	0	Ea	$41.96	$0.00
8080110	Fence, Structure	3,420	Sft	$10.01	$34,234.20
7160001	Field Repr of Damaged Coating	0	LS	$8,000.00	$0.00
				SUBTOTAL	**$1,368,240.00**
				Percent of structure cost	30%
Misc.					
6050101	Conc Quality Initiative	16,372	Dlr	$1.00	$16,372.35
7060008	Conc Quality Assurance, Structure	2,741	Cyd	$11.00	$30,154.56
				SUBTOTAL	**$46,530.00**
				Percent of structure cost	1.0%
Maintenance of Traffic				**SUBTOTAL**	**$25,000.00**
					0.5%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$17,719.10	$17,719.10
				SUBTOTAL	**$17,720.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$71,230.80	$71,230.80
				SUBTOTAL	**$71,230.00**
				Percent of structure cost	1.6%
	Aesthetics 1%	1	LS	$36,327.70	$36,327.70
					$36,330.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$3,669,100.00**
	Design Contingency 15%	1	LS	$550,365.00	$550,365.00
				SUBTOTAL	**$550,370.00**
				Percent of project cost	12.0%
1000001	Mobilization, Max, 10%	1	LS	$366,910.00	$366,910.00
				SUBTOTAL	**$366,910.00**
					8.0%
				TOTAL	**$4,586,380.00**

ASSUMPTIONS:

Area of Deck (ft2) = **21105**

(**) Special Provision Required

1) A 15% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new Livernois Avenue approach roadway is not included

COST PER FT^2 = **$193**

3) Cost per square foot of deck does not include the cost of removing the existing bridge

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 8/26/2008

Checked by: KMP Date: 9/5/2008

Clark Ave. over I-75
Job # 802330
(in Detroit)

S12 of 82194

Bridge Replacement

39 - 42" Side-by-Side PPC Box Beam Alternative

((2) Span - 89'-7", 89'-7"), Full Height Abutment

Bridge Width=123'-5" including (2-20' U-turn lanes, 5-12' lanes, 2-10' median, two 1'-8 1/2" aesthetic railing)
Bridge Length=179'-2"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
2040020	Structures, Rem	17,906	Sft	$25.00	$447,651.04
7040002	Steel Sheet Piling, Temp	1,649	Sft	$23.98	$39,543.02
7040003	Steel Sheet Piling, Temp, Left in Place	1,815	Sft	$23.48	$42,612.53
2060010	Excavation, Fdn	9,777	Cyd	$8.24	$80,559.18
4040033	Underdrain, Fdn, 6 inch	247	Ft	$7.04	$1,737.71
4040113	Underdrain, Outlet Ending, 6 inch	4	Ea	$115.94	$463.76
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	20,903	Ft	$26.00	$543,470.92
7060010	Substructure Conc	1,751	Cyd	$402.00	$703,754.24
7060035	Reinforcement, Steel, Epoxy Coated	106,013	Lb	$1.10	$116,614.77
2067021	Lightweight Aggregate, Slag, LM	3,172	Cyd	$25.00	$79,289.22
7060080	Wall Drain	201	Sft	$6.00	$1,206.00
2060002	Backfill, Structure, CIP	4,860	Cyd	$9.70	$47,146.76
				SUBTOTAL	**$2,104,050.00**
				Percent of structure cost	39%
Superstructure					
7060020	Superstructure Conc	133	Cyd	$134.50	$17,888.50
7060021	Superstructure Conc, Night Casting	519	Cyd	$178.50	$92,590.78
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$55,860.00	$55,860.00
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$220,454.23	$220,454.23
7060031	Expansion Joint Device	247	Ft	$123.63	$30,516.01
7060032	False Decking	17,906	Sft	$0.56	$10,027.38
7060035	Reinforcement, Steel, Epoxy Coated	116,834	Lb	$1.10	$128,517.37
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	519	Cyd	$2.04	$1,058.18
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
7070073	Bearing, Elastomeric, 3 inch	154	Sft	$185.00	$28,490.00
7080081	Prest Conc Box Beam, Furn, 42 inch	6,786	Ft	$176.63	$1,198,611.18
7080082	Prest Conc Box Beam, Erect, 42 inch	6,786	Ft	$12.00	$81,432.00
7110005	Bridge Railing, Aesthetic Parapet Tube	342	Ft	$155.84	$53,297.28
8190159	Conduit, Schedule 80 PVC, 3 inch	342	Ft	$7.50	$2,565.00
7120084	Reinforcement, Mechanical Splice	0	Ea	$41.96	$0.00
8080110	Fence, Structure	3,420	Sft	$10.01	$34,234.20
7160001	Field Repr of Damaged Coating	0	LS	$8,000.00	$0.00
7080015	Post Tensioning	1	LS	$30,000.00	$30,000.00
				SUBTOTAL	**$1,995,420.00**
				Percent of structure cost	37%
Misc.					
6050101	Conc Quality Initiative	15,927	Dlr	$1.00	$15,926.90
7060008	Conc Quality Assurance, Structure	2,617	Cyd	$11.00	$28,782.01
				SUBTOTAL	**$44,710.00**
				Percent of structure cost	0.8%
Maintenance of Traffic				**SUBTOTAL**	**$25,000.00**
					0.5%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$20,845.90	$20,845.90
				SUBTOTAL	**$20,850.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$83,800.60	$83,800.60
				SUBTOTAL	**$83,800.00**
				Percent of structure cost	1.6%
	Aesthetics 1%	1	LS	$42,738.30	$42,738.30
					$42,740.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$4,316,570.00**
	Design Contingency 15%	1	LS	$647,485.50	$647,485.50
				SUBTOTAL	**$647,490.00**
				Percent of project cost	12.0%
1000001	Mobilization, Max, 10%	1	LS	$431,657.00	$431,657.00
				SUBTOTAL	**$431,660.00**
					8.0%
				TOTAL	**$5,395,720.00**

ASSUMPTIONS:

Area of Deck (ft2) = **21105**

(**) Special Provision Required

1) A 15% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new Livernois Avenue approach roadway is not included

COST PER FT^2 = **$231**

3) Cost per square foot of deck does not include the cost of removing the existing bridge

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 8/26/2008

Checked by: KMP Date: 9/5/2008

Clark Ave. over I-75
Job # 802330
(in Detroit)

S12 of 82194

Bridge Replacement

34" Web Steel Plate Girder Alternative

((2) Span - 89'-7", 89'-7"), Full Height Abutment

Bridge Width=123'-5" including (2-20' U-turn lanes, 5-12' lanes, 2-10' median, two 1'-8 1/2" aesthetic railing)
Bridge Length=179'-2"

ITEM		QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
2040020	Structures, Rem	17,906	Sft	$25	$447,651.04
7040002	Steel Sheet Piling, Temp	1,649	Sft	$23.98	$39,543.02
7040003	Steel Sheet Piling, Temp, Left in Place	1,815	Sft	$23.48	$42,612.53
2060010	Excavation, Fdn	9,777	Cyd	$8.24	$80,559.18
4040033	Underdrain, Fdn, 6 inch	247	Ft	$7.04	$1,737.71
4040113	Underdrain, Outlet Ending, 6 inch	4	Ea	$115.94	$463.76
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	20,903	Ft	$26.00	$543,470.92
7060010	Substructure Conc	1,751	Cyd	$402.00	$703,754.24
7060035	Reinforcement, Steel, Epoxy Coated	106,013	Lb	$1.10	$116,614.77
2067021	Lightweight Aggregate, Slag, LM	3,172	Cyd	$25.00	$79,289.22
7060080	Wall Drain	201	Sft	$6.00	$1,206.00
2060002	Backfill, Structure, CIP	4,860	Cyd	$9.70	$47,146.76
				SUBTOTAL	**$2,104,050.00**
				Percent of structure cost	35%
Superstructure					
7060020	Superstructure Conc	133	Cyd	$134.50	$17,888.50
7060021	Superstructure Conc, Night Casting	625	Cyd	$178.50	$111,487.71
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$55,860.00	$55,860.00
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$265,446.93	$265,446.93
7060031	Expansion Joint Device	247	Ft	$123.63	$30,516.01
7060032	False Decking	39,010	Sft	$0.56	$21,845.76
7060035	Reinforcement, Steel, Epoxy Coated	198,613	Lb	$1.10	$218,474.23
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	625	Cyd	$2.04	$1,274.15
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
7070073	Bearing, Elastomeric, 3 inch	50	Sft	$185.00	$9,250.00
7070007	Structural Steel, Plate, Furn and Fab	755,595	Lb	$1.87	$1,412,961.88
7070008	Structural Steel, Plate, Erect	755,595	Lb	$0.18	$136,007.03
7110005	Bridge Railing, Aesthetic Parapet Tube	342	Ft	$155.84	$53,297.28
8190159	Conduit, Schedule 80 PVC, 3 inch	342	Ft	$7.50	$2,565.00
7120084	Reinforcement, Mechanical Splice		Ea	$41.96	$0.00
7070080	Shear Developers	1	LS	$34,436.33	$34,436.33
8080110	Fence, Structure	3,420	Sft	$10.01	$34,234.20
7160001	Field Repr of Damaged Coating	0	LS	$8,000.00	$0.00
				SUBTOTAL	**$2,415,420.00**
				Percent of structure cost	41%
Misc.					
6050101	Conc Quality Initiative	16,305	Dlr	$1.00	$16,304.84
7060008	Conc Quality Assurance, Structure	2,722	Cyd	$11.00	$29,946.53
				SUBTOTAL	**$46,250.00**
				Percent of structure cost	0.8%
Maintenance of Traffic				**SUBTOTAL**	**$25,000.00**
					0.4%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$22,953.60	$22,953.60
				SUBTOTAL	**$22,950.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$92,273.40	$92,273.40
				SUBTOTAL	**$92,270.00**
				Percent of structure cost	1.6%
	Aesthetics 1%	1	LS	$47,059.40	$47,059.40
					$47,060.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$4,753,000.00**
	Design Contingency 15%	1	LS	$712,950.00	$712,950.00
				SUBTOTAL	**$712,950.00**
				Percent of project cost	12.0%
1000001	Mobilization, Max, 10%	1	LS	$475,300.00	$475,300.00
				SUBTOTAL	**$475,300.00**
					8.0%
				TOTAL	**$5,941,250.00**

ASSUMPTIONS: **Area of Deck (ft2) =** **21105**

(**) Special Provision Required

1) A 15% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new Livernois Avenue approach roadway is not included **COST PER FT^2 =** **$257**

3) Cost per square foot of deck does not include the cost of removing the existing bridge

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate (Major Pay Items)

Prepared by: KMP Date: 10/012008

Checked by: Date:

Ramp A over Fort Street and Ramp F
Job # 802330
(in Detroit)

S37 of 82194

New Bridge

84" Web Curved Steel Plate Girder Alternative (Radius = 1340 feet)

Spans 166'-0", 166'-0", 212'-0" and 166'-0", Stub Abutments

Bridge Width=45'-3" including (2-12'-lanes, 8'inside and 10' outside shoulder, 1'-7 1/2" parapets)
Bridge Length=544'-0"

ITEM		QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	27,859	Ft	$26.00	$724,326.31
7060010	Substructure Conc	1,145	Cyd	$402.00	$460,285.95
7060035	Reinforcement, Steel, Epoxy Coated	125,229	Lb	$1.10	$137,751.61
2060010	Excavation, Fdn	921	Cyd	$8.24	$7,586.18
2060002	Backfill, Structure, CIP	1,021	Cyd	$9.70	$9,907.68
2067021	Lightweight Aggregate, Slag, LM	705	Cyd	$25.00	$17,632.55
				SUBTOTAL	**$1,357,490.00**
				Percent of structure cost	15%
Superstructure					
7060020	Superstructure Conc	163	Cyd	$134.50	$21,978.17
7060021	Superstructure Conc, Night Casting	967	Cyd	$178.50	$172,604.64
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$68,630.73	$68,630.73
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$410,963.44	$410,963.44
Z000003	Modular Expansion Joint		Ft	$1,189.00	$0.00
7060031	Expansion Joint Device	88	Ft	$123.63	$10,909.36
7060032	False Decking	31,599	Sft	$0.56	$17,695.39
7060035	Reinforcement, Steel, Epoxy Coated	325,008	Lb	$1.10	$357,508.53
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	967	Cyd	$2.04	$1,972.62
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
Z000001	Floating Expansion Bearing	28	Ea	$1,984.50	$55,566.00
7070007	Structural Steel, Plate, Furn and Fab	2,053,929	Lb	$1.87	$3,840,847.16
7070008	Structural Steel, Plate, Erect	2,053,929	Lb	$0.18	$369,707.21
7070080	Shear Developers	1	LS	$28,440.00	$28,440.00
7160001	Field Repr of Damaged Coating	1	LS	$8,000.00	$8,000.00
				SUBTOTAL	**$5,374,700.00**
				Percent of structure cost	59%
Misc.					
6050101	Conc Quality Initiative	12,658	Dlr	$1.00	$12,657.81
7060008	Conc Quality Assurance, Structure	2,275	Cyd	$11.00	$25,029.06
				SUBTOTAL	**$37,690.00**
				Percent of structure cost	0.4%
Maintenance of Traffic				**SUBTOTAL**	**$25,000.00**
				Percent of structure cost	0.3%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$33,974.40	$33,974.40
				SUBTOTAL	**$33,970.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$136,577.00	$136,577.00
				SUBTOTAL	**$136,580.00**
				Percent of structure cost	1.5%
	Aesthetics 1%	1	LS	$69,654.30	$69,654.30
					$69,650.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$7,035,080.00**
	Design Contingency 20%	1	LS	$1,407,016.00	$1,407,016.00
				SUBTOTAL	**$1,407,020.00**
				Percent of project cost	15.4%
1000001	Mobilization, Max, 10%	1	LS	$703,508.00	$703,508.00
				SUBTOTAL	**$703,510.00**
				Percent of project cost	7.7%
				TOTAL	**$9,146,000.00**

ASSUMPTIONS: **Area of Deck (ft2) =** **31,599**

(**) Special Provision Required

1) A 20% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new approach roadway is not included **COST PER FT^2 =** **$289**

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate (Major Pay Items)

Prepared by: KMP Date: 10//12008

Checked by: Date:

Ramp B over NB Service Drive, Livernois and Fort Street
Job # 802330
(in Detroit)

S38 of 82194

New Bridge

Unit 1 - 54" Web Curved Steel Plate Girder Alternative (Radius = 1500 feet)
Spans 127'-6", 158'-9", 150'-3" and 110'-0" with Stub Abutment
Unit 2 - 84" Web Curved Steel Plate Girder Alternative (Radius = 1500 feet)
Spans 251'-6" and 151'-6" with Stub Abutment

Bridge Width=45'-3" including (2-12'-lanes, 8'inside and 10' outside shoulder, 1'-7 1/2" parapets)
Bridge Length=949'-6"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	27,620	Ft	$26.00	$718,131.77
7060010	Substructure Conc	1,447	Cyd	$402.00	$581,721.87
7060035	Reinforcement, Steel, Epoxy Coated	156,594	Lb	$1.10	$172,253.35
Z000004	Fill, Lightweight, EPS Block	983	Cyd	$77.00	$75,691.34
2060010	Excavation, Fdn	921	Cyd	$8.24	$7,586.18
2060002	Backfill, Structure, CIP	4,302	Cyd	$9.70	$41,730.32
2067021	Lightweight Aggregate, Slag, LM	472	Cyd	$25.00	$11,810.09
				SUBTOTAL	**$1,608,920.00**
				Percent of structure cost	12%
Superstructure					
7060020	Superstructure Conc	224	Cyd	$134.50	$30,102.90
7060021	Superstructure Conc, Night Casting	1,313	Cyd	$178.50	$234,284.02
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$94,001.63	$94,001.63
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$557,819.09	$557,819.09
Z000003	Modular Expansion Joint	132	Ft	$1,189.00	$157,379.61
7060031	Expansion Joint Device		Ft	$123.63	$0.00
7060032	False Decking	43,280	Sft	$0.56	$24,236.89
7060035	Reinforcement, Steel, Epoxy Coated	441,578	Lb	$1.10	$485,735.83
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	1,313	Cyd	$2.04	$2,677.53
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
Z000001	Floating Expansion Bearing	56	Ea	$1,984.50	$111,132.00
7070007	Structural Steel, Plate, Furn and Fab	3,183,276	Lb	$1.87	$5,952,725.79
7070008	Structural Steel, Plate, Erect	3,183,276	Lb	$0.18	$572,989.65
7070080	Shear Developers	1	LS	$38,952.00	$38,952.00
7160001	Field Repr of Damaged Coating	1	LS	$8,000.00	$8,000.00
				SUBTOTAL	**$8,279,910.00**
				Percent of structure cost	62%
Misc.					
6050101	Conc Quality Initiative	16,320	Dlr	$1.00	$16,320.12
7060008	Conc Quality Assurance, Structure	2,983	Cyd	$11.00	$32,817.38
				SUBTOTAL	**$49,140.00**
				Percent of structure cost	0.4%
Maintenance of Traffic				**SUBTOTAL**	**$25,000.00**
				Percent of structure cost	0.2%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$49,814.85	$49,814.85
				SUBTOTAL	**$49,810.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$200,255.60	$200,255.60
				SUBTOTAL	**$200,260.00**
				Percent of structure cost	1.5%
	Aesthetics 1%	1	LS	$102,130.40	$102,130.40
					$102,130.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$10,315,170.00**
	Design Contingency 20%	1	LS	$2,063,034.00	$2,063,034.00
				SUBTOTAL	**$2,063,030.00**
				Percent of project cost	15.4%
1000001	Mobilization, Max, 10%	1	LS	$1,031,517.00	$1,031,517.00
				SUBTOTAL	**$1,031,520.00**
				Percent of project cost	7.7%
				TOTAL	**$13,410,000.00**

ASSUMPTIONS: **Area of Deck (ft2) =** **43,280**

(**) Special Provision Required

1) A 20% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new approach roadway is not included **COST PER FT^2 =** **$310**

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate (Major Pay Items)

Prepared by: KMP Date: 9/26/2008

Checked by: Date:

Ramp C over I-75
Job # 802330
(in Detroit)

S39 of 82194 and S40 of 82194

New Bridges

S39 of 82194 - 84" Web Curved Steel Plate Girder Alternative (Radius = 1641 feet)
Spans 153'-0", 257'-8", 192'-6", 159'-6", 198'-6" and 142'-0", High Wall and Pile Bent Abutments
S40 of 82194 - 54" Web Curved Steel Plate Girder Alternative (Radius = 818 feet)
Spans 86'-8"and 114'-8", High Wall Abutments, Straddle Bent

Bridge Width=45'-3" including (2-12'-lanes, 8'inside and 10' outside shoulder, 1'-7 1/2" parapets)
Bridge Length=1103'-2" (Structure 1), 201'-4" (Structure 2)

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	65,621	Ft	$26.00	$1,706,139.55
7060010	Substructure Conc	3,385	Cyd	$402.00	$1,360,589.48
7060035	Reinforcement, Steel, Epoxy Coated	430,278	Lb	$1.10	$473,305.56
2067021	Lightweight Aggregate, Slag, LM	3,337	Cyd	$25.00	$83,436.93
Z000004	Fill, Lightweight, EPS Block	3,337	Cyd	$77.00	$256,985.74
2060010	Excavation, Fdn	436	Cyd	$8.24	$3,590.50
2060002	Backfill, Structure, CIP	3,426	Cyd	$9.70	$33,235.40
				SUBTOTAL	**$3,917,280.00**
				Percent of structure cost	17%
Superstructure					
7060020	Superstructure Conc	367	Cyd	$134.50	$49,320.78
7060021	Superstructure Conc, Night Casting	2,151	Cyd	$178.50	$383,934.93
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$154,012.84	$154,012.84
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$914,130.78	$914,130.78
Z000003	Modular Expansion Joint	88	Ft	$1,189.00	$104,919.74
7060031	Expansion Joint Device	112	Ft	$123.63	$13,876.48
7060032	False Decking	70,926	Sft	$0.56	$39,718.29
7060035	Reinforcement, Steel, Epoxy Coated	723,623	Lb	$1.10	$795,985.18
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	2,151	Cyd	$2.04	$4,387.83
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
Z000001	Floating Expansion Bearing	56	Ea	$1,984.50	$111,132.00
7070007	Structural Steel, Plate, Furn and Fab	4,875,231	Lb	$1.87	$9,116,682.13
7070008	Structural Steel, Plate, Erect	4,875,231	Lb	$0.18	$877,541.60
7070080	Shear Developers	1	LS	$63,832.00	$63,832.00
7160001	Field Repr of Damaged Coating	1	LS	$8,000.00	$8,000.00
				SUBTOTAL	**$12,647,350.00**
				Percent of structure cost	56%
Misc.					
6050101	Conc Quality Initiative	34,890	Dlr	$1.00	$34,890.49
7060008	Conc Quality Assurance, Structure	5,902	Cyd	$11.00	$64,923.59
				SUBTOTAL	**$99,810.00**
				Percent of structure cost	0.4%
Maintenance of Traffic				**SUBTOTAL**	**$25,000.00**
				Percent of structure cost	0.1%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$83,447.20	$83,447.20
				SUBTOTAL	**$83,450.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$335,457.80	$335,457.80
				SUBTOTAL	**$335,460.00**
				Percent of structure cost	1.5%
	Aesthetics 1%	1	LS	$171,083.50	$171,083.50
					$171,080.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$17,279,430.00**
	Design Contingency 20%	1	LS	$3,455,886.00	$3,455,886.00
				SUBTOTAL	**$3,455,890.00**
				Percent of project cost	15.4%
1000001	Mobilization, Max, 10%	1	LS	$1,727,943.00	$1,727,943.00
				SUBTOTAL	**$1,727,940.00**
				Percent of project cost	7.7%
				TOTAL	**$22,463,000.00**

ASSUMPTIONS: **Area of Deck (ft2) =** **70925**

(**) Special Provision Required

1) A 20% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new approach roadway is not included **COST PER FT^2 =** **$317**

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate (Major Pay Items)

Prepared by: KMP Date: 9/24/2008

Checked by: Date:

Ramp D over I-75
Job # 802330
(in Detroit)

S41 of 82194

New Bridge

114" and 84" Web Curved Steel Plate Girder Alternative (Radius = 1574 feet)

Unit 1 Spans 181'-2", 170'-10", 170'-10", 170'-10" and 149'-10", Unit 2 Spans 241'-6", 357'-6" and 241'-6". Pile Bent Abutment

Bridge Width=45'-3" including (2-12'-lanes, 8'inside and 10' outside shoulder, 1'-7 1/2" parapets)

Bridge Length=1684'-0"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	53,548	Ft	$26.00	$1,392,259.59
7060010	Substructure Conc	2,724	Cyd	$402.00	$1,095,106.79
7060035	Reinforcement, Steel, Epoxy Coated	382,508	Lb	$1.10	$420,758.99
2067021	Lightweight Aggregate, Slag, LM	816	Cyd	$25.00	$20,404.40
2060010	Excavation, Fdn	461	Cyd	$8.24	$3,797.65
2060002	Backfill, Structure, CIP	1,125	Cyd	$9.70	$10,911.35
				SUBTOTAL	**$2,943,240.00**
				Percent of structure cost	13%
Superstructure					
7060020	Superstructure Conc	366	Cyd	$134.50	$49,192.46
7060021	Superstructure Conc, Night Casting	2,295	Cyd	$178.50	$409,585.54
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$153,612.13	$153,612.13
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$975,203.67	$975,203.67
Z000003	Modular Expansion Joint	132	Ft	$1,189.00	$157,379.61
7060032	False Decking	75,670	Sft	$0.56	$42,375.04
7060035	Reinforcement, Steel, Epoxy Coated	664,585	Lb	$1.10	$731,043.50
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	2,295	Cyd	$2.04	$4,680.98
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
Z000001	Floating Expansion Bearing	56	Ea	$1,984.50	$111,132.00
7070007	Structural Steel, Plate, Furn and Fab	6,824,765	Lb	$1.50	$10,237,147.50
7070008	Structural Steel, Plate, Erect	6,824,765	Lb	$0.18	$1,228,457.70
7070080	Shear Developers	1	LS	$34,160.00	$34,160.00
7160001	Field Repr of Damaged Coating	1	LS	$8,000.00	$8,000.00
				SUBTOTAL	**$14,151,850.00**
				Percent of structure cost	61%
Misc.					
6050101	Conc Quality Initiative	30,094	Dlr	$1.00	$30,093.85
7060008	Conc Quality Assurance, Structure	5,384	Cyd	$11.00	$59,229.35
				SUBTOTAL	**$89,320.00**
				Percent of structure cost	0.4%
Maintenance of Traffic				**SUBTOTAL**	**$25,000.00**
				Percent of structure cost	0.1%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$86,047.05	$86,047.05
				SUBTOTAL	**$86,050.00**
					0.4%
1040005	Contractor Staking, Bridge 2%	1	LS	$345,909.20	$345,909.20
				SUBTOTAL	**$345,910.00**
				Percent of structure cost	1.5%
	Aesthetics 1%	1	LS	$176,413.70	$176,413.70
					$176,410.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$17,817,780.00**
	Design Contingency 20%	1	LS	$3,563,556.00	$3,563,556.00
				SUBTOTAL	**$3,563,560.00**
				Percent of project cost	15.4%
1000001	Mobilization, Max, 10%	1	LS	$1,781,778.00	$1,781,778.00
				SUBTOTAL	**$1,781,780.00**
				Percent of project cost	7.7%
				TOTAL	**$23,163,000.00**

ASSUMPTIONS:

Area of Deck (ft2) = 75670

(**) Special Provision Required

1) A 20% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new approach roadway is not included

COST PER FT^2 = **$306**

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: AJK Date: 10/30/2008

Checked by: KMP Date: 11/11/2008

Ramp E over Ramp F
Job # 802330
(in Detroit)

S42 of 82194

6 - 42" Spread PPC Box Beam Alternative

Single Span - (112'-0"), Full Height Abutment

Bridge Width=37'-8" including (34'-0" of Roadway, two 1'-7 1/2" aesthetic railing, and 5" to accommodate tangent strucutre on curved alignemnt)

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	8,209	Ft	$26.00	$213,444.42
7060010	Substructure Conc	985	Cyd	$402.00	$395,951.39
7060035	Reinforcement, Steel, Epoxy Coated	49,248	Lb	$1.10	$54,172.45
2067021	Lightweight Aggregate, Slag, LM	2,148	Cyd	$25.00	$53,707.00
2060010	Excavation, Fdn	3,088	Cyd	$8.24	$25,445.72
2060002	Backfill, Structure, CIP	496	Cyd	$9.70	$4,809.48
				SUBTOTAL	**$747,530.00**
				Percent of structure cost	54%
Superstructure					
7060020	Superstructure Conc	27	Cyd	$134.50	$3,603.66
7060021	Superstructure Conc, Night Casting	139	Cyd	$178.50	$24,885.48
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$11,253.06	$11,253.06
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$59,251.14	$59,251.14
7060031	Expansion Joint Device	40	Ft	$123.63	$4,945.20
7060035	Reinforcement, Steel, Epoxy Coated	39,149	Lb	$1.10	$43,064.44
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	139	Cyd	$2.04	$284.41
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
7070073	Bearing, Elastomeric, 3 inch	23	Sft	$185.00	$4,255.00
7080081	Prest Conc Box Beam, Furn, 42 inch	675	Ft	$176.63	$119,225.25
7080082	Prest Conc Box Beam, Erect, 42 inch	675	Ft	$12.00	$8,100.00
				SUBTOTAL	**$288,740.00**
				Percent of structure cost	21%
Maintenance of Traffic				**SUBTOTAL**	**$0.00**
				Percent of structure cost	0.0%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$5,181.35	$5,181.35
				SUBTOTAL	**$5,180.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$20,829.00	$20,829.00
				SUBTOTAL	**$20,830.00**
				Percent of structure cost	1.5%
	Aesthetics 1%	1	LS	$10,622.80	$10,622.80
					$10,620.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$1,072,900.00**
	Design Contingency 20%	1	LS	$214,580.00	$214,580.00
				SUBTOTAL	**$214,580.00**
				Percent of project cost	15.4%
1000001	Mobilization, Max, 10%	1	LS	$107,290.00	$107,290.00
				SUBTOTAL	**$107,290.00**
				Percent of project cost	7.7%
				TOTAL	**$1,394,770.00**

ASSUMPTIONS:

Area of Deck (ft2) = 4313

(**) Special Provision Required

1) A 20% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new Ramp E approach roadway is not included

3) Wing walls included in the Cost Estimate and the Square Foot Cost.

COST PER FT^2 = **$323**

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 10/2/2008

Checked by: KMP Date: 11/12/2008

Ramp E over Ramp F
Job # 802330
(in Detroit)

Three-Sided Concrete Structure

Bridge Clear Width=42'-0"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	8,103	Ft	$26.00	$210,690.58
7060010	Substructure Conc	954	Cyd	$402.00	$383,575.00
7060035	Reinforcement, Steel, Epoxy Coated	47,708	Lb	$1.10	$52,479.17
				SUBTOTAL	**$646,740.00**
				Percent of structure cost	41%
Superstructure					
	Three-Sided Concrete Structure	126	LF	$4,000.00	$504,000.00
				SUBTOTAL	**$504,000.00**
				Percent of structure cost	32%
Misc.					
6050101	Conc Quality Initiative	7,672	Dlr	$1.00	$7,671.50
7060008	Conc Quality Assurance, Structure	954	Cyd	$11.00	$10,495.83
				SUBTOTAL	**$18,170.00**
				Percent of structure cost	1.2%
Maintenance of Traffic				**SUBTOTAL**	**$0.00**
					0.0%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$5,844.55	$5,844.55
				SUBTOTAL	**$5,840.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$23,495.00	$23,495.00
				SUBTOTAL	**$23,500.00**
				Percent of structure cost	1.5%
	Aesthetics	1	LS	$11,982.50	$11,982.50
					$11,980.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$1,210,230.00**
	Design Contingency 20%	1	LS	$242,046.00	$242,046.00
				SUBTOTAL	**$242,050.00**
				Percent of project cost	15.4%
1000001	Mobilization, Max, 10%	1	LS	$121,023.00	$121,023.00
				SUBTOTAL	**$121,020.00**
				Percent of project cost	7.7%
				TOTAL	**$1,573,300.00**

ASSUMPTIONS:

(**) Special Provision Required

1) A 20% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices
2) Area of Deck taken as Bridge Alternative.
3) Wing walls included in the Cost Estimate and the Square Foot Cost.
4) Roadway not included in the cost.

Area of Deck (ft2) = **4313**

COST PER FT^2 = **$365**

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate (Major Pay Items)

Prepared by: KMP Date: 10/7/2008

Checked by: Date:

Ramps B & D over the Norfolk Southern RR and Plaza Drive
Job # 802330
(in Detroit)

R01-3 of 82194

New Bridges

38" Web Steel Plate Girder Alternative

Spans 123'-6" Max. Span, Flared Girders High Wall Abutments

Bridge Width varies 81'-2 1/4" to 125'-9 5/8" including (4-12'-lanes, 8' min. inside and 10' min. outside shoulder, 1'-6" parapets)
Bridge Length=117'-6" (+/-)

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	32,122	Ft	$26.00	$835,178.04
7060010	Substructure Conc	2,257	Cyd	$402.00	$907,233.60
7060035	Reinforcement, Steel, Epoxy Coated	225,680	Lb	$1.10	$248,248.00
Z000004	Fill, Lightweight, EPS Block	6,495	Cyd	$77.00	$500,115.91
2060010	Excavation, Fdn	1,265	Cyd	$8.24	$10,424.36
2060002	Backfill, Structure, CIP	5,274	Cyd	$9.70	$51,159.52
				SUBTOTAL	**$2,552,360.00**
				Percent of structure cost	48%
Superstructure					
7060020	Superstructure Conc	29	Cyd	$134.50	$3,940.53
7060021	Superstructure Conc, Night Casting	354	Cyd	$178.50	$63,115.25
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$12,305.00	$12,305.00
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$150,274.39	$150,274.39
Z000003	Modular Expansion Joint		Ft	$1,189.00	$0.00
7060031	Expansion Joint Device	210	Ft	$123.63	$25,987.03
7060032	False Decking	12,078	Sft	$0.56	$6,763.68
7060035	Reinforcement, Steel, Epoxy Coated	112,211	Lb	$1.10	$123,432.15
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	354	Cyd	$2.04	$721.32
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
7070073	Bearing, Elastomeric, 3 inch	26	Sft	$185.00	$4,810.00
7070007	Structural Steel, Plate, Furn and Fab	514,386	Lb	$1.87	$961,901.41
7070008	Structural Steel, Plate, Erect	514,386	Lb	$0.18	$92,589.44
7070080	Shear Developers	1	LS	$17,080.00	$17,080.00
7160001	Field Repr of Damaged Coating	1	LS	$8,000.00	$8,000.00
				SUBTOTAL	**$1,480,800.00**
				Percent of structure cost	28%
Misc.					
6050101	Conc Quality Initiative	19,407	Dlr	$1.00	$19,406.98
7060008	Conc Quality Assurance, Structure	2,640	Cyd	$11.00	$29,036.53
				SUBTOTAL	**$48,440.00**
				Percent of structure cost	0.9%
Maintenance of Traffic				**SUBTOTAL**	**$25,000.00**
				Percent of structure cost	0.5%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$20,533.00	$20,533.00
				SUBTOTAL	**$20,530.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$82,542.60	$82,542.60
				SUBTOTAL	**$82,540.00**
				Percent of structure cost	1.6%
	Aesthetics 1%	1	LS	$42,096.70	$42,096.70
					$42,100.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$4,251,770.00**
	Design Contingency 15%	1	LS	$637,765.50	$637,765.50
				SUBTOTAL	**$637,770.00**
				Percent of project cost	12.0%
1000001	Mobilization, Max, 10%	1	LS	$425,177.00	$425,177.00
				SUBTOTAL	**$425,180.00**
				Percent of project cost	8.0%
				TOTAL	**$5,315,000.00**

ASSUMPTIONS:

(**) Special Provision Required

1) A 15% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices
2) The cost of reconstructing the new approach roadway is not included
3) Wing walls are included in the estimated cost and the cost per square foot.

Area of Deck (ft2) = **12078**

COST PER FT^2 = **$440**

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate (Major Pay Items)

Prepared by: KMP Date: 10/14/2008

Checked by: Date:

Ramps A & C over the Norfolk Southern RR and Plaza Drive
Job # 802330
(in Detroit)

R01-4 of 82194

New Bridges

38" Web Steel Plate Girder Alternative

Simple Span, Steel Girders, High Wall Abutments

Bridge Width=71'-8" including (4-12'-lanes, 8' min. nside and 10' min. outside shoulder, 1'-7 1/2" parapets)
Bridge Length=117'-6" (+/-)

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
7050020	Pile, CIP Conc, Furn and Driven, 12 inch	23,265	Ft	$26.00	$604,880.62
7060010	Substructure Conc	1,751	Cyd	$402.00	$703,861.80
7060035	Reinforcement, Steel, Epoxy Coated	175,090	Lb	$1.10	$192,599.00
Z000004	Fill, Lightweight, EPS Block	5,865	Cyd	$77.00	$451,641.02
2060010	Excavation, Fdn	921	Cyd	$8.24	$7,586.18
2060002	Backfill, Structure, CIP	4,302	Cyd	$9.70	$41,730.32
				SUBTOTAL	**$2,002,300.00**
				Percent of structure cost	51%
Superstructure					
7060020	Superstructure Conc	28	Cyd	$134.50	$3,728.92
7060021	Superstructure Conc, Night Casting	247	Cyd	$178.50	$44,038.06
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$11,644.21	$11,644.21
7060023	Superstructure Conc, Form, Finish, and Cure, Night Casting	1	LS	$104,852.52	$104,852.52
Z000003	Modular Expansion Joint		Ft	$1,189.00	$0.00
7060031	Expansion Joint Device	141	Ft	$123.63	$17,441.97
7060032	False Decking	8,462	Sft	$0.56	$4,738.72
7060035	Reinforcement, Steel, Epoxy Coated	79,938	Lb	$1.10	$87,931.30
7060090	Elec Grounding System	1	Ea	$1,875.00	$1,875.00
7060100	Bridge Ltg, Oper and Maintain	247	Cyd	$2.04	$503.29
7060101	Bridge Ltg, Furn and Rem	1	LS	$8,000.00	$8,000.00
7070073	Bearing, Elastomeric, 3 inch	17	Sft	$185.00	$3,145.00
7070007	Structural Steel, Plate, Furn and Fab	315,973	Lb	$1.87	$590,870.39
7070008	Structural Steel, Plate, Erect	315,973	Lb	$0.18	$56,875.22
7070080	Shear Developers	1	LS	$10,980.00	$10,980.00
7160001	Field Repr of Damaged Coating	1	LS	$8,000.00	$8,000.00
				SUBTOTAL	**$954,620.00**
				Percent of structure cost	24%
Misc.					
6050101	Conc Quality Initiative	14,958	Dlr	$1.00	$14,958.00
7060008	Conc Quality Assurance, Structure	2,025	Cyd	$11.00	$22,278.70
				SUBTOTAL	**$37,240.00**
				Percent of structure cost	1.0%
Maintenance of Traffic				**SUBTOTAL**	**$25,000.00**
				Percent of structure cost	0.6%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$15,095.80	$15,095.80
				SUBTOTAL	**$15,100.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$60,685.20	$60,685.20
				SUBTOTAL	**$60,690.00**
				Percent of structure cost	1.6%
	Aesthetics 1%	1	LS	$30,949.50	$30,949.50
					$30,950.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contigency and Mobilization)	**$3,125,900.00**
	Design Contingency 15%	1	LS	$468,885.00	$468,885.00
				SUBTOTAL	**$468,890.00**
				Percent of project cost	12.0%
1000001	Mobilization, Max, 10%	1	LS	$312,590.00	$312,590.00
				SUBTOTAL	**$312,590.00**
				Percent of project cost	8.0%
				TOTAL	**$3,907,000.00**

ASSUMPTIONS: **Area of Deck (ft2) =** **8462**

(**) Special Provision Required

1) A 15% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) The cost of reconstructing the new approach roadway is not included **COST PER FT^2 =** **$462**

3) Wing walls are included in the estimated cost and the cost per square foot.

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 9/16/2008

Checked by: Date:

Solvay Ave. Pedestrian Bridge over I-75
Job # 802330
(in Detroit)

P01 of 82194

Pedestrian Bridge Replacement

28" Steel Plate Girder

(2 Spans - 88'-0" & 101'-0" plus Ramps)

Bridge Clear Width=14'-0"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
2040020	Structures, Rem	3,848	Sft	$25	$96,187.50
7060010	Substructure Conc	269	Cyd	$402.00	$108,292.55
7060035	Reinforcement, Steel, Epoxy Coated	29,008	Lb	$1.10	$31,908.38
				SUBTOTAL	**$236,390.00**
				Percent of structure cost	23%
Superstructure					
7060020	Superstructure Conc	258	Cyd	$134.50	$34,669.87
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$108,262.78	$108,262.78
7060031	Expansion Joint Device	30	Ft	$123.63	$3,708.90
7060032	False Decking	12,458	Sft	$0.56	$6,976.20
7060035	Reinforcement, Steel, Epoxy Coated	95,428	Lb	$1.10	$104,970.25
7070073	Bearing, Elastomeric, 3 inch	6	Sft	$185.00	$1,110.00
7070007	Structural Steel, Plate, Furn and Fab	76,414	Lb	$1.87	$142,895.08
7070008	Structural Steel, Plate, Erect	76,414	Lb	$0.18	$13,754.61
7070080	Shear Developers	1	LS	$2,304.00	$2,304.00
8080110	Fence, Structure	11,480	Sft	$10.01	$114,914.80
				SUBTOTAL	**$533,570.00**
				Percent of structure cost	51%
Misc.					
6050101	Conc Quality Initiative	2,166	Dlr	$1.00	$2,165.85
7060008	Conc Quality Assurance, Structure	527	Cyd	$11.00	$5,798.68
				SUBTOTAL	**$7,960.00**
				Percent of structure cost	0.8%
Maintenance of Traffic				**SUBTOTAL**	**$0.00**
					0.0%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$3,889.60	$3,889.60
				SUBTOTAL	**$3,890.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$15,636.20	$15,636.20
				SUBTOTAL	**$15,640.00**
				Percent of structure cost	1.5%
	Aesthetics	1	LS	$7,974.50	$7,974.50
					$7,970.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contingency and Mobilization)	**$805,420.00**
	Design Contingency 20%	1	LS	$161,084.00	$161,084.00
				SUBTOTAL	**$161,080.00**
				Percent of project cost	15.4%
1000001	Mobilization, Max, 10%	1	LS	$80,542.00	$80,542.00
				SUBTOTAL	**$80,540.00**
				Percent of project cost	7.7%
				TOTAL	**$1,047,040.00**

ASSUMPTIONS: **Area of Deck (ft2) =** **8610**

(**) Special Provision Required

1) A 20% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) Cost per square foot of deck does not include the cost of removing the existing bridge **COST PER FT^2 =** **$108**

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 9/16/2008

Checked by: Date:

Beard Ave. Pedestrian Bridge over I-75
Job # 802330
(in Detroit)

P02 of 82194

Pedestrian Bridge Replacement

28" Plate Girder Steel Beam
(2 Spans - 89'-0" & 101'-0" plus Ramps)
Bridge Clear Width=14'-0"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
2040020	Structures, Rem	3,648	Sft	$25	$91,200.00
7060010	Substructure Conc	309	Cyd	$402.00	$124,336.75
7060035	Reinforcement, Steel, Epoxy Coated	33,797	Lb	$1.10	$37,176.62
				SUBTOTAL	**$252,710.00**
				Percent of structure cost	22%
Superstructure					
7060020	Superstructure Conc	298	Cyd	$134.50	$40,045.51
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$125,049.17	$125,049.17
7060031	Expansion Joint Device	30	Ft	$123.63	$3,708.90
7060032	False Decking	13,593	Sft	$0.56	$7,612.08
7060035	Reinforcement, Steel, Epoxy Coated	110,224	Lb	$1.10	$121,246.13
7070073	Bearing, Elastomeric, 3 inch	6	Sft	$185.00	$1,110.00
7070007	Structural Steel, Plate, Furn and Fab	76,414	Lb	$1.87	$142,895.08
7070008	Structural Steel, Plate, Erect	76,414	Lb	$0.18	$13,754.61
7070080	Shear Developers	1	LS	$2,304.00	$2,304.00
8080110	Fence, Structure	13,260	Sft	$10.01	$132,732.60
				SUBTOTAL	**$590,460.00**
				Percent of structure cost	51%
Misc.					
6050101	Conc Quality Initiative	2,487	Dlr	$1.00	$2,486.73
7060008	Conc Quality Assurance, Structure	607	Cyd	$11.00	$6,677.35
				SUBTOTAL	**$9,160.00**
				Percent of structure cost	0.8%
Maintenance of Traffic				**SUBTOTAL**	**$0.00**
					0.0%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$4,261.65	$4,261.65
				SUBTOTAL	**$4,260.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$17,131.80	$17,131.80
				SUBTOTAL	**$17,130.00**
				Percent of structure cost	1.5%
	Aesthetics	1	LS	$8,737.20	$8,737.20
					$8,740.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contingency and Mobilization)	**$882,460.00**
	Design Contingency 20%	1	LS	$176,492.00	$176,492.00
				SUBTOTAL	**$176,490.00**
				Percent of project cost	15.4%
1000001	Mobilization, Max, 10%	1	LS	$88,246.00	$88,246.00
				SUBTOTAL	**$88,250.00**
				Percent of project cost	7.7%
				TOTAL	**$1,147,200.00**

ASSUMPTIONS:

(**) Special Provision Required

1) A 20% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) Cost per square foot of deck does not include the cost of removing the existing bridge

Area of Deck (ft2) = 9945

COST PER FT^2 = $104

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 9/16/2008

Checked by: Date:

Waterman Ave. Pedestrian Bridge over I-75
Job # 802330
(in Detroit)

P10 of 82194

Pedestrian Bridge Replacement

28" Steel Plate Girder
(2 Spans - 116'-0" & 112'-0" plus Ramps)
Bridge Clear Width=14'-0"

	ITEM		QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure						
2040020	Structures, Rem	(included elsewhere)	0	Sft	$25	$0.00
7060010	Substructure Conc		242	Cyd	$402.00	$97,275.44
7060035	Reinforcement, Steel, Epoxy Coated		25,719	Lb	$1.10	$28,290.82
					SUBTOTAL	**$125,570.00**
					Percent of structure cost	13%
Superstructure						
7060020	Superstructure Conc		242	Cyd	$134.50	$32,604.53
7060022	Superstructure Conc, Form, Finish, and Cure		1	LS	$101,813.40	$101,813.40
7060031	Expansion Joint Device		30	Ft	$123.63	$3,708.90
7060032	False Decking		8,089	Sft	$0.56	$4,529.70
7060035	Reinforcement, Steel, Epoxy Coated		89,650	Lb	$1.10	$98,615.34
7070073	Bearing, Elastomeric, 3 inch		8	Sft	$185.00	$1,480.00
7070007	Structural Steel, Plate, Furn and Fab		109,201	Lb	$1.87	$204,205.57
7070008	Structural Steel, Plate, Erect		109,201	Lb	$0.18	$19,656.15
7070080	Shear Developers		1	LS	$2,760.00	$2,760.00
8080110	Fence, Structure		10,785	Sft	$10.01	$107,957.85
					SUBTOTAL	**$577,330.00**
					Percent of structure cost	60%
Misc.						
6050101	Conc Quality Initiative		1,946	Dlr	$1.00	$1,945.51
7060008	Conc Quality Assurance, Structure		484	Cyd	$11.00	$5,328.31
					SUBTOTAL	**$7,270.00**
					Percent of structure cost	0.8%
Maintenance of Traffic					**SUBTOTAL**	**$0.00**
						0.0%
Misc.						
2090001	Project Cleanup 0.5%		1	LS	$3,550.85	$3,550.85
					SUBTOTAL	**$3,550.00**
						0.4%
1040005	Contractor Staking, Bridge		1	LS	$14,274.40	$14,274.40
					SUBTOTAL	**$14,270.00**
					Percent of structure cost	1.5%
	Aesthetics		1	LS	$7,279.90	$7,279.90
						$7,280.00
					Percent of structure cost	0.8%
					TOTAL (w/o Contingency and Mobilization)	**$735,270.00**
	Design Contingency 20%		1	LS	$147,054.00	$147,054.00
					SUBTOTAL	**$147,050.00**
					Percent of project cost	15.4%
1000001	Mobilization, Max, 10%		1	LS	$73,527.00	$73,527.00
					SUBTOTAL	**$73,530.00**
					Percent of project cost	7.7%
					TOTAL	**$955,850.00**

ASSUMPTIONS:

(**) Special Provision Required

1) A 20% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

2) Cost of removing existing bridge is not included in this estimate

Area of Deck (ft2) = 8089

COST PER FT^2 = $118

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 9/16/2008

Checked by: Date:

Morrell Ave. Pedestrian Bridge over I-75
Job # 802330
(in Detroit)

P11 of 82194

Pedestrian Bridge Replacement

30" Steel Plate Girder
(2 Spans - 100'-0" & 128'-0" plus Ramps)
Bridge Clear Width=8'-0"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
2040020	Structures, Rem	0	Sft	$25	$0.00
7060010	Substructure Conc	122	Cyd	$402.00	$48,875.51
7060035	Reinforcement, Steel, Epoxy Coated	12,516	Lb	$1.10	$13,767.19
				SUBTOTAL	**$62,640.00**
				Percent of structure cost	11%
Superstructure					
7060020	Superstructure Conc	123	Cyd	$134.50	$16,580.74
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$51,776.30	$51,776.30
7060031	Expansion Joint Device	18	Ft	$123.63	$2,225.34
7060032	False Decking	4,005	Sft	$0.56	$2,242.80
7060035	Reinforcement, Steel, Epoxy Coated	53,289	Lb	$1.10	$58,617.63
7070073	Bearing, Elastomeric, 3 inch	5	Sft	$185.00	$925.00
7070007	Structural Steel, Plate, Furn and Fab	73,756	Lb	$1.87	$137,923.67
7070008	Structural Steel, Plate, Erect	73,756	Lb	$0.18	$13,276.08
7070080	Shear Developers	1	LS	$1,840.00	$1,840.00
8080110	Fence, Structure	8,900	Sft	$10.01	$89,089.00
				SUBTOTAL	**$374,500.00**
				Percent of structure cost	63%
Misc.					
6050101	Conc Quality Initiative	978	Dlr	$1.00	$977.51
7060008	Conc Quality Assurance, Structure	245	Cyd	$11.00	$2,693.44
				SUBTOTAL	**$3,670.00**
				Percent of structure cost	0.6%
Maintenance of Traffic				**SUBTOTAL**	**$0.00**
					0.0%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$2,204.05	$2,204.05
				SUBTOTAL	**$2,200.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$8,860.20	$8,860.20
				SUBTOTAL	**$8,860.00**
				Percent of structure cost	1.5%
	Aesthetics	1	LS	$4,518.70	$4,518.70
					$4,520.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contingency and Mobilization)	**$456,390.00**
	Design Contingency 20%	1	LS	$91,278.00	$91,278.00
				SUBTOTAL	**$91,280.00**
				Percent of project cost	15.4%
1000001	Mobilization, Max, 10%	1	LS	$45,639.00	$45,639.00
				SUBTOTAL	**$45,640.00**
				Percent of project cost	7.7%
				TOTAL	**$593,310.00**

ASSUMPTIONS:

(**) Special Provision Required

1) A 20% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

Area of Deck (ft2) = **4005**

COST PER FT^2 = **$148**

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Prepared by: MRB Date: 9/16/2008

Checked by: Date:

McKinstry Ave. Pedestrian Bridge over I-75
Job # 802330
(in Detroit)

P12 of 82194

Pedestrian Bridge Replacement

28" Steel Plate Girder
(2 Spans - 109'-0" & 100'-0" plus Ramps)
Bridge Clear Width=14'-0"

	ITEM	QUANTITY	UNIT	UNIT COST	AMOUNT
Substructure					
2040020	Structures, Rem	0	Sft	$25	$0.00
7060010	Substructure Conc	287	Cyd	$402.00	$115,361.30
7060035	Reinforcement, Steel, Epoxy Coated	31,118	Lb	$1.10	$34,229.46
				SUBTOTAL	**$149,590.00**
				Percent of structure cost	14%
Superstructure					
7060020	Superstructure Conc	291	Cyd	$134.50	$39,199.90
7060022	Superstructure Conc, Form, Finish, and Cure	1	LS	$122,408.61	$122,408.61
7060031	Expansion Joint Device	30	Ft	$123.63	$3,708.90
7060032	False Decking	9,735	Sft	$0.56	$5,451.60
7060035	Reinforcement, Steel, Epoxy Coated	107,896	Lb	$1.10	$118,685.88
7070073	Bearing, Elastomeric, 3 inch	7	Sft	$185.00	$1,295.00
7070007	Structural Steel, Plate, Furn and Fab	91,057	Lb	$1.87	$170,277.17
7070008	Structural Steel, Plate, Erect	91,057	Lb	$0.18	$16,390.32
7070080	Shear Developers	1	LS	$2,544.00	$2,544.00
8080110	Fence, Structure	12,980	Sft	$10.01	$129,929.80
				SUBTOTAL	**$609,890.00**
				Percent of structure cost	59%
Misc.					
6050101	Conc Quality Initiative	2,307	Dlr	$1.00	$2,307.23
7060008	Conc Quality Assurance, Structure	578	Cyd	$11.00	$6,362.59
				SUBTOTAL	**$8,670.00**
				Percent of structure cost	0.8%
Maintenance of Traffic				**SUBTOTAL**	**$0.00**
					0.0%
Misc.					
2090001	Project Cleanup 0.5%	1	LS	$3,840.75	$3,840.75
				SUBTOTAL	**$3,840.00**
					0.4%
1040005	Contractor Staking, Bridge	1	LS	$15,439.80	$15,439.80
				SUBTOTAL	**$15,440.00**
				Percent of structure cost	1.5%
	Aesthetics	1	LS	$7,874.30	$7,874.30
					$7,870.00
				Percent of structure cost	0.8%
				TOTAL (w/o Contingency and Mobilization)	**$795,300.00**
	Design Contingency 20%	1	LS	$159,060.00	$159,060.00
				SUBTOTAL	**$159,060.00**
				Percent of project cost	15.4%
1000001	Mobilization, Max, 10%	1	LS	$79,530.00	$79,530.00
				SUBTOTAL	**$79,530.00**
				Percent of project cost	7.7%
				TOTAL	**$1,033,890.00**

ASSUMPTIONS:

(**) Special Provision Required

1) A 20% design contingency is included to account for the preliminary nature of the design and the fluctuation of prices

Area of Deck (ft2) = **9735**

COST PER FT^2 = **$106**

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate
Retaining Walls
Job # 802330
(in Detroit)

Retaining Wall Type	cost
Cast-in-Place Cantilever Wall	$ 45 /SF
Precast Cantilever Wall	$ 35 /SF
Steel Sheet Pile w/ Conc Face	$ 29 /SF
Soldier Pile & Lagging w/ Conc Face	$ 65 /SF
MSE Wall:	
Furnish & Erect	$ 30 /SF
Concrete Level Pad	$ 15 /LF
Coping	$ 175 /LF
Select Backfill	$ 20 /CY
Backfill, Structure, CIP	$ 7 /CY
Lightweight Aggregate, Slag, LM	$ 24 /CY
Exacavation, fdn	$ 8.5 /CY
EPS Blocks	$ 75 /CY
Contingency	30%

WALL	LENGTH	MIN WALL HEIGHT	MAX Wall HEIGHT	AVERAGE WALL HEIGHT	AREA	CIP CANTILEVER	PRECAST CANTILEVER	MSE	SHEET PILE W/ CONC FACE	SOLDIER PILE & LAG W/ CONC FACE
	(ft)	(ft)	(ft)	(ft)	(ft^2)					
A	200	11.5	11.5	11.5	2300.0	$190,222	$160,322	$240,304	$86,710	$194,350
B	80	10.5	10.5	10.5	840.0	$68,394	$57,474	$87,975	$31,668	$70,980
C	345	10.0	16.5	11.5	3967.5	$319,519	$267,941	$393,879	N/A	$335,254
D	440	9.5	10.0	10.0	4400.0	$354,485	$297,285	$450,107	$165,880	$371,800
E	1300	8.0	24.0	15.5	20150.0	$2,045,959	$1,784,009	$1,778,944	N/A	N/A
F	770	5.0	24.0	13.7	10549.0	$1,301,446	$1,164,309	$942,381	N/A	N/A
G	270	10.0	11.0	10.5	2835.0	$231,049	$194,194	$294,593	$106,880	$239,558
H	1450	11.5	21.5	14.3	20735.0	$1,700,667	$1,431,112	$2,034,879	N/A	N/A
J	260	12.0	16.0	14.0	3640.0	$293,981	$246,661	$350,059	N/A	$307,580
K	380	11.5	18.5	14.3	5434.0	$452,397	$381,755	$549,520	N/A	N/A
L	400	8.0	9.0	8.5	3400.0	$258,788	$214,588	$340,641	$128,180	$287,300
M	715	7.0	20.0	13.5	9652.5	$714,755	$589,272	$829,699	N/A	N/A
N	880	7.0	24.0	15.0	13200.0	$1,070,702	$899,102	$1,203,093	N/A	N/A
P	2300	9.0	24.0	17.5	40250.0	$3,112,236	$2,588,986	$3,463,084	N/A	N/A
Q	275	10.0	16.0	12.0	3300.0	$269,639	$226,739	$329,416	N/A	$278,850
R	35	12.0	12.0	12.0	420.0	$38,661	$33,201	$48,829	$15,834	$35,490
S	210	12.0	12.0	12.0	2520.0	$231,966	$199,206	$292,971	$95,004	$212,940
T	1475	8.0	20.0	16.5	24337.5	$2,054,441	$1,738,054	$2,457,969	N/A	N/A
U	2200	5.5	22.0	16.0	35200.0	$2,636,010	$2,178,410	$3,000,517	N/A	N/A
V	380	5.0	14.0	8.8	3325.0	$267,323	$224,098	$340,721	N/A	$280,963
W	775	11.5	13.0	12.5	9687.5	$928,253	$802,315	$1,226,678	N/A	$818,594
X	270	16.0	22.0	19.5	5265.0	$358,053	$289,608	$415,025	N/A	N/A
Y	360	18.0	26.0	23.3	8370.0	$663,171	$554,361	$664,181	N/A	N/A
Z	52	20.0	20.0	20.0	1040.0	$85,859	$72,339	$98,872	N/A	N/A
AA	65	24.0	24.0	24.0	1560.0	$181,066	$160,786	$208,771	N/A	N/A
TOTAL	**15887**				**236378**					

MICHIGAN DEPARTMENT OF TRANSPORTATION

Retaining Walls
Job # 802330
(in Detroit)
Summary of Options

WALL	OPTIONS	CONSTRUCTION COST
A	**Option1: Steel Sheet Pile w/ Conc Face**	**$86,710**
	Option2: Precast Cantilever Wall	$160,322
	Option3: Cast-in-Place Cantilever Wall	$190,222
	Option4: Soldier Pile & Lagging w/ Conc Face	$194,350
	Option5: MSE Wall	$240,304
B	**Option1: Steel Sheet Pile w/ Conc Face**	**$31,668**
	Option2: Precast Cantilever Wall	$57,474
	Option3: Cast-in-Place Cantilever Wall	$68,394
	Option4: Soldier Pile & Lagging w/ Conc Face	$70,980
	Option5: MSE Wall	$87,975
C	**Option1: Precast Cantilever Wall**	**$267,941**
	Option2: Cast-in-Place Cantilever Wall	$319,519
	Option3: Soldier Pile & Lagging w/ Conc Face	$335,254
	Option4: MSE Wall	$393,879
D	**Option1: Steel Sheet Pile w/ Conc Face**	**$165,880**
	Option2: Precast Cantilever Wall	$297,285
	Option3: Cast-in-Place Cantilever Wall	$354,485
	Option4: Soldier Pile & Lagging w/ Conc Face	$371,800
	Option5: MSE Wall	$450,107
E	**Option1: Precast Cantilever Wall**	**$1,784,009**
	Option2: Cast-in-Place Cantilever Wall	$2,045,959
	Option3: MSE Wall	N/A*
F	**Option1: Precast Cantilever Wall**	**$1,164,309**
	Option2: Cast-in-Place Cantilever Wall	$1,301,446
	Option3: MSE Wall	N/A*
G	**Option1: Steel Sheet Pile w/ Conc Face**	**$106,880**
	Option2: Precast Cantilever Wall	$194,194
	Option3: Cast-in-Place Cantilever Wall	$231,049
	Option4: Soldier Pile & Lagging w/ Conc Face	$239,558
	Option5: MSE Wall	$294,593
H	**Option1: Precast Cantilever Wall**	**$1,431,112**
	Option2: Cast-in-Place Cantilever Wall	$1,700,667
	Option3: MSE Wall	$2,034,879
J	**Option1: Precast Cantilever Wall**	**$246,661**
	Option2: Cast-in-Place Cantilever Wall	$293,981
	Option3: Soldier Pile & Lagging w/ Conc Face	$307,580
	Option4: MSE Wall	$350,059
K	**Option1: Precast Cantilever Wall**	**$381,755**
	Option2: Cast-in-Place Cantilever Wall	$452,397
	Option3: MSE Wall	$549,520
L	**Option1: Steel Sheet Pile w/ Conc Face**	**$128,180**
	Option2: Precast Cantilever Wall	$214,588
	Option3: Cast-in-Place Cantilever Wall	$258,788
	Option4: Soldier Pile & Lagging w/ Conc Face	$287,300
	Option5: MSE Wall	$340,641
M	**Option1: Precast Cantilever Wall**	**$589,272**
	Option2: Cast-in-Place Cantilever Wall	$714,755
	Option3: MSE Wall	$829,699

WALL	OPTIONS	CONSTRUCTION COST
N	**Option1: Precast Cantilever Wall**	**$899,102**
	Option2: Cast-in-Place Cantilever Wall	$1,070,702
	Option3: MSE Wall	$1,203,093
P	**Option1: Precast Cantilever Wall**	**$2,588,986**
	Option2: Cast-in-Place Cantilever Wall	$3,112,236
	Option3: MSE Wall	$3,463,084
Q	**Option1: Precast Cantilever Wall**	**$226,739**
	Option2: Cast-in-Place Cantilever Wall	$269,639
	Option3: Soldier Pile & Lagging w/ Conc Face	$278,850
	Option4: MSE Wall	$329,416
R	**Option1: Steel Sheet Pile w/ Conc Face**	**$15,834**
	Option2: Precast Cantilever Wall	$33,201
	Option3: Cast-in-Place Cantilever Wall	$38,661
	Option4: Soldier Pile & Lagging w/ Conc Face	$35,490
	Option5: MSE Wall	$48,829
S	**Option1: Steel Sheet Pile w/ Conc Face**	**$95,004**
	Option2: Precast Cantilever Wall	$199,206
	Option3: Cast-in-Place Cantilever Wall	$231,966
	Option4: Soldier Pile & Lagging w/ Conc Face	$212,940
	Option5: MSE Wall	$292,971
T	**Option1: Precast Cantilever Wall**	**$1,738,054**
	Option2: Cast-in-Place Cantilever Wall	$2,054,441
	Option3: MSE Wall	$2,457,969
U	**Option1: Precast Cantilever Wall**	**$2,178,410**
	Option2: Cast-in-Place Cantilever Wall	$2,636,010
	Option3: MSE Wall	$3,000,517
V	**Option1: Precast Cantilever Wall**	**$224,098**
	Option2: Cast-in-Place Cantilever Wall	$267,323
	Option3: Soldier Pile & Lagging w/ Conc Face	$280,963
	Option4: MSE Wall	$340,721
W	**Option1: Precast Cantilever Wall**	**$802,315**
	Option2: Cast-in-Place Cantilever Wall	$928,253
	Option3: Soldier Pile & Lagging w/ Conc Face	$818,594
	Option4: MSE Wall	$1,226,678
X	**Option1: Precast Cantilever Wall**	**$289,608**
	Option2: Cast-in-Place Cantilever Wall	$358,053
	Option3: MSE Wall	$415,025
Y	**Option1: Precast Cantilever Wall**	**$554,361**
	Option2: Cast-in-Place Cantilever Wall	$663,171
	Option3: MSE Wall	$664,181
Z	**Option1: Precast Cantilever Wall**	**$72,339**
	Option2: Cast-in-Place Cantilever Wall	$85,859
	Option3: MSE Wall	$98,872
AA	**Option1: Precast Cantilever Wall**	**$160,786**
	Option2: MSE Wall	$208,771
	Option3: Cast-in-Place Cantilever Wall	$181,066

Note: preferred option in bold
* MSE wall option is not applicable since EPS blocks should be used for this wall because of settlement issues

MICHIGAN DEPARTMENT OF TRANSPORTATION

Preliminary Estimate

Demolition Cost Estimate

(for structures not being replaced)

Structure	**Area (Sq.ft.)**	***Unit Cost***	***Cost***
Casgrain Street Pedestrain Bridge	3885.5	$ 25	$ 97,138
Dragoon St. Bridge	16179.75	$ 25	$ 404,494
Cavalry Street Pedestrain Bridge	5323.5	$ 25	$ 133,088
Junction Street Bridge	10579	$ 25	$ 264,475
Ferdinand Street Pedestrain Bridge	3638.5	$ 25	$ 90,963
Waterman Street	21249	$ 25	$ 531,225
		Sub Total =	$ 1,521,381
		20% Contingency =	$ 304,276
		Total =	$ 1,825,658

Appendix C

Comparative Cost Estimate – Steel Girder vs. Tub Girder (Ramp D)

MICHIGAN DEPARTMENT OF TRANSPORTATION

Comparative Cost Estimate Curved Steel Plate Girders vs. Curved Tub Girders

Prepared by: KMP Date: 9/20/2008

Checked by: Date:

Ramp D over I-75
Job # 802330
(in Detroit)

SXX of 82194
New Bridge

Unit 2 Spans 241'-6", 357'-6" and 241'-6". Pile Bent Abutment

Bridge Width=45'-3" including (2-12'-lanes, 8'inside and 10' outside shoulder, 1'-7 1/2" parapets)
Unit Length=840'-6"

Curved Steel Plate Girder Alternative

Girder 1	558,920	lbs			
Girder 2	561,080	lbs			
Girder 3	563,640	lbs			
Girder 4	566,200	lbs			
Girder 5	658,930	lbs			
Girder 6	656,260	lbs			
Girder 7	666,640	lbs			
Cross Frames	127,940	lbs			
Total	**4,359,610**	**lbs**	*** $1.50/lb (fabricate) =**	**$**	**6,539,415**

Steel Curved Tub Girder Alternative

Tub Girder 1	1,493,800	lbs			
Tub Girder 2	1,912,000	lbs			
Cross Frames	274,690	lbs			
Longitudinal Bracing	132,980	lbs			
Longitudinal Flange Splice	128,800	lbs			
Total	**3,942,270**	**lbs**	*** $2.10/lb (fabricate)* =**	**$**	**8,278,767**

*** Units Costs are from Industrial Steel Corp. from a recent Michigan Bridge Project**

Appendix D - Geotechnical Report

(To come Nov. 30,2008)