Alternative Analysis Report

For

Rehabilitation of Bridge P-0599
Governor Bridge Road over Patuxent River

Prince George's County, Maryland

Prepared for

Prince George's County Government
Department of Public Works & Transportation
9400 Peppercorn Place
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August 15, 2018

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1. Introduction

1.1 Project Description

The Governor Bridge Road Bridge (Structure No. P-0599) over the Patuxent River connects Prince George's County (to the West) and Anne Arundel County (to the East). It is a single lane, single span, Pratt through-truss supporting a stringer floor beam system and an open steel grid deck. The substructure consists of concrete abutments and wingwalls. This structure is a shared resource between the counties; however, Prince George's County maintains the structure. Per agreement, any repair costs are to be shared equally between the two counties.

This bridge was built circa 1910 with numerous rehabilitations and has been designated as a historic structure. It is prone to frequent flooding on the Prince George's County approach and the river is known to overtop the deck. The flooding results in repeated road and bridge closures. This structure is 108 years old and considered structurally deficient and past its reasonable life expectancy. In 2009, Governor Bridge Road was posted for the minimum weight allowed of 4 tons. Due to the age of the bridge, inspections had occurred every six months, until it was closed in 2015 (see below).

In March 2015, DPW&T's inspection staff identified significant deterioration in critical members of the bridge. If one of these critical members fails, then the whole bridge would fail catastrophically. Severe section loss with up to 100% section loss and perforations in numerous areas throughout the bridge including gusset plates, rivets and bolts, steel grid deck, inner webs, stringers, and joists were found. The bridge was closed to vehicular traffic at this time.

Figure 1: **Bottom Chord @ West Abutment**

Figure 2: **Corrosion and Section Loss – Stringers**

Governor Bridge Road is classified as a Rural Secondary Residential roadway. The roadway approaches consist of approximately 11'-0" paved lanes and no shoulder. The bridge is located within a horizontal tangent. The existing low point on the roadway is located 150 feet west of the west abutment within Prince Georges County.

1.2 Location Map

1.3 Site Photos

Photo: Prince George's County (West) Approach

Photo: Anne Arundel County (East) Approach

Photo: South Elevation of Governor Bridge Road Bridge

1.4 Previous Repairs

On May 6, 2013, the County's inspection of the Governor Bridge Road Bridge determined that it was structurally deficient and in need of repairs. In January 2014, bridge repairs were made to remove and reset the existing steel grid decking, remove defective stringers, install new stringers and splice plates, repair the structural steel throughout, repair the bridge traffic rail, replace the approach traffic barrier, repair the approach asphalt pavement and clean the roadway. Although these repairs have occurred, the Governor Bridge Road is again in critical condition.

1.5 Scope of Work

The primary intent of this project is to provide rehabilitation and drainage improvements to Governor Bridge Road, Bridge (P-0599) by replacing the existing truss bridge's floor system with a steel multi-girder structure and composite reinforced concrete slab.

1.6 Performed Tasks

In preparation of this report, the following tasks have been performed:

- Alternative bridge spans, widths, and locations were investigated and developed for the rehabilitation of the existing bridge. Typical structure cross sections were prepared to illustrate the alternatives.
- Existing data has been collected and/or provided by DPW&T of Prince George's County for review. This data includes:
    - Maintenance agreements between Anne Arundel County and Prince George's County
    - Road closure Meetings and Briefings (6/19/2015, 5/13/15)
    - Maryland Historical Trust Documentation
    - 2017 Bridge Inspection Report prepared by Wilson T. Ballard Company.
    - 2015 Bridge Inspection Report prepared by Marine Solutions, Inc.
    - 2013 Bridge Inspection Report prepared by Alvi Associates.
    - Previous Bridge Repair Plans (9/23/13)
    - Repair QC Report (4/22/14)
    - Memorandum Bridge Repairs on Governors Bridge Road (1/29/14)
    - Critical Findings Memorandum (3/20/15)
    - Emergency Memorandum Bridge Closing (3/25/15)
    - Letter of Concern (5/1/13)
    - Crash History Data (2004-2014)
    - Field Surveys were performed by KCI Technologies to supplement the study and to be used in final design. Additionally a 2' contours were also provided by Prince George's County DPW&T to be used as a reference.
    - A detailed archeological study conducted by Lotus Environmental Consulting in April, 2018, and is included in this report as in Appendix 15.4.
    - KCI has evaluated profiles to clear the 2-year, 10-year, and 100-year storm events.
    - A hydraulic study conducted by KCI in January 2018, and is included in this report as Appendix 15.7.

- Detailed environmental studies and reviews have been performed in 2017, including wetland delineation, stream delineation, letters of inquiry for rare, threatened and endangered species, and historical inquiries that the project could affect.
- Wildlife and Heritage Services have determined no official State or Federal records for list plant or animal species are within Governor Bridge Road project limits.
- Fisheries has reviewed the proposed project. The Patuxent River is classified as a Use I Stream and generally, no work is allowed between March 1st and June 15th of any given year.
- The JPA permit pre-application site visit meeting has occurred.
- A plan of the concept layout of the structure and approximate limits of the approach roadway work has been prepared. The roadway work includes improving the existing roadway geometry to meet minimum guidelines, where possible, while remaining within the existing right of way.
- A plan of the site with preliminary layout of the roadway alignment and structure location.
- Alternative bridge locations, types, and span lengths have been investigated and developed for the replacement of the existing bridge. Factors such as hydraulic data, project cost, environmental impacts, construction schedule, and future roadway improvements were considered. Typical cross sections have been prepared and illustrated in the alternatives.
- The existing road closure will remain in effect during construction and the current detour will be utilized for maintenance for traffic.
- Preliminary comparison cost estimates were developed for each bridge alternative deemed to be feasible based on structural, hydraulic and economic considerations. Right-of-way and/or easement costs are not included in the estimates.
- The bridge will be closed to vehicular traffic during construction.
- Six structure rehabilitation alternatives were developed to evaluate this project with different levels of reconstruction impacts and costs.

The findings and results of these tasks are presented in the following section of this engineering report that will form the basis for the final design of the Rehabilitation of Governor Bridge Road Bridge (P-0599) over Patuxent River.

2. Review of Existing Data/Conditions

The existing Pratt truss bridge, built circa 1910, has been designated as a historic structure. The bridge is 114'-0"± long single span structure, 15'-0"± wide and maintains a clear roadway width of 11'0"±. The bridge which is located over the Patuxent River, is prone to flooding and the river often overtops the west approach and steel grid deck. The bridge has a posted maximum weight allowance of 4 tons since 2009. However, the bridge has been closed since March 2015 upon the findings of structural deficient members. The Patuxent River is classified as a Use I stream with generally no in-stream work allowed between March 1st and June 15th of any given year to protect spawning fish.

Traffic data for the years 2002 – 2014 was provided by PG County. During that time, there were no reported accidents within the project limits.

According to the Bridge Inspection report dated April 26, 2013 and October 1, 2012, the average daily traffic count is 840 vehicles per day.

Bridge inspection reports from 2013, 2015 and 2017; Emergency Memorandums and Letters of Concern from 2013 and 2015; and repair plans from 2014 were reviewed prior to this alternative analysis study. Due to its makeup (steel truss), it is a fracture critical structure. The following is a summary of the conditions of the existing bridge from the latest inspection report.

Deck: The steel grid deck is in poor condition. There are multiple locations of severe corrosion, delaminations, and corrosion holes in the longitudinal, transverse, and joist bars throughout. The condition rating for the bridge deck was 4.

Superstructure: The Pratt through truss is in serious condition. The paint system is in poor condition and is failing throughout. Typically, the truss members exhibit heavy to severe corrosion at the connections, bearings, and panel points with 10%-15% section loss. The stringers exhibit area of corrosion and delaminating rust with section loss to the webs and top flange. Typically the tops of the top flanges and webs of the floorbeams are moderately corroded and pitted with up to 15% section loss. The condition rating for the bridge superstructure was 3.

Substructure: The concrete gravity abutments are in satisfactory condition. The abutments have cracks and spalls with some hollow sounding areas. The condition rating for the bridge substructure was 6.

Channel and Channel Protection: The channel alignment, channel flow and natural channel were in good condition. There was random scour and aggradation though out the main channel. However, there was no scour at the substructure units.

Approach Roadway: The roadway approaches were in poor condition. The west and east approaches contain substandard geometric curves that do not currently meet Prince George's County or ASSHTO design standards. The east approach shows evidence of high velocity flow and flooding during storm events closing the roadway to vehicular traffic. At this time, Governor Bridge Road is closed to through traffic.

Load Ratings: The bridge was closed to vehicular traffic due to its structural deficiency. Therefore load ratings were not performed. However, prior to the closing the bridge was posted for 8,000 lbs. (4 Tons) for single-unit vehicles and 14,000 lbs. (7 Tons) for combination-unit vehicles.

Existing Roadway Geometry
The existing roadway is classified as a Rural Secondary Residential roadway, with a posted speed of 30 MPH. It is an open section road with 10'± lanes in each direction, without a paved shoulder. The bridge approaches in each direction merge into a single lane at Governor Bridge Road Bridge crossing. The Horizontal Alignment west of the bridge, on the Prince George's County approach, has a substandard curve with a radius of 140 ft. A low point is located approximate 140 ft. from the approach at elevation 20.96. Flooding occurs regularly during storm events due to the low elevation which does not currently meet the 2-Year Flood elevation 26.50'. On the east side approach of the bridge (Anne Arundel County) there is a sharp curve with radius of 169'. There is no indication of flooding with the low point located on the west side of the bridge.

3. Roadway and Bridge Design Criteria

In accordance with the Maryland Department of Transportation, State Highway Administration's "Policy and Procedure Memorandum" D-85-32(G)-Minimum Bridge Width, dated March 1985, the minimum clear roadway width for ADT under 250 shall be 24'. In accordance with consultation with Prince George's County Department of Public Works & Transportation, a single lane option will consist of one 13' lane with 1' offsets and a dual lane option will consist of two 10' lanes with 1' offsets.

The bridge will be designed for HL-93 live load, using the current AASHTO LRFD Bridge Design Specifications. The bridge will eventually be rated using the Allowable Load and Resistance Factor Rating (LRFR) method.

Proposed roadway improvements for each alternative will include design improvements to meet or exceed Prince George's County and Anne Arundel County design standards. As mentioned in the existing conditions, the road is considered a Rural Secondary Residential roadway. Therefore, our proposed typical will meet Prince George's County Std. 100.11. Proposed improvements include an open section roadway with two - 11 foot lanes and 4 foot shoulder on each side of the roadway. As shown in Table I-2 Design Criteria in Prince George's County Department of Public Works and Transportation Guide and AASHTO, a design speed of 30 mph requires a 300 ft minimum curve radius and a 10% centerline grade maximum with a 50' Right-of-Way. Using AASHTO Method 2, Superelevation for all alternatives is normal crown.

The primary intent of this rehabilitation is to replace the existing truss bridge's floor system with a steel multi-girder structure and composite reinforced concrete slab. In accordance with the Scope of Services, six (6) alternatives have been developed for this Alternatives Analysis Report.

The alternatives include the following:

- **Alternative 1 –** No-Action alternative.
- **Alternative 2 –** Rehabilitation of the existing structure to again accommodate vehicular traffic (Minimization Alternative).
- **Alternative 3 –** Construction of a new single lane structure on location, with retained elements of the original structure.
- **Alternative 4 –** Construction of a new dual lane structure on location, with some retained elements of the original structure.
- **Alternative 5 –** Construction of a new single lane structure at a different location without affecting the historic integrity of the existing bridge (Avoidance Alternative).
- **Alternative 6 –** Construction of a new dual lane structure at a different location without affecting the historic integrity of the existing bridge (Avoidance Alternative).

4. Hydrologic Analysis

4.1 Watershed Description and Methodology

The Patuxent River watershed to the subject crossing is 352 square miles. The subject reach of Patuxent River is designated as a floodplain and floodway under the National Flood Insurance Program (NFIP). The effective FEMA hydrology is based on a 1985 study; however, FEMA's hydraulics are based on a 2009 HEC-RAS model. With respect to Hydrology, due to the conceptual nature of the study, KCI used the effective FEMA discharges for the 10-, 50- and 100-year storms. A detailed hydrologic analysis based on *Application of Hydrologic Methods in Maryland* (2016), WIN TR-20 and GISHydro will likely be required for the design phase of this project.

4.2 Peak Flow Discharges

Since FEMA does not provide a 2-year storm discharge, KCI estimated the 2-year discharge using the USGS application Maryland StreamStats. The following discharges were applied to the preliminary hydraulic study:

Return Period (year)	Peak Discharge at Governor Bridge Road (cfs)
2	8,600
10	19,000
50	35,000
100	45,000
500	70,000

5. Hydraulic Analysis

5.1 Methodology

For the preliminary hydraulics, KCI obtained the effective FEMA HEC-RAS model for the Patuxent River. An updated existing conditions HEC-RAS plan was created by revising the FEMA provided bridge geometry for the Governor Bridge Road Bridge based on recent field survey. The existing conditions HEC-RAS plan consists of a "perched bridge" in that the low point of Prince George's County approach roadway is below the bridge deck elevation. This approach roadway is essentially at the floodplain elevation, resulting in frequent roadway flooding, which can occur even when the bridge deck is not overtopped. One of the goals of this project is to increase the design storm for the crossing to reduce road closures that are specifically due to the low elevation of the Governor Bridge Road approach from the Prince George's County side.

For the proposed conditions HEC-RAS plan, Alternative 4 was modeled since it will provide the greatest potential for floodplain impacts. (Alternative 6 would be similar to Alternative 4 with respect to floodplain impacts.) To improve hydraulic capacity, raising the profile of Governor Bridge Road on the Prince George's County side is necessary. Constraints to the project include limiting 100-year increases to facilitate FEMA requirements since the Patuxent River is a regulated FEMA floodplain and floodway. With respect to FEMA regulations, the presence of the regulated floodway will require the CLOMR/LOMR review process. In addition, impacts to the upstream MDOT SHA US 50 Bridge must be considered. The US 50 Bridge currently overtops for the 100-year event. The goal is to not make this condition noticeably worse. Finally, it is best to limit increases to unimproved properties to meet Code of Maryland (COMAR) requirements through the MDE Non-tidal Wetlands and Waterways review process.

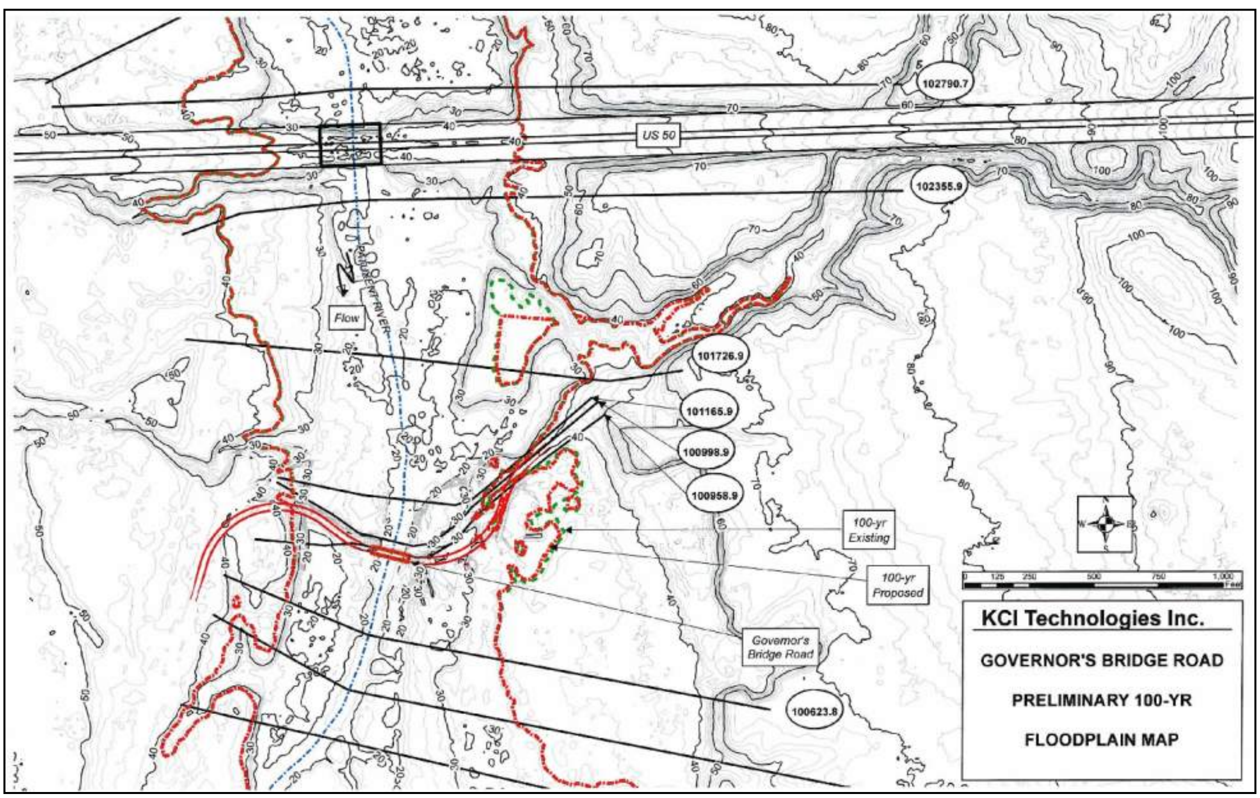
Initially, a 10-year design storm was considered for the crossing to provide a significant upgrade in hydraulic capacity. To pass the 10-year storm, over a 10-foot increase in the vertical profile of the Prince George's County approach was required. Due to the Patuxent River flow magnitude, it was not practical to pass the 10-year storm because the US 50 and FEMA floodplain impacts would not likely be approved. Several lower approach profiles on the Prince George's County side were evaluated to maximum hydraulic capacity. It became apparent that passing a storm higher than the 2-year event resulted in unacceptable 100-year floodplain impacts to upstream US 50 and the FEMA floodplain and floodway. Therefore, a profile was developed that raises the roadway vertical profile approximately 6 feet to pass the 2-year event and limit floodplain impacts to a degree to which a FEMA CLOMR would be feasible. Additionally, MDOT would likely accept the small 100-year increase at their upstream US 50 Bridge and COMAR could be satisfied. A preliminary relief culvert sizing of a 3 cell 48" RCP at the sag location on the Prince George's County approach was provided. This 3-cell culvert is not large enough to pass much additional Patuxent River floodplain flow and is mainly intended to protect the approach roadway fill and to provide an outlet for the roadside ditches. For this reason, this culvert was not modeled in the preliminary HEC-RAS model so as to provide a conservative comparison to existing conditions. The figure and table that follow provide HEC-RAS section locations and 2-, 10- and 100-year water-surface elevation comparisons of existing and proposed (based on the selected profile that passes the 2-year storm). The 2-, 10- and 100-year storms are provided since they are the most important events with respect to FEMA, COMAR and the MDOT SHA US 50 Bridge.

Hydraulic Analysis Results

River Station	2-YR Water Surface Elevation (ft)			10-YR Water Surface Elevation (ft)			100-YR Water Surface Elevation (ft)		
	Existing	Proposed	Diff.	Existing	Proposed	Diff.	Existing	Proposed	Diff.
102790.7	27.09	27.38	0.29	31.84	32.81	0.97	40.44	40.61	0.17
102570.9	**US 50 Bridge**								
102355.9	26.98	27.27	0.29	31.53	32.53	1.00	38.48	38.67	0.19
101726.9	26.69	27.01	0.32	31.04	32.10	1.06	37.49	37.70	0.21
101165.9	26.09	26.39	0.30	30.01	31.40	1.39	35.94	36.25	0.31
100998.9	25.95	26.18	0.23	29.79	31.23	1.44	35.51	35.84	0.33
100980	**Governor Bridge Road Bridge**								
100958.9	25.62	25.64	0.02	29.63	29.63	0	35.57	35.57	0
100623.8	25.38	25.36	-0.02	29.25	29.25	0	35.05	35.05	0
100397.7	25.15	25.15	0	28.98	28.98	0	34.68	34.68	0

5.2 Hydraulic Analysis Results

With respect to impacts to the upstream MDOT US 50 Bridge, this bridge is overtopped for the existing 100-year storm. The proposed Governor Bridge Road profile will only result in a slight increase in the 100-year water surface elevation of 0.17 foot at US 50. The assumption is that MDOT would accept this type of increase since the bridge overtops under existing conditions for the 100-year storm and this project would not noticeably worsen the condition. However, this would need to be verified with MDOT during the design phase of this project. There are no improved properties in the floodplain in the vicinity of Governor Bridge Road other than MDOT's US 50. COMAR requirements are expected to be met since 100-year increases are less than 0.5-foot, which would simply require notification for any impacted unimproved private properties. The 10-year comparison shows increases in excess of 1.0-foot, due to the raising of the roadway on the Prince George's County approach. However, these increases are expected to be on unimproved Prince George's County and Anne Arundel County property, such that flood mitigation measures would not be necessary to obtain MDE approval. Finally, considering the magnitude of the 100-year increase upstream of Governor Bridge Road, and with MDOT acceptance of the small 100-year increase at US 50 and the fact that there are no insurable structures impacted, eventual CLOMR approval from FEMA under the design phase of the project can be expected. Due to the potential for Federal funding for the design phase of this project, a detailed scour analysis may eventually be required for review by the counties and MDOT SHA. Appendix 15.7 provides comparisons of existing versus proposed water-surface elevation and channel velocity for the 2-, 10- and 100-year events and channel shear stress for the 2- and 10-year events, as required by COMAR.



100 Year Floodplain Map

5.3 Stormwater Management

Due to the proposed changes to Governor Bridge Road, stormwater management (SWM) will be required to meet environmental site design (ESD) to the maximum extent practical (MEP) both on the Prince George's County approach and the Anne Arundel County approach. The project will include new and redevelopment impervious areas. To meet environmental site design volume (ESDv) and channel protection volume (CPv), a combination of dry swales and bioswales are proposed. For the purposes of this conceptual study, 8 feet wide swales are provided on both sides of Governor Bridge Road. The 8 feet width is expected to provide enough volume to meet both ESDv and CPv requirements for the target rainfall (Pe). Due to the location of the project in the floodplain of Patuxent River, it is not expected that 10-year peak management (QP10) will be required by either Prince George's County or Anne Arundel County since the 10-year Patuxent River flood overtops the proposed Governor Bridge Road profile in both counties. Bioswales are proposed for areas where the road profile exceeds 4%. For flatter portions of the road, dry swales are proposed. Where the proposed roadway is in fill on the Prince George's County approach and road grade is acceptable, perched dry swales (i.e. at top of fill, adjacent to road) will be utilized to keep the SWM devices out of the frequently inundated floodplain. Inlets will be placed in sump locations of the swales which will drop down to tie into the 3-cell 48" RCP relief culvert for eventual discharge to the Patuxent River. Ditches at the toes of fill may be required to direct runoff from smaller storm events away from the roadway fill.

6. Bridge Alternatives

The primary intent of this rehabilitation is to replace the existing truss bridge's floor system with a steel multi-girder structure and composite reinforced concrete slab. In accordance with the Scope of Services, six (6) alternatives have been developed for this Alternatives Analysis Report. The alternatives include the following:

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- **Alternative 4 –** Construction of a new dual lane structure on location, with some retained elements of the original structure.
- **Alternative 5 –** Construction of a new single lane structure at a different location without affecting the historic integrity of the existing bridge (Avoidance Alternative).
- **Alternative 6 –** Construction of a new dual lane structure at a different location without affecting the historic integrity of the existing bridge (Avoidance Alternative).

Because soil information is not available at this stage, Alternatives 3 through 6 assume using steel H-pile foundations. The foundation type will be studied further and a final foundation report will be prepared once an alternative is chosen to take to final design. Alternatives 3 through 6 have been developed in accordance with current AASHTO LRFD Bridge Design

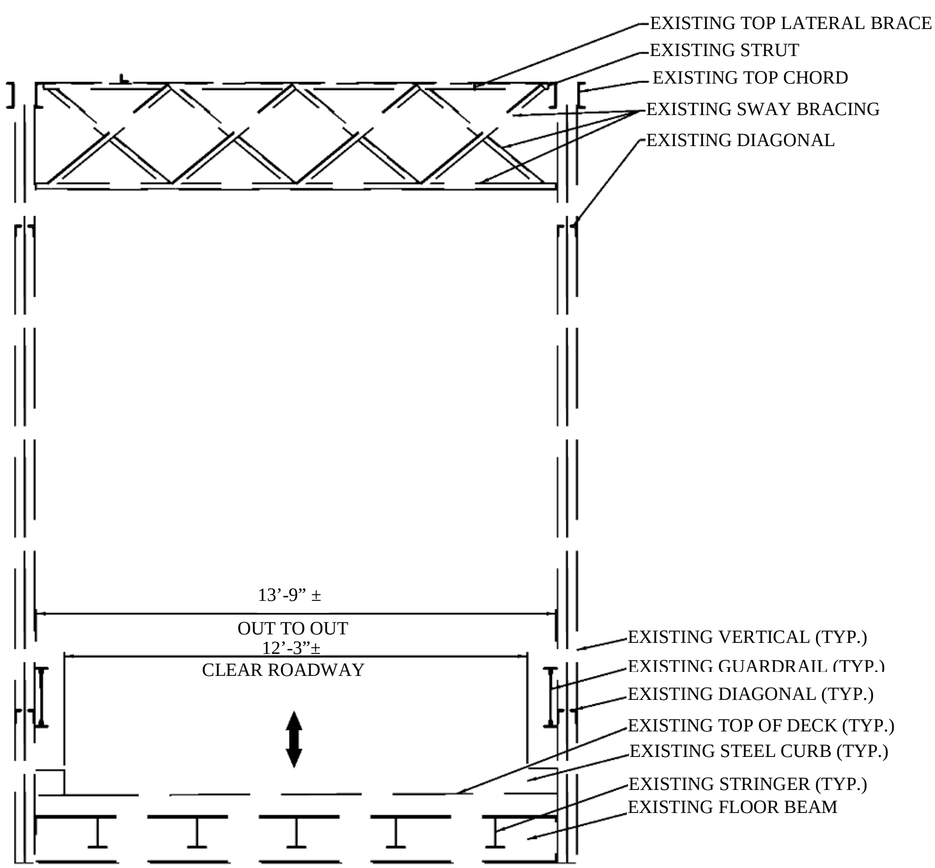
Specifications and MDOT-SHA Specifications, Policy and Procedure Memorandums, and Structural Standards Manual. The single span steel I-girder bridges were designed as composite sections for dead and live loads. The structural steel for the I-girders conform to A709, Grade 50. MD SHA Mix 6 (4500 psi) concrete will be used for the deck and abutment backwalls. All other structure concrete will be MD SHA Mix 3 (3500 psi). The software program *Leap Bridge Steel* developed by Bentley was used for the structural steel design.

Other structure types investigated for this crossing, included prefabricated bridge types manufactured by Contech (Steadfast Vehicular Truss Bridge) and Mabey. Both types were not investigated further for they both are truss type bridges which are fracture critical structures, the appearance of the truss members will clash with the retained historic trusses of the original bridge, and will require more maintenance due to the number of members than a typical steel girder bridge.

6.1 Alternative 1 (No-Build)

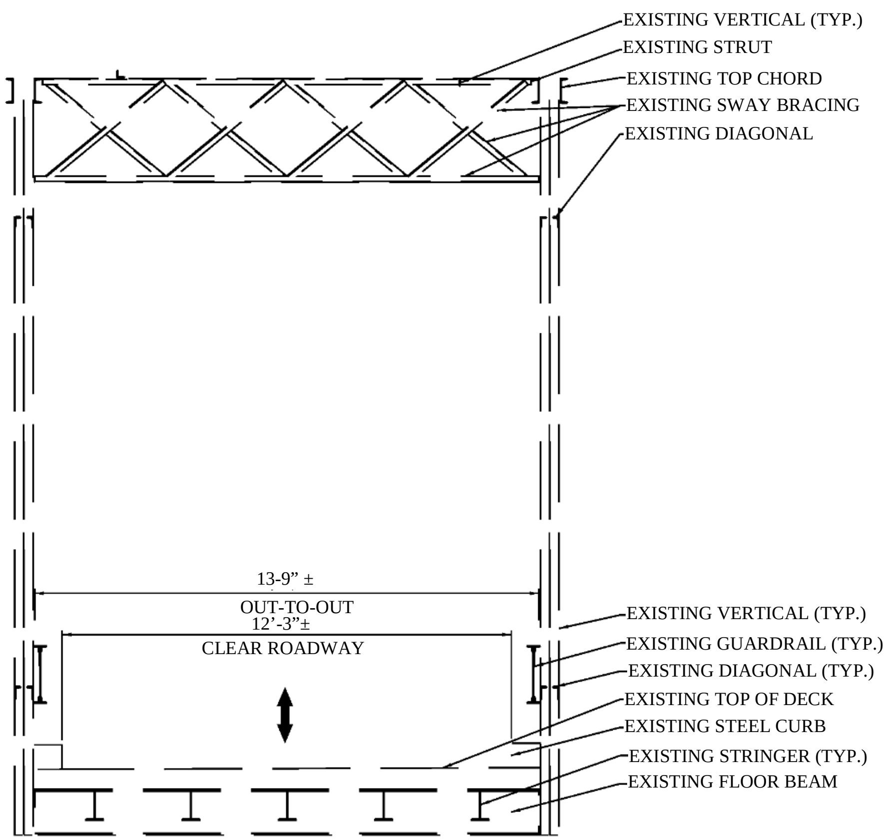
Alternative 1 is the least comprehensive design, whereas we do nothing. This includes no rehabilitation to the existing Pratt truss bridge and the roadway and bridge remains closed to traffic. The bridge is structurally deficient due to severe corrosion and section loss of the primary structural steel members, particularly the bottom chord members in the vicinity of the abutments. If nothing is done to structurally repair the existing bridge Governor Bridge Road will remain closed indefinitely.

Alternative 1 - Existing Typical Section



6.2 Alternative 2 (Minimization)

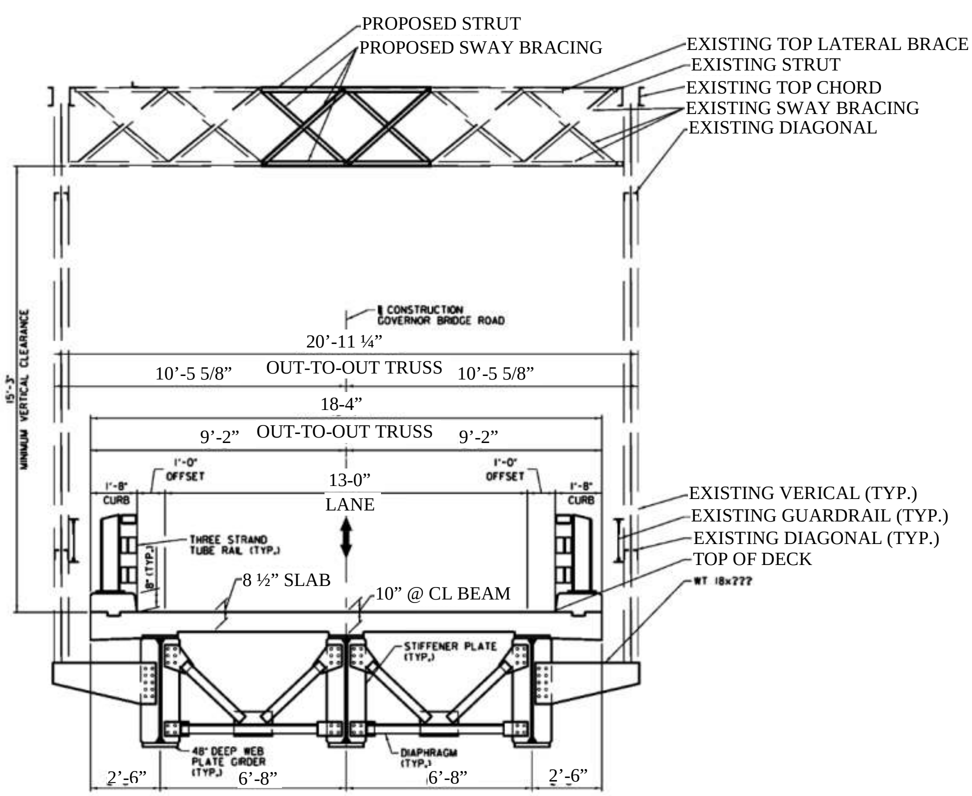
Alternative 2 is the minimization alternative. The existing Pratt truss bridge will be rehabilitated with little affects to its historic integrity. Besides cleaning and painting the existing bridge, the following structural members will need to be replaced: three steel stringers; nine steel bottom chords; and the steel open-grid deck. Even with the repairs, the rehabilitated bridge will remain posted for certain live loading combinations due to its inherent structural makeup. This bridge has been rehabilitated similarly in the past, most recently in 2014. Even with the repairs, the structure has undergone more deterioration and section loss in some of the primary structural steel members and was subsequently closed to vehicular traffic in March 2015. The structure remains closed as of the timing of this report. This alternative will not resolve frequent flooding on the Prince George’s County roadway approach to the bridge.



Alternative 2 Typical Section

6.3 Alternative 3 (Existing Alignment – 1 Lane Bridge)

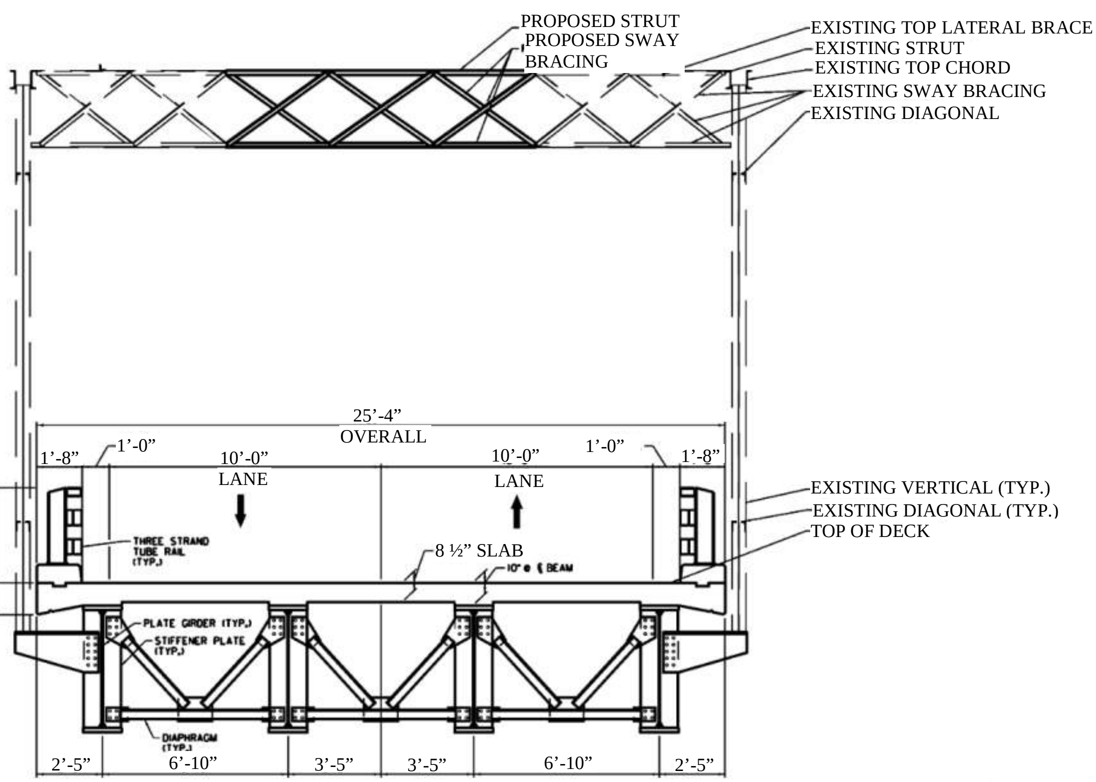
Alternative 3 is the least comprehensive design, providing a 15' clear roadway, one lane bridge on the existing bridge location with retained elements of the original structure. The existing Pratt truss bridge would be replaced with a steel I-girder structure and composite 8.5" thick reinforced concrete slab. Traffic barriers on the bridge will consist of a 42" high, three strand steel tube rail system. The bridge deck will be supported by three I-girders, 48" deep and spaced at 6'-8" on center. The trusses from the original bridge will be removed, retained and reinstalled only to maintain the historic appearance without providing any structural support to the bridge. Damaged portions of the existing trusses will be repaired or replaced as necessary for reuse. The existing top lateral bracing, struts and sway bracings will be cut and new members will be added to account for the slight adjustment in bridge width. The new reinforced concrete bridge abutments will be situated 10'± behind the existing bridge abutments, providing a new bridge length of 137'. The new abutments will be founded on steel piling. The existing bridge abutments will be retained to act as a stream diversion device for construction, provide scour protection for the new bridge abutments and to support the retained trusses. The steel I-girders for the new bridge will span between the new abutments, however a notch will be made within the existing abutments to allow the new girders to pass over them. Since the bridge will be designed using the latest AASHTO design criteria, there will be no live load posting for the new bridge. The profile of the new bridge will be set to clear a 2 year storm at elevation. The approaches will be raised to pass the 2-year storm. Large storm events were evaluated, but the blockage create impacts to the floodplain by more than 1' causing in impact upstream at the US50 crossing.



Alternative 3 Typical Section

6.4 Alternative 4 (Existing Alignment – 2 Lane Bridge)

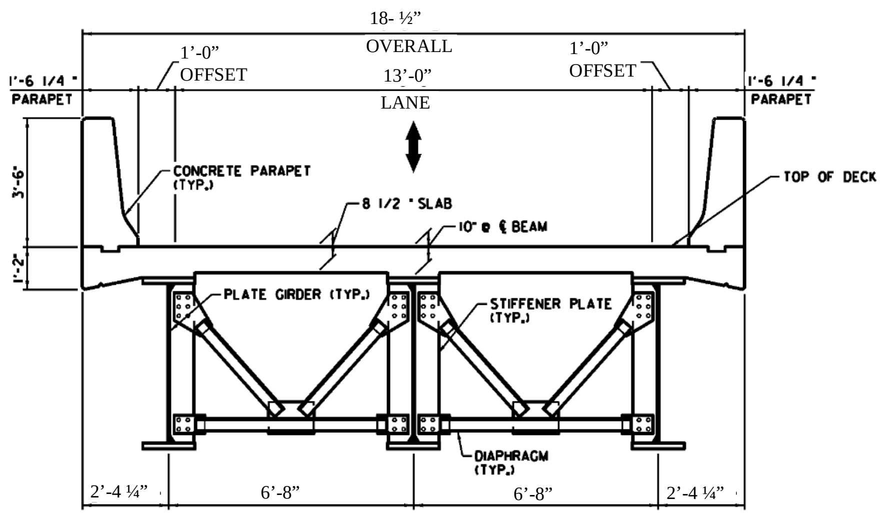
Alternative 4 is a moderate improvement providing a 22’ clear roadway, two-lane bridge on the existing bridge location with retained elements of the original structure. Alternative 4 is similar to Alternative 3 other than the number and width of the lanes on the bridge. The existing Pratt truss bridge would be replaced with a steel I-girder structure and composite 8.5” thick reinforced concrete slab. Traffic barriers on the bridge will consist of a 42” high, three strand steel tube rail system. The bridge deck will be supported by four I-girders, 57” deep and spaced at 6’-10” on center. The trusses from the original bridge will be removed, retained and reinstalled only to maintain the historic appearance without providing any structural support to the bridge. Damaged portions of the existing trusses will be repaired or replaced as necessary for reuse. The existing top lateral bracing, struts and sway bracings will be cut and new members will be added to account for the adjustment in bridge width. The new reinforced concrete bridge abutments will sit 10’± behind the existing bridge abutments, providing a new bridge length of 137’. The new abutments will be founded on steel piling. The existing bridge abutments will be retained to act as a stream diversion device for construction, provide scour protection for the new bridge abutments and to support the retained trusses. The steel I-girders for the new bridge will span between the new abutments, however a notch will be made within the existing abutments to allow the new girders to pass through them. Since the bridge will be designed using the latest AASHTO design criteria, there will be no live load posting for the new bridge.



Alternative 4 Typical Section

6.5 Alternative 5 (Shifted Alignment – 1 Lane Bridge)

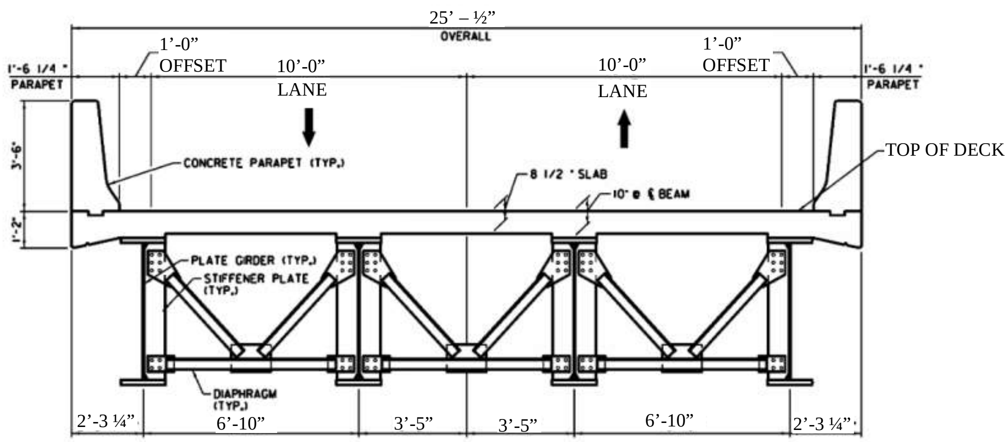
Alternative 5 is the avoidance alternative. It achieves the project objectives by creating a new 15'clear roadway, one-lane bridge downstream of the existing location to maintain the existing structure in the event MHT does not allow for the historical bridge to be replaced. Because this alternative constructs a new bridge at a different location, no repairs will be performed on the existing Pratt truss bridge and roadway tie-ins to the existing bridge will be removed. The new bridge will be a steel I-girder structure and composite 8.5" thick reinforced concrete slab. Traffic barriers on the bridge will be 42" high reinforced concrete parapets. The bridge deck will be supported by three I-girders, 48" deep and spaced at 6'-8" on center. The new reinforced concrete bridge abutments will be situated on the stream banks, providing a new bridge length of 137'. The new abutments will be founded on steel piling. With this alternative, the use of temporary sheeting will be needed for the construction of the abutments, which correlates to stream impacts that will need to be permitted. The new abutments will be susceptible to scour and protection, possibly through the use of riprap and longer abutment piling. Since the bridge will be designed using the latest AASHTO design criteria, there will be no live load posting for the new bridge.



Alternative 5 Typical Section

6.6 Alternative 6 (Shifted Alignment – 2 Lane Bridge)

Alternative 6 is the avoidance alternative. It achieves the project objectives by creating a new 22' clear roadway, two-lane bridge downstream of the existing location. Because this alternative constructs a new bridge at a different location, no repairs will be performed on the existing Pratt truss bridge and roadway tie-ins to the existing bridge will be removed. Alternative 6 is similar to Alternative 5 other than the number and width of the lanes on the bridge. The new bridge will be a steel I-girder structure and composite 8.5" thick reinforced concrete slab. Traffic barriers on the bridge will be 42" high reinforced concrete parapets. The bridge deck will be supported by three I-girders, 57" deep and spaced at 6'-10" on center. The new reinforced concrete bridge abutments will be situated on the stream banks, providing a new bridge length of 137'. The new abutments will be founded on steel piling. With this alternative, the use of temporary sheeting will be needed for the construction of the abutments, which correlates to stream impacts that will need to be permitted. The new abutments will be susceptible to scour and protection, possibly through the use of riprap and longer abutment piling. Since the bridge will be designed using the latest AASHTO design criteria, there will be no live load posting for the new bridge.



Alternative 6 Typical Section

7. Roadway Design

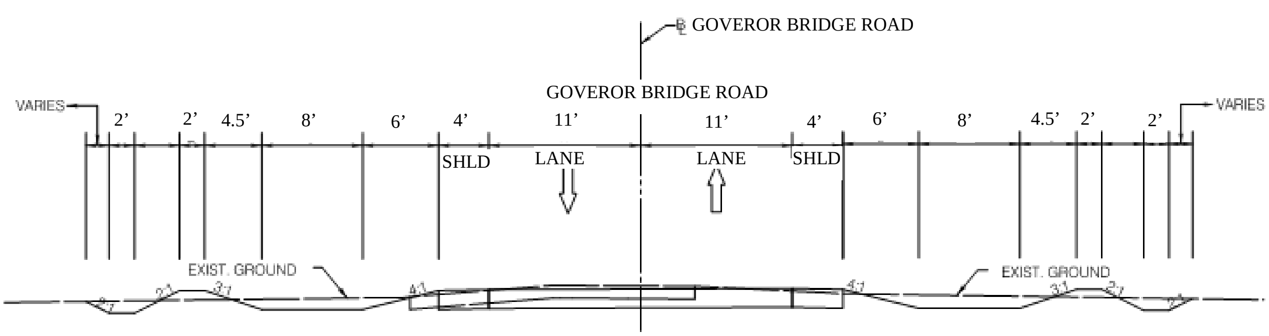
7.1 Existing Roadway Conditions

Governor Bridge Road is a rural secondary residential two-lane roadway with existing right of way width varying from 60’ to 180’ wide; the road has no street parking, shoulders, or sidewalks with a posted speed of 30 mph. From the Prince George’s County Standards, Governor Bridge Road closely represents the Rural Secondary Residential Road typical (PG Std.100.11). The existing typical is two 10’± lanes. Existing utility poles containing primary electric lines are located along the south side of the roadway. Street lighting is located on utility poles predominantly on the northbound side of Governor Bridge Road throughout the project limits.

The existing roadway geometry at the bridge approaches do not currently meet ASSHTO or Prince George’s/Anne Arundel County DPW&T county minimum design standards. The west approach roadway located in Prince George’s county regularly floods causing road closures during storm events. The existing low point resides approximately 140’ from the west abutment of the bridge and 5.5’± below the 2 year flood elevation. There is a 140’ radial - horizontal curve located on a sag vertical curve approaching the Governor Bridge Road bridge. On the East of side of the bridge, a 125’ horizontal curve is located immediately after the bridge abutment.

7.2 Proposed Roadway

Proposed roadway improvements for each alternative will include design improvements to meet or exceed Prince George’s County and Anne Arundel County design standards, where possible. As mentioned in the existing conditions, the road is considered a Rural Secondary Residential roadway. Therefore, our proposed typical section will meet Prince George’s County Std. 100.11. Proposed improvements include an open section roadway with two - 11 foot lanes and 4 foot shoulder on each side of the roadway. As shown in Table I-2 Design Criteria in Prince George’s County Department of Public Works and Transportation Guide and AASHTO, a 30 MPH design speed is utilized with a minimum curve radius of 300 feet, and a 10% centerline grade maximum with a 50’ Right-of-Way. Superelevation for all alternatives is normal crown, using ASSHTO method 2. The proposed roadway typical section is shown below.



Roadway Typical Section

Proposed Horizontal Alignments

The proposed horizontal alignment was set to meet the 30 mph roadway design speed to accommodate 11' lanes and 4' shoulders with roadside ditch and clear water ditch at the toe of slope. The proposed alignment east of the bridge has been improved to meet the minimum design radius of 300'. This alignment will improve the overall geometry but increasing the existing sight distance, smoothing out the existing multiple horizontal curves, and meet the minimum design criteria for Prince George's County. Prince George's County currently owns the land to the south of the existing alignment for future widening and this increased radius will not impact the schedule or add cost to the project due to right of way needs. On the east approach, the proposed horizontal alignment contains a 140' radial curve. A 300' curve could not be achieved with the new bridge alignment while remaining within the existing right of way and creating additional environmental impacts. Additional impacts include relocating existing utility poles, wetlands, Waters of the US. A design waiver will be required.

Proposed Vertical Alignments

The proposed vertical profiles were set based on 30 MPH design speed and the hydraulic design criteria. Several profiles were developed and evaluated for various bridge types. The 25-year design storm was the initial criteria to be achieved if feasible. The hydraulic analysis results in section 5.2 determined the height required for a new bridge to pass the 25 year storm was not reasonable due to the roadway classification, cost, impacts, and objectives of this project. Raising the profile would impact the hydraulic US50 upstream and possible not permittable. Therefore a bridge type and height were evaluated that would be feasibly permitted, constructed, minimize impacts, and conscious of the historical bridge. After several evaluations, the low point elevation of 26.50 would clear the 2 year storm and improve Governor Bridge Road existing flooding conditions on the east approach.

7.2.1 Alternative 1 (No-Build)

Alternative 1 is the least comprehensive design, whereas we do nothing. This includes no rehabilitation to the existing Pratt truss bridge and the roadway and bridge remains closed to traffic. The bridge is structurally deficient due to severe corrosion of the structural steel members, particularly the bottom chord members in the vicinity of the abutments.

7.2.2 Alternative 2 (Minimization)

Alternative 2 is the minimization alternative. Minimal approach roadway work will be done to the existing roadway. The west approach would continue to flood during minimal storm events and would cause regular road closures that are encountered today.

7.2.3 Alternative 3 (Existing Alignment – 1 Lane Bridge)

Alternative 3 is the least comprehensive design, providing a 15' clear roadway, one lane bridge on the existing bridge location with retained elements of the original structure. Proposed roadway improvements along Governor Bridge Road would include reconstruction, widening, and resurfacing. For the Prince George's County west approach, the horizontal and vertical geometry have been improved to meet the curve minimum of 300', which will result in full depth construction and widening. The existing right of way varies from 60' to 180'and no properties are expected to be impacted. Additional approach roadway work will be done on the east approach raising the roadway to clear a 2 year storm elevation and install cross pipes under the roadway to improve flooding issues. Alternative 3 would require a design exception for Anne Arundel County bridge approach as the 300' horizontal curve minimum is not met. This alternative is estimated to impact 11 utility poles, some of which may be avoided in final design. Additional utility relocations may be required due to stormwater management.

7.2.4 Alternative 4 (Existing Alignment – 2 Lane Bridge)

Alternative 4 is a moderate improvement providing a 22' clear roadway, new two-lane bridge on the existing bridge location with retained elements of the original structure. Proposed roadway improvements along Governor Bridge Road would include reconstruction, widening and resurfacing. For the Prince George's County side, the horizontal curve minimum of 300' feet was met which will result in extensive full depth construction and widening. The existing right of way varies from 60' to 180'and no properties are expected to be impacted. Additional approach roadway work will be done on the west approach raising the roadway to clear a 2 year storm elevation and install cross pipes under the roadway to improve flooding issues. Alternative 4 would require a design exception for the Anne Arundel County side as the 300' horizontal curve minimum is not met. This alternative is estimated to impact 11 utility poles, some of which may be avoided in final design. Additional utility relocations may be required due to stormwater management.

7.2.5 Alternative 5 (Shifted Alignment – 1 Lane Bridge)

Alternative 5 is the avoidance alternative and has been developed if Maryland Historical Trust, did not approve of the archaeological finds or the impacts to the historical bridge. It achieves the project objectives by creating a new 15' clear roadway, one-lane bridge downstream of the existing location. Proposed roadway improvements along Governor Bridge Road would include reconstruction, widening and resurfacing. For Alternative 5, the existing curve is improved to meet the minimum horizontal curve radius of 300' on both Prince George's County and Anne Arundel County sides. Extensive full depth construction and widening will be necessary on the Anne Arundel County approach side impacting Waters of the US. The existing right of way varies from 60' to 180' to the west and adjacent properties are expected to be impacted. Additional approach roadway work will be done on the west approach raising the roadway to clear a 2 year storm elevation and install cross pipes under the roadway to improve flooding issues. This alternative impacts 11 utility poles, some of which may be avoided in final design. Additional utility relocations may be required due to storm water management. Right of way impacts on both Prince George's County and Anne Arundel County approaches would be encountered.

7.2.6 Alternative 6 (Shifted Alignment – 2 Lane Bridge)

Alternative 6 is the avoidance alternative and has been developed if Maryland Historical Trust, did not approve of the archaeological finds or the impacts to the historical bridge. It achieves the project objectives by creating a new 22' clear roadway, two-lane bridge downstream of the existing location. Proposed roadway improvements along Governor Bridge Road would include reconstruction, widening and resurfacing. For Alternative 6, the minimum horizontal curve radius of 300' is met on both Prince George's and Anne Arundel County sides. Meeting the minimum horizontal design criteria, extensive full depth and widening will also occur on the Anne Arundel County side, likely affecting the WUS. The existing right of way varies from 60' to 180'and adjacent properties are expected to be impacted. Additional approach roadway work will be done on the west approach to improve flooding issues. This alternative impacts 11 utility poles, some of which may be avoided in final design. Additional utility relocations may be required due to storm water management.

8. Right-of-Way Impacts

ROW Impacts (SF)				
Fee Simple, Slope Easements, Drainage Easements				
Description	Alternative 3	Alternative 4	Alternative 5	Alternative 6
MNCPPC	9767	10706	11293	11095
AA Parks and Rec	8095	9692	50174	25113
Anne Arundel County	8220	7439	0	0
MDSHA	0	0	0	27197
Summary	**26,082**	**27,837**	**61,467**	**63,405**

Note: Alternatives 1 and 2 do not have ROW Impacts since no roadway improvements are proposed

9. Environmental Impacts

9.1 Stream Classification

The study area is located within the Upper Patuxent River Watershed (02131104). The Maryland Surface Water Use Designation for the Patuxent River and all its tributaries in this area is "Use I", pursuant to which they are protected for water contact recreation, and protection of non-tidal, warm water, aquatic life (COMAR 26.08.02.08). Due to this designation, in-stream work may not be conducted during the period of March 1 through June 15, inclusive, during any year (COMAR 26.08.02.11). Additionally, KCI reviewed Maryland's High Quality Waters (Tier II) list to identify any Tier II waters within the study area. Tier II waters are systems that exceed the minimum requirements for fishable and swimmable waters. No Tier II waters were identified within the study area (MDE, 2010). According to the Maryland 303(d) list of impaired waterways, the Patuxent River in this area is listed as Category 5 – impaired for sulfates and total suspended solids.

The Maryland Department of Planning, Land Use/Land Cover geographic information systems (GIS, 2011) indicated a majority of the study area, and its immediate surroundings, is classified as "Deciduous Forest" (Code 41).

9.2 Wetlands

The *National Wetlands Inventory (NWI) Map for Bowie, Maryland* (U.S. Fish and Wildlife Service [USFWS], 1981-2002) identifies palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A), palustrine, forested, broad-leaved deciduous, seasonally flooded (PFO1C) and palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E) wetlands within the study area. The Patuxent River is identified as a riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH) system within the study area. In the appendices, the NWI map shows the locations of NWI-classified wetlands in the vicinity of the study area.
According to a review of Federal Emergency Management Agency (FEMA) Q3 flood data, the majority of the study area is within the 100-year floodplain associated with the Patuxent River (*FEMA Panel No. 24003C0204E*). In the appendices, the Q3 flood map shows the locations of FEMA-designated floodplains in the vicinity of the study area.
KCI performed a field reconnaissance for the entire study area to determine the presence or absence of wetland areas during May 2017. Based upon this review, KCI determined that normal conditions were present on the site and that the "Routine Determination" method would be appropriate in order to identify wetland boundaries within the study area. In the field, wetland delineations were conducted using the criteria outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)* (Environmental Laboratory, 2010). A field investigation to delineate wetlands and waterways was conducted on May 26, 2017.

During the course of the field investigation, dominant plant species within suspected wetland areas were identified and recorded for each stratum present. The United States Army Corps of Engineers (USACE) *2016 National Wetland Plant List* (*Lichvar, 2016)* was used to determine the indicator status of the vegetation found within each community. KCI then characterized the plant community as hydrophytic or upland based upon the results of the Dominance Test and the Prevalence Index worksheets within the *Wetland Determination Data Form – Atlantic and Gulf Coastal Plain Region*.

KCI assessed wetland hydrology within the study area based on the presence of one primary or two or more secondary hydrology indicators. Surface water inundation, depth to soil saturation, drift lines, water marks, and sediment deposits are some of the primary indicators listed in the *Wetland Determination Data Form – Atlantic and Gulf Coastal Plain Region*. Secondary indicators include surface soil cracks, a sparsely vegetated concave surface, drainage patterns, and moss trim lines, as well as other less commonly found indicators.

Soil pits were typically excavated to a depth of approximately 18-24 inches, barring refusal, or immediately below the A-horizon. KCI recorded soil texture and the color of the matrix and any concretions or soft masses within a representative soil sample were assigned hue, value, and chroma utilizing the *Munsell Soil Color Charts* (Munsell, 2000). All soil samples were thoroughly investigated for the presence of redoximorphic features and/or hydric soil indicators included in *Field Indicators of Hydric Soils* (NRCS, 2016) and the *Wetland Determination Data Form – Atlantic and Gulf Coastal Plain Region*. KCI then classified soils as hydric or non-hydric based upon the presence or absence of hydric soil characteristics and indicators.

KCI determined areas to be wetlands once all three wetland parameters (vegetation, hydrology, and soils), as described above, were identified (Environmental Laboratory, 1987 and 2010). When wetlands and streams were identified in the field, their boundaries were flagged along the wetland/upland interface or along the ordinary high water mark, respectively. Closed wetland systems were identified with a "WP" in the system name, while open or linear systems that extended outside of the study area were identified with a "WL" in the system name. Boundaries were marked in the field using consecutively numbered flagging tape, and flag locations were subsequently field located utilizing a total station survey apparatus. A map showing delineated wetlands and waterways is included in the *Wetland Assessment & Delineation Letter report*.

Vegetation, hydrologic, and soils data collected in the field, as well as information derived from the pre-fieldwork data review, were transferred to *Wetland Determination Data Forms - Atlantic and Gulf Coastal Plain Region* in accordance with USACE protocols (1987 and 2010). *Wetland Assessment & Delineation Letter report* includes the Wetland Determination Data Forms for the upland and wetland sample plot locations and Stream Features Datasheets for WUS systems throughout the study area.

Representative photographs were taken throughout the study area and specifically of wetlands and stream systems in order to document field conditions at the time of the delineation. Below is a table of probable environmental impacts.

Environmental Impacts				
Description	Alternative 3	Alternative 4	Alternative 5	Alternative 6
Wetlands (SF)	27443	28093	37634	39530
Waters of US (LF)	136	136	136	310
Wetland Buffer (SF)	16066	19195	13146	13280
Forest (SF)	8497	8536	7491	7652
Stream	No	No	Yes	Yes
100 Year Flood Plain	Yes	Yes	Yes	Yes
Historic	TBD	TBD	No	No
Utility Impacts	11	11	11	11
Full Depth Pavement (SF)	34561	23519	45170	45382
Mill and Overlay (SF)	4316	5500	3300	3300

Note: Alternatives 1 and 2 do not have Environmental Impacts since no roadway improvements are proposed

10. Archeological Impacts

Archaeological investigations were undertaken to determine if archaeological sites eligible for listing in the National Register of Historic Places (NRHP) are located within the proposed project Area of Potential Effects (APE) to facilitate compliance with the National Historic Preservation Act of 1966, as amended.

A total of 39 STPs were excavated for this effort. One archaeological site, the Pit Site (18ANXXX), was identified just outside of the APE in the northeastern quadrant. The 1861 Martenent Prince George's County map depicts a grist mill on the north side of the road. However, comparison of the road track on the 1861 map to the current road suggests that mill would have been located further to the northeast on the north side of the road bend.

Given the absence of any cultural features within the quadrant, as well as the recovery of the artifacts within the A-horizon, these artifacts are interpreted as general household refuse disposal from these nearby dwellings dispersed across the setting by ground disturbance associated with the borrow pit excavation. No patterns by artifact class or count were observed to indicate the presence of intact deposits or features within the site. Because of its poor integrity, ubiquitous nature, and the limited research potential, the Pit Site does not provide new information in history. No further archeological investigation is recommended for this site, pending approval from MHT. The complete Phase I Archaeological Survey Report is located in appendices will have to be reviewed and approved by the Maryland Historic Trust (MHT), Prince George's County, and Anne Arundel County Historic Trust prior to final design.

11. Cost Analysis of Alternatives

Governor Bridge Road Alternative Cost Analysis						
Description	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
Design	$0	$200,000	$545,000	$620,000	$630,000	$700,000
Construction	$0	$1,990,950	$5,447,200	$6,208,100	$6,272,500	$6,986,600
Estimated Total	$0	$2,190,950	$5,992,200	$6,828,100	$6,900,500	$7,683,600

Note: Design Estimate is approximately 10% of estimated construction cost. Does not include Right of Way.

12. Evaluation of Alternatives

Alternative 1 - (No-Build)

Estimated Cost ($0)

***Advantages*:**
- Little to no cost
- Since the bridge is closed, flooding of roadway is not an issue.
- No utility impacts
- Existing structure is not impacted
- Emergency Service Responders have viable routes. These services have functioned with the bridge closure in place for the past 3 years with no ill effect.
- Existing structure can be used by pedestrians, bikers, fisherman, and other non-vehicle based users.
- Bridge structure could remain as a historic structure.
- Area could be used as an environmental resource/nature sanctuary

***Disadvantages*:**
- Roadway remains closed and detour route stays in effect
- Bridge will remain structurally deficient causing safety hazard
- In the event of catastrophic failure, could cause major environmental impacts to USE I Stream.

Alternative 2 - (Minimization)

Estimated Cost ($2,190,950)

Advantages:
- Structure retains its historic integrity
- Least expensive “build” alternative
- No additional right-of-way is required
- No impacts to wetlands
- No impacts to Waters of the US
- No utility impacts

Disadvantages:
- Does not address sub roadway geometrics
- Roadway will still be subject to frequent closings due to flooding
- Structure will be posted for load restrictions
- Continual maintenance of structure due to deterioration
- Existing bridge members may need to be replaced in the future due to further deterioration.

<u>Alternative 3</u> - (Existing Alignment – 1 Lane Bridge)

Estimated Cost ($5,992,200)

Advantages:
- New structure
- No loading restrictions on the bridge
- Portions of existing bridge will be retained for historical context
- Improved roadway geometrics on west approach
- Frequency of flooding will be reduced slightly in low storm event (2 yr. storm event)
- Least expensive "Build" alternative

Disadvantages:
- One lane bridge is maintained, similar to existing bridge condition
- Environmental impacts due to approach roadway geometric improvements
- Right-of-way is required to improve the roadway alignment
- Utility impacts adding time and cost
- Roadway will still flood for 2-year and greater storms.
- US50 will be impacted by 0.17 feet in the 100 year storm.

<u>Alternative 4</u> – (Existing Alignment – 2 Lane Bridge)

Estimated Cost ($6,828,100)

Advantages:
- New structure
- No loading restrictions on the bridge
- Two lane bridge will replace one lane bridge
- Portions of existing bridge will be retained for historical context
- Improved roadway geometrics on west approach
- Frequency of flooding will be reduced slightly in low storm event (2 yr. storm event)

Disadvantages:
- Increased environmental impacts compared to Alternative 3 due to roadway geometric improvements and 2 lane bridge structure
- Increase Right-of-way impacts compared to Alternative 3 due to improved roadway alignment and 2 lane bridge structure
- Utility impacts adding to time and cost
- Roadway will still flood for 2-year and greater storms.
- US50 will be impacted by 0.17 feet in the 100 year storm.

Alternative 5 – (Shifted Alignment – 1 Lane Bridge)

Estimated Cost ($6,900,500)

Advantages:

- New structure
- No loading restrictions on the bridge
- Improved roadway geometrics on east and west approach
- Frequency of flooding will be reduced slightly in low storm event (2 yr. storm event)

Disadvantages:

- One lane bridge is maintained, similar to existing bridge condition, but on a shifted alignment
- USE I Stream impacts due to construction of new abutments
- Increased Environmental impacts compared to Alternatives 3 & 4 due to shifted alignment and roadway geometric improvements
- Increased Right-of-way impacts compared to Alternatives 3 & 4 due to shifted alignments and roadway geometric improvements.
- Utility impacts adding to time and cost
- Existing bridge will not continue to be maintained further
- Higher cost than Alternatives 3 & 4
- Permitting will be more difficult than Alternatives 3 & 4
- US50 will be impacted by 0.17 feet in the 100 year storm.

Alternative 6 - (Shifted Alignment – 2 Lane Bridge)

Estimated Cost ($7,683,600)

Advantages:

- New structure
- No loading restrictions on the bridge
- Two lane bridge will replace one lane bridge
- Improved roadway geometrics on east and west approach
- Frequency of flooding will be reduced slightly in low storm event (2 yr. storm event)

Disadvantages:

- Two lane bridge is maintained, similar to existing bridge condition, but on a shifted alignment
- USE I Stream impacts due to construction of new abutments
- Increase Environmental impacts compared to Alternatives 3, 4, & 5 due to shifted alignment and roadway geometric improvements
- Increased Right-of-way impacts compared to Alternatives 3, 4, & 5 due to shifted alignments and roadway geometric improvements

- Utility impacts adding to time and cost
- Existing bridge will not continue to be maintained further
- Higher cost then Alternatives 3, 4, & 5
- Permitting will be more difficult than Alternatives 3 & 4
- US50 will be impacted by 0.17 feet in the 100 year storm.

13. Conclusions

For projects of this size and scope, factors such as initial construction costs, long-term maintenance costs, constructability, on-site construction schedule, environmental impacts, permitting, aesthetics, and H&H impacts should be considered in selecting the best alternative.

The cost difference between constructing the bridge on a new alignment as compared to the existing alignment is approximately $882,000 more. The cost difference between constructing a one lane bridge as compared to a dual lane bridge is approximately $810,000 less, not including Right of Way.

Single span structures of the proposed span range are more cost effective than multi-span structures because they can provide clear spans over the stream to avoid expensive in-stream substructure construction. Single span structures can also avoid accumulation of debris by the piers in the stream. Therefore single span bridges have less environmental impacts during and after construction than multi-span structures. Single span structures are also more aesthetically appealing than multi-span bridges.

In general, both prestressed concrete structures and steel structures last approximately 75 years, but concrete structures cost more than steel ones to build for long–span bridges. Also with the retention of the historic steel truss, it would be more appealing, aesthetically using a steel structure to attach to and span the stream as compared to concrete. For those reasons, only steel options were considered for the project. All build alternatives will need deck overlay repairs or replacement every 20 to 30 years. Steel girder bridges will require painting every 20 years, so regular maintenance during the life of the structure will be important.

As far as constructability and construction schedule are concerned, all alternatives can utilize local manufacturing facilities, local skilled labors, and with the roadway closed, provide safer construction environment.

Alternatives 3, 4, 5, and 6 will raise the vertical roadway profiles by 5.5'± to maintain speed limit and to minimize the storm water impacts on the upstream properties. All alternatives will not eliminate overtopping of the bridge, but the 10 year flow passes through the proposed structure under pressure flow condition and overtops the roadway at the low point by 2.8' ±.

Alternatives 3, 4, 5 and 6 all impact wetlands, wetland buffers, Waters of the US, and forests. All impacts will be required to be permitted. Alternatives 3 and 4 impact less wetlands and buffers than Alternatives 5 and 6 since the roadway is on the same alignment as existing. Alternative 3 impacts the least amount of wetlands and buffers compared to the other three alternatives. With less impacts, there will be less mitigation required, thus reducing the construction cost. Also with reduced impacts, Agency review and approval may be more expedient.

14. Supplemental Information

14.1 Existing Historic Bridge Truss Retention

It is being proposed that the existing truss members be retained for Alternatives 3 and 4. The following is the disassembling and reassembling process:

Site Preparation:

- Relocate overhead utility lines.
- Clear and level a staging area at the southwest approach to the bridge, where the steel truss bridge will be moved for rehabilitation work.
- Clear the trees in the surrounding area to allow the transfer of the bridge to the staging area.
- Place timber mats on which the relocated truss bridge will be positioned on.
- Position the crane near the staging area.

Dissembling and Reassembling Steps:

- Detach and remove the existing steel grid deck.
- Secure the truss in place with one crane. The crane should support the whole bridge at the top four end corners (U1 & U5).
- Detach the bearing connections at both abutments.
- Slowly lift the whole bridge from its existing position and reposition it at the staging area.
- Secure the bridge at the staging area with timber or other form of false work.
- Using a torch, cut each of the top cross members through the middle.
- Disconnect all the girders and floor beam from the trusses.
- Disconnect all the pin connections at the vertical members and lay the truss down for repairs and replacement work.
- Replace all deteriorated truss members.
- Reassemble trusses using new bolted connections.
- Paint the steel trusses.
- Lift each of the assembled trusses from the staging area and connect it to the new bridge superstructure and substructure.
    - The existing bridge abutments will be retained and will still serve as the end supports of the truss.
    - The new bridge will have structural steel ledges installed along the fascia girders at the former location of the truss floor beams that will lend support of the truss at each of its member connections.
- Supplement top cross members with additional steel members in the same pattern to accommodate new truss width.

Rehabilitation of Governor Bridge Road Bridge (P-0599) over Patuxent River

Appendix 15.1: Location Map

KCI Technologies, Inc.
936 Ridgebrook Road
Sparks, MD 21152


LEGEND:
PROPOSED FULL DEPTH PAVEMENT
MILL AND OVERLAY
ROW
WETLAND BOUNDARY
LIMIT OF DISTURBANCE
100' 0 100' 200'
SCALE: 1" = 100'
US50 WESTBOUND
US50 EASTBOUND
PATUXENT RIVER
GOVERNOR BRIDGE ROAD
GOVERNOR BRIDGE ROAD
EXISTING GOVERNOR'S BRIDGE

Rehabilitation of Governor Bridge Road Bridge (P-0599) over Patuxent River

Appendix 15.2: Wetland Assessment & Delineation Letter Report

KCI Technologies, Inc.
936 Ridgebrook Road
Sparks, MD 21152

September 1, 2017

Mr. Unmesh Patel, PE
Prince George's County Department of Public Works and Transportation
Highways and Bridges Division
9400 Peppercorn Place
Suite 310
Largo, Maryland 20774

RE: Rehabilitation of Bridge No. P-0599 over the Patuxent River
Bowie, Prince George's County and Davidsonville, Anne Arundel County, Maryland

SUB: Wetland Assessment & Delineation Letter Report

Dear Mr. Patel:

The Prince George's County Department of Public Works and Transportation (DPW&T) is proposing the rehabilitation of Bridge No. P-0599 over the Patuxent River, on Governor Bridge Road in Bowie, Prince George's County, and Davidsonville, Anne Arundel County, Maryland. As part of this effort, KCI Technologies, Inc. (KCI) conducted a wetland investigation to determine the presence of wetlands and other "waters of the United States" (WUS) systems within the study area. Resources throughout the study area were identified and delineated in accordance with the methodologies outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)* (Environmental Laboratory, 2010), and other relevant guidance documents.

This report documents wetland and waterway conditions as field delineated on May 26, 2017, in the vicinity of the proposed rehabilitation of Bridge No. P-0599 over the Patuxent River. Prior to the commencement of field activities, KCI reviewed readily available primary source materials to determine the presence or absence of natural resources within the study area. Relevant information found during this search is described in detail below and references utilized during the literature review are included as Appendix A to this report.

Study Area and Description

The project study area extends along a forested corridor of Governor Bridge Road, crossing the Patuxent River, and is located south of US Route 50. The Patuxent River flows south beneath Governor Bridge Road, continuing outside of the study area to its eventual confluence with the Chesapeake Bay. The study area is surrounded by residential property, forested land, and wetlands. A Site Location Map depicting the study area is enclosed as Attachment 1 to this report.

Watershed and Land Use

The study area is located within the Upper Patuxent River Watershed (02131104). The Maryland Surface Water Use Designation for the Patuxent River and all its tributaries in this area is "Use I", pursuant to which they are protected for water contact recreation, and protection of nontidal, warmwater, aquatic life (COMAR 26.08.02.08). Due to this designation, in-stream work may not be conducted during the period of March 1 through June 15, inclusive, during any year (COMAR 26.08.02.11). Additionally, KCI reviewed Maryland's High Quality Waters (Tier II) list to identify any Tier II waters within the study area. Tier II waters are systems that exceed the minimum requirements for fishable and swimmable waters. No Tier II waters were identified within the study area (MDE, 2010). According to the Maryland 303(d) list of impaired waterways, the Patuxent River in this area is listed as Category 5 – impaired for sulfates and total suspended solids.

The Maryland Department of Planning, Land Use/Land Cover geographic information systems (GIS, 2011) indicated a majority of the study area, and its immediate surroundings, is classified as "Deciduous Forest" (Code 41).

Topography

The study area is located within the Atlantic Coastal Plain Physiographic Province. According to a review of the *Bowie, Maryland 7.5' Topographic Quadrangle* (United States Geological Survey, 2016) and other sources, the topography within the study area is moderately sloping towards the Patuxent River. Elevations range from approximately 60 feet above mean sea level (MSL) to 70 feet above MSL. A copy of the relevant USGS quadrangle map for the study area is included as Attachment 2 to this report.

Soils

According to the *Soil Survey of Anne Arundel County*, and the *Soil Survey of Prince George's County, Maryland* (United States Department of Agriculture-Soil Conservation Service [USDA-SCS], 1973, 1967) and more recently available digital Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) soils data for the county (NRCS Web Soil Survey, 2017), the predominant soil associations found within the vicinity of the study area are the Galestown-Evesboro-Rumford and the Bibb-Tidal Marsh Associations. Soils in the Galestown-

Evesboro-Rumford Association are mostly level and gently sloping, sandy soils. Soils in the Bibb-Tidal Marsh Association are poorly drained soils of floodplains and marshes. Within these associations, four distinct soil units are present within the study area:

- Widewater and Issue soils, 0-2% slopes, frequently flooded (WBA)
- Widewater and Issue soils, frequently flooded (WE)
- Udorthents, reclaimed gravel pits, 0-5% slopes (UdgB)
- Udorthents, reclaimed gravel pits, 0-5% slopes (UpB)

Mapped soil units are classified hydric based upon their listing on the *National Hydric Soils List by State* (USDA-NRCS, 2015) and the State and county lists in the web soil survey (NRCS Web Soil Survey, 2017). Hydric soils are defined as those soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile. The table below summarizes hydric components of soils within the study area as listed in either the National Hydric Soils List by State or the web soil survey.

Soil Series	Hydric (Y/N)	Hydric Component	Percent of Map Unit
Widewater and Issue soils, 0-2% slopes, frequently flooded (WBA)	Yes	Widewater Zekiah Longmarsh Shrewsbury	40% 10% 5% 5%
Widewater and Issue soils, frequently flooded (WE)	Yes	Widewater Zekiah Longmarsh Shrewsbury	40% 10% 5% 5%
Udorthents, reclaimed gravel pits, 0-5% slopes (UdgB)	No	N/A	N/A
Udorthents, reclaimed gravel pits, 0-5% slopes (UpB)	No	N/A	N/A

A copy of the soil survey map for the study area is included as Attachment 3 to this report.

National Wetlands Inventory

The *National Wetlands Inventory (NWI) Map for Bowie, Maryland* (U.S. Fish and Wildlife Service [USFWS], 1981-2002) identifies palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A), palustrine, forested, broad-leaved deciduous, seasonally flooded (PFO1C) and palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E) wetlands within the study area. The Patuxent River is identified as a riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH) system within the study area. Attachment 4 shows the locations of NWI-classified wetlands in the vicinity of the study area.

FEMA-Designated Floodplains

According to a review of Federal Emergency Management Agency (FEMA) Q3 flood data, the majority of the study area is within the 100-year floodplain associated with the Patuxent River (*FEMA Panel No. 24003C0204E*). Attachment 5 shows the locations of FEMA-designated floodplains in the vicinity of the study area.

Wetland Delineation Methodology

KCI performed a field reconnaissance for the entire study area to determine the presence or absence of wetland areas during May 2017. Based upon this review, KCI determined that normal conditions were present on the site and that the “Routine Determination" method would be appropriate in order to identify wetland boundaries within the study area. In the field, wetland delineations were conducted using the criteria outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)* (Environmental Laboratory, 2010). A field investigation to delineate wetlands and waterways was conducted on May 26, 2017.

During the course of the field investigation, dominant plant species within suspected wetland areas were identified and recorded for each stratum present. The United States Army Corps of Engineers (USACE) *2016 National Wetland Plant List* (Lichvar, 2016) was used to determine the indicator status of the vegetation found within each community. KCI then characterized the plant community as hydrophytic or upland based upon the results of the Dominance Test and the Prevalence Index worksheets within the *Wetland Determination Data Form – Atlantic and Gulf Coastal Plain Region*.

KCI assessed wetland hydrology within the study area based on the presence of one primary or two or more secondary hydrology indicators. Surface water inundation, depth to soil saturation, drift lines, water marks, and sediment deposits are some of the primary indicators listed in the *Wetland Determination Data Form – Atlantic and Gulf Coastal Plain Region*. Secondary indicators include surface soil cracks, a sparsely vegetated concave surface, drainage patterns, and moss trim lines, as well as other less commonly found indicators.

Soil pits were typically excavated to a depth of approximately 18-24 inches, barring refusal, or immediately below the A-horizon. KCI recorded soil texture and the color of the matrix and any concretions or soft masses within a representative soil sample were assigned hue, value, and chroma utilizing the *Munsell Soil Color Charts* (Munsell, 2000). All soil samples were thoroughly investigated for the presence of redoximorphic features and/or hydric soil indicators included in *Field Indicators of Hydric Soils* (NRCS, 2016) and the *Wetland Determination Data Form – Atlantic and Gulf Coastal Plain Region*. KCI then classified soils as hydric or non-hydric based upon the presence or absence of hydric soil characteristics and indicators.

KCI determined areas to be wetlands once all three wetland parameters (vegetation, hydrology, and soils), as described above, were identified (Environmental Laboratory, 1987 and 2010). When wetlands and streams were identified in the field, their boundaries were flagged along the wetland/upland interface or along the ordinary high water mark, respectively. Closed wetland systems were identified with a "WP" in the system name, while open or linear systems that extended outside of the study area were identified with a "WL" in the system name. Boundaries were marked in the field using consecutively numbered flagging tape, and flag locations were subsequently field located utilizing a total station survey apparatus. A map showing delineated wetlands and waterways is included as Appendix B to this report.

Vegetation, hydrologic, and soils data collected in the field, as well as information derived from the pre-fieldwork data review, were transferred to *Wetland Determination Data Forms - Atlantic and Gulf Coastal Plain Region* in accordance with USACE protocols (1987 and 2010). Appendix C includes the Wetland Determination Data Forms for the upland and wetland sample plot locations and Stream Features Datasheets for WUS systems throughout the study area.

Representative photographs were taken throughout the study area and specifically of wetlands and stream systems in order to document field conditions at the time of the delineation. These photos have been included as Appendix D to this report.

May 2017 Field Investigation Results

The May 2017 field investigation located four nontidal wetland systems, one perennial stream, and two intermittent streams, classified as "waters of the U.S." . Information concerning these systems is outlined below and included in the appendices to this report.

Waters of the United States (WUS) Systems

<u>WUS WL001 (Perennial)</u>

WUS WL001 is a nontidal, perennial segment of the Patuxent River. WUS WL001 enters the study area from the north, and flows generally south through the study area, beneath the Governor Bridge Road bridge, where it continues outside of the study area to its eventual confluence with the Chesapeake Bay. Approximately 98 linear feet (LF) of this stream is within the study area. This perennial stream had an approximate bankfull width of 40 feet with an average bank height of 4 feet and an observed water depth of 4 feet at the time of the site investigation. Rain occurred overnight, causing the channel to overtop its banks. WUS WL001 is identified on the *National Wetland Inventory Map for Bowie, Maryland* (USFWS, 1981-2002) as a riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH) system. Based on the field investigation, the Cowardin Classification for this system is riverine, lower perennial, unconsolidated bottom, cobble-grave/sand (R2UB1/2).

More information regarding WUS WL001 can be found in the appendices to this report.

WUS WL003 (Intermittent)

WUS WL003 (Flags WL003-001a/b to WL003-006a/b) is a nontidal, intermittent stream that originates at a stormwater management facility southeast of Governor Bridge Road and outside of the study area. WUS WL003 conveys flow generally southwest to its eventual confluence with the Patuxent River (WUS WL001). This stream is located adjacent to and outside of the study area. This intermittent stream had an approximate bankfull width of 5 feet with an average bank height of 6 inches and an observed water depth of 2 inches at the time of the site investigation. WUS WL003 is not identified on the *National Wetland Inventory Map for Bowie, Maryland* (USFWS, 1981-2002). Based on the field investigation, the Cowardin Classification for this system is riverine, intermittent, streambed, cobble-gravel/sand (R4SB3/4).

More information regarding WUS WL003 can be found in the appendices to this report.

WUS WL004 (Intermittent)

WUS WL004 (Flags WL004-001a/b to WL004-002a/b) is a nontidal, intermittent stream that originates at a wetland outside of the study area and conveys flow generally northwest to its confluence with WUS WL003 This stream is located just outside of the study area. This intermittent stream had an approximate bankfull width of 5 feet with an average bank height of 6 inches and an observed water depth of 6 inch at the time of the site investigation. WUS WL004 is not identified on the *National Wetland Inventory Map for Bowie, Maryland* (USFWS, 1981-2002). Based on the field investigation, the Cowardin Classification for this system is riverine, intermittent, streambed, cobble-gravel/sand (R4SB3/4).

More information regarding WUS WL004 can be found in the appendices to this report.

Nontidal Wetlands

Wetland WL002 (Flags WL002-001 to WL002-013)

Wetland WL002 is a palustrine, forested, broad-leaved deciduous, saturated (PFO1B) wetland south of Governor Bridge Road and east of the Patuxent River. Approximately 0.19 acre of Wetland WL002 is within the study area. This wetland extends south and continues outside of the study area. Wetland WL002 receives hydrology from groundwater and overland flow and outlets in a southwesterly direction towards the Patuxent River. This wetland is identified on the *National Wetland Inventory Map for Bowie, Maryland* (USFWS, 1981-2002) as a palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E) wetland.

KCI collected information from a sample plot within Wetland WL002 (Plot WL002-WET) in order to properly classify the predominant vegetation, soil characteristics, and hydrologic indicators. Vegetative cover in close proximity to the sample plot is dominated by sweetgum (*Liquidambar styraciflua*), river birch (*Betula nigra*), jack-in-the-pulpit (*Arisaema triphyllum*), Japanese stiltgrass (*Microstegium vimineum*), poison ivy (*Toxicodendron radicans*), and Asiatic tearthumb (*Persicaria perfoliata*). Red maple (*Acer rubrum*), boxelder (*Acer negundo*), tree of heaven (*Ailanthus altissima*), soft rush (*Juncus effusus*), jewelweed (*Impatiens capensis*), and fox sedge (*Carex vulpinoidea*) were also noted within the sample plot. Based on species composition, sample plot WL002-WET satisfies the hydrophytic vegetation criterion. Hydrologic indicators in the wetland include surface water, high water table, saturation, water-stained leaves, hydrogen sulfide odor, drainage patterns, and geomorphic position.

Soil characteristics within Wetland WL002 are summarized in the following table:

Depth (inches)	Texture	Matrix	Redox Features
0-8	Sandy silt loam	10YR 3/1	7.5YR 3/2, matrix concentrations 10YR 2/1, matrix depletions
8+	Refusal due to gravel/liquid soils		

Hydric soil indicators were identified within the soil profile; therefore, sample plot WL002-WET satisfies the hydric soils criterion.

In addition to a sample plot within the wetland, one upland data point (UPL-1) was taken in close proximity to Wetland WL002 to classify the surrounding upland area. Vegetation at UPL-1 is dominated by ironwood (*Carpinus caroliniana*), sweetgum, American holly (*Ilex opaca*), Christmas fern (*Polystichum acrostichoides*), jack-in-the-pulpit, poison ivy, Japanese honeysuckle (*Lonicera japonica*), Oriental bittersweet (*Celastrus orbiculatus*), and Virginia creeper (*Parthenocissus quinquefolia*). River birch, tulip poplar (*Liriodendron tulipifera*), boxelder, and American sycamore (*Platanus occidentalis*) were also noted within the sample plot. Sample plot UPL-1 satisfies the hydrophytic vegetation criterion.

Soil characteristics at UPL-1 are summarized in the following table:

Depth (inches)	Texture	Matrix	Redox Features
0-10	Sandy silt loam	10YR 3/3	10YR 3/4, matrix concentrations
10+	Refusal due to gravel		

Hydric soil indicators were not identified within the soil profile; therefore, sample plot UPL-1 does not satisfy the hydric soils criterion. No wetland hydrologic indicators were present in close proximity to upland sample plot UPL-1. Sample plot UPL-1 satisfies only one of the three mandatory wetland criteria; therefore, this area was classified as upland.

More information regarding the soils, vegetation, and hydrology found within Wetland WL002 and the adjacent upland can be found in the appendices to this report.

Wetland WL005 (Flags WL005-001 to WL005-013)

Wetland WL005 is a palustrine, forested, broad-leaved deciduous, saturated (PFO1B) wetland, north of Governor Bridge Road and east of the Patuxent River. Approximately 0.02 acre of Wetland WL005 is within the study area. This wetland extends north, and continues outside of the study area. Wetland WL005 receives hydrology from groundwater and overland flow and outlets in a westerly direction towards the Patuxent River. This wetland is identified on the *National Wetland Inventory Map for Bowie, Maryland* (USFWS, 1981-2002) as a palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E) wetland.

KCI collected information from a sample plot within Wetland WL005 (Plot WL005-WET) in order to properly classify the predominant vegetation, soil characteristics, and hydrologic indicators. Vegetative cover in close proximity to the sample plot is dominated by ironwood, river birch, sweetgum, blackhaw (*Viburnum prunifolium*), Japanese honeysuckle, and poison ivy. American sycamore, red maple, silver maple (*Acer saccharinum*), northern spicebush (*Lindera benzoin*), mayapple (*Podophyllum peltatum*), jack-in-the-pulpit, swamp white oak (*Quercus bicolor*), trumpet vine (*Campsis radicans*), and Virginia creeper were also noted within the sample plot. Based on species composition, sample plot WL005-WET satisfies the hydrophytic vegetation criterion. Hydrologic indicators in the wetland include surface water, high water table, saturation, water-stained leaves, drainage patterns, and geomorphic position.

Soil characteristics within Wetland WL005 are summarized in the following table:

Depth (inches)	Texture	Matrix	Redox Features
0-2	Sandy silt loam	10YR 2/1	--
2-8	Sandy silt loam	10YR 3/2	10YR 2/1, matrix depletions,
8+	Refusal due to gravel		

Hydric soil indicators were identified within the soil profile; therefore, sample plot WL005-WET satisfies the hydric soils criterion.

For more information regarding the surrounding upland area, please refer to Sample Plot UPL-1 above in the Wetland WL002 description. More information regarding the soils, vegetation, and hydrology found within Wetland WL005 and the adjacent upland can be found in the appendices to this report.

Wetland WL006 (Flags WL006-001 to WL006-006)

Wetland WL006 is a palustrine, emergent, persistent, seasonally flooded/saturated (PEM1E) wetland south of Governor Bridge Road and west of the Patuxent River. Approximately 0.31 acre of Wetland WL006 is within the study area. This wetland extends south, and continues outside of the study area. Wetland WL006 receives hydrology from groundwater and overland flow and outlets in an easterly direction towards the Patuxent River. This wetland is identified on the *National Wetland Inventory Map for Bowie, Maryland* (USFWS, 1981-2002) as a palustrine, forested, broad-leaved deciduous, seasonally flooded (PFO1C) wetland.

KCI collected information from a sample plot within Wetland WL006 (Plot WL006-WET) in order to properly classify the predominant vegetation, soil characteristics, and hydrologic indicators. Vegetative cover in close proximity to the sample plot is dominated by multiflora rose (*Rosa multiflora*), reed canary grass (*Phalaris arundinacea*), jewelweed, and green arrow arum (*Peltandra virginica*). False nettle (*Boehmeria cylindrica*), fox sedge, sensitive fern (*Onoclea sensibilis*), and soft rush were also noted within the sample plot. Based on species composition, sample plot WL006-WET satisfies the hydrophytic vegetation criterion. Hydrologic indicators in the wetland include surface water, high water table, saturation, inundation visible on aerial imagery, oxidized rhizospheres along living roots, drainage patterns, saturation visible on aerial imagery, and geomorphic position.

Soil characteristics within Wetland WL006 are summarized in the following table:

Depth (inches)	Texture	Matrix	Redox Features
0-2	Fine sandy silt loam	10YR 3/3	--
2-14	Silt clay loam	10YR 3/2	10YR 3/3, matrix concentrations 5YR 4/6, matrix and pore lining concentrations
14+`	Silt clay loam	5Y 3/1	10YR 3/2, matrix concentrations

Hydric soil indicators were identified within the soil profile; therefore, sample plot WL006-WET satisfies the hydric soils criterion.

In addition to a sample plot within the wetland, one upland data point (UPL-2) was taken in close proximity to Wetland WL006 to classify the surrounding upland area. Vegetation at UPL-2 is dominated by American beech (*Fagus grandifolia*), white oak (*Quercus alba*), paw paw (*Asimina triloba*), pachysandra species (*Pachysandra sp.*), and Virginia creeper. Pignut hickory (*Carya glabra*), sweetgum, white oak, and meadow garlic (*Allium canadense*) were also noted within the sample plot. Sample plot UPL-2 does not satisfy the hydrophytic vegetation criterion.

Soil characteristics at UPL-2 are summarized in the following table:

Depth (inches)	Texture	Matrix	Redox Features
0-18	Sandy silt loam	7.5YR 2.5/3	10YR 3/3, matrix concentrations 7.5YR 5/6, matrix concentrations

Hydric soil indicators were not identified within the soil profile; therefore, sample plot UPL-2 does not satisfy the hydric soils criterion. No wetland hydrologic indicators were present in close proximity to upland sample plot UPL-2. Sample plot UPL-2 does not satisfy any of the three mandatory wetland criteria; therefore, this area was classified as upland.

More information regarding the soils, vegetation, and hydrology found within Wetland WL006 and the adjacent upland can be found in the appendices to this report.

Wetland WL007 (Flags WL007-001 to WL007-007)

Wetland WL007 is a palustrine, scrub-shrub, broad-leaved deciduous, temporarily flooded (PSS1A) wetland, generally north of Governor Bridge Road, and west of the Patuxent River. Approximately 0.15 acre of this wetland is within the study area. This wetland extends generally north, and continues outside of the study area. Wetland WL007 receives hydrology from groundwater and overland flow and outlets in an easterly direction towards the Patuxent River. Wetland WL007 is identified on the *National Wetland Inventory Map for Bowie, Maryland* (USFWS, 1981-2002) as a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland.

KCI collected information from a sample plot within Wetland WL007 (Plot WL007-WET) in order to properly classify the predominant vegetation, soil characteristics, and hydrologic indicators. Vegetative cover in close proximity to the sample plot is dominated by American sycamore, sweetgum, black willow (*Salix nigra*), reed canary grass, and Japanese honeysuckle. Common greenbrier (*Smilax rotundifolia*) was also noted within the sample plot. Based on species composition, sample plot WL007-WET satisfies the hydrophytic vegetation criterion. Hydrologic indicators in the wetland include saturation, drainage patterns, and geomorphic position.

Soil characteristics within Wetland WL007 are summarized in the following table:

Depth (inches)	Texture	Matrix	Redox Features
0-8	Fine sand	7.5YR 3/2	10YR 2/1, matrix concentrations 5YR 4/8, matrix concentrations
8-16+	Fine sand	10YR 5/2	10YR 2/1, matrix depletions 7.5YR 4/6, matrix concentrations

Hydric soil indicators were identified within the soil profile; therefore, sample plot WL007-WET satisfies the hydric soils criterion.

For more information regarding the surrounding upland area, please refer to Sample Plot UPL-2 above in the Wetland WL006 description. More information regarding the soils, vegetation, and hydrology found within Wetland WL007 and the adjacent upland can be found in the appendices to this report.

Conclusions

The study area contains four wetlands; two palustrine forested (PFO) wetland systems, one palustrine emergent (PEM) wetland system, and one palustrine scrub-shrub wetland system, as described above. Information concerning these wetland systems is summarized below, in tabular form and included in the appendices to this report.

Wetland System	Cowardin Classification*	Approximate Wetland Area within the Study Area
Wetland WL002	PFO1B	0.19 acre
Wetland WL005	PFO1B	0.02 acre
Wetland WL006	PEM1E	0.31 acre
Wetland WL007	PSS1A	0.15 acre

** Based on National Wetland Inventory Classification System (Cowardin, et al. 1979).*

In addition, three WUS systems were identified during the field investigation. Information regarding these waterways is summarized below, in tabular form. Refer to Appendix B: Map of Delineated Wetlands/Waterways for the locations of these features within the study area.

WUS System	Cowardin Classification*	Approximate Length within Study Area (LF)
WUS WL001	R2UB1/2	98 LF
WUS WL003	R4SB3/4	Outside of study area
WUS WL004	R4SB3/4	Outside of study area

** Based on National Wetland Inventory Classification System (Cowardin, et al. 1979).*

Impacts to wetlands or waterways within the proposed project area will require a *Joint Federal/State Application for the Alteration of Any Floodplain, Waterway, Tidal, or Nontidal Wetland in Maryland*.

This report represents a study of the nontidal wetland and waterway resources as observed within the study area. Investigations of this type reflect the current state of temporal and variable conditions and require individual professional judgment. This is, therefore, a professional estimate of the wetlands and waters of the U.S. located in the study area based on the delineation methodology utilized and the most recent and best-available information for the above mentioned site. Wetland boundaries, as currently defined for regulatory purposes, can only be verified through a review by the U.S. Army Corps of Engineers and/or the Maryland Department of the Environment in consultation with the U.S. Environmental Protection Agency and U.S. Fish and Wildlife Service.

If you should have any questions regarding the information outlined above, or if you require additional information concerning this wetland delineation report, please do not hesitate to contact me.

Very truly yours,
KCI TECHNOLOGIES, INC.

Jennifer Bird
Senior Project Manager
Natural Resources Practice

Direct Dial Phone: 410.316.7959
Email: jennifer.bird@kci.com

KEM/jb

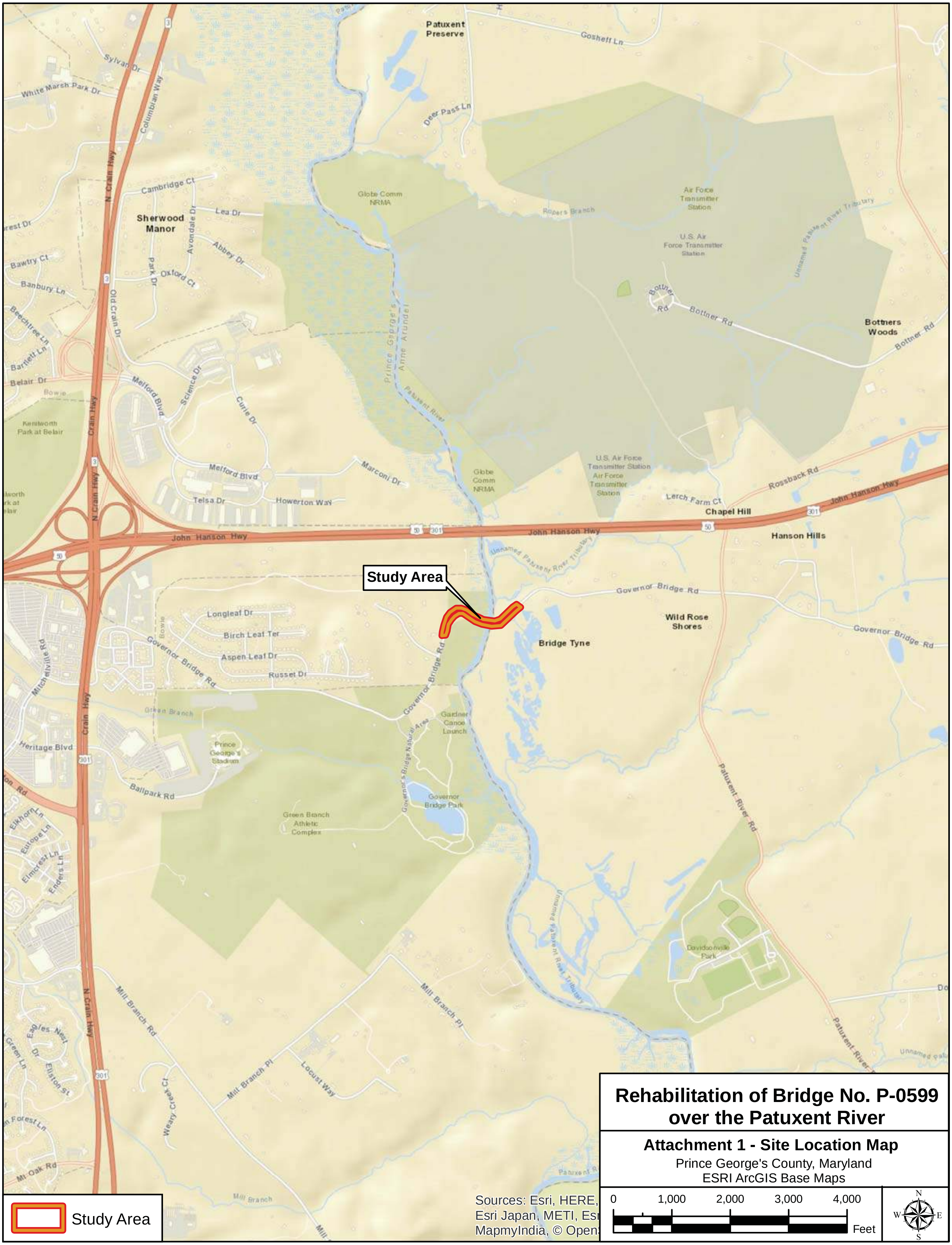
Enclosures: Attachment 1: Site Location Map
Attachment 2: USGS 7.5' Topographic Map
Attachment 3: Soils Map
Attachment 4: National Wetlands Inventory (NWI) Map
Attachment 5: Q3 Flood Map

Appendix A: References
Appendix B: Map of Delineated Wetlands & Waterways
Appendix C: Data Point Forms: Routine Wetland Determination and Stream Features
Appendix D: Representative Site Photographs

CC: Robert Lynch, PE // KCI Structures Division
KCI File (23100466.57)

ATTACHMENT 1

Site Location Map


Rehabilitation of Bridge No. P-0599
over the Patuxent River
Attachment 1 - Site Location Map
Prince George's County, Maryland
ESRI ArcGIS Base Maps
0
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2,000
3,000
4,000
Feet
N
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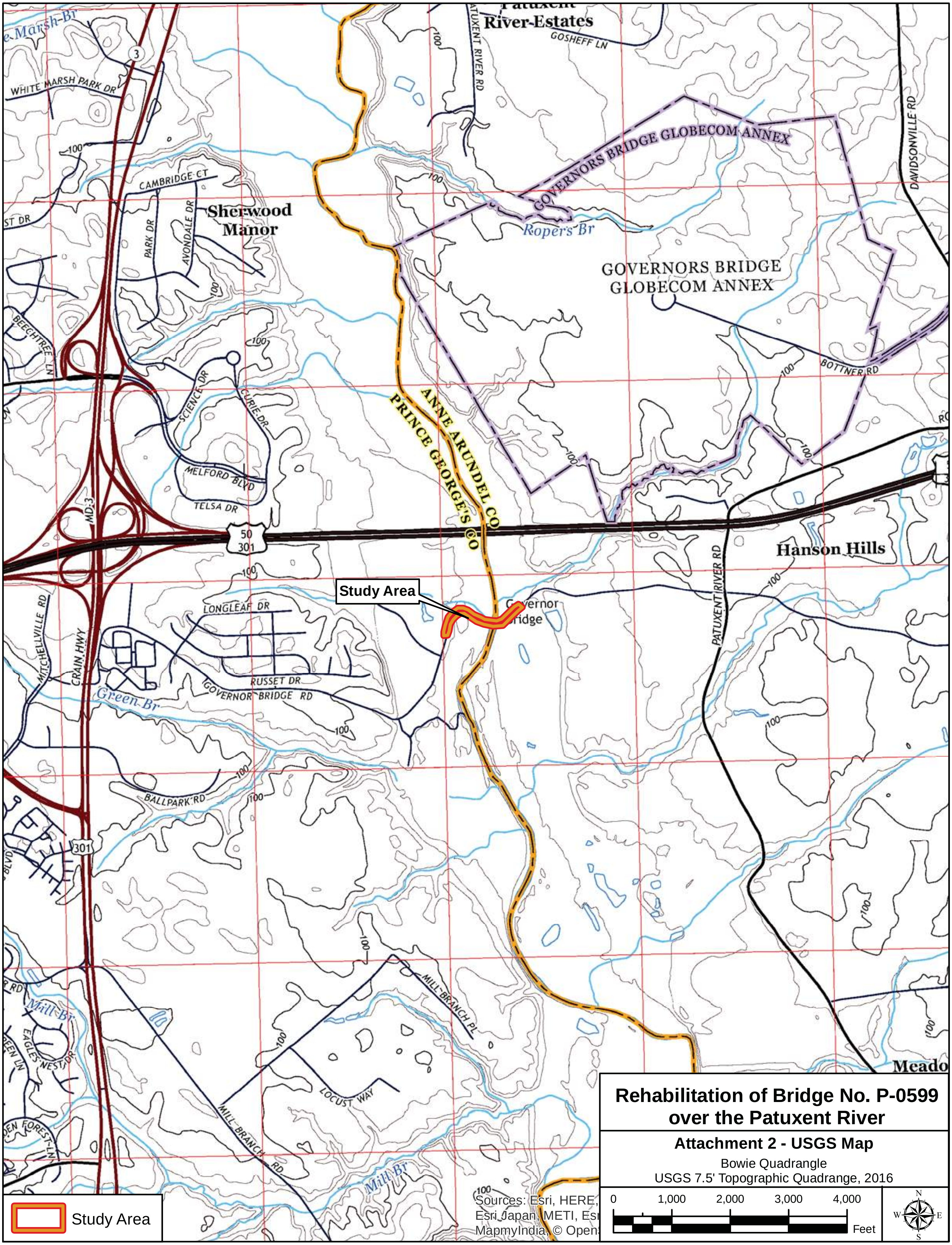
Study Area
Study Area
Patuxent Preserve
Gosheff Ln
Sylvan Dr
White Marsh Park Dr
Columbian Way
Deer Pass Ln
Cambridge Ct
Sherwood Manor
Lea Dr
Avondale Dr
Abbey Dr
Oxford Ct
Park Dr
Bawtry Ct
Banbury Ln
Globe Comm NRMA
Air Force Transmitter Station
U.S. Air Force Transmitter Station
Ropers Branch
Bottner Rd
Bottners Woods
Old Crain Dr
N Crain Hwy
Beechtree Ln
Bartlett Ln
Belair Dr
Bowie
Kenilworth Park at Belair
Melford Blvd
Science Dr
Curie Dr
Prince George's
Anne Arundel
Patuxent River
Marconi Dr
Telsa Dr
Howerton Way
U.S. Air Force Transmitter Station Air Force Transmitter Station
Lerch Farm Ct
Rossback Rd
Chapel Hill
John Hanson Hwy
Hanson Hills
Unnamed Patuxent River Tributary
Governor Bridge Rd
Wild Rose Shores
Bridge Tyne
Longleaf Dr
Birch Leaf Ter
Aspen Leaf Dr
Russet Dr
Mitchellville Rd
Green Branch
Gardner Canoe Launch
Heritage Blvd
Prince George's Stadium
Governor Bridge Natural Area
Governor Bridge Park
Ballpark Rd
Green Branch Athletic Complex
Patuxent River Rd
Davidsonville Park
Elkhorn Ln
Europe Ln
Elmcrest Ln
Enders Ln
Mill Branch Rd
Mill Branch Pl
Eagles Nest
Elliston St
Green Ln
Weary Creek Ct
Locust Way
Forest Ln
Mt Oak Rd
Mill Branch
Sources: Esri, HERE,
Esri Japan, METI, Esri
MapmyIndia, © OpenS

ATTACHMENT 2

USGS 7.5' Topographic Map



Rehabilitation of Bridge No. P-0599 over the Patuxent River

Attachment 2 - USGS Map

Bowie Quadrangle
USGS 7.5' Topographic Quadrange, 2016

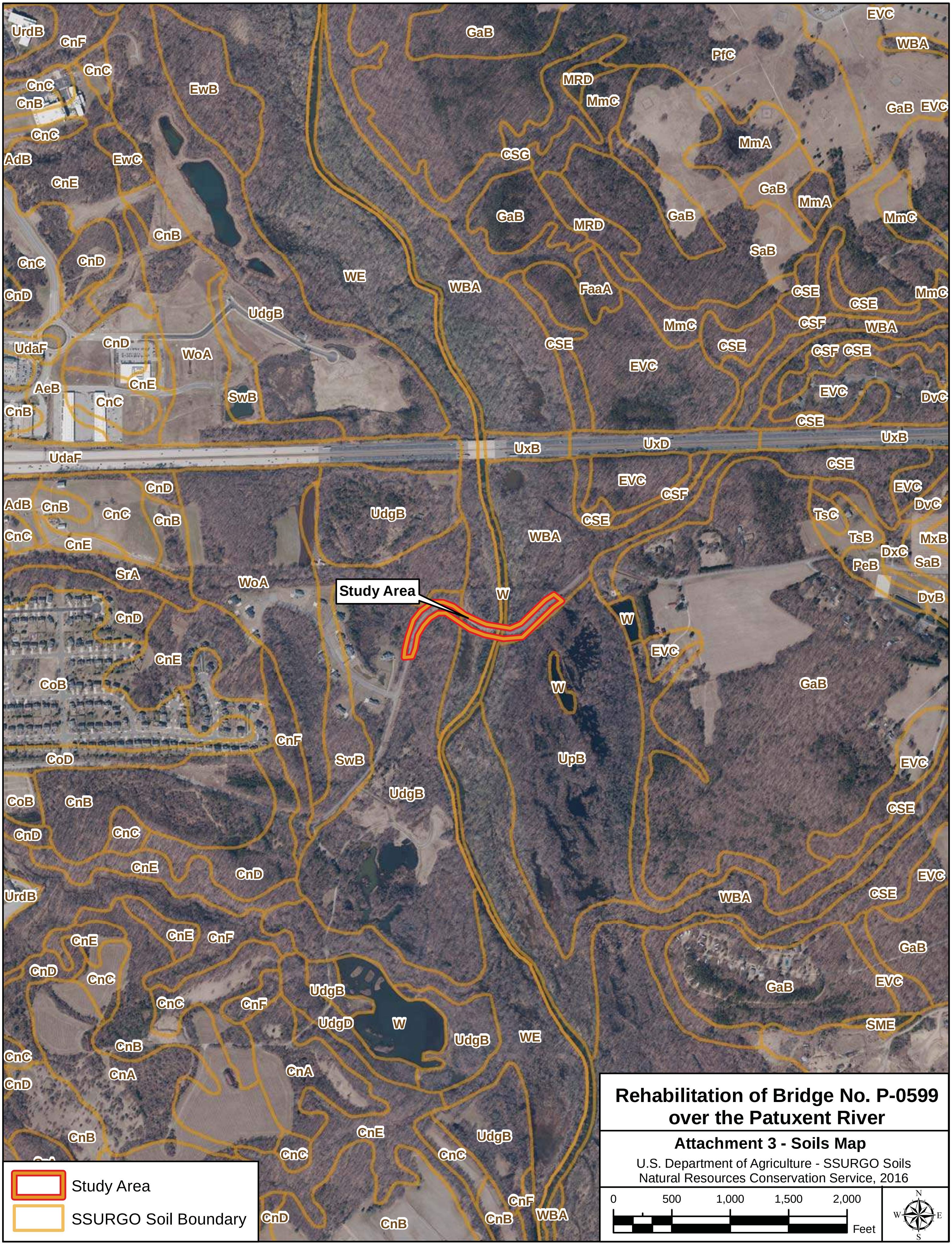
0 1,000 2,000 3,000 4,000 Feet

Study Area

Sources: Esri, HERE, Esri Japan, METI, Esri MapmyIndia, © Open

ATTACHMENT 3

Soils Map



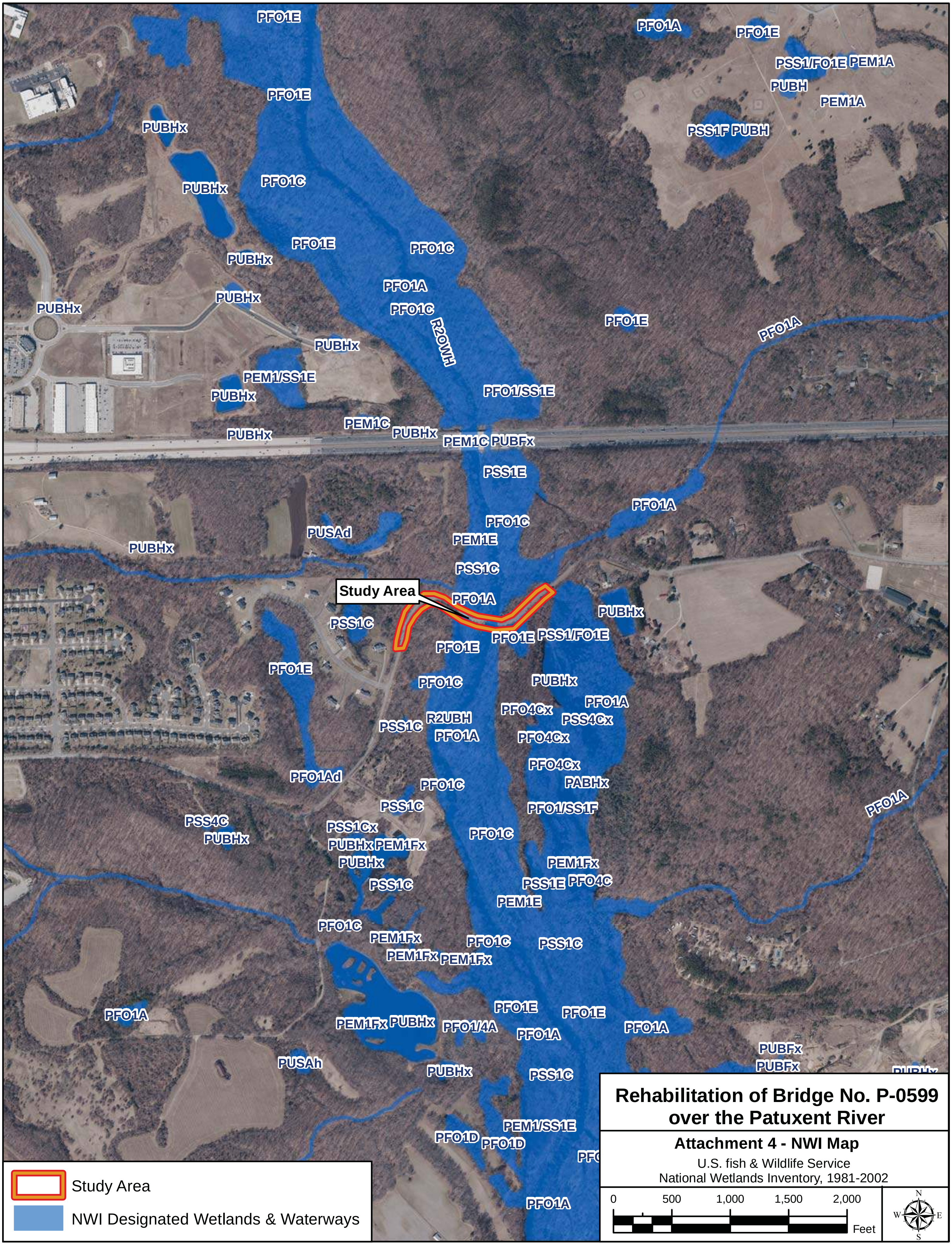
Rehabilitation of Bridge No. P-0599 over the Patuxent River

Attachment 3 - Soils Map

U.S. Department of Agriculture - SSURGO Soils
Natural Resources Conservation Service, 2016

ATTACHMENT 4

National Wetlands Inventory (NWI) Map



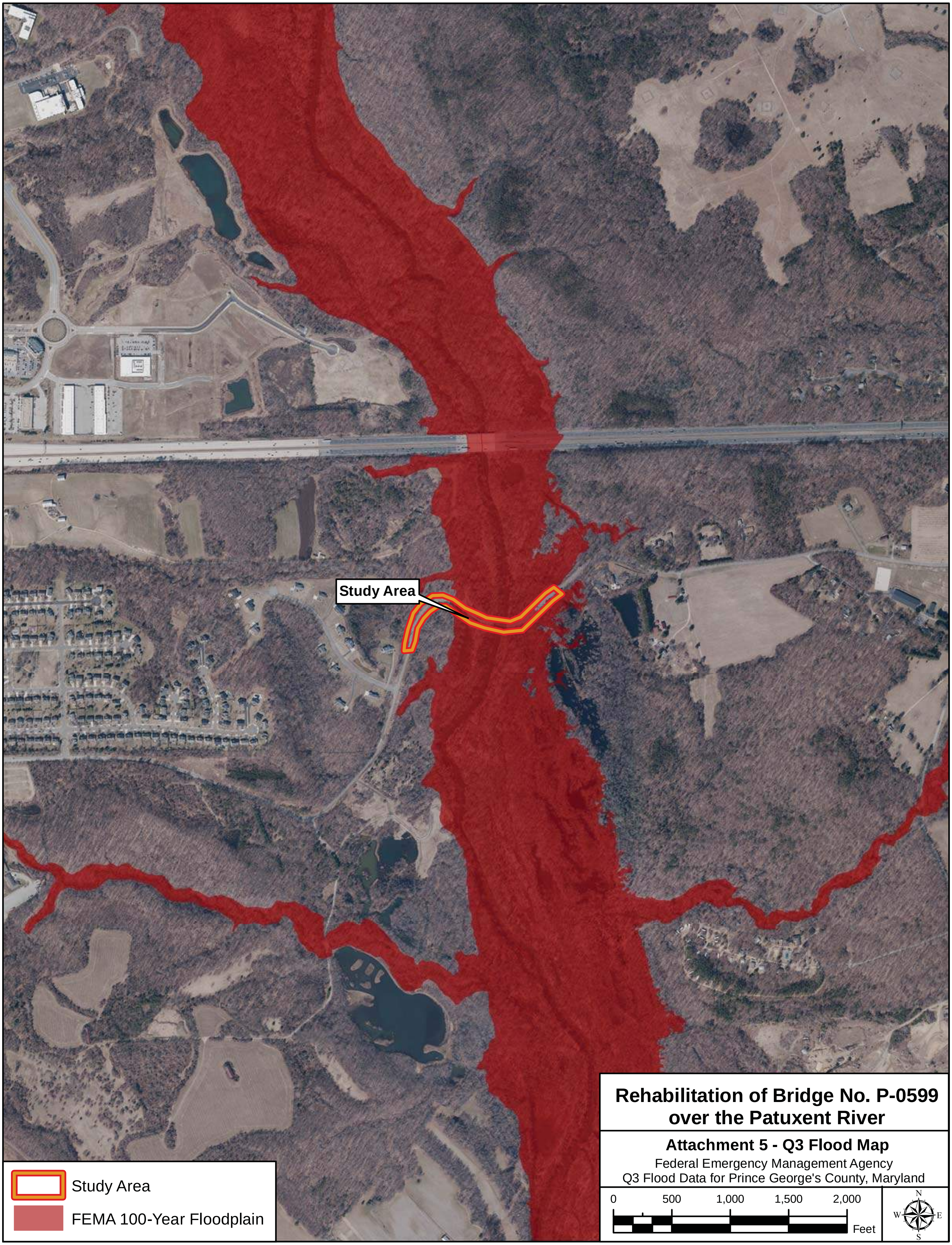
Rehabilitation of Bridge No. P-0599 over the Patuxent River

Attachment 4 - NWI Map

U.S. fish & Wildlife Service
National Wetlands Inventory, 1981-2002

ATTACHMENT 5

Q3 Flood Map



Rehabilitation of Bridge No. P-0599 over the Patuxent River

Attachment 5 - Q3 Flood Map

Federal Emergency Management Agency
Q3 Flood Data for Prince George's County, Maryland

APPENDIX A

References

Appendix A: References

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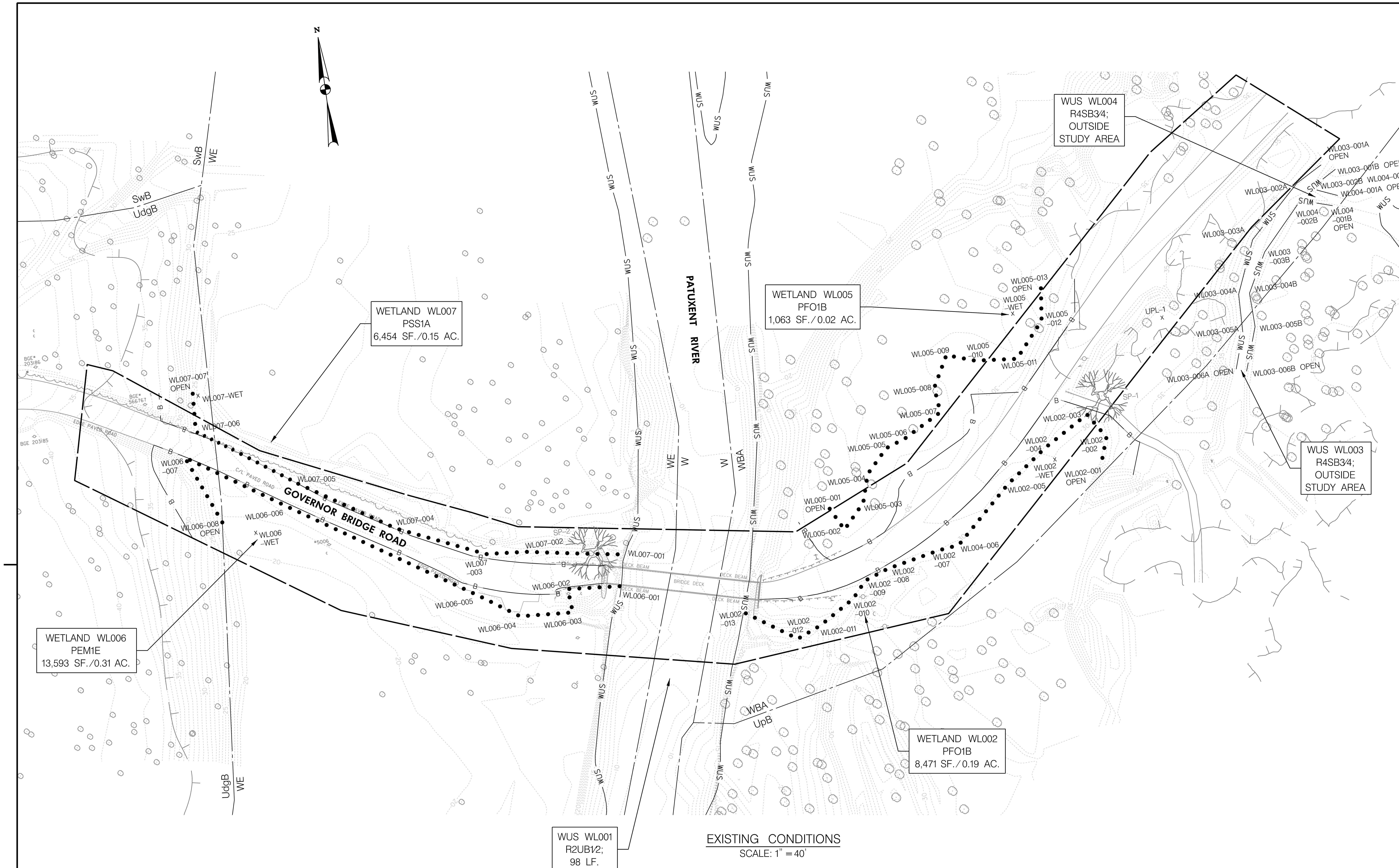
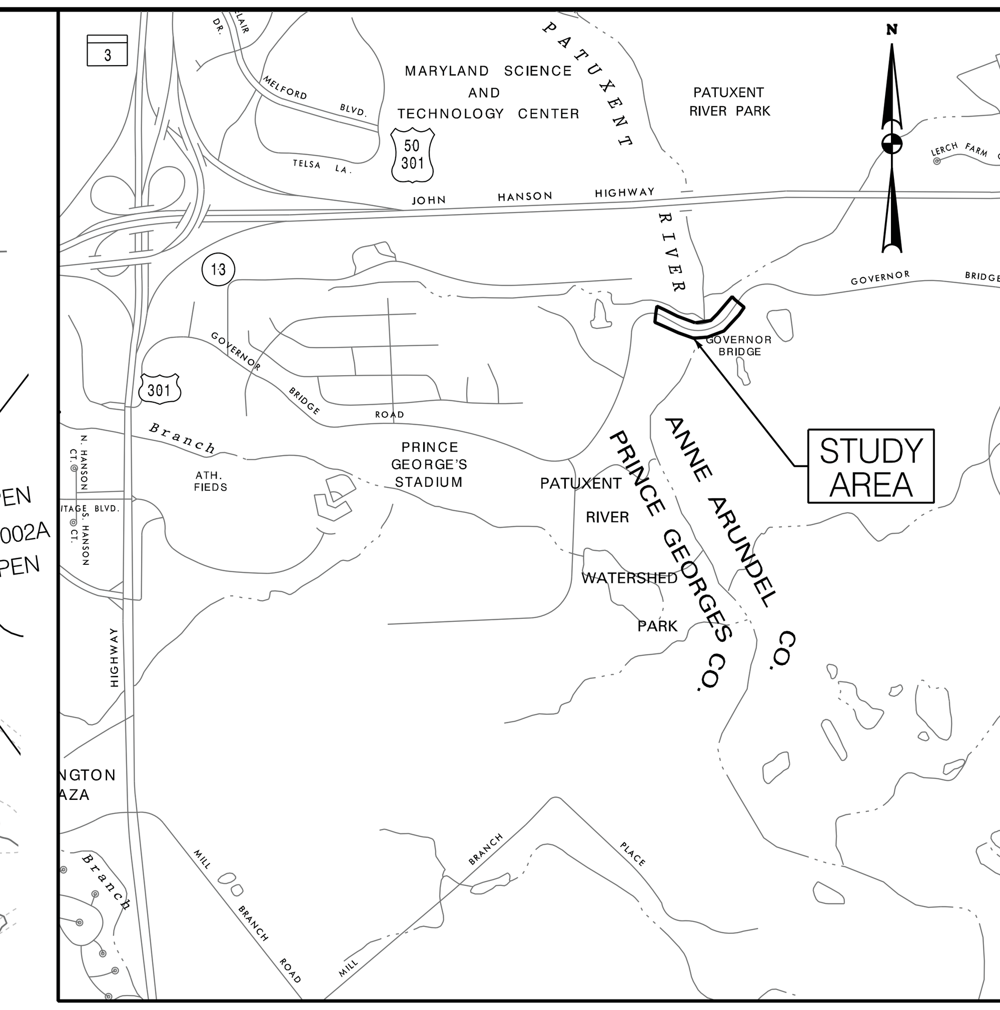
APPENDIX B

Map of Delineated Wetlands & Waterways



EXISTING CONDITIONS
SCALE: 1" = 40'



VICINITY MAP
SCALE: 1" = 2000'

NOTE: ALL SYSTEMS EXTEND BEYOND THE STUDY AREA BOUNDARY.

LEGEND

- EX. CONTOUR
- EX. GUARDRAIL
- EX. WOODS LINE
- EX. TREE
- SPECIMEN TREE
- PROPERTY LINE
- SwB / UdgB — SOILS LINE
- xUPL-2 xWL007-WET — WETLAND /UPLAND SAMPLE PLOT
- STUDY AREA BOUNDARY
- EX. NON-TIDAL WETLAND
- B — 25' WETLAND BUFFER
- WUS — WATERS OF THE UNITED STATES
- 100 YEAR FEMA FLOODPLAIN

DATUM: NAD 83/91 Horizontal
NAVD 88 Vertical

40 0 40 80
SCALE: 1" = 40'

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BY: – Division:

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
HIGHWAY DESIGN DIVISION

GOVERNOR BRIDGE ROAD OVER PATUXENT RIVER
BRIDGE REHABILITATION

APPENDIX B: MAP OF DELINEATED WETLANDS AND WATERWAYS

SCALE 1" = 40'	ADVERTISED DATE	CONTRACT NO. PG814ZM1	
DESIGNED BY	CSD	COUNTY	PRINCE GEORGE'S
DRAWN BY	CSD	LOGMILE	
CHECKED BY	JAB	HORIZONTAL SCALE	
MDE/PRD		VERTICAL SCALE	
DRAWING NO. ED-1 OF 1		SHEET NO. 1 OF 1	

PLOTTED: Wednesday, August 23, 2017 AT 01:01 PM
FILE: M:\2010\23100466.57\Drawings\wetdel\pED-SA00_Governors.dgn

APPENDIX C

Data Point Forms: Routine Wetland Determination and Stream Features

Stream Features
Field Sheet

Date: 5/26/2017 **Project Site:** Governor Bridge Road **Stream #** WL001 (Patuxent River)
Observers: A. Wagoner, K. Myers

Stream Flow: X Perennial ___ Intermittent ___ Ephemeral
Gradient: 2%

Morphology:

Average Bankful Width 40ft Average Bankfull Depth 4ft Average Water Depth 4ft

Has stream morphometry been altered? Describe type and degree: The stream has been bridged by Governor Bridge Road. Difficult to determine bankfull and water depth due to storm event.

Habitat and Pollutants:

Substrate:

___ Bedrock X Gravel/Sand X Silt

X Sand ___ Cobble/Gravel X Clay

Habitat Complexity:

X Riffle/Pools ___ Undercut banks

___ Tree Roots ___ Woody Debris

Bank Erosion: ___ Severe X Moderate ___ Minor

Describe: Sheer banks

Silt Deposition: ___ Severe X Moderate ___ Minor

Riparian Zone:

Right Bank: X Forested X Vegetated ___ Developed ___ Maintained

Notes: Adjacent to PEM and wetlands

Slope: 1%

Left Bank. X Forested ___ Vegetated ___ Developed ___ Maintained

Notes: Adjacent to forested wetland

Slope: 1%

Cowardin (1979) Stream Classification: R2UB1/2

Stream Features
Field Sheet

Date: 5/26/2017 **Project Site:** Governor Bridge Road **Stream #** WL003

Observers: A. Wagoner, K. Myers

Stream Flow: ____ Perennial __X__ Intermittent ____ Ephemeral

Gradient: __2%__

Morphology:

Average Bankful Width __5ft__ Average Bankfull Depth __6in__ Average Water Depth: __2in__

Has stream morphometry been altered? Describe type and degree: Not within the project area

Habitat and Pollutants:

Substrate:

____ Bedrock __X__ Gravel/Sand __X__ Silt

__X__ Sand ____ Cobble/Gravel ____ Clay

Habitat Complexity:

__X__ Riffle/Pools ____ Undercut banks

____ Tree Roots ____ Woody Debris

Bank Erosion: ____ Severe ____ Moderate __X__ Minor

Describe: Well vegetated banks, and low gradient channel

Silt Deposition: ____ Severe ____ Moderate __X__ Minor

Riparian Zone:

Right Bank: __X__ Forested ____ Vegetated ____ Developed ____ Maintained

Notes: Adjacent to riparian upland forest

Slope: __2%__

Left Bank. __X__ Forested ____ Vegetated ____ Developed ____ Maintained

Notes: Adjacent to riparian upland forest

Slope: __2%__

Cowardin (1979) Stream Classification: R4SB3/4

Stream Features
Field Sheet

Date: 5/26/2017 **Project Site:** Governor Bridge Road **Stream #** WL004
Observers: A. Wagoner, K. Myers

Stream Flow: ____ Perennial __X__ Intermittent ____ Ephemeral
Gradient: <2%

Morphology:

Average Bankful Width 5ft Average Bankfull Depth 6in Average Water Depth: 1"

Has stream morphometry been altered? Describe type and degree: Not within the project area

Habitat and Pollutants:

Substrate:

____ Bedrock __X__ Gravel/Sand __X__ Silt

__X__ Sand ____ Cobble/Gravel ____ Clay

Habitat Complexity:

__X__ Riffle/Pools ____ Undercut banks

____ Tree Roots ____ Woody Debris

Bank Erosion: ____ Severe ____ Moderate __X__ Minor

Describe: Well vegetated banks

Silt Deposition: ____ Severe __X__ Moderate ____ Minor

Riparian Zone:

Right Bank: __X__ Forested ____ Vegetated ____ Developed ____ Maintained

Notes: Adjacent to riparian forest

Slope: 3%

Left Bank. __X__ Forested ____ Vegetated ____ Developed ____ Maintained

Notes: Adjacent to riparian forest

Slope: 3%

Cowardin (1979) Stream Classification: R4SB3/4

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Governor Bridge Road City/County: Anne Arundel County Sampling Date: 5/26/2017

Applicant/Owner: Prince George's County State: MD Sampling Point: WL002-WET

Investigator(s): A. Wagoner, K. Myers Section, Township, Range: Davidsonville

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): <2

Subregion (LRR or MLRA): MLRA149A Lat: 38.051365 Long: -76.692700 Datum: NAD83

Soil Map Unit Name: Widewater and Issue soils, 0-2% slopes, frequently flooded NWI classification: PFO1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes Y No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes Y No ___	
Wetland Hydrology Present?	Yes Y No ___	

Remarks:

The sample plot satisfies the three mandatory wetland criteria; therefore, this area is classified as a palustrine, forested, broad-leaved deciduous, saturated (PFO1B) wetland. Rain has occurred within the past 24 hours. The wetland is located adjacent to Governor Bridge Road. A sheen is present on the water surface within the wetland. Downed woody debris is also present within the wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [x] Surface Water (A1)
- [x] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [x] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [x] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [x] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [x] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): ___

Water Table Present? Yes X No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): ___

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The sample plot satisfies the wetland hydrology criterion. Approximately 1" of water is present within 60% of the plot.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: WL002-WET

Tree Stratum (Plot size: 30ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Liquidambar styraciflua	50	Y	FAC
2. Betula nigra	5	N	FACW
3. Acer rubrum	10	N	FAC
4.			
5.			
6.			
7.			
8.			
	65 = Total Cover		
50% of total cover: 32.5	20% of total cover: 13		

Sapling/Shrub Stratum (Plot size: 30ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Asimina triloba	2	N	FAC
2. Acer negundo	2	N	FAC
3. Betula nigra	5	Y	FACW
4. Ailanthus altissima	2	N	FACU
5.			
6.			
7.			
8.			
	11 = Total Cover		
50% of total cover: 5.5	20% of total cover: 2.2		

Herb Stratum (Plot size: 30ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Juncus effusus	10	N	OBL
2. Impatiens capensis	2	N	FACW
3. Arisaema triphyllum	15	Y	FACW
4. Carex vulpinoidea	10	N	FACW
5. Microstegium vimineum	15	Y	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	52 = Total Cover		
50% of total cover: 26	20% of total cover: 10.4		

Woody Vine Stratum (Plot size: 30ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Toxicodendron radicans	30	Y	FAC
2. Persicaria perfoliata	15	Y	FAC
3.			
4.			
5.			
	45 = Total Cover		
50% of total cover: 22.5	20% of total cover: 9		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks: (If observed, list morphological adaptations below).

The sample plot satisfies the hydrophytic vegetation criterion.

SOIL

Sampling Point: WL002-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/1	96	7.5YR 3/2	2	C	M	ssil	
			10YR 2/1	2	D	M		
8+	--	--	--	--	--	--	refusal	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☑ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Gravel/liquid soils

Depth (inches): 8"

Hydric Soil Present? **Yes** X **No** ______

Remarks:

The sample plot satisfies the hydric soils criterion.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Governor Bridge Road City/County: Anne Arundel County Sampling Date: 5/26/2017

Applicant/Owner: Prince George's County State: MD Sampling Point: WL005-WET

Investigator(s): A. Wagoner, K. Myers Section, Township, Range: Davidsonville

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): <2

Subregion (LRR or MLRA): MLRA 149A Lat: 38.952141 Long: -75.692217 Datum: NAD83

Soil Map Unit Name: Widewater and Issue soils, 0-2% slopes, frequently flooded NWI classification: PFO1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

The sample plot satisfies the three mandatory wetland criteria; therefore, this area is classified as a palustrine, forested, broad-leaved deciduous, saturated (PFO1B) wetland. The wetland is adjacent to Governor Bridge Road and the Patuxent River. Rain has occurred within the past 24 hours. Downed woody debris is present within the wetland, with some trash.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [x] Surface Water (A1)
- [x] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [x] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [x] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [x] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 2"
Water Table Present?	Yes X	No ____	Depth (inches): surface
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): surface

Wetland Hydrology Present? Yes X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The sample plot satisfies the wetland hydrology criterion. Approximately 2" of water is present in 50% of the plot.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: WL005-WET

Tree Stratum (Plot size: 30ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Platanus occidentalis	15	N	FACW
2. Acer rubrum	10	N	FAC
3. Carpinus caroliniana	35	Y	FAC
4. Betula nigra	25	Y	FACW
5. Acer saccharinum	5	N	FAC
6.			
7.			
8.			
	90	= Total Cover	
50% of total cover: 45	20% of total cover: 18		

Sapling/Shrub Stratum (Plot size: 30ft radius)			
1. Carpinus caroliniana	10	Y	FAC
2. Lindera benzoin	5	N	FACW
3. Viburnum prunifolium	15	Y	FACU
4. Smilax rotundifolia	5	N	FAC
5.			
6.			
7.			
8.			
	35	= Total Cover	
50% of total cover: 17.5	20% of total cover: 7		

Herb Stratum (Plot size: 30ft radius)			
1. Quercus bicolor	2	N	FACW
2. Betula nigra	10	Y	FACW
3. Podophyllum peltatum	2	N	FACU
4. Liquidambar styraciflua	10	Y	FAC
5. Arisaema triphyllum	5	N	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	29	= Total Cover	
50% of total cover: 14.5	20% of total cover: 5.8		

Woody Vine Stratum (Plot size: 30ft radius)			
1. Lonicera japonica	15	Y	FACU
2. Campsis radicans	5	N	FAC
3. Toxicodendron radicans	10	Y	FAC
4. Parthenocissus quinquefolia	2	N	FACU
5.			
	32	= Total Cover	
50% of total cover: 16	20% of total cover: 6.4		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks: (If observed, list morphological adaptations below).

The sample plot satisfies the hydrophytic vegetation criterion.

SOIL

Sampling Point: WL005-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1	100	--	--	--	--	ssil	with organics
2-8	10YR 3/2	85	10YR 2/1	10	D	M	ssil	with gravel
			10YR 3/6	5	C	M		
8+	--	--	--	--	--	--	refusal	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☑ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Gravel

Depth (inches): 8

Hydric Soil Present? **Yes** X **No** ______

Remarks:

The sample plot satisfies the hydric soils criterion.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Governor Bridge Road City/County: Prince George's County Sampling Date: 5/26/2017
Applicant/Owner: Prince George's County State: MD Sampling Point: WL006-WET
Investigator(s): A. Wagoner, K. Myers Section, Township, Range: Bowie
Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): <2
Subregion (LRR or MLRA): MLRA 149A Lat: 38.951432 Long: -76.694363 Datum: NAD83
Soil Map Unit Name: Widewater and Issue soils, frequently flooded (WE) NWI classification: PFO1E
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	

Remarks:

The sample plot satisfies the three mandatory wetland criteria; therefore, this area is classified as a palustrine, emergent, persistent, seasonally flooded/saturated (PEM1E) wetland. Rain has occurred within the past 24 hours. The sample plot is located between the toe of slope and the Patuxent River.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [x] Surface Water (A1)
- [x] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [x] Inundation Visible on Aerial Imagery (B7)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [x] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [x] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [x] Saturation Visible on Aerial Imagery (C9)
- [x] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): surface
Water Table Present? Yes X No ___ Depth (inches): 1"
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): surface

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The sample plot satisfies the wetland hydrology criterion. Approximately 1" of water is located within 40% of the plot.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: WL006-WET

Tree Stratum (Plot size: 30ft radius)

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Sapling/Shrub Stratum (Plot size: 30ft radius)

Sapling/Shrub Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. Rosa multiflora	2	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	2 = Total Cover		

50% of total cover: 1 20% of total cover: 0.4

Herb Stratum (Plot size: 30ft radius)

Herb Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. Boehmeria cylindrica	10	N	FACW
2. Carex vulpinoidea	3	N	FACW
3. Phalaris arundinacea	25	Y	OBL
4. Impatiens capensis	25	Y	FACW
5. Onoclea sensibilis	2	N	FACW
6. Juncus effusus	5	N	OBL
7. Peltandra virginica	25	Y	OBL
8.			
9.			
10.			
11.			
12.			
	95 = Total Cover		

50% of total cover: 47.5 20% of total cover: 19

Woody Vine Stratum (Plot size: 30ft radius)

Woody Vine Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: (If observed, list morphological adaptations below).

The sample plot satisfies the hydrophytic vegetation criterion. Trees are located on edges, and not within the sample plot.

SOIL

Sampling Point: WL006-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/3	100	--	--	--	--	fssil	
2-14	10YR 3/2	55	10YR 3/3	15	C	M	sicl	
			5YR 4/6	30	C	M, PL		
14+	5Y 3/1	85	10YR 3/2	15	C	M	sicl	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/A

Depth (inches): ______

Hydric Soil Present? Yes X No ______

Remarks:

The sample plot satisfies the hydric soils criterion.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Governor Bridge Road City/County: Prince George's County Sampling Date: 5/26/2017

Applicant/Owner: Prince George's County State: MD Sampling Point: WL007-WET

Investigator(s): A. Wagoner, K. Myers Section, Township, Range: Bowie

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 1%

Subregion (LRR or MLRA): MLRA 149A Lat: 38.961761 Long: -76.694256 Datum: NAD83

Soil Map Unit Name: Widewater and Issue soils, frequently flooded (WE) NWI classification: PFO1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	Is the Sampled Area within a Wetland?	Yes X No ___
Hydric Soil Present?	Yes X No ___		
Wetland Hydrology Present?	Yes X No ___		

Remarks:

The sample plot satisfies the three mandatory wetland criteria; therefore, this area is classified as a palustrine, scrub-shrub, broad-leaved deciduous, temporarily flooded (PSS1A) wetland. Rain has occurred within the past 24 hours. The wetland is located between the toe of slope and the Patuxent River.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [x] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [x] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___ No X	Depth (inches): ___	
Water Table Present?	Yes ___ No X	Depth (inches): ___	
Saturation Present? (includes capillary fringe)	Yes X No ___	Depth (inches): surface	**Wetland Hydrology Present? Yes X No ___**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The sample plot satisfies the wetland hydrology criterion.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: WL007-WET

Tree Stratum (Plot size: 30ft radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Platanus occidentalis	10	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	10		

50% of total cover: 5 20% of total cover: 2

Sapling/Shrub Stratum (Plot size: 30ft radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Smilax rotundifolia	10	N	FAC
2. Platanus occidentalis	30	Y	FACW
3. Liquidambar styraciflua	20	Y	FAC
4. Salix nigra	20	Y	OBL
5.			
6.			
7.			
8.			
= Total Cover	80		

50% of total cover: 40 20% of total cover: 16

Herb Stratum (Plot size: 30ft radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Phalaris arundinacea	25	Y	OBL
2. Platanus occidentalis	10	Y	FACW
3. Liquidambar styraciflua	10	Y	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
= Total Cover	45		

50% of total cover: 27.5 20% of total cover: 9

Woody Vine Stratum (Plot size: 30ft radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Lonicera japonica	10	Y	FACU
2.			
3.			
4.			
5.			
= Total Cover	10		

50% of total cover: 5 20% of total cover: 2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 87.5 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

The sample plot satisfies the hydrophytic vegetation criterion.

SOIL

Sampling Point: WL007-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 3/2	96	10YR 2/1	2	C	M	fs	root matter present
			5YR 4/8	2	C	M		
8-16+	10YR 5/2	70	10YR 2/1	10	D	M	fs	very saturated at the bottom
			7.5YR 4/6	20	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Organic Bodies (A6) **(LRR P, T, U)**
- [ ] 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- [ ] Muck Presence (A8) **(LRR U)**
- [ ] 1 cm Muck (A9) **(LRR P, T)**
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Coast Prairie Redox (A16) **(MLRA 150A)**
- [ ] Sandy Mucky Mineral (S1) **(LRR O, S)**
- [ ] Sandy Gleyed Matrix (S4)
- [x] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) **(LRR P, S, T, U)**
- [ ] Polyvalue Below Surface (S8) **(LRR S, T, U)**
- [ ] Thin Dark Surface (S9) **(LRR S, T, U)**
- [ ] Loamy Mucky Mineral (F1) **(LRR O)**
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Marl (F10) **(LRR U)**
- [ ] Depleted Ochric (F11) **(MLRA 151)**
- [ ] Iron-Manganese Masses (F12) **(LRR O, P, T)**
- [ ] Umbric Surface (F13) **(LRR P, T, U)**
- [ ] Delta Ochric (F17) **(MLRA 151)**
- [ ] Reduced Vertic (F18) **(MLRA 150A, 150B)**
- [ ] Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- [ ] 1 cm Muck (A9) **(LRR O)**
- [ ] 2 cm Muck (A10) **(LRR S)**
- [ ] Reduced Vertic (F18) **(outside MLRA 150A,B)**
- [ ] Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/A

Depth (inches): ______

Hydric Soil Present? Yes X **No** ______

Remarks:

The sample plot satisfies the hydric soils criterion.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Governor Bridge Road City/County: Anne Arundel Sampling Date: 5/26/2017

Applicant/Owner: Prince George's County State: MD Sampling Point: UPL-1

Investigator(s): A. Wagoner, K. Myers Section, Township, Range: Davidsonville

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): <1

Subregion (LRR or MLRA): MLRA 149A Lat: 38.951787 Long: -76.692307 Datum: NAD83

Soil Map Unit Name: Widewater and Issue soils, 0-2% slopes, frequently flooded (WBA) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___ No X	
Wetland Hydrology Present?	Yes ___ No X	

Remarks:

The sample plot satisfies only one of the three mandatory wetland criteria; therefore, this area is classified as upland. Rain has occurred within the past 24 hours. The upland terrace is located between two berms. Some trash is present. The sample plot is adjacent to Governor Bridge Road.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The sample plot does not satisfy the wetland hydrology criterion.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: UPL-1

Tree Stratum (Plot size: 30ft radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Betula nigra	2	N	FACW
2. Carpinus caroliniana	20	Y	FAC
3. Liriodendron tulipifera	13	N	FACU
4. Liquidambar styraciflua	30	Y	FAC
5. Acer negundo	5	N	FAC
6. Platanus occidentalis	5	N	FACW
7.			
8.			
	75 = Total Cover		

50% of total cover: 37.5 20% of total cover: 15

Sapling/Shrub Stratum (Plot size: 30ft radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Liquidambar styraciflua	15	Y	FAC
2. Ilex opaca	10	Y	FAC
3. Lindera benzoin	5	N	FACW
4. Acer rubrum	5	N	FAC
5. Rosa multiflora	2	N	FACU
6. Liriodendron tulipifera	5	N	FACU
7.			
8.			
	42 = Total Cover		

50% of total cover: 21 20% of total cover: 8.6

Herb Stratum (Plot size: 30ft radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Polystichum acrostichoides	2	Y	FACU
2. Arisaema triphyllum	2	Y	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	4 = Total Cover		

50% of total cover: 2 20% of total cover: 0.8

Woody Vine Stratum (Plot size: 30ft radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Toxicodendron radicans	15	Y	FAC
2. Lonicera japonica	15	Y	FACU
3. Celastrus orbiculatus	5	Y	FACU
4. Partenocissus quinquefolia	5	Y	FACU
5. Campsis radicans	2	N	FAC
	42 = Total Cover		

50% of total cover: 21 20% of total cover: 4.2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: (If observed, list morphological adaptations below).

The sample plot satisfies the hydrophytic vegetation criterion.

SOIL

Sampling Point: UPL-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/3	90	10YR 3/4	5	C	M	ssil	gravel and organic matter
			7.5YR 5/8	5	C	M		
10+	--	--	--	--	--	--	refusal	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Gravel

Depth (inches): 10

Hydric Soil Present? Yes ______ No X

Remarks:

The sample plot does not satisfy the hydric soils criterion.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Governor Bridge Road City/County: Prince George's Sampling Date: 5/26/2017

Applicant/Owner: Prince George's County State: MD Sampling Point: UPL-2

Investigator(s): A. Wagoner, K. Myers Section, Township, Range: Bowie

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): <2

Subregion (LRR or MLRA): MLRA 149A Lat: 38.951881 Long: -76.695841 Datum: NAD83

Soil Map Unit Name: Udorthents, reclaimed gravel pits, 0-5% slopes (UdgB) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___ No X	
Wetland Hydrology Present?	Yes ___ No X	

Remarks:

The sample plot does not satisfy the three mandatory wetland criteria; therefore, this area is classified as upland. The sample plot is located in riparian forest, adjacent to Governor Bridge Road. Rain has occurred within the past 24 hours

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The sample plot does not satisfy the wetland hydrology criterion.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: UPL-2

Tree Stratum (Plot size: 30ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fagus grandifolia	40	Y	FACU
2. Quercus alba	30	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	70 = Total Cover		
50% of total cover: 35	20% of total cover: 14		

Sapling/Shrub Stratum (Plot size: 30ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus alba	15	Y	FACU
2. Fagus grandifolia	15	Y	FACU
3. Asimina triloba	15	Y	FAC
4. Carya glabra	10	N	FACU
5.			
6.			
7.			
8.			
	55 = Total Cover		
50% of total cover: 22.5	20% of total cover: 11		

Herb Stratum (Plot size: 30ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pachysandra species	60	Y	NI
2. Carya glabra	2	N	FACU
3. Liquidambar styraciflua	2	N	FAC
4. Quercus alba	5	N	FACU
5. Allium canadense	2	N	FACU
6. Fagus grandifolia	2	N	FACU
7.			
8.			
9.			
10.			
11.			
12.			
	73 = Total Cover		
50% of total cover: 36.5	20% of total cover: 14.6		

Woody Vine Stratum (Plot size: 30ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Parthenocissus quinquefolia	5	Y	FACU
2.			
3.			
4.			
5.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 16.7 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	156	x 4 =	504
UPL species	0	x 5 =	0
Column Totals:	171 (A)		549 (B)

Prevalence Index = B/A = 3.21

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ______ **No** X

Remarks: (If observed, list morphological adaptations below).

The sample plot does not satisfy the hydrophytic vegetation criterion.

SOIL

Sampling Point: UPL-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR 2.5/3	80	10YR 3/3	15	C	M	ssil	
			7.5YR 5/6	5	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/A

Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks:

The sample plot does not satisfy the hydric soils criterion.

APPENDIX D

Representative Site Photographs

Photographic Record

KCI Technologies, Inc.

Agency: Prince George's County
Project: Rehabilitation of Bridge No. P-0599 over the Patuxent River
KCI Job No.- 23100466.57

Photographer: K. Myers
Date: 5/26/2017
Frame No. 1
Direction: Northeast
Comments: View of WUS WL001 facing upstream from bridge.

Photographer: K. Myers
Date: 5/26/2017
Frame No. 2
Direction: Southwest
Comments: View of WUS WL001 facing downstream from bridge.

Photographic Record

KCI Technologies, Inc.

Agency: Prince George's County
Project: Rehabilitation of Bridge No. P-0599 over the Patuxent River
KCI Job No.- 23100466.57

Photographer: K. Myers
Date: 5/26/2017
Frame No. 3
Direction: West
Comments: View of Wetland Sample Plot WL002-WET.

Photographer: K. Myers
Date: 5/26/2017
Frame No. 4
Direction: N/A
Comments: View of Wetland Sample Plot WL002-WET soils.

Photographic Record

KCI Technologies, Inc.

Agency: Prince George's County
Project: Rehabilitation of Bridge No. P-0599 over the Patuxent River
KCI Job No.- 23100466.57

Photographer: K. Myers
Date: 5/26/2017
Frame No. 5
Direction: Southwest
Comments: View of WUS WL003 facing downstream from flag WL003-005.

Photographer: K. Myers
Date: 5/26/2017
Frame No. 6
Direction: East
Comments: View of WUS WL004 facing upstream from flag WL004-002.

Photographic Record

KCI Technologies, Inc.
Agency: Prince George's County
Project: Rehabilitation of Bridge No. P-0599 over the Patuxent River
KCI Job No.- 23100466.57

Photographer: K. Myers
Date: 5/26/2017
Frame No. 7
Direction: North
Comments: View of Wetland Sample Plot WL005.

Photographer: K. Myers
Date: 5/26/2017
Frame No. 8
Direction: N/A
Comments: View of Wetland Sample Plot WL005-WET soils.

Photographic Record

KCI Technologies, Inc.

Agency: Prince George's County
Project: Rehabilitation of Bridge No. P-0599 over the Patuxent River
KCI Job No.- 23100466.57

Photographer: K. Myers
Date: 5/26/2017
Frame No. 9
Direction: South
Comments: View of Wetland Sample Plot WL006-WET.

Photographer: K. Myers
Date: 5/26/2017
Frame No. 10
Direction: N/A
Comments: View of Wetland Sample Plot WL006-WET soils.

Photographic Record

KCI Technologies, Inc.

Agency: Prince George's County
Project: Rehabilitation of Bridge No. P-0599 over the Patuxent River
KCI Job No.- 23100466.57

Photographer: K. Myers
Date: 5/26/2017
Frame No. 11
Direction: North
Comments: View of Wetland Sample Plot WL007-WET.

Photographer: K. Myers
Date: 5/26/2017
Frame No. 12
Direction: N/A
Comments: View of Wetland Sample Plot WL007-WET soils.

Photographic Record

KCI Technologies, Inc.

Agency: Prince George's County
Project: Rehabilitation of Bridge No. P-0599 over the Patuxent River
KCI Job No.- 23100466.57

Photographer: K. Myers
Date: 5/26/2017
Frame No. 13
Direction: West
Comments: View of Upland Sample Plot UPL-1.

Photographer: K. Myers
Date: 5/26/2017
Frame No. 14
Direction: N/A
Comments: View of Upland Sample Plot UPL-1 soils.

Photographic Record

KCI Technologies, Inc.
Agency: Prince George's County
Project: Rehabilitation of Bridge No. P-0599 over the Patuxent River
KCI Job No.- 23100466.57

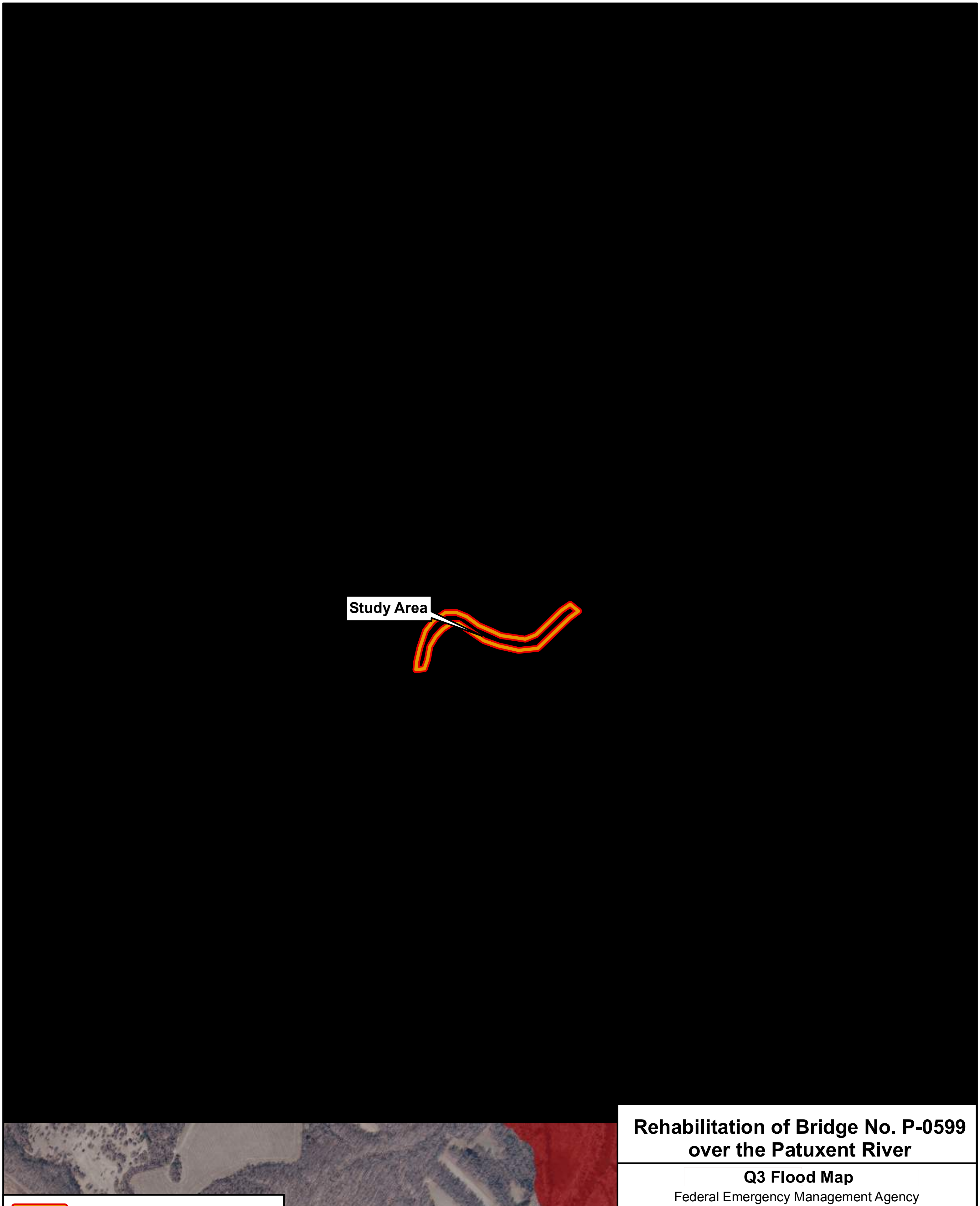
Photographer: K. Myers
Date: 5/26/2017
Frame No. 15
Direction: North
Comments: View of Upland Sample Plot UPL-2.

Photographer: K. Myers
Date: 5/26/2017
Frame No. 16
Direction: N/A
Comments: View of Upland Sample Plot UPL-2 soils.

Rehabilitation of Governor Bridge Road Bridge (P-0599) over Patuxent River

Appendix 15.3: Delineated Wetlands and Waterways

KCI Technologies, Inc.
936 Ridgebrook Road
Sparks, MD 21152



Rehabilitation of Bridge No. P-0599 over the Patuxent River

Q3 Flood Map

Federal Emergency Management Agency
Q3 Flood Data for Prince George's County, Maryland

0 500 1,000 1,500 2,000 Feet

N S E W

Study Area

FEMA 100-Year Floodplain

Rehabilitation of Governor Bridge Road Bridge (P-0599) over Patuxent River

Appendix 15.4: Archeological Report

KCI Technologies, Inc.
936 Ridgebrook Road
Sparks, MD 21152

Phase I Archeological Survey Report

Rehabilitation of Bridge No. P-0599
On Governor Bridge Road over the Patuxent River

Prince George's and Anne Arundel Counties, Maryland

May 24, 2018

Prepared for:

KCI Technologies, Inc.
936 Ridgebrook Road
Sparks, MD, 21152

Prepared by:

Lotus Environmental Consulting, LLC
487 Devon Park Drive
Suite 219
Wayne, Pennsylvania 19087

PHASE I ARCHAEOLOGICAL SURVEY REPORT

GOVERNOR BRIDGE ROAD OVER THE PATUXENT RIVER
PRINCE GEORGE'S COUNTY AND ANNE ARUNDEL COUNTY, MARYLAND

ABSTRACT

Lotus Environmental Consulting, LLC as a subconsultant to the KCI Technologies, Inc. (KCI)/Gannett Fleming, Inc. (GF) Joint Venture, who is under contract with Prince George's County Department of Public Works and Transportation Office of Engineering and Project Management and the Maryland State Highway Administration (MDOT SHA) to perform archaeological investigations for the rehabilitation of the Governor Bridge Road over the Patuxent River and drainage improvements to the roadway approaches. The century-old Governor Bridge (County Bridge P-0599, MHT Nos. PG-74B-1 and AA-851) was determined eligible for listing in the National Register of Historic Places in 2001, and is subject to Section 106 of the National Historic Preservation Act of 1966, as amended; the implementing regulations in 36 CFR Part 800 as set forth by the Advisory Council on Historic Preservation (ACHP); the National Environmental Policy Act, as amended; the Maryland Historical Trust Act of 1985 as amended, State Finance and Procurement Article §§ 5A-325 and 5A-326 of the Annotated Code of Maryland; and policies and guidelines of the Maryland State Highway Administration (SHA) and the Maryland Historical Trust (MHT).

The Prince George's County Department of Public Works is proposing to rehabilitate the Governor Bridge Road Bridge by replacing the existing truss bridge's floor system with a steel multi-girder structure and composite reinforced concrete slab. The proposed plan would leave the existing trusses in place simply to maintain historic appearance, without providing any structural support. The bridge connects Anne Arundel County and Prince George's County and is considered to be a shared resource between the two. The counties have agreed that any repair costs incurred will be split equally.

Investigations were undertaken to determine if archaeological sites eligible for listing in the National Register of Historic Places (NRHP) are located within the proposed project Area of Potential Effects (APE) to facilitate compliance with the National Historic Preservation Act of 1966, as amended.

PHASE I ARCHAEOLOGICAL SURVEY REPORT

GOVERNOR BRIDGE ROAD OVER THE PATUXENT RIVER
PRINCE GEORGE'S COUNTY AND ANNE ARUNDEL COUNTY, MARYLAND

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May 24, 2018

PHASE I ARCHAEOLOGICAL SURVEY REPORT

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1.0 INTRODUCTION

1.1 Project Location and Description

This report documents the results of the Phase I Archaeological investigation undertaken to identify the presence of archaeological sites within the project area for Governor Bridge over the Patuxent River (Bridge No. P-0599; MHT No. PG-74B-1 and AA-851) in Prince George's County and Anne Arundel County, Maryland (**Figure 1, Photo 1**).

Photo 1 - Governor Bridge Road Bridge over the Patuxent River, looking NE

The archaeological investigations were conducted in compliance with Federal and Maryland historic preservation legislation and regulations. Federal mandates include the National Historic Preservation Act of 1966, as amended, the National Environmental Policy Act of 1969, as amended, and the implementing regulation of the Advisory Council on Historic Preservation (36 CFR Part 800). Maryland mandates include the Maryland Historical Trust Act of 1985 as amended, the State Finance and Procurement Article §§ 5A-325 and 5A-326 of the Annotated Code of Maryland; and policies and guidelines of the

Maryland State Highway Administration (SHA) and the Maryland Historical Trust (MHT). This project requires a permit from the United States Army Corps of Engineers.

The Governor Bridge Road Bridge was determined eligible for listing in the National Register of Historic Places in 2001 under Criteria A and C. The bridge is significant under Criterion A for being one of the many metal truss bridges constructed in Maryland in the late nineteenth and early twentieth centuries. Dating between 1907 and 1912, Governor Bridge Road Bridge is one of two remaining examples of Pratt truss bridges in Prince George's County. The bridge is significant under Criterion C as a surviving example of a single-span Pratt through-truss bridge, which were once abundant in Maryland.

Research at the Maryland Historic Trust was conducted by Gabrielle Vicari in December 2017. Archaeological field work was conducted in March 2018.

1.2 Area of Potential Effects

The Area of Potential Effects (APE) for the Governor Bridge Road over Patuxent River Project encompasses the design alternatives under consideration, the existing bridge and its approaches to both the east and west on Governor Bridge Road, plus a buffer of approximately fifty feet in both directions to accommodate potential design shifts during final design **(Figure 2)**.

1.3 Project Area Description

Governor Bridge Road bridge spans the Patuxent River, and is located in both Prince George's and Anne Arundel County, Maryland. It is located about halfway between Bladensburg and Annapolis, and is sited just south of Route 50, the modern major road connecting Washington, D.C. with Annapolis, MD. The bridge's immediate surroundings are fairly undeveloped, consisting largely of wetlands and floodplains. The area of Anne Arundel County to the east of the bridge is largely agricultural, having escaped the heavy development that characterizes the area of Prince George's County to the west.

2.0 RESULTS OF BACKGROUND RESEARCH

2.1 Previous Archaeological Research

This area of Maryland is archaeologically rich, with pre-contact sites appearing with frequency along rivers and streams. The banks of the Patuxent have yielded the oldest evidence of human occupation in the mid-Atlantic, which have been carbon dated to ten thousand years ago (Furguson, 2015). A particularly striking local concentration occurs along a 3.5 mile stretch of Collington Branch, between its intersections with Routes 214 and 50. No fewer than eleven sites are located the eastern side of the waterway, which is located about three miles west of the Patuxent River. Although there are no previously identified sites located within the APE of the current project, several archaeological investigations in the vicinity indicate that the area of Governor Bridge Road was a site of pre-historic activity and was home to an operational mill from approximately the late eighteenth century until the 1920s.

In 1953, archaeologists and eventual property owners Clifford Evans and Betty J. Meggers conducted an excavation of an area to the northeast of the bridge, which turned up a wide variety of artifacts indicating pre-historic occupation, including a number of "rhyolite, chert, and green jasper flakes, tools, and points." The property also yielded items dating from the eighteenth through twentieth centuries, including nails, a diverse selection of pottery sherds, kaolin pipe stems, automobile parts, and various household items. At the time, the property was owned by Betty Meggers' parents, William and Edith. A 2009 Phase II/Site Testing investigation revealed fewer total objects, yielding just one quartz point and one sherd of pre-historic pottery, as well several eighteenth-century pottery sherds, a handful of nails dating to different periods, glass bottles, and two pipe stems (Sperling 2010b).

Collectively, pre-historic artifacts from the site have been dated to the middle and late Archaic and early and middle Woodland periods, covering 6000 B.C.-1000 B.C. and 1000 B.C. – 500 A.D. respectively. Meggers and Evans noted that the site was a natural choice for a camp, with its proximity to water in the form of the river, and protection afforded by a small stream and a series of steep banks to the northeast and east. The historic artifacts, dating from the colonial era to the modern period, were indicative of residential and milling activity on the property. Meggers and Evans note the presence of a mill foundation, raceway, and miller's house, which likely date to at least the early nineteenth century, and items related to occupation and small-scale agricultural production by tenant farmers in the mid-twentieth century (Sperling 2010b). A survey in 1983 by the Davidsonville Area Civic Association recorded that the miller's house had collapsed, but writes that mechanisms such as grinding wheels, millstone banding, and a pulley were still visible among the ruins of the mill structures. The report additionally indicates that undisturbed trash pits near the cabin site may yield further archaeological finds (Sperling 2010b).

2.2 Regional Prehistoric Cultural Context

Paleoindian Period (11000 B.C. - 8000 B.C.)

The Paleoindian period characterizes the beginning of human habitation in the Mid-Atlantic Region. Paleoindian finds in Maryland are poorly represented, with a few intact sites, including the Higgins Site, and over a hundred isolated stone tools found (Dent 1995; Ebright 1992).

Archeological investigations of Paleoindian sites in the Mid-Atlantic Region, such as the Shawnee-Minisink Site along the Delaware River (McNett 1985) and the Thunderbird Site in the Shenandoah Valley (Gardner 1974), have offered new evidence toward our understanding of Paleoindian subsistence, technology, and settlement in Maryland. Traditional theories suggest that Paleoindians hunted late Pleistocene megafauna, such as mastodon and elk, based on the finds of large fluted stone points at megafaunal kill sites (Willey 1966). Evidence from archeological excavations of Mid-Atlantic Region Paleoindian sites, however, indicates that aboriginal diets may have included game such as deer, hare, turkey and fish, and plant foods such as wild grape, black walnut and blackberry (Dent 1985, 1995; Ebright 1992; Gardner 1980:19-20; McNett 1985). Paleoindian tool kits reflected hunting activities as the major focus of the diet, including diagnostic Clovis, Mid-Paleo, and Dalton point styles, as well as scrapers, burins, gravers, utilized flakes, knives, and hammerstones (Gardner 1980; Custer 1984; Funk 1972).

The dependency on area game and plant sources for sustenance likely required Paleoindian peoples to migrate with the changing seasons, as well as with the depletion of area resources. Archeological evidence suggests Paleoindian sites can be divided into several types based on artifact assemblage and stone tool/debitage distribution. "Base camps" are identified by the artifact variety of the site assemblage, the indication of discrete activity areas based on the distribution of stone tools and debitage, and the presence of pits and post molds (Gardner 1974, 1977, 1979). An example of a base camp is the Thunderbird site in Virginia. Smaller, specialized sites, such as quarries and reduction sites, were utilized for brief periods by smaller groups than those at base camps (Dent 1995). The Higgins Site Paleoindian occupation represents a small, short-term campsite occupied by a highly mobile small band (Ebright 1992). No Paleoindian sites or finds have been recorded in the project area.

Archaic Period (8000 B.C. – 1200 B.C.)

The Early Archaic (8000 B.C. – 6500 B.C.) people continued the traditions of those from the Paleoindian Period. Settlements expanded into more diverse environments, utilizing a wide variety of shellfish, fish, game, and plant food resources such as nuts, berries, and roots (Dent 1995). The environmental conditions were more seasonable, and the habitat changed from open conifer parkland setting to an oak-hickory forest habitat.

Early Archaic people shifted from the use of high quality lithic materials to more advantageous materials. Exploitation of locally various materials were utilized such as, quartz, quartzite, and rhyolite. The appearance of the Corner-Notched Tradition (7500 – 6800 B.C.) and the Bifurcate Tradition (6800 – 6000 B.C.) represent tool style changes characteristic of the Early Archaic period. The introduction of the atlatl occurred at this time as well. Toolkits of the Early Archaic included ground stone tools and chipped-stone axes in addition to what would have been found in Paleoindian toolkits (Geier 1990:70; Dent 1995:170; Gardner 1989).

During the Middle Archaic period (6500 B.C. – 3000 B.C.), environmental fluctuations diminished, with the climate warming to an average temperature near that of the present day. An increase in precipitation also occurred during this period. In response to the stable, favorable environmental factors and diversification of the resource base, the aboriginal population expanded over a larger geographic area. Increased growth of the oak-hickory forest provided Middle Archaic people with a wider range of nutritious and storable food resources in the form of mast products (i.e. acorns, nuts) and an increase in game animals, such as turkey.

Kavanagh (1982), in a study of the Monocacy Valley, noted an increase in Middle Archaic sites away from the river and along tributaries, suggesting the use of a broader resource base in the environment. The populations became more sedentary with the stability and availability of various resources, fostering a sense of territoriality based on the given resources located with a physiographic province or drainage basin (Custer 1989). Upland settings and interior wetland areas were utilized more often by these larger sedentary population groups. Fusion-fission settlement patterns developed with the Middle Archaic people along major floodplains (Gardner 1987; Dent 1995:177). Small groups would meet on a large floodplain and create a base camp when certain resources were available during various periods of the year, such as migrations of fish or birds. When the food resources became scarce, the base camp would disperse back into smaller groups and move to the upland settings to utilize the resources in this environmental area.

While Middle Archaic tool kits continued to resemble those of previous periods, several types of ground-stone tools were added for processing an expanded resource base. A variety of grinding tools found on Middle Archaic sites, such as mortars and pestles, indicate the increased reliance on plants in the diet. The Higgins Site produced fragments of mortars and pestles within its Middle Archaic component (Ebright 1992). Netsinkers and atlatl weights suggested increased collection of both fish and game. Atlatl weights have been found along the Nottaway River in Virginia (Egloff and MacAvoy 1990). Drills and other wood-working tools, such as adzes and celts, were also found in a Middle Archaic tool kit (Dent 1995: 176). Diagnostic tool forms include LeCroy, Kanawha, Stanly, Morrow Mountain, Guilford, Halifax, other bifurcate/ notched-base, contracting-stem, and side notched point types.

The Late/Terminal Archaic Period (3000 B.C. – 1200 B.C.) is marked by a greater emphasis on local resource exploitation along the major river and estuarine systems. Warm and dry conditions favored the development of open grasslands and oak-hickory forests. Rise in sea levels established more permanent waterways in the region. Late Archaic people continued fusion-fission patterns and traditions of those from Middle Archaic people with an increase of a sedentary lifestyle. Settlement patterns tended to focus more along interior drainages of first order streams, with larger social groupings and increased sedentary lifestyles (Mouer 1991; Steponaitis 1980; Kavanagh 1982).

Evidence of territory development occurred within the region during the Late Archaic period through the development of stylistic and territorial zones of diagnostic lithic artifacts. Diagnostic artifacts found in the Late Archaic period include Broadspear variants, such as Savannah River and the Holmes projectile points, Notched Broadspear, Perkiomen, Dry Brook, and Dry Brook Orient projectile points. The appearance of Savannah River Broadspear is attributed to aboriginals migrating from the Carolinas in the early portion of Late Archaic (Gardner 1987). Gardner suggests that the Holmes projectile point was a later version of the Savannah River and Susquehanna Broadspear, which have been located at sites with inhabitants from the northern regions. Susquehanna projectile points, usually manufactured from rhyolite, have been restricted to the Shenandoah Valley and above the fall line of the Potomac River, whereas quartz or quartzite Savannah River and Holmes types have generally been found in the southern portion of the Potomac River and through the Piedmont regions. Recent investigations at the Pig Point Site (18AN50) in Anne Arundel County recorded a series of triangle points co-terminus with Late Archaic Piscataway points, further building upon the knowledge that triangle points reflect a much wider period of use than just the Late Woodland period (Luckenbach et al 2010).

Large flat bottom steatite (soapstone) vessels (i.e. bowls) with carved lug-handles are one of the most noted types of artifacts to be introduced to the Chesapeake Bay assemblage during the Late Archaic Period (Dent 1995). Steatite was found in the western regions past the fall line of the Potomac River and in the Piedmont areas. The use of the heavy steatite bowls appears to indicate a more sedentary pattern of existence (Tuck 1978:38). The use of steatite bowls allowed for carrying of liquids, and cooking either over a fire or with stone boiling.

Woodland Period (1200 B.C. – A.D. 1600)

The Early Woodland Period (1200 B.C. – 500 B.C.) represents an increased sedentary lifestyle for aboriginal peoples, with larger, long-term sites being serviced by outlying extraction sites (Mouer 1991). Climate evolved into a more stable, moister condition, which allowed for more stable living conditions. Domesticated cultigens, such as corn, beans, and squash, were gradually incorporated into the daily diet. Wild grasses, such as amaranth, and wild plants like polygonum, mustard, and grape, provided additional sources of sustenance (McLearen 1991). These types of wild plants were collected from storage pit features in nine oval pit houses identified at the 522 Bridge Site in Front Royal, Virginia (McLearen 1991).

A rapid rise in ceramic technology flourished during the Early Woodland Period. The earliest ceramics, attributed to the Marcey Creek series, were tempered with crushed steatite and formed in a similar fashion as steatite bowls of the previous period (Mouer 1991). Other types of experimental ceramics, including Selden Island, Bushnell, and

Croaker Landing wares, are possibly distinctive forms for the Chesapeake Bay area (Custer 1989). Accokeek wares, featuring sand and quartz temper and coil construction, eventually replaced Marcey Creek ceramics (Wright 1973). Early Woodland period ceramics tempered with steatite were limited to raw resource locations found in areas around the Fall Line and Piedmont. However, the use of sand and quartz temper opened up manufacturing of ceramic technology to other locations where steatite was absent, allowing Early Woodland people further mobility and uses of ceramics.

The flaked-tool industry reflects Late Archaic technology with small bifaces, drills, scrapers, and utilized flakes. Antler and bone tools have been recovered as well (Dent 1995). Point types associated with Early Woodland ceramics include Savannah River points, Dry Brook, Orient Fishtail, and Calvert points. Additional point types associated with other Maryland ceramics dating at this time would have included Piscataway/Rossville, Teardrop or ovoid, Calvert, Clagett and Vernon (Ebright 1992:38).

The Middle Woodland Period (500 B.C. – A.D. 1000) was witness to an elaboration of mortuary practices, including burial mounds and elaborate, exotic ceremonial grave goods related to the Adena culture (Griffin 1967). These grave practices and goods not only indicate a shift from a band level of social organization to complex rank societies, but also extensive trade associations beyond the immediate interior of Maryland. Pottery styles continued to shift. Popes Creek, a thick-walled, sand-tempered, net-impressed ware found predominately in the Coastal Plain areas, and Mockley, a shell-tempered, cord- and net-impressed ware, are two dominant styles (Custer 1989; Dent 1995; Wright 1973). Calvert and Rossville projectile points have been found in association with Popes Creek ceramics, and Selby Bay–Fox Creek points are associated with Mockley ceramics (Dent 1995:236-237). Tools were manufactured with quartz or local materials. The predominant exotic material used at this time was rhyolite that originated from the Blue Ridge Province of western Maryland and South–Central Pennsylvania.

Settlement patterns for the Late Woodland period (1000 A.D. – 1600 A.D.) are reflected in permanent villages with a subsistence base focused on grown domesticated foods, namely maize (corn), beans, and squash. Maize horticulture occurred around 1000 A.D. Floodplain locations are favored for village sites, likely based on the availability of fertile bottomland soils for agricultural practices and the ease of clearing the land in these areas. Stockade fortifications have been found at some Late Woodland Period village sites, possibly indicating defensive measures used to protect from attacking parties (Griffin 1967). Evidence of stockade settlements began around 1300 A.D. to 1400 A.D.

Smaller base camps and procurement sites tend to serve as specialized function sites with periods of multiple re-use. A dramatic increase in the small village sites with multiple storage pits during the Late Woodland period suggests that these populations were sedentary and continually growing in size. The sedentary lifestyle and food surpluses were attributed to the creation of complex sociopolitical structures within ranked societies.

Recognized territories developed among the complex societies, limiting movement into another tribe's area (Dent 1995). Trade networks developed among the various societies, with neutral trade zones established between territories.

Ceramic diversity continued, with a variety of motifs likely associated with the borrowing of designs from other societies through established trade networks. The Patuxent drainage basin witnessed two phases of ceramic traditions during the Late Woodland Period. The Little Round Bay Phase (800 A.D. – 1250 A.D.) was exemplified by a thin walled and shell tempered with complex incised designs (i.e. Rappahannock and Townsend) (Steponaitis 1980:16). The Sullivan Cove Phase (1250 A.D. – Contact) featured Rappahannock Incised as well, but with simpler incised designs of horizontal lines. Common projectile points found in the Late Woodland period include Jacks Reef, Levanna triangular, and Madison.

2.3 Regional Historic Cultural Context

Maryland's waterways were the primary mode of transportation in the colony's early days, thanks to the Chesapeake Bay and its enormous network of tributaries. Although the Patuxent River is effectively no longer navigable above Queen Anne (also called Hardesty), it was an important shipping route to the bay in the mid-eighteenth century for iron furnaces in Laurel (Chidester 2004). Captain John Smith's map of his 1608 expedition indicates that he likely made it to a point just below what is now called Jug Bay (Salmon). The river and its tributaries also powered several mills and furnaces, notably those belonging to the locally prominent Snowden family. Despite its significance, the Patuxent was not an effective mode of transportation for the growing population of the area, and often proved a significant barrier to overland travel.

As more settlers arrived throughout the seventeenth and eighteenth centuries and agricultural output increased, sheer numbers demanded a regulated system of roadways throughout the colony. In 1666, the Maryland General Assembly passed a law mandating creating and marking passable roads on land and through or over bodies of water. Laws were updated as needed, including an increase in roads and patrols to address the increased expansion into Native American territory. Any early bridges would have been of wood construction, as large-scale production of structural metals would not become common for another century, and a 1724 law permitted road overseers to cut down trees for bridge repair from any property adjoining the site. Evidently, at the time of this legislation, many existing bridges were poorly maintained, and there was a demand for new wooden structures to replace the unsafe ones (Maryland State Highway Administration 1995).

The first date of construction for a bridge at Governor Bridge is unclear, but eighteenth-century court agreements in Anne Arundel County ordered the construction of sixteen bridges on the Patuxent River between 1744 and 1773. Common belief holds that the colonial governors of Maryland, particularly Samuel Ogle (1694-1752) and his son Benjamin Ogle (1749-1809), crossed the Patuxent River at or near this spot on their journey from nearby Belair Mansion to Annapolis hence the moniker "Governor Bridge."

Additionally, such a crossing would have been highly beneficial to farmers and merchants, who needed to transport goods to ports on the Chesapeake from more west-lying areas in Maryland. In the 1790s, exiled French aristocrat Francois de la Rochefoucauld noted the presence of dilapidated wooden bridges over the two branches of the Patuxent, which he qualifies as the "worst and most dangerous I ever saw" (De la Rochefoucauld 1800). It is certainly possible that the one of the structures de la Rochefoucauld describes is a predecessor to the modern Governor Bridge. A 1797 German map illustrates a bridge labeled "Patuxent Bridge" along the road from Bladensburg to the Chesapeake, sited at or near the current-day location (**Figure 3**). Notably, it is the only crossing over the river that is clearly drawn as a bridge, indicating its importance as part of the east-west road network across the state (Sotzman 1797).

Despite its natural deterioration, wood remained a preferred building material for bridges throughout Maryland into the early twentieth century, as it was generally abundant and inexpensive. However, the advent of cast and wrought iron as building materials allowed for more highly-engineered, longer-lasting structures. Additionally, the expansion of the railroads offered greater opportunity for engineers to experiment with bridge design. Although early timber forms of truss bridges had been in use since the early 1800s, the ascension of the Baltimore and Ohio Railroad catalyzed mass construction of this form between the 1840s and 1880s, first with a combination of metal and timber, and later using solely metal (Maryland State Highway Administration 1995).

The Governor Bridge Road bridge, which dates to approximately 1912, is an example of a riveted steel single-span Pratt through-truss bridge. Truss bridges are a highly adaptable form and are characterized by a structure of vertical beams and diagonal bars. These work together to provide a balance of compressive and tensile forces, allowing the bridge to bear weight. The Pratt truss, introduced in 1844, was a significant development in truss bridge construction, spawning at least half a dozen subtypes that could be found throughout Maryland. Despite the past prevalence of Pratt truss bridges throughout the area, Governor Bridge is one of only two remaining in Prince George's County. The 1907 Duvall Bridge, the other remaining example, is located within the bounds of the Patuxent Wildlife Research Center.

3.0 FIELD AND LABORATORY METHODS

FIELD METHODS

Lotus archaeologists conducted a field view of the project on March 5, 2018, prior to the initiation of field excavations. A preliminary pedestrian review of the survey area and assessment of existing conditions and disturbance was performed.

Due to the variable environmental conditions and limit of the testable area within the APE, each quadrant of the APE was subjected to a different test grid. Where possible, a fixed datum point was used to take compass bearings to establish the magnetic north and east grid axes and plot 40-centimeter (cm)-diameter shovel test pit (STP) excavations at 15-meter (m) intervals over the APE. In the northeast quadrant of the APE the survey grid was arbitrarily established due to the absence of any utility poles or other reference points. Based on the poorly drained and disturbed conditions in the southeast quadrant, no subsurface testing was conducted.

Soils in STPs were excavated according to identifiable horizons. STPs were excavated 10 cm (3.9 in) or deeper into culturally sterile Pleistocene deposits. Soils were screened through quarter-inch wire mesh in order to ensure uniform recovery of artifacts regardless of age cultural affiliation, or soil stratum. Soil stratum was excavated and screened separately. Artifacts recovered from STPs were collected and provenienced by stratigraphic layer.

Soil profile information, including measurements, soil texture, and color, was recorded on standardized forms. The location of STPs was recorded on scaled base maps. Excavations were backfilled upon completion. Areas of slope greater than ten percent were usually not tested, as permitted by MHT guidelines (Shaffer and Cole 1994). Cultural features and land modifications were also plotted on base maps, as were potential culturally influenced vegetation (trees, shrubs, ornamentals, and ground cover). Digital photographs were taken of each area as needed.

At the completion of the test excavations, archeological base maps were created illustrating the locations of Phase I test excavations, standing structures, proposed study area limits, and ground disturbances within the study area.

LABORATORY METHODS

Artifacts recovered during the course of the Phase I survey were cataloged using standard typologies and terminology for the Mid-Atlantic Region. Recovered prehistoric artifacts were cataloged using standard typologies for the project region and analyzed for chronological and functional attributes. Recovered historic period material was cataloged using a variant of Stanley South's functional classification scheme and analyzed for chronological attributes (South 1977). The functional categories enable artifact material to be sorted and analyzed by use and compare the assemblage for identification of possible activity areas within the site. Artifacts were classified by functional class and materials as per current historical material culture studies. Glass color and decorative treatment were also noted when present.

Waste debitage associated with the manufacture of stone tools was characterized as primary, secondary, and tertiary flakes and shatter. Primary flakes are characterized as having a rough or patinated outer cortex that is present over more than 50 percent of the flake and covers the entire dorsal surface of the artifact. Secondary flakes display less than 50 percent cortex covering the dorsal surface. Tertiary flakes are typically associated with shaping the tool, such as bifacial reduction, and do not exhibit cortex. Shatter is characterized as lithic debris which does not exhibit a bulb of percussion or striking platform.

4.0 RESULTS OF FIELD INVESTIGATION

SOUTHWESTERN QUADRANT

The southwestern quadrant consists of a flat to gently undulating secondary growth forested upland setting overlooking an active floodplain setting of the Patuxent River. Governor Bridge Road follows an at-surface grade in the western portion of the quadrant, but cuts deeply into the uplands at the transition to the floodplain. While the majority of the forest consists of secondary growth, several larger, older oak and walnut trees dot the setting (**Photo 2**). A 6.1 to 7.6 m-wide utility corridor borders Governor Bridge Road in this quadrant, providing a corridor for utility poles and overhead electrical lines. A shallow drainage swale bisects through the center of the quadrant, gently sloping to the south towards a small feeder stream that empties into the Patuxent River downstream of the APE. The floodplain setting within the quadrant exhibits signs of a high-energy flood environment, including scour of the surface, flood chutes, and piles of flotsam (**Photos 3 and 4**). Roadside dumping is evident in this quadrant, located near the site of a large mounded berm and road barrier used to block traffic from crossing the Governor Bridge Road bridge.

Photo 2 – Tested area in SW quadrant, view facing S

Photo 3 – Area of high velocity flooding in SW quadrant, view facing W

Photo 4 – Area of high velocity flooding in SW quadrant, view facing NW

A survey grid was extrapolated across the southwestern quadrant of the APE from a datum point established 15 m southeast of utility pole 203180. From this datum point, designated N1000 E1000, a bearing was established 24 degrees from magnetic north and referred to as the E1000 transect. Roughly 75 m to the northeast, a second transect, referred to as the N1075 transect, was established at 90 degrees from the E1000 transect. Using these two transects, a series of 17 STPs were systematically laid out at 15 m intervals within the quadrant. In addition, seven radial test pits were placed at 7.5 m intervals around positive finds for prehistoric artifacts.

A total of 24 STPs were excavated within the southwestern quadrant (**Figure 4**). The soil stratigraphy within the study area reflected a deflated setting. A 10 to 20 cm-thick (3.9 to 7.9 in) dark brown to dark grayish brown (10YR 3/3 to 4/2) sandy loam to sandy silt A-horizon (Stratum I) was observed across the surface of the setting. Below the A-horizon, the subsoil matrix generally consisted of a strong brown (7.5YR 4/6) to brownish yellow (10YR 6/6) silty sand to sand. A reddish yellow (7.5YR 6/6) silty sand subsoil was recorded below the strong brown (7.5YR 4/6) subsoil in STPs N985 E1000, N1007.5 E1000, N1022.5 E1000, N1015 E1007.5, corresponding to the elevated upland setting near the roadway. Moderate density (40 to 60%) quartz and quartzite gravels were recorded in the subsoil in all excavations conducted in the quadrant (**Photo 5**). STPs N1060 E1000 and N1105 E1020 both evidenced an 11 cm-thick (4.3 in) dark yellowish brown (10YR 4/4) sandy loam E-horizon below the A-horizon.

Photo 5 – Treefall in SW quadrant, illustrating percentage of quartz cobbles within soil matrix, view facing N/NW

Possible cultural materials recovered from the southwestern quadrant of the APE include a piece of quartz shatter in Stratum I, the A-horizon, STP N1015 E1000, and a possible quartz scraper in Stratum II, the B-horizon, STP N1105 E1050. Radial test pits excavated around these positive finds yielded no additional prehistoric artifacts. (Note - subsequent artifact cleaning and analysis conducted post field work indicated that the quartz material did not exhibit evidence of cultural manipulation and were therefore not considered indicative of prehistoric activity in the APE.) No subsurface features nor historic archaeological deposits or features were recorded in this quadrant.

NORTHWESTERN QUADRANT

The northwestern quadrant of the APE encompasses a similar environmental setting as described in the southwestern quadrant (**Photos 6 and 7**). The western end of the northwestern quadrant merges into a landscaped residential property, part of a nearby late 20th century development. A series of dirt bike trails wind through the quadrant for the first 50 m (164 ft) from the western end. Towards the eastern end of the quadrant, a small borrow pit lies along Governor Bridge Road.

Photo 6 – View of NW quadrant from bridge, view facing N/NW

Photo 7 – View of testable area of NW quadrant, view facing N

A survey grid was extrapolated across the northwestern quadrant from a datum point established 18 m northwest of utility pole 203180 at the western end of the quadrant and perpendicular to the road. From this datum point, designated NW2, a bearing was established 24 degrees from magnetic north. A total of six STPs, NW1 to NW6, were excavated at 15 m intervals on this first transect. From STP NW6, a second transect was established at 50 degrees from magnetic north and four additional test pits, NW7 to NW10, were placed on the transect. Given the presence of a borrow pit in the quadrant, one additional test pit, NW11, was placed 15 m to the east of STP NW10 and west of the borrow pit. On the east side of the borrow pit, STP NW12 was placed 8 m north of utility pole 203186 and perpendicular to the road. STP NW13 was established 15 m east of NW12 and also 8 m north of the road. A total of 13 STPs were excavated within the northwestern quadrant of the APE (**Figure 4**). Overall, the soil profiles within the study area illustrated deflation across the setting. The general soil profile included a 10 to 20 centimeter-thick very dark grayish brown to brown (10YR 3/2 to 4/3) sandy loam to sandy silt A-horizon overlying a gravelly strong brown (7.5YR 4/6) to brownish yellow (10YR 6/8) silty sand to sandy clay loam B-horizon (Appendix A). A reddish yellow (7.5YR 6/6) silty sand subsoil was recorded below the strong brown (7.5YR 4/6) subsoil in STPs NW4 and NW7, corresponding to the elevated upland setting near the roadway.

No prehistoric or historic artifacts or cultural features were recorded within the northwestern quadrant of the APE. While a small collection of modern bottles, plastic, auto parts, and other debris was observed in the quadrant, these items represent modern roadside trash and are not indicative of a historic site.

SOUTHEASTERN QUADRANT

The southeastern quadrant is located on a poorly drained floodplain and terrace setting between the Patuxent River and the adjacent uplands. This quadrant exhibits numerous pools of standing water, small streams, ditches and generally boggy conditions. In addition, several large spoils piles dot the setting within the quadrant (**Photos 8 and 9**). In several locales these spoils piles appear to be associated with excavation of the ditches and streams, or construction of the extant roadway. Given the poorly drained setting and evidence of disturbance, no subsurface investigation was conducted within the southeastern quadrant of the APE.

Photo 8 – View of SE illustrating wet and boggy conditions, view facing E

Photo 9 – View of SE quadrant illustrating wet conditions and push piles, view facing E/NE

No subsurface investigation was conducted in this quadrant due to the poorly drained conditions, standing water, and visible evidence of ground disturbance. While mid-19th century maps illustrate the Dorsey Store and a post office managed by Mrs. Bassford in this portion of the study area, no evidence of these resources was observed within the APE. Given the volume of disturbance associated with the excavation of ditches, stream channels, push piles and other landscape features, it is unlikely intact archaeological resources associated with these mid-19th century structures, if present, have survived. Comparison of the 1860 (**Figure 5**) and 1861 (**Figure 6**) maps with the current roadway shows a straight alignment of the 19th-century bridge crossing on the east side of the river compared to the sharp northeasterly curve after the bridge on the current alignment. Based on the difference in the road course, archaeological deposits associated with the Dorsey Store and post office may be located outside of the APE.

NORTHEASTERN QUADRANT

The northeastern quadrant of the APE is situated on a similar topographic setting as noted in the southeastern quadrant. The eastern end of the quadrant consists of a narrow, 12 to 18 m-wide flat terrace setting overlooking the Patuxent River floodplain (**Photo 10**). A steep slope forms the northwestern boundary of the terrace and delineates the topographic transition to the floodplain. Evidence of ground disturbance, including large pits and push piles, dot the setting in the northeastern quadrant. A mix of auto parts, household debris, and other trash was observed in association with the pits and push piles, as well as scattered throughout the quadrant (**Photo 11**). A road cut leads north from the extant roadway through the quadrant and down to the floodplain. The terrace narrows towards the southwest, eventually tapering into the extant roadway approximately 90m east of the bridge. The setting transitions to a wooded, poorly drained floodplain with numerous pools of standing water and evidence of scour (**Photo 12**).

Based on the limited area of testable ground, an arbitrarily established datum point was placed in the northern corner of the quadrant and two STPs, designated NE-1 and NE-2, were laid out over the study area.

Two (2) STPs were excavated within the northeastern quadrant of the APE (**Figure 4**). Both test pits were excavated within a small, flat setting in the northern end of the quadrant, just to the south of an approximately 6 m-long by 4 m-wide by 2 m-deep borrow pit. The profile exhibited a 20 centimeter-thick (7.9 in) dark grayish brown (10YR 4/2) sandy loam over a brownish yellow (10YR 6/8) sandy clay loam B-horizon.

The archeological survey in the northeastern quadrant produced a small assortment of historic artifacts from within the A-horizon, including a sherd of Albany slipped stoneware and a brick fragment in STP NE-1, and undecorated ironstone (n=21) sherds and a cut nail in STP NE-2. Albany slipped stoneware was commonly manufactured from 1805 to the 1920s, whereas ironstone, first manufactured in 1842, is still produced today (Miller et al 2000:10). No artifacts were recovered in the subsoil and no subsurface features were encountered in the excavations.

Photo 10 – View of testable are of NE quadrant, view facing SW

Photo 11 – View of large push pile in NE quadrant, view facing N

Photo 12 – View of poorly drained area in floodplain of NE quadrant, view facing N

The few artifacts recorded in STPs NE1 and NE2 represent a scatter of 19th and 20th century domestic refuse, auto parts, and other roadside debris deposited in the northeastern quadrant of the APE. Contemporaneous bottle and vessel glass fragments, brick fragments, auto parts, and ironstone sherds were noted along the edge of a borrow pit situated just outside of the APE, suggesting that the artifacts in the two test pits are part of a larger artifact scatter located within the flat setting. These artifacts were designated the Pit Site (18ANXXX) (**Appendix B**).

A mill foundation is reported in this location, but the quad file information is limited as to what type of foundation. No intact building stone, brick or other structural material was observed in the pit, and only a few fragments of brick were observed scattered around the area. Given the location of the pit on the edge of a steep slope roughly 12 m above the floodplain, it is unlikely this feature represents a mill foundation. The 1861 Martenent Prince George's County map depicts a grist mill on the north side of the road (**Figure 6**). However, comparison of the road track on the 1861 map to the current road suggests that mill would have been located further to the northeast on the north side of the road bend. Because of its poor integrity, ubiquitous nature, and the limited research potential, Site 18ANXXX does not provide new information in history. No further archeological investigation is recommended for this site.

A pedestrian traversal of the APE in the northeastern quadrant revealed no evidence of ruins, artifacts or other cultural features associated with the Jackson structure as shown on the 1860 Martenent Anne Arundel County map (**Figure 5**). The portion of the northeast quadrant located along the Patuxent River represents a very poorly drained and boggy setting subject to flooding. Comparison of the 1860 and 1861 maps with the current roadway shows a straight alignment of the 19th-century bridge crossing on the east side of the river, compared to the sharp northeasterly curve after the bridge on the current alignment. Based on the difference in the road course, any archaeological deposits associated with the Jackson structure may be located outside of the APE or buried under the current roadway.

5.0 SUMMARY AND RECOMMENDATIONS

Lotus conducted archaeological investigations to determine if archaeological sites eligible for listing in the National Register of Historic Places (NRHP) are located within the proposed project Area of Potential Effects (APE) to facilitate compliance with the National Historic Preservation Act of 1966, as amended.

A total of 39 STPs were excavated for this effort. One archaeological site, the Pit Site (18ANXXX), was identified just outside of the APE in the northeastern quadrant (**Figure 4**). The 1861 Martenent Prince George's County map depicts a grist mill on the north side of the road. However, comparison of the road track on the 1861 map to the current road suggests that mill would have been located further to the northeast on the north side of the road bend.

Given the absence of any cultural features within the quadrant, as well as the recovery of the artifacts within the A-horizon, these artifacts are interpreted as general household refuse disposal from these nearby dwellings dispersed across the setting by ground disturbance associated with the borrow pit excavation. No patterns by artifact class or count were observed to indicate the presence of intact deposits or features within the site. Because of its poor integrity, ubiquitous nature, and the limited research potential, the Pit Site does not provide new information in history. No further archeological investigation is recommended for this site.

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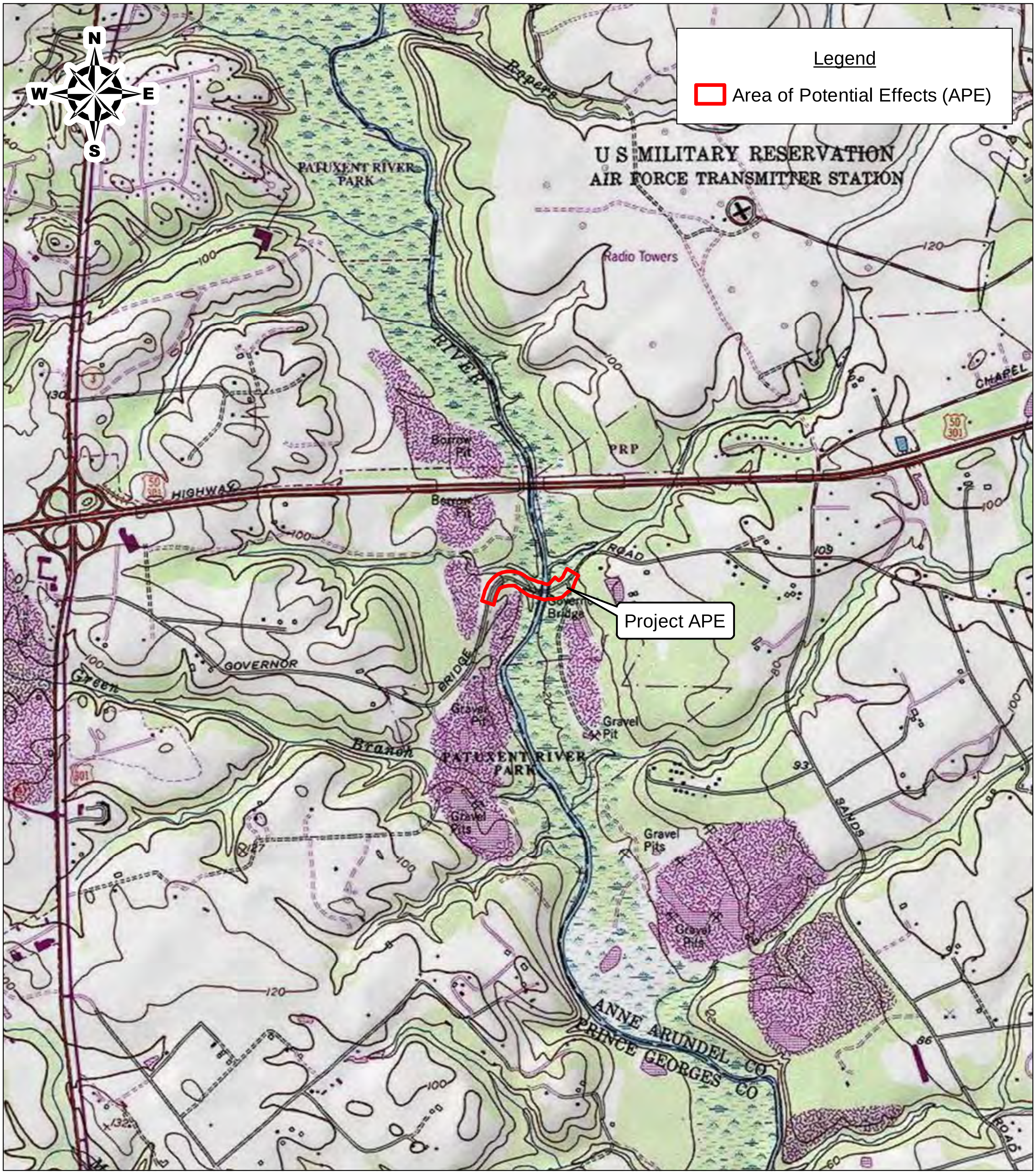
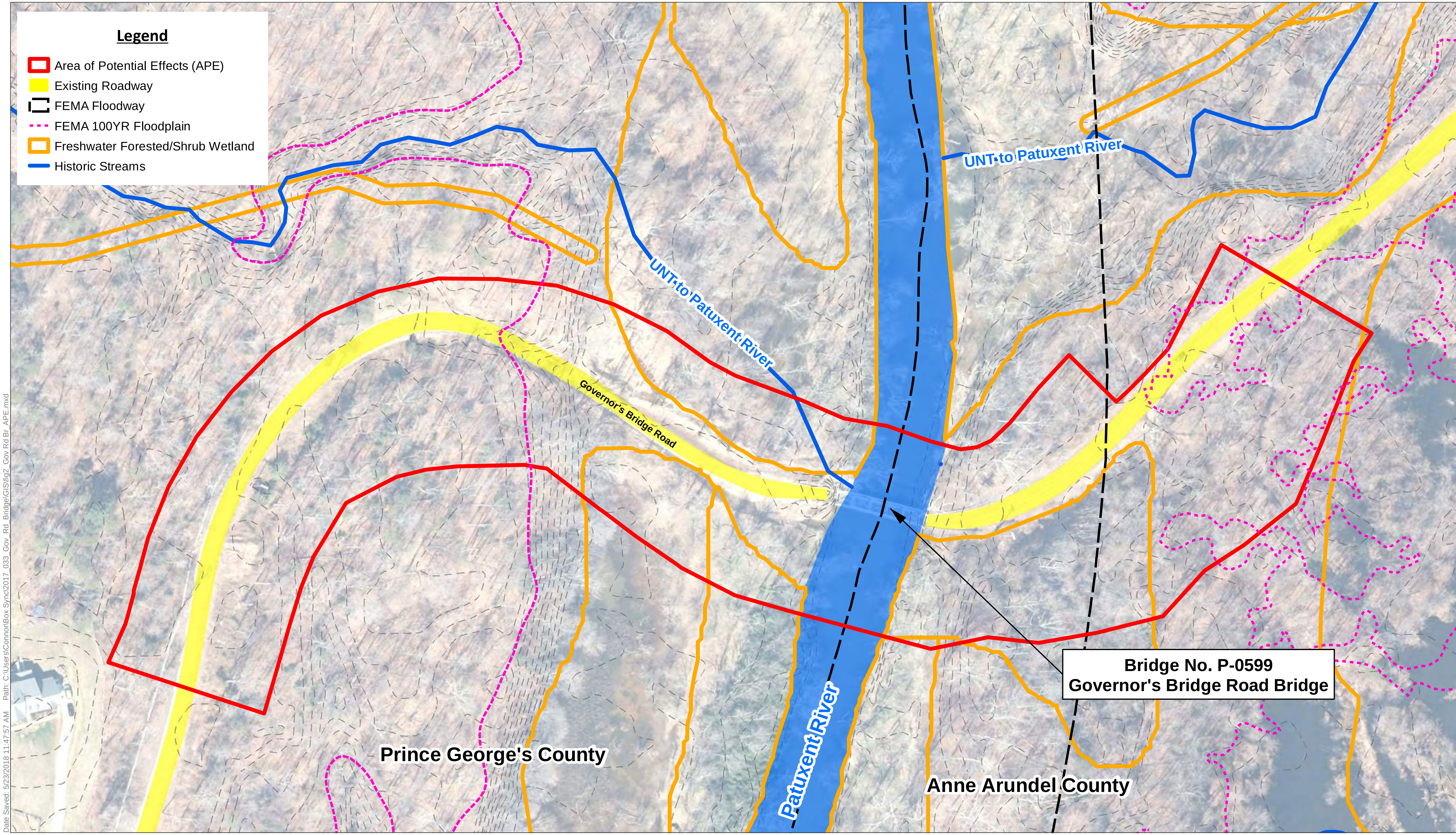
APPENDIX A

Figures



Source:Bowie, MD Quadrangle, USGS Copyright:© 2013 National Geographic Society, i-cubed

0 1,000 2,000 4,000 6,000 Feet	**Figure 1: Project Location Map**
SCALE: 1 inch = 2,000 feet / DATE: May 2018	Rehabilitation of Bridge No. P-0599 on Governor Bridge Road over the Patuxent River Prince George's and Anne Arundel Counties, Maryland
PREPARED BY: Lotus Environmental Consulting, LLC	
PREPARED FOR: MDOT State Highway Administration	



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PLAN PREPARED BY:
Lotus Environmental Consulting, LLC
487 Devon Park Drive, Suite 219
Wayne, PA 19087

PREPARED FOR:
Maryland Department of Transportation
State Highway Administration
707 North Calvert St.
Baltimore, MD 21202

Coordinate System: NAD 1983 StatePlane Maryland FIPS 1900 Feet
Projection: Lambert Conformal Conic

0 25 50 100 150 200 250 Feet

N

Figure 2: Area of Potential Effects

Rehabilitation of Bridge No. P-0599 on
Governor Bridge Road over the Patuxent River
Prince George's and Anne Arundel Counties, Maryland

May 2018

Basemap Source: Sotzmann, D. F., Maryland und Delaware, 1797.

Date Saved: 5/24/2018 10:33:05 AM Path: C:\Users\Connor\Box Sync\2017_033_Gov_Rd_Bridge\GIS\fig_Gov Rd Br_Historic Maps.mxd

PLAN PREPARED BY:
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Coordinate System: NAD 1983 StatePlane Maryland FIPS 1900 Feet
Projection: Lambert Conformal Conic

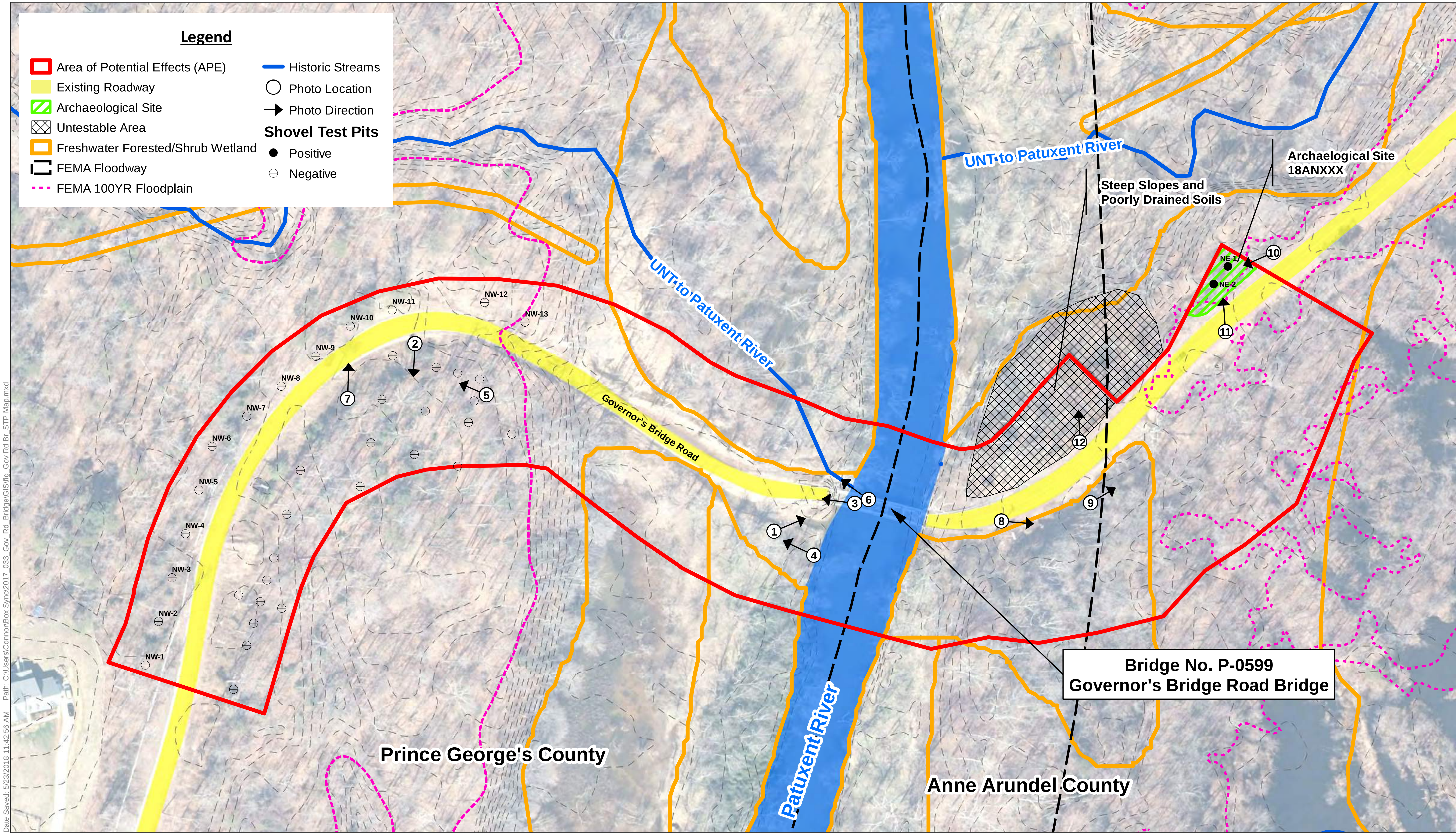
0 1,250 2,500 5,000 7,500 10,000 12,500 Feet

N

Figure 3: Historical Map, 1797

Rehabilitation of Bridge No. P-0599 on
Governor Bridge Road over the Patuxent River
Prince George's and Anne Arundel Counties, Maryland

May 2018



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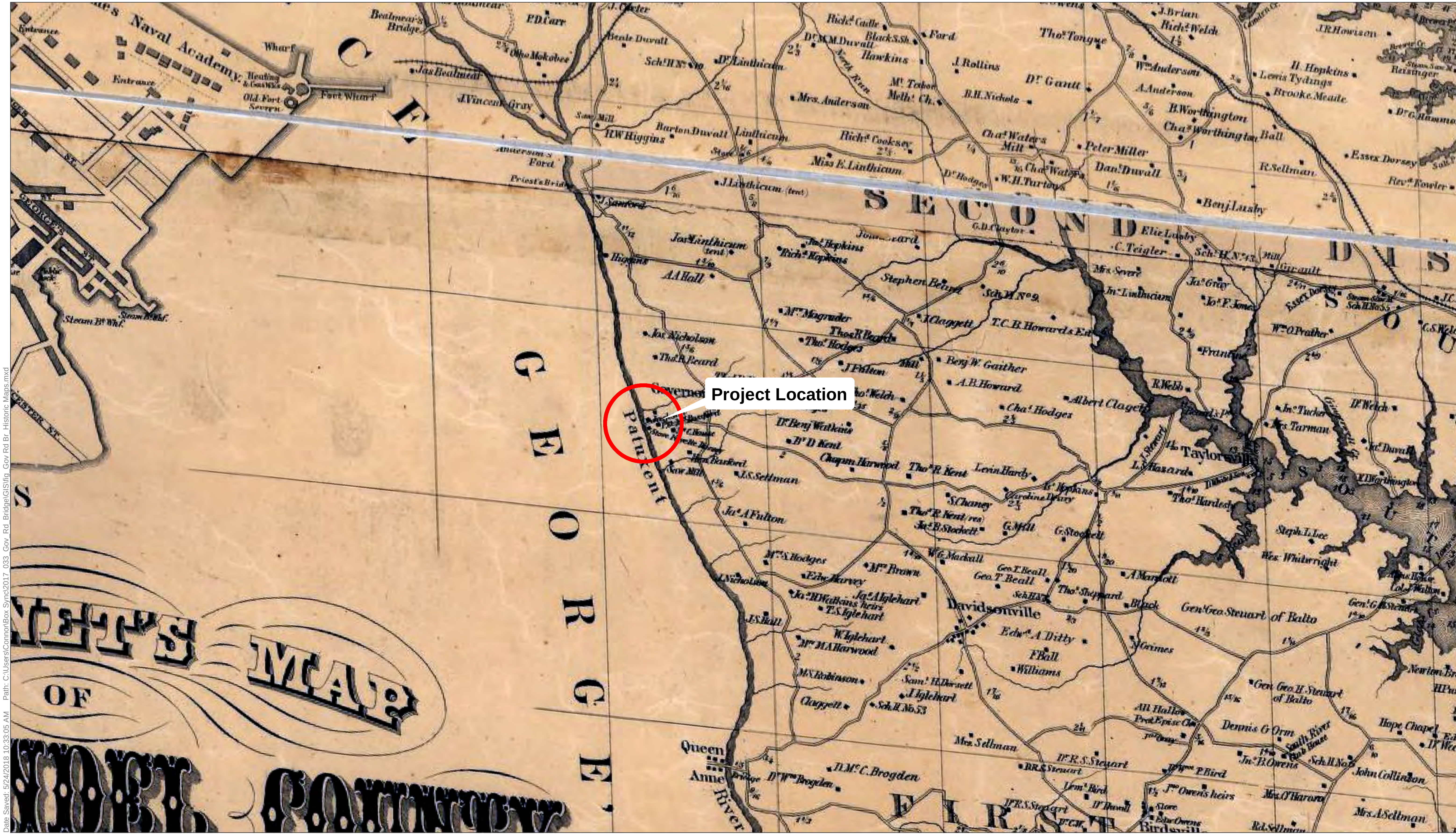
Projection: Lambert Conformal Conic

0 25 50 100 150 200 250 Feet

Figure 4: STP and Photo Locations

Rehabilitation of Bridge No. P-0599 on
Governor Bridge Road over the Patuxent River
Prince George's and Anne Arundel Counties, Maryland

May 2018



Basemap Source: Martenet, Simon J. and G.W. Beall, Martenet's map of Anne Arundel County, Maryland, 1860.

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State Highway Administration
707 North Calvert St.
Baltimore, MD 21202

Coordinate System: NAD 1983 StatePlane Maryland FIPS 1900 Feet
Projection: Lambert Conformal Conic

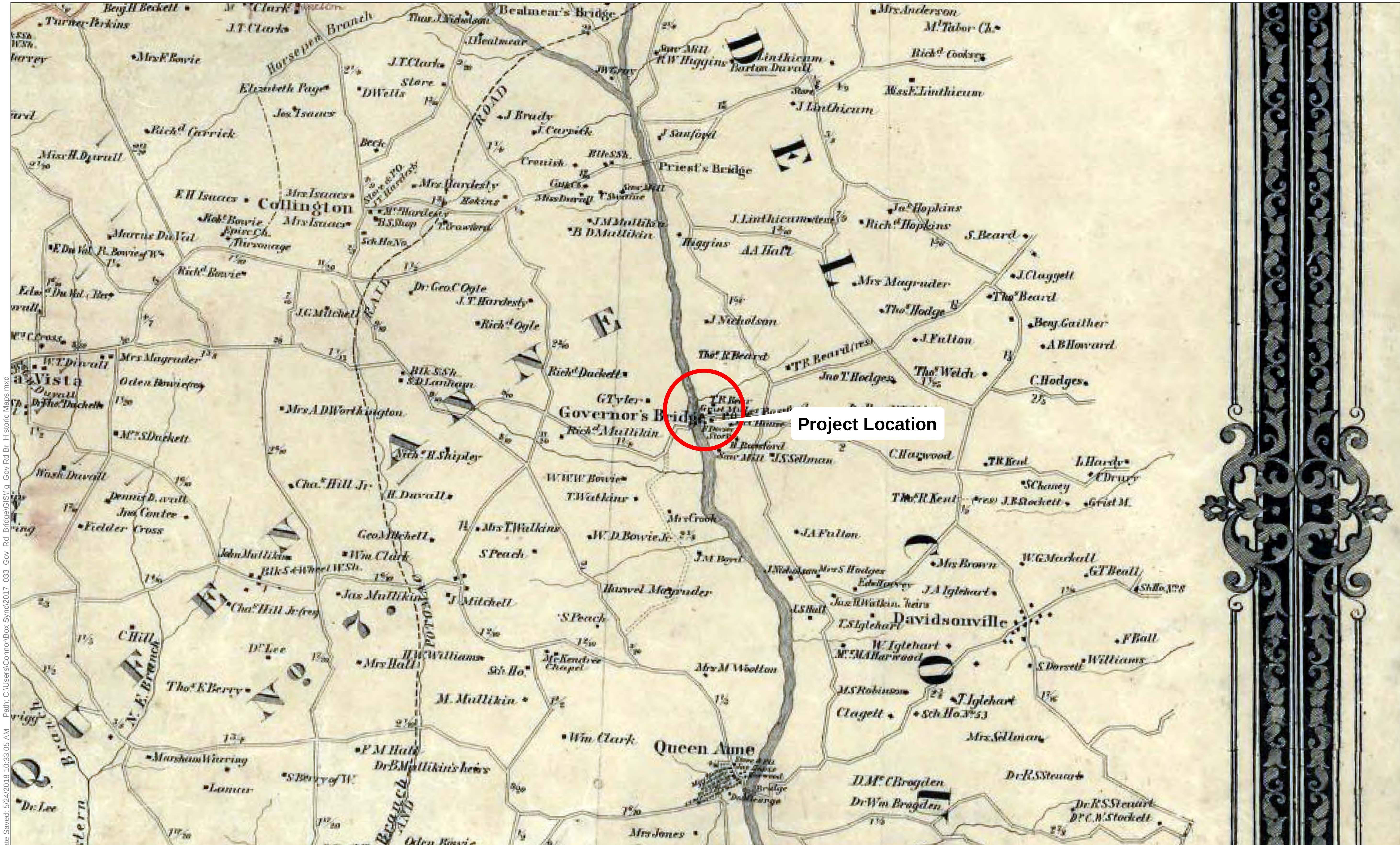
0 1,250 2,500 5,000 7,500 10,000 12,500 Feet

N

Figure 5: Historical Map, 1860

Rehabilitation of Bridge No. P-0599 on
Governor Bridge Road over the Patuxent River
Prince George's and Anne Arundel Counties, Maryland

May 2018



Basemap Source: Martenet, Simon J. and G.W. Beall, Martenet's Map of Prince George's County, Maryland, 1861.

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PLAN PREPARED BY:
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PREPARED FOR:
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State Highway Administration
707 North Calvert St.
Baltimore, MD 21202

Coordinate System: NAD 1983 StatePlane Maryland FIPS 1900 Feet
Projection: Lambert Conformal Conic

0 1,250 2,500 5,000 7,500 10,000 12,500 Feet

N

Figure 6: Historical Map, 1861

Rehabilitation of Bridge No. P-0599 on
Governor Bridge Road over the Patuxent River
Prince George's and Anne Arundel Counties, Maryland

May 2018

APPENDIX B

MARYLAND INVENTORY OF HISTORIC PROPERTIES
ARCHEOLOGICAL SITE SURVEY: BASIC DATA FORM

MARYLAND INVENTORY OF HISTORIC PROPERTIES

ARCHEOLOGICAL SITE SURVEY: BASIC DATA FORM

Date Filed: ___________

Check if update: ☐

Maryland Department of Planning

Maryland Historical Trust

Division of Historical and Cultural Programs

100 Community Place

Crownsville, Maryland 21032

Site Number: 18AN____
County: Anne Arundel

A. DESIGNATION

1. Site Name: Pit Site

2. Alternate Site Name/Numbers: ______________

3. Site Type (describe site chronology and function; see instructions):
   Late 19th to 20th century artifact scatter

4. Prehistoric ______ Historic X Unknown _____

5. Terrestrial X Submerged/Underwater _______ Both ________

B. LOCATION

6. USGS 7.5' Quadrangle(s): Bowie 2013 | (For underwater sites) NOAA Chart No.:

(Photocopy section of quad or chart on page 4 and mark site location)

Latitude in decimal degrees 38.952313 Longitude in decimal degrees -76.691865

7. Maryland Archeological Research Unit Number: 8

8. Physiographic Province (check one):
   - _______ Allegany Plateau
   - _______ Ridge and Valley
   - _______ Great Valley
   - _______ Blue Ridge
   - _______ Lancaster/Frederick Lowland
   - _______ Eastern Piedmont
   - X Western Shore Coastal Plain
   - _______ Eastern Shore Coastal Plain

9. Major Watershed/Underwater Zone (see instructions for map and list): Patuxent River

C. ENVIRONMENTAL DATA

10. Nearest Water Source: unnamed tributary of Patuxent River Stream Order: ______

11. Closest Surface Water Type (check all applicable):
    - _______ Ocean
    - _______ Estuarine Bay/Tidal River
    - _______ Tidal or Marsh
    - X Freshwater Stream/River
    - _______ Freshwater Swamp
    - X Lake or Pond
    - _______ Spring

12. Distance from closest surface water: 32 meters (or 105 feet)

C. ENVIRONMENTAL DATA [CONTINUED]

13. Current water speed: _____ knots   14. Water Depth: _____ meters

15. Water visibility: _______________

16. SCS Soils Typology and/or Sediment Type: _WBA____

17. Topographic Settings (check all applicable):

_______ Floodplain
_______ Interior Flat
_______ Terrace
_______ Low Terrace
____X__ High Terrace
_______ Hillslope
_______ Hilltop/Bluff
_______ Upland Flat
_______ Ridgetop
_______ Rockshelter/Cave
_______ Unknown
_______ Other: _____________

18. Slope: _0 to 2%__

19. Elevation: _10_ meters (or __34_ feet) above sea level

20. Land use at site when last field checked (check all applicable):

_______ Plowed/Tilled
_______ No-Till
_X_____ Wooded/Forested
_______ Logging/Logged
_______ Underbrush/Overgrown
_______ Pasture
_______ Cemetery
_______ Commercial
_______ Educational
___X___ Extractive
_______ Military
_______ Recreational
_______ Residential
_______ Ruin
_______ Standing Structure
_______ Transportation
_______ Unknown
_______ Other: _____________

21. Condition of site:

____X__ Disturbed
_______ Undisturbed
_______ Unknown

22. Cause of disturbance/destruction (check all applicable):

_______ Plowed
_______ Eroded/Eroding
_X_____ Graded/Contoured
_______ Collected
_______ Vandalized/Looted
_______ Dredged
_______ Heavy Marine Traffic
___X___ Other: ___Gravel borrow__________

23. Extent of disturbance:

_______ Minor (0-10%)
_______ Moderate (10-60%)
____X__ Major (60-99%)
_______ Total (100%)
_______ % unknown

C. ENVIRONMENTAL DATA [CONTINUED]

24. Describe site setting with respect to local natural and cultural landmarks (topography, hydrology, fences, structures, roads). Use continuation sheet if needed.

The site is located on a narrow, well-drained flat terrace setting overlooking the Patuxent River floodplain. A steep slope forms the northwestern boundary of the terrace and delineates the topographic transition to the floodplain. To the south, the setting exhibits numerous pools of standing water, small streams, ditches and generally boggy conditions. In addition, several large spoils piles dot the setting within the quadrant. In several locales these spoils piles appear to be associated with excavation of the ditches and streams, or construction of the extant roadway. Governors Bridge Road separates the well-drained setting from the poorly drained conditions further to the south. A mix of auto parts, household debris, and other trash was observed in association with the pits and push piles within the site. To the southwest of the site, a road cut leads north from the extant roadway and down to the floodplain. The terrace narrows towards the southwest, eventually tapering into the extant roadway approximately 91.4 m (300 ft) east of the river. The setting transitions to a wooded poorly drained floodplain with numerous pools of standing water and evidence of scour.

25. Characterize site stratigraphy. Include a representative profile on separate sheet, if applicable. Address plowzone (presence/absence), subplowzone features and levels, if any, and how stratigraphy affects site integrity. Use continuation sheet if needed.

Site stratigraphy consists of a 20 centimeter-thick (7.9 in) dark grayish brown (10YR 4/2) sandy loam over a brownish yellow (10YR 6/8) sandy clay loam B-horizon.

26. Site size: __35_ meters by 10___ meters (or 114.8 feet by 32.8 feet)

27. Draw a sketch map of the site and immediate environs, here or on separate sheet:

Scale: North arrow:

Photocopy section of quadrangle map(s) and mark site location with heavy dot or circle and arrow pointing to it.

D. CONTEXT

28. Cultural Affiliation (check all applicable):

PREHISTORIC
_______ Unknown
_______ Paleoindian
_______ Archaic
_______ Early Archaic
_______ Middle Archaic
_______ Late Archaic
_______ Terminal Archaic
_______ Woodland
_______ Adena
_______ Early Woodland
_______ Middle Woodland
_______ Late Woodland

_______ CONTACT

HISTORIC:
_______ Unknown
17th century
_______ 1630-1675
_______ 1676-1720
18th century
_______ 1721-1780
_______ 1781-1820
19th century
_______ 1821-1860
___X___ 1861-1900
20th century
___X___ 1901-1930
___X___ post-1930

____ UNKNOWN

E. INVESTIGATIVE DATA

29. Type of investigation:
____X__ Phase I
_______ Phase II/Site Testing
_______ Phase III/Excavation
_______ Archival Investigation
_______ Monitoring
_______ Field Visit
_______ Collection/Artifact Inventory
_______ Report From Informant
_______ Other:
____

30. Purpose of investigation:
____X__ Compliance
_______ Research
_______ Avocational
_______ Regional Survey
_______ Site Inventory
_______ MHT Grant Project
_______ Other:
____

31. Method of sampling (check all applicable):
____X__ Non-systematic surface search
_______ Systematic surface collection
_______ Non-systematic shovel test pits
__X____ Systematic shovel test pits
_______ Excavation units
_______ Mechanical excavation
_______ Remote sensing
_______ Other:
____

32. Extent/nature of excavation: __Two, 45 cm wide by 40 cm deep STPs, screened (1/4" mesh), at 15 m intervals

F. SUPPORT DATA

33. Accompanying Data Form(s):
_________ Prehistoric
___X_____ Historic
_________ Shipwreck

34. Ownership: _______ Private ________ Federal _____X__ State ________ Local/County
_______ Unknown

35. Owner(s): Maryland-National Capital Park and Planning Commission
Address: 6600 Kenilworth Avenue, Riverdale, MD 20737
Phone: 301-699-2255
Email: ________

36. Tenant and/or Local Contact: ________
Address: ________
Phone: ________
Email: ________

37. Other Known Investigations: Quad file 6, Anne Arundel County, Bowie Quad

38. Primary report reference or citation: Kodlick, Marcia M., Emory, Scott A, and Vicari, Gabrielle, 2018 *Phase I Archaeological Survey for the Rehabilitation of Bridge No. P-0599 on Governor Bridge Road over the Patuxent River, Prince George's and Anne Arundel Counties, Maryland*

39. Other Records (e.g. slides, photos, original field maps/notes, sonar, magnetic record)?
_______ Slides
___X___ Photos
___X___ Field maps
___X___ Field record
______ Sonar
______ Magnetic record
______ Other: _____

40. If yes, location of records: Lotus Environmental,

41. Collections at Maryland Archeological Conservation (MAC) Lab or to be deposited at MAC Lab?
___X___ Yes
_______ No
_______ Unknown

42. If NO or UNKNOWN, give owner: ______
location: ________
and brief description of collection: ________

43. Informant: ________
Address: ________
Phone: ________
Email: ________

44. Site visited by Scott Emory
Company/Group name: Lotus Environmental
Address: 487 Devon park Drive, Suite 219, Wayne, PA. 19087
Phone: 610-605-3104
Email: semory104@yahoo.com Date: 3/14/18

45. Form filled out by: Scott Emory
Company/Group name: Lotus Environmental
Address: 487 Devon Park Drive, Suite 219, Wayne, PA. 19087
Phone: 610-605-3104
Email: semory104@yahoo.com Date: 4/9/18

46. Site Summary/Additional Comments (append additional pages if needed):

The Pit Site (18ANXXX) represents a scatter of 19th and 20th century domestic refuse, auto parts, and other roadside debris deposited in the northeastern quadrant of the APE. Contemporaneous bottle and vessel glass fragments, brick fragments, auto parts, and ironstone sherds were noted along the edge of a borrow pit situated just outside of the APE, suggesting that the artifacts in the two test pits are part of a larger artifact scatter located within the flat setting. A mill foundation is reported in this location but the quad file information is limited as to what type of foundation. No intact building stone, brick or other structural material was observed in the pit, and only a few fragments of brick were observed scattered around the area. Given the location of the pit on the edge of a steep slope roughly 12 m (39.3 ft) above the floodplain, it is unlikely this feature represents a mill foundation. The 1861 Martenent Prince George's County map depicts a grist mill on the north side of the road. However, comparison of the road track on the 1861 map to the current road suggests that mill would have been located further to the northeast on the north side of the road bend. Because of its poor integrity, ubiquitous nature, and the limited research potential, the Pit Site does not provide new information in history. No further archeological investigation is recommended for this site.

MARYLAND ARCHEOLOGICAL SITE SURVEY: HISTORIC DATA FORM

Site Number 18_AN_____

1. Site class (check all applicable, check at least one from each group):

a.
- __X__ domestic
- ______ industrial
- __X__ transportation
- ______ military
- ______ sepulchre
- ______ religious
- ______ commercial
- ______ educational
- ______ non-domestic agricultural
- ______ unknown
- ______ other: ________________________

b.
- ______ urban
- __X__ rural
- ______ unknown

c. standing structure:
- ______ yes
- __X__ no
- ______ unknown

d. above-grade/visible ruin:
- ______ yes
- __X__ no
- ______ unknown

2. Site Type (check all applicable):
- __X__ artifact concentration
- ______ possible structure
- ______ post-in-ground structure
- ______ frame structure
- ______ masonry structure
- ______ log structure
- ______ farmstead
- ______ plantation
- ______ townsite
- ______ road/railroad
- ______ wharf/landing
- ______ bridge
- ______ ford
- ______ mill (specify:____________________)
- ______ raceway
- ______ quarry
- ______ furnace/forge
- ______ other industrial (specify): ________________________
- ______ battlefield
- ______ military fortification
- ______ military encampment
- ______ cemetery
- ______ unknown
- ______ other:________________________

3. Ethnic Association:
- ______ Native American
- ______ African American
- ______ Angloamerican
- ______ Hispanic American
- ______ Asian American
- ______ other Euroamerican (specify): ________________________
- __X__ unknown
- ______ other: ________________________

4. Categories of material remains present (check all applicable):
- __X__ ceramics
- __X__ bottle/table glass
- ______ other kitchen artifacts
- __X__ architecture
- ______ furniture
- ______ arms
- ______ clothing
- ______ personal items
- ______ tobacco pipes
- ______ activity items
- ______ human skeletal remains
- ______ faunal remains
- ______ floral remains
- ______ organic remains
- ______ unknown
- __X__ other: auto parts

5. Diagnostics (choose from manual and give number recorded or observed):

Cut nail, 1

6. Features present:
   ______yes
   __X__no
   ______unknown

7. Types of features present:

_____ construction feature	_____ road/drive/walkway
_____ foundation	_____ depression/mound
_____ cellar hole/storage cellar	_____ burial
_____ hearth/chimney base	_____ railroad bed
_____ posthole/postmold	_____ earthworks
_____ paling ditch/fence	_____ raceway
_____ privy	_____ wheel pit
_____ well/cistern	_____ unknown
_____ trash pit/dump	_____ other:
_____ sheet midden	__________________
_____ planting feature	

8. Flotation samples collected:
   _____ yes
   __X__ no
   _____ unknown

   analyzed:
   _____ yes, by ____________
   __X__ no
   _____ unknown

9. Soil samples collected:
   _____ yes
   __X__ no
   _____ unknown

   analyzed:
   _____ yes, by ____________
   __X__ no
   _____ unknown

10. Other analyses (specify):________________________
____
____
____

11. Additional comments:

Site 18ANXXX represents a scatter of 19th and 20th century domestic refuse, architectural debris, auto parts, and roadside debris recovered within the A-horizon and surface around a small borrow pit. The 1860 and 1861 Martenet maps show two structures along the Patuxent River on the north and south side of ancestral Governor Bridge Road, with one additional structure associated with a post office located to the east/southeast of the study area. The 19th century artifacts in the collection, including the ironstone and cut nail, as well as the machine-made medicine bottle and mason jar fragments observed around the pit, all represent general domestic classes of artifacts that would likely be found in these residences. However, given the absence of any cultural features within the quadrant, as well as the recovery of the artifacts within the A-horizon, these artifacts are interpreted as general household refuse disposal from these nearby dwellings dispersed across the setting by ground disturbance associated with the borrow pit excavation. No patterns by artifact class or count were observed to indicate the presence of intact deposits or features within the site.

12. Form filled out by: Scott Emory
    Address/Company: Lotus Environmental, 487 Devon Park Drive, Suite 219, Wayne, PA. 19087
    Date: April 9, 2018

APPENDIX C

Marcia M. Kodlick, MA, RPA

Principal Investigator

Resume

Please include a brief resume of key persons within your firm: ***(Note:*** *Please use the "copy and paste" capabilities of your word processing program to duplicate this template for each resume included with the submission)*

Resume # 5

Name **Marcia Kodlick** **Title** Principal Investigator/Senior Proj. Mgr.

Primary Responsibilities

Phase I/II/III Archaeology, Section 106 Coordination, Public Outreach

Years Experience: **With This Firm** **7** **With Other Firms** **23**

Education

Institution	Degree(s)	Year	Specialization
Hood College	**BS Art & Design**	**1986**	**Art History**
West Virginia University	**MA**	**1990**	**Art History & Anthropology**

Active Registration

Year first registered **2000**

Disciplines **Registered Professional Archaeologist**

Other Experience and Qualifications

Ms. Kodlick is a Registered Professional Archaeologist (RPA) with 30 years of experience as a consultant in cultural resource management. She has served clients in both public and private sectors throughout the Mid-Atlantic region. She specializes in National Historic Preservation Act (NHPA), Section 106 and National Environmental Policy Act (NEPA) compliance issues. Ms. Kodlick has extensive experience in public involvement coordination, resource agency coordination, Tribal coordination, and in the design, implementation, and management of Phase I Identification Surveys, Phase II Significance Evaluations, and Phase III Data Recovery excavations for archaeological investigations, and historic structure surveys and inventories. She is also experienced in providing the technical basis for, authoring, and the quality assurance/quality control (QA/QC) review of Environmental Impact Statements (EISs), Environmental Assessments (EAs), Categorical Exclusion Evaluations (CEEs), and resource specific research and documentation. Ms. Kodlick's project experience includes:

E03370, S.R. 0248 Realignment, Northampton County, PA, PennDOT District 5-0. Ms. Kodlick served as the Team's Principal Investigator/Archaeologist for the tasks associated with the proposed roadway improvements within Bath Borough. Responsibilities included geomorphological and archaeological investigations.

E03038, WO3, S.R. 0425, Sec 011, York County, PA, PennDOT District 8-0. Principal and Lead Investigator for archaeology investigations associated with the rehabilitation of the S.R. 0425 bridge over Muddy Creek in Lower Chanceford, Fawn, and Peach Bottom Townships, York County, PA.

E02931, Part 10, S.R. 0248, Section 07B, Bridge Replacement Project, Northampton County, PennDOT District 5-0. Principal Investigator for the proposed bridge replacement project over East Branch Monocacy Creek. Responsible for conducting the Phase I archaeology study.

Total Reconstruction, MP A48-A53, Lehigh County, PA, Pennsylvania Turnpike Commission. Principal Investigator and Lead Archaeologist for the 5-mile section of corridor improvements. Responsible for the development of the Area of Potential Effect documentation and for the Phase IA Archaeological Investigation.

PEN to OFX Pipeline Project, Ritchie and Doddridge Counties, WV, ARM Group, Inc. Principal Investigator for the proposed 14.5-mile pipeline corridor in southern West Virginia. Responsible for conducting Phase I archaeological investigations at 74 US Army Corps of Engineers permit areas within the pipeline corridor.

E02747, S.R. 0209/S.R. 0115 Intersection Improvements Project, Monroe County, PA, PennDOT District 5-0. Ms. Kodlick served as the Team's Principal Investigator/Archaeologist for the tasks associated with the proposed roadway improvements to the Route 209 and Route 115 intersections. Tasks included the completion of Phase IA and IB archaeological investigations.

E02152, Tuckerton Road and S.R. 0061 Intersection Improvements, Berks County, PA, PennDOT District 5-0. Ms. Kodlick served as the Team's Principal Investigator/Archaeologist for the tasks associated with the proposed roadway improvements to the Route 61 and Tuckerton Road intersections. Responsible for the three areas that are under investigation as part of the Phase I Archeological Survey.

County of Lackawanna Transit System (COLTS) Operations Facility Expansion and Renovations, Scranton, PA, PennDOT Bureau of Public Transportation. Principal Investigator for the archaeological investigation required for the renovations to their maintenance facilities and the installation of a CNG filling station. The facility is comprised of a one-story bus storage garage and office building and a one-story bus wash building. The land cover consists of macadam parking areas, storm water retention basin, grass lawn, and scrub-shrub woodlands. The proposed acquisition parcel (the Bolus property) is an unimproved graveled lot which is used to store trailers and frames. Also, responsible for coordination with the SHPO.

Delaware River Trail, Philadelphia, PA, Delaware River Waterfront Corporation. Principal Investigator for the proposed multi-use trail along the Delaware River from Pier 70 to Penn Treaty Park. Responsible for identifying the potential for below ground archaeological features and limits of previously disturbed ground. Also, responsible for effects determination and coordination with the SHPO.

E02937, US Route 202 Intersections (S.R. 926 and US 1 Loop Roads), Chester and Delaware Counties, PA, PennDOT District 6-0. Principal Investigator responsible for conducting the Phase I Archaeological Survey for the S.R. 926 and US Route 1 Intersection Improvements. Assisting with coordination with the National Park Service and PHMC regarding the project effect on the Brandywine Battlefield.

Design Management Contract, Statewide Total Reconstruction, PA Turnpike Commission. Responsible for providing management and oversight on behalf of PTC on five sections of Total Reconstruction projects with a focus on Section 106, Section 4(f), and archaeological reviews and guidance.

E03797, Bristol Road (S.R. 2025, Section 002) Extension Project, Montgomery County, PA, PennDOT District 6-0. Lead Archaeologist for the alternatives analysis associated with the Bristol Road Extension project. The project is intended to enhance the Chalfont street network by providing additional connections and or relieve local congestion between US 202 and portions of Chalfont Borough, New Britain Borough, New Britain Township and Doylestown Township.

E02960 Monroe County Bridge Agreement No. 2, Part 10 SR 3010 over Pohopoco Creek, PennDOT District 5-0. Lead Archaeologist responsible for the geomorphological and archaeological investigations for the proposed replacement of the S.R. 3010 (Mill Pond Road) Bridge in Polk Township, Monroe County, PA.

E03609, Open End Environmental Contract, Oley Township Historic District, Berks County, PA, PennDOT District 5-0. Historian responsible for conducting research and field surveys to identify twentieth-century agricultural trends and resources to prepare supplemental documentation for the two rural historic districts.

Rehabilitation of Governor Bridge Road Bridge (P-0599) over Patuxent River

Appendix 15.5: Alternative Concepts

KCI Technologies, Inc.
936 Ridgebrook Road
Sparks, MD 21152

REHABILITATION OF GOVERNOR BRIDGE ROAD BRIDGE (P-0599)

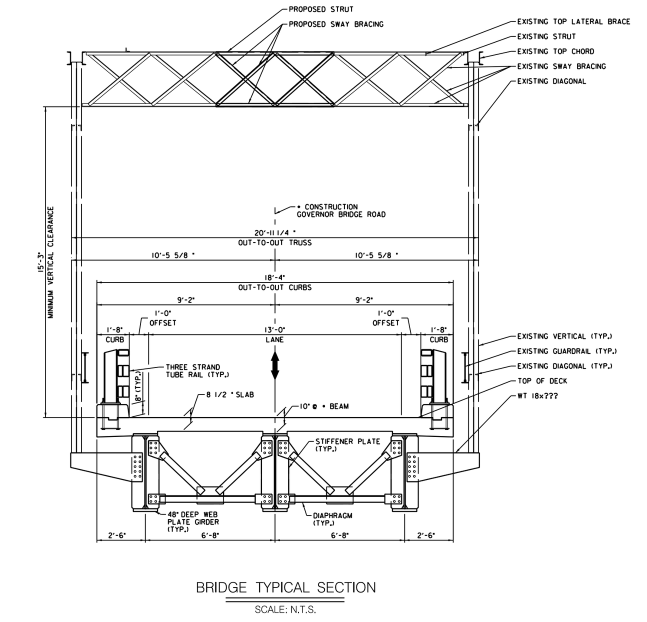
ON GOVERNORS BRIDGE ROAD OVER PATUXENT RIVER

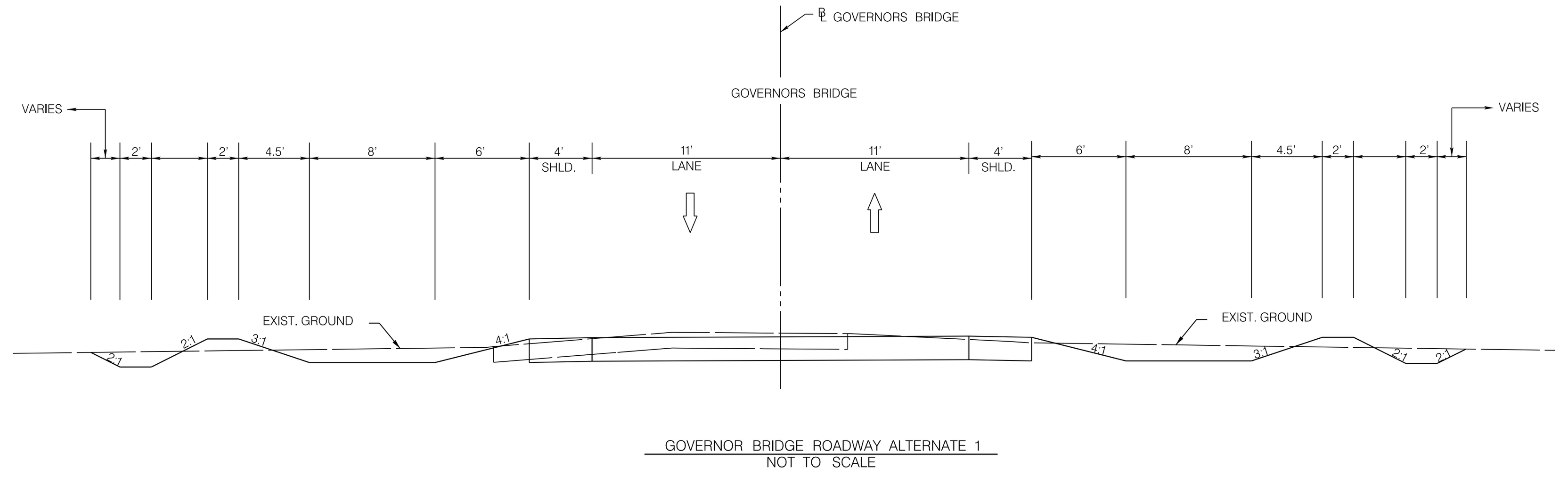
ALTERNATE 3 - EXISTING ALIGNMENT - 1 LANE BRIDGE OPTION

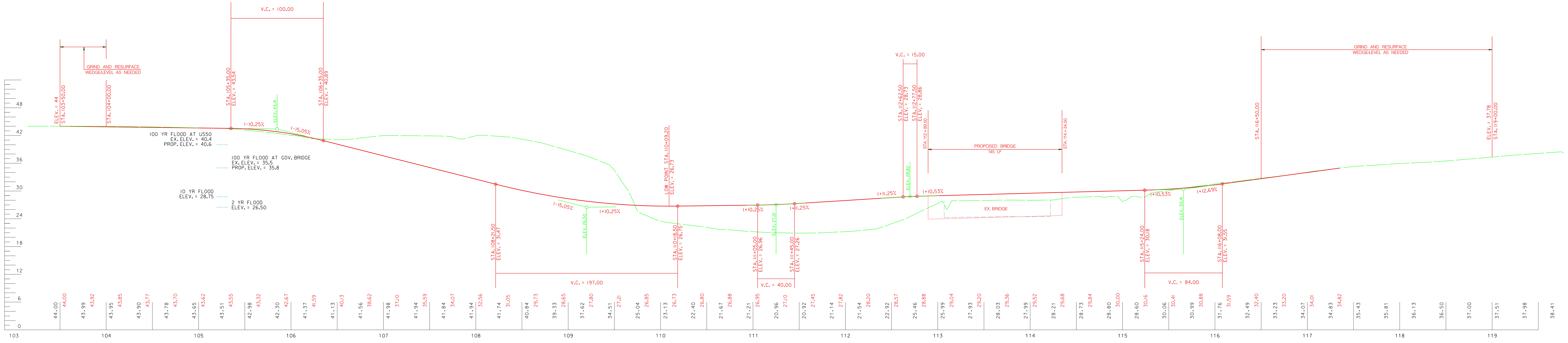
County Executive Rushern L. Baker, III

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

Director Darrell B. Mobley







Prince George's County Maryland

REHABILITATION OF GOVERNOR BRIDGE ROAD BRIDGE (P-0599)

ON GOVERNORS BRIDGE ROAD OVER PATUXENT RIVER

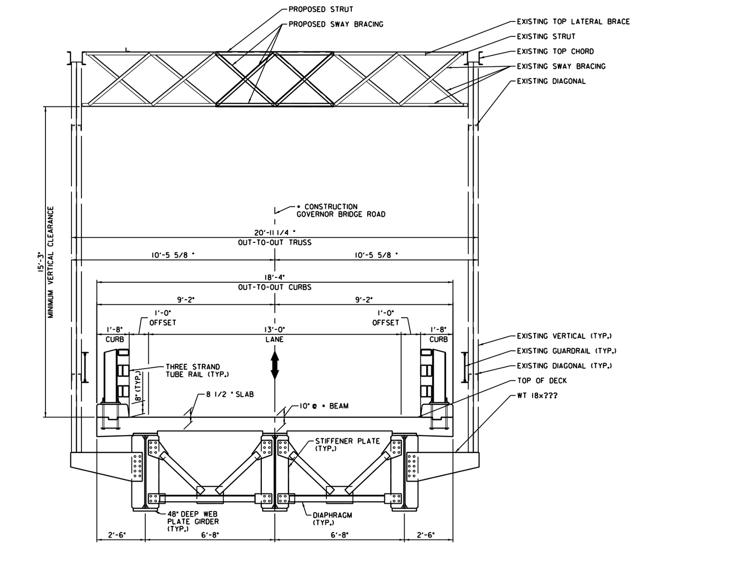
ALTERNATE 3 - EXISTING ALIGNMENT - 1 LANE BRIDGE OPTION

DPW&T

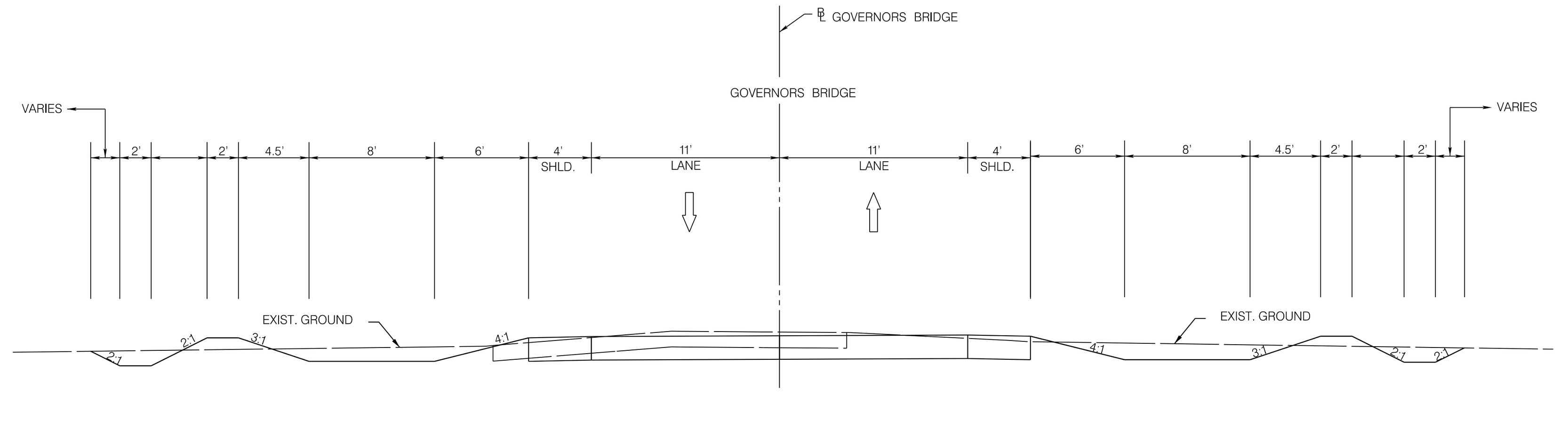
County Executive Rushern L. Baker, III

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

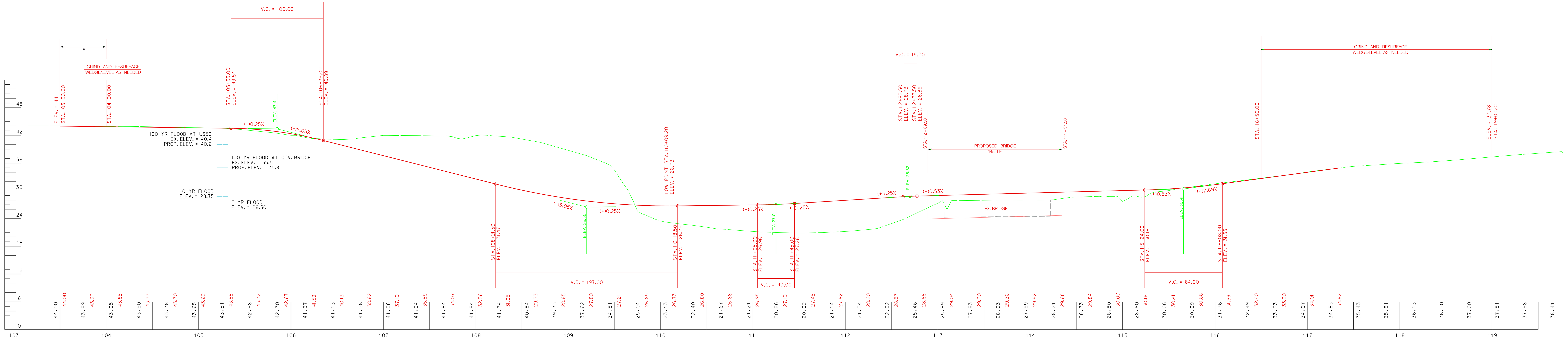
Director Darrell B. Mobley



BRIDGE TYPICAL SECTION



GOVERNOR BRIDGE ROADWAY ALTERNATE 1
NOT TO SCALE



REHABILITATION OF GOVERNOR BRIDGE ROAD BRIDGE (P-0599)

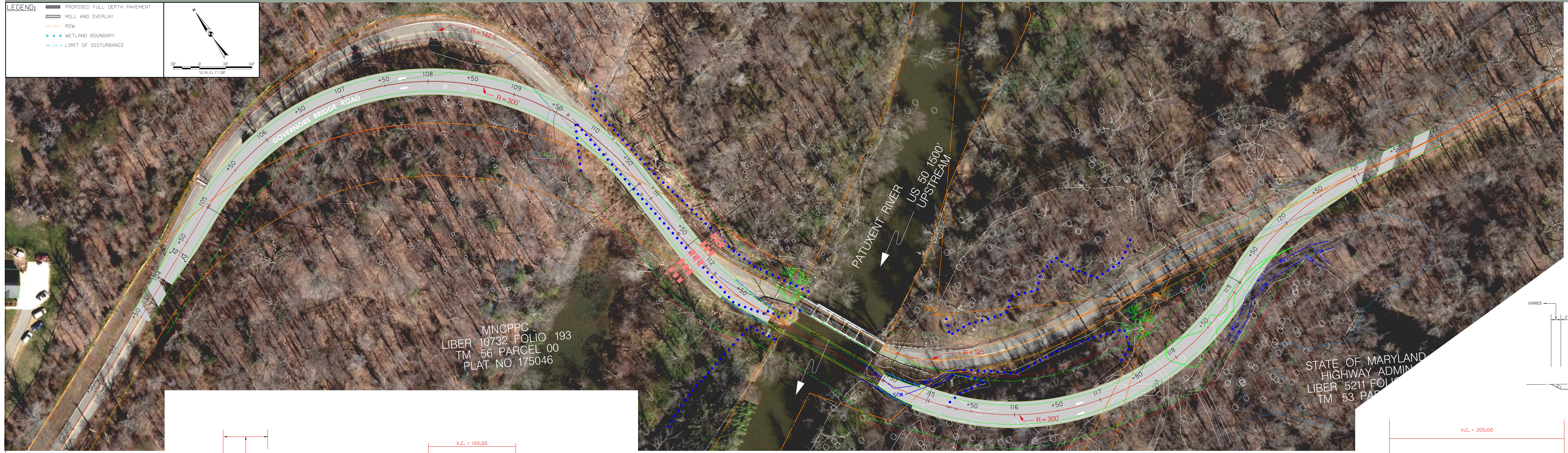
ON GOVERNORS BRIDGE ROAD OVER PATUXENT RIVER

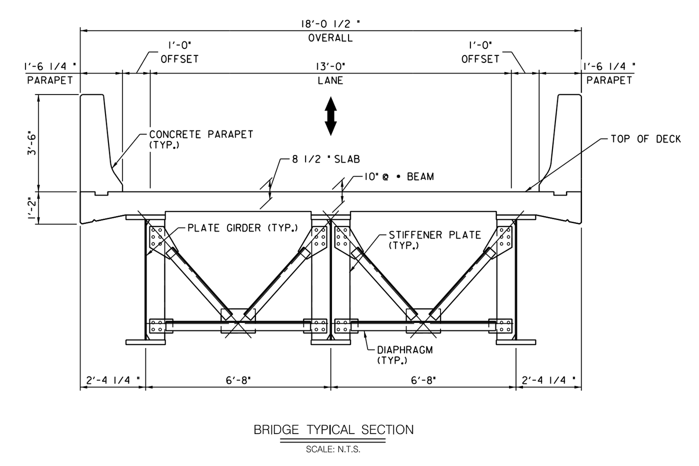
ALTERNATE 5 - SHIFTED ALIGNMENT - 1 LANE BRIDGE OPTION

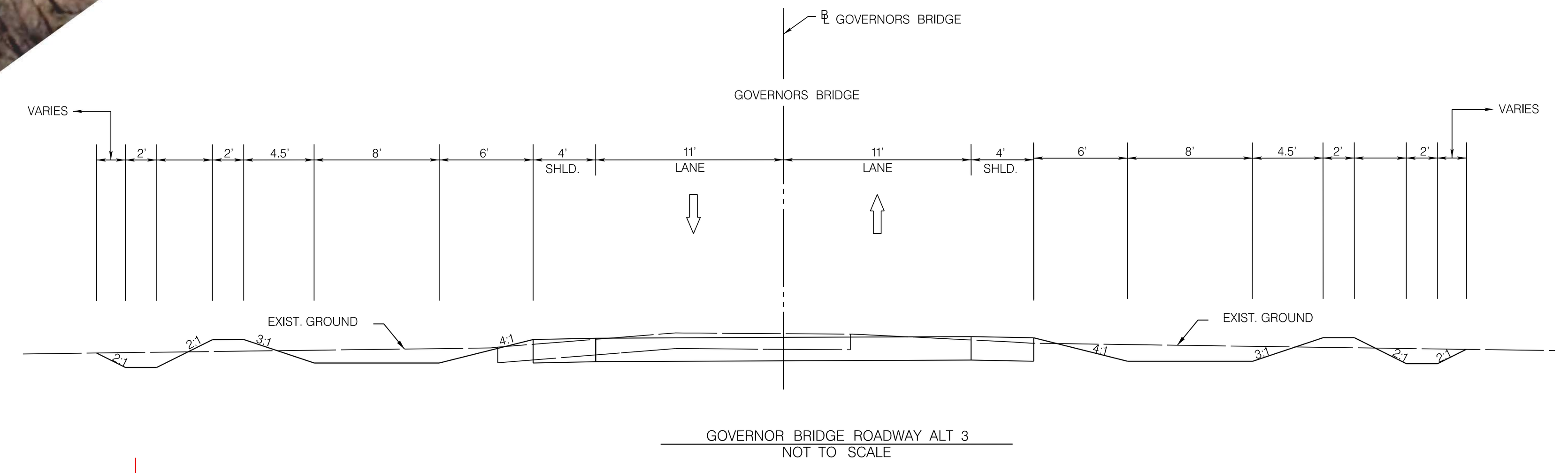
County Executive Rushern L. Baker, III

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

Director Darrell B. Mobley







REHABILITATION OF GOVERNOR BRIDGE ROAD BRIDGE (P-0599)

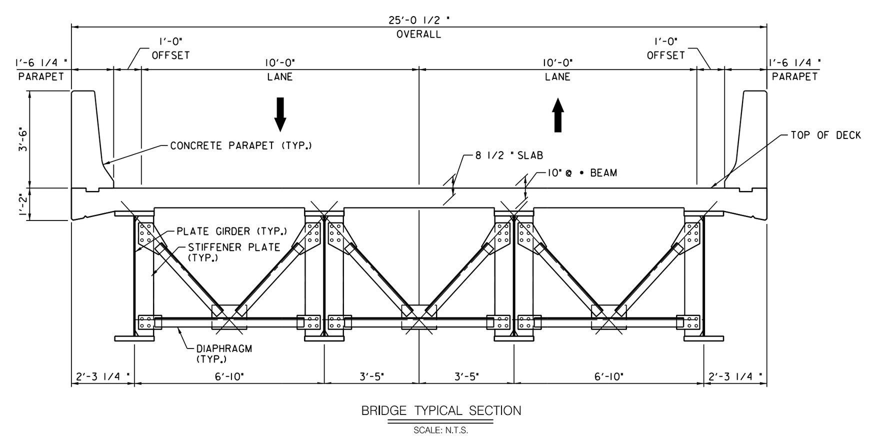
ON GOVERNORS BRIDGE ROAD OVER PATUXENT RIVER

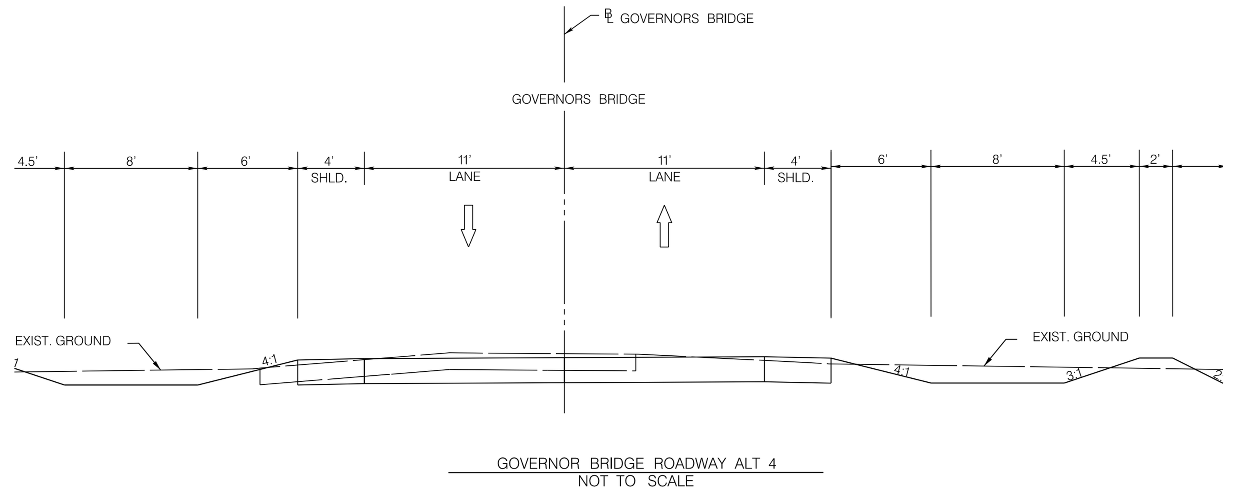
ALTERNATE 6 - SHIFTED ALIGNMENT - 2 LANE BRIDGE OPTION

County Executive Rushern L. Baker, III

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

Director Darrell B. Mobley





Rehabilitation of Governor Bridge Road Bridge (P-0599) over Patuxent River

Appendix 15.6: Alternative Cost Estimates

KCI Technologies, Inc.
936 Ridgebrook Road
Sparks, MD 21152

KCI TECHNOLOGIES, INC.

QUANTITY AND COST BREAKDOWN — Job Order No.: 23100466.57

Project: **Governor's Bridge Road - Alternative 2 - Minimization**

Client: Prince George's County

Type of Estimate: Concept Development Phase

Date of Estimate: June 2018

	Date	BY
COMPUTED:		
CHECKED:		

ITEM NO.	CAT. CODE	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1000		PRELIMINARY				
1001		Category 1 (35% of Categories 2,4,5, & 6)	LS	1	$ 300,000.00	$ 300,000.00
		Preliminary Total				**$ 300,000.00**
2000		GRADING				
		Grading Total				**$ -**
3000		DRAINAGE				
3001		Category 3 (For Sidewalk 40% of Categories 2,4,5,& 6)	LS	1	$ 250,000.00	$ 250,000.00
3002		6 Inch Perforated Circular Pipe Longitudinal Underdrain	LF		$ 14.00	$ -
		Drainage Total				**$ 250,000.00**
4000		STRUCTURES				
4001		Fabricated Structural Steel	LS	1	$ 600,000.00	$ 600,000.00
4002		Cleaning and Painting Bridge No.	LS	1	$ 200,000.00	$ 200,000.00
		Structures Total				**$ 800,000.00**
5000		PAVING				
5001		Superpave HMA Superpave 12.5mm for Wedge/Level, PG64-22	TON		$ 110.00	$ -
5002		Superpave HMA Superpave 12.5mm for 2" Surface, PG64-22	TON	100	$ 100.00	$ 10,000.00
5003		Superpave HMA Superpave 12.5mm for 2" Intermediate Surface, PG64-22	TON	500	$ 125.00	$ 62,500.00
5003		Superpave HMA Superpave 19.0mm for 3" Base, PG64-22	SY	300	$ 120.00	$ 36,000.00
5004		6 Inch Graded Aggregate Subbase (GASB) Course	SY	1,000	$ 15.00	$ 15,000.00
		Paving Total				**$ 123,500.00**
6000		SHOULDERS				
6001		Detectable Warning Surface for Curb Ramp	SF		$ 30.00	$ -
6002		Type C Endtreatment	EA	4	$ 3,000.00	$ 12,000.00
6003		Traffic Barrier Thrie Beam Anchorage at Bridge End Post	EA	4	$ 4,000.00	$ 16,000.00
		Shoulder Total				**$ 28,000.00**
7000		LANDSCAPING				
7001		Landscaping (5% of Categories 2,4,5, & 6)	LS	1	$ 30,000.00	$ 30,000.00
		Landscaping Total				**$ 30,000.00**
8000		TRAFFIC				
		Traffic Total				**$0.00**
9000		UTILITIES				
9001		Utility Pole Relocation - 3 Phase Primary Poles	EA	0	$ 20,000.00	$ -
9001		Utility Infrastructure Maintenance - Administrative Fee	LS	0	$ 5,000.00	$ -
						$0.00

Preliminary	*$ 300,000.00*
Grading	*$ -*
Drainage	*$ 250,000.00*
Structures	*$ 800,000.00*
Paving	*$ 123,500.00*
Shoulders	*$ 28,000.00*
Landscaping	*$ 30,000.00*
Traffic	*$ -*
Utilities	*$ -*
SUBTOTAL	$ 1,531,500.00
30% CONTINGENCY	$ 459,450.00
	$ -
TOTAL ROADWAY COSTS	**$ 1,990,950.00**

KCI TECHNOLOGIES, INC.

QUANTITY AND COST BREAKDOWN

Job Order No.: 23100466.57

Project: **Governor's Bridge Road - Alternative 3 - Existing Alignment - 1 Lane Bridge**

Client: Prince George's County

Type of Estimate: Concept Development Phase

Date of Estimate: June 2018

	Date	BY
COMPUTED:		
CHECKED:		

ITEM NO.	CAT. CODE	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1000		PRELIMINARY				
1001		Category 1 (35% of Categories 2,4,5, & 6)	LS	1	$ 710,000.00	$ 710,000.00
		Preliminary Total				**$ 710,000.00**
2000		GRADING				
2001		Class 2 Excavation	CY	10,350	$ 40.00	$ 414,000.00
2002		Common Borrow	CY	4,555	$ 35.00	$ 159,425.00
2003		Saw Cut	LF	200	$ 3.00	$ 600.00
		Grading Total				**$ 574,025.00**
3000		DRAINAGE				
3001		Category 3 (35% of Categories 2,4,5,& 6)	LS	1	$ 710,000.00	$ 710,000.00
3002		6 Inch Perforated Circular Pipe Longitudinal Underdrain	LF	2000	$ 14.00	$ 28,000.00
		Drainage Total				**$ 738,000.00**
4000		STRUCTURES				
4001		Maintenance of Stream Flow	LS	1	$ 50,000.00	$ 50,000.00
4002		Removal of Portions of Existing Structure	LS	1	$ 57,600.00	$ 57,600.00
4003		Class 3 Excavation	CY	340	$ 75.00	$ 25,500.00
4004		Dynamic Pile Monitoring	EA	2	$ 3,000.00	$ 6,000.00
4005		Capwap	EA	2	$ 1,000.00	$ 2,000.00
4006		Steel HP 14 x 89 Bearing Piles	LF	600	$ 100.00	$ 60,000.00
4007		Steel HP 14 x 89 Bearing Test Piles	LF	40	$ 150.00	$ 6,000.00
4008		Footing Concrete	CY	152	$ 800.00	$ 121,600.00
4009		Substructure Concrete for Bridge	LS	1	$ 153,200.00	$ 153,200.00
4010		Superstructure Concrete for Bridge	LS	1	$ 106,500.00	$ 106,500.00
4011		Concrete Parapet	LS	1	$ 28,000.00	$ 28,000.00
4012		Three Strand Structural Tube Railing	LS	1	$ 27,400.00	$ 27,400.00
4013		Approach Slab and Sleeper Slab	LS	1	$ 76,000.00	$ 76,000.00
4014		Linseed Oil Protective Coating Bridge No.	SY	280	$ 4.00	$ 1,120.00
4015		Epoxy Steel for Superstructure	LS	1	$ 35,500.00	$ 35,500.00
4016		Fabricated Structural Steel	LS	1	$ 500,000.00	$ 500,000.00
4017		Steel Stud Shear Developers	LS	1	$ 3,000.00	$ 3,000.00
4018		Epoxy Protective Coating on Abutments	LS	1	$ 3,600.00	$ 3,600.00
4019		Riprap Slope Protection for Bridge	SY	149	$ 35.00	$ 5,215.00
4020		Bottom Cutoff Walls for Riprap Slope Protection	LF	50	$ 20.00	$ 1,000.00
4021		Side Cutoff Walls for Riprap Slope Protection	LF	80	$ 20.00	$ 1,600.00
4022		Truss Retention	LS	1	$ 250,000.00	$ 250,000.00
		Structures Total				**$ 1,520,835.00**
5000		PAVING				
5001		Superpave HMA Superpave 12.5mm for Wedge/Level, PG64-22	TON	25	$ 110.00	$ 2,750.00
5002		Superpave HMA Superpave 12.5mm for 2" Surface, PG64-22	TON	550	$ 100.00	$ 55,000.00
5003		Superpave HMA Superpave 12.5mm for 2" Intermediate Surface, PG64-22	TON	500	$ 125.00	$ 62,500.00
5003		Superpave HMA Superpave 19.0mm for 3" Base, PG64-22	TON	700	$ 120.00	$ 84,000.00
5004		6 Inch Graded Aggregate Subbase (GASB) Course	SY	4,000	$ 15.00	$ 60,000.00
5004		Grinding HMA Pavement 0"-2"	SY	500	$ 3.00	$ 1,500.00
5005		Thermo Plastic White Pavement Marking, 5 Inch	LF	3,900	$ 3.00	$ 11,700.00
5005		Thermo Plastic Yellow Pavement Marking, 5 Inch	LF	3,900	$ 3.00	$ 11,700.00
5006		Thermoplastic Stop Bar, 24 Inch	LF	24	$ 6.00	$ 144.00
		Paving Total				**$ 289,294.00**
6000		SHOULDERS				
6001		TYPE C ENDTREATMENT	EA	4	$ 3,000.00	$ 12,000.00
6002		TRAFFIC BARRIER THRIE BEAM ANCHORAGE AT BRIDGE END POST	EA	4	$ 4,000.00	$ 16,000.00
		Shoulder Total				**$ 28,000.00**
7000		LANDSCAPING				
7001		DPW&T Street Tree	EA		$ 250.00	$ -
7002		Landscaping (5% of Categories 2,4,5, & 6)	LS	1	$ 100,000.00	$ 100,000.00
		Landscaping Total				**$ 100,000.00**
8000		TRAFFIC				
8001		Sheet Aluminum Sign	LS	1	$ 5,000.00	$ 5,000.00
		Traffic Total				**$5,000.00**
9000		UTILITIES				
9001		Utility Pole Relocation	EA	11	$ 20,000.00	$ 220,000.00
9001		Utility Infrastructure Maintenance - Administrative Fee	LS	1	$ 5,000.00	$ 5,000.00
						$225,000.00

Preliminary	*$ 710,000.00*
Grading	*$ 574,025.00*
Drainage	*$ 738,000.00*
Structures	*$ 1,520,835.00*
Paving	*$ 289,294.00*
Shoulders	*$ 28,000.00*
Landscaping	*$ 100,000.00*
Traffic	*$ 5,000.00*
Utilities	*$ 225,000.00*
SUBTOTAL	$ 4,190,154.00
30% CONTINGENCY	$ 1,257,046.20
TOTAL ROADWAY COSTS	**$ 5,447,200.20**

This cost estimate does not include Right of Way or P/E.

KCI TECHNOLOGIES, INC.

QUANTITY AND COST BREAKDOWN

Job Order No.: 23100466.57

Project: **Governors Bridge Road - Alternative 4 - Existing Alignment - 2 Lane Bridge**

Client: Prince George's County

Type of Estimate: Concept Development Phase

Date of Estimate: June 2018

	Date	BY
COMPUTED:		
CHECKED:		

ITEM NO.	CAT. CODE	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1000		PRELIMINARY				
1001		Category 1 (35% of Categories 2,4,5, & 6)	LS	1	$ 820,000.00	$ 820,000.00
		Preliminary Total				**$ 820,000.00**
2000		GRADING				
2001		Class 2 Excavation	CY	10,250	$ 40.00	$ 410,000.00
2002		Common Borrow	CY	6,990	$ 35.00	$ 244,650.00
2003		Saw Cut	LF	50	$ 3.00	$ 150.00
		Grading Total				**$ 654,800.00**
3000		DRAINAGE				
3001		Category 3 (35% of Categories 2,4,5,& 6)	LS	1	$ 820,000.00	$ 820,000.00
3002		6 Inch Perforated Circular Pipe Longitudinal Underdrain	LF	2000	$ 14.00	$ 28,000.00
		Drainage Total				**$ 848,000.00**
4000		STRUCTURES				
4001	410005	Maintenance of Stream Flow	LS	1	$ 50,000.00	$ 50,000.00
4002	410205	Removal of Portions of Existing Structure	LS	1	$ 61,100.00	$ 61,100.00
4003	417105	Class 3 Excavation	CY	360	$ 75.00	$ 27,000.00
4004	421122	Dynamic Pile Monitoring	EA	2	$ 3,000.00	$ 6,000.00
4005	421123	Capwap	EA	2	$ 1,000.00	$ 2,000.00
4006	421155	Steel HP 14 x 89 Bearing Piles	LF	700	$ 100.00	$ 70,000.00
4007	421200	Steel HP 14 x 89 Bearing Test Piles	LF	40	$ 150.00	$ 6,000.00
4008	428105	Footing Concrete	CY	171	$ 800.00	$ 136,800.00
4009	431110	Substructure Concrete for Bridge	LS	1	$ 180,000.00	$ 180,000.00
4010	433115	Superstructure Concrete for Bridge	LS	1	$ 150,000.00	$ 150,000.00
4011	433157	Concrete Parapet	LS	1	$ 28,000.00	$ 28,000.00
4012	400000	Three Strand Structural Tube Railing	LS	1	$ 27,400.00	$ 27,400.00
4013	400000	Approach Slab and Sleeper Slab	LS	1	$ 105,200.00	$ 105,200.00
4014	449195	Linseed Oil Protective Coating Bridge No.	SY	390	$ 4.00	$ 1,560.00
4015	456130	Epoxy Steel for Superstructure	LS	1	$ 48,500.00	$ 48,500.00
4016	459110	Fabricated Structural Steel	LS	1	$ 700,000.00	$ 700,000.00
4017	459310	Steel Stud Shear Developers	LS	1	$ 4,000.00	$ 4,000.00
4018	466115	Epoxy Protective Coating on Abutments	LS	1	$ 5,000.00	$ 5,000.00
4019	492045	Riprap Slope Protection for Bridge	SY	164	$ 35.00	$ 5,740.00
4020	492047	Bottom Cutoff Walls for Riprap Slope Protection	LF	64	$ 20.00	$ 1,280.00
4021	492049	Side Cutoff Walls for Riprap Slope Protection	LF	84	$ 20.00	$ 1,680.00
4022	400000	Truss Retention	LS	1	$ 250,000.00	$ 250,000.00
		Structures Total				**$ 1,867,260.00**
5000		PAVING				
5001		Superpave HMA Superpave 9.5mm for Wedge/Level, PG64-22	TON	25	$ 110.00	$ 2,750.00
5002		Superpave HMA Superpave 12.5mm for 2" Surface, PG64-22	TON	400	$ 100.00	$ 40,000.00
5003		Superpave HMA Superpave 12.5mm for 2" Intermediate Surface, PG64-22	TON	350	$ 125.00	$ 43,750.00
5003		Superpave HMA Superpave 19.0mm for 3" Base, PG64-22	TON	500	$ 120.00	$ 60,000.00
5004		6 Inch Graded Aggregate Subbase (GASB) Course	SY	2,700	$ 15.00	$ 40,500.00
5004		Grinding HMA Pavement 0"-2"	SY	612	$ 3.00	$ 1,836.00
5005		Thermo Plastic White Pavement Marking, 5 Inch	LF	3,900	$ 3.00	$ 11,700.00
5006		Thermo Plastic Yellow Pavement Marking, 5 Inch	LF	3,900	$ 3.00	$ 11,700.00
5007		Thermoplastic Stop Bar, 24 Inch	LF	24	$ 6.00	$ 144.00
		Paving Total				**$ 212,380.00**
6000		SHOULDERS				
6001		TYPE C ENDTREATMENT	EA	4	$ 3,000.00	$ 12,000.00
6002		TRAFFIC BARRIER THRIE BEAM ANCHORAGE AT BRIDGE END POST	EA	4	$ 4,000.00	$ 16,000.00
		Shoulder Total				**$ 28,000.00**
7000		LANDSCAPING				
7001		Landscaping (5% of Categories 2,4,5, & 6)	LS	1	$ 120,000.00	$ 120,000.00
		Landscaping Total				**$ 120,000.00**
8000		TRAFFIC				
8001		Sheet Aluminum Signs	SF		$ 25.00	$ -
		Traffic Total				**$0.00**
9000		UTILITIES				
9001		Utility Pole Relocation	EA	11	$ 20,000.00	$ 220,000.00
9001		Utility Infrastructure Maintenance - Administrative Fee	LS	1	$ 5,000.00	$ 5,000.00
						$225,000.00

Preliminary	*$ 820,000.00*
Grading	*$ 654,800.00*
Drainage	*$ 848,000.00*
Structures	*$ 1,867,260.00*
Paving	*$ 212,380.00*
Shoulders	*$ 28,000.00*
Landscaping	*$ 120,000.00*
Traffic	*$ -*
Utilities	*$ 225,000.00*
SUBTOTAL	$ 4,775,440.00
30% CONTINGENCY	$ 1,432,632.00
TOTAL ROADWAY COSTS	**$ 6,208,072.00**

This cost estimate does not include Right of Way or P/E.

KCI TECHNOLOGIES, INC.

QUANTITY AND COST BREAKDOWN — Job Order No.: 23100466.57

Project: **Governor's Bridge Road - Alternative 5 - Shifted Alignment - 1 Lane Bridge**

Client: Prince George's County

Type of Estimate: Concept Development Phase

Date of Estimate: June 2018

	Date	BY
COMPUTED:		
CHECKED:		

ITEM NO.	CAT. CODE	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1000		PRELIMINARY				
1001		Category 1 (35% of Categories 2,4,5, & 6)	LS	1	$ 815,000.00	$ 815,000.00
		Preliminary Total				**$ 815,000.00**
2000		GRADING				
2001		Class 2 Excavation	CY	11,000	$ 40.00	$ 440,000.00
2002		Common Borrow	CY	8,000	$ 35.00	$ 280,000.00
2003		Saw Cut	LF	50	$ 3.00	$ 150.00
		Grading Total				**$ 720,150.00**
3000		DRAINAGE				
3001		Category 3 (35% of Categories 2,4,5,& 6)	LS	1	$ 815,000.00	$ 815,000.00
3002		6 Inch Perforated Circular Pipe Longitudinal Underdrain	LF	2,000	$ 14.00	$ 28,000.00
		Drainage Total				**$ 843,000.00**
4000		STRUCTURES				
4001		Maintenance of Stream Flow	LS	1	$ 150,000.00	$ 150,000.00
4002		Class 3 Excavation	CY	500	$ 75.00	$ 37,500.00
4003		Dynamic Pile Monitoring	EA	2	$ 3,000.00	$ 6,000.00
4004		Capwap	EA	2	$ 1,000.00	$ 2,000.00
4005		Steel HP 14 x 89 Bearing Piles	LF	600	$ 100.00	$ 60,000.00
4006		Steel HP 14 x 89 Bearing Test Piles	LF	30	$ 150.00	$ 4,500.00
4007		Temporary Sheet Piling	LS	1	$ 130,500.00	$ 130,500.00
4008		Footing Concrete	CY	205	$ 800.00	$ 164,000.00
4009		Substructure Concrete for Bridge	LS	1	$ 307,500.00	$ 307,500.00
4010		Superstructure Concrete for Bridge	LS	1	$ 106,500.00	$ 106,500.00
4011		Concrete Parapet	LS	1	$ 114,000.00	$ 114,000.00
4012		Approach Slab and Sleeper Slab	LS	1	$ 76,000.00	$ 76,000.00
4013		Linseed Oil Protective Coating Bridge No.	SY	280	$ 4.00	$ 1,120.00
4014		Epoxy Steel for Superstructure	LS	1	$ 35,500.00	$ 35,500.00
4015		Fabricated Structural Steel	LS	1	$ 500,000.00	$ 500,000.00
4016		Steel Stud Shear Developers	LS	1	$ 3,000.00	$ 3,000.00
4017		Epoxy Protective Coating on Abutments	LS	1	$ 3,600.00	$ 3,600.00
4018		Riprap Slope Protection for Bridge	SY	193	$ 35.00	$ 6,755.00
4019		Bottom Cutoff Walls for Riprap Slope Protection	LF	50	$ 20.00	$ 1,000.00
4020		Side Cutoff Walls for Riprap Slope Protection	LF	124	$ 20.00	$ 2,480.00
		Structures Total				**$ 1,711,955.00**
5000		PAVING				
5001		Superpave HMA Superpave 9.5mm for Wedge/Level, PG64-22	TON	25	$ 110.00	$ 2,750.00
5002		Superpave HMA Superpave 12.5mm for 2" Surface, PG64-22	TON	700	$ 100.00	$ 70,000.00
5003		Superpave HMA Superpave 12.5mm for 2" Intermediate Surface, PG64-22	TON	600	$ 125.00	$ 75,000.00
5003		Superpave HMA Superpave 19.0mm for 3" Base, PG64-22	TON	900	$ 120.00	$ 108,000.00
5004		6 Inch Graded Aggregate Subbase (GASB) Course	SY	5,100	$ 15.00	$ 76,500.00
5004		Grinding HMA Pavement 0"-2"	SY	367	$ 3.00	$ 1,101.00
5005		Thermo Plastic White Pavement Marking, 5 Inch	LF	3,900	$ 3.00	$ 11,700.00
5005		Thermo Plastic Yellow Pavement Marking, 5 Inch	LF	3,900	$ 3.00	$ 11,700.00
5006		Thermoplastic Stop Bar, 24 Inch	LF	24	$ 6.00	$ 144.00
		Paving Total				**$ 356,895.00**
6000		SHOULDERS				
6001		TYPE C ENDTREATMENT	EA	4	$ 3,000.00	$ 12,000.00
6002		TRAFFIC BARRIER THRIE BEAM ANCHORAGE AT BRIDGE END POST	EA	4	$ 4,000.00	$ 16,000.00
		Shoulder Total				**$ 28,000.00**
7000		LANDSCAPING				
7001		Landscaping (5% of Categories 2,4,5, & 6)	LS	1	$ 120,000.00	$ 120,000.00
		Landscaping Total				**$ 120,000.00**
8000		TRAFFIC				
8001		Sheet Aluminum Sign	LS	1	$ 5,000.00	$ 5,000.00
		Traffic Total				**$5,000.00**
9000		UTILITIES				
9001		Utility Pole Relocation - 3 Phase Primary Poles	EA	11	$ 20,000.00	$ 220,000.00
9001		Utility Infrastructure Maintenance - Administrative Fee	LS	1	$ 5,000.00	$ 5,000.00
						$225,000.00

Preliminary	*$ 815,000.00*
Grading	*$ 720,150.00*
Drainage	*$ 843,000.00*
Structures	*$ 1,711,955.00*
Paving	*$ 356,895.00*
Shoulders	*$ 28,000.00*
Landscaping	*$ 120,000.00*
Traffic	*$ 5,000.00*
Utilities	*$ 225,000.00*
SUBTOTAL	$ 4,825,000.00
30% CONTINGENCY	$ 1,447,500.00
TOTAL ROADWAY COSTS	**$ 6,272,500.00**

This cost estimate does not include Right of Way or P/E.

KCI TECHNOLOGIES, INC.

QUANTITY AND COST BREAKDOWN

Job Order No.: 23100466.57

Project: **Governor's Bridge Road - Alternative 6 - Shifted Alignment - 2 Lane Bridge**

Client: Prince George's County

Type of Estimate: Concept Development Phase

Date of Estimate: June 2018

	Date	BY
COMPUTED:		
CHECKED:		

ITEM NO.	CAT. CODE	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1000		PRELIMINARY				
1001		Category 1 (35% of Categories 2,4,5, & 6)	LS	1	$ 910,000.00	$ 910,000.00
		Preliminary Total				**$ 910,000.00**
2000		GRADING				
2001		Class 2 Excavation	CY	10,790	$ 40.00	$ 431,600.00
2002		Common Borrow	CY	7,380	$ 35.00	$ 258,300.00
		Grading Total				**$ 689,900.00**
3000		DRAINAGE				
3001		Category 3 (35% of Categories 2,4,5,& 6)	LS	1	$ 910,000.00	$ 910,000.00
3002		6 Inch Perforated Circular Pipe Longitudinal Underdrain	LF	2,000	$ 14.00	$ 28,000.00
		Drainage Total				**$ 938,000.00**
4000		STRUCTURES				
4001		Maintenance of Stream Flow	LS	1	$ 150,000.00	$ 150,000.00
4002		Class 3 Excavation	CY	500	$ 75.00	$ 37,500.00
4003		Dynamic Pile Monitoring	EA	2	$ 3,000.00	$ 6,000.00
4004		Capwap	EA	2	$ 1,000.00	$ 2,000.00
4005		Steel HP 14 x 89 Bearing Piles	LF	700	$ 100.00	$ 70,000.00
4006		Steel HP 14 x 89 Bearing Test Piles	LF	30	$ 150.00	$ 4,500.00
4008		Temporary Sheet Piling	LS	1	$ 141,000.00	$ 141,000.00
4007		Footing Concrete	CY	220	$ 800.00	$ 176,000.00
4009		Substructure Concrete for Bridge	LS	1	$ 346,000.00	$ 346,000.00
4010		Superstructure Concrete for Bridge	LS	1	$ 146,000.00	$ 146,000.00
4011		Concrete Parapet	LS	1	$ 114,000.00	$ 114,000.00
4012		Approach Slab and Sleeper Slab	LS	1	$ 105,200.00	$ 105,200.00
4013		Linseed Oil Protective Coating Bridge No.	SY	390	$ 4.00	$ 1,560.00
4014		Epoxy Steel for Superstructure	LS	1	$ 48,500.00	$ 48,500.00
4015		Fabricated Structural Steel	LS	1	$ 700,000.00	$ 700,000.00
4016		Steel Stud Shear Developers	LS	1	$ 4,000.00	$ 4,000.00
4017		Epoxy Protective Coating on Abutments	LS	1	$ 4,800.00	$ 4,800.00
4018		Riprap Slope Protection for Bridge	SY	209	$ 35.00	$ 7,315.00
4019		Bottom Cutoff Walls for Riprap Slope Protection	LF	64	$ 20.00	$ 1,280.00
4020		Side Cutoff Walls for Riprap Slope Protection	LF	124	$ 20.00	$ 2,480.00
		Structures Total				**$ 2,068,135.00**
5000		PAVING				
5001		Superpave HMA Superpave 9.5mm for Wedge/Level, PG64-22	TON	25	$ 110.00	$ 2,750.00
5002		Superpave HMA Superpave 12.5mm for 2" Surface, PG64-22	TON	700	$ 100.00	$ 70,000.00
5003		Superpave HMA Superpave 12.5mm for 2" Intermediate Surface, PG64-22	TON	600	$ 125.00	$ 75,000.00
5004		Superpave HMA Superpave 19.0mm for 3" Base, PG64-22	TON	900	$ 120.00	$ 108,000.00
5005		6 Inch Graded Aggregate Subbase (GASB) Course	SY	6,000	$ 15.00	$ 90,000.00
5006		Grinding HMA Pavement 0"-2"	SY	367	$ 3.00	$ 1,101.00
5007		Thermo Plastic White Pavement Marking, 5 Inch	LF	3,900	$ 3.00	$ 11,700.00
5008		Thermo Plastic Yellow Pavement Marking, 5 Inch	LF	3,900	$ 3.00	$ 11,700.00
		Paving Total				**$ 370,251.00**
6000		SHOULDERS				
6001		TYPE C ENDTREATMENT	EA	4	$ 3,000.00	$ 12,000.00
6002		TRAFFIC BARRIER THRIE BEAM ANCHORAGE AT BRIDGE END POST	EA	4	$ 4,000.00	$ 16,000.00
		Shoulder Total				**$ 28,000.00**
7000		LANDSCAPING				
7001						
7002		Landscaping (5% of Categories 2,4,5, & 6)	LS	1	$ 140,000.00	$ 140,000.00
		Landscaping Total				**$ 140,000.00**
8000		TRAFFIC				
8001		Sheet Aluminum Signs	LS	1	$ 5,000.00	$ 5,000.00
		Traffic Total				**$5,000.00**
9000		UTILITIES				
9001		Utility Pole Relocation - 3 Phase Primary Poles	EA	11	$ 20,000.00	$ 220,000.00
9001		Utility Infrastructure Maintenance - Administrative Fee	LS	1	$ 5,000.00	$ 5,000.00
						$225,000.00

Preliminary	*$ 910,000.00*
Grading	*$ 689,900.00*
Drainage	*$ 938,000.00*
Structures	*$ 2,068,135.00*
Paving	*$ 370,251.00*
Shoulders	*$ 28,000.00*
Landscaping	*$ 140,000.00*
Traffic	*$ 5,000.00*
Utilities	*$ 225,000.00*
SUBTOTAL	$ 5,374,286.00
30% CONTINGENCY	$ 1,612,285.80
TOTAL ROADWAY COSTS	**$ 6,986,571.80**

This cost estimate does not include Right of Way or P/E.

Rehabilitation of Governor Bridge Road Bridge (P-0599) over Patuxent River

Appendix 15.7: Hydraulic Analysis

KCI Technologies, Inc.
936 Ridgebrook Road
Sparks, MD 21152

StreamStats Report

Region ID: MD
Workspace ID: MD20180118143435603000
Clicked Point (Latitude, Longitude): 38.95140, -76.69333
Time: 2018-01-18 09:33:53 -0500

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	352	square miles
IMPERV	Percentage of impervious area	17.6	percent
SOILCorD	Percentage of area of Hydrologic Soil Type C or D from SSURGO	36.1	percent
LIME	Percentage of area of limestone geology	0	percent
FOREST_MD	Percent forest from Maryland 2010 land-use data	35.4	percent

Peak-Flow Statistics Parameters [27 Percent (95.2 square miles) Peak Western Coastal Plain 2010 AHMMD]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	352	square miles	0.41	349.6
SOILCorD	Percent SSURGO Soil Type C or D	36.1	percent	13	74.7
IMPERV	Percent Impervious	17.6	percent	0	36.8

Peak-Flow Statistics Parameters [73 Percent (256 square miles) Peak Piedmont and BlueRidge Rural 2010 AHMMD]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	352	square miles	0.11	820
LIME	Percent Limestone	0	percent	0	81.7
FOREST_MD	Percent forest from MD 2010 land use	35.4	percent	2.7	100

Peak-Flow Statistics Disclaimers [27 Percent (95.2 square miles) Peak Western Coastal Plain 2010 AHMMD]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Peak-Flow Statistics Flow Report [27 Percent (95.2 square miles) Peak Western Coastal Plain 2010 AHMMD]

Statistic	Value	Unit
1.25 Year Peak Flood	4130	ft^3/s
1.5 Year Peak Flood	5160	ft^3/s
2 Year Peak Flood	6500	ft^3/s
5 Year Peak Flood	11000	ft^3/s
10 Year Peak Flood	14900	ft^3/s
25 Year Peak Flood	20900	ft^3/s
50 Year Peak Flood	26300	ft^3/s
100 Year Peak Flood	32700	ft^3/s
200 Year Peak Flood	40500	ft^3/s
500 Year Peak Flood	52100	ft^3/s

Peak-Flow Statistics Flow Report [73 Percent (256 square miles) Peak Piedmont and BlueRidge Rural 2010 AHMMD]

Statistic	Value	Unit	Equiv. Yrs.
1.25 Year Peak Flood	5980	ft^3/s	2.8
1.5 Year Peak Flood	7700	ft^3/s	3.1
2 Year Peak Flood	9390	ft^3/s	3.7
5 Year Peak Flood	15800	ft^3/s	9
10 Year Peak Flood	21200	ft^3/s	14

Statistic	Value	Unit	Equiv. Yrs.
25 Year Peak Flood	29900	ft^3/s	20
50 Year Peak Flood	37600	ft^3/s	23
100 Year Peak Flood	46600	ft^3/s	24
200 Year Peak Flood	57500	ft^3/s	25
500 Year Peak Flood	74000	ft^3/s	25

Peak-Flow Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
1.25 Year Peak Flood	5480	ft^3/s
1.5 Year Peak Flood	7010	ft^3/s
2 Year Peak Flood	8600	ft^3/s
5 Year Peak Flood	14500	ft^3/s
10 Year Peak Flood	19500	ft^3/s
25 Year Peak Flood	27500	ft^3/s
50 Year Peak Flood	34500	ft^3/s
100 Year Peak Flood	42900	ft^3/s
200 Year Peak Flood	52900	ft^3/s
500 Year Peak Flood	68100	ft^3/s

Peak-Flow Statistics Citations

Thomas, Jr., W.O. and Moglen, G.E.,2010, An Update of Regional Regression Equations for Maryland, Appendix 3 in Application of Hydrologic Methods in Maryland, Third Edition, September 2010: Maryland State Highway Administration and Maryland Department of the Environment, 38 p. (http://www.gishydro.umd.edu/HydroPanel/hydrology_panel_report_3rd_edition_final.pdf)

Comparison Water Surface Elevation, Shear Stress and Velocities for the 2-yr Stream Stat storm event

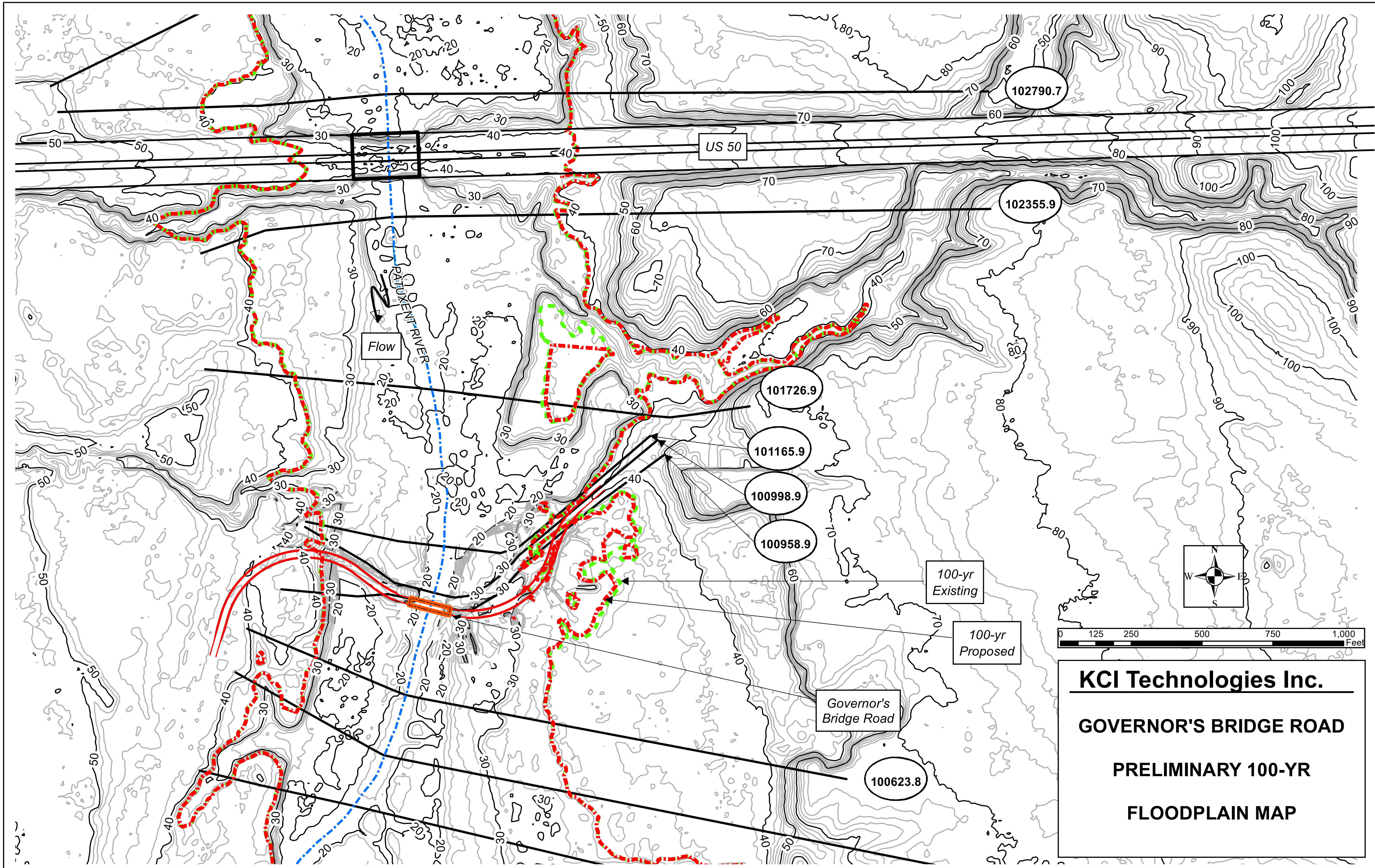
River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Change (ft)	Shear Chan (lb/sq ft)	Percent Change %	Vel Chnl (ft/s)	Percent Change %
103356.5	2yr StreamStats	PR 1-25-18	8600	8.2	27.42	0.29	0.12	-14.3%	2.33	-4.1%
103356.5	2yr StreamStats	Existing	8600	8.2	27.13		0.14		2.43	
102790.7	2yr StreamStats	PR 1-25-18	8600	7.8	27.38	0.29	0.05	-16.7%	1.61	-2.4%
102790.7	2yr StreamStats	Existing	8600	7.8	27.09		0.06		1.65	
102570.9			Bridge							
102355.9	2yr StreamStats	PR 1-25-18	8600	8.3	27.27	0.29	0.09	-10.0%	2.05	-2.4%
102355.9	2yr StreamStats	Existing	8600	8.3	26.98		0.1		2.1	
101726.9	2yr StreamStats	PR 1-25-18	8600	8.94	27.01	0.32	0.39	-7.1%	4.05	-3.6%
101726.9	2yr StreamStats	Existing	8600	8.94	26.69		0.42		4.2	
101165.9	2yr StreamStats	PR 1-25-18	8600	10.84	26.39	0.3	0.78	0.0%	5.65	0.7%
101165.9	2yr StreamStats	Existing	8600	10.84	26.09		0.78		5.61	
100998.9	2yr StreamStats	PR 1-25-18	8600	9.8	26.18	0.23	0.75	11.9%	5.67	6.0%
100998.9	2yr StreamStats	Existing	8600	9.8	25.95		0.67		5.35	
100980			Mult Open							
100958.9	2yr StreamStats	PR 1-25-18	8600	9.25	25.64	0.02	0.61	0.0%	5.53	0.0%
100958.9	2yr StreamStats	Existing	8600	9.25	25.62		0.61		5.53	
100623.8	2yr StreamStats	PR 1-25-18	8600	9	25.36	-0.02	0.76	10.1%	5.59	4.9%
100623.8	2yr StreamStats	Existing	8600	9	25.38		0.69		5.33	

Comparison Water Surface Elevation, Shear Stress and Velocities for the 10-yr Storm event

River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Change (ft)	Shear Chan (lb/sq ft)	Percent Change %	Vel Chnl (ft/s)	Percent Change %
103356.5	10yr	PR 1-25-18	19000	8.2	32.87	0.96	0.17	-19.0%	2.89	-8.0%
103356.5	10yr	Existing	19000	8.2	31.91		0.21		3.14	
102790.7	10yr	PR 1-25-18	19000	7.8	32.81	0.97	0.11	-15.4%	2.4	-5.5%
102790.7	10yr	Existing	19000	7.8	31.84		0.13		2.54	
102570.9			Bridge							
102355.9	10yr	PR 1-25-18	19000	8.3	32.53	1	0.22	-12.0%	3.31	-5.4%
102355.9	10yr	Existing	19000	8.3	31.53		0.25		3.5	
101726.9	10yr	PR 1-25-18	19000	8.94	32.1	1.06	0.74	-10.8%	5.87	-4.9%
101726.9	10yr	Existing	19000	8.94	31.04		0.83		6.17	
101165.9	10yr	PR 1-25-18	19000	10.84	31.4	1.39	1.17	-25.9%	7.28	-12.6%
101165.9	10yr	Existing	19000	10.84	30.01		1.58		8.33	
100998.9	10yr	PR 1-25-18	19000	9.8	31.23	1.44	1.05	-24.5%	7.08	-11.9%
100998.9	10yr	Existing	19000	9.8	29.79		1.39		8.04	
100980			Mult Open							
100958.9	10yr	PR 1-25-18	19000	9.25	29.63	0	0.97	0.0%	7.31	0.0%
100958.9	10yr	Existing	19000	9.25	29.63		0.97		7.31	
100623.8	10yr	PR 1-25-18	19000	9	29.25	0	1.32	0.0%	7.71	0.0%
100623.8	10yr	Existing	19000	9	29.25		1.32		7.71	

Comparison Water Surface Elevation and Velocities for the 100-yr Storm event

River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Change (ft)	Vel Chnl (ft/s)	Percent Change %
103356.5	100yr	PR 1-25-18	45000	8.2	40.72	0.18	4.08	-0.7%
103356.5	100yr	Existing	45000	8.2	40.54		4.11	
102790.7	100yr	PR 1-25-18	45000	7.8	40.61	0.17	3.64	-0.8%
102790.7	100yr	Existing	45000	7.8	40.44		3.67	
102570.9			Bridge					
102355.9	100yr	PR 1-25-18	45000	8.3	38.67	0.19	5.53	-0.9%
102355.9	100yr	Existing	45000	8.3	38.48		5.58	
101726.9	100yr	PR 1-25-18	45000	8.94	37.7	0.21	9.75	-0.9%
101726.9	100yr	Existing	45000	8.94	37.49		9.84	
101165.9	100yr	PR 1-25-18	45000	10.84	36.25	0.31	11.93	-2.2%
101165.9	100yr	Existing	45000	10.84	35.94		12.2	
100998.9	100yr	PR 1-25-18	45000	9.8	35.84	0.33	11.85	-2.1%
100998.9	100yr	Existing	45000	9.8	35.51		12.11	
100980			Mult Open					
100958.9	100yr	PR 1-25-18	45000	9.25	35.57	0	11	0.0%
100958.9	100yr	Existing	45000	9.25	35.57		11	
100623.8	100yr	PR 1-25-18	45000	9	35.05	0	11.36	0.0%
100623.8	100yr	Existing	45000	9	35.05		11.36	



KCI Technologies Inc.

GOVERNOR'S BRIDGE ROAD

PRELIMINARY 100-YR

FLOODPLAIN MAP

Rehabilitation of Governor Bridge Road Bridge (P-0599) over Patuxent River

Appendix 15.8: Bridge Computations1 Lane and 2 Lane Bridge

KCI Technologies, Inc.
936 Ridgebrook Road
Sparks, MD 21152

Bridge 1

Roadway Elements

Alignments

Alignment Name: ALG01
Begin Station: 0+00.0000
Coordinate Tie:
Northing: 0.0000
Easting: 0.0000

Segment	Shape	Start Direction	Radius (ft)	End Station	Spiral In (ft)	Spiral Out (ft)	Sense
1	Tangent	N 90 00 00.00 E		1+37.0000			

Profiles

Profile Name: PROF01

VPI	Station	Elevation	Transition	LVC-1 (ft)	LVC-2 (ft)
1	0+00.0000	100.0000			
2	1+37.0000	100.0000			

Cross Sections

Cross Section Name: XSECT01

Template Name: TMPL 0
Template Station: 0+00.0000
PG Offset: 0.0000
PG Node: 2

Plane	Width Type	Width (ft)	Vertical Type	Vertical %
1	Distance	9.0208	Slope	0.0000
2	Distance	9.0208	Slope	0.0000

Roadways

No.	Name	Align	Profile	Cross Section	Min. Station	Max. Station
1	RDWY01	ALG01	PROF01	XSECT01	0+00.0000	1+37.0000

Superstructure

Pier/Abutment Locations

Roadway: RDWY01

Offset to Bridge CL: 0.0000 ft

No.	Type	Name	Input Method	Station/Distance(ft)	Skew/Bearing
1	Abutment	Support 01	Station	0+00.0000	NORMAL
2	Abutment	Support 02	Station	1+37.0000	NORMAL

Deck Slab

Deck Thickness: 8.0000 in

Haunch Thickness: 2.0000 in

Sacrificial Wearing Surface: 0.5000 in

No.	Name	Material	Ref. Back	Ref. Method	Offset/Station	Ref. Ahead	Ref. Method	Offset/Station
1	Slab 01	Cl A	Support 01	Perpendicular to Support	0.000000	Support 02	Perpendicular to Support	0.000000

Member Groups

Member Group Name: Group01

Back Reference: Support 01

Ahead Reference: Support 02

Number of Members: 3

Path: Concentric to align.

Back Location

Left Fascia Member

Reference: Left edge of slab

Direction: Along support

Offset(ft): 2.3540

Interior Members

Spacing Type: Equally spaced

Spacing(ft): 6.6668

Right Fascia Member

Reference: Right edge of slab

Direction: Along support

Offset(ft): 2.3540

Ahead Location

Left Fascia Member

Reference: Left edge of slab

Direction: Along support

Offset(ft): 0.0000

Interior Members

Spacing Type: Independent

Spacing(ft):

Member No	Distance from prev.
Member 01:	2.3540
Member 02:	5.9793
Member 03:	7.3543

Note: Distances are along the support, from left to right, up-station!

Right Fascia Member

Reference: Right edge of slab

Direction: Along support

Offset(ft): 0.0000

Member Definition

Member Group: Group01

Member 01:

WEB	No.	Ref. Span	Start (ft)	Length (ft)	Material	Thick (in)	Start Height (in)	Variation	End Height (in)
	1	1	0.0000	137.0000	Grade 50	0.7500	45.0000	None	45.0000
Top Flange	**No.**	**Ref. Span**	**Start (ft)**	**Length (ft)**	**Material**	**Thick (in)**	**Start Width (in)**	**Variation**	**End Width (in)**
	1	1	0.0000	35.0000	Grade 50	1.7500	17.0000	None	17.0000
	2	1	35.0000	67.0000	Grade 50	2.2500	17.0000	None	17.0000
	3	1	102.0000	35.0000	Grade 50	1.7500	17.0000	None	17.0000
Bottom Flange	**No.**	**Ref. Span**	**Start (ft)**	**Length (ft)**	**Material**	**Thick (in)**	**Start Width (in)**	**Variation**	**End Width (in)**

Bottom Flange	No.	Ref. Span	Start (ft)	Length (ft)	Material	Thick (in)	Start Width (in)	Variation	End Width (in)
	1	1	0.0000	35.0000	Grade 50	1.7500	17.0000	None	17.0000
	2	1	35.0000	67.0000	Grade 50	2.5000	17.0000	None	17.0000
	3	1	102.0000	35.0000	Grade 50	1.7500	17.0000	None	17.0000

Member 02:

WEB	No.	Ref. Span	Start (ft)	Length (ft)	Material	Thick (in)	Start Height (in)	Variation	End Height (in)
	1	1	0.0000	137.0000	Grade 50	0.7500	45.0000	None	45.0000
Top Flange	**No.**	**Ref. Span**	**Start (ft)**	**Length (ft)**	**Material**	**Thick (in)**	**Start Width (in)**	**Variation**	**End Width (in)**
	1	1	0.0000	35.0000	Grade 50	1.7500	17.0000	None	17.0000
	2	1	35.0000	67.0000	Grade 50	2.2500	17.0000	None	17.0000
	3	1	102.0000	35.0000	Grade 50	1.7500	17.0000	None	17.0000
Bottom Flange	**No.**	**Ref. Span**	**Start (ft)**	**Length (ft)**	**Material**	**Thick (in)**	**Start Width (in)**	**Variation**	**End Width (in)**
	1	1	0.0000	35.0000	Grade 50	1.7500	17.0000	None	17.0000
	2	1	35.0000	67.0000	Grade 50	2.5000	17.0000	None	17.0000
	3	1	102.0000	35.0000	Grade 50	1.7500	17.0000	None	17.0000

Member 03:

WEB	No.	Ref. Span	Start (ft)	Length (ft)	Material	Thick (in)	Start Height (in)	Variation	End Height (in)
	1	1	0.0000	137.0000	Grade 50	0.7500	45.0000	None	45.0000
Top Flange	**No.**	**Ref. Span**	**Start (ft)**	**Length (ft)**	**Material**	**Thick (in)**	**Start Width (in)**	**Variation**	**End Width (in)**
	1	1	0.0000	35.0000	Grade 50	1.7500	17.0000	None	17.0000
	2	1	35.0000	67.0000	Grade 50	2.2500	17.0000	None	17.0000
	3	1	102.0000	35.0000	Grade 50	1.7500	17.0000	None	17.0000
Bottom Flange	**No.**	**Ref. Span**	**Start (ft)**	**Length (ft)**	**Material**	**Thick (in)**	**Start Width (in)**	**Variation**	**End Width (in)**

Bottom Flange	No.	Ref. Span	Start (ft)	Length (ft)	Material	Thick (in)	Start Width (in)	Variation	End Width (in)
	1	1	0.0000	35.0000	Grade 50	1.7500	17.0000	None	17.0000
	2	1	35.0000	67.0000	Grade 50	2.5000	17.0000	None	17.0000
	3	1	102.0000	35.0000	Grade 50	1.7500	17.0000	None	17.0000

Cross-frame/Diaphragm Definition

Frame Name: CFD01

Frame Type: Frame V

Top Strut

Enabled:	Yes
Top Left Distance (in):	6.000000
Top Right Distance (in):	6.000000
Begin Offset (in):	0.000000
End Offset (in):	0.000000
Section:	L40406
Material:	None
Center Line Reference:	Middle
Vertical Orientation:	Long leg vertical
Horizontal Orientation:	N/A

Bottom Strut

Enabled:	Yes
Bottom Left Distance (in):	6.000000
Bottom Right Distance (in):	6.000000
Begin Offset (in):	0.000000
End Offset (in):	0.000000
Section:	L40406
Material:	Grade 50
Center Line Reference:	Middle
Vertical Orientation:	Long leg vertical
Horizontal Orientation:	N/A

Left Diagonal

Bottom Left Distance (in): 6.000000
Top Right Distance (in): 0.000000
Begin Offset (in): 0.000000
End Offset (in): 0.000000
Section: L40406
Material: Grade 50
Center Line Reference: Middle
Vertical Orientation: Long leg vertical
Horizontal Orientation: N/A

Right Diagonal

Top Left Distance (in): 0.000000
Bottom Right Distance (in): 6.000000
Begin Offset (in): 0.000000
End Offset (in): 0.000000
Section: L40406
Material: Grade 50
Center Line Reference: Middle
Vertical Orientation: Long leg vertical
Horizontal Orientation: N/A

Cross-frame/Diaphragm Location

Member Group: Group01

Bay 01

No.	Location Type	Left Location	Right Location	Link Left-Right	Cross-Frame/ Diaphragm	CFD Orientation	Connection Type	Permanent/ Temporary
1	Absolute (ft)	3.5000	3.5000	No	CFD01	Upstation	Welded	Permanent
2	Absolute (ft)	16.5000	16.5000	No	CFD01	Upstation	Welded	Permanent
3	Absolute (ft)	29.5000	29.5000	No	CFD01	Upstation	Welded	Permanent
4	Absolute (ft)	42.5000	42.5000	No	CFD01	Upstation	Welded	Permanent
5	Absolute (ft)	55.5000	55.5000	No	CFD01	Upstation	Welded	Permanent
6	Absolute (ft)	68.5000	68.5000	No	CFD01	Upstation	Bolted	Permanent
7	Absolute (ft)	81.5000	81.5000	No	CFD01	Upstation	Welded	Permanent
8	Absolute (ft)	94.5000	94.5000	No	CFD01	Upstation	Welded	Permanent

Bay 01

No.	Location Type	Left Location	Right Location	Link Left-Right	Cross-Frame/ Diaphragm	CFD Orientation	Connection Type	Permanent/ Temporary
9	Absolute (ft)	107.5000	107.5000	No	CFD01	Upstation	Welded	Permanent
10	Absolute (ft)	120.5000	120.5000	No	CFD01	Upstation	Welded	Permanent
11	Absolute (ft)	133.5000	133.5000	No	CFD01	Upstation	Welded	Permanent
12	Absolute (ft)	0.0000	0.0000	No	CFD01	Upstation	Welded	Permanent
13	Absolute (ft)	137.0000	137.0000	No	CFD01	Upstation	Welded	Permanent

Bay 02

No.	Location Type	Left Location	Right Location	Link Left-Right	Cross-Frame/ Diaphragm	CFD Orientation	Connection Type	Permanent/ Temporary
1	Absolute (ft)	3.5000	3.5000	No	CFD01	Upstation	Welded	Permanent
2	Absolute (ft)	16.5000	16.5000	No	CFD01	Upstation	Welded	Permanent
3	Absolute (ft)	29.5000	29.5000	No	CFD01	Upstation	Welded	Permanent
4	Absolute (ft)	42.5000	42.5000	No	CFD01	Upstation	Welded	Permanent
5	Absolute (ft)	55.5000	55.5000	No	CFD01	Upstation	Welded	Permanent
6	Absolute (ft)	68.5000	68.5000	No	CFD01	Upstation	Welded	Permanent
7	Absolute (ft)	81.5000	81.5000	No	CFD01	Upstation	Welded	Permanent
8	Absolute (ft)	94.5000	94.5000	No	CFD01	Upstation	Welded	Permanent
9	Absolute (ft)	107.5000	107.5000	No	CFD01	Upstation	Welded	Permanent
10	Absolute (ft)	120.5000	120.5000	No	CFD01	Upstation	Welded	Permanent
11	Absolute (ft)	133.5000	133.5000	No	CFD01	Upstation	Welded	Permanent
12	Absolute (ft)	0.0000	0.0000	No	CFD01	Upstation	Welded	Permanent
13	Absolute (ft)	137.0000	137.0000	No	CFD01	Upstation	Welded	Permanent

Stiffener Definition

Stiff01

Function: Bearing stiffener
Width (in): 7.0000
Thickness (in): 0.7500
Material: Grade 50
Corner Clip:

Top Inner H (in): 1.5000

Top Inner V(in): 2.5000

Top Outer H (in): 0.0000

Top Outer V (in): 0.0000

Bottom Inner H (in): 1.5000

Bottom Inner V(in): 2.5000

Bottom Outer H (in): 0.0000

Bottom Outer V (in): 0.0000

Stiffener Locations

Transversal Stiffener:

Member Group: Group01

Member 01

No.	Location Type	Location	Position	Web	Stiffener	Dist. from Top (in)	Dist. from Bottom (in)
1	Relative	0.0000	Right		Stiff01	0.0000	0.0000
2	Absolute (ft)	3.5000	Right		Stiff01	0.0000	0.0000
3	Absolute (ft)	16.5000	Right		Stiff01	0.0000	0.0000
4	Relative	0.2153	Right		Stiff01	0.0000	0.0000
5	Relative	0.3102	Right		Stiff01	0.0000	0.0000
6	Relative	0.4051	Right		Stiff01	0.0000	0.0000
7	Relative	0.5000	Right		Stiff01	0.0000	0.0000
8	Relative	0.5949	Right		Stiff01	0.0000	0.0000
9	Relative	0.6898	Right		Stiff01	0.0000	0.0000
10	Relative	0.7847	Right		Stiff01	0.0000	0.0000
11	Relative	0.8796	Right		Stiff01	0.0000	0.0000
12	Relative	0.9745	Right		Stiff01	0.0000	0.0000
13	Relative	1.0000	Right		Stiff01	0.0000	0.0000

Member 02

No.	Location Type	Location	Position	Web	Stiffener	Dist. from Top (in)	Dist. from Bottom (in)
1	Relative	0.0000	Both		Stiff01	0.0000	0.0000
2	Absolute (ft)	3.5000	Both		Stiff01	0.0000	0.0000
3	Absolute (ft)	16.5000	Both		Stiff01	0.0000	0.0000
4	Relative	0.2153	Both		Stiff01	0.0000	0.0000

Member 02

No.	Location Type	Location	Position	Web	Stiffener	Dist. from Top (in)	Dist. from Bottom (in)
5	Relative	0.3102	Both		Stiff01	0.0000	0.0000
6	Relative	0.4051	Both		Stiff01	0.0000	0.0000
7	Relative	0.5000	Both		Stiff01	0.0000	0.0000
8	Relative	0.5949	Both		Stiff01	0.0000	0.0000
9	Relative	0.6898	Both		Stiff01	0.0000	0.0000
10	Relative	0.7847	Both		Stiff01	0.0000	0.0000
11	Relative	0.8796	Both		Stiff01	0.0000	0.0000
12	Relative	0.9745	Both		Stiff01	0.0000	0.0000
13	Relative	1.0000	Both		Stiff01	0.0000	0.0000

Member 03

No.	Location Type	Location	Position	Web	Stiffener	Dist. from Top (in)	Dist. from Bottom (in)
1	Relative	0.0000	Left		Stiff01	0.0000	0.0000
2	Absolute (ft)	3.5000	Left		Stiff01	0.0000	0.0000
3	Absolute (ft)	16.5000	Left		Stiff01	0.0000	0.0000
4	Relative	0.2153	Left		Stiff01	0.0000	0.0000
5	Relative	0.3102	Left		Stiff01	0.0000	0.0000
6	Relative	0.4051	Left		Stiff01	0.0000	0.0000
7	Relative	0.5000	Left		Stiff01	0.0000	0.0000
8	Relative	0.5949	Left		Stiff01	0.0000	0.0000
9	Relative	0.6898	Left		Stiff01	0.0000	0.0000
10	Relative	0.7847	Left		Stiff01	0.0000	0.0000
11	Relative	0.8796	Left		Stiff01	0.0000	0.0000
12	Relative	0.9745	Left		Stiff01	0.0000	0.0000
13	Relative	1.0000	Left		Stiff01	0.0000	0.0000

Shear Connector Definition

Shear Connector Type: Stud

No.	Name	Height (in)	Diameter (in)	Material
1	ShearConn01	7.500000	0.750000	Grade 50
2	ShearConn02	8.250000	0.750000	Grade 50

Shear Connector Locations

Shear Connector Type: Stud

Member Group: Group01

Member 02

No.	Location Type	Begin Location	End Location	Longitudinal Spacing (ft)	Shear Stud	Number of Studs per Row	Transverse Spacing (in)
1	Absolute (ft)	0.0000	137.0000	0.0000	ShearConn01	2	0.0000

Appurtenance Locations

Parapet

No.	Appurtenance Name	Reference Element	Reference Offset(ft)	Refrence Location	Reference Back	Reference Method	Offset (ft)	Reference Ahead	Reference Method	Offset (ft)
1	Parapet 01	Left edge of slab	0.0000	Outside face	Support 01	Along alignment	0.0000	Support 02	Along alignment	0.0000
2	Parapet 01	Right edge of slab	0.0000	Outside face	Support 01	Along alignment	0.0000	Support 02	Along alignment	0.0000

Substructure

Abutments

Abutment Location: Support 01

Start Elevation: 0.0000 ft

End Elevation: 0.0000 ft

Factor of Reduced Moment of Inertia: 1.0000

Keep top of the cap straight: Yes

Skew Angle: 0.0000 deg

Bearings:

Line 1 Offset: 0.0000 in

Line 2 Offset: 0.0000 in

Abutment Type: Stem Wall

Cap:

Cap Length (ft): 18.041660

Back Wall Width (ft): 1.000000

Back Wall Depth (ft): 5.500000

Seat Width (ft): 3.000000

Seat Depth (ft): 5.000000

Wing Wall/Approach Slab:

Wing Wall Width (ft): 0.000000

Wing Wall Height (ft): 0.000000

Wing Wall Thickness (ft): 0.000000

Wing Wall Skew (deg): 0.000000

Approach Slab Width (ft): 0.000000

Approach Slab Length (ft): 0.000000

Approach Slab Thickness (ft): 0.000000

Footing:

Support 01 Footing

Length Overhang (ft): -0.270830

Footing Width (ft): 12.000000

Footing Depth (ft): 3.000000

Footing Position under Column: Concentric under Column

Piles:

Support 01 PilePattern

Enable Piles: Yes

Pile Shape: Circular

Diameter (in) 12.000000

Rotation (deg): 0.000000

Length (in): 360.000000

Embed Length (in): 0.000000

Abutment Location: Support 02

Start Elevation: 0.0000 ft

End Elevation: 0.0000 ft

Factor of Reduced Moment of Inertia: 1.0000

Keep top of the cap straight: Yes

Skew Angle: 0.0000 deg

Bearings:

Line 1 Offset: 0.0000 in

Line 2 Offset: 0.0000 in

Abutment Type: Stem Wall

Cap:

Cap Length (ft): 18.041660

Back Wall Width (ft): 1.000000

Back Wall Depth (ft): 5.500000

Seat Width (ft): 3.000000

Seat Depth (ft): 5.000000

Wing Wall/Approach Slab:

Wing Wall Width (ft): 0.000000

Wing Wall Height (ft): 0.000000

Wing Wall Thickness (ft): 0.000000

Wing Wall Skew (deg): 0.000000

Approach Slab Width (ft): 0.000000

Approach Slab Length (ft): 0.000000

Approach Slab Thickness (ft): 0.000000

Footing:

Support 02 Footing

Length Overhang (ft): -0.270830

Footing Width (ft): 12.000000

Footing Depth (ft): 3.000000

Footing Position under Column: Concentric under Column

Piles:

Support 02 PilePattern

Enable Piles: Yes

Pile Shape: Circular

Diameter (in) 12.000000

Rotation (deg): 0.000000

Length (in): 360.000000

Embed Length (in): 0.000000

Support Condition

Abutment/Pier Location: Support 01

Bearing Line	Member	Support Type	Angle (deg)	KFX (k/ft)	KFZ (k/ft)	KMX (k-ft/deg)	KMY (k-ft/deg)	KMZ (k-ft/deg)
2	Group01.Member 01	Pinned	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	Group01.Member 02	Pinned	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	Group01.Member 03	Pinned	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Abutment/Pier Location: Support 02

Bearing Line	Member	Support Type	Angle (deg)	KFX (k/ft)	KFZ (k/ft)	KMX (k-ft/deg)	KMY (k-ft/deg)	KMZ (k-ft/deg)
1	Group01.Member 01	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 02	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 03	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Code Checker Results

Group01 Member 01

Overall Design Summary Report

POI Location (ft)	Span Fraction	Critical Load Combination
0.000	1.000	Final - Strength I 6.10.9.1-1 0.285
0.100	1.001	Final - Strength I 6.10.9.1-1 0.281
0.100	1.001	Final - Strength I 6.10.9.1-1 0.281
1.750	1.013	Final - Strength I 6.10.9.1-1 0.255
3.500	1.026	Final - Strength I 6.10.9.1-1 0.250
10.000	1.073	Final - Service II 6.10.4.2.2-3 0.402
16.500	1.120	Final - Service II 6.10.4.2.2-3 0.574
23.000	1.168	Final - Strength I 6.10.8.1.2-1 0.727
29.500	1.215	Final - Strength I 6.10.8.1.2-1 0.870
34.900	1.255	Final - Strength I 6.10.8.1.2-1 0.943
35.100	1.256	Final - Service II 6.10.4.2.2-3

POI Location (ft)	Span Fraction	Critical Load Combination
		0.729
36.000	1.263	Final - Service II 6.10.4.2.2-3 0.739
42.500	1.310	Final - Service II 6.10.4.2.2-3 0.815
49.000	1.358	Final - Service II 6.10.4.2.2-3 0.876
55.500	1.405	Final - Service II 6.10.4.2.2-3 0.911
62.000	1.453	Final - Service II 6.10.4.2.2-3 0.930
68.500	1.500	Final - Service II 6.10.4.2.2-3 0.940
75.000	1.547	Final - Service II 6.10.4.2.2-3 0.935
81.500	1.595	Final - Service II 6.10.4.2.2-3 0.912
88.000	1.642	Final - Service II 6.10.4.2.2-3 0.874
94.500	1.690	Final - Service II 6.10.4.2.2-3 0.819
101.000	1.737	Final - Service II 6.10.4.2.2-3 0.743
101.900	1.744	Final - Service II 6.10.4.2.2-3 0.727

POI Location (ft)	Span Fraction	Critical Load Combination
102.100	1.745	Final - Strength I 6.10.8.1.2-1 0.938
107.500	1.785	Final - Strength I 6.10.8.1.2-1 0.838
114.000	1.832	Final - Strength I 6.10.8.1.2-1 0.722
120.500	1.880	Final - Strength I 6.10.8.1.2-1 0.567
127.000	1.927	Final - Service II 6.10.4.2.2-3 0.390
133.500	1.974	Final - Strength I 6.10.9.1-1 0.270
135.250	1.987	Final - Strength I 6.10.9.1-1 0.273
136.900	1.999	Final - Strength I 6.10.9.1-1 0.276
136.900	1.999	Final - Strength I 6.10.9.1-1 0.276
137.000	2.000	Final - Strength I 6.10.9.1-1 0.280

Summary Flexure Report

Load combination: Initial Default

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation

Date:	4/12/2018	Govornor Bridge Road Design- One Lane.lbs	
Time:	9:16 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 7th Ed. with 2016 Interims]	v17.00.02.15

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	1.75	0.0000	6.10.3.2.1-1	17.00	1.75	0.0000	6.10.3.2.2-1
0.100	1.001	17.00	1.75	0.0005	6.10.3.2.1-1	17.00	1.75	0.0005	6.10.3.2.2-1
1.750	1.013	17.00	1.75	0.0083	6.10.3.2.1-1	17.00	1.75	0.0083	6.10.3.2.2-1
3.500	1.026	17.00	1.75	0.0165	6.10.3.2.1-1	17.00	1.75	0.0165	6.10.3.2.2-1
10.000	1.073	17.00	1.75	0.0449	6.10.3.2.1-1	17.00	1.75	0.0449	6.10.3.2.2-1
16.500	1.120	17.00	1.75	0.0708	6.10.3.2.1-1	17.00	1.75	0.0708	6.10.3.2.2-1
23.000	1.168	17.00	1.75	0.0939	6.10.3.2.1-1	17.00	1.75	0.0939	6.10.3.2.2-1
29.500	1.215	17.00	1.75	0.1144	6.10.3.2.1-1	17.00	1.75	0.1144	6.10.3.2.2-1
34.900	1.255	17.00	1.75	0.1293	6.10.3.2.1-1	17.00	1.75	0.1293	6.10.3.2.2-1
35.100	1.256	17.00	2.25	0.1031	6.10.3.2.1-1	17.00	2.50	0.0967	6.10.3.2.2-1
36.000	1.263	17.00	2.25	0.1049	6.10.3.2.1-1	17.00	2.50	0.0984	6.10.3.2.2-1
42.500	1.310	17.00	2.25	0.1166	6.10.3.2.1-1	17.00	2.50	0.1094	6.10.3.2.2-1
49.000	1.358	17.00	2.25	0.1256	6.10.3.2.1-1	17.00	2.50	0.1178	6.10.3.2.2-1
55.500	1.405	17.00	2.25	0.1322	6.10.3.2.1-1	17.00	2.50	0.1240	6.10.3.2.2-1
62.000	1.453	17.00	2.25	0.1360	6.10.3.2.1-1	17.00	2.50	0.1276	6.10.3.2.2-1
68.500	1.500	17.00	2.25	0.1374	6.10.3.2.1-1	17.00	2.50	0.1288	6.10.3.2.2-1
75.000	1.547	17.00	2.25	0.1360	6.10.3.2.1-1	17.00	2.50	0.1276	6.10.3.2.2-1
81.500	1.595	17.00	2.25	0.1322	6.10.3.2.1-1	17.00	2.50	0.1240	6.10.3.2.2-1
88.000	1.642	17.00	2.25	0.1256	6.10.3.2.1-1	17.00	2.50	0.1178	6.10.3.2.2-1
94.500	1.690	17.00	2.25	0.1166	6.10.3.2.1-1	17.00	2.50	0.1094	6.10.3.2.2-1
101.000	1.737	17.00	2.25	0.1049	6.10.3.2.1-1	17.00	2.50	0.0984	6.10.3.2.2-1
101.900	1.744	17.00	2.25	0.1031	6.10.3.2.1-1	17.00	2.50	0.0967	6.10.3.2.2-1
102.100	1.745	17.00	1.75	0.1293	6.10.3.2.1-1	17.00	1.75	0.1293	6.10.3.2.2-1
107.500	1.785	17.00	1.75	0.1144	6.10.3.2.1-1	17.00	1.75	0.1144	6.10.3.2.2-1
114.000	1.832	17.00	1.75	0.0939	6.10.3.2.1-1	17.00	1.75	0.0939	6.10.3.2.2-1
120.500	1.880	17.00	1.75	0.0708	6.10.3.2.1-1	17.00	1.75	0.0708	6.10.3.2.2-1
127.000	1.927	17.00	1.75	0.0449	6.10.3.2.1-1	17.00	1.75	0.0449	6.10.3.2.2-1
133.500	1.974	17.00	1.75	0.0165	6.10.3.2.1-1	17.00	1.75	0.0165	6.10.3.2.2-1
135.250	1.987	17.00	1.75	0.0083	6.10.3.2.1-1	17.00	1.75	0.0083	6.10.3.2.2-1
136.900	1.999	17.00	1.75	0.0005	6.10.3.2.1-1	17.00	1.75	0.0005	6.10.3.2.2-1
137.000	2.000	17.00	1.75	0.0000	6.10.3.2.1-1	17.00	1.75	0.0000	6.10.3.2.2-1

Load combination: Final Default Strength I

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	1.75	---	---	17.00	1.75	0.0040	6.10.8.1.2-1
0.100	1.001	17.00	1.75	---	---	17.00	1.75	0.1312	6.10.8.1.1-1
0.100	1.001	17.00	1.75	---	---	17.00	1.75	0.0124	6.10.8.1.2-1
1.750	1.013	17.00	1.75	---	---	17.00	1.75	0.0662	6.10.8.1.2-1
3.500	1.026	17.00	1.75	---	---	17.00	1.75	0.1805	6.10.8.1.2-1
10.000	1.073	17.00	1.75	---	---	17.00	1.75	0.3941	6.10.8.1.2-1
16.500	1.120	17.00	1.75	---	---	17.00	1.75	0.5732	6.10.8.1.2-1
23.000	1.168	17.00	1.75	---	---	17.00	1.75	0.7270	6.10.8.1.2-1
29.500	1.215	17.00	1.75	---	---	17.00	1.75	0.8696	6.10.8.1.2-1
34.900	1.255	17.00	1.75	---	---	17.00	1.75	0.9426	6.10.8.1.2-1
35.100	1.256	17.00	2.25	---	---	17.00	2.50	0.7032	6.10.8.1.2-1
36.000	1.263	17.00	2.25	---	---	17.00	2.50	0.7131	6.10.8.1.2-1
42.500	1.310	17.00	2.25	---	---	17.00	2.50	0.7874	6.10.8.1.2-1
49.000	1.358	17.00	2.25	---	---	17.00	2.50	0.8434	6.10.8.1.2-1
55.500	1.405	17.00	2.25	---	---	17.00	2.50	0.8776	6.10.8.1.2-1
62.000	1.453	17.00	2.25	---	---	17.00	2.50	0.8959	6.10.8.1.2-1
68.500	1.500	17.00	2.25	---	---	17.00	2.50	0.9055	6.10.8.1.2-1
75.000	1.547	17.00	2.25	---	---	17.00	2.50	0.9005	6.10.8.1.2-1
81.500	1.595	17.00	2.25	---	---	17.00	2.50	0.8785	6.10.8.1.2-1
88.000	1.642	17.00	2.25	---	---	17.00	2.50	0.8414	6.10.8.1.2-1
94.500	1.690	17.00	2.25	---	---	17.00	2.50	0.7882	6.10.8.1.2-1
101.000	1.737	17.00	2.25	---	---	17.00	2.50	0.7167	6.10.8.1.2-1
101.900	1.744	17.00	2.25	---	---	17.00	2.50	0.7011	6.10.8.1.2-1
102.100	1.745	17.00	1.75	---	---	17.00	1.75	0.9383	6.10.8.1.2-1
107.500	1.785	17.00	1.75	---	---	17.00	1.75	0.8384	6.10.8.1.2-1
114.000	1.832	17.00	1.75	---	---	17.00	1.75	0.7219	6.10.8.1.2-1
120.500	1.880	17.00	1.75	---	---	17.00	1.75	0.5670	6.10.8.1.2-1
127.000	1.927	17.00	1.75	---	---	17.00	1.75	0.3876	6.10.8.1.2-1
133.500	1.974	17.00	1.75	---	---	17.00	1.75	0.1402	6.10.8.1.2-1
135.250	1.987	17.00	1.75	---	---	17.00	1.75	0.0694	6.10.8.1.2-1
136.900	1.999	17.00	1.75	---	---	17.00	1.75	0.1402	6.10.8.1.1-1
136.900	1.999	17.00	1.75	---	---	17.00	1.75	0.0110	6.10.8.1.2-1

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
137.000	2.000	17.00	1.75	---	---	17.00	1.75	0.0027	6.10.8.1.2-1

Load combination: Final Default Service II

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	1.75	0.0055	6.10.4.2.2-3	17.00	1.75	0.0055	6.10.4.2.2-3
0.100	1.001	17.00	1.75	0.0075	6.10.4.2.2-3	17.00	1.75	0.0075	6.10.4.2.2-3
0.100	1.001	17.00	1.75	0.0135	6.10.4.2.2-3	17.00	1.75	0.0135	6.10.4.2.2-3
1.750	1.013	17.00	1.75	0.0653	6.10.4.2.2-3	17.00	1.75	0.0653	6.10.4.2.2-3
3.500	1.026	17.00	1.75	0.1963	6.10.4.2.2-3	17.00	1.75	0.1963	6.10.4.2.2-3
10.000	1.073	17.00	1.75	0.4016	6.10.4.2.2-3	17.00	1.75	0.4016	6.10.4.2.2-3
16.500	1.120	17.00	1.75	0.5741	6.10.4.2.2-3	17.00	1.75	0.5741	6.10.4.2.2-3
23.000	1.168	17.00	1.75	0.7225	6.10.4.2.2-3	17.00	1.75	0.7225	6.10.4.2.2-3
29.500	1.215	17.00	1.75	0.8598	6.10.4.2.2-3	17.00	1.75	0.8598	6.10.4.2.2-3
34.900	1.255	17.00	1.75	0.9157	6.10.4.2.2-3	17.00	1.75	0.9157	6.10.4.2.2-3
35.100	1.256	17.00	2.25	0.7290	6.10.4.2.2-3	17.00	2.50	0.6828	6.10.4.2.2-3
36.000	1.263	17.00	2.25	0.7391	6.10.4.2.2-3	17.00	2.50	0.6923	6.10.4.2.2-3
42.500	1.310	17.00	2.25	0.8154	6.10.4.2.2-3	17.00	2.50	0.7639	6.10.4.2.2-3
49.000	1.358	17.00	2.25	0.8761	6.10.4.2.2-3	17.00	2.50	0.8204	6.10.4.2.2-3
55.500	1.405	17.00	2.25	0.9114	6.10.4.2.2-3	17.00	2.50	0.8536	6.10.4.2.2-3
62.000	1.453	17.00	2.25	0.9305	6.10.4.2.2-3	17.00	2.50	0.8715	6.10.4.2.2-3
68.500	1.500	17.00	2.25	0.9403	6.10.4.2.2-3	17.00	2.50	0.8807	6.10.4.2.2-3
75.000	1.547	17.00	2.25	0.9348	6.10.4.2.2-3	17.00	2.50	0.8756	6.10.4.2.2-3
81.500	1.595	17.00	2.25	0.9122	6.10.4.2.2-3	17.00	2.50	0.8543	6.10.4.2.2-3
88.000	1.642	17.00	2.25	0.8739	6.10.4.2.2-3	17.00	2.50	0.8184	6.10.4.2.2-3
94.500	1.690	17.00	2.25	0.8192	6.10.4.2.2-3	17.00	2.50	0.7671	6.10.4.2.2-3
101.000	1.737	17.00	2.25	0.7430	6.10.4.2.2-3	17.00	2.50	0.6960	6.10.4.2.2-3
101.900	1.744	17.00	2.25	0.7272	6.10.4.2.2-3	17.00	2.50	0.6811	6.10.4.2.2-3
102.100	1.745	17.00	1.75	0.9121	6.10.4.2.2-3	17.00	1.75	0.9121	6.10.4.2.2-3
107.500	1.785	17.00	1.75	0.8159	6.10.4.2.2-3	17.00	1.75	0.8159	6.10.4.2.2-3
114.000	1.832	17.00	1.75	0.7124	6.10.4.2.2-3	17.00	1.75	0.7124	6.10.4.2.2-3
120.500	1.880	17.00	1.75	0.5630	6.10.4.2.2-3	17.00	1.75	0.5630	6.10.4.2.2-3

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
127.000	1.927	17.00	1.75	0.3902	6.10.4.2.2-3	17.00	1.75	0.3902	6.10.4.2.2-3
133.500	1.974	17.00	1.75	0.1355	6.10.4.2.2-3	17.00	1.75	0.1355	6.10.4.2.2-3
135.250	1.987	17.00	1.75	0.0677	6.10.4.2.2-3	17.00	1.75	0.0677	6.10.4.2.2-3
136.900	1.999	17.00	1.75	0.0056	6.10.4.2.2-3	17.00	1.75	0.0056	6.10.4.2.2-3
136.900	1.999	17.00	1.75	0.0115	6.10.4.2.2-3	17.00	1.75	0.0115	6.10.4.2.2-3
137.000	2.000	17.00	1.75	0.0037	6.10.4.2.2-3	17.00	1.75	0.0037	6.10.4.2.2-3

Load combination: Final Default Fatigue

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	1.75	0.1371	6.10.5.3-1	17.00	1.75	0.1371	6.10.5.3-1
0.100	1.001	17.00	1.75	0.1363	6.10.5.3-1	17.00	1.75	0.1363	6.10.5.3-1
0.100	1.001	17.00	1.75	0.1363	6.10.5.3-1	17.00	1.75	0.1363	6.10.5.3-1
1.750	1.013	17.00	1.75	0.1245	6.10.5.3-1	17.00	1.75	0.1245	6.10.5.3-1
3.500	1.026	17.00	1.75	0.1214	6.10.5.3-1	17.00	1.75	0.1214	6.10.5.3-1
10.000	1.073	17.00	1.75	0.2875	6.6.1.2.2-1	17.00	1.75	0.2875	6.6.1.2.2-1
16.500	1.120	17.00	1.75	0.4266	6.6.1.2.2-1	17.00	1.75	0.4266	6.6.1.2.2-1
23.000	1.168	17.00	1.75	0.5310	6.6.1.2.2-1	17.00	1.75	0.5310	6.6.1.2.2-1
29.500	1.215	17.00	1.75	0.6373	6.6.1.2.2-1	17.00	1.75	0.6373	6.6.1.2.2-1
34.900	1.255	17.00	1.75	0.7236	6.6.1.2.2-1	17.00	1.75	0.7236	6.6.1.2.2-1
35.100	1.256	17.00	2.25	0.5207	6.6.1.2.2-1	17.00	2.50	0.5207	6.6.1.2.2-1
36.000	1.263	17.00	2.25	0.5219	6.6.1.2.2-1	17.00	2.50	0.5219	6.6.1.2.2-1
42.500	1.310	17.00	2.25	0.5785	6.6.1.2.2-1	17.00	2.50	0.5785	6.6.1.2.2-1
49.000	1.358	17.00	2.25	0.6006	6.6.1.2.2-1	17.00	2.50	0.6006	6.6.1.2.2-1
55.500	1.405	17.00	2.25	0.6126	6.6.1.2.2-1	17.00	2.50	0.6126	6.6.1.2.2-1
62.000	1.453	17.00	2.25	0.6130	6.6.1.2.2-1	17.00	2.50	0.6130	6.6.1.2.2-1
68.500	1.500	17.00	2.25	0.6248	6.6.1.2.2-1	17.00	2.50	0.6248	6.6.1.2.2-1
75.000	1.547	17.00	2.25	0.6284	6.6.1.2.2-1	17.00	2.50	0.6284	6.6.1.2.2-1
81.500	1.595	17.00	2.25	0.6222	6.6.1.2.2-1	17.00	2.50	0.6222	6.6.1.2.2-1
88.000	1.642	17.00	2.25	0.5926	6.6.1.2.2-1	17.00	2.50	0.5926	6.6.1.2.2-1
94.500	1.690	17.00	2.25	0.5657	6.6.1.2.2-1	17.00	2.50	0.5657	6.6.1.2.2-1
101.000	1.737	17.00	2.25	0.5404	6.6.1.2.2-1	17.00	2.50	0.5404	6.6.1.2.2-1

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
101.900	1.744	17.00	2.25	0.5250	6.6.1.2.2-1	17.00	2.50	0.5250	6.6.1.2.2-1
102.100	1.745	17.00	1.75	0.7252	6.6.1.2.2-1	17.00	1.75	0.7252	6.6.1.2.2-1
107.500	1.785	17.00	1.75	0.6319	6.6.1.2.2-1	17.00	1.75	0.6319	6.6.1.2.2-1
114.000	1.832	17.00	1.75	0.5305	6.6.1.2.2-1	17.00	1.75	0.5305	6.6.1.2.2-1
120.500	1.880	17.00	1.75	0.4259	6.6.1.2.2-1	17.00	1.75	0.4259	6.6.1.2.2-1
127.000	1.927	17.00	1.75	0.2950	6.6.1.2.2-1	17.00	1.75	0.2950	6.6.1.2.2-1
133.500	1.974	17.00	1.75	0.1391	6.6.1.2.2-1	17.00	1.75	0.1391	6.6.1.2.2-1
135.250	1.987	17.00	1.75	0.1332	6.10.5.3-1	17.00	1.75	0.1332	6.10.5.3-1
136.900	1.999	17.00	1.75	0.1353	6.10.5.3-1	17.00	1.75	0.1353	6.10.5.3-1
136.900	1.999	17.00	1.75	0.1353	6.10.5.3-1	17.00	1.75	0.1353	6.10.5.3-1
137.000	2.000	17.00	1.75	0.1362	6.10.5.3-1	17.00	1.75	0.1362	6.10.5.3-1

Summary Shear Report

Load combination: Initial Default

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
0.000	1.000	0.75	45.00	3.5000	Stiffened	---	---	0.0325	6.10.3.3-1
0.100	1.001	0.75	45.00	3.5000	Stiffened	---	---	0.0323	6.10.3.3-1
1.750	1.013	0.75	45.00	3.5000	Stiffened	---	---	0.0316	6.10.3.3-1
3.500	1.026	0.75	45.00	13.0000	Unstiffened	---	---	0.0307	6.10.3.3-1
10.000	1.073	0.75	45.00	13.0000	Unstiffened	---	---	0.0280	6.10.3.3-1
16.500	1.120	0.75	45.00	13.0000	Unstiffened	---	---	0.0252	6.10.3.3-1
23.000	1.168	0.75	45.00	13.0000	Unstiffened	---	---	0.0225	6.10.3.3-1
29.500	1.215	0.75	45.00	13.0000	Unstiffened	---	---	0.0197	6.10.3.3-1
34.900	1.255	0.75	45.00	13.0000	Unstiffened	---	---	0.0174	6.10.3.3-1
35.100	1.256	0.75	45.00	13.0000	Unstiffened	---	---	0.0173	6.10.3.3-1
36.000	1.263	0.75	45.00	13.0000	Unstiffened	---	---	0.0169	6.10.3.3-1
42.500	1.310	0.75	45.00	13.0000	Unstiffened	---	---	0.0134	6.10.3.3-1
49.000	1.358	0.75	45.00	13.0000	Unstiffened	---	---	0.0101	6.10.3.3-1
55.500	1.405	0.75	45.00	13.0000	Unstiffened	---	---	0.0067	6.10.3.3-1
62.000	1.453	0.75	45.00	13.0000	Unstiffened	---	---	0.0034	6.10.3.3-1

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
68.500	1.500	0.75	45.00	13.0000	Unstiffened	---	---	0.0001	6.10.3.3-1
75.000	1.547	0.75	45.00	13.0000	Unstiffened	---	---	0.0034	6.10.3.3-1
81.500	1.595	0.75	45.00	13.0000	Unstiffened	---	---	0.0069	6.10.3.3-1
88.000	1.642	0.75	45.00	13.0000	Unstiffened	---	---	0.0101	6.10.3.3-1
94.500	1.690	0.75	45.00	13.0000	Unstiffened	---	---	0.0136	6.10.3.3-1
101.000	1.737	0.75	45.00	13.0000	Unstiffened	---	---	0.0169	6.10.3.3-1
101.900	1.744	0.75	45.00	13.0000	Unstiffened	---	---	0.0173	6.10.3.3-1
102.100	1.745	0.75	45.00	13.0000	Unstiffened	---	---	0.0174	6.10.3.3-1
107.500	1.785	0.75	45.00	13.0000	Unstiffened	---	---	0.0199	6.10.3.3-1
114.000	1.832	0.75	45.00	13.0000	Unstiffened	---	---	0.0225	6.10.3.3-1
120.500	1.880	0.75	45.00	13.0000	Unstiffened	---	---	0.0254	6.10.3.3-1
127.000	1.927	0.75	45.00	13.0000	Unstiffened	---	---	0.0280	6.10.3.3-1
133.500	1.974	0.75	45.00	13.0000	Unstiffened	---	---	0.0309	6.10.3.3-1
135.250	1.987	0.75	45.00	3.5000	Stiffened	---	---	0.0316	6.10.3.3-1
136.900	1.999	0.75	45.00	3.5000	Stiffened	---	---	0.0323	6.10.3.3-1
137.000	2.000	0.75	45.00	3.5000	Stiffened	---	---	0.0325	6.10.3.3-1

Load combination: Final Default Strength I

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
0.000	1.000	0.75	45.00	3.5000	Stiffened	---	---	0.2852	6.10.9.1-1
0.100	1.001	0.75	45.00	3.5000	Stiffened	---	---	0.2811	6.10.9.1-1
0.100	1.001	0.75	45.00	3.5000	Stiffened	---	---	0.2811	6.10.9.1-1
1.750	1.013	0.75	45.00	3.5000	Stiffened	---	---	0.2549	6.10.9.1-1
3.500	1.026	0.75	45.00	13.0000	Unstiffened	---	---	0.2504	6.10.9.1-1
10.000	1.073	0.75	45.00	13.0000	Unstiffened	---	---	0.2286	6.10.9.1-1
16.500	1.120	0.75	45.00	13.0000	Unstiffened	---	---	0.2047	6.10.9.1-1
23.000	1.168	0.75	45.00	13.0000	Unstiffened	---	---	0.1880	6.10.9.1-1
29.500	1.215	0.75	45.00	13.0000	Unstiffened	---	---	0.1765	6.10.9.1-1
34.900	1.255	0.75	45.00	13.0000	Unstiffened	---	---	0.1556	6.10.9.1-1
35.100	1.256	0.75	45.00	13.0000	Unstiffened	---	---	0.1552	6.10.9.1-1
36.000	1.263	0.75	45.00	13.0000	Unstiffened	---	---	0.1537	6.10.9.1-1

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
42.500	1.310	0.75	45.00	13.0000	Unstiffened	---	---	0.1340	6.10.9.1-1
49.000	1.358	0.75	45.00	13.0000	Unstiffened	---	---	0.1171	6.10.9.1-1
55.500	1.405	0.75	45.00	13.0000	Unstiffened	---	---	0.0968	6.10.9.1-1
62.000	1.453	0.75	45.00	13.0000	Unstiffened	---	---	0.0785	6.10.9.1-1
68.500	1.500	0.75	45.00	13.0000	Unstiffened	---	---	0.0602	6.10.9.1-1
75.000	1.547	0.75	45.00	13.0000	Unstiffened	---	---	0.0764	6.10.9.1-1
81.500	1.595	0.75	45.00	13.0000	Unstiffened	---	---	0.0978	6.10.9.1-1
88.000	1.642	0.75	45.00	13.0000	Unstiffened	---	---	0.1145	6.10.9.1-1
94.500	1.690	0.75	45.00	13.0000	Unstiffened	---	---	0.1401	6.10.9.1-1
101.000	1.737	0.75	45.00	13.0000	Unstiffened	---	---	0.1591	6.10.9.1-1
101.900	1.744	0.75	45.00	13.0000	Unstiffened	---	---	0.1606	6.10.9.1-1
102.100	1.745	0.75	45.00	13.0000	Unstiffened	---	---	0.1609	6.10.9.1-1
107.500	1.785	0.75	45.00	13.0000	Unstiffened	---	---	0.1728	6.10.9.1-1
114.000	1.832	0.75	45.00	13.0000	Unstiffened	---	---	0.1848	6.10.9.1-1
120.500	1.880	0.75	45.00	13.0000	Unstiffened	---	---	0.2066	6.10.9.1-1
127.000	1.927	0.75	45.00	13.0000	Unstiffened	---	---	0.2330	6.10.9.1-1
133.500	1.974	0.75	45.00	13.0000	Unstiffened	---	---	0.2704	6.10.9.1-1
135.250	1.987	0.75	45.00	3.5000	Stiffened	---	---	0.2730	6.10.9.1-1
136.900	1.999	0.75	45.00	3.5000	Stiffened	---	---	0.2755	6.10.9.1-1
136.900	1.999	0.75	45.00	3.5000	Stiffened	---	---	0.2755	6.10.9.1-1
137.000	2.000	0.75	45.00	3.5000	Stiffened	---	---	0.2800	6.10.9.1-1

Group01 Member 02

Overall Design Summary Report

POI Location (ft)	Span Fraction	Critical Load Combination
0.000	1.000	Final - Strength I 6.10.7.3-1 0.407
0.100	1.001	Final - Strength I 6.10.7.3-1 0.407

POI Location (ft)	Span Fraction	Critical Load Combination
1.750	1.013	Final - Strength I 6.10.7.3-1 0.407
3.500	1.026	Final - Strength I 6.10.7.3-1 0.407
10.000	1.073	Final - Strength I 6.10.7.3-1 0.407
16.500	1.120	Final - Service II 6.10.4.2.2-2 0.423
23.000	1.168	Final - Service II 6.10.4.2.2-2 0.552
29.500	1.215	Final - Service II 6.10.4.2.2-2 0.661
34.900	1.255	Final - Service II 6.10.4.2.2-2 0.743
35.100	1.256	Final - Strength I 6.10.7.1.1-1 0.574
36.000	1.263	Final - Strength I 6.10.7.1.1-1 0.587
42.500	1.310	Final - Strength I 6.10.7.1.1-1 0.641
49.000	1.358	Final - Strength I 6.10.7.1.1-1 0.686
55.500	1.405	Final - Strength I 6.10.7.1.1-1 0.714
		Final - Strength I

POI Location (ft)	Span Fraction	Critical Load Combination
62.000	1.453	6.10.7.1.1-1 0.732
68.500	1.500	Final - Strength I 6.10.7.1.1-1 0.735
75.000	1.547	Final - Strength I 6.10.7.1.1-1 0.730
81.500	1.595	Final - Strength I 6.10.7.1.1-1 0.712
88.000	1.642	Final - Strength I 6.10.7.1.1-1 0.683
94.500	1.690	Final - Strength I 6.10.7.1.1-1 0.635
101.000	1.737	Final - Strength I 6.10.7.1.1-1 0.584
101.900	1.744	Final - Strength I 6.10.7.1.1-1 0.577
102.100	1.745	Final - Service II 6.10.4.2.2-2 0.746
107.500	1.785	Final - Service II 6.10.4.2.2-2 0.666
114.000	1.832	Final - Service II 6.10.4.2.2-2 0.560
120.500	1.880	Final - Service II 6.10.4.2.2-2 0.432
127.000	1.927	Final - Strength I 6.10.7.3-1

POI Location (ft)	Span Fraction	Critical Load Combination
		0.407
133.500	1.974	Final - Strength I 6.10.7.3-1 0.407
135.250	1.987	Final - Strength I 6.10.7.3-1 0.407
136.900	1.999	Final - Strength I 6.10.7.3-1 0.407
137.000	2.000	Final - Strength I 6.10.7.3-1 0.407

Summary Flexure Report

Load combination: Initial Default

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	1.75	0.0000	6.10.3.2.1-1	17.00	1.75	0.0000	6.10.3.2.2-1
0.100	1.001	17.00	1.75	0.0005	6.10.3.2.1-1	17.00	1.75	0.0005	6.10.3.2.2-1
1.750	1.013	17.00	1.75	0.0084	6.10.3.2.1-1	17.00	1.75	0.0084	6.10.3.2.2-1
3.500	1.026	17.00	1.75	0.0166	6.10.3.2.1-1	17.00	1.75	0.0166	6.10.3.2.2-1
10.000	1.073	17.00	1.75	0.0450	6.10.3.2.1-1	17.00	1.75	0.0450	6.10.3.2.2-1
16.500	1.120	17.00	1.75	0.0709	6.10.3.2.1-1	17.00	1.75	0.0709	6.10.3.2.2-1
23.000	1.168	17.00	1.75	0.0940	6.10.3.2.1-1	17.00	1.75	0.0940	6.10.3.2.2-1
29.500	1.215	17.00	1.75	0.1145	6.10.3.2.1-1	17.00	1.75	0.1145	6.10.3.2.2-1
34.900	1.255	17.00	1.75	0.1293	6.10.3.2.1-1	17.00	1.75	0.1293	6.10.3.2.2-1
35.100	1.256	17.00	2.25	0.1031	6.10.3.2.1-1	17.00	2.50	0.0967	6.10.3.2.2-1
36.000	1.263	17.00	2.25	0.1049	6.10.3.2.1-1	17.00	2.50	0.0984	6.10.3.2.2-1
42.500	1.310	17.00	2.25	0.1166	6.10.3.2.1-1	17.00	2.50	0.1094	6.10.3.2.2-1
49.000	1.358	17.00	2.25	0.1257	6.10.3.2.1-1	17.00	2.50	0.1178	6.10.3.2.2-1
55.500	1.405	17.00	2.25	0.1322	6.10.3.2.1-1	17.00	2.50	0.1240	6.10.3.2.2-1
62.000	1.453	17.00	2.25	0.1360	6.10.3.2.1-1	17.00	2.50	0.1276	6.10.3.2.2-1

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
68.500	1.500	17.00	2.25	0.1374	6.10.3.2.1-1	17.00	2.50	0.1288	6.10.3.2.2-1
75.000	1.547	17.00	2.25	0.1360	6.10.3.2.1-1	17.00	2.50	0.1276	6.10.3.2.2-1
81.500	1.595	17.00	2.25	0.1322	6.10.3.2.1-1	17.00	2.50	0.1240	6.10.3.2.2-1
88.000	1.642	17.00	2.25	0.1257	6.10.3.2.1-1	17.00	2.50	0.1178	6.10.3.2.2-1
94.500	1.690	17.00	2.25	0.1166	6.10.3.2.1-1	17.00	2.50	0.1094	6.10.3.2.2-1
101.000	1.737	17.00	2.25	0.1049	6.10.3.2.1-1	17.00	2.50	0.0984	6.10.3.2.2-1
101.900	1.744	17.00	2.25	0.1031	6.10.3.2.1-1	17.00	2.50	0.0967	6.10.3.2.2-1
102.100	1.745	17.00	1.75	0.1293	6.10.3.2.1-1	17.00	1.75	0.1293	6.10.3.2.2-1
107.500	1.785	17.00	1.75	0.1145	6.10.3.2.1-1	17.00	1.75	0.1145	6.10.3.2.2-1
114.000	1.832	17.00	1.75	0.0940	6.10.3.2.1-1	17.00	1.75	0.0940	6.10.3.2.2-1
120.500	1.880	17.00	1.75	0.0709	6.10.3.2.1-1	17.00	1.75	0.0709	6.10.3.2.2-1
127.000	1.927	17.00	1.75	0.0450	6.10.3.2.1-1	17.00	1.75	0.0450	6.10.3.2.2-1
133.500	1.974	17.00	1.75	0.0166	6.10.3.2.1-1	17.00	1.75	0.0166	6.10.3.2.2-1
135.250	1.987	17.00	1.75	0.0084	6.10.3.2.1-1	17.00	1.75	0.0084	6.10.3.2.2-1
136.900	1.999	17.00	1.75	0.0005	6.10.3.2.1-1	17.00	1.75	0.0005	6.10.3.2.2-1
137.000	2.000	17.00	1.75	0.0000	6.10.3.2.1-1	17.00	1.75	0.0000	6.10.3.2.2-1

Load combination: Final Default Strength I

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	1.75	0.4075	6.10.7.3-1	17.00	1.75	0.4075	6.10.7.3-1
0.100	1.001	17.00	1.75	0.4075	6.10.7.3-1	17.00	1.75	0.4075	6.10.7.3-1
1.750	1.013	17.00	1.75	0.4075	6.10.7.3-1	17.00	1.75	0.4075	6.10.7.3-1
3.500	1.026	17.00	1.75	0.4075	6.10.7.3-1	17.00	1.75	0.4075	6.10.7.3-1
10.000	1.073	17.00	1.75	0.4075	6.10.7.3-1	17.00	1.75	0.4075	6.10.7.3-1
16.500	1.120	17.00	1.75	0.4130	6.10.7.1.1-1	17.00	1.75	0.4130	6.10.7.1.1-1
23.000	1.168	17.00	1.75	0.5371	6.10.7.1.1-1	17.00	1.75	0.5371	6.10.7.1.1-1
29.500	1.215	17.00	1.75	0.6418	6.10.7.1.1-1	17.00	1.75	0.6418	6.10.7.1.1-1
34.900	1.255	17.00	1.75	0.7195	6.10.7.1.1-1	17.00	1.75	0.7195	6.10.7.1.1-1
35.100	1.256	17.00	2.25	0.5742	6.10.7.1.1-1	17.00	2.50	0.5742	6.10.7.1.1-1
36.000	1.263	17.00	2.25	0.5870	6.10.7.1.1-1	17.00	2.50	0.5870	6.10.7.1.1-1
42.500	1.310	17.00	2.25	0.6411	6.10.7.1.1-1	17.00	2.50	0.6411	6.10.7.1.1-1

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
49.000	1.358	17.00	2.25	0.6855	6.10.7.1.1-1	17.00	2.50	0.6855	6.10.7.1.1-1
55.500	1.405	17.00	2.25	0.7138	6.10.7.1.1-1	17.00	2.50	0.7138	6.10.7.1.1-1
62.000	1.453	17.00	2.25	0.7315	6.10.7.1.1-1	17.00	2.50	0.7315	6.10.7.1.1-1
68.500	1.500	17.00	2.25	0.7349	6.10.7.1.1-1	17.00	2.50	0.7349	6.10.7.1.1-1
75.000	1.547	17.00	2.25	0.7299	6.10.7.1.1-1	17.00	2.50	0.7299	6.10.7.1.1-1
81.500	1.595	17.00	2.25	0.7117	6.10.7.1.1-1	17.00	2.50	0.7117	6.10.7.1.1-1
88.000	1.642	17.00	2.25	0.6832	6.10.7.1.1-1	17.00	2.50	0.6832	6.10.7.1.1-1
94.500	1.690	17.00	2.25	0.6354	6.10.7.1.1-1	17.00	2.50	0.6354	6.10.7.1.1-1
101.000	1.737	17.00	2.25	0.5837	6.10.7.1.1-1	17.00	2.50	0.5837	6.10.7.1.1-1
101.900	1.744	17.00	2.25	0.5772	6.10.7.1.1-1	17.00	2.50	0.5772	6.10.7.1.1-1
102.100	1.745	17.00	1.75	0.7229	6.10.7.1.1-1	17.00	1.75	0.7229	6.10.7.1.1-1
107.500	1.785	17.00	1.75	0.6458	6.10.7.1.1-1	17.00	1.75	0.6458	6.10.7.1.1-1
114.000	1.832	17.00	1.75	0.5438	6.10.7.1.1-1	17.00	1.75	0.5438	6.10.7.1.1-1
120.500	1.880	17.00	1.75	0.4189	6.10.7.1.1-1	17.00	1.75	0.4189	6.10.7.1.1-1
127.000	1.927	17.00	1.75	0.4075	6.10.7.3-1	17.00	1.75	0.4075	6.10.7.3-1
133.500	1.974	17.00	1.75	0.4075	6.10.7.3-1	17.00	1.75	0.4075	6.10.7.3-1
135.250	1.987	17.00	1.75	0.4075	6.10.7.3-1	17.00	1.75	0.4075	6.10.7.3-1
136.900	1.999	17.00	1.75	0.4075	6.10.7.3-1	17.00	1.75	0.4075	6.10.7.3-1
137.000	2.000	17.00	1.75	0.4075	6.10.7.3-1	17.00	1.75	0.4075	6.10.7.3-1

Load combination: Final Default Service II

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	1.75	0.0000	6.10.4.2.2-1	17.00	1.75	0.0009	6.10.4.2.2-2
0.100	1.001	17.00	1.75	0.0017	6.10.4.2.2-1	17.00	1.75	0.0038	6.10.4.2.2-2
1.750	1.013	17.00	1.75	0.0305	6.10.4.2.2-1	17.00	1.75	0.0567	6.10.4.2.2-2
3.500	1.026	17.00	1.75	0.0598	6.10.4.2.2-1	17.00	1.75	0.1102	6.10.4.2.2-2
10.000	1.073	17.00	1.75	0.1587	6.10.4.2.2-1	17.00	1.75	0.2823	6.10.4.2.2-2
16.500	1.120	17.00	1.75	0.2439	6.10.4.2.2-1	17.00	1.75	0.4230	6.10.4.2.2-2
23.000	1.168	17.00	1.75	0.3196	6.10.4.2.2-1	17.00	1.75	0.5524	6.10.4.2.2-2
29.500	1.215	17.00	1.75	0.3851	6.10.4.2.2-1	17.00	1.75	0.6607	6.10.4.2.2-2
34.900	1.255	17.00	1.75	0.4321	6.10.4.2.2-1	17.00	1.75	0.7427	6.10.4.2.2-2

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
35.100	1.256	17.00	2.25	0.3679	6.10.4.2.2-1	17.00	2.50	0.5666	6.10.4.2.2-2
36.000	1.263	17.00	2.25	0.3750	6.10.4.2.2-1	17.00	2.50	0.5788	6.10.4.2.2-2
42.500	1.310	17.00	2.25	0.4124	6.10.4.2.2-1	17.00	2.50	0.6327	6.10.4.2.2-2
49.000	1.358	17.00	2.25	0.4424	6.10.4.2.2-1	17.00	2.50	0.6768	6.10.4.2.2-2
55.500	1.405	17.00	2.25	0.4626	6.10.4.2.2-1	17.00	2.50	0.7052	6.10.4.2.2-2
62.000	1.453	17.00	2.25	0.4763	6.10.4.2.2-1	17.00	2.50	0.7208	6.10.4.2.2-2
68.500	1.500	17.00	2.25	0.4796	6.10.4.2.2-1	17.00	2.50	0.7244	6.10.4.2.2-2
75.000	1.547	17.00	2.25	0.4756	6.10.4.2.2-1	17.00	2.50	0.7198	6.10.4.2.2-2
81.500	1.595	17.00	2.25	0.4629	6.10.4.2.2-1	17.00	2.50	0.7016	6.10.4.2.2-2
88.000	1.642	17.00	2.25	0.4427	6.10.4.2.2-1	17.00	2.50	0.6730	6.10.4.2.2-2
94.500	1.690	17.00	2.25	0.4117	6.10.4.2.2-1	17.00	2.50	0.6261	6.10.4.2.2-2
101.000	1.737	17.00	2.25	0.3740	6.10.4.2.2-1	17.00	2.50	0.5760	6.10.4.2.2-2
101.900	1.744	17.00	2.25	0.3687	6.10.4.2.2-1	17.00	2.50	0.5694	6.10.4.2.2-2
102.100	1.745	17.00	1.75	0.4328	6.10.4.2.2-1	17.00	1.75	0.7459	6.10.4.2.2-2
107.500	1.785	17.00	1.75	0.3852	6.10.4.2.2-1	17.00	1.75	0.6664	6.10.4.2.2-2
114.000	1.832	17.00	1.75	0.3203	6.10.4.2.2-1	17.00	1.75	0.5604	6.10.4.2.2-2
120.500	1.880	17.00	1.75	0.2438	6.10.4.2.2-1	17.00	1.75	0.4318	6.10.4.2.2-2
127.000	1.927	17.00	1.75	0.1583	6.10.4.2.2-1	17.00	1.75	0.2857	6.10.4.2.2-2
133.500	1.974	17.00	1.75	0.0594	6.10.4.2.2-1	17.00	1.75	0.1083	6.10.4.2.2-2
135.250	1.987	17.00	1.75	0.0303	6.10.4.2.2-1	17.00	1.75	0.0565	6.10.4.2.2-2
136.900	1.999	17.00	1.75	0.0017	6.10.4.2.2-1	17.00	1.75	0.0046	6.10.4.2.2-2
137.000	2.000	17.00	1.75	0.0000	6.10.4.2.2-1	17.00	1.75	0.0015	6.10.4.2.2-2

Load combination: Final Default Fatigue

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	1.75	0.1530	6.10.5.3-1	17.00	1.75	0.1530	6.10.5.3-1
0.100	1.001	17.00	1.75	0.1493	6.10.5.3-1	17.00	1.75	0.1493	6.10.5.3-1
1.750	1.013	17.00	1.75	0.1467	6.10.5.3-1	17.00	1.75	0.1467	6.10.5.3-1
3.500	1.026	17.00	1.75	0.1425	6.10.5.3-1	17.00	1.75	0.1425	6.10.5.3-1
10.000	1.073	17.00	1.75	0.2889	6.6.1.2.2-1	17.00	1.75	0.2889	6.6.1.2.2-1
16.500	1.120	17.00	1.75	0.4093	6.6.1.2.2-1	17.00	1.75	0.4093	6.6.1.2.2-1

Date:	4/12/2018	Govornor Bridge Road Design- One Lane.lbs	
Time:	9:16 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 7th Ed. with 2016 Interims]	v17.00.02.15

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
23.000	1.168	17.00	1.75	0.5118	6.6.1.2.2-1	17.00	1.75	0.5118	6.6.1.2.2-1
29.500	1.215	17.00	1.75	0.5999	6.6.1.2.2-1	17.00	1.75	0.5999	6.6.1.2.2-1
34.900	1.255	17.00	1.75	0.6635	6.6.1.2.2-1	17.00	1.75	0.6635	6.6.1.2.2-1
35.100	1.256	17.00	2.25	0.5045	6.6.1.2.2-1	17.00	2.50	0.5045	6.6.1.2.2-1
36.000	1.263	17.00	2.25	0.5189	6.6.1.2.2-1	17.00	2.50	0.5189	6.6.1.2.2-1
42.500	1.310	17.00	2.25	0.5608	6.6.1.2.2-1	17.00	2.50	0.5608	6.6.1.2.2-1
49.000	1.358	17.00	2.25	0.5976	6.6.1.2.2-1	17.00	2.50	0.5976	6.6.1.2.2-1
55.500	1.405	17.00	2.25	0.6112	6.6.1.2.2-1	17.00	2.50	0.6112	6.6.1.2.2-1
62.000	1.453	17.00	2.25	0.6243	6.6.1.2.2-1	17.00	2.50	0.6243	6.6.1.2.2-1
68.500	1.500	17.00	2.25	0.6145	6.6.1.2.2-1	17.00	2.50	0.6145	6.6.1.2.2-1
75.000	1.547	17.00	2.25	0.6175	6.6.1.2.2-1	17.00	2.50	0.6175	6.6.1.2.2-1
81.500	1.595	17.00	2.25	0.6099	6.6.1.2.2-1	17.00	2.50	0.6099	6.6.1.2.2-1
88.000	1.642	17.00	2.25	0.5976	6.6.1.2.2-1	17.00	2.50	0.5976	6.6.1.2.2-1
94.500	1.690	17.00	2.25	0.5577	6.6.1.2.2-1	17.00	2.50	0.5577	6.6.1.2.2-1
101.000	1.737	17.00	2.25	0.5114	6.6.1.2.2-1	17.00	2.50	0.5114	6.6.1.2.2-1
101.900	1.744	17.00	2.25	0.5101	6.6.1.2.2-1	17.00	2.50	0.5101	6.6.1.2.2-1
102.100	1.745	17.00	1.75	0.6724	6.6.1.2.2-1	17.00	1.75	0.6724	6.6.1.2.2-1
107.500	1.785	17.00	1.75	0.5984	6.6.1.2.2-1	17.00	1.75	0.5984	6.6.1.2.2-1
114.000	1.832	17.00	1.75	0.5171	6.6.1.2.2-1	17.00	1.75	0.5171	6.6.1.2.2-1
120.500	1.880	17.00	1.75	0.4078	6.6.1.2.2-1	17.00	1.75	0.4078	6.6.1.2.2-1
127.000	1.927	17.00	1.75	0.2832	6.6.1.2.2-1	17.00	1.75	0.2832	6.6.1.2.2-1
133.500	1.974	17.00	1.75	0.1412	6.10.5.3-1	17.00	1.75	0.1412	6.10.5.3-1
135.250	1.987	17.00	1.75	0.1452	6.10.5.3-1	17.00	1.75	0.1452	6.10.5.3-1
136.900	1.999	17.00	1.75	0.1524	6.10.5.3-1	17.00	1.75	0.1524	6.10.5.3-1
137.000	2.000	17.00	1.75	0.1529	6.10.5.3-1	17.00	1.75	0.1529	6.10.5.3-1

Summary Shear Report

Load combination: Initial Default

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
0.000	1.000	0.75	45.00	3.5000	Stiffened	---	---	0.0329	6.10.3.3-1

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
0.100	1.001	0.75	45.00	3.5000	Stiffened	---	---	0.0324	6.10.3.3-1
1.750	1.013	0.75	45.00	3.5000	Stiffened	---	---	0.0318	6.10.3.3-1
3.500	1.026	0.75	45.00	13.0000	Unstiffened	---	---	0.0307	6.10.3.3-1
10.000	1.073	0.75	45.00	13.0000	Unstiffened	---	---	0.0280	6.10.3.3-1
16.500	1.120	0.75	45.00	13.0000	Unstiffened	---	---	0.0251	6.10.3.3-1
23.000	1.168	0.75	45.00	13.0000	Unstiffened	---	---	0.0225	6.10.3.3-1
29.500	1.215	0.75	45.00	13.0000	Unstiffened	---	---	0.0196	6.10.3.3-1
34.900	1.255	0.75	45.00	13.0000	Unstiffened	---	---	0.0174	6.10.3.3-1
35.100	1.256	0.75	45.00	13.0000	Unstiffened	---	---	0.0173	6.10.3.3-1
36.000	1.263	0.75	45.00	13.0000	Unstiffened	---	---	0.0168	6.10.3.3-1
42.500	1.310	0.75	45.00	13.0000	Unstiffened	---	---	0.0133	6.10.3.3-1
49.000	1.358	0.75	45.00	13.0000	Unstiffened	---	---	0.0101	6.10.3.3-1
55.500	1.405	0.75	45.00	13.0000	Unstiffened	---	---	0.0063	6.10.3.3-1
62.000	1.453	0.75	45.00	13.0000	Unstiffened	---	---	0.0034	6.10.3.3-1
68.500	1.500	0.75	45.00	13.0000	Unstiffened	---	---	0.0003	6.10.3.3-1
75.000	1.547	0.75	45.00	13.0000	Unstiffened	---	---	0.0034	6.10.3.3-1
81.500	1.595	0.75	45.00	13.0000	Unstiffened	---	---	0.0070	6.10.3.3-1
88.000	1.642	0.75	45.00	13.0000	Unstiffened	---	---	0.0101	6.10.3.3-1
94.500	1.690	0.75	45.00	13.0000	Unstiffened	---	---	0.0138	6.10.3.3-1
101.000	1.737	0.75	45.00	13.0000	Unstiffened	---	---	0.0168	6.10.3.3-1
101.900	1.744	0.75	45.00	13.0000	Unstiffened	---	---	0.0173	6.10.3.3-1
102.100	1.745	0.75	45.00	13.0000	Unstiffened	---	---	0.0174	6.10.3.3-1
107.500	1.785	0.75	45.00	13.0000	Unstiffened	---	---	0.0200	6.10.3.3-1
114.000	1.832	0.75	45.00	13.0000	Unstiffened	---	---	0.0225	6.10.3.3-1
120.500	1.880	0.75	45.00	13.0000	Unstiffened	---	---	0.0255	6.10.3.3-1
127.000	1.927	0.75	45.00	13.0000	Unstiffened	---	---	0.0280	6.10.3.3-1
133.500	1.974	0.75	45.00	13.0000	Unstiffened	---	---	0.0311	6.10.3.3-1
135.250	1.987	0.75	45.00	3.5000	Stiffened	---	---	0.0318	6.10.3.3-1
136.900	1.999	0.75	45.00	3.5000	Stiffened	---	---	0.0324	6.10.3.3-1
137.000	2.000	0.75	45.00	3.5000	Stiffened	---	---	0.0329	6.10.3.3-1

Load combination: Final Default Strength I

Date:	4/12/2018	Govornor Bridge Road Design- One Lane.lbs	
Time:	9:16 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 7th Ed. with 2016 Interims]	v17.00.02.15

POI Location (ft)	**Span Fraction**	**Web**				**Top Long. Stiff. ds (in)**	**Bottom Long. Stiff. ds (in)**	**Perf. Ratio**	**Control Equation**
		Thickness (in)	**Height (in)**	**d0 (ft)**	**Stiffened/ Unstiffened**				
0.000	1.000	0.75	45.00	3.5000	Stiffened	---	---	0.3245	6.10.9.1-1
0.100	1.001	0.75	45.00	3.5000	Stiffened	---	---	0.3126	6.10.9.1-1
1.750	1.013	0.75	45.00	3.5000	Stiffened	---	---	0.3085	6.10.9.1-1
3.500	1.026	0.75	45.00	13.0000	Unstiffened	---	---	0.2998	6.10.9.1-1
10.000	1.073	0.75	45.00	13.0000	Unstiffened	---	---	0.2622	6.10.9.1-1
16.500	1.120	0.75	45.00	13.0000	Unstiffened	---	---	0.2418	6.10.9.1-1
23.000	1.168	0.75	45.00	13.0000	Unstiffened	---	---	0.2168	6.10.9.1-1
29.500	1.215	0.75	45.00	13.0000	Unstiffened	---	---	0.2081	6.10.9.1-1
34.900	1.255	0.75	45.00	13.0000	Unstiffened	---	---	0.1819	6.10.9.1-1
35.100	1.256	0.75	45.00	13.0000	Unstiffened	---	---	0.1811	6.10.9.1-1
36.000	1.263	0.75	45.00	13.0000	Unstiffened	---	---	0.1785	6.10.9.1-1
42.500	1.310	0.75	45.00	13.0000	Unstiffened	---	---	0.1654	6.10.9.1-1
49.000	1.358	0.75	45.00	13.0000	Unstiffened	---	---	0.1357	6.10.9.1-1
55.500	1.405	0.75	45.00	13.0000	Unstiffened	---	---	0.1314	6.10.9.1-1
62.000	1.453	0.75	45.00	13.0000	Unstiffened	---	---	0.1026	6.10.9.1-1
68.500	1.500	0.75	45.00	13.0000	Unstiffened	---	---	0.0943	6.10.9.1-1
75.000	1.547	0.75	45.00	13.0000	Unstiffened	---	---	0.1028	6.10.9.1-1
81.500	1.595	0.75	45.00	13.0000	Unstiffened	---	---	0.1295	6.10.9.1-1
88.000	1.642	0.75	45.00	13.0000	Unstiffened	---	---	0.1384	6.10.9.1-1
94.500	1.690	0.75	45.00	13.0000	Unstiffened	---	---	0.1664	6.10.9.1-1
101.000	1.737	0.75	45.00	13.0000	Unstiffened	---	---	0.1756	6.10.9.1-1
101.900	1.744	0.75	45.00	13.0000	Unstiffened	---	---	0.1778	6.10.9.1-1
102.100	1.745	0.75	45.00	13.0000	Unstiffened	---	---	0.1822	6.10.9.1-1
107.500	1.785	0.75	45.00	13.0000	Unstiffened	---	---	0.2051	6.10.9.1-1
114.000	1.832	0.75	45.00	13.0000	Unstiffened	---	---	0.2148	6.10.9.1-1
120.500	1.880	0.75	45.00	13.0000	Unstiffened	---	---	0.2424	6.10.9.1-1
127.000	1.927	0.75	45.00	13.0000	Unstiffened	---	---	0.2594	6.10.9.1-1
133.500	1.974	0.75	45.00	13.0000	Unstiffened	---	---	0.2942	6.10.9.1-1
135.250	1.987	0.75	45.00	3.5000	Stiffened	---	---	0.3043	6.10.9.1-1
136.900	1.999	0.75	45.00	3.5000	Stiffened	---	---	0.3215	6.10.9.1-1
137.000	2.000	0.75	45.00	3.5000	Stiffened	---	---	0.3219	6.10.9.1-1

Group01 Member 03

Overall Design Summary Report

POI Location (ft)	Span Fraction	Critical Load Combination
0.000	1.000	Final - Strength I 6.10.9.1-1 0.276
0.100	1.001	Final - Strength I 6.10.9.1-1 0.272
0.100	1.001	Final - Strength I 6.10.9.1-1 0.272
1.750	1.013	Final - Strength I 6.10.9.1-1 0.270
3.500	1.026	Final - Strength I 6.10.9.1-1 0.255
10.000	1.073	Final - Service II 6.10.4.2.2-3 0.390
16.500	1.120	Final - Strength I 6.10.8.1.2-1 0.558
23.000	1.168	Final - Strength I 6.10.8.1.2-1 0.722
29.500	1.215	Final - Strength I 6.10.8.1.2-1 0.855
34.900	1.255	Final - Strength I 6.10.8.1.2-1 0.945
35.100	1.256	Final - Service II 6.10.4.2.2-3 0.732

POI Location (ft)	Span Fraction	Critical Load Combination
36.000	1.263	Final - Service II 6.10.4.2.2-3 0.748
42.500	1.310	Final - Service II 6.10.4.2.2-3 0.811
49.000	1.358	Final - Service II 6.10.4.2.2-3 0.882
55.500	1.405	Final - Service II 6.10.4.2.2-3 0.912
62.000	1.453	Final - Service II 6.10.4.2.2-3 0.937
68.500	1.500	Final - Service II 6.10.4.2.2-3 0.940
75.000	1.547	Final - Service II 6.10.4.2.2-3 0.933
81.500	1.595	Final - Service II 6.10.4.2.2-3 0.905
88.000	1.642	Final - Service II 6.10.4.2.2-3 0.870
94.500	1.690	Final - Service II 6.10.4.2.2-3 0.815
101.000	1.737	Final - Service II 6.10.4.2.2-3 0.740
101.900	1.744	Final - Service II 6.10.4.2.2-3 0.731
		Final - Strength I

POI Location (ft)	Span Fraction	Critical Load Combination
102.100	1.745	6.10.8.1.2-1 0.946
107.500	1.785	Final - Strength I 6.10.8.1.2-1 0.836
114.000	1.832	Final - Strength I 6.10.8.1.2-1 0.733
120.500	1.880	Final - Service II 6.10.4.2.2-3 0.578
127.000	1.927	Final - Service II 6.10.4.2.2-3 0.404
133.500	1.974	Final - Strength I 6.10.9.1-1 0.254
135.250	1.987	Final - Strength I 6.10.9.1-1 0.257
136.900	1.999	Final - Strength I 6.10.9.1-1 0.284
136.900	1.999	Final - Strength I 6.10.9.1-1 0.284
137.000	2.000	Final - Strength I 6.10.9.1-1 0.288

Summary Flexure Report

Load combination: Initial Default

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	1.75	0.0000	6.10.3.2.1-1	17.00	1.75	0.0000	6.10.3.2.2-1

Date:	4/12/2018	Govornor Bridge Road Design- One Lane.lbs	
Time:	9:16 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 7th Ed. with 2016 Interims]	v17.00.02.15

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.100	1.001	17.00	1.75	0.0005	6.10.3.2.1-1	17.00	1.75	0.0005	6.10.3.2.2-1
1.750	1.013	17.00	1.75	0.0083	6.10.3.2.1-1	17.00	1.75	0.0083	6.10.3.2.2-1
3.500	1.026	17.00	1.75	0.0165	6.10.3.2.1-1	17.00	1.75	0.0165	6.10.3.2.2-1
10.000	1.073	17.00	1.75	0.0449	6.10.3.2.1-1	17.00	1.75	0.0449	6.10.3.2.2-1
16.500	1.120	17.00	1.75	0.0708	6.10.3.2.1-1	17.00	1.75	0.0708	6.10.3.2.2-1
23.000	1.168	17.00	1.75	0.0939	6.10.3.2.1-1	17.00	1.75	0.0939	6.10.3.2.2-1
29.500	1.215	17.00	1.75	0.1144	6.10.3.2.1-1	17.00	1.75	0.1144	6.10.3.2.2-1
34.900	1.255	17.00	1.75	0.1293	6.10.3.2.1-1	17.00	1.75	0.1293	6.10.3.2.2-1
35.100	1.256	17.00	2.25	0.1031	6.10.3.2.1-1	17.00	2.50	0.0967	6.10.3.2.2-1
36.000	1.263	17.00	2.25	0.1049	6.10.3.2.1-1	17.00	2.50	0.0984	6.10.3.2.2-1
42.500	1.310	17.00	2.25	0.1166	6.10.3.2.1-1	17.00	2.50	0.1094	6.10.3.2.2-1
49.000	1.358	17.00	2.25	0.1256	6.10.3.2.1-1	17.00	2.50	0.1178	6.10.3.2.2-1
55.500	1.405	17.00	2.25	0.1322	6.10.3.2.1-1	17.00	2.50	0.1240	6.10.3.2.2-1
62.000	1.453	17.00	2.25	0.1360	6.10.3.2.1-1	17.00	2.50	0.1276	6.10.3.2.2-1
68.500	1.500	17.00	2.25	0.1374	6.10.3.2.1-1	17.00	2.50	0.1288	6.10.3.2.2-1
75.000	1.547	17.00	2.25	0.1360	6.10.3.2.1-1	17.00	2.50	0.1276	6.10.3.2.2-1
81.500	1.595	17.00	2.25	0.1322	6.10.3.2.1-1	17.00	2.50	0.1240	6.10.3.2.2-1
88.000	1.642	17.00	2.25	0.1256	6.10.3.2.1-1	17.00	2.50	0.1178	6.10.3.2.2-1
94.500	1.690	17.00	2.25	0.1166	6.10.3.2.1-1	17.00	2.50	0.1094	6.10.3.2.2-1
101.000	1.737	17.00	2.25	0.1049	6.10.3.2.1-1	17.00	2.50	0.0984	6.10.3.2.2-1
101.900	1.744	17.00	2.25	0.1031	6.10.3.2.1-1	17.00	2.50	0.0967	6.10.3.2.2-1
102.100	1.745	17.00	1.75	0.1293	6.10.3.2.1-1	17.00	1.75	0.1293	6.10.3.2.2-1
107.500	1.785	17.00	1.75	0.1144	6.10.3.2.1-1	17.00	1.75	0.1144	6.10.3.2.2-1
114.000	1.832	17.00	1.75	0.0939	6.10.3.2.1-1	17.00	1.75	0.0939	6.10.3.2.2-1
120.500	1.880	17.00	1.75	0.0708	6.10.3.2.1-1	17.00	1.75	0.0708	6.10.3.2.2-1
127.000	1.927	17.00	1.75	0.0449	6.10.3.2.1-1	17.00	1.75	0.0449	6.10.3.2.2-1
133.500	1.974	17.00	1.75	0.0165	6.10.3.2.1-1	17.00	1.75	0.0165	6.10.3.2.2-1
135.250	1.987	17.00	1.75	0.0083	6.10.3.2.1-1	17.00	1.75	0.0083	6.10.3.2.2-1
136.900	1.999	17.00	1.75	0.0005	6.10.3.2.1-1	17.00	1.75	0.0005	6.10.3.2.2-1
137.000	2.000	17.00	1.75	0.0000	6.10.3.2.1-1	17.00	1.75	0.0000	6.10.3.2.2-1

Load combination: Final Default Strength I

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	1.75	---	---	17.00	1.75	0.0038	6.10.8.1.2-1
0.100	1.001	17.00	1.75	---	---	17.00	1.75	0.0125	6.10.8.1.2-1
0.100	1.001	17.00	1.75	---	---	17.00	1.75	0.1369	6.10.8.1.1-1
1.750	1.013	17.00	1.75	---	---	17.00	1.75	0.0700	6.10.8.1.2-1
3.500	1.026	17.00	1.75	---	---	17.00	1.75	0.1748	6.10.8.1.2-1
10.000	1.073	17.00	1.75	---	---	17.00	1.75	0.3871	6.10.8.1.2-1
16.500	1.120	17.00	1.75	---	---	17.00	1.75	0.5580	6.10.8.1.2-1
23.000	1.168	17.00	1.75	---	---	17.00	1.75	0.7222	6.10.8.1.2-1
29.500	1.215	17.00	1.75	---	---	17.00	1.75	0.8550	6.10.8.1.2-1
34.900	1.255	17.00	1.75	---	---	17.00	1.75	0.9445	6.10.8.1.2-1
35.100	1.256	17.00	2.25	---	---	17.00	2.50	0.7061	6.10.8.1.2-1
36.000	1.263	17.00	2.25	---	---	17.00	2.50	0.7222	6.10.8.1.2-1
42.500	1.310	17.00	2.25	---	---	17.00	2.50	0.7823	6.10.8.1.2-1
49.000	1.358	17.00	2.25	---	---	17.00	2.50	0.8484	6.10.8.1.2-1
55.500	1.405	17.00	2.25	---	---	17.00	2.50	0.8772	6.10.8.1.2-1
62.000	1.453	17.00	2.25	---	---	17.00	2.50	0.9017	6.10.8.1.2-1
68.500	1.500	17.00	2.25	---	---	17.00	2.50	0.9044	6.10.8.1.2-1
75.000	1.547	17.00	2.25	---	---	17.00	2.50	0.8978	6.10.8.1.2-1
81.500	1.595	17.00	2.25	---	---	17.00	2.50	0.8703	6.10.8.1.2-1
88.000	1.642	17.00	2.25	---	---	17.00	2.50	0.8365	6.10.8.1.2-1
94.500	1.690	17.00	2.25	---	---	17.00	2.50	0.7831	6.10.8.1.2-1
101.000	1.737	17.00	2.25	---	---	17.00	2.50	0.7145	6.10.8.1.2-1
101.900	1.744	17.00	2.25	---	---	17.00	2.50	0.7053	6.10.8.1.2-1
102.100	1.745	17.00	1.75	---	---	17.00	1.75	0.9456	6.10.8.1.2-1
107.500	1.785	17.00	1.75	---	---	17.00	1.75	0.8362	6.10.8.1.2-1
114.000	1.832	17.00	1.75	---	---	17.00	1.75	0.7331	6.10.8.1.2-1
120.500	1.880	17.00	1.75	---	---	17.00	1.75	0.5772	6.10.8.1.2-1
127.000	1.927	17.00	1.75	---	---	17.00	1.75	0.3969	6.10.8.1.2-1
133.500	1.974	17.00	1.75	---	---	17.00	1.75	0.1317	6.10.8.1.2-1
135.250	1.987	17.00	1.75	---	---	17.00	1.75	0.0655	6.10.8.1.2-1
136.900	1.999	17.00	1.75	---	---	17.00	1.75	0.0114	6.10.8.1.2-1
136.900	1.999	17.00	1.75	---	---	17.00	1.75	0.1317	6.10.8.1.1-1

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
137.000	2.000	17.00	1.75	---	---	17.00	1.75	0.0027	6.10.8.1.2-1

Load combination: Final Default Service II

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	1.75	0.0053	6.10.4.2.2-3	17.00	1.75	0.0053	6.10.4.2.2-3
0.100	1.001	17.00	1.75	0.0135	6.10.4.2.2-3	17.00	1.75	0.0135	6.10.4.2.2-3
0.100	1.001	17.00	1.75	0.0072	6.10.4.2.2-3	17.00	1.75	0.0072	6.10.4.2.2-3
1.750	1.013	17.00	1.75	0.0688	6.10.4.2.2-3	17.00	1.75	0.0688	6.10.4.2.2-3
3.500	1.026	17.00	1.75	0.1857	6.10.4.2.2-3	17.00	1.75	0.1857	6.10.4.2.2-3
10.000	1.073	17.00	1.75	0.3897	6.10.4.2.2-3	17.00	1.75	0.3897	6.10.4.2.2-3
16.500	1.120	17.00	1.75	0.5547	6.10.4.2.2-3	17.00	1.75	0.5547	6.10.4.2.2-3
23.000	1.168	17.00	1.75	0.7127	6.10.4.2.2-3	17.00	1.75	0.7127	6.10.4.2.2-3
29.500	1.215	17.00	1.75	0.8409	6.10.4.2.2-3	17.00	1.75	0.8409	6.10.4.2.2-3
34.900	1.255	17.00	1.75	0.9178	6.10.4.2.2-3	17.00	1.75	0.9178	6.10.4.2.2-3
35.100	1.256	17.00	2.25	0.7320	6.10.4.2.2-3	17.00	2.50	0.6857	6.10.4.2.2-3
36.000	1.263	17.00	2.25	0.7485	6.10.4.2.2-3	17.00	2.50	0.7011	6.10.4.2.2-3
42.500	1.310	17.00	2.25	0.8107	6.10.4.2.2-3	17.00	2.50	0.7594	6.10.4.2.2-3
49.000	1.358	17.00	2.25	0.8818	6.10.4.2.2-3	17.00	2.50	0.8258	6.10.4.2.2-3
55.500	1.405	17.00	2.25	0.9119	6.10.4.2.2-3	17.00	2.50	0.8540	6.10.4.2.2-3
62.000	1.453	17.00	2.25	0.9371	6.10.4.2.2-3	17.00	2.50	0.8776	6.10.4.2.2-3
68.500	1.500	17.00	2.25	0.9400	6.10.4.2.2-3	17.00	2.50	0.8803	6.10.4.2.2-3
75.000	1.547	17.00	2.25	0.9330	6.10.4.2.2-3	17.00	2.50	0.8737	6.10.4.2.2-3
81.500	1.595	17.00	2.25	0.9048	6.10.4.2.2-3	17.00	2.50	0.8473	6.10.4.2.2-3
88.000	1.642	17.00	2.25	0.8698	6.10.4.2.2-3	17.00	2.50	0.8145	6.10.4.2.2-3
94.500	1.690	17.00	2.25	0.8148	6.10.4.2.2-3	17.00	2.50	0.7629	6.10.4.2.2-3
101.000	1.737	17.00	2.25	0.7403	6.10.4.2.2-3	17.00	2.50	0.6935	6.10.4.2.2-3
101.900	1.744	17.00	2.25	0.7308	6.10.4.2.2-3	17.00	2.50	0.6846	6.10.4.2.2-3
102.100	1.745	17.00	1.75	0.9182	6.10.4.2.2-3	17.00	1.75	0.9182	6.10.4.2.2-3
107.500	1.785	17.00	1.75	0.8131	6.10.4.2.2-3	17.00	1.75	0.8131	6.10.4.2.2-3
114.000	1.832	17.00	1.75	0.7281	6.10.4.2.2-3	17.00	1.75	0.7281	6.10.4.2.2-3
120.500	1.880	17.00	1.75	0.5777	6.10.4.2.2-3	17.00	1.75	0.5777	6.10.4.2.2-3

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
127.000	1.927	17.00	1.75	0.4041	6.10.4.2.2-3	17.00	1.75	0.4041	6.10.4.2.2-3
133.500	1.974	17.00	1.75	0.1276	6.10.4.2.2-3	17.00	1.75	0.1276	6.10.4.2.2-3
135.250	1.987	17.00	1.75	0.0642	6.10.4.2.2-3	17.00	1.75	0.0642	6.10.4.2.2-3
136.900	1.999	17.00	1.75	0.0120	6.10.4.2.2-3	17.00	1.75	0.0120	6.10.4.2.2-3
136.900	1.999	17.00	1.75	0.0055	6.10.4.2.2-3	17.00	1.75	0.0055	6.10.4.2.2-3
137.000	2.000	17.00	1.75	0.0038	6.10.4.2.2-3	17.00	1.75	0.0038	6.10.4.2.2-3

Load combination: Final Default Fatigue

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	1.75	0.1352	6.10.5.3-1	17.00	1.75	0.1352	6.10.5.3-1
0.100	1.001	17.00	1.75	0.1344	6.10.5.3-1	17.00	1.75	0.1344	6.10.5.3-1
0.100	1.001	17.00	1.75	0.1344	6.10.5.3-1	17.00	1.75	0.1344	6.10.5.3-1
1.750	1.013	17.00	1.75	0.1323	6.10.5.3-1	17.00	1.75	0.1323	6.10.5.3-1
3.500	1.026	17.00	1.75	0.1277	6.6.1.2.2-1	17.00	1.75	0.1277	6.6.1.2.2-1
10.000	1.073	17.00	1.75	0.2906	6.6.1.2.2-1	17.00	1.75	0.2906	6.6.1.2.2-1
16.500	1.120	17.00	1.75	0.4125	6.6.1.2.2-1	17.00	1.75	0.4125	6.6.1.2.2-1
23.000	1.168	17.00	1.75	0.5252	6.6.1.2.2-1	17.00	1.75	0.5252	6.6.1.2.2-1
29.500	1.215	17.00	1.75	0.6267	6.6.1.2.2-1	17.00	1.75	0.6267	6.6.1.2.2-1
34.900	1.255	17.00	1.75	0.7429	6.6.1.2.2-1	17.00	1.75	0.7429	6.6.1.2.2-1
35.100	1.256	17.00	2.25	0.5379	6.6.1.2.2-1	17.00	2.50	0.5379	6.6.1.2.2-1
36.000	1.263	17.00	2.25	0.5541	6.6.1.2.2-1	17.00	2.50	0.5541	6.6.1.2.2-1
42.500	1.310	17.00	2.25	0.5684	6.6.1.2.2-1	17.00	2.50	0.5684	6.6.1.2.2-1
49.000	1.358	17.00	2.25	0.6120	6.6.1.2.2-1	17.00	2.50	0.6120	6.6.1.2.2-1
55.500	1.405	17.00	2.25	0.6086	6.6.1.2.2-1	17.00	2.50	0.6086	6.6.1.2.2-1
62.000	1.453	17.00	2.25	0.6328	6.6.1.2.2-1	17.00	2.50	0.6328	6.6.1.2.2-1
68.500	1.500	17.00	2.25	0.6245	6.6.1.2.2-1	17.00	2.50	0.6245	6.6.1.2.2-1
75.000	1.547	17.00	2.25	0.6139	6.6.1.2.2-1	17.00	2.50	0.6139	6.6.1.2.2-1
81.500	1.595	17.00	2.25	0.6121	6.6.1.2.2-1	17.00	2.50	0.6121	6.6.1.2.2-1
88.000	1.642	17.00	2.25	0.5986	6.6.1.2.2-1	17.00	2.50	0.5986	6.6.1.2.2-1
94.500	1.690	17.00	2.25	0.5703	6.6.1.2.2-1	17.00	2.50	0.5703	6.6.1.2.2-1
101.000	1.737	17.00	2.25	0.5400	6.6.1.2.2-1	17.00	2.50	0.5400	6.6.1.2.2-1

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
101.900	1.744	17.00	2.25	0.5400	6.6.1.2.2-1	17.00	2.50	0.5400	6.6.1.2.2-1
102.100	1.745	17.00	1.75	0.7508	6.6.1.2.2-1	17.00	1.75	0.7508	6.6.1.2.2-1
107.500	1.785	17.00	1.75	0.6472	6.6.1.2.2-1	17.00	1.75	0.6472	6.6.1.2.2-1
114.000	1.832	17.00	1.75	0.5288	6.6.1.2.2-1	17.00	1.75	0.5288	6.6.1.2.2-1
120.500	1.880	17.00	1.75	0.4260	6.6.1.2.2-1	17.00	1.75	0.4260	6.6.1.2.2-1
127.000	1.927	17.00	1.75	0.2944	6.6.1.2.2-1	17.00	1.75	0.2944	6.6.1.2.2-1
133.500	1.974	17.00	1.75	0.1237	6.10.5.3-1	17.00	1.75	0.1237	6.10.5.3-1
135.250	1.987	17.00	1.75	0.1270	6.10.5.3-1	17.00	1.75	0.1270	6.10.5.3-1
136.900	1.999	17.00	1.75	0.1370	6.10.5.3-1	17.00	1.75	0.1370	6.10.5.3-1
136.900	1.999	17.00	1.75	0.1370	6.10.5.3-1	17.00	1.75	0.1370	6.10.5.3-1
137.000	2.000	17.00	1.75	0.1378	6.10.5.3-1	17.00	1.75	0.1378	6.10.5.3-1

Summary Shear Report

Load combination: Initial Default

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
0.000	1.000	0.75	45.00	3.5000	Stiffened	---	---	0.0325	6.10.3.3-1
0.100	1.001	0.75	45.00	3.5000	Stiffened	---	---	0.0323	6.10.3.3-1
1.750	1.013	0.75	45.00	3.5000	Stiffened	---	---	0.0316	6.10.3.3-1
3.500	1.026	0.75	45.00	13.0000	Unstiffened	---	---	0.0307	6.10.3.3-1
10.000	1.073	0.75	45.00	13.0000	Unstiffened	---	---	0.0280	6.10.3.3-1
16.500	1.120	0.75	45.00	13.0000	Unstiffened	---	---	0.0252	6.10.3.3-1
23.000	1.168	0.75	45.00	13.0000	Unstiffened	---	---	0.0225	6.10.3.3-1
29.500	1.215	0.75	45.00	13.0000	Unstiffened	---	---	0.0197	6.10.3.3-1
34.900	1.255	0.75	45.00	13.0000	Unstiffened	---	---	0.0174	6.10.3.3-1
35.100	1.256	0.75	45.00	13.0000	Unstiffened	---	---	0.0173	6.10.3.3-1
36.000	1.263	0.75	45.00	13.0000	Unstiffened	---	---	0.0169	6.10.3.3-1
42.500	1.310	0.75	45.00	13.0000	Unstiffened	---	---	0.0134	6.10.3.3-1
49.000	1.358	0.75	45.00	13.0000	Unstiffened	---	---	0.0101	6.10.3.3-1
55.500	1.405	0.75	45.00	13.0000	Unstiffened	---	---	0.0067	6.10.3.3-1
62.000	1.453	0.75	45.00	13.0000	Unstiffened	---	---	0.0034	6.10.3.3-1

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
68.500	1.500	0.75	45.00	13.0000	Unstiffened	---	---	0.0001	6.10.3.3-1
75.000	1.547	0.75	45.00	13.0000	Unstiffened	---	---	0.0034	6.10.3.3-1
81.500	1.595	0.75	45.00	13.0000	Unstiffened	---	---	0.0069	6.10.3.3-1
88.000	1.642	0.75	45.00	13.0000	Unstiffened	---	---	0.0101	6.10.3.3-1
94.500	1.690	0.75	45.00	13.0000	Unstiffened	---	---	0.0136	6.10.3.3-1
101.000	1.737	0.75	45.00	13.0000	Unstiffened	---	---	0.0169	6.10.3.3-1
101.900	1.744	0.75	45.00	13.0000	Unstiffened	---	---	0.0173	6.10.3.3-1
102.100	1.745	0.75	45.00	13.0000	Unstiffened	---	---	0.0174	6.10.3.3-1
107.500	1.785	0.75	45.00	13.0000	Unstiffened	---	---	0.0199	6.10.3.3-1
114.000	1.832	0.75	45.00	13.0000	Unstiffened	---	---	0.0225	6.10.3.3-1
120.500	1.880	0.75	45.00	13.0000	Unstiffened	---	---	0.0254	6.10.3.3-1
127.000	1.927	0.75	45.00	13.0000	Unstiffened	---	---	0.0280	6.10.3.3-1
133.500	1.974	0.75	45.00	13.0000	Unstiffened	---	---	0.0309	6.10.3.3-1
135.250	1.987	0.75	45.00	3.5000	Stiffened	---	---	0.0316	6.10.3.3-1
136.900	1.999	0.75	45.00	3.5000	Stiffened	---	---	0.0323	6.10.3.3-1
137.000	2.000	0.75	45.00	3.5000	Stiffened	---	---	0.0325	6.10.3.3-1

Load combination: Final Default Strength I

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
0.000	1.000	0.75	45.00	3.5000	Stiffened	---	---	0.2763	6.10.9.1-1
0.100	1.001	0.75	45.00	3.5000	Stiffened	---	---	0.2723	6.10.9.1-1
0.100	1.001	0.75	45.00	3.5000	Stiffened	---	---	0.2723	6.10.9.1-1
1.750	1.013	0.75	45.00	3.5000	Stiffened	---	---	0.2697	6.10.9.1-1
3.500	1.026	0.75	45.00	13.0000	Unstiffened	---	---	0.2551	6.10.9.1-1
10.000	1.073	0.75	45.00	13.0000	Unstiffened	---	---	0.2329	6.10.9.1-1
16.500	1.120	0.75	45.00	13.0000	Unstiffened	---	---	0.2062	6.10.9.1-1
23.000	1.168	0.75	45.00	13.0000	Unstiffened	---	---	0.1870	6.10.9.1-1
29.500	1.215	0.75	45.00	13.0000	Unstiffened	---	---	0.1752	6.10.9.1-1
34.900	1.255	0.75	45.00	13.0000	Unstiffened	---	---	0.1645	6.10.9.1-1
35.100	1.256	0.75	45.00	13.0000	Unstiffened	---	---	0.1642	6.10.9.1-1
36.000	1.263	0.75	45.00	13.0000	Unstiffened	---	---	0.1627	6.10.9.1-1

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
42.500	1.310	0.75	45.00	13.0000	Unstiffened	---	---	0.1393	6.10.9.1-1
49.000	1.358	0.75	45.00	13.0000	Unstiffened	---	---	0.1206	6.10.9.1-1
55.500	1.405	0.75	45.00	13.0000	Unstiffened	---	---	0.0953	6.10.9.1-1
62.000	1.453	0.75	45.00	13.0000	Unstiffened	---	---	0.0789	6.10.9.1-1
68.500	1.500	0.75	45.00	13.0000	Unstiffened	---	---	0.0610	6.10.9.1-1
75.000	1.547	0.75	45.00	13.0000	Unstiffened	---	---	0.0789	6.10.9.1-1
81.500	1.595	0.75	45.00	13.0000	Unstiffened	---	---	0.0976	6.10.9.1-1
88.000	1.642	0.75	45.00	13.0000	Unstiffened	---	---	0.1175	6.10.9.1-1
94.500	1.690	0.75	45.00	13.0000	Unstiffened	---	---	0.1371	6.10.9.1-1
101.000	1.737	0.75	45.00	13.0000	Unstiffened	---	---	0.1507	6.10.9.1-1
101.900	1.744	0.75	45.00	13.0000	Unstiffened	---	---	0.1522	6.10.9.1-1
102.100	1.745	0.75	45.00	13.0000	Unstiffened	---	---	0.1532	6.10.9.1-1
107.500	1.785	0.75	45.00	13.0000	Unstiffened	---	---	0.1782	6.10.9.1-1
114.000	1.832	0.75	45.00	13.0000	Unstiffened	---	---	0.1868	6.10.9.1-1
120.500	1.880	0.75	45.00	13.0000	Unstiffened	---	---	0.2079	6.10.9.1-1
127.000	1.927	0.75	45.00	13.0000	Unstiffened	---	---	0.2304	6.10.9.1-1
133.500	1.974	0.75	45.00	13.0000	Unstiffened	---	---	0.2542	6.10.9.1-1
135.250	1.987	0.75	45.00	3.5000	Stiffened	---	---	0.2568	6.10.9.1-1
136.900	1.999	0.75	45.00	3.5000	Stiffened	---	---	0.2842	6.10.9.1-1
136.900	1.999	0.75	45.00	3.5000	Stiffened	---	---	0.2842	6.10.9.1-1
137.000	2.000	0.75	45.00	3.5000	Stiffened	---	---	0.2883	6.10.9.1-1

Bridge 1

Roadway Elements

Alignments

Alignment Name: ALG01

Begin Station: 0+00.0000

Coordinate Tie:

Northing: 0.0000

Easting: 0.0000

Segment	Shape	Start Direction	Radius (ft)	End Station	Spiral In (ft)	Spiral Out (ft)	Sense
1	Tangent	N 90 00 00.00 E		1+37.0000			

Profiles

Profile Name: PROF01

VPI	Station	Elevation	Transition	LVC-1 (ft)	LVC-2 (ft)
1	0+00.0000	100.0000			
2	1+37.0000	100.0000			

Cross Sections

Cross Section Name: XSECT01

Template Name: TMPL 0

Template Station: 0+00.0000

PG Offset: 0.0000

PG Node: 2

Plane	Width Type	Width (ft)	Vertical Type	Vertical %
1	Distance	12.5000	Slope	0.0000
2	Distance	12.5000	Slope	0.0000

Roadways

No.	Name	Align	Profile	Cross Section	Min. Station	Max. Station
1	RDWY01	ALG01	PROF01	XSECT01	0+00.0000	1+37.0000

Superstructure

Pier/Abutment Locations

Roadway: RDWY01

Offset to Bridge CL: 0.0000 ft

No.	Type	Name	Input Method	Station/Distance(ft)	Skew/Bearing
1	Abutment	Support 01	Station	0+00.0000	NORMAL
2	Abutment	Support 02	Station	1+37.0000	NORMAL

Deck Slab

Deck Thickness: 8.0000 in

Haunch Thickness: 2.0000 in

Sacrificial Wearing Surface: 0.5000 in

No.	Name	Material	Ref. Back	Ref. Method	Offset/Station	Ref. Ahead	Ref. Method	Offset/Station
1	Slab 01	Cl A	Support 01	Perpendicular to Support	0.000000	Support 02	Perpendicular to Support	0.000000

Member Groups

Member Group Name: Group01

Back Reference: Support 01

Ahead Reference: Support 02

Number of Members: 4

Path: Concentric to align.

Back Location

Left Fascia Member

Reference: Left edge of slab

Direction: Along support

Offset(ft): 2.2708

Interior Members

Spacing Type: Equally spaced

Spacing(ft): 6.8194

Right Fascia Member

Reference: Right edge of slab

Direction: Along support

Offset(ft): 2.2708

Ahead Location

Left Fascia Member

Reference: Left edge of slab

Direction: Along support

Offset(ft): 0.0000

Interior Members

Spacing Type: Independent

Spacing(ft):

Member No	Distance from prev.
Member 01:	2.2708
Member 02:	6.0625
Member 03:	8.3333
Member 04:	6.0625

Note: Distances are along the support, from left to right, up-station!

Right Fascia Member

Reference: Right edge of slab

Direction: Along support

Offset(ft): 0.0000

Member Definition

Member Group: Group01

Member 01:

WEB	**No.**	**Ref. Span**	**Start (ft)**	**Length (ft)**	**Material**	**Thick (in)**	**Start Height (in)**	**Variation**	**End Height (in)**
	1	1	0.0000	137.0000	Grade 50	0.5000	52.0000	None	52.0000
Top Flange	**No.**	**Ref. Span**	**Start (ft)**	**Length (ft)**	**Material**	**Thick (in)**	**Start Width (in)**	**Variation**	**End Width (in)**
	1	1	0.0000	48.0000	Grade 50	2.0000	17.0000	None	17.0000
	2	1	48.0000	40.0000	Grade 50	2.2500	17.0000	None	17.0000
	3	1	88.0000	49.0000	Grade 50	2.0000	17.0000	None	17.0000

Bottom Flange	No.	Ref. Span	Start (ft)	Length (ft)	Material	Thick (in)	Start Width (in)	Variation	End Width (in)
	1	1	0.0000	48.0000	Grade 50	2.0000	17.0000	None	17.0000
	2	1	48.0000	42.0000	Grade 50	2.2500	17.5000	None	17.5000
	3	1	90.0000	47.0000	Grade 50	2.0000	17.0000	None	17.0000

Member 02:

WEB	No.	Ref. Span	Start (ft)	Length (ft)	Material	Thick (in)	Start Height (in)	Variation	End Height (in)
	1	1	0.0000	137.0000	Grade 50	0.5000	52.0000	None	52.0000
Top Flange	**No.**	**Ref. Span**	**Start (ft)**	**Length (ft)**	**Material**	**Thick (in)**	**Start Width (in)**	**Variation**	**End Width (in)**
	1	1	0.0000	48.0000	Grade 50	2.0000	17.0000	None	17.0000
	2	1	48.0000	40.0000	Grade 50	2.2500	17.0000	None	17.0000
	3	1	88.0000	49.0000	Grade 50	2.0000	17.0000	None	17.0000
Bottom Flange	**No.**	**Ref. Span**	**Start (ft)**	**Length (ft)**	**Material**	**Thick (in)**	**Start Width (in)**	**Variation**	**End Width (in)**
	1	1	0.0000	137.0000	Grade 50	2.0000	17.0000	None	17.0000

Member 03:

WEB	No.	Ref. Span	Start (ft)	Length (ft)	Material	Thick (in)	Start Height (in)	Variation	End Height (in)
	1	1	0.0000	137.0000	Grade 50	0.5000	52.0000	None	52.0000
Top Flange	**No.**	**Ref. Span**	**Start (ft)**	**Length (ft)**	**Material**	**Thick (in)**	**Start Width (in)**	**Variation**	**End Width (in)**
	1	1	0.0000	48.0000	Grade 50	2.0000	17.0000	None	17.0000
	2	1	48.0000	40.0000	Grade 50	2.2500	17.0000	None	17.0000
	3	1	88.0000	49.0000	Grade 50	2.0000	17.0000	None	17.0000
Bottom Flange	**No.**	**Ref. Span**	**Start (ft)**	**Length (ft)**	**Material**	**Thick (in)**	**Start Width (in)**	**Variation**	**End Width (in)**
	1	1	0.0000	137.0000	Grade 50	2.0000	17.0000	None	17.0000

Member 04:

WEB	No.	Ref. Span	Start (ft)	Length (ft)	Material	Thick (in)	Start Height (in)	Variation	End Height (in)
	1	1	0.0000	137.0000	Grade 50	0.5000	52.0000	None	52.0000
Top Flange	**No.**	**Ref. Span**	**Start (ft)**	**Length (ft)**	**Material**	**Thick (in)**	**Start Width (in)**	**Variation**	**End Width (in)**
	1	1	0.0000	48.0000	Grade 50	2.0000	17.0000	None	17.0000
	2	1	48.0000	40.0000	Grade 50	2.2500	17.0000	None	17.0000
	3	1	88.0000	49.0000	Grade 50	2.0000	17.0000	None	17.0000
Bottom Flange	**No.**	**Ref. Span**	**Start (ft)**	**Length (ft)**	**Material**	**Thick (in)**	**Start Width (in)**	**Variation**	**End Width (in)**
	1	1	0.0000	48.0000	Grade 50	2.0000	17.0000	None	17.0000
	2	1	48.0000	42.0000	Grade 50	2.2500	17.5000	None	17.5000
	3	1	90.0000	47.0000	Grade 50	2.0000	17.0000	None	17.0000

Cross-frame/Diaphragm Definition

Frame Name: CFD01

Frame Type: Frame V

Top Strut

Enabled:	Yes
Top Left Distance (in):	6.000000
Top Right Distance (in):	6.000000
Begin Offset (in):	0.000000
End Offset (in):	0.000000
Section:	L40406
Material:	None
Center Line Reference:	Middle
Vertical Orientation:	Long leg vertical
Horizontal Orientation:	N/A

Bottom Strut

Enabled:	Yes
Bottom Left Distance (in):	6.000000
Bottom Right Distance (in):	6.000000
Begin Offset (in):	0.000000
End Offset (in):	0.000000
Section:	L40406
Material:	Grade 50
Center Line Reference:	Middle
Vertical Orientation:	Long leg vertical
Horizontal Orientation:	N/A

Left Diagonal

Bottom Left Distance (in):	6.000000
Top Right Distance (in):	0.000000
Begin Offset (in):	0.000000
End Offset (in):	0.000000
Section:	L40406
Material:	Grade 50
Center Line Reference:	Middle
Vertical Orientation:	Long leg vertical
Horizontal Orientation:	N/A

Right Diagonal

Top Left Distance (in):	0.000000
Bottom Right Distance (in):	6.000000
Begin Offset (in):	0.000000
End Offset (in):	0.000000
Section:	L40406
Material:	Grade 50
Center Line Reference:	Middle
Vertical Orientation:	Long leg vertical
Horizontal Orientation:	N/A

Cross-frame/Diaphragm Location

Member Group: Group01

Bay 01

No.	Location Type	Left Location	Right Location	Link Left-Right	Cross-Frame/ Diaphragm	CFD Orientation	Connection Type	Permanent/ Temporary
1	Absolute (ft)	3.5000	3.5000	No	CFD01	Upstation	Welded	Permanent
2	Absolute (ft)	16.5000	16.5000	No	CFD01	Upstation	Welded	Permanent
3	Absolute (ft)	29.5000	29.5000	No	CFD01	Upstation	Welded	Permanent
4	Absolute (ft)	42.5000	42.5000	No	CFD01	Upstation	Welded	Permanent
5	Absolute (ft)	55.5000	55.5000	No	CFD01	Upstation	Welded	Permanent
6	Absolute (ft)	68.5000	68.5000	No	CFD01	Upstation	Welded	Permanent
7	Absolute (ft)	81.5000	81.5000	No	CFD01	Upstation	Welded	Permanent
8	Absolute (ft)	94.5000	94.5000	No	CFD01	Upstation	Welded	Permanent
9	Absolute (ft)	107.5000	107.5000	No	CFD01	Upstation	Welded	Permanent
10	Absolute (ft)	120.5000	120.5000	No	CFD01	Upstation	Welded	Permanent
11	Absolute (ft)	133.5000	133.5000	No	CFD01	Upstation	Welded	Permanent
12	Absolute (ft)	137.0000	137.0000	No	CFD01	Upstation	Welded	Permanent
13	Absolute (ft)	0.0000	0.0000	No	CFD01	Upstation	Welded	Permanent

Bay 02

No.	Location Type	Left Location	Right Location	Link Left-Right	Cross-Frame/ Diaphragm	CFD Orientation	Connection Type	Permanent/ Temporary
1	Absolute (ft)	3.5000	3.5000	No	CFD01	Upstation	Welded	Permanent
2	Absolute (ft)	16.5000	16.5000	No	CFD01	Upstation	Welded	Permanent
3	Absolute (ft)	29.5000	29.5000	No	CFD01	Upstation	Welded	Permanent
4	Absolute (ft)	42.5000	42.5000	No	CFD01	Upstation	Welded	Permanent
5	Absolute (ft)	55.5000	55.5000	No	CFD01	Upstation	Welded	Permanent
6	Absolute (ft)	68.5000	68.5000	No	CFD01	Upstation	Welded	Permanent
7	Absolute (ft)	81.5000	81.5000	No	CFD01	Upstation	Welded	Permanent
8	Absolute (ft)	94.5000	94.5000	No	CFD01	Upstation	Welded	Permanent
9	Absolute (ft)	107.5000	107.5000	No	CFD01	Upstation	Welded	Permanent
10	Absolute (ft)	120.5000	120.5000	No	CFD01	Upstation	Welded	Permanent
11	Absolute (ft)	133.5000	133.5000	No	CFD01	Upstation	Welded	Permanent
12	Absolute (ft)	137.0000	137.0000	No	CFD01	Upstation	Welded	Permanent

Bay 02

No.	Location Type	Left Location	Right Location	Link Left-Right	Cross-Frame/ Diaphragm	CFD Orientation	Connection Type	Permanent/ Temporary
13	Absolute (ft)	0.0000	0.0000	No	CFD01	Upstation	Welded	Permanent

Bay 03

No.	Location Type	Left Location	Right Location	Link Left-Right	Cross-Frame/ Diaphragm	CFD Orientation	Connection Type	Permanent/ Temporary
1	Absolute (ft)	3.5000	3.5000	No	CFD01	Upstation	Welded	Permanent
2	Absolute (ft)	16.5000	16.5000	No	CFD01	Upstation	Welded	Permanent
3	Absolute (ft)	29.5000	29.5000	No	CFD01	Upstation	Welded	Permanent
4	Absolute (ft)	42.5000	42.5000	No	CFD01	Upstation	Welded	Permanent
5	Absolute (ft)	55.5000	55.5000	No	CFD01	Upstation	Welded	Permanent
6	Absolute (ft)	68.5000	68.5000	No	CFD01	Upstation	Welded	Permanent
7	Absolute (ft)	81.5000	81.5000	No	CFD01	Upstation	Welded	Permanent
8	Absolute (ft)	94.5000	94.5000	No	CFD01	Upstation	Welded	Permanent
9	Absolute (ft)	107.5000	107.5000	No	CFD01	Upstation	Welded	Permanent
10	Absolute (ft)	120.5000	120.5000	No	CFD01	Upstation	Welded	Permanent
11	Absolute (ft)	133.5000	133.5000	No	CFD01	Upstation	Welded	Permanent
12	Absolute (ft)	137.0000	137.0000	No	CFD01	Upstation	Welded	Permanent
13	Absolute (ft)	0.0000	0.0000	No	CFD01	Upstation	Welded	Permanent

Stiffener Definition

Stiff01

Function: Bearing stiffener
Width (in): 7.0000
Thickness (in): 0.7500
Material: Grade 50

Corner Clip:

Top Inner H (in):	1.5000
Top Inner V(in):	2.5000
Top Outer H (in):	0.0000
Top Outer V (in):	0.0000
Bottom Inner H (in):	1.5000
Bottom Inner V(in):	2.5000
Bottom Outer H (in):	0.0000
Bottom Outer V (in):	0.0000

Stiffener Locations

Transversal Stiffener:

Member Group: Group01

Member 01

No.	Location Type	Location	Position	Web	Stiffener	Dist. from Top (in)	Dist. from Bottom (in)
1	Relative	0.0000	Right		Stiff01	0.0000	0.0000
2	Relative	0.0255	Right		Stiff01	0.0000	0.0000
3	Relative	0.1204	Right		Stiff01	0.0000	0.0000
4	Relative	0.2153	Right		Stiff01	0.0000	0.0000
5	Relative	0.3102	Right		Stiff01	0.0000	0.0000
6	Relative	0.4051	Right		Stiff01	0.0000	0.0000
7	Relative	0.5000	Right		Stiff01	0.0000	0.0000
8	Relative	0.5949	Right		Stiff01	0.0000	0.0000
9	Relative	0.6898	Right		Stiff01	0.0000	0.0000
10	Relative	0.7847	Right		Stiff01	0.0000	0.0000
11	Relative	0.8796	Right		Stiff01	0.0000	0.0000
12	Relative	0.9745	Right		Stiff01	0.0000	0.0000
13	Relative	1.0000	Right		Stiff01	0.0000	0.0000

Member 02

No.	Location Type	Location	Position	Web	Stiffener	Dist. from Top (in)	Dist. from Bottom (in)
1	Relative	0.0000	Both		Stiff01	0.0000	0.0000
2	Relative	0.0255	Both		Stiff01	0.0000	0.0000
3	Relative	0.1204	Both		Stiff01	0.0000	0.0000
4	Relative	0.2153	Both		Stiff01	0.0000	0.0000

Member 02

No.	Location Type	Location	Position	Web	Stiffener	Dist. from Top (in)	Dist. from Bottom (in)
5	Relative	0.3102	Both		Stiff01	0.0000	0.0000
6	Relative	0.4051	Both		Stiff01	0.0000	0.0000
7	Relative	0.5000	Both		Stiff01	0.0000	0.0000
8	Relative	0.5949	Both		Stiff01	0.0000	0.0000
9	Relative	0.6898	Both		Stiff01	0.0000	0.0000
10	Relative	0.7847	Both		Stiff01	0.0000	0.0000
11	Relative	0.8796	Both		Stiff01	0.0000	0.0000
12	Relative	0.9745	Both		Stiff01	0.0000	0.0000
13	Relative	1.0000	Both		Stiff01	0.0000	0.0000

Member 03

No.	Location Type	Location	Position	Web	Stiffener	Dist. from Top (in)	Dist. from Bottom (in)
1	Relative	0.0000	Both		Stiff01	0.0000	0.0000
2	Relative	0.0255	Both		Stiff01	0.0000	0.0000
3	Relative	0.1204	Both		Stiff01	0.0000	0.0000
4	Relative	0.2153	Both		Stiff01	0.0000	0.0000
5	Relative	0.3102	Both		Stiff01	0.0000	0.0000
6	Relative	0.4051	Both		Stiff01	0.0000	0.0000
7	Relative	0.5000	Both		Stiff01	0.0000	0.0000
8	Relative	0.5949	Both		Stiff01	0.0000	0.0000
9	Relative	0.6898	Both		Stiff01	0.0000	0.0000
10	Relative	0.7847	Both		Stiff01	0.0000	0.0000
11	Relative	0.8796	Both		Stiff01	0.0000	0.0000
12	Relative	0.9745	Both		Stiff01	0.0000	0.0000
13	Relative	1.0000	Both		Stiff01	0.0000	0.0000

Member 04

No.	Location Type	Location	Position	Web	Stiffener	Dist. from Top (in)	Dist. from Bottom (in)
1	Relative	0.0000	Left		Stiff01	0.0000	0.0000
2	Relative	0.0255	Left		Stiff01	0.0000	0.0000
3	Relative	0.1204	Left		Stiff01	0.0000	0.0000
4	Relative	0.2153	Left		Stiff01	0.0000	0.0000
5	Relative	0.3102	Left		Stiff01	0.0000	0.0000
6	Relative	0.4051	Left		Stiff01	0.0000	0.0000

Member 04

No.	Location Type	Location	Position	Web	Stiffener	Dist. from Top (in)	Dist. from Bottom (in)
7	Relative	0.5000	Left		Stiff01	0.0000	0.0000
8	Relative	0.5949	Left		Stiff01	0.0000	0.0000
9	Relative	0.6898	Left		Stiff01	0.0000	0.0000
10	Relative	0.7847	Left		Stiff01	0.0000	0.0000
11	Relative	0.8796	Left		Stiff01	0.0000	0.0000
12	Relative	0.9745	Left		Stiff01	0.0000	0.0000
13	Relative	1.0000	Left		Stiff01	0.0000	0.0000

Shear Connector Definition

Shear Connector Type: Stud

No.	Name	Height (in)	Diameter (in)	Material
1	ShearConn01	7.500000	0.750000	Grade 50
2	ShearConn02	8.250000	0.750000	Grade 50

Appurtenance Locations

Parapet

No.	Appurtenance Name	Reference Element	Reference Offset(ft)	Refrence Location	Reference Back	Reference Method	Offset (ft)	Reference Ahead	Reference Method	Offset (ft)
1	Parapet 01 (new)(new1) (new2)(new3) (new4)(new5)	Left edge of slab	0.0000	Outside face	Support 01	Along alignment	0.0000	Support 02	Along alignment	0.0000
2	Parapet 01 (new)(new1) (new2)(new3) (new4)(new5)	Right edge of slab	0.0000	Outside face	Support 01	Along alignment	0.0000	Support 02	Along alignment	0.0000

Substructure

Abutments

Abutment Location: Support 01

Start Elevation: 0.0000 ft

End Elevation: 0.0000 ft

Factor of Reduced Moment of Inertia: 1.0000

Keep top of the cap straight: Yes

Skew Angle: 0.0000 deg

Bearings:

Line 1 Offset: 0.0000 in

Line 2 Offset: 0.0000 in

Abutment Type: Stem Wall

Cap:

Cap Length (ft): 25.000000

Back Wall Width (ft): 1.000000

Back Wall Depth (ft): 5.500000

Seat Width (ft): 3.000000

Seat Depth (ft): 5.000000

Wing Wall/Approach Slab:

Wing Wall Width (ft): 0.000000

Wing Wall Height (ft): 0.000000

Wing Wall Thickness (ft): 0.000000

Wing Wall Skew (deg): 0.000000

Approach Slab Width (ft): 0.000000

Approach Slab Length (ft): 0.000000

Approach Slab Thickness (ft): 0.000000

Footing:

Support 01 Footing

Length Overhang (ft): 2.000000

Footing Width (ft): 12.000000

Footing Depth (ft): 3.000000

Footing Position under Column: Concentric under Column

Piles:

Support 01 PilePattern

Enable Piles: Yes

Pile Shape: Circular

Rotation (deg): 0.000000

Diameter (in) 12.000000

Length (in): 360.000000

Embed Length (in): 0.000000

Abutment Location: Support 02

Start Elevation: 0.0000 ft

End Elevation: 0.0000 ft

Factor of Reduced Moment of Inertia: 1.0000

Keep top of the cap straight: Yes

Skew Angle: 0.0000 deg

Bearings:

Line 1 Offset: 0.0000 in

Line 2 Offset: 0.0000 in

Abutment Type: Stem Wall

Cap:

Cap Length (ft): 25.000000

Back Wall Width (ft): 1.000000

Back Wall Depth (ft): 5.500000

Seat Width (ft): 3.000000

Seat Depth (ft): 5.000000

Wing Wall/Approach Slab:

Wing Wall Width (ft): 0.000000

Wing Wall Height (ft): 0.000000

Wing Wall Thickness (ft): 0.000000

Wing Wall Skew (deg): 0.000000

Approach Slab Width (ft): 0.000000

Approach Slab Length (ft): 0.000000

Approach Slab Thickness (ft): 0.000000

Footing:

Support 02 Footing

Length Overhang (ft): 2.000000

Footing Width (ft): 12.000000

Footing Depth (ft): 3.000000

Footing Position under Column: Concentric under Column

Piles:

Support 02 PilePattern

Enable Piles:	Yes		
Pile Shape:	Circular	Rotation (deg):	0.000000
Diameter (in)	12.000000	Length (in):	360.000000
		Embed Length (in):	0.000000

Support Condition

Abutment/Pier Location: Support 01

Bearing Line	Member	Support Type	Angle (deg)	KFX (k/ft)	KFZ (k/ft)	KMX (k-ft/deg)	KMY (k-ft/deg)	KMZ (k-ft/deg)
2	Group01.Member 01	Pinned	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	Group01.Member 02	Pinned	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	Group01.Member 03	Pinned	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	Group01.Member 04	Pinned	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Abutment/Pier Location: Support 02

Bearing Line	Member	Support Type	Angle (deg)	KFX (k/ft)	KFZ (k/ft)	KMX (k-ft/deg)	KMY (k-ft/deg)	KMZ (k-ft/deg)
1	Group01.Member 01	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 02	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 03	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 04	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Code Checker Results

Group01 Member 01

Overall Design Summary Report

POI Location (ft)	Span Fraction	Critical Load Combination
0.000	1.000	Final - Strength I 6.10.9.1-1 0.382
0.100	1.001	Final - Strength I 6.10.9.1-1 0.379
0.100	1.001	Final - Strength I 6.10.9.1-1 0.379
1.750	1.013	Final - Strength I 6.10.9.1-1 0.374
3.500	1.026	Final - Strength I 6.10.9.1-1 0.811
10.000	1.073	Final - Strength I 6.10.9.1-1 0.754
16.500	1.120	Final - Strength I 6.10.9.1-1 0.676
23.000	1.168	Final - Strength I 6.10.8.1.2-1 0.640
29.500	1.215	Final - Strength I 6.10.8.1.2-1 0.764
36.000	1.263	Final - Strength I 6.10.8.1.2-1 0.830
42.500	1.310	Final - Strength I 6.10.8.1.2-1

POI Location (ft)	**Span Fraction**	**Critical Load Combination**
		0.921
47.900	1.350	Final - Strength I 6.10.8.1.2-1 0.994
48.100	1.351	Final - Strength I 6.10.8.1.2-1 0.874
49.000	1.358	Final - Strength I 6.10.8.1.2-1 0.880
55.500	1.405	Final - Strength I 6.10.8.1.2-1 0.915
62.000	1.453	Final - Strength I 6.10.8.1.2-1 0.936
68.500	1.500	Final - Strength I 6.10.8.1.2-1 0.947
75.000	1.547	Final - Strength I 6.10.8.1.2-1 0.942
81.500	1.595	Final - Strength I 6.10.8.1.2-1 0.919
87.900	1.642	Final - Strength I 6.10.8.1.2-1 0.891
88.000	1.642	Final - Strength I 6.10.8.1.2-1 0.890
88.100	1.643	Final - Service II 6.10.4.2.2-3 0.967
89.900	1.656	Final - Service II 6.10.4.2.2-3 0.952

POI Location (ft)	Span Fraction	Critical Load Combination
90.100	1.658	Final - Strength I 6.10.8.1.2-1 0.994
94.500	1.690	Final - Strength I 6.10.8.1.2-1 0.930
101.000	1.737	Final - Strength I 6.10.8.1.2-1 0.836
107.500	1.785	Final - Strength I 6.10.8.1.2-1 0.723
114.000	1.832	Final - Strength I 6.10.8.1.2-1 0.655
120.500	1.880	Final - Strength I 6.10.9.1-1 0.718
127.000	1.927	Final - Strength I 6.10.9.1-1 0.539
133.500	1.974	Final - Strength I 6.10.9.1-1 0.579
135.250	1.987	Final - Strength I 6.10.9.1-1 0.387
136.900	1.999	Final - Strength I 6.10.9.1-1 0.397
136.900	1.999	Final - Strength I 6.10.9.1-1 0.397
137.000	2.000	Final - Strength I 6.10.9.1-1 0.411

Summary Flexure Report

Load combination: Initial Default

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	2.00	0.0000	6.10.3.2.1-1	17.00	2.00	0.0000	6.10.3.2.2-1
0.100	1.001	17.00	2.00	0.0004	6.10.3.2.1-1	17.00	2.00	0.0004	6.10.3.2.2-1
1.750	1.013	17.00	2.00	0.0062	6.10.3.2.1-1	17.00	2.00	0.0062	6.10.3.2.2-1
3.500	1.026	17.00	2.00	0.0123	6.10.3.2.1-1	17.00	2.00	0.0123	6.10.3.2.2-1
10.000	1.073	17.00	2.00	0.0335	6.10.3.2.1-1	17.00	2.00	0.0335	6.10.3.2.2-1
16.500	1.120	17.00	2.00	0.0526	6.10.3.2.1-1	17.00	2.00	0.0526	6.10.3.2.2-1
23.000	1.168	17.00	2.00	0.0697	6.10.3.2.1-1	17.00	2.00	0.0697	6.10.3.2.2-1
29.500	1.215	17.00	2.00	0.0846	6.10.3.2.1-1	17.00	2.00	0.0846	6.10.3.2.2-1
36.000	1.263	17.00	2.00	0.0976	6.10.3.2.1-1	17.00	2.00	0.0976	6.10.3.2.2-1
42.500	1.310	17.00	2.00	0.1084	6.10.3.2.1-1	17.00	2.00	0.1084	6.10.3.2.2-1
47.900	1.350	17.00	2.00	0.1157	6.10.3.2.1-1	17.00	2.00	0.1157	6.10.3.2.2-1
48.100	1.351	17.00	2.25	0.1041	6.10.3.2.1-1	17.50	2.25	0.1019	6.10.3.2.2-1
49.000	1.358	17.00	2.25	0.1050	6.10.3.2.1-1	17.50	2.25	0.1029	6.10.3.2.2-1
55.500	1.405	17.00	2.25	0.1109	6.10.3.2.1-1	17.50	2.25	0.1086	6.10.3.2.2-1
62.000	1.453	17.00	2.25	0.1142	6.10.3.2.1-1	17.50	2.25	0.1118	6.10.3.2.2-1
68.500	1.500	17.00	2.25	0.1155	6.10.3.2.1-1	17.50	2.25	0.1131	6.10.3.2.2-1
75.000	1.547	17.00	2.25	0.1142	6.10.3.2.1-1	17.50	2.25	0.1119	6.10.3.2.2-1
81.500	1.595	17.00	2.25	0.1109	6.10.3.2.1-1	17.50	2.25	0.1086	6.10.3.2.2-1
87.900	1.642	17.00	2.25	0.1052	6.10.3.2.1-1	17.50	2.25	0.1030	6.10.3.2.2-1
88.000	1.642	17.00	2.25	0.1051	6.10.3.2.1-1	17.50	2.25	0.1029	6.10.3.2.2-1
88.100	1.643	17.00	2.00	0.1151	6.10.3.2.1-1	17.50	2.25	0.1043	6.10.3.2.2-1
89.900	1.656	17.00	2.00	0.1129	6.10.3.2.1-1	17.50	2.25	0.1023	6.10.3.2.2-1
90.100	1.658	17.00	2.00	0.1145	6.10.3.2.1-1	17.00	2.00	0.1145	6.10.3.2.2-1
94.500	1.690	17.00	2.00	0.1085	6.10.3.2.1-1	17.00	2.00	0.1085	6.10.3.2.2-1
101.000	1.737	17.00	2.00	0.0976	6.10.3.2.1-1	17.00	2.00	0.0976	6.10.3.2.2-1
107.500	1.785	17.00	2.00	0.0847	6.10.3.2.1-1	17.00	2.00	0.0847	6.10.3.2.2-1
114.000	1.832	17.00	2.00	0.0697	6.10.3.2.1-1	17.00	2.00	0.0697	6.10.3.2.2-1
120.500	1.880	17.00	2.00	0.0527	6.10.3.2.1-1	17.00	2.00	0.0527	6.10.3.2.2-1
127.000	1.927	17.00	2.00	0.0335	6.10.3.2.1-1	17.00	2.00	0.0335	6.10.3.2.2-1
133.500	1.974	17.00	2.00	0.0123	6.10.3.2.1-1	17.00	2.00	0.0123	6.10.3.2.2-1

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
135.250	1.987	17.00	2.00	0.0062	6.10.3.2.1-1	17.00	2.00	0.0062	6.10.3.2.2-1
136.900	1.999	17.00	2.00	0.0004	6.10.3.2.1-1	17.00	2.00	0.0004	6.10.3.2.2-1
137.000	2.000	17.00	2.00	0.0000	6.10.3.2.1-1	17.00	2.00	0.0000	6.10.3.2.2-1

Load combination: Final Default Strength I

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	2.00	---	---	17.00	2.00	0.0047	6.10.8.1.2-1
0.100	1.001	17.00	2.00	---	---	17.00	2.00	0.1119	6.10.8.1.1-1
0.100	1.001	17.00	2.00	---	---	17.00	2.00	0.0104	6.10.8.1.2-1
1.750	1.013	17.00	2.00	---	---	17.00	2.00	0.0574	6.10.8.1.2-1
3.500	1.026	17.00	2.00	---	---	17.00	2.00	0.1608	6.10.8.1.2-1
10.000	1.073	17.00	2.00	---	---	17.00	2.00	0.3444	6.10.8.1.2-1
16.500	1.120	17.00	2.00	---	---	17.00	2.00	0.5046	6.10.8.1.2-1
23.000	1.168	17.00	2.00	---	---	17.00	2.00	0.6398	6.10.8.1.2-1
29.500	1.215	17.00	2.00	---	---	17.00	2.00	0.7641	6.10.8.1.2-1
36.000	1.263	17.00	2.00	---	---	17.00	2.00	0.8301	6.10.8.1.2-1
42.500	1.310	17.00	2.00	---	---	17.00	2.00	0.9208	6.10.8.1.2-1
47.900	1.350	17.00	2.00	---	---	17.00	2.00	0.9938	6.10.8.1.2-1
48.100	1.351	17.00	2.25	---	---	17.50	2.25	0.8738	6.10.8.1.2-1
49.000	1.358	17.00	2.25	---	---	17.50	2.25	0.8797	6.10.8.1.2-1
55.500	1.405	17.00	2.25	---	---	17.50	2.25	0.9149	6.10.8.1.2-1
62.000	1.453	17.00	2.25	---	---	17.50	2.25	0.9357	6.10.8.1.2-1
68.500	1.500	17.00	2.25	---	---	17.50	2.25	0.9470	6.10.8.1.2-1
75.000	1.547	17.00	2.25	---	---	17.50	2.25	0.9420	6.10.8.1.2-1
81.500	1.595	17.00	2.25	---	---	17.50	2.25	0.9193	6.10.8.1.2-1
87.900	1.642	17.00	2.25	---	---	17.50	2.25	0.8906	6.10.8.1.2-1
88.000	1.642	17.00	2.25	---	---	17.50	2.25	0.8900	6.10.8.1.2-1
88.100	1.643	17.00	2.00	---	---	17.50	2.25	0.9018	6.10.8.1.2-1
89.900	1.656	17.00	2.00	---	---	17.50	2.25	0.8874	6.10.8.1.2-1
90.100	1.658	17.00	2.00	---	---	17.00	2.00	0.9943	6.10.8.1.2-1
94.500	1.690	17.00	2.00	---	---	17.00	2.00	0.9296	6.10.8.1.2-1

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
101.000	1.737	17.00	2.00	---	---	17.00	2.00	0.8361	6.10.8.1.2-1
107.500	1.785	17.00	2.00	---	---	17.00	2.00	0.7230	6.10.8.1.2-1
114.000	1.832	17.00	2.00	---	---	17.00	2.00	0.6551	6.10.8.1.2-1
120.500	1.880	17.00	2.00	---	---	17.00	2.00	0.5126	6.10.8.1.2-1
127.000	1.927	17.00	2.00	---	---	17.00	2.00	0.3494	6.10.8.1.2-1
133.500	1.974	17.00	2.00	---	---	17.00	2.00	0.1144	6.10.8.1.2-1
135.250	1.987	17.00	2.00	---	---	17.00	2.00	0.0576	6.10.8.1.2-1
136.900	1.999	17.00	2.00	---	---	17.00	2.00	0.1144	6.10.8.1.1-1
136.900	1.999	17.00	2.00	---	---	17.00	2.00	0.0089	6.10.8.1.2-1
137.000	2.000	17.00	2.00	---	---	17.00	2.00	0.0034	6.10.8.1.2-1

Load combination: Final Default Service II

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	2.00	0.0066	6.10.4.2.2-3	17.00	2.00	0.0066	6.10.4.2.2-3
0.100	1.001	17.00	2.00	0.0083	6.10.4.2.2-3	17.00	2.00	0.0083	6.10.4.2.2-3
0.100	1.001	17.00	2.00	0.0120	6.10.4.2.2-3	17.00	2.00	0.0120	6.10.4.2.2-3
1.750	1.013	17.00	2.00	0.0570	6.10.4.2.2-3	17.00	2.00	0.0570	6.10.4.2.2-3
3.500	1.026	17.00	2.00	0.1774	6.10.4.2.2-3	17.00	2.00	0.1774	6.10.4.2.2-3
10.000	1.073	17.00	2.00	0.3532	6.10.4.2.2-3	17.00	2.00	0.3532	6.10.4.2.2-3
16.500	1.120	17.00	2.00	0.5068	6.10.4.2.2-3	17.00	2.00	0.5068	6.10.4.2.2-3
23.000	1.168	17.00	2.00	0.6367	6.10.4.2.2-3	17.00	2.00	0.6367	6.10.4.2.2-3
29.500	1.215	17.00	2.00	0.7559	6.10.4.2.2-3	17.00	2.00	0.7559	6.10.4.2.2-3
36.000	1.263	17.00	2.00	0.8018	6.10.4.2.2-3	17.00	2.00	0.8018	6.10.4.2.2-3
42.500	1.310	17.00	2.00	0.8887	6.10.4.2.2-3	17.00	2.00	0.8887	6.10.4.2.2-3
47.900	1.350	17.00	2.00	0.9641	6.10.4.2.2-3	17.00	2.00	0.9641	6.10.4.2.2-3
48.100	1.351	17.00	2.25	0.8663	6.10.4.2.2-3	17.50	2.25	0.8473	6.10.4.2.2-3
49.000	1.358	17.00	2.25	0.8721	6.10.4.2.2-3	17.50	2.25	0.8530	6.10.4.2.2-3
55.500	1.405	17.00	2.25	0.9069	6.10.4.2.2-3	17.50	2.25	0.8871	6.10.4.2.2-3
62.000	1.453	17.00	2.25	0.9274	6.10.4.2.2-3	17.50	2.25	0.9071	6.10.4.2.2-3
68.500	1.500	17.00	2.25	0.9385	6.10.4.2.2-3	17.50	2.25	0.9180	6.10.4.2.2-3
75.000	1.547	17.00	2.25	0.9333	6.10.4.2.2-3	17.50	2.25	0.9129	6.10.4.2.2-3

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
81.500	1.595	17.00	2.25	0.9110	6.10.4.2.2-3	17.50	2.25	0.8910	6.10.4.2.2-3
87.900	1.642	17.00	2.25	0.8823	6.10.4.2.2-3	17.50	2.25	0.8630	6.10.4.2.2-3
88.000	1.642	17.00	2.25	0.8817	6.10.4.2.2-3	17.50	2.25	0.8624	6.10.4.2.2-3
88.100	1.643	17.00	2.00	0.9668	6.10.4.2.2-3	17.50	2.25	0.8737	6.10.4.2.2-3
89.900	1.656	17.00	2.00	0.9516	6.10.4.2.2-3	17.50	2.25	0.8598	6.10.4.2.2-3
90.100	1.658	17.00	2.00	0.9641	6.10.4.2.2-3	17.00	2.00	0.9641	6.10.4.2.2-3
94.500	1.690	17.00	2.00	0.9025	6.10.4.2.2-3	17.00	2.00	0.9025	6.10.4.2.2-3
101.000	1.737	17.00	2.00	0.8070	6.10.4.2.2-3	17.00	2.00	0.8070	6.10.4.2.2-3
107.500	1.785	17.00	2.00	0.6988	6.10.4.2.2-3	17.00	2.00	0.6988	6.10.4.2.2-3
114.000	1.832	17.00	2.00	0.6487	6.10.4.2.2-3	17.00	2.00	0.6487	6.10.4.2.2-3
120.500	1.880	17.00	2.00	0.5121	6.10.4.2.2-3	17.00	2.00	0.5121	6.10.4.2.2-3
127.000	1.927	17.00	2.00	0.3556	6.10.4.2.2-3	17.00	2.00	0.3556	6.10.4.2.2-3
133.500	1.974	17.00	2.00	0.1110	6.10.4.2.2-3	17.00	2.00	0.1110	6.10.4.2.2-3
135.250	1.987	17.00	2.00	0.0566	6.10.4.2.2-3	17.00	2.00	0.0566	6.10.4.2.2-3
136.900	1.999	17.00	2.00	0.0065	6.10.4.2.2-3	17.00	2.00	0.0065	6.10.4.2.2-3
136.900	1.999	17.00	2.00	0.0099	6.10.4.2.2-3	17.00	2.00	0.0099	6.10.4.2.2-3
137.000	2.000	17.00	2.00	0.0047	6.10.4.2.2-3	17.00	2.00	0.0047	6.10.4.2.2-3

Load combination: Final Default Fatigue

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	2.00	0.1800	6.10.5.3-1	17.00	2.00	0.1800	6.10.5.3-1
0.100	1.001	17.00	2.00	0.1795	6.10.5.3-1	17.00	2.00	0.1795	6.10.5.3-1
1.750	1.013	17.00	2.00	0.1758	6.10.5.3-1	17.00	2.00	0.1758	6.10.5.3-1
3.500	1.026	17.00	2.00	0.3791	6.10.5.3-1	17.00	2.00	0.3791	6.10.5.3-1
10.000	1.073	17.00	2.00	0.3519	6.10.5.3-1	17.00	2.00	0.3519	6.10.5.3-1
16.500	1.120	17.00	2.00	0.4253	6.6.1.2.2-1	17.00	2.00	0.4253	6.6.1.2.2-1
23.000	1.168	17.00	2.00	0.5296	6.6.1.2.2-1	17.00	2.00	0.5296	6.6.1.2.2-1
29.500	1.215	17.00	2.00	0.6331	6.6.1.2.2-1	17.00	2.00	0.6331	6.6.1.2.2-1
36.000	1.263	17.00	2.00	0.7254	6.6.1.2.2-1	17.00	2.00	0.7254	6.6.1.2.2-1
42.500	1.310	17.00	2.00	0.8170	6.6.1.2.2-1	17.00	2.00	0.8170	6.6.1.2.2-1
47.900	1.350	17.00	2.00	0.8699	6.6.1.2.2-1	17.00	2.00	0.8699	6.6.1.2.2-1

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
48.100	1.351	17.00	2.25	0.7576	6.6.1.2.2-1	17.50	2.25	0.7576	6.6.1.2.2-1
49.000	1.358	17.00	2.25	0.7589	6.6.1.2.2-1	17.50	2.25	0.7589	6.6.1.2.2-1
55.500	1.405	17.00	2.25	0.7662	6.6.1.2.2-1	17.50	2.25	0.7662	6.6.1.2.2-1
62.000	1.453	17.00	2.25	0.7944	6.6.1.2.2-1	17.50	2.25	0.7944	6.6.1.2.2-1
68.500	1.500	17.00	2.25	0.7915	6.6.1.2.2-1	17.50	2.25	0.7915	6.6.1.2.2-1
75.000	1.547	17.00	2.25	0.8051	6.6.1.2.2-1	17.50	2.25	0.8051	6.6.1.2.2-1
81.500	1.595	17.00	2.25	0.7945	6.6.1.2.2-1	17.50	2.25	0.7945	6.6.1.2.2-1
87.900	1.642	17.00	2.25	0.8060	6.6.1.2.2-1	17.50	2.25	0.8060	6.6.1.2.2-1
88.000	1.642	17.00	2.25	0.8061	6.6.1.2.2-1	17.50	2.25	0.8061	6.6.1.2.2-1
88.100	1.643	17.00	2.00	0.8143	6.6.1.2.2-1	17.50	2.25	0.8143	6.6.1.2.2-1
89.900	1.656	17.00	2.00	0.8050	6.6.1.2.2-1	17.50	2.25	0.8050	6.6.1.2.2-1
90.100	1.658	17.00	2.00	0.9121	6.6.1.2.2-1	17.00	2.00	0.9121	6.6.1.2.2-1
94.500	1.690	17.00	2.00	0.8360	6.6.1.2.2-1	17.00	2.00	0.8360	6.6.1.2.2-1
101.000	1.737	17.00	2.00	0.7321	6.6.1.2.2-1	17.00	2.00	0.7321	6.6.1.2.2-1
107.500	1.785	17.00	2.00	0.6520	6.6.1.2.2-1	17.00	2.00	0.6520	6.6.1.2.2-1
114.000	1.832	17.00	2.00	0.5951	6.6.1.2.2-1	17.00	2.00	0.5951	6.6.1.2.2-1
120.500	1.880	17.00	2.00	0.4679	6.6.1.2.2-1	17.00	2.00	0.4679	6.6.1.2.2-1
127.000	1.927	17.00	2.00	0.3321	6.10.5.3-1	17.00	2.00	0.3321	6.10.5.3-1
133.500	1.974	17.00	2.00	0.3634	6.10.5.3-1	17.00	2.00	0.3634	6.10.5.3-1
135.250	1.987	17.00	2.00	0.1860	6.10.5.3-1	17.00	2.00	0.1860	6.10.5.3-1
136.900	1.999	17.00	2.00	0.1887	6.10.5.3-1	17.00	2.00	0.1887	6.10.5.3-1
137.000	2.000	17.00	2.00	0.1892	6.10.5.3-1	17.00	2.00	0.1892	6.10.5.3-1

Summary Shear Report

Load combination: Initial Default

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
0.000	1.000	0.50	52.00	3.5000	Stiffened	---	---	0.0431	6.10.3.3-1
0.100	1.001	0.50	52.00	3.5000	Stiffened	---	---	0.0427	6.10.3.3-1
1.750	1.013	0.50	52.00	3.5000	Stiffened	---	---	0.0418	6.10.3.3-1
3.500	1.026	0.50	52.00	13.0000	Unstiffened	---	---	0.0888	6.10.3.3-1

Date:	4/12/2018	Govornor Bridge Road Design - 4 beams.lbs	
Time:	2:14 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 7th Ed. with 2016 Interims]	v17.00.02.15

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
10.000	1.073	0.50	52.00	13.0000	Unstiffened	---	---	0.0806	6.10.3.3-1
16.500	1.120	0.50	52.00	13.0000	Unstiffened	---	---	0.0723	6.10.3.3-1
23.000	1.168	0.50	52.00	13.0000	Stiffened	---	---	0.0575	6.10.3.3-1
29.500	1.215	0.50	52.00	13.0000	Stiffened	---	---	0.0504	6.10.3.3-1
36.000	1.263	0.50	52.00	13.0000	Stiffened	---	---	0.0427	6.10.3.3-1
42.500	1.310	0.50	52.00	13.0000	Stiffened	---	---	0.0352	6.10.3.3-1
47.900	1.350	0.50	52.00	13.0000	Stiffened	---	---	0.0287	6.10.3.3-1
48.100	1.351	0.50	52.00	13.0000	Stiffened	---	---	0.0285	6.10.3.3-1
49.000	1.358	0.50	52.00	13.0000	Stiffened	---	---	0.0274	6.10.3.3-1
55.500	1.405	0.50	52.00	13.0000	Unstiffened	---	---	0.0207	6.10.3.3-1
62.000	1.453	0.50	52.00	13.0000	Unstiffened	---	---	0.0103	6.10.3.3-1
68.500	1.500	0.50	52.00	13.0000	Unstiffened	---	---	0.0001	6.10.3.3-1
75.000	1.547	0.50	52.00	13.0000	Unstiffened	---	---	0.0103	6.10.3.3-1
81.500	1.595	0.50	52.00	13.0000	Unstiffened	---	---	0.0214	6.10.3.3-1
87.900	1.642	0.50	52.00	13.0000	Stiffened	---	---	0.0272	6.10.3.3-1
88.000	1.642	0.50	52.00	13.0000	Stiffened	---	---	0.0273	6.10.3.3-1
88.100	1.643	0.50	52.00	13.0000	Stiffened	---	---	0.0275	6.10.3.3-1
89.900	1.656	0.50	52.00	13.0000	Stiffened	---	---	0.0296	6.10.3.3-1
90.100	1.658	0.50	52.00	13.0000	Stiffened	---	---	0.0299	6.10.3.3-1
94.500	1.690	0.50	52.00	13.0000	Unstiffened	---	---	0.0398	6.10.3.3-1
101.000	1.737	0.50	52.00	13.0000	Unstiffened	---	---	0.0475	6.10.3.3-1
107.500	1.785	0.50	52.00	13.0000	Unstiffened	---	---	0.0567	6.10.3.3-1
114.000	1.832	0.50	52.00	13.0000	Unstiffened	---	---	0.0640	6.10.3.3-1
120.500	1.880	0.50	52.00	13.0000	Unstiffened	---	---	0.0731	6.10.3.3-1
127.000	1.927	0.50	52.00	13.0000	Stiffened	---	---	0.0726	6.10.3.3-1
133.500	1.974	0.50	52.00	13.0000	Stiffened	---	---	0.0806	6.10.3.3-1
135.250	1.987	0.50	52.00	3.5000	Stiffened	---	---	0.0418	6.10.3.3-1
136.900	1.999	0.50	52.00	3.5000	Stiffened	---	---	0.0427	6.10.3.3-1
137.000	2.000	0.50	52.00	3.5000	Stiffened	---	---	0.0431	6.10.3.3-1

Load combination: Final Default Strength I

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
0.000	1.000	0.50	52.00	3.5000	Stiffened	---	---	0.3817	6.10.9.1-1
0.100	1.001	0.50	52.00	3.5000	Stiffened	---	---	0.3786	6.10.9.1-1
0.100	1.001	0.50	52.00	3.5000	Stiffened	---	---	0.3786	6.10.9.1-1
1.750	1.013	0.50	52.00	3.5000	Stiffened	---	---	0.3741	6.10.9.1-1
3.500	1.026	0.50	52.00	13.0000	Unstiffened	---	---	0.8112	6.10.9.1-1
10.000	1.073	0.50	52.00	13.0000	Unstiffened	---	---	0.7540	6.10.9.1-1
16.500	1.120	0.50	52.00	13.0000	Unstiffened	---	---	0.6761	6.10.9.1-1
23.000	1.168	0.50	52.00	13.0000	Stiffened	---	---	0.4292	6.10.9.1-1
29.500	1.215	0.50	52.00	13.0000	Stiffened	---	---	0.3997	6.10.9.1-1
36.000	1.263	0.50	52.00	13.0000	Stiffened	---	---	0.3526	6.10.9.1-1
42.500	1.310	0.50	52.00	13.0000	Stiffened	---	---	0.3224	6.10.9.1-1
47.900	1.350	0.50	52.00	13.0000	Stiffened	---	---	0.2790	6.10.9.1-1
48.100	1.351	0.50	52.00	13.0000	Stiffened	---	---	0.2766	6.10.9.1-1
49.000	1.358	0.50	52.00	13.0000	Stiffened	---	---	0.2737	6.10.9.1-1
55.500	1.405	0.50	52.00	13.0000	Unstiffened	---	---	0.3279	6.10.9.1-1
62.000	1.453	0.50	52.00	13.0000	Unstiffened	---	---	0.2614	6.10.9.1-1
68.500	1.500	0.50	52.00	13.0000	Unstiffened	---	---	0.2018	6.10.9.1-1
75.000	1.547	0.50	52.00	13.0000	Unstiffened	---	---	0.2579	6.10.9.1-1
81.500	1.595	0.50	52.00	13.0000	Unstiffened	---	---	0.3280	6.10.9.1-1
87.900	1.642	0.50	52.00	13.0000	Stiffened	---	---	0.2669	6.10.9.1-1
88.000	1.642	0.50	52.00	13.0000	Stiffened	---	---	0.2672	6.10.9.1-1
88.100	1.643	0.50	52.00	13.0000	Stiffened	---	---	0.2695	6.10.9.1-1
89.900	1.656	0.50	52.00	13.0000	Stiffened	---	---	0.2909	6.10.9.1-1
90.100	1.658	0.50	52.00	13.0000	Stiffened	---	---	0.3056	6.10.9.1-1
94.500	1.690	0.50	52.00	13.0000	Unstiffened	---	---	0.4846	6.10.9.1-1
101.000	1.737	0.50	52.00	13.0000	Unstiffened	---	---	0.5197	6.10.9.1-1
107.500	1.785	0.50	52.00	13.0000	Unstiffened	---	---	0.5921	6.10.9.1-1
114.000	1.832	0.50	52.00	13.0000	Unstiffened	---	---	0.6206	6.10.9.1-1
120.500	1.880	0.50	52.00	13.0000	Unstiffened	---	---	0.7183	6.10.9.1-1
127.000	1.927	0.50	52.00	13.0000	Stiffened	---	---	0.5393	6.10.9.1-1
133.500	1.974	0.50	52.00	13.0000	Stiffened	---	---	0.5788	6.10.9.1-1
135.250	1.987	0.50	52.00	3.5000	Stiffened	---	---	0.3872	6.10.9.1-1

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
136.900	1.999	0.50	52.00	3.5000	Stiffened	---	---	0.3968	6.10.9.1-1
136.900	1.999	0.50	52.00	3.5000	Stiffened	---	---	0.3968	6.10.9.1-1
137.000	2.000	0.50	52.00	3.5000	Stiffened	---	---	0.4110	6.10.9.1-1

Group01 Member 02

Overall Design Summary Report

POI Location (ft)	Span Fraction	Critical Load Combination
0.000	1.000	Final - Strength I 6.10.9.1-1 0.385
0.100	1.001	Final - Strength I 6.10.9.1-1 0.384
1.750	1.013	Final - Strength I 6.10.9.1-1 0.380
3.500	1.026	Final - Strength I 6.10.9.1-1 0.797
10.000	1.073	Final - Strength I 6.10.9.1-1 0.690
16.500	1.120	Final - Strength I 6.10.9.1-1 0.614
23.000	1.168	Final - Strength I 6.10.8.1.2-1 0.548
29.500	1.215	Final - Strength I 6.10.8.1.2-1 0.652
36.000	1.263	Final - Strength I 6.10.8.1.2-1

POI Location (ft)	Span Fraction	Critical Load Combination
		0.720
42.500	1.310	Final - Strength I 6.10.8.1.2-1 0.793
47.900	1.350	Final - Strength I 6.10.8.1.2-1 0.840
48.100	1.351	Final - Strength I 6.10.8.1.2-1 0.830
49.000	1.358	Final - Strength I 6.10.8.1.2-1 0.838
55.500	1.405	Final - Strength I 6.10.8.1.2-1 0.880
62.000	1.453	Final - Strength I 6.10.8.1.2-1 0.904
68.500	1.500	Final - Strength I 6.10.8.1.2-1 0.906
75.000	1.547	Final - Strength I 6.10.8.1.2-1 0.900
81.500	1.595	Final - Strength I 6.10.8.1.2-1 0.878
87.900	1.642	Final - Strength I 6.10.8.1.2-1 0.843
88.000	1.642	Final - Strength I 6.10.8.1.2-1 0.842
88.100	1.643	Final - Strength I 6.10.8.1.2-1 0.852

POI Location (ft)	Span Fraction	Critical Load Combination
94.500	1.690	Final - Strength I 6.10.8.1.2-1 0.805
101.000	1.737	Final - Strength I 6.10.8.1.2-1 0.727
107.500	1.785	Final - Strength I 6.10.8.1.2-1 0.641
114.000	1.832	Final - Strength I 6.10.8.1.2-1 0.552
120.500	1.880	Final - Strength I 6.10.9.1-1 0.618
127.000	1.927	Final - Strength I 6.10.9.1-1 0.474
133.500	1.974	Final - Strength I 6.10.9.1-1 0.550
135.250	1.987	Final - Strength I 6.10.9.1-1 0.366
136.900	1.999	Final - Strength I 6.10.9.1-1 0.388
137.000	2.000	Final - Strength I 6.10.9.1-1 0.391

Summary Flexure Report

Load combination: Initial Default

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation

Date:	4/12/2018	Govornor Bridge Road Design - 4 beams.lbs	
Time:	2:14 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 7th Ed. with 2016 Interims]	v17.00.02.15

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
10.000	1.073	17.00	2.00	0.0334	6.10.3.2.1-1	17.00	2.00	0.0334	6.10.3.2.2-1
16.500	1.120	17.00	2.00	0.0524	6.10.3.2.1-1	17.00	2.00	0.0524	6.10.3.2.2-1
23.000	1.168	17.00	2.00	0.0689	6.10.3.2.1-1	17.00	2.00	0.0689	6.10.3.2.2-1
29.500	1.215	17.00	2.00	0.0833	6.10.3.2.1-1	17.00	2.00	0.0833	6.10.3.2.2-1
36.000	1.263	17.00	2.00	0.0952	6.10.3.2.1-1	17.00	2.00	0.0952	6.10.3.2.2-1
0.000	1.000	17.00	2.00	0.0000	6.10.3.2.1-1	17.00	2.00	0.0000	6.10.3.2.2-1
0.100	1.001	17.00	2.00	0.0004	6.10.3.2.1-1	17.00	2.00	0.0004	6.10.3.2.2-1
1.750	1.013	17.00	2.00	0.0063	6.10.3.2.1-1	17.00	2.00	0.0063	6.10.3.2.2-1
3.500	1.026	17.00	2.00	0.0124	6.10.3.2.1-1	17.00	2.00	0.0124	6.10.3.2.2-1
55.500	1.405	17.00	2.25	0.1074	6.10.3.2.1-1	17.00	2.00	0.1161	6.10.3.2.2-1
62.000	1.453	17.00	2.25	0.1103	6.10.3.2.1-1	17.00	2.00	0.1192	6.10.3.2.2-1
68.500	1.500	17.00	2.25	0.1112	6.10.3.2.1-1	17.00	2.00	0.1202	6.10.3.2.2-1
75.000	1.547	17.00	2.25	0.1103	6.10.3.2.1-1	17.00	2.00	0.1192	6.10.3.2.2-1
42.500	1.310	17.00	2.00	0.1050	6.10.3.2.1-1	17.00	2.00	0.1050	6.10.3.2.2-1
47.900	1.350	17.00	2.00	0.1113	6.10.3.2.1-1	17.00	2.00	0.1113	6.10.3.2.2-1
48.100	1.351	17.00	2.25	0.1018	6.10.3.2.1-1	17.00	2.00	0.1100	6.10.3.2.2-1
49.000	1.358	17.00	2.25	0.1026	6.10.3.2.1-1	17.00	2.00	0.1109	6.10.3.2.2-1
81.500	1.595	17.00	2.25	0.1074	6.10.3.2.1-1	17.00	2.00	0.1161	6.10.3.2.2-1
87.900	1.642	17.00	2.25	0.1026	6.10.3.2.1-1	17.00	2.00	0.1109	6.10.3.2.2-1
88.000	1.642	17.00	2.25	0.1025	6.10.3.2.1-1	17.00	2.00	0.1108	6.10.3.2.2-1
88.100	1.643	17.00	2.00	0.1123	6.10.3.2.1-1	17.00	2.00	0.1123	6.10.3.2.2-1
94.500	1.690	17.00	2.00	0.1050	6.10.3.2.1-1	17.00	2.00	0.1050	6.10.3.2.2-1
101.000	1.737	17.00	2.00	0.0951	6.10.3.2.1-1	17.00	2.00	0.0951	6.10.3.2.2-1
107.500	1.785	17.00	2.00	0.0833	6.10.3.2.1-1	17.00	2.00	0.0833	6.10.3.2.2-1
114.000	1.832	17.00	2.00	0.0688	6.10.3.2.1-1	17.00	2.00	0.0688	6.10.3.2.2-1
120.500	1.880	17.00	2.00	0.0524	6.10.3.2.1-1	17.00	2.00	0.0524	6.10.3.2.2-1
127.000	1.927	17.00	2.00	0.0334	6.10.3.2.1-1	17.00	2.00	0.0334	6.10.3.2.2-1
133.500	1.974	17.00	2.00	0.0124	6.10.3.2.1-1	17.00	2.00	0.0124	6.10.3.2.2-1
135.250	1.987	17.00	2.00	0.0063	6.10.3.2.1-1	17.00	2.00	0.0063	6.10.3.2.2-1
136.900	1.999	17.00	2.00	0.0004	6.10.3.2.1-1	17.00	2.00	0.0004	6.10.3.2.2-1
137.000	2.000	17.00	2.00	0.0000	6.10.3.2.1-1	17.00	2.00	0.0000	6.10.3.2.2-1

Load combination: Final Default Strength I

Date:	4/12/2018	Govornor Bridge Road Design - 4 beams.lbs	
Time:	2:14 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 7th Ed. with 2016 Interims]	v17.00.02.15

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
10.000	1.073	17.00	2.00	---	---	17.00	2.00	0.2936	6.10.8.1.2-1
16.500	1.120	17.00	2.00	---	---	17.00	2.00	0.4295	6.10.8.1.2-1
23.000	1.168	17.00	2.00	---	---	17.00	2.00	0.5480	6.10.8.1.2-1
29.500	1.215	17.00	2.00	---	---	17.00	2.00	0.6520	6.10.8.1.2-1
0.000	1.000	17.00	2.00	---	---	17.00	2.00	0.0005	6.10.8.1.2-1
0.100	1.001	17.00	2.00	---	---	17.00	2.00	0.0034	6.10.8.1.2-1
1.750	1.013	17.00	2.00	---	---	17.00	2.00	0.0565	6.10.8.1.2-1
3.500	1.026	17.00	2.00	---	---	17.00	2.00	0.1271	6.10.8.1.2-1
55.500	1.405	17.00	2.25	---	---	17.00	2.00	0.8804	6.10.8.1.2-1
62.000	1.453	17.00	2.25	---	---	17.00	2.00	0.9039	6.10.8.1.2-1
68.500	1.500	17.00	2.25	---	---	17.00	2.00	0.9063	6.10.8.1.2-1
75.000	1.547	17.00	2.25	---	---	17.00	2.00	0.9003	6.10.8.1.2-1
36.000	1.263	17.00	2.00	---	---	17.00	2.00	0.7199	6.10.8.1.2-1
42.500	1.310	17.00	2.00	---	---	17.00	2.00	0.7926	6.10.8.1.2-1
47.900	1.350	17.00	2.00	---	---	17.00	2.00	0.8396	6.10.8.1.2-1
48.100	1.351	17.00	2.25	---	---	17.00	2.00	0.8295	6.10.8.1.2-1
49.000	1.358	17.00	2.25	---	---	17.00	2.00	0.8375	6.10.8.1.2-1
81.500	1.595	17.00	2.25	---	---	17.00	2.00	0.8781	6.10.8.1.2-1
87.900	1.642	17.00	2.25	---	---	17.00	2.00	0.8426	6.10.8.1.2-1
88.000	1.642	17.00	2.25	---	---	17.00	2.00	0.8417	6.10.8.1.2-1
88.100	1.643	17.00	2.00	---	---	17.00	2.00	0.8523	6.10.8.1.2-1
94.500	1.690	17.00	2.00	---	---	17.00	2.00	0.8046	6.10.8.1.2-1
101.000	1.737	17.00	2.00	---	---	17.00	2.00	0.7267	6.10.8.1.2-1
107.500	1.785	17.00	2.00	---	---	17.00	2.00	0.6409	6.10.8.1.2-1
114.000	1.832	17.00	2.00	---	---	17.00	2.00	0.5523	6.10.8.1.2-1
120.500	1.880	17.00	2.00	---	---	17.00	2.00	0.4299	6.10.8.1.2-1
127.000	1.927	17.00	2.00	---	---	17.00	2.00	0.2890	6.10.8.1.2-1
133.500	1.974	17.00	2.00	---	---	17.00	2.00	0.1080	6.10.8.1.2-1
135.250	1.987	17.00	2.00	---	---	17.00	2.00	0.0544	6.10.8.1.2-1
136.900	1.999	17.00	2.00	---	---	17.00	2.00	0.0037	6.10.8.1.2-1
137.000	2.000	17.00	2.00	---	---	17.00	2.00	0.0003	6.10.8.1.2-1

Load combination: Final Default Service II

Date:	4/12/2018	Governor Bridge Road Design - 4 beams.lbs	
Time:	2:14 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 7th Ed. with 2016 Interims]	v17.00.02.15

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
10.000	1.073	17.00	2.00	0.2905	6.10.4.2.2-3	17.00	2.00	0.2905	6.10.4.2.2-3
16.500	1.120	17.00	2.00	0.4214	6.10.4.2.2-3	17.00	2.00	0.4214	6.10.4.2.2-3
23.000	1.168	17.00	2.00	0.5358	6.10.4.2.2-3	17.00	2.00	0.5358	6.10.4.2.2-3
29.500	1.215	17.00	2.00	0.6359	6.10.4.2.2-3	17.00	2.00	0.6359	6.10.4.2.2-3
0.000	1.000	17.00	2.00	0.0006	6.10.4.2.2-3	17.00	2.00	0.0006	6.10.4.2.2-3
0.100	1.001	17.00	2.00	0.0034	6.10.4.2.2-3	17.00	2.00	0.0034	6.10.4.2.2-3
1.750	1.013	17.00	2.00	0.0543	6.10.4.2.2-3	17.00	2.00	0.0543	6.10.4.2.2-3
3.500	1.026	17.00	2.00	0.1305	6.10.4.2.2-3	17.00	2.00	0.1305	6.10.4.2.2-3
49.000	1.358	17.00	2.25	0.7467	6.10.4.2.2-3	17.00	2.00	0.8072	6.10.4.2.2-3
55.500	1.405	17.00	2.25	0.7847	6.10.4.2.2-3	17.00	2.00	0.8482	6.10.4.2.2-3
62.000	1.453	17.00	2.25	0.8056	6.10.4.2.2-3	17.00	2.00	0.8709	6.10.4.2.2-3
68.500	1.500	17.00	2.25	0.8078	6.10.4.2.2-3	17.00	2.00	0.8732	6.10.4.2.2-3
36.000	1.263	17.00	2.00	0.6932	6.10.4.2.2-3	17.00	2.00	0.6932	6.10.4.2.2-3
42.500	1.310	17.00	2.00	0.7632	6.10.4.2.2-3	17.00	2.00	0.7632	6.10.4.2.2-3
47.900	1.350	17.00	2.00	0.8092	6.10.4.2.2-3	17.00	2.00	0.8092	6.10.4.2.2-3
48.100	1.351	17.00	2.25	0.7396	6.10.4.2.2-3	17.00	2.00	0.7995	6.10.4.2.2-3
75.000	1.547	17.00	2.25	0.8046	6.10.4.2.2-3	17.00	2.00	0.8701	6.10.4.2.2-3
81.500	1.595	17.00	2.25	0.7849	6.10.4.2.2-3	17.00	2.00	0.8487	6.10.4.2.2-3
87.900	1.642	17.00	2.25	0.7532	6.10.4.2.2-3	17.00	2.00	0.8145	6.10.4.2.2-3
88.000	1.642	17.00	2.25	0.7524	6.10.4.2.2-3	17.00	2.00	0.8136	6.10.4.2.2-3
88.100	1.643	17.00	2.00	0.8239	6.10.4.2.2-3	17.00	2.00	0.8239	6.10.4.2.2-3
94.500	1.690	17.00	2.00	0.7777	6.10.4.2.2-3	17.00	2.00	0.7777	6.10.4.2.2-3
101.000	1.737	17.00	2.00	0.6998	6.10.4.2.2-3	17.00	2.00	0.6998	6.10.4.2.2-3
107.500	1.785	17.00	2.00	0.6172	6.10.4.2.2-3	17.00	2.00	0.6172	6.10.4.2.2-3
114.000	1.832	17.00	2.00	0.5377	6.10.4.2.2-3	17.00	2.00	0.5377	6.10.4.2.2-3
120.500	1.880	17.00	2.00	0.4198	6.10.4.2.2-3	17.00	2.00	0.4198	6.10.4.2.2-3
127.000	1.927	17.00	2.00	0.2842	6.10.4.2.2-3	17.00	2.00	0.2842	6.10.4.2.2-3
133.500	1.974	17.00	2.00	0.1036	6.10.4.2.2-3	17.00	2.00	0.1036	6.10.4.2.2-3
135.250	1.987	17.00	2.00	0.0522	6.10.4.2.2-3	17.00	2.00	0.0522	6.10.4.2.2-3
136.900	1.999	17.00	2.00	0.0037	6.10.4.2.2-3	17.00	2.00	0.0037	6.10.4.2.2-3
137.000	2.000	17.00	2.00	0.0004	6.10.4.2.2-3	17.00	2.00	0.0004	6.10.4.2.2-3

Load combination: Final Default Fatigue

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
10.000	1.073	17.00	2.00	0.3216	6.10.5.3-1	17.00	2.00	0.3216	6.10.5.3-1
16.500	1.120	17.00	2.00	0.2882	6.10.5.3-1	17.00	2.00	0.2882	6.10.5.3-1
23.000	1.168	17.00	2.00	0.3332	6.6.1.2.2-1	17.00	2.00	0.3332	6.6.1.2.2-1
29.500	1.215	17.00	2.00	0.3845	6.6.1.2.2-1	17.00	2.00	0.3845	6.6.1.2.2-1
0.000	1.000	17.00	2.00	0.1813	6.10.5.3-1	17.00	2.00	0.1813	6.10.5.3-1
0.100	1.001	17.00	2.00	0.1806	6.10.5.3-1	17.00	2.00	0.1806	6.10.5.3-1
1.750	1.013	17.00	2.00	0.1776	6.10.5.3-1	17.00	2.00	0.1776	6.10.5.3-1
3.500	1.026	17.00	2.00	0.3713	6.10.5.3-1	17.00	2.00	0.3713	6.10.5.3-1
49.000	1.358	17.00	2.25	0.5010	6.6.1.2.2-1	17.00	2.00	0.5010	6.6.1.2.2-1
55.500	1.405	17.00	2.25	0.5208	6.6.1.2.2-1	17.00	2.00	0.5208	6.6.1.2.2-1
62.000	1.453	17.00	2.25	0.5350	6.6.1.2.2-1	17.00	2.00	0.5350	6.6.1.2.2-1
68.500	1.500	17.00	2.25	0.5137	6.6.1.2.2-1	17.00	2.00	0.5137	6.6.1.2.2-1
36.000	1.263	17.00	2.00	0.4388	6.6.1.2.2-1	17.00	2.00	0.4388	6.6.1.2.2-1
42.500	1.310	17.00	2.00	0.4783	6.6.1.2.2-1	17.00	2.00	0.4783	6.6.1.2.2-1
47.900	1.350	17.00	2.00	0.4962	6.6.1.2.2-1	17.00	2.00	0.4962	6.6.1.2.2-1
48.100	1.351	17.00	2.25	0.4928	6.6.1.2.2-1	17.00	2.00	0.4928	6.6.1.2.2-1
75.000	1.547	17.00	2.25	0.5226	6.6.1.2.2-1	17.00	2.00	0.5226	6.6.1.2.2-1
81.500	1.595	17.00	2.25	0.5082	6.6.1.2.2-1	17.00	2.00	0.5082	6.6.1.2.2-1
87.900	1.642	17.00	2.25	0.5002	6.6.1.2.2-1	17.00	2.00	0.5002	6.6.1.2.2-1
88.000	1.642	17.00	2.25	0.4993	6.6.1.2.2-1	17.00	2.00	0.4993	6.6.1.2.2-1
88.100	1.643	17.00	2.00	0.5036	6.6.1.2.2-1	17.00	2.00	0.5036	6.6.1.2.2-1
94.500	1.690	17.00	2.00	0.4798	6.6.1.2.2-1	17.00	2.00	0.4798	6.6.1.2.2-1
101.000	1.737	17.00	2.00	0.4481	6.6.1.2.2-1	17.00	2.00	0.4481	6.6.1.2.2-1
107.500	1.785	17.00	2.00	0.3947	6.6.1.2.2-1	17.00	2.00	0.3947	6.6.1.2.2-1
114.000	1.832	17.00	2.00	0.3495	6.6.1.2.2-1	17.00	2.00	0.3495	6.6.1.2.2-1
120.500	1.880	17.00	2.00	0.2951	6.10.5.3-1	17.00	2.00	0.2951	6.10.5.3-1
127.000	1.927	17.00	2.00	0.2944	6.10.5.3-1	17.00	2.00	0.2944	6.10.5.3-1
133.500	1.974	17.00	2.00	0.3380	6.10.5.3-1	17.00	2.00	0.3380	6.10.5.3-1
135.250	1.987	17.00	2.00	0.1723	6.10.5.3-1	17.00	2.00	0.1723	6.10.5.3-1
136.900	1.999	17.00	2.00	0.1890	6.10.5.3-1	17.00	2.00	0.1890	6.10.5.3-1
137.000	2.000	17.00	2.00	0.1896	6.10.5.3-1	17.00	2.00	0.1896	6.10.5.3-1

Summary Shear Report

Load combination: Initial Default

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
10.000	1.073	0.50	52.00	13.0000	Unstiffened	---	---	0.0800	6.10.3.3-1
16.500	1.120	0.50	52.00	13.0000	Unstiffened	---	---	0.0706	6.10.3.3-1
23.000	1.168	0.50	52.00	13.0000	Stiffened	---	---	0.0556	6.10.3.3-1
29.500	1.215	0.50	52.00	13.0000	Stiffened	---	---	0.0473	6.10.3.3-1
36.000	1.263	0.50	52.00	13.0000	Stiffened	---	---	0.0391	6.10.3.3-1
0.000	1.000	0.50	52.00	3.5000	Stiffened	---	---	0.0436	6.10.3.3-1
0.100	1.001	0.50	52.00	3.5000	Stiffened	---	---	0.0429	6.10.3.3-1
1.750	1.013	0.50	52.00	3.5000	Stiffened	---	---	0.0419	6.10.3.3-1
3.500	1.026	0.50	52.00	13.0000	Unstiffened	---	---	0.0884	6.10.3.3-1
55.500	1.405	0.50	52.00	13.0000	Unstiffened	---	---	0.0168	6.10.3.3-1
62.000	1.453	0.50	52.00	13.0000	Unstiffened	---	---	0.0083	6.10.3.3-1
68.500	1.500	0.50	52.00	13.0000	Unstiffened	---	---	0.0017	6.10.3.3-1
75.000	1.547	0.50	52.00	13.0000	Unstiffened	---	---	0.0084	6.10.3.3-1
42.500	1.310	0.50	52.00	13.0000	Stiffened	---	---	0.0308	6.10.3.3-1
47.900	1.350	0.50	52.00	13.0000	Stiffened	---	---	0.0242	6.10.3.3-1
48.100	1.351	0.50	52.00	13.0000	Stiffened	---	---	0.0240	6.10.3.3-1
49.000	1.358	0.50	52.00	13.0000	Stiffened	---	---	0.0229	6.10.3.3-1
81.500	1.595	0.50	52.00	13.0000	Unstiffened	---	---	0.0184	6.10.3.3-1
87.900	1.642	0.50	52.00	13.0000	Stiffened	---	---	0.0229	6.10.3.3-1
88.000	1.642	0.50	52.00	13.0000	Stiffened	---	---	0.0230	6.10.3.3-1
88.100	1.643	0.50	52.00	13.0000	Stiffened	---	---	0.0231	6.10.3.3-1
94.500	1.690	0.50	52.00	13.0000	Unstiffened	---	---	0.0355	6.10.3.3-1
101.000	1.737	0.50	52.00	13.0000	Unstiffened	---	---	0.0434	6.10.3.3-1
107.500	1.785	0.50	52.00	13.0000	Unstiffened	---	---	0.0539	6.10.3.3-1
114.000	1.832	0.50	52.00	13.0000	Unstiffened	---	---	0.0618	6.10.3.3-1
120.500	1.880	0.50	52.00	13.0000	Unstiffened	---	---	0.0720	6.10.3.3-1
127.000	1.927	0.50	52.00	13.0000	Stiffened	---	---	0.0720	6.10.3.3-1
133.500	1.974	0.50	52.00	13.0000	Stiffened	---	---	0.0807	6.10.3.3-1
135.250	1.987	0.50	52.00	3.5000	Stiffened	---	---	0.0419	6.10.3.3-1

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
136.900	1.999	0.50	52.00	3.5000	Stiffened	---	---	0.0428	6.10.3.3-1
137.000	2.000	0.50	52.00	3.5000	Stiffened	---	---	0.0435	6.10.3.3-1

Load combination: Final Default Strength I

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
10.000	1.073	0.50	52.00	13.0000	Unstiffened	---	---	0.6900	6.10.9.1-1
16.500	1.120	0.50	52.00	13.0000	Unstiffened	---	---	0.6138	6.10.9.1-1
23.000	1.168	0.50	52.00	13.0000	Stiffened	---	---	0.3760	6.10.9.1-1
29.500	1.215	0.50	52.00	13.0000	Stiffened	---	---	0.3635	6.10.9.1-1
0.000	1.000	0.50	52.00	3.5000	Stiffened	---	---	0.3853	6.10.9.1-1
0.100	1.001	0.50	52.00	3.5000	Stiffened	---	---	0.3842	6.10.9.1-1
1.750	1.013	0.50	52.00	3.5000	Stiffened	---	---	0.3801	6.10.9.1-1
3.500	1.026	0.50	52.00	13.0000	Unstiffened	---	---	0.7966	6.10.9.1-1
55.500	1.405	0.50	52.00	13.0000	Unstiffened	---	---	0.3109	6.10.9.1-1
62.000	1.453	0.50	52.00	13.0000	Unstiffened	---	---	0.2347	6.10.9.1-1
68.500	1.500	0.50	52.00	13.0000	Unstiffened	---	---	0.2238	6.10.9.1-1
75.000	1.547	0.50	52.00	13.0000	Unstiffened	---	---	0.2364	6.10.9.1-1
36.000	1.263	0.50	52.00	13.0000	Stiffened	---	---	0.3111	6.10.9.1-1
42.500	1.310	0.50	52.00	13.0000	Stiffened	---	---	0.2864	6.10.9.1-1
47.900	1.350	0.50	52.00	13.0000	Stiffened	---	---	0.2429	6.10.9.1-1
48.100	1.351	0.50	52.00	13.0000	Stiffened	---	---	0.2422	6.10.9.1-1
49.000	1.358	0.50	52.00	13.0000	Stiffened	---	---	0.2386	6.10.9.1-1
81.500	1.595	0.50	52.00	13.0000	Unstiffened	---	---	0.3105	6.10.9.1-1
87.900	1.642	0.50	52.00	13.0000	Stiffened	---	---	0.2331	6.10.9.1-1
88.000	1.642	0.50	52.00	13.0000	Stiffened	---	---	0.2335	6.10.9.1-1
88.100	1.643	0.50	52.00	13.0000	Stiffened	---	---	0.2361	6.10.9.1-1
94.500	1.690	0.50	52.00	13.0000	Unstiffened	---	---	0.4051	6.10.9.1-1
101.000	1.737	0.50	52.00	13.0000	Unstiffened	---	---	0.4486	6.10.9.1-1
107.500	1.785	0.50	52.00	13.0000	Unstiffened	---	---	0.5147	6.10.9.1-1
114.000	1.832	0.50	52.00	13.0000	Unstiffened	---	---	0.5424	6.10.9.1-1
120.500	1.880	0.50	52.00	13.0000	Unstiffened	---	---	0.6178	6.10.9.1-1

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
127.000	1.927	0.50	52.00	13.0000	Stiffened	---	---	0.4737	6.10.9.1-1
133.500	1.974	0.50	52.00	13.0000	Stiffened	---	---	0.5500	6.10.9.1-1
135.250	1.987	0.50	52.00	3.5000	Stiffened	---	---	0.3661	6.10.9.1-1
136.900	1.999	0.50	52.00	3.5000	Stiffened	---	---	0.3884	6.10.9.1-1
137.000	2.000	0.50	52.00	3.5000	Stiffened	---	---	0.3906	6.10.9.1-1

Group01 Member 03

Overall Design Summary Report

POI Location (ft)	Span Fraction	Critical Load Combination
0.000	1.000	Final - Strength I 6.10.9.1-1 0.369
0.100	1.001	Final - Strength I 6.10.9.1-1 0.362
1.750	1.013	Final - Strength I 6.10.9.1-1 0.357
3.500	1.026	Final - Strength I 6.10.9.1-1 0.777
10.000	1.073	Final - Strength I 6.10.9.1-1 0.684
16.500	1.120	Final - Strength I 6.10.9.1-1 0.652
23.000	1.168	Final - Strength I 6.10.8.1.2-1 0.552
29.500	1.215	Final - Strength I 6.10.8.1.2-1 0.650

POI Location (ft)	Span Fraction	Critical Load Combination
36.000	1.263	Final - Strength I 6.10.8.1.2-1 0.730
42.500	1.310	Final - Strength I 6.10.8.1.2-1 0.802
47.900	1.350	Final - Strength I 6.10.8.1.2-1 0.851
48.100	1.351	Final - Strength I 6.10.8.1.2-1 0.841
49.000	1.358	Final - Strength I 6.10.8.1.2-1 0.849
55.500	1.405	Final - Strength I 6.10.8.1.2-1 0.883
62.000	1.453	Final - Strength I 6.10.8.1.2-1 0.905
68.500	1.500	Final - Strength I 6.10.8.1.2-1 0.906
75.000	1.547	Final - Strength I 6.10.8.1.2-1 0.908
81.500	1.595	Final - Strength I 6.10.8.1.2-1 0.887
87.900	1.642	Final - Strength I 6.10.8.1.2-1 0.847
88.000	1.642	Final - Strength I 6.10.8.1.2-1 0.846
		Final - Strength I

POI Location (ft)	Span Fraction	Critical Load Combination
88.100	1.643	6.10.8.1.2-1 0.857
94.500	1.690	Final - Strength I 6.10.8.1.2-1 0.799
101.000	1.737	Final - Strength I 6.10.8.1.2-1 0.726
107.500	1.785	Final - Strength I 6.10.8.1.2-1 0.637
114.000	1.832	Final - Strength I 6.10.8.1.2-1 0.547
120.500	1.880	Final - Strength I 6.10.9.1-1 0.605
127.000	1.927	Final - Strength I 6.10.9.1-1 0.470
133.500	1.974	Final - Strength I 6.10.9.1-1 0.534
135.250	1.987	Final - Strength I 6.10.9.1-1 0.359
136.900	1.999	Final - Strength I 6.10.9.1-1 0.363
137.000	2.000	Final - Strength I 6.10.9.1-1 0.367

Summary Flexure Report

Load combination: Initial Default

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	2.00	0.0000	6.10.3.2.1-1	17.00	2.00	0.0000	6.10.3.2.2-1
0.100	1.001	17.00	2.00	0.0004	6.10.3.2.1-1	17.00	2.00	0.0004	6.10.3.2.2-1
1.750	1.013	17.00	2.00	0.0063	6.10.3.2.1-1	17.00	2.00	0.0063	6.10.3.2.2-1
3.500	1.026	17.00	2.00	0.0124	6.10.3.2.1-1	17.00	2.00	0.0124	6.10.3.2.2-1
10.000	1.073	17.00	2.00	0.0334	6.10.3.2.1-1	17.00	2.00	0.0334	6.10.3.2.2-1
16.500	1.120	17.00	2.00	0.0524	6.10.3.2.1-1	17.00	2.00	0.0524	6.10.3.2.2-1
23.000	1.168	17.00	2.00	0.0689	6.10.3.2.1-1	17.00	2.00	0.0689	6.10.3.2.2-1
29.500	1.215	17.00	2.00	0.0833	6.10.3.2.1-1	17.00	2.00	0.0833	6.10.3.2.2-1
36.000	1.263	17.00	2.00	0.0952	6.10.3.2.1-1	17.00	2.00	0.0952	6.10.3.2.2-1
42.500	1.310	17.00	2.00	0.1050	6.10.3.2.1-1	17.00	2.00	0.1050	6.10.3.2.2-1
47.900	1.350	17.00	2.00	0.1113	6.10.3.2.1-1	17.00	2.00	0.1113	6.10.3.2.2-1
48.100	1.351	17.00	2.25	0.1018	6.10.3.2.1-1	17.00	2.00	0.1100	6.10.3.2.2-1
49.000	1.358	17.00	2.25	0.1026	6.10.3.2.1-1	17.00	2.00	0.1109	6.10.3.2.2-1
55.500	1.405	17.00	2.25	0.1074	6.10.3.2.1-1	17.00	2.00	0.1161	6.10.3.2.2-1
62.000	1.453	17.00	2.25	0.1103	6.10.3.2.1-1	17.00	2.00	0.1192	6.10.3.2.2-1
68.500	1.500	17.00	2.25	0.1112	6.10.3.2.1-1	17.00	2.00	0.1202	6.10.3.2.2-1
75.000	1.547	17.00	2.25	0.1103	6.10.3.2.1-1	17.00	2.00	0.1192	6.10.3.2.2-1
81.500	1.595	17.00	2.25	0.1074	6.10.3.2.1-1	17.00	2.00	0.1161	6.10.3.2.2-1
87.900	1.642	17.00	2.25	0.1026	6.10.3.2.1-1	17.00	2.00	0.1109	6.10.3.2.2-1
88.000	1.642	17.00	2.25	0.1025	6.10.3.2.1-1	17.00	2.00	0.1108	6.10.3.2.2-1
88.100	1.643	17.00	2.00	0.1123	6.10.3.2.1-1	17.00	2.00	0.1123	6.10.3.2.2-1
94.500	1.690	17.00	2.00	0.1050	6.10.3.2.1-1	17.00	2.00	0.1050	6.10.3.2.2-1
101.000	1.737	17.00	2.00	0.0951	6.10.3.2.1-1	17.00	2.00	0.0951	6.10.3.2.2-1
107.500	1.785	17.00	2.00	0.0833	6.10.3.2.1-1	17.00	2.00	0.0833	6.10.3.2.2-1
114.000	1.832	17.00	2.00	0.0688	6.10.3.2.1-1	17.00	2.00	0.0688	6.10.3.2.2-1
120.500	1.880	17.00	2.00	0.0524	6.10.3.2.1-1	17.00	2.00	0.0524	6.10.3.2.2-1
127.000	1.927	17.00	2.00	0.0334	6.10.3.2.1-1	17.00	2.00	0.0334	6.10.3.2.2-1
133.500	1.974	17.00	2.00	0.0124	6.10.3.2.1-1	17.00	2.00	0.0124	6.10.3.2.2-1
135.250	1.987	17.00	2.00	0.0063	6.10.3.2.1-1	17.00	2.00	0.0063	6.10.3.2.2-1
136.900	1.999	17.00	2.00	0.0004	6.10.3.2.1-1	17.00	2.00	0.0004	6.10.3.2.2-1
137.000	2.000	17.00	2.00	0.0000	6.10.3.2.1-1	17.00	2.00	0.0000	6.10.3.2.2-1

Load combination: Final Default Strength I

Date:	4/12/2018	Govornor Bridge Road Design - 4 beams.lbs	
Time:	2:14 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 7th Ed. with 2016 Interims]	v17.00.02.15

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	2.00	---	---	17.00	2.00	0.0010	6.10.8.1.2-1
0.100	1.001	17.00	2.00	---	---	17.00	2.00	0.0041	6.10.8.1.2-1
1.750	1.013	17.00	2.00	---	---	17.00	2.00	0.0537	6.10.8.1.2-1
3.500	1.026	17.00	2.00	---	---	17.00	2.00	0.1190	6.10.8.1.2-1
10.000	1.073	17.00	2.00	---	---	17.00	2.00	0.2860	6.10.8.1.2-1
16.500	1.120	17.00	2.00	---	---	17.00	2.00	0.4310	6.10.8.1.2-1
23.000	1.168	17.00	2.00	---	---	17.00	2.00	0.5522	6.10.8.1.2-1
29.500	1.215	17.00	2.00	---	---	17.00	2.00	0.6495	6.10.8.1.2-1
36.000	1.263	17.00	2.00	---	---	17.00	2.00	0.7297	6.10.8.1.2-1
42.500	1.310	17.00	2.00	---	---	17.00	2.00	0.8020	6.10.8.1.2-1
47.900	1.350	17.00	2.00	---	---	17.00	2.00	0.8506	6.10.8.1.2-1
48.100	1.351	17.00	2.25	---	---	17.00	2.00	0.8407	6.10.8.1.2-1
49.000	1.358	17.00	2.25	---	---	17.00	2.00	0.8487	6.10.8.1.2-1
55.500	1.405	17.00	2.25	---	---	17.00	2.00	0.8831	6.10.8.1.2-1
62.000	1.453	17.00	2.25	---	---	17.00	2.00	0.9046	6.10.8.1.2-1
68.500	1.500	17.00	2.25	---	---	17.00	2.00	0.9059	6.10.8.1.2-1
75.000	1.547	17.00	2.25	---	---	17.00	2.00	0.9081	6.10.8.1.2-1
81.500	1.595	17.00	2.25	---	---	17.00	2.00	0.8874	6.10.8.1.2-1
87.900	1.642	17.00	2.25	---	---	17.00	2.00	0.8465	6.10.8.1.2-1
88.000	1.642	17.00	2.25	---	---	17.00	2.00	0.8460	6.10.8.1.2-1
88.100	1.643	17.00	2.00	---	---	17.00	2.00	0.8569	6.10.8.1.2-1
94.500	1.690	17.00	2.00	---	---	17.00	2.00	0.7987	6.10.8.1.2-1
101.000	1.737	17.00	2.00	---	---	17.00	2.00	0.7263	6.10.8.1.2-1
107.500	1.785	17.00	2.00	---	---	17.00	2.00	0.6369	6.10.8.1.2-1
114.000	1.832	17.00	2.00	---	---	17.00	2.00	0.5473	6.10.8.1.2-1
120.500	1.880	17.00	2.00	---	---	17.00	2.00	0.4244	6.10.8.1.2-1
127.000	1.927	17.00	2.00	---	---	17.00	2.00	0.2864	6.10.8.1.2-1
133.500	1.974	17.00	2.00	---	---	17.00	2.00	0.1068	6.10.8.1.2-1
135.250	1.987	17.00	2.00	---	---	17.00	2.00	0.0547	6.10.8.1.2-1
136.900	1.999	17.00	2.00	---	---	17.00	2.00	0.0046	6.10.8.1.2-1
137.000	2.000	17.00	2.00	---	---	17.00	2.00	0.0017	6.10.8.1.2-1

Load combination: Final Default Service II

Date:	4/12/2018	Govornor Bridge Road Design - 4 beams.lbs	
Time:	2:14 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 7th Ed. with 2016 Interims]	v17.00.02.15

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	2.00	0.0013	6.10.4.2.2-3	17.00	2.00	0.0013	6.10.4.2.2-3
0.100	1.001	17.00	2.00	0.0043	6.10.4.2.2-3	17.00	2.00	0.0043	6.10.4.2.2-3
1.750	1.013	17.00	2.00	0.0519	6.10.4.2.2-3	17.00	2.00	0.0519	6.10.4.2.2-3
3.500	1.026	17.00	2.00	0.1202	6.10.4.2.2-3	17.00	2.00	0.1202	6.10.4.2.2-3
10.000	1.073	17.00	2.00	0.2806	6.10.4.2.2-3	17.00	2.00	0.2806	6.10.4.2.2-3
16.500	1.120	17.00	2.00	0.4200	6.10.4.2.2-3	17.00	2.00	0.4200	6.10.4.2.2-3
23.000	1.168	17.00	2.00	0.5369	6.10.4.2.2-3	17.00	2.00	0.5369	6.10.4.2.2-3
29.500	1.215	17.00	2.00	0.6308	6.10.4.2.2-3	17.00	2.00	0.6308	6.10.4.2.2-3
36.000	1.263	17.00	2.00	0.7030	6.10.4.2.2-3	17.00	2.00	0.7030	6.10.4.2.2-3
42.500	1.310	17.00	2.00	0.7726	6.10.4.2.2-3	17.00	2.00	0.7726	6.10.4.2.2-3
47.900	1.350	17.00	2.00	0.8196	6.10.4.2.2-3	17.00	2.00	0.8196	6.10.4.2.2-3
48.100	1.351	17.00	2.25	0.7494	6.10.4.2.2-3	17.00	2.00	0.8102	6.10.4.2.2-3
49.000	1.358	17.00	2.25	0.7565	6.10.4.2.2-3	17.00	2.00	0.8177	6.10.4.2.2-3
55.500	1.405	17.00	2.25	0.7872	6.10.4.2.2-3	17.00	2.00	0.8510	6.10.4.2.2-3
62.000	1.453	17.00	2.25	0.8064	6.10.4.2.2-3	17.00	2.00	0.8718	6.10.4.2.2-3
68.500	1.500	17.00	2.25	0.8077	6.10.4.2.2-3	17.00	2.00	0.8732	6.10.4.2.2-3
75.000	1.547	17.00	2.25	0.8091	6.10.4.2.2-3	17.00	2.00	0.8746	6.10.4.2.2-3
81.500	1.595	17.00	2.25	0.7905	6.10.4.2.2-3	17.00	2.00	0.8545	6.10.4.2.2-3
87.900	1.642	17.00	2.25	0.7547	6.10.4.2.2-3	17.00	2.00	0.8158	6.10.4.2.2-3
88.000	1.642	17.00	2.25	0.7542	6.10.4.2.2-3	17.00	2.00	0.8153	6.10.4.2.2-3
88.100	1.643	17.00	2.00	0.8259	6.10.4.2.2-3	17.00	2.00	0.8259	6.10.4.2.2-3
94.500	1.690	17.00	2.00	0.7699	6.10.4.2.2-3	17.00	2.00	0.7699	6.10.4.2.2-3
101.000	1.737	17.00	2.00	0.7010	6.10.4.2.2-3	17.00	2.00	0.7010	6.10.4.2.2-3
107.500	1.785	17.00	2.00	0.6150	6.10.4.2.2-3	17.00	2.00	0.6150	6.10.4.2.2-3
114.000	1.832	17.00	2.00	0.5319	6.10.4.2.2-3	17.00	2.00	0.5319	6.10.4.2.2-3
120.500	1.880	17.00	2.00	0.4135	6.10.4.2.2-3	17.00	2.00	0.4135	6.10.4.2.2-3
127.000	1.927	17.00	2.00	0.2805	6.10.4.2.2-3	17.00	2.00	0.2805	6.10.4.2.2-3
133.500	1.974	17.00	2.00	0.1031	6.10.4.2.2-3	17.00	2.00	0.1031	6.10.4.2.2-3
135.250	1.987	17.00	2.00	0.0532	6.10.4.2.2-3	17.00	2.00	0.0532	6.10.4.2.2-3
136.900	1.999	17.00	2.00	0.0052	6.10.4.2.2-3	17.00	2.00	0.0052	6.10.4.2.2-3
137.000	2.000	17.00	2.00	0.0024	6.10.4.2.2-3	17.00	2.00	0.0024	6.10.4.2.2-3

Load combination: Final Default Fatigue

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	2.00	0.1765	6.10.5.3-1	17.00	2.00	0.1765	6.10.5.3-1
0.100	1.001	17.00	2.00	0.1712	6.10.5.3-1	17.00	2.00	0.1712	6.10.5.3-1
1.750	1.013	17.00	2.00	0.1682	6.10.5.3-1	17.00	2.00	0.1682	6.10.5.3-1
3.500	1.026	17.00	2.00	0.3628	6.10.5.3-1	17.00	2.00	0.3628	6.10.5.3-1
10.000	1.073	17.00	2.00	0.3222	6.10.5.3-1	17.00	2.00	0.3222	6.10.5.3-1
16.500	1.120	17.00	2.00	0.3029	6.10.5.3-1	17.00	2.00	0.3029	6.10.5.3-1
23.000	1.168	17.00	2.00	0.3495	6.6.1.2.2-1	17.00	2.00	0.3495	6.6.1.2.2-1
29.500	1.215	17.00	2.00	0.3825	6.6.1.2.2-1	17.00	2.00	0.3825	6.6.1.2.2-1
36.000	1.263	17.00	2.00	0.4540	6.6.1.2.2-1	17.00	2.00	0.4540	6.6.1.2.2-1
42.500	1.310	17.00	2.00	0.4740	6.6.1.2.2-1	17.00	2.00	0.4740	6.6.1.2.2-1
47.900	1.350	17.00	2.00	0.5109	6.6.1.2.2-1	17.00	2.00	0.5109	6.6.1.2.2-1
48.100	1.351	17.00	2.25	0.5079	6.6.1.2.2-1	17.00	2.00	0.5079	6.6.1.2.2-1
49.000	1.358	17.00	2.25	0.5185	6.6.1.2.2-1	17.00	2.00	0.5185	6.6.1.2.2-1
55.500	1.405	17.00	2.25	0.5221	6.6.1.2.2-1	17.00	2.00	0.5221	6.6.1.2.2-1
62.000	1.453	17.00	2.25	0.5217	6.6.1.2.2-1	17.00	2.00	0.5217	6.6.1.2.2-1
68.500	1.500	17.00	2.25	0.5199	6.6.1.2.2-1	17.00	2.00	0.5199	6.6.1.2.2-1
75.000	1.547	17.00	2.25	0.5354	6.6.1.2.2-1	17.00	2.00	0.5354	6.6.1.2.2-1
81.500	1.595	17.00	2.25	0.5190	6.6.1.2.2-1	17.00	2.00	0.5190	6.6.1.2.2-1
87.900	1.642	17.00	2.25	0.5133	6.6.1.2.2-1	17.00	2.00	0.5133	6.6.1.2.2-1
88.000	1.642	17.00	2.25	0.5126	6.6.1.2.2-1	17.00	2.00	0.5126	6.6.1.2.2-1
88.100	1.643	17.00	2.00	0.5167	6.6.1.2.2-1	17.00	2.00	0.5167	6.6.1.2.2-1
94.500	1.690	17.00	2.00	0.4968	6.6.1.2.2-1	17.00	2.00	0.4968	6.6.1.2.2-1
101.000	1.737	17.00	2.00	0.4456	6.6.1.2.2-1	17.00	2.00	0.4456	6.6.1.2.2-1
107.500	1.785	17.00	2.00	0.3925	6.6.1.2.2-1	17.00	2.00	0.3925	6.6.1.2.2-1
114.000	1.832	17.00	2.00	0.3436	6.6.1.2.2-1	17.00	2.00	0.3436	6.6.1.2.2-1
120.500	1.880	17.00	2.00	0.2898	6.10.5.3-1	17.00	2.00	0.2898	6.10.5.3-1
127.000	1.927	17.00	2.00	0.2896	6.10.5.3-1	17.00	2.00	0.2896	6.10.5.3-1
133.500	1.974	17.00	2.00	0.3311	6.10.5.3-1	17.00	2.00	0.3311	6.10.5.3-1
135.250	1.987	17.00	2.00	0.1713	6.10.5.3-1	17.00	2.00	0.1713	6.10.5.3-1
136.900	1.999	17.00	2.00	0.1743	6.10.5.3-1	17.00	2.00	0.1743	6.10.5.3-1
137.000	2.000	17.00	2.00	0.1750	6.10.5.3-1	17.00	2.00	0.1750	6.10.5.3-1

Summary Shear Report

Load combination: Initial Default

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
0.000	1.000	0.50	52.00	3.5000	Stiffened	---	---	0.0436	6.10.3.3-1
0.100	1.001	0.50	52.00	3.5000	Stiffened	---	---	0.0429	6.10.3.3-1
1.750	1.013	0.50	52.00	3.5000	Stiffened	---	---	0.0419	6.10.3.3-1
3.500	1.026	0.50	52.00	13.0000	Unstiffened	---	---	0.0884	6.10.3.3-1
10.000	1.073	0.50	52.00	13.0000	Unstiffened	---	---	0.0800	6.10.3.3-1
16.500	1.120	0.50	52.00	13.0000	Unstiffened	---	---	0.0706	6.10.3.3-1
23.000	1.168	0.50	52.00	13.0000	Stiffened	---	---	0.0556	6.10.3.3-1
29.500	1.215	0.50	52.00	13.0000	Stiffened	---	---	0.0473	6.10.3.3-1
36.000	1.263	0.50	52.00	13.0000	Stiffened	---	---	0.0391	6.10.3.3-1
42.500	1.310	0.50	52.00	13.0000	Stiffened	---	---	0.0308	6.10.3.3-1
47.900	1.350	0.50	52.00	13.0000	Stiffened	---	---	0.0242	6.10.3.3-1
48.100	1.351	0.50	52.00	13.0000	Stiffened	---	---	0.0240	6.10.3.3-1
49.000	1.358	0.50	52.00	13.0000	Stiffened	---	---	0.0229	6.10.3.3-1
55.500	1.405	0.50	52.00	13.0000	Unstiffened	---	---	0.0168	6.10.3.3-1
62.000	1.453	0.50	52.00	13.0000	Unstiffened	---	---	0.0083	6.10.3.3-1
68.500	1.500	0.50	52.00	13.0000	Unstiffened	---	---	0.0017	6.10.3.3-1
75.000	1.547	0.50	52.00	13.0000	Unstiffened	---	---	0.0084	6.10.3.3-1
81.500	1.595	0.50	52.00	13.0000	Unstiffened	---	---	0.0184	6.10.3.3-1
87.900	1.642	0.50	52.00	13.0000	Stiffened	---	---	0.0229	6.10.3.3-1
88.000	1.642	0.50	52.00	13.0000	Stiffened	---	---	0.0230	6.10.3.3-1
88.100	1.643	0.50	52.00	13.0000	Stiffened	---	---	0.0231	6.10.3.3-1
94.500	1.690	0.50	52.00	13.0000	Unstiffened	---	---	0.0355	6.10.3.3-1
101.000	1.737	0.50	52.00	13.0000	Unstiffened	---	---	0.0434	6.10.3.3-1
107.500	1.785	0.50	52.00	13.0000	Unstiffened	---	---	0.0539	6.10.3.3-1
114.000	1.832	0.50	52.00	13.0000	Unstiffened	---	---	0.0618	6.10.3.3-1
120.500	1.880	0.50	52.00	13.0000	Unstiffened	---	---	0.0720	6.10.3.3-1
127.000	1.927	0.50	52.00	13.0000	Stiffened	---	---	0.0720	6.10.3.3-1
133.500	1.974	0.50	52.00	13.0000	Stiffened	---	---	0.0807	6.10.3.3-1
135.250	1.987	0.50	52.00	3.5000	Stiffened	---	---	0.0419	6.10.3.3-1

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
136.900	1.999	0.50	52.00	3.5000	Stiffened	---	---	0.0428	6.10.3.3-1
137.000	2.000	0.50	52.00	3.5000	Stiffened	---	---	0.0435	6.10.3.3-1

Load combination: Final Default Strength I

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
0.000	1.000	0.50	52.00	3.5000	Stiffened	---	---	0.3686	6.10.9.1-1
0.100	1.001	0.50	52.00	3.5000	Stiffened	---	---	0.3618	6.10.9.1-1
1.750	1.013	0.50	52.00	3.5000	Stiffened	---	---	0.3571	6.10.9.1-1
3.500	1.026	0.50	52.00	13.0000	Unstiffened	---	---	0.7771	6.10.9.1-1
10.000	1.073	0.50	52.00	13.0000	Unstiffened	---	---	0.6843	6.10.9.1-1
16.500	1.120	0.50	52.00	13.0000	Unstiffened	---	---	0.6522	6.10.9.1-1
23.000	1.168	0.50	52.00	13.0000	Stiffened	---	---	0.3721	6.10.9.1-1
29.500	1.215	0.50	52.00	13.0000	Stiffened	---	---	0.3513	6.10.9.1-1
36.000	1.263	0.50	52.00	13.0000	Stiffened	---	---	0.3049	6.10.9.1-1
42.500	1.310	0.50	52.00	13.0000	Stiffened	---	---	0.2796	6.10.9.1-1
47.900	1.350	0.50	52.00	13.0000	Stiffened	---	---	0.2384	6.10.9.1-1
48.100	1.351	0.50	52.00	13.0000	Stiffened	---	---	0.2363	6.10.9.1-1
49.000	1.358	0.50	52.00	13.0000	Stiffened	---	---	0.2325	6.10.9.1-1
55.500	1.405	0.50	52.00	13.0000	Unstiffened	---	---	0.3309	6.10.9.1-1
62.000	1.453	0.50	52.00	13.0000	Unstiffened	---	---	0.2412	6.10.9.1-1
68.500	1.500	0.50	52.00	13.0000	Unstiffened	---	---	0.2136	6.10.9.1-1
75.000	1.547	0.50	52.00	13.0000	Unstiffened	---	---	0.2350	6.10.9.1-1
81.500	1.595	0.50	52.00	13.0000	Unstiffened	---	---	0.3012	6.10.9.1-1
87.900	1.642	0.50	52.00	13.0000	Stiffened	---	---	0.2331	6.10.9.1-1
88.000	1.642	0.50	52.00	13.0000	Stiffened	---	---	0.2369	6.10.9.1-1
88.100	1.643	0.50	52.00	13.0000	Stiffened	---	---	0.2372	6.10.9.1-1
94.500	1.690	0.50	52.00	13.0000	Unstiffened	---	---	0.4047	6.10.9.1-1
101.000	1.737	0.50	52.00	13.0000	Unstiffened	---	---	0.4518	6.10.9.1-1
107.500	1.785	0.50	52.00	13.0000	Unstiffened	---	---	0.5107	6.10.9.1-1
114.000	1.832	0.50	52.00	13.0000	Unstiffened	---	---	0.5372	6.10.9.1-1
120.500	1.880	0.50	52.00	13.0000	Unstiffened	---	---	0.6052	6.10.9.1-1

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
127.000	1.927	0.50	52.00	13.0000	Stiffened	---	---	0.4696	6.10.9.1-1
133.500	1.974	0.50	52.00	13.0000	Stiffened	---	---	0.5340	6.10.9.1-1
135.250	1.987	0.50	52.00	3.5000	Stiffened	---	---	0.3592	6.10.9.1-1
136.900	1.999	0.50	52.00	3.5000	Stiffened	---	---	0.3634	6.10.9.1-1
137.000	2.000	0.50	52.00	3.5000	Stiffened	---	---	0.3667	6.10.9.1-1

Group01 Member 04

Overall Design Summary Report

POI Location (ft)	Span Fraction	Critical Load Combination
0.000	1.000	Final - Strength I 6.10.9.1-1 0.387
0.100	1.001	Final - Strength I 6.10.9.1-1 0.382
0.100	1.001	Final - Strength I 6.10.9.1-1 0.382
1.750	1.013	Final - Strength I 6.10.9.1-1 0.378
3.500	1.026	Final - Strength I 6.10.9.1-1 0.794
10.000	1.073	Final - Strength I 6.10.9.1-1 0.758
16.500	1.120	Final - Strength I 6.10.9.1-1 0.671
23.000	1.168	Final - Strength I 6.10.8.1.2-1 0.640

POI Location (ft)	Span Fraction	Critical Load Combination
29.500	1.215	Final - Strength I 6.10.8.1.2-1 0.766
36.000	1.263	Final - Strength I 6.10.8.1.2-1 0.818
42.500	1.310	Final - Strength I 6.10.8.1.2-1 0.896
47.900	1.350	Final - Strength I 6.10.8.1.2-1 0.977
48.100	1.351	Final - Strength I 6.10.8.1.2-1 0.860
49.000	1.358	Final - Strength I 6.10.8.1.2-1 0.872
55.500	1.405	Final - Strength I 6.10.8.1.2-1 0.927
62.000	1.453	Final - Strength I 6.10.8.1.2-1 0.944
68.500	1.500	Final - Strength I 6.10.8.1.2-1 0.945
75.000	1.547	Final - Strength I 6.10.8.1.2-1 0.929
81.500	1.595	Final - Strength I 6.10.8.1.2-1 0.903
87.900	1.642	Final - Strength I 6.10.8.1.2-1 0.865
		Final - Strength I

POI Location (ft)	Span Fraction	Critical Load Combination
88.000	1.642	6.10.8.1.2-1 0.864
88.100	1.643	Final - Service II 6.10.4.2.2-3 0.940
89.900	1.656	Final - Service II 6.10.4.2.2-3 0.918
90.100	1.658	Final - Strength I 6.10.8.1.2-1 0.958
94.500	1.690	Final - Strength I 6.10.8.1.2-1 0.929
101.000	1.737	Final - Strength I 6.10.8.1.2-1 0.807
107.500	1.785	Final - Strength I 6.10.8.1.2-1 0.716
114.000	1.832	Final - Strength I 6.10.8.1.2-1 0.637
120.500	1.880	Final - Strength I 6.10.9.1-1 0.678
127.000	1.927	Final - Strength I 6.10.9.1-1 0.507
133.500	1.974	Final - Strength I 6.10.9.1-1 0.543
135.250	1.987	Final - Strength I 6.10.9.1-1 0.364
136.900	1.999	Final - Strength I 6.10.9.1-1

POI Location (ft)	Span Fraction	Critical Load Combination
		0.405
136.900	1.999	Final - Strength I 6.10.9.1-1 0.405
137.000	2.000	Final - Strength I 6.10.9.1-1 0.426

Summary Flexure Report

Load combination: Initial Default

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	2.00	0.0000	6.10.3.2.1-1	17.00	2.00	0.0000	6.10.3.2.2-1
0.100	1.001	17.00	2.00	0.0004	6.10.3.2.1-1	17.00	2.00	0.0004	6.10.3.2.2-1
1.750	1.013	17.00	2.00	0.0062	6.10.3.2.1-1	17.00	2.00	0.0062	6.10.3.2.2-1
3.500	1.026	17.00	2.00	0.0123	6.10.3.2.1-1	17.00	2.00	0.0123	6.10.3.2.2-1
10.000	1.073	17.00	2.00	0.0335	6.10.3.2.1-1	17.00	2.00	0.0335	6.10.3.2.2-1
16.500	1.120	17.00	2.00	0.0526	6.10.3.2.1-1	17.00	2.00	0.0526	6.10.3.2.2-1
23.000	1.168	17.00	2.00	0.0697	6.10.3.2.1-1	17.00	2.00	0.0697	6.10.3.2.2-1
29.500	1.215	17.00	2.00	0.0846	6.10.3.2.1-1	17.00	2.00	0.0846	6.10.3.2.2-1
36.000	1.263	17.00	2.00	0.0976	6.10.3.2.1-1	17.00	2.00	0.0976	6.10.3.2.2-1
42.500	1.310	17.00	2.00	0.1084	6.10.3.2.1-1	17.00	2.00	0.1084	6.10.3.2.2-1
47.900	1.350	17.00	2.00	0.1157	6.10.3.2.1-1	17.00	2.00	0.1157	6.10.3.2.2-1
48.100	1.351	17.00	2.25	0.1041	6.10.3.2.1-1	17.50	2.25	0.1019	6.10.3.2.2-1
49.000	1.358	17.00	2.25	0.1050	6.10.3.2.1-1	17.50	2.25	0.1029	6.10.3.2.2-1
55.500	1.405	17.00	2.25	0.1109	6.10.3.2.1-1	17.50	2.25	0.1086	6.10.3.2.2-1
62.000	1.453	17.00	2.25	0.1142	6.10.3.2.1-1	17.50	2.25	0.1118	6.10.3.2.2-1
68.500	1.500	17.00	2.25	0.1155	6.10.3.2.1-1	17.50	2.25	0.1131	6.10.3.2.2-1
75.000	1.547	17.00	2.25	0.1142	6.10.3.2.1-1	17.50	2.25	0.1119	6.10.3.2.2-1
81.500	1.595	17.00	2.25	0.1109	6.10.3.2.1-1	17.50	2.25	0.1086	6.10.3.2.2-1
87.900	1.642	17.00	2.25	0.1052	6.10.3.2.1-1	17.50	2.25	0.1030	6.10.3.2.2-1
88.000	1.642	17.00	2.25	0.1051	6.10.3.2.1-1	17.50	2.25	0.1029	6.10.3.2.2-1

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
88.100	1.643	17.00	2.00	0.1151	6.10.3.2.1-1	17.50	2.25	0.1043	6.10.3.2.2-1
89.900	1.656	17.00	2.00	0.1129	6.10.3.2.1-1	17.50	2.25	0.1023	6.10.3.2.2-1
90.100	1.658	17.00	2.00	0.1145	6.10.3.2.1-1	17.00	2.00	0.1145	6.10.3.2.2-1
94.500	1.690	17.00	2.00	0.1085	6.10.3.2.1-1	17.00	2.00	0.1085	6.10.3.2.2-1
101.000	1.737	17.00	2.00	0.0976	6.10.3.2.1-1	17.00	2.00	0.0976	6.10.3.2.2-1
107.500	1.785	17.00	2.00	0.0847	6.10.3.2.1-1	17.00	2.00	0.0847	6.10.3.2.2-1
114.000	1.832	17.00	2.00	0.0697	6.10.3.2.1-1	17.00	2.00	0.0697	6.10.3.2.2-1
120.500	1.880	17.00	2.00	0.0527	6.10.3.2.1-1	17.00	2.00	0.0527	6.10.3.2.2-1
127.000	1.927	17.00	2.00	0.0335	6.10.3.2.1-1	17.00	2.00	0.0335	6.10.3.2.2-1
133.500	1.974	17.00	2.00	0.0123	6.10.3.2.1-1	17.00	2.00	0.0123	6.10.3.2.2-1
135.250	1.987	17.00	2.00	0.0062	6.10.3.2.1-1	17.00	2.00	0.0062	6.10.3.2.2-1
136.900	1.999	17.00	2.00	0.0004	6.10.3.2.1-1	17.00	2.00	0.0004	6.10.3.2.2-1
137.000	2.000	17.00	2.00	0.0000	6.10.3.2.1-1	17.00	2.00	0.0000	6.10.3.2.2-1

Load combination: Final Default Strength I

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	2.00	---	---	17.00	2.00	0.0038	6.10.8.1.2-1
0.100	1.001	17.00	2.00	---	---	17.00	2.00	0.1086	6.10.8.1.1-1
0.100	1.001	17.00	2.00	---	---	17.00	2.00	0.0094	6.10.8.1.2-1
1.750	1.013	17.00	2.00	---	---	17.00	2.00	0.0572	6.10.8.1.2-1
3.500	1.026	17.00	2.00	---	---	17.00	2.00	0.1578	6.10.8.1.2-1
10.000	1.073	17.00	2.00	---	---	17.00	2.00	0.3435	6.10.8.1.2-1
16.500	1.120	17.00	2.00	---	---	17.00	2.00	0.5010	6.10.8.1.2-1
23.000	1.168	17.00	2.00	---	---	17.00	2.00	0.6404	6.10.8.1.2-1
29.500	1.215	17.00	2.00	---	---	17.00	2.00	0.7658	6.10.8.1.2-1
36.000	1.263	17.00	2.00	---	---	17.00	2.00	0.8178	6.10.8.1.2-1
42.500	1.310	17.00	2.00	---	---	17.00	2.00	0.8964	6.10.8.1.2-1
47.900	1.350	17.00	2.00	---	---	17.00	2.00	0.9770	6.10.8.1.2-1
48.100	1.351	17.00	2.25	---	---	17.50	2.25	0.8604	6.10.8.1.2-1
49.000	1.358	17.00	2.25	---	---	17.50	2.25	0.8724	6.10.8.1.2-1
55.500	1.405	17.00	2.25	---	---	17.50	2.25	0.9265	6.10.8.1.2-1

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
62.000	1.453	17.00	2.25	---	---	17.50	2.25	0.9438	6.10.8.1.2-1
68.500	1.500	17.00	2.25	---	---	17.50	2.25	0.9448	6.10.8.1.2-1
75.000	1.547	17.00	2.25	---	---	17.50	2.25	0.9293	6.10.8.1.2-1
81.500	1.595	17.00	2.25	---	---	17.50	2.25	0.9033	6.10.8.1.2-1
87.900	1.642	17.00	2.25	---	---	17.50	2.25	0.8651	6.10.8.1.2-1
88.000	1.642	17.00	2.25	---	---	17.50	2.25	0.8640	6.10.8.1.2-1
88.100	1.643	17.00	2.00	---	---	17.50	2.25	0.8748	6.10.8.1.2-1
89.900	1.656	17.00	2.00	---	---	17.50	2.25	0.8544	6.10.8.1.2-1
90.100	1.658	17.00	2.00	---	---	17.00	2.00	0.9575	6.10.8.1.2-1
94.500	1.690	17.00	2.00	---	---	17.00	2.00	0.9292	6.10.8.1.2-1
101.000	1.737	17.00	2.00	---	---	17.00	2.00	0.8073	6.10.8.1.2-1
107.500	1.785	17.00	2.00	---	---	17.00	2.00	0.7158	6.10.8.1.2-1
114.000	1.832	17.00	2.00	---	---	17.00	2.00	0.6366	6.10.8.1.2-1
120.500	1.880	17.00	2.00	---	---	17.00	2.00	0.4964	6.10.8.1.2-1
127.000	1.927	17.00	2.00	---	---	17.00	2.00	0.3335	6.10.8.1.2-1
133.500	1.974	17.00	2.00	---	---	17.00	2.00	0.1076	6.10.8.1.2-1
135.250	1.987	17.00	2.00	---	---	17.00	2.00	0.0542	6.10.8.1.2-1
136.900	1.999	17.00	2.00	---	---	17.00	2.00	0.1076	6.10.8.1.1-1
136.900	1.999	17.00	2.00	---	---	17.00	2.00	0.0088	6.10.8.1.2-1
137.000	2.000	17.00	2.00	---	---	17.00	2.00	0.0030	6.10.8.1.2-1

Load combination: Final Default Service II

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	2.00	0.0053	6.10.4.2.2-3	17.00	2.00	0.0053	6.10.4.2.2-3
0.100	1.001	17.00	2.00	0.0071	6.10.4.2.2-3	17.00	2.00	0.0071	6.10.4.2.2-3
0.100	1.001	17.00	2.00	0.0106	6.10.4.2.2-3	17.00	2.00	0.0106	6.10.4.2.2-3
1.750	1.013	17.00	2.00	0.0564	6.10.4.2.2-3	17.00	2.00	0.0564	6.10.4.2.2-3
3.500	1.026	17.00	2.00	0.1742	6.10.4.2.2-3	17.00	2.00	0.1742	6.10.4.2.2-3
10.000	1.073	17.00	2.00	0.3521	6.10.4.2.2-3	17.00	2.00	0.3521	6.10.4.2.2-3
16.500	1.120	17.00	2.00	0.5031	6.10.4.2.2-3	17.00	2.00	0.5031	6.10.4.2.2-3
23.000	1.168	17.00	2.00	0.6370	6.10.4.2.2-3	17.00	2.00	0.6370	6.10.4.2.2-3

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
29.500	1.215	17.00	2.00	0.7571	6.10.4.2.2-3	17.00	2.00	0.7571	6.10.4.2.2-3
36.000	1.263	17.00	2.00	0.7905	6.10.4.2.2-3	17.00	2.00	0.7905	6.10.4.2.2-3
42.500	1.310	17.00	2.00	0.8662	6.10.4.2.2-3	17.00	2.00	0.8662	6.10.4.2.2-3
47.900	1.350	17.00	2.00	0.9476	6.10.4.2.2-3	17.00	2.00	0.9476	6.10.4.2.2-3
48.100	1.351	17.00	2.25	0.8526	6.10.4.2.2-3	17.50	2.25	0.8340	6.10.4.2.2-3
49.000	1.358	17.00	2.25	0.8642	6.10.4.2.2-3	17.50	2.25	0.8453	6.10.4.2.2-3
55.500	1.405	17.00	2.25	0.9170	6.10.4.2.2-3	17.50	2.25	0.8970	6.10.4.2.2-3
62.000	1.453	17.00	2.25	0.9341	6.10.4.2.2-3	17.50	2.25	0.9138	6.10.4.2.2-3
68.500	1.500	17.00	2.25	0.9354	6.10.4.2.2-3	17.50	2.25	0.9151	6.10.4.2.2-3
75.000	1.547	17.00	2.25	0.9215	6.10.4.2.2-3	17.50	2.25	0.9014	6.10.4.2.2-3
81.500	1.595	17.00	2.25	0.8961	6.10.4.2.2-3	17.50	2.25	0.8764	6.10.4.2.2-3
87.900	1.642	17.00	2.25	0.8585	6.10.4.2.2-3	17.50	2.25	0.8396	6.10.4.2.2-3
88.000	1.642	17.00	2.25	0.8574	6.10.4.2.2-3	17.50	2.25	0.8386	6.10.4.2.2-3
88.100	1.643	17.00	2.00	0.9396	6.10.4.2.2-3	17.50	2.25	0.8489	6.10.4.2.2-3
89.900	1.656	17.00	2.00	0.9181	6.10.4.2.2-3	17.50	2.25	0.8295	6.10.4.2.2-3
90.100	1.658	17.00	2.00	0.9303	6.10.4.2.2-3	17.00	2.00	0.9303	6.10.4.2.2-3
94.500	1.690	17.00	2.00	0.9025	6.10.4.2.2-3	17.00	2.00	0.9025	6.10.4.2.2-3
101.000	1.737	17.00	2.00	0.7811	6.10.4.2.2-3	17.00	2.00	0.7811	6.10.4.2.2-3
107.500	1.785	17.00	2.00	0.6929	6.10.4.2.2-3	17.00	2.00	0.6929	6.10.4.2.2-3
114.000	1.832	17.00	2.00	0.6323	6.10.4.2.2-3	17.00	2.00	0.6323	6.10.4.2.2-3
120.500	1.880	17.00	2.00	0.4979	6.10.4.2.2-3	17.00	2.00	0.4979	6.10.4.2.2-3
127.000	1.927	17.00	2.00	0.3417	6.10.4.2.2-3	17.00	2.00	0.3417	6.10.4.2.2-3
133.500	1.974	17.00	2.00	0.1044	6.10.4.2.2-3	17.00	2.00	0.1044	6.10.4.2.2-3
135.250	1.987	17.00	2.00	0.0533	6.10.4.2.2-3	17.00	2.00	0.0533	6.10.4.2.2-3
136.900	1.999	17.00	2.00	0.0059	6.10.4.2.2-3	17.00	2.00	0.0059	6.10.4.2.2-3
136.900	1.999	17.00	2.00	0.0097	6.10.4.2.2-3	17.00	2.00	0.0097	6.10.4.2.2-3
137.000	2.000	17.00	2.00	0.0042	6.10.4.2.2-3	17.00	2.00	0.0042	6.10.4.2.2-3

Load combination: Final Default Fatigue

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	17.00	2.00	0.1858	6.10.5.3-1	17.00	2.00	0.1858	6.10.5.3-1

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.100	1.001	17.00	2.00	0.1853	6.10.5.3-1	17.00	2.00	0.1853	6.10.5.3-1
1.750	1.013	17.00	2.00	0.1826	6.10.5.3-1	17.00	2.00	0.1826	6.10.5.3-1
3.500	1.026	17.00	2.00	0.3946	6.10.5.3-1	17.00	2.00	0.3946	6.10.5.3-1
10.000	1.073	17.00	2.00	0.3597	6.10.5.3-1	17.00	2.00	0.3597	6.10.5.3-1
16.500	1.120	17.00	2.00	0.4181	6.6.1.2.2-1	17.00	2.00	0.4181	6.6.1.2.2-1
23.000	1.168	17.00	2.00	0.5091	6.6.1.2.2-1	17.00	2.00	0.5091	6.6.1.2.2-1
29.500	1.215	17.00	2.00	0.6281	6.6.1.2.2-1	17.00	2.00	0.6281	6.6.1.2.2-1
36.000	1.263	17.00	2.00	0.7176	6.6.1.2.2-1	17.00	2.00	0.7176	6.6.1.2.2-1
42.500	1.310	17.00	2.00	0.7904	6.6.1.2.2-1	17.00	2.00	0.7904	6.6.1.2.2-1
47.900	1.350	17.00	2.00	0.8563	6.6.1.2.2-1	17.00	2.00	0.8563	6.6.1.2.2-1
48.100	1.351	17.00	2.25	0.7485	6.6.1.2.2-1	17.50	2.25	0.7485	6.6.1.2.2-1
49.000	1.358	17.00	2.25	0.7631	6.6.1.2.2-1	17.50	2.25	0.7631	6.6.1.2.2-1
55.500	1.405	17.00	2.25	0.7677	6.6.1.2.2-1	17.50	2.25	0.7677	6.6.1.2.2-1
62.000	1.453	17.00	2.25	0.7683	6.6.1.2.2-1	17.50	2.25	0.7683	6.6.1.2.2-1
68.500	1.500	17.00	2.25	0.8148	6.6.1.2.2-1	17.50	2.25	0.8148	6.6.1.2.2-1
75.000	1.547	17.00	2.25	0.8579	6.6.1.2.2-1	17.50	2.25	0.8579	6.6.1.2.2-1
81.500	1.595	17.00	2.25	0.8221	6.6.1.2.2-1	17.50	2.25	0.8221	6.6.1.2.2-1
87.900	1.642	17.00	2.25	0.7975	6.6.1.2.2-1	17.50	2.25	0.7975	6.6.1.2.2-1
88.000	1.642	17.00	2.25	0.7970	6.6.1.2.2-1	17.50	2.25	0.7970	6.6.1.2.2-1
88.100	1.643	17.00	2.00	0.8045	6.6.1.2.2-1	17.50	2.25	0.8045	6.6.1.2.2-1
89.900	1.656	17.00	2.00	0.7954	6.6.1.2.2-1	17.50	2.25	0.7954	6.6.1.2.2-1
90.100	1.658	17.00	2.00	0.9036	6.6.1.2.2-1	17.00	2.00	0.9036	6.6.1.2.2-1
94.500	1.690	17.00	2.00	0.8793	6.6.1.2.2-1	17.00	2.00	0.8793	6.6.1.2.2-1
101.000	1.737	17.00	2.00	0.7491	6.6.1.2.2-1	17.00	2.00	0.7491	6.6.1.2.2-1
107.500	1.785	17.00	2.00	0.6553	6.6.1.2.2-1	17.00	2.00	0.6553	6.6.1.2.2-1
114.000	1.832	17.00	2.00	0.5658	6.6.1.2.2-1	17.00	2.00	0.5658	6.6.1.2.2-1
120.500	1.880	17.00	2.00	0.4481	6.6.1.2.2-1	17.00	2.00	0.4481	6.6.1.2.2-1
127.000	1.927	17.00	2.00	0.3168	6.10.5.3-1	17.00	2.00	0.3168	6.10.5.3-1
133.500	1.974	17.00	2.00	0.3386	6.10.5.3-1	17.00	2.00	0.3386	6.10.5.3-1
135.250	1.987	17.00	2.00	0.1742	6.10.5.3-1	17.00	2.00	0.1742	6.10.5.3-1
136.900	1.999	17.00	2.00	0.1906	6.10.5.3-1	17.00	2.00	0.1906	6.10.5.3-1
137.000	2.000	17.00	2.00	0.1998	6.10.5.3-1	17.00	2.00	0.1998	6.10.5.3-1

Summary Shear Report

Load combination: Initial Default

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
0.000	1.000	0.50	52.00	3.5000	Stiffened	---	---	0.0431	6.10.3.3-1
0.100	1.001	0.50	52.00	3.5000	Stiffened	---	---	0.0427	6.10.3.3-1
1.750	1.013	0.50	52.00	3.5000	Stiffened	---	---	0.0418	6.10.3.3-1
3.500	1.026	0.50	52.00	13.0000	Unstiffened	---	---	0.0888	6.10.3.3-1
10.000	1.073	0.50	52.00	13.0000	Unstiffened	---	---	0.0806	6.10.3.3-1
16.500	1.120	0.50	52.00	13.0000	Unstiffened	---	---	0.0723	6.10.3.3-1
23.000	1.168	0.50	52.00	13.0000	Stiffened	---	---	0.0575	6.10.3.3-1
29.500	1.215	0.50	52.00	13.0000	Stiffened	---	---	0.0504	6.10.3.3-1
36.000	1.263	0.50	52.00	13.0000	Stiffened	---	---	0.0427	6.10.3.3-1
42.500	1.310	0.50	52.00	13.0000	Stiffened	---	---	0.0352	6.10.3.3-1
47.900	1.350	0.50	52.00	13.0000	Stiffened	---	---	0.0287	6.10.3.3-1
48.100	1.351	0.50	52.00	13.0000	Stiffened	---	---	0.0285	6.10.3.3-1
49.000	1.358	0.50	52.00	13.0000	Stiffened	---	---	0.0274	6.10.3.3-1
55.500	1.405	0.50	52.00	13.0000	Unstiffened	---	---	0.0207	6.10.3.3-1
62.000	1.453	0.50	52.00	13.0000	Unstiffened	---	---	0.0103	6.10.3.3-1
68.500	1.500	0.50	52.00	13.0000	Unstiffened	---	---	0.0001	6.10.3.3-1
75.000	1.547	0.50	52.00	13.0000	Unstiffened	---	---	0.0103	6.10.3.3-1
81.500	1.595	0.50	52.00	13.0000	Unstiffened	---	---	0.0214	6.10.3.3-1
87.900	1.642	0.50	52.00	13.0000	Stiffened	---	---	0.0272	6.10.3.3-1
88.000	1.642	0.50	52.00	13.0000	Stiffened	---	---	0.0273	6.10.3.3-1
88.100	1.643	0.50	52.00	13.0000	Stiffened	---	---	0.0275	6.10.3.3-1
89.900	1.656	0.50	52.00	13.0000	Stiffened	---	---	0.0296	6.10.3.3-1
90.100	1.658	0.50	52.00	13.0000	Stiffened	---	---	0.0299	6.10.3.3-1
94.500	1.690	0.50	52.00	13.0000	Stiffened	---	---	0.0358	6.10.3.3-1
101.000	1.737	0.50	52.00	13.0000	Stiffened	---	---	0.0428	6.10.3.3-1
107.500	1.785	0.50	52.00	13.0000	Unstiffened	---	---	0.0567	6.10.3.3-1
114.000	1.832	0.50	52.00	13.0000	Unstiffened	---	---	0.0640	6.10.3.3-1
120.500	1.880	0.50	52.00	13.0000	Unstiffened	---	---	0.0731	6.10.3.3-1
127.000	1.927	0.50	52.00	13.0000	Stiffened	---	---	0.0726	6.10.3.3-1

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
133.500	1.974	0.50	52.00	13.0000	Stiffened	---	---	0.0806	6.10.3.3-1
135.250	1.987	0.50	52.00	3.5000	Stiffened	---	---	0.0418	6.10.3.3-1
136.900	1.999	0.50	52.00	3.5000	Stiffened	---	---	0.0427	6.10.3.3-1
137.000	2.000	0.50	52.00	3.5000	Stiffened	---	---	0.0431	6.10.3.3-1

Load combination: Final Default Strength I

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
0.000	1.000	0.50	52.00	3.5000	Stiffened	---	---	0.3874	6.10.9.1-1
0.100	1.001	0.50	52.00	3.5000	Stiffened	---	---	0.3819	6.10.9.1-1
0.100	1.001	0.50	52.00	3.5000	Stiffened	---	---	0.3819	6.10.9.1-1
1.750	1.013	0.50	52.00	3.5000	Stiffened	---	---	0.3776	6.10.9.1-1
3.500	1.026	0.50	52.00	13.0000	Unstiffened	---	---	0.7936	6.10.9.1-1
10.000	1.073	0.50	52.00	13.0000	Unstiffened	---	---	0.7578	6.10.9.1-1
16.500	1.120	0.50	52.00	13.0000	Unstiffened	---	---	0.6706	6.10.9.1-1
23.000	1.168	0.50	52.00	13.0000	Stiffened	---	---	0.4287	6.10.9.1-1
29.500	1.215	0.50	52.00	13.0000	Stiffened	---	---	0.3750	6.10.9.1-1
36.000	1.263	0.50	52.00	13.0000	Stiffened	---	---	0.3330	6.10.9.1-1
42.500	1.310	0.50	52.00	13.0000	Stiffened	---	---	0.3098	6.10.9.1-1
47.900	1.350	0.50	52.00	13.0000	Stiffened	---	---	0.2890	6.10.9.1-1
48.100	1.351	0.50	52.00	13.0000	Stiffened	---	---	0.2881	6.10.9.1-1
49.000	1.358	0.50	52.00	13.0000	Stiffened	---	---	0.2847	6.10.9.1-1
55.500	1.405	0.50	52.00	13.0000	Unstiffened	---	---	0.3089	6.10.9.1-1
62.000	1.453	0.50	52.00	13.0000	Unstiffened	---	---	0.2649	6.10.9.1-1
68.500	1.500	0.50	52.00	13.0000	Unstiffened	---	---	0.2263	6.10.9.1-1
75.000	1.547	0.50	52.00	13.0000	Unstiffened	---	---	0.2663	6.10.9.1-1
81.500	1.595	0.50	52.00	13.0000	Unstiffened	---	---	0.3218	6.10.9.1-1
87.900	1.642	0.50	52.00	13.0000	Stiffened	---	---	0.2642	6.10.9.1-1
88.000	1.642	0.50	52.00	13.0000	Stiffened	---	---	0.2645	6.10.9.1-1
88.100	1.643	0.50	52.00	13.0000	Stiffened	---	---	0.2648	6.10.9.1-1
89.900	1.656	0.50	52.00	13.0000	Stiffened	---	---	0.2706	6.10.9.1-1
90.100	1.658	0.50	52.00	13.0000	Stiffened	---	---	0.2730	6.10.9.1-1

Date:	4/12/2018	Govornor Bridge Road Design - 4 beams.lbs	
Time:	2:14 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 7th Ed. with 2016 Interims]	v17.00.02.15

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/ Unstiffened				
94.500	1.690	0.50	52.00	13.0000	Stiffened	---	---	0.3112	6.10.9.1-1
101.000	1.737	0.50	52.00	13.0000	Stiffened	---	---	0.3397	6.10.9.1-1
107.500	1.785	0.50	52.00	13.0000	Unstiffened	---	---	0.5413	6.10.9.1-1
114.000	1.832	0.50	52.00	13.0000	Unstiffened	---	---	0.6146	6.10.9.1-1
120.500	1.880	0.50	52.00	13.0000	Unstiffened	---	---	0.6778	6.10.9.1-1
127.000	1.927	0.50	52.00	13.0000	Stiffened	---	---	0.5069	6.10.9.1-1
133.500	1.974	0.50	52.00	13.0000	Stiffened	---	---	0.5431	6.10.9.1-1
135.250	1.987	0.50	52.00	3.5000	Stiffened	---	---	0.3640	6.10.9.1-1
136.900	1.999	0.50	52.00	3.5000	Stiffened	---	---	0.4054	6.10.9.1-1
136.900	1.999	0.50	52.00	3.5000	Stiffened	---	---	0.4054	6.10.9.1-1
137.000	2.000	0.50	52.00	3.5000	Stiffened	---	---	0.4255	6.10.9.1-1