pennsylvania
DEPARTMENT OF TRANSPORTATION

BRIDGE REHABILITATION ANALYSIS AND FEASIBILITY REPORT

SR 0016-037
Main Street Bridge Project

Memorial Bridge over the West Branch of Little Antietam Creek

in

Waynesboro Borough and Washington Township
Franklin County, PA

February 2012

Franklin County
SR 0016-037
Memorial Bridge

BRIDGE REHABILITATION ANALYSIS
AND
FEASIBILITY REPORT

Table of Contents

Appendices

Franklin County
SR 0016-037
Memorial Bridge

BRIDGE REHABILITATION ANALYSIS AND FEASIBILITY REPORT

Bridge Features and Historic Significance – The Memorial Bridge was built in 1926 and is a 2-span, 76-foot long, reinforced concrete T-beam bridge, supported on concrete abutments and a center pier. The bridge has standard concrete balustrades that have been architecturally embellished by the addition of paneled exedrae [definition (plural): curved outdoor bench] and paneled end pylons (definition: gateway tower). The exedrae and pylons once housed memorial plaques to commemorate Waynesboro's World War I veterans. The bridge is technologically distinguished as an unusual architectonic example of the standard state highway department T-beam bridge design. It dates from first-generation state highway improvements to an early state route and automobile tourist trail (SR 16 in Franklin County is named the Buchanan Trail) and is the only such surviving architectonic highway bridge identified on Route 16. The bridge was surveyed during the 1997 statewide bridge survey and was determined eligible for the National Register of Historic Places. The original bridge had ornamental lighting atop the end pylons. Over the years, all the memorial plaques and the lighting fixtures have been stolen or removed. One plaque was removed by Waynesboro Borough and relocated to a town park memorial.

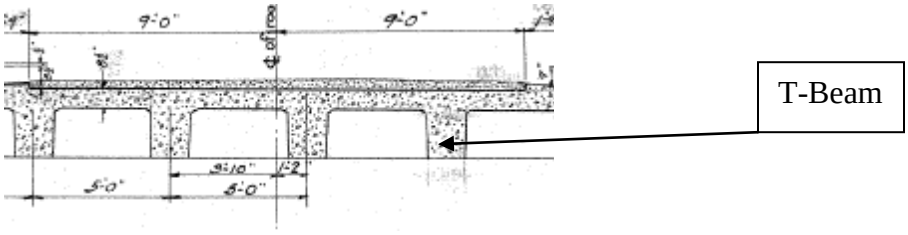
Project Area Description - The bridge carries State Route 16, a 2-lane highway over the West Branch of the Little Antietam Creek. The creek is the western boundary of Waynesboro Borough and the eastern boundary of Washington Township. The roadway is on a tangent (straight-line) alignment in this location.

This area of Waynesboro consists of mixed commercial and recreational/social properties. The area does not have the cohesiveness of a historic district. Several property lots to the east are late-19th to early 20th century residences and businesses but these have significant alterations. A modern concrete block structure in the southeast quadrant contains Moose Lodge 1191 with an asphalt parking lot, and the modern Fraternal Order of Eagles (FOE) building and an asphalt parking lot is located at the southwest quadrant. Beyond the FOE property is the modern Buchanan Trail Tire Sales building. The northeast quadrant contains a modern commercial garage with an asphalt parking lot and a small enclosed area containing gas pipe lines. An early-to-mid 20th century, small, formed-block building contains the Columbia Gas Co., and a modern concrete block structure for the UGI gas company are located at the northwest quadrant.

The bridge is approximately 1/2 mile west of downtown Waynesboro, which has been identified as an eligible historic district by Pennsylvania Historical and Museum Commission (PHMC) (9/8/93). The bridge was originally designed to be a gateway to the historic community, although the historic district is outside the visual area of potential (APE) effects of the bridge. There are no other historic properties within the APE of the project.

Bridge Condition – Built in 1926, the bridge is a 2-span reinforced concrete "T-beam" bridge, 76- feet long, 24-feet wide and carries two lanes of traffic. The bridge is generally in poor to bad condition. The western approach roadway is 40-feet wide and consists of two 11-foot lanes and 9-foot shoulders. The eastern approach roadway is 40-feet wide with a sidewalk on the south side. The bridge creates a "pinch-point" on SR 16 due to the 16-foot difference between the bridge and the approach roadway. The speed limit at the bridge is 35 mph. Speed is not a criterion in determining the bridge width.

This paragraph is an explanation of what the term "T-beam" means and how it relates to the existing bridge and its original construction (cross sectional view below). A T-beam type bridge means that the horizontal support of the bridge deck surface looks like a series of "T's". The T-beam does not have a flange on the bottom of the beam as opposed to an "I-beam" which has a flange on the bottom of the beam. A T-beam bridge does not have a separate bridge deck. The deck slab and beams (when constructed) were formed and the concrete poured monolithically (which means a continuous pour with no joints). The deck and beams are one component and are not individual units. They act as one unit to support their weight and the weight of traffic. In the case of a T-beam bridge, the "deck" is actually the way to connect the "beams". Neither the deck nor beams can support their weight without the other. Nor can either be removed without removal of the other. Most bridges constructed by PennDOT today have separately supported beams (all concrete beams are precast) and then a concrete deck is placed on top of the beams. In 1926, construction methods did not include precast individual concrete beams. At the time, a T-beam bridge was the cheapest way to construct short-span bridges. The fact that this is a T-beam bridge is the most important aspect in determining the type of bridge rehabilitation that is feasible for this project.



The concrete surface of the bridge deck has been overlaid with bituminous. The underside of the concrete has many delaminated areas. Since the surface is overlaid with bituminous we cannot determine the actual surface problems in the underlying concrete. When PennDOT overlays a bridge deck with bituminous pavement the engineers have determined the deck to be in a condition that is beyond normal repair and the next step in the maintenance cycle would be the total replacement of the bridge deck. The problem with a T-beam bridge is that the deck cannot be separately replaced from the beams because as explained above the deck and beams are one solid inseparable unit.

The fascia beams, both on the upstream and down stream side, exhibit heavy to severe concrete spalling. Large areas of the beam reinforcing steel are exposed with minor to heavy cross section loss. Spalling and rebar section loss are a concern due to the potential for catastrophic failure of the bridge beam and bridge collapse. Spalling concrete is an indication of internal stresses in the concrete. These can be related to salt intrusion, thermal expansion or additional stress. Over time the concrete has spalled enough to expose a substantial length of the beam reinforcing steel. Since the bars are black steel and not epoxy coated, the bars have experienced accelerated corrosion. This corrosion has led to bar cross section loss which means the bars are actually becoming smaller in diameter due to the steel rusting away. If the bar corrosion continues to propagate and enough steel is lost the bar could potentially fail or weaken to a point which could lead to posting or possible closure of the bridge.

Approximately 25’ of the upstream parapet has been removed and repaired. This is the result of concrete deterioration and a vehicular accident that damaged the parapet. The “pigeon hole” parapet is a concern on this structure due to the narrowness of the bridge and heavy traffic. If the bridge parapet is hit by an errant vehicle the vehicle tends to snag or catch on the parapet hole thus causing a situation in which the driver can easily lose control of the vehicle.

The upstream bridge deck gutter line concrete is severely deteriorated. Due to water lying in the gutter, holes have been cut in the gutter line of the bridge deck for drainage. This is not proper maintenance and is leading to further deterioration of the bridge surface and the beams underneath the holes. This situation is actually very bad for a T-beam bridge because the holes through the supporting deck have created a “failure line” where cracks through the deck run from hole to hole to hole. This bridge seems to have the most deterioration at the fascia beams. This makes sense for a couple of reasons:

1. The pigeon hole parapets allow more salt from snow plowing to go through the pigeon hole and drip down to the beams causing deterioration.

2. The most dead-load weight is on the fascia beam since the concrete parapet is above the beam. Since holes were cut through the gutter a crack has formed from hole to hole parallel with the beam below. Due to the concrete being cracked through the deck, the unit is not acting together and additional stresses are being placed on the fascia beam. The result is the spalling of the fascia beam.

The pier has rotated slightly and is out of plumb ¼” in 4-feet. Rotation of the pier means that the pier is not sitting on a solid foundation because it is moving horizontally. Pier out of plumb means that the pier is leaning vertically and also not on a solid foundation. Put both of these deficiencies together and this has resulted in a situation where part of the bridge is moving that is not supposed to move. If a supporting structure member such as the pier would fail then this would result in the collapse of the bridge.

The PennDOT bridge rating is 38.7 out of a scale of 100. PennDOT classifies the bridge as both structurally deficient (SD) and functionally obsolete (FO). There are 413 bridges and culverts in Franklin County. This structure has the 19th ranked (worst) SD rating. The bridge is not weight posted. See Appendix for photos.

Bridge Use – The Bridge is located on State Route 16 (SR 16). At the location of the bridge, SR 16 is an urban arterial route and carries 9,890 vehicles per day of which 5% or 495 are trucks. SR 16 is the major east-west route in southern Franklin County and is named Main Street in Waynesboro Borough. SR 16 connects Waynesboro to Interstate 81; approximately 6 miles to the west of the borough. The Waynesboro Ambulance Squad (less than ½ mile west of the bridge on Main Street), Waynesboro Fire Department and Waynesboro Area School District school buses use this bridge on a daily basis. Pedestrian use is very limited due to few walking destinations on the west side of the bridge. Few, if any pedestrians are generated by the private clubs on either side of the bridge or by the tire sales store. Local authorities estimate a maximum of 10 – 15 pedestrians per day. SR 16 is not a designated PA Bike Route.

Bridge Future Use – Waynesboro and Washington Township have a Joint Comprehensive Plan. The number one priority on that plan is the completion of the "Washington Township Boulevard" (see map in Appendix). The boulevard is essentially a northern bypass of Waynesboro through Washington Township. Some pieces of the route have been built. The eastern part of the route will use existing Prices Church Road where a signalized intersection would be built and SR 16 widened to three-lanes from Prices Church Road east to the Memorial Bridge and into Washington Township. The connection to Prices Church Road is estimated to be competed in 2018. In addition, Washington Township was presented plans (in year 2010) for commercial development on a parcel of land along the south side of SR 16 approximately 500-feet west of the bridge. The developer has not started work due to the struggling economy but will most likely resubmit plans in the near future. This parcel will be developed with a nation-wide retailer and/or grocery store. When the development does occur it will be a pedestrian destination and will require roadway improvements including a traffic signal, turn lanes, curb and sidewalk. Washington Township has requested that if a new bridge is build that it be made wider to accommodate future traffic, development and pedestrians.

Future Growth - Waynesboro's population was 10,147 (2010 census) up +5.5% from 2000. Washington Township's population increased 21.2% and Franklin County's population increased 15.7% in the same time period. The greater Waynesboro area population is 29,876. The area has a trend of increasing population growth which means greater future development potential and more vehicular traffic which the bridge and roadway will need to accommodate. No one or any type of vehicle is excluded from using the bridge.

Detour Routes – There are no detours routes around the Memorial Bridge that would be acceptable as a long-term detour for the 9,890 vehicles per day or truck traffic. If the bridge were

closed, traffic on SR 16 headed west to I-81 would have to use SR 0316. The length of this detour is over 20 miles.

Project Purpose and Needs

Purpose:

- The purpose of the project is to provide a safe structure which accommodates expected growth and facilitates multi modal forms of transportation on State Route 16 over the West Branch of the Little Antietam Creek.

Needs (in order of priority):

(1) Bridge Condition

(a) Vehicular: The concrete beams, pier deck and abutments are deteriorated; as a result the bridge is classified as structurally deficient.

(b) Pedestrian and Bicycles: The bridge lacks shoulder and functional sidewalks.

(2) Safety

(a) Vehicular: The existing functionally obsolete bridge is 24-feet wide and the approach road is 40-feet wide on either side of the bridge. The bridge is a "pinch-point" on an otherwise uniform width road. The bridge must function and safely handle current and future traffic on this urban arterial route. Current daily traffic is 9,890 ADT, of which 5% are trucks. The 20-year traffic projection is 14,989 ADT.

The narrowness of the bridge affects the operation and function of the roadway in that it increases the likelihood of sideswipes. For instance, a tractor trailer type truck is 8-feet wide. The bridge has two 12 foot lanes and no shoulder. When two trucks cross the bridge at the same time and are centered in the lane, there are 4-feet between the vehicles and 2 feet to the parapet, leaving little room for lane repositioning.

(b) Pedestrian and Bicycles: When trucks cross the bridge and are centered in the lane, there is 2 feet to the parapet. This creates an unsafe condition if a pedestrian or bicyclist is on the bridge at the same time as a truck.

(3) Future Growth

(a) Vehicular: As a result of the future commercial development 500 feet west of the bridge, traffic demands will exceed numbers projected currently. The bridge will see an increase in truck traffic as a result of having to supply the new development with products. As a result the wear and tear on the bridge will become greater not only as ADT rises, but also as the percentage of trucks rises. Turn lanes and a signal will also be required near the western approach roadway for the future development.

(b) Pedestrian and Bicycles: The new commercial development will also be a generator of pedestrian and bicyclists across the bridge, and as mentioned previously, the bridge is unsafe for bikes and pedestrians.

Bridge Rehabilitation Alternative Analysis.

Three alternatives were considered for the proposed project. Alternatives included the no-build, rehabilitation and complete replacement of the bridge on existing alignment.

1. No Build Alternative.

The existing bridge is a major link between Waynesboro and Interstate 81. The condition of the bridge is poor and will continue to worsen without corrective action. The No Build Alternative does not meet any of the needs or purpose of the project. The bridge would not be widened, the structural components would not be replaced and pedestrians would not be accommodated. Therefore, the No Build Alternative is not a viable alternative.

2. Rehabilitation Alternative

In general, a desired bridge life is 100 years with proper routine maintenance and rehabilitation cycles. A desired bridge deck service life is 50 years. This bridge is 85 years old and has not been properly maintained nor have any structural components been replaced in that time. The reason nothing has been replaced on this bridge in 85 years is because it is a T-beam bridge. The existing T-beam and deck, abutments and pier cannot be rehabilitated due to the amount of deterioration and must be replaced.

With a T-beam bridge the entire superstructure (beams and deck) are one unit. Rehabilitation or widening is not possible. The entire superstructure must be removed. Individual components cannot be removed or the bridge will fail. In addition, the exposed reinforcing steel in the fascia beams are corroded to the point that they have lost section and could fail in the future. Patching of the beam is not possible either because this would only be cosmetic and will not fix the structural issues as noted in the bridge conditions. When the parapets are

removed the defining characteristics of the bridge, namely the end pylons and exedrae, must be demolished because these features are physically connected to the bridge with concrete and reinforcing steel. The pylons and exedrae cannot be saved and will be destroyed during the demolition of the bridge. The structure cannot be rehabilitated without destroying the qualities that qualify the bridge for the National Register.

To accommodate pedestrians a sidewalk cannot be cantilevered from the bridge due to the fact that the parapets would have to be removed to construct this type of sidewalk. As a result of the bridge type, this would mean destruction of the whole bridge. For the intended purpose and needs of the project, it is not possible to rehabilitate the bridge and save the bridge's character defining elements. Therefore, the bridge Rehabilitation Alternative is not a viable alternative. No cost is calculated for rehabilitation because a T-beam bridge cannot be rehabilitated.

3. Replacement Alternative Off-Alignment

Replacing the existing bridge on another alignment was not analyzed due to the fact the bridge is on tangent alignment. By shifting the bridge from a tangent alignment, you will be introducing a curve into the roadway which will effect not only sight distance but also a driver's expectation of the roadway design. Shifting the roadway was not considered as result required right-of-way takes, sight distance issues, possible environmental impacts and cost. It is estimated that the cost of constructing a new bridge off current alignment will end up costing around 3 million dollars. The major factor in the cost figure is the right of way impacts. Therefore, this option does meet the purpose and need of the project, but is not prudent.

4. Replacement Alternative On-Alignment.

Replacing the bridge on the existing alignment will meet all the needs and purpose of the project. A new bridge will be designed and constructed using current methodologies and materials. A new bridge will be wider and have sidewalks and shoulders thus accommodating traffic demands and meeting the needs of the community and pedestrians. The replacement bridge will be designed using Context Sensitive Design and the principals of Smart Transportation to evaluate what aesthetic treatments are appropriate for a new structure. The Replacement Alternative is the selected and most viable and only alternative. Cost is $2,200,000.

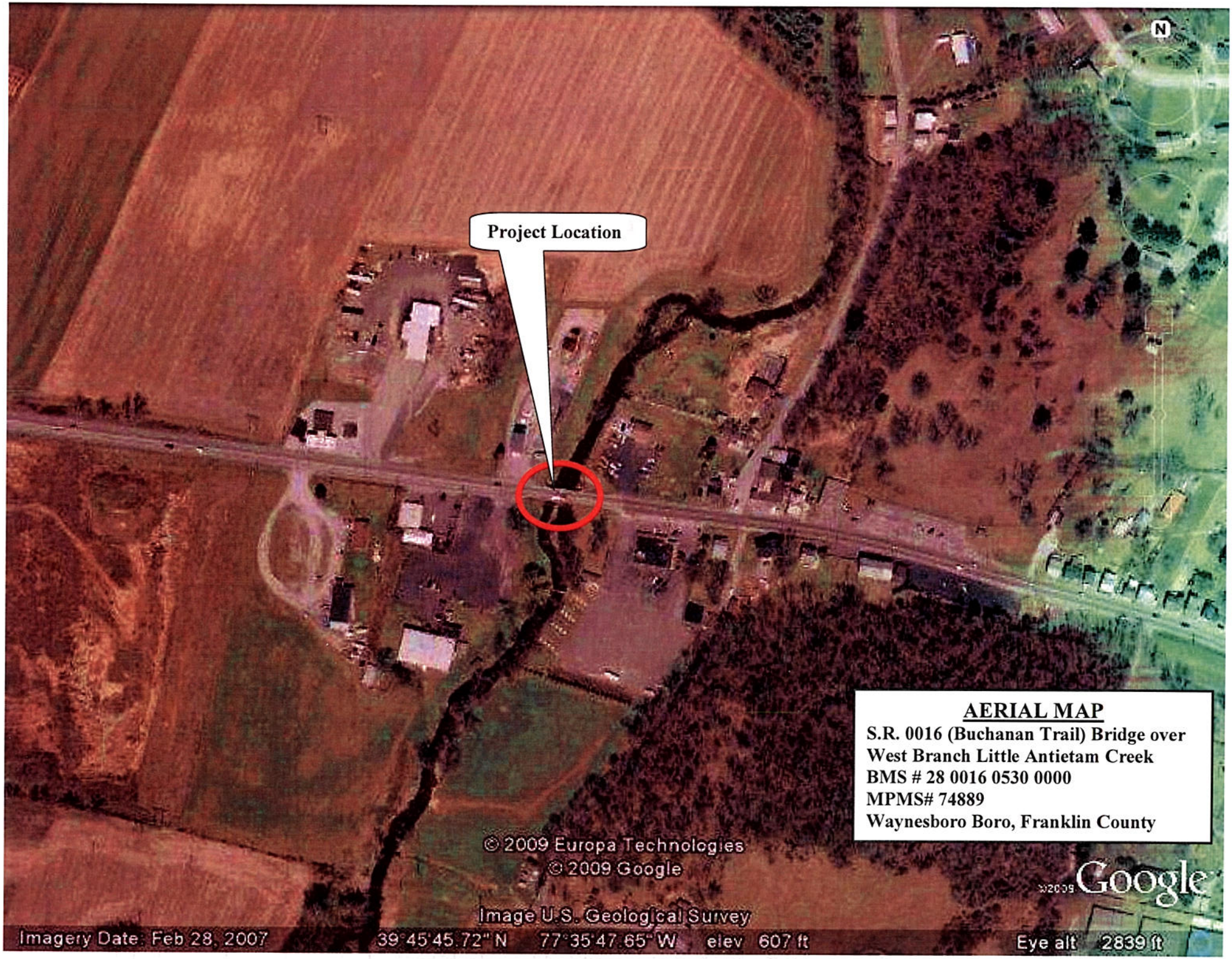
Conclusion and Recommendation

The Memorial Bridge is located on State Route 16 and spans the West Branch of the Little Antietam Creek. The creek is the western boundary of Waynesboro Borough and the eastern boundary of Washington Township, two growing municipalities in Franklin County, PA. This arterial route has an ADT of 9,890 and is the direct route to I-81 from Waynesboro.

The bridge is eligible for the National Register and was built in 1926 as a tribute to World War I veterans. Since that time, the 24-foot wide bridge has served its intended purpose; but has received little maintenance over the years.

The purpose of the project is to provide a safe structure which accommodates expected growth and facilitates multi modal forms of transportation on State Route 16 over the West Branch of the Little Antietam Creek. In the Rehabilitation Alternative Analysis it was determined that the No-Build alternative did not meet the purpose or needs of the project. The Bridge Rehabilitation alternative is not feasible due the bridge being a T-beam structure which cannot be rehabilitated and therefore, did not meet the purpose or needs of the project. The Bridge Replacement Off-Alignment alternative did meet the purpose and need of the project was considered not prudent. The Bridge Replacement Alternative was the only alternative that meets both the purpose and needs of the project.

Based on these considerations, it is recommended to advance the Bridge Replacement alternative for this project.



AERIAL MAP

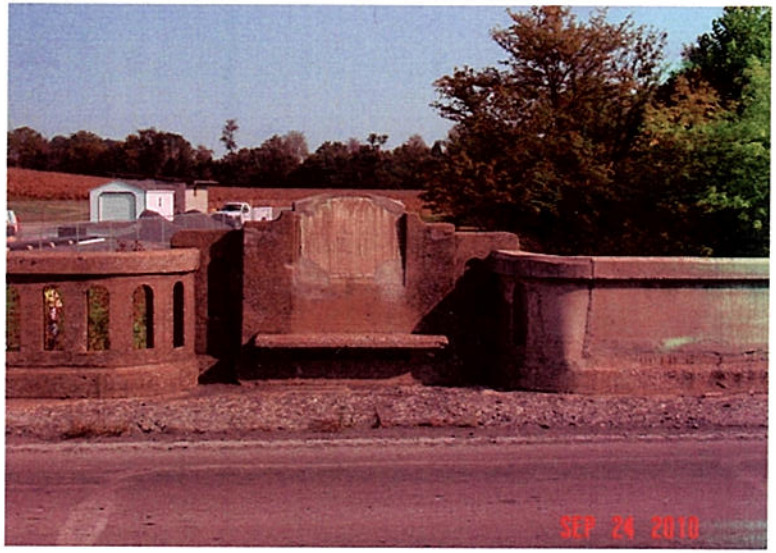
S.R. 0016 (Buchanan Trail) Bridge over West Branch Little Antietam Creek
BMS # 28 0016 0530 0000
MPMS# 74889
Waynesboro Boro, Franklin County

Memorial Bridge

1. Looking west to Washington Township

2. Looking east to Waynesboro

3. Downstream exedra. Plaque was removed.



4. Upstream exedra. Plaque was removed.

Memorial Bridge

5. West side pylons.

6. Plaque and lighting removed on all pylons.

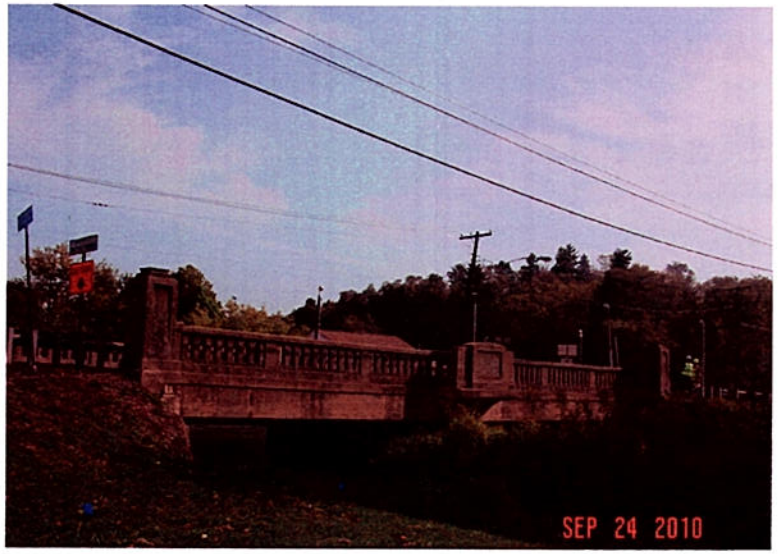
7. Looking upstream.

8. Looking downstream.

Memorial Bridge

9. Looking downstream at exedra

10. Edge deterioration



11. Looking upstream at exedra

12. Abutment 1 – deck and beams have shifted.

13. Span One - Right Fascia Beam

14. Span Two - Right Fascia Beam

15. Span One - Left Fascia Beam

16. Span Two - Left Fascia Beam

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
BUREAU OF ENVIRONMENTAL QUALITY

A.G. LICHTENSTEIN & ASSOCIATES, INC.

PENNSYLVANIA HISTORIC BRIDGE INVENTORY & EVALUATION

BMS #: 28001605300000 **DIST:** 8 **UTM:** 18/277291/4404883

OLD BMS #: **CTY:** FRANKLIN **OWNER:** PADOT

MUNICIPALITY: WAYNESBORO **LOCATION:** WEST SIDE OF WAYNESBORO

FACILITY CARRIED: SR 16 (BUCHANAN TRAIL)

NAME/ FEATURE INTERSECTED: SR 16 OVER WEST BRANCH LITTLE ANTIETAM CREEK

TYPE: T BEAM **DESIGN:** SIMPLE

MATERIAL: REINFORCED CONCRETE

#SPANS: 2 **LENGTH:** 76 (23.2 m) **WIDTH:** 28.5 (8.7 m)

YR BUILT: 1926 **ALTERATION:** **SOURCE:** PLAQUE

DESIGNER/BUILDER: PA STATE HWY DEPT BRIDGE UNIT

SETTING/CONTEXT:

The bridge carries a 2 lane highway and 2 sidewalks over a stream that is the western boundary of Waynesboro. The bridge is in an area of predominately late-20th-century commercial development including car dealership and propane gas shop yard to the north and modern Moose and Elks lodges to the south. The bridge is approximately 1/2 mile west of downtown Waynesboro, which has been identified as an eligible historic district by PHMC (9/8/93). Several property lots to the east are late-19th to early 20th century residences and businesses but these have significant alterations. The bridge is more than eight blocks west of the boundary of the eligible district as delineated on the historic district map. The bridge is located on the Buchanan Trail, an early automobile tourist trail founded in the 1910s to promote tourism along a route from Baltimore to Pittsburgh by way of Waynesboro. It was named after James Buchanan, the only Pennsylvanian elected president, and passed through his birthplace near Cove Gap, Franklin County.

CY01 INDIVIDUAL ELIGIBILITY: Eligible
CY01 CONTRIBUTING STATUS:

AGL NR RECOMMENDATION: Eligible

AGL SUMMARY: The 2-span, 76'-long, T beam bridge is supported on concrete abutments and cutwater pier. The bridge has standard concrete balustrades that have been architecturally embellished by the addition of paneled exedrae and paneled end pylons. The north side exedra has a memorial plaque to Waynesboro's World War I veterans. The bridge is technologically distinguished as an unusual architectonic example of the standard state highway department T beam bridge design. It dates from first-generation state highway improvements to an early state route and automobile tourist trail (SR 16/Buchanan Trail) and is the only such surviving architectonic highway bridge identified on the route.

PHOTO INDEX (DATE): 212:5-10 **REVIEWED BY/ DATE:** JPH (9/96)

PENNSYLVANIA HISTORIC BRIDGE INVENTORY & EVALUATION

BMS #: 28001605300000 **DIST:** 8 **UTM:** 18/277291/4404883

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
BUREAU OF ENVIRONMENTAL QUALITY

A.G. LICHTENSTEIN & ASSOCIATES, INC.

PENNSYLVANIA HISTORIC BRIDGE INVENTORY & EVALUATION

BMS #: 28001605300000 **DIST:** 8 **UTM:** 18/277291/4404883

OLD BMS #: **CTY:** FRANKLIN **OWNER:** PADOT

MUNICIPALITY: WAYNESBORO **LOCATION:** WEST SIDE OF WAYNESBORO

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NAME/ FEATURE INTERSECTED: SR 16 OVER WEST BRANCH LITTLE ANTIETAM CREEK

TYPE: T BEAM **DESIGN:** SIMPLE

MATERIAL: REINFORCED CONCRETE

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SETTING/CONTEXT:

The bridge carries a 2 lane highway and 2 sidewalks over a stream that is the western boundary of Waynesboro. The bridge is in an area of predominately late-20th-century commercial development including car dealership and propane gas shop yard to the north and modern Moose and Elks lodges to the south. The bridge is approximately 1/2 mile west of downtown Waynesboro, which has been identified as an eligible historic district by PHMC (9/8/93). Several property lots to the east are late-19th to early 20th century residences and businesses but these have significant alterations. The bridge is more than eight blocks west of the boundary of the eligible district as delineated on the historic district map. The bridge is located on the Buchanan Trail, an early automobile tourist trail founded in the 1910s to promote tourism along a route from Baltimore to Pittsburgh by way of Waynesboro. It was named after James Buchanan, the only Pennsylvanian elected president, and passed through his birthplace near Cove Gap, Franklin County.

CURRENT NATIONAL REGISTER STATUS: Previously Not Evaluated

SURVEY NR RECOMMENDATION: Eligible

SUMMARY:

The 2-span, 76'-long, T beam bridge is supported on concrete abutments and cutwater pier. The bridge has standard concrete balustrades that have been architecturally embellished by the addition of paneled exedrae and paneled end pylons. The north side exedra has a memorial plaque to Waynesboro's World War I veterans. The bridge is technologically distinguished as an unusual architectonic example of the standard state highway department T beam bridge design. It dates from first-generation state highway improvements to an early state route and automobile tourist trail (SR 16/Buchanan Trail) and is the only such surviving architectonic highway bridge identified on the route.

PHOTO INDEX (DATE): 212:5-10 **REVIEWED BY/ DATE:** JPH (9/96)

28 0016 0530 0000

Sources: Chamberburg Public Library. Historic Collections.
Pennsylvania State Highway Department. Facts Motorists Should Know. Harrisburg, 1926.
PADOT. Bridge Inspection Files and Plans.
PHMC. State Parks Survey.
PHMC. Waynesboro Town Center Historic District. BHP# 102235. 9/8/1993.

Physical Description: The 2-span, 76'-long, 30'-wide, reinforced concrete T beam bridge is supported on concrete abutments and cutwater pier. The bridge has standard concrete balustrades that have been architecturally embellished by the addition of paneled exedrae (pedestrian refuges with benches) at midspan and paneled end pylons. The panels have a pebble-dash textured finish. The exedrae are cantilevered from the bridge fascia and supported by brackets. The bench back of the north side exedra has a memorial plaque to Waynesboro's World War I veterans. The bases of light standards remain on top of the end pylons but the standards and luminaires have been lost.

Historical and Technological Significance: The 1926 SR 16 (Buchanan Trail) over West Branch Antietam Creek bridge is technologically distinguished as an uncommonly architectonic T beam bridge dating from first-generation state highway improvements to a regionally and locally important state route (Criteria A & C). The bridge is noteworthy as an uncommon example of the standard-design state highway department T beam bridge that was embellished with exedrae, end pylons, and luminaires to serve as a memorial to Waynesboro's World War I veterans. The bridge is located over the creek that is Waynesboro's western boundary.

The T beam bridge, where the cast-in-place longitudinal beam and deck section are integrally connected, emerged as one of the most popular reinforced concrete bridge technologies in the state because of its overall economy of material and maintenance. In a T beam, the deck thickness and longitudinal beam size and spacing are proportioned to achieve a lighter, stronger, and more economical section than a slab bridge. Basically the same technology was used extensively by both the state highway department, which developed standard designs for T beam bridges, and the counties from the late 1910s through the 1950s, making T beams one of the most common bridge types in the state. There are over 2,300 T beam bridges in the state with the vast majority of them being simply supported. The earliest documented example dates to 1905, and about 30 from before 1916 remain. The state highway department built hundreds of nearly identical T beam bridges with standard concrete balustrades from the late 1910s through the 1950s.

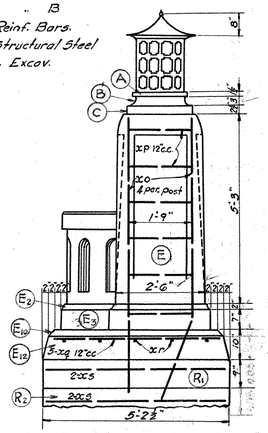
The SR 16 bridge is the most architectonic extant, first-generation, state highway

department bridge on the Buchanan Trail. The trail, established in the 1910s by a group of local businessmen, was one of several automobile tourist trails that crossed the state and followed established state highway routes, that themselves had been built on top of old turnpikes. The Buchanan Trail paid honor to the only Pennsylvanian to be elected president, James Buchanan, and passed through his birthplace near Cove Gap, Franklin County. A state park was established on the site of the Buchanan Birthplace in 1911. The route offered a scenic alternative to travelers between Pittsburgh and Baltimore. Waynesboro was the largest town on this section of the route, which meandered over Tuscarora Mountain and Sideling Hill before linking with the Lincoln Highway at McConnelsburg. The Buchanan Trail was one of many tourist trails paved, widened, and realigned by the state highway department from the 1910s to the 1920s, and contributed to the increasing popularity of long-distance automobile tourism. The embellished SR 16 bridge was an uncommon concession by the state highway department to architectural aesthetics and local desire for a war memorial on the route.

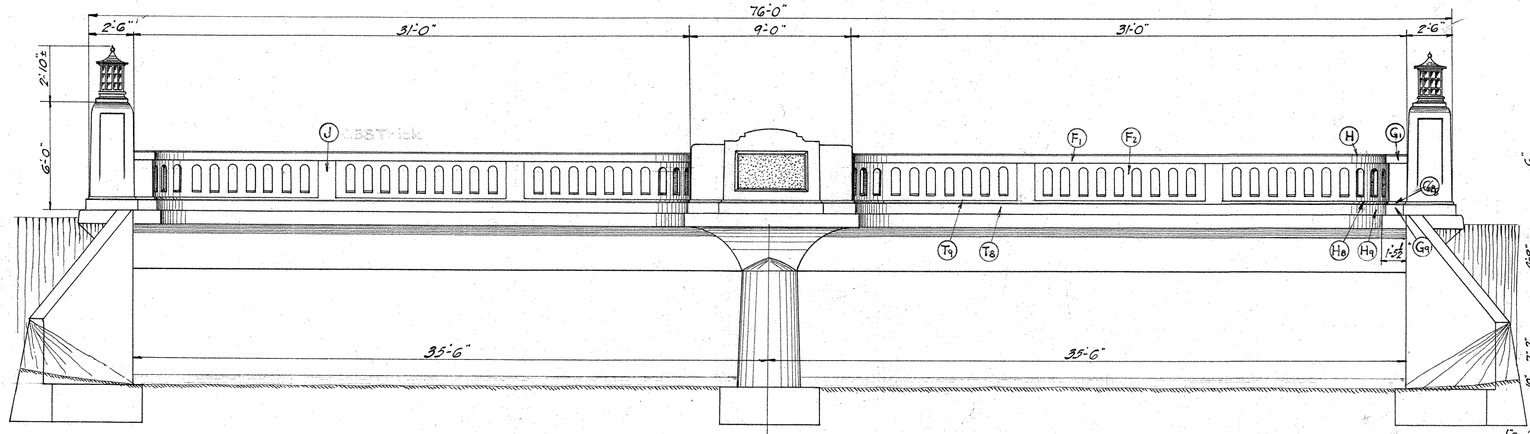
Boundary Description and Justification: The bridge is recommended individually significant. The boundary is limited to the bridge's superstructure and substructure.

Quantities Required

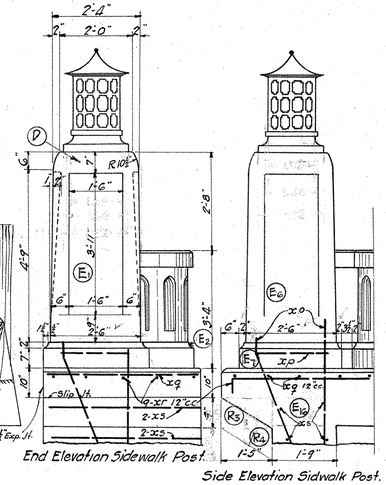
146 Cu. Yds. Class A
1496 " " " B
30727 Lbs. Reinf. Bars.
4755 " Structural Steel
166 Cu. Yds. Excav.



End Elevation Roadway Post

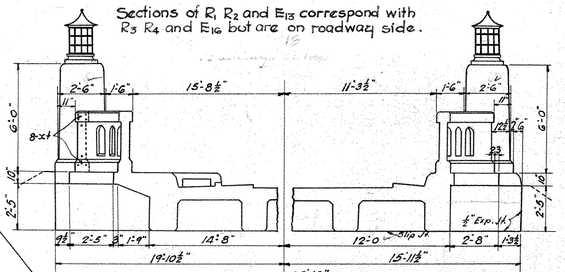


ELEVATION - SIDEWALK SIDE

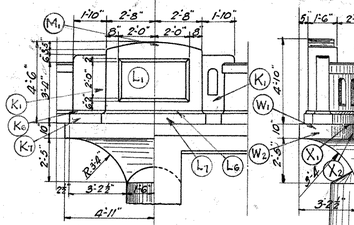


End Elevation Sidewalk Post. Side Elevation Sidwalk Post.

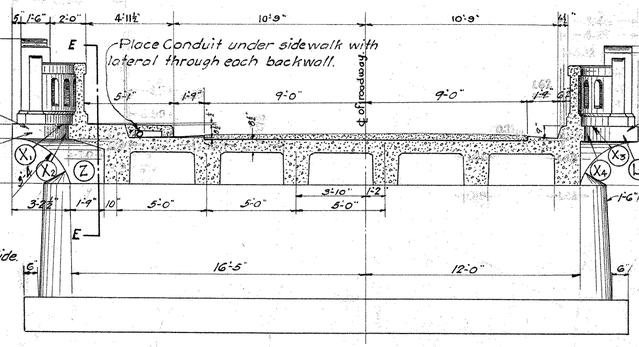
Sections of R, R2 and E15 correspond with R3 R4 and E16 but are on roadway side.

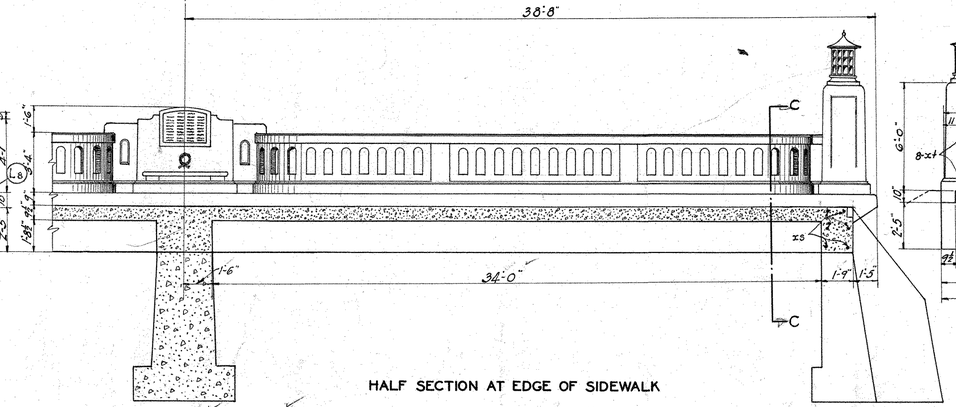


Section C-C.



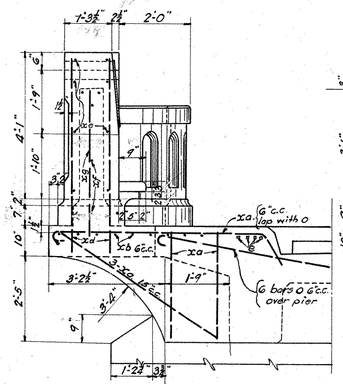
Half Outside Elevation, Half Inside Elevation
Elevation of Pier Rail Post Roadway Side.



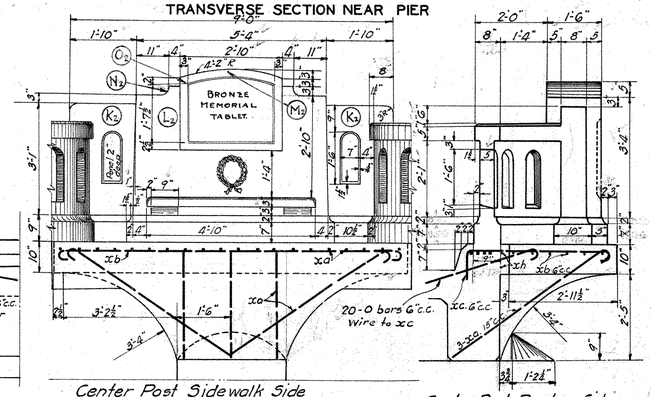


HALF SECTION AT EDGE OF SIDEWALK

Note.
Panel for outside of Pier Post on Sidewalk is same as above shown.

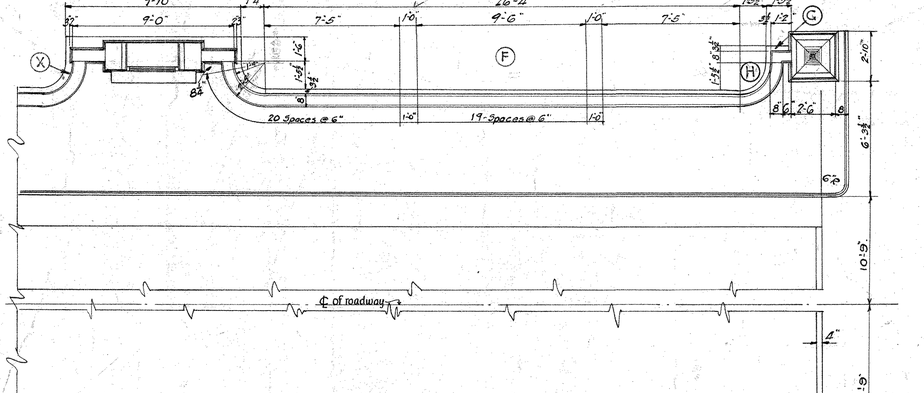


Pier Post Sidewalk Side
Section on ℄

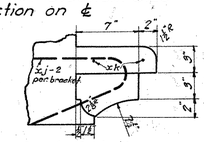


Center Post Sidewalk Side
Section E-E

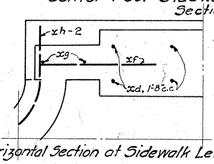
Center Post Roadway Side
Section F-F



HALF PLAN



Seat Details
Showing Plinth Molding



Horizontal Section at Sidewalk Level.

Approved Oct 5th 1926
E E Brandon Bridge Engineer

Approved
W H Connell Engineering Executive and Dep. Sec. of Highways.

Extra Bars Required.

Mark	No.	Stock	Bending Diagram
xa	30	⅜" × 7'-6"	xa
xb	15	⅜" × 10'-6"	xb
xc	20	⅜" × 5'-0"	xc
xd	16	⅜" × 5'-4"	xd
xe	16	⅜" × 7'-2"	xe
xf	20	⅜" × 3'-0"	Straight xf
xg	8	⅜" × 4'-6"	Straight xg
xh	8	⅜" × 8'-6"	Straight xh
xj	4	⅜" × 4'-0"	xj
xk	2	⅜" × 5'-0"	
O	26	⅜" × 6'-3"	See L-91
xo	16	⅜" × 9'-0"	Straight xo
xp	24	⅜" × 8'-6"	R 11" xp
xq	20	⅜" × 4'-6"	Straight xq
xr	28	⅜" × 5'-0"	Straight xr
xs	24	⅜" × 8'-0"	Straight xs
xt	32	⅜" × 3'-6"	

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF HIGHWAYS
BRIDGE DIVISION

SKETCH OF PROPOSED MEMORIAL BRIDGE

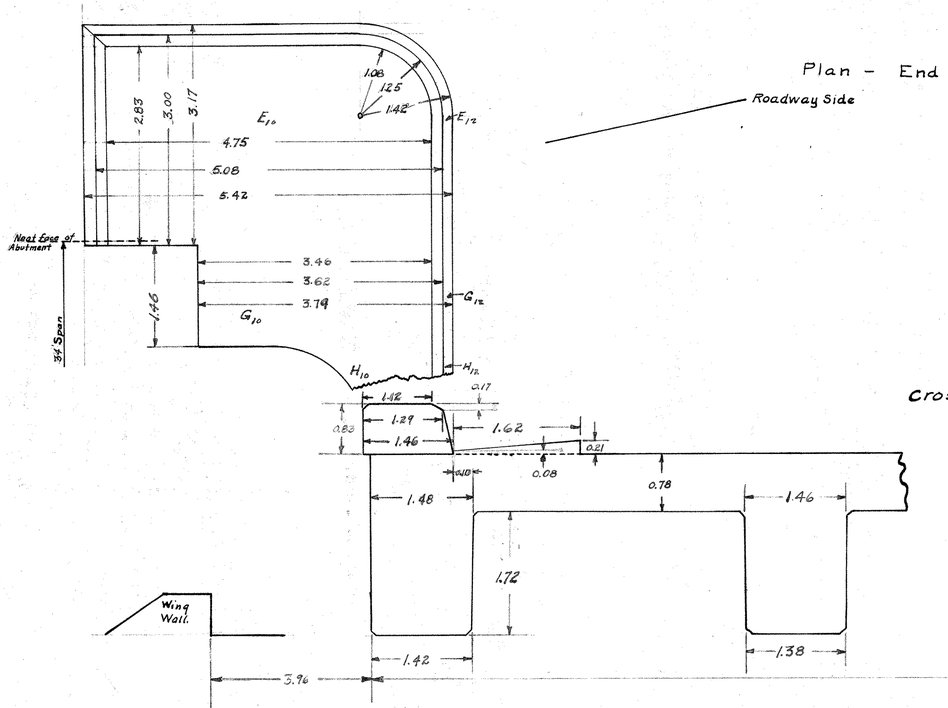
BORO. OF WAYNESBORO TR. 51 - L 224 FRANKLIN CO.
ARCHITECTURAL DETAILS

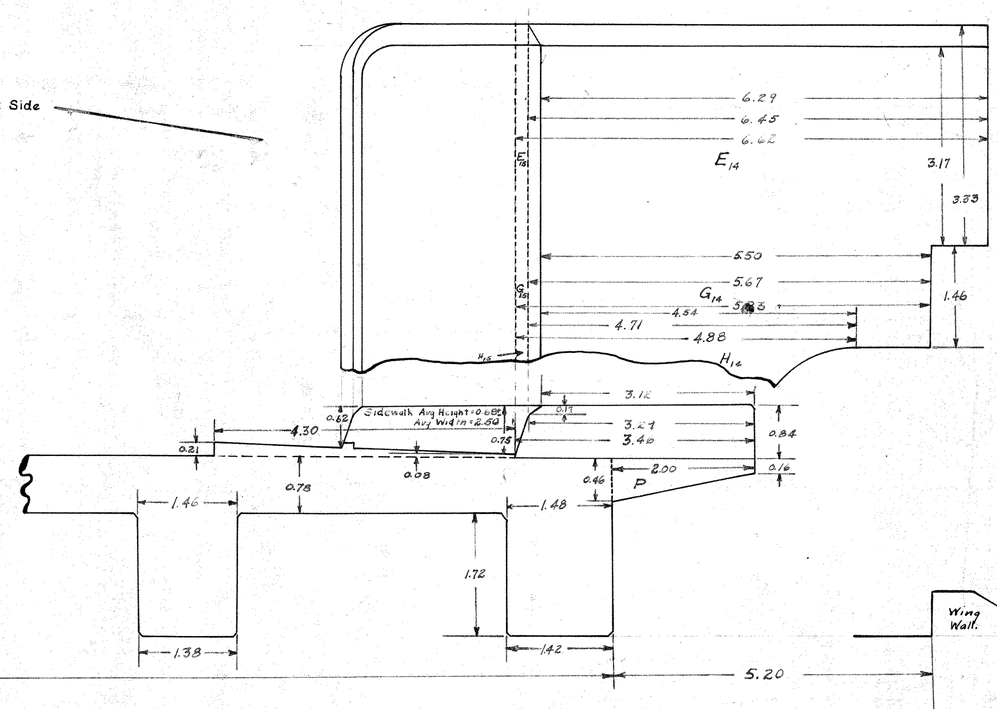
SK-147

Made by C.C.R.
Checked by C.E.R.M. W.B.D. 10-6-26

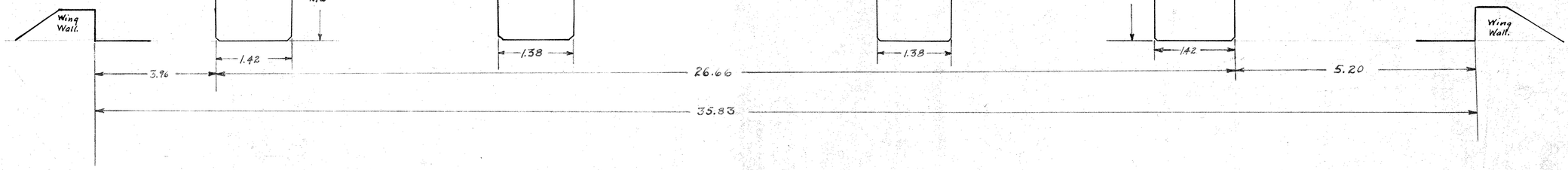
"IMPERIAL" TRACING CLOTH
K & E CO., N.Y.

Plan – End Post Projection

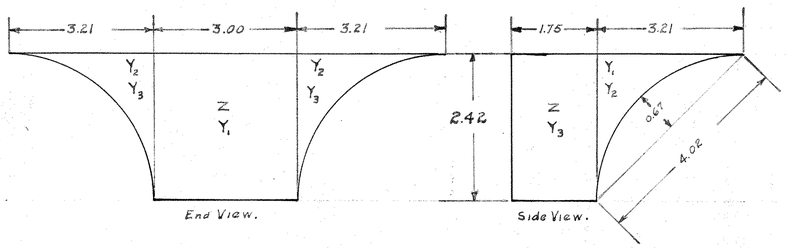


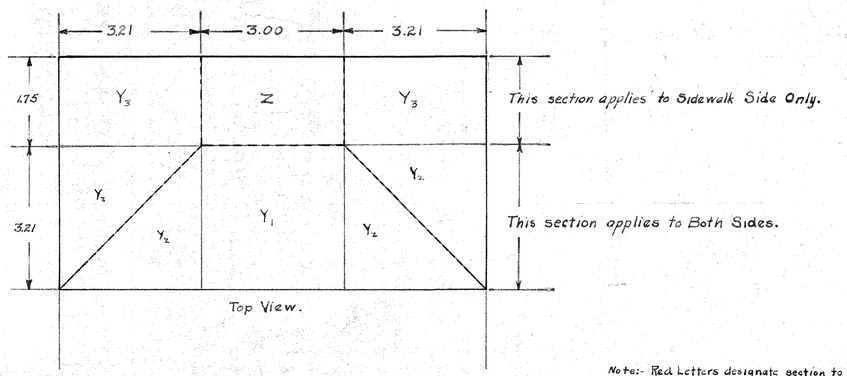


Cross Section.



Sketches of Pier Projection for Memorial Support



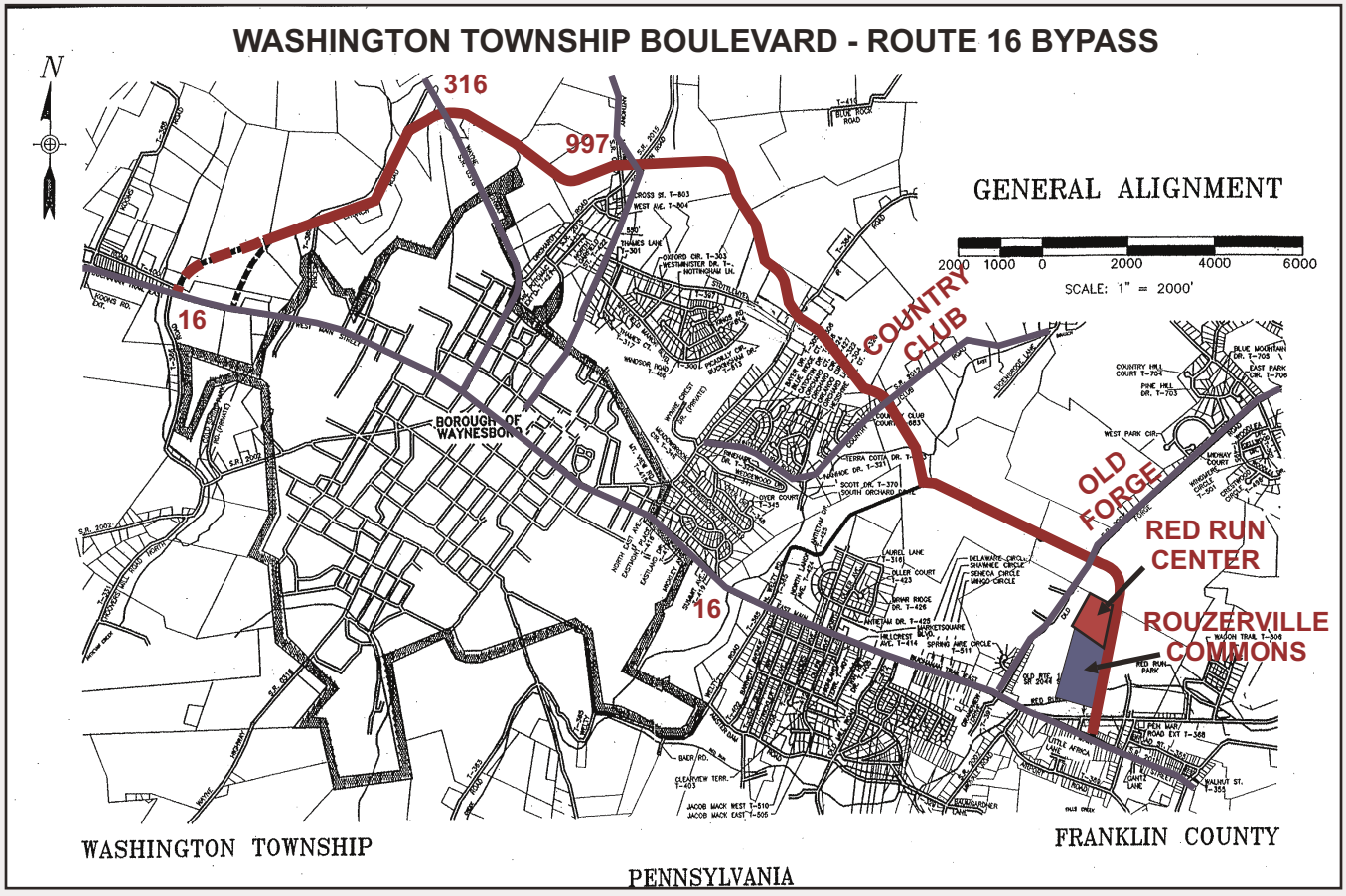


Note:- Red Letters designate section to which computation applies.
Note:- No Scale for Sketches

Franklin Co
R 224
Waynesboro Boro Bridge
See SK 147

Washington Township Boulevard will provide dramatically increasing traffic in coming years to support commercial development. The Boulevard was designed as a Route 16 bypass around the traffic congestion of Main Street Waynesboro. Construction of the Boulevard will be complete to Country Club Road by 2010, to Route 997 by 2011, to Route 316 by 2014, and back to Route 16 on the west side of Waynesboro by 2018.

Completion to Route 997 will provide dramatically improved access to the Rouzerville Commons/Red Run Center commercial area for the Quincy, Mont Alto, Penn State, and wealthy Penn National region of the county.



MINIMUM WIDTH CRITERIA FOR BRIDGES

I. MINIMUM WIDTH CRITERIA FOR NEW BRIDGES ON NEW FACILITIES (ALL FUNCTIONAL CLASSIFICATIONS)

Where a new highway is to be constructed on a new location, bridges shall be designed for a PHL-93 design load structural capacity with the minimum bridge width equal to the pavement and shoulder widths for the applicable functional classification systems indicated in Chapter 1, Table 1.3 through Table 1.8.

II. MINIMUM WIDTH CRITERIA FOR BRIDGES ON LIMITED ACCESS FREEWAY (INTERSTATE) FACILITIES

A. BRIDGES TO REMAIN IN PLACE (Deck repair or deck overlay, parapet modifications or no bridge work).

Where an existing highway is to be rehabilitated or reconstructed and no bridge work is to be performed, or an existing bridge deck is to be repaired or overlaid, the bridge may remain in place when: the design load structural capacity meets MS-18 (HS-20); and the bridge parapet meets current standards (F shape); and the bridge width shall provide 3.6 m (12 ft) lanes and a minimum of a 3.0 m (10 ft) right shoulder and a 1.05 m (3.5 ft) left shoulder. For major long-span bridges, generally over 60 m (200 ft) in length, offsets to the face of the parapet or bridge rail shall be a minimum of 1.05 m (3.5 ft) from the travel lane both left and right.

B. DECK REPLACEMENT OR PARTIAL SUPERSTRUCTURE REPLACEMENT.

Where a bridge deck is to be replaced, or a portion of the superstructure is to be replaced, the bridge or superstructure shall meet the MS-18 (HS-20) minimum (PHL-93 desirable) design load structural capacity and shall meet the applicable bridge widths indicated in Chapter 1, Table 1.8. For major long-span bridges, generally over 60 m (200 ft) in length, offsets to the face of the parapet or bridge rail shall be a minimum of 1.2 m (4 ft), but not less than the existing widths, from the travel lane both left and right.

C. RECONSTRUCTED BRIDGES (Superstructure replacement or bridge replacement).

Where the entire superstructure is to be replaced, or the bridge is to be replaced, the superstructure or bridge shall meet the applicable bridge widths indicated in Chapter 1, Table 1.8. For major long-span bridges, generally over 60 m (200 ft) in length, offsets to the face of the parapet or bridge rail shall be a minimum of 1.2 m (4 ft), but not less than the existing width, from the travel lane both left and right. Design load structural capacity shall equal PHL-93.

III. MINIMUM WIDTH CRITERIA FOR BRIDGES ON LIMITED ACCESS FREEWAY (NON-INTERSTATE) FACILITIES

A. BRIDGES TO REMAIN IN PLACE (Deck repair or deck overlay, parapet modifications or no bridge work).

Where an existing highway is to be rehabilitated or reconstructed and no bridge work is to be performed, or an existing bridge deck is to be repaired or overlaid, the bridge may remain in place when: the design load structural capacity meets MS-18 (HS-20); and the bridge parapet meets current standards (F shape); and the bridge width shall provide 3.3 m (11 ft) lanes and a minimum of a 2.4 m (8 ft) right shoulder and a 1.05 m (3.5 ft) left shoulder. For major long-span bridges, generally over 60 m (200 ft) in length, offsets to the face of parapet or bridge rail shall be a minimum of 1.05 m (3.5 ft) from the travel lane both left and right.

B. DECK REPLACEMENT OR PARTIAL SUPERSTRUCTURE REPLACEMENT.

Where a bridge deck is to be replaced, or a portion of the superstructure is to be replaced, the bridge or superstructure shall meet the MS-18 (HS-20) minimum (PHL-93 desirable) design load structural capacity and shall meet the applicable bridge widths indicated in Chapter 1, Table 1.8. For major long-span bridges, generally over 60 m (200 ft) in length, offsets to the face of the parapet or bridge rail shall be a minimum of 1.2 m (4 ft), but not less than the existing widths, from the travel lane both left and right.

C. RECONSTRUCTED BRIDGES (Superstructure replacement or bridge replacement).

Where the entire superstructure is to be replaced, or the bridge is to be replaced, the superstructure or bridge shall meet the applicable bridge widths indicated in Chapter 1, Table 1.8. For major long-span bridges, generally over 60 m (200 ft) in length, offsets to the face of the parapet or bridge rail shall be a minimum of 1.2 m (4 ft), but not less than the existing width, from the travel lane both left and right. Design load structural capacity shall equal PHL-93.

IV. MINIMUM WIDTH CRITERIA FOR BRIDGES ON ARTERIAL FACILITIES

A. BRIDGES TO REMAIN IN PLACE (Deck repair or deck overlay, parapet modifications or no bridge work).

Where an existing highway is to be rehabilitated or reconstructed and no bridge work is to be performed, or an existing bridge deck is to be repaired or overlaid, an existing bridge that fits the proposed alignment and profile may remain in place when the design load structural capacity meets MS-18 (HS-20) and the bridge width is equal to or greater than the applicable widths indicated in Table 1 on Pages 1 - 35 and 1 - 36. The approach lane widths plus the approach shoulder widths indicated in Table 1.3 and Table 1.4 may be considered for bridge widths if they are less than the bridge widths on Pages 1 - 35 and 1 - 36.

B. DECK REPLACEMENT OR PARTIAL SUPERSTRUCTURE REPLACEMENT.

Where a bridge deck is to be replaced, or a portion of the superstructure is to be replaced, the bridge or superstructure shall meet the MS-18 (HS-20) minimum (PHL-93 desirable) design load structural capacity and the minimum bridge width shall equal or exceed the applicable widths indicated in Table 2 on Pages 1 - 35 and 1 - 36. The approach lane widths plus the approach shoulder widths indicated in Table 1.3 and Table 1.4 may be considered for bridge widths if they are less than the bridge widths on Pages 1 - 35 and 1 - 36.

If the bridge is not on the National Highway System and the conditions listed on the form in Chapter1, Appendix A, 3R Bridge Width Criteria Documentation are met, the minimum bridge width is equal to the corresponding value listed in Minimum Width Criteria for Rural 3R Projects table in Chapter 1, Section 1.2. If the conditions are not met, this criterion does not apply. Forward a copy of the signed documentation to the Bureau of Design, Highway Quality Assurance Division.

C. RECONSTRUCTED BRIDGES (Superstructure replacement or bridge replacement).

Where the entire superstructure is to be replaced, or the bridge is to be replaced, the superstructure or bridge shall meet the applicable bridge widths indicated in Chapter 1, Tables 1.3 and 1.4. Design load structural capacity shall equal PHL-93.

If the bridge is not on the National Highway System and the conditions listed on the form in Chapter 1, Appendix A, 3R Bridge Width Criteria Documentation are met, the minimum bridge width is equal to the corresponding value listed in Minimum Width Criteria for Rural 3R Projects table in Chapter 1, Section 1.2. If the conditions are not met, this criterion does not apply. Forward a copy of the signed documentation to the Bureau of Design, Highway Quality Assurance Division.

MINIMUM WIDTH CRITERIA FOR BRIDGES (CONTINUED)

MINIMUM WIDTH CRITERIA FOR BRIDGES ON ARTERIAL FACILITIES (English)

	TABLE 1 BRIDGES TO REMAIN IN PLACE (Deck Repair or Deck Overlay, Parapet Modifications or No Bridge Work)		TABLE 2 DECK REPLACEMENT OR PARTIAL SUPERSTRUCTURE REPLACEMENT	
TRAFFIC VOLUMES CURRENT (a) TRAFFIC ADT	MINIMUM BRIDGE WIDTHS (b)	DESIGN LOAD STRUCTURAL CAPACITY	MINIMUM BRIDGE WIDTHS (b) (c) (n)	DESIGN LOAD STRUCTURAL CAPACITY
400 and Under	28'-0"	HS-20	30'-0"	HS-20 Min*
401 to 1500	30'-0"	HS-20	32'-0"	HS-20 Min*
1501 to 2000	30'-0"	HS-20	34'-0"	HS-20 Min*
Over 2000	30'-0"	HS-20	34'-0"	HS-20 Min*

* PHL-93 Desirable

MINIMUM WIDTH CRITERIA FOR BRIDGES ON COLLECTOR AND LOCAL ROAD FACILITIES (English)

	TABLE 3 BRIDGES TO REMAIN IN PLACE (Deck Repair or Deck Overlay, Parapet Modifications or No Bridge Work)		TABLE 4 DECK REPLACEMENT OR PARTIAL SUPERSTRUCTURE REPLACEMENT		TABLE 5 RECONSTRUCTED BRIDGES (Superstructure Replacement or Bridge Replacement)	
TRAFFIC VOLUMES CURRENT (a) TRAFFIC ADT	MINIMUM BRIDGE WIDTHS (b)	DESIGN LOAD STRUCTURAL CAPACITY (e)	MINIMUM BRIDGE WIDTHS (b) (c) (n)	DESIGN LOAD STRUCTURAL CAPACITY (e)	MINIMUM BRIDGE WIDTHS (b) (g) (h) (k) (n)	DESIGN LOAD STRUCTURAL CAPACITY
400 and Under	22'-0" (d) (l)	HS-15	24'-0" (d) (l)	HS-15 Min*	24'-0" (i) (m)	PHL-93
401 to 1500	22'-0"	HS-15	28'-0"	HS-15 Min*	28'-0"	PHL-93
1501 to 2000	24'-0"	HS-15	30'-0" (f)	HS-15 Min*	32'-0"	PHL-93
Over 2000	28'-0"	HS-15	34'-0" (f)	HS-15 Min*	40'-0" (j)	PHL-93

* HS-20 Desirable

See General Bridge Width Table Notes on Page 1 - 37.

OS-2 (10-08)

pennsylvania
DEPARTMENT OF TRANSPORTATION
www.dot.state.pa.us

September 13, 2011

Washington Township
Board of Supervisors
13012 Welty Road
Waynesboro, PA 17268

Franklin County
SR 0016, Section 037
Memorial Bridge Replacement

To Whom It May Concern:

The Pennsylvania Department of Transportation (PennDOT) has a bridge replacement project scheduled for State Route 0016 in your municipality.

The bridge carries PA-16 over the West Branch of the Little Antietam Creek and is located at the Waynesboro Borough and Washington Township municipal boundary. Please see the enclosed location map.

The anticipated work is to replace the existing bridge.

We propose to maintain a single-lane of traffic during the bridge construction using a temporary traffic signal. Construction is expected to begin in the fall of 2014 and be completed in the fall of 2015.

Attached is a Municipal Officials Response Form to be returned to the Project Manager. On this form, we are requesting information concerning utilities, special events, emergency services, and other design considerations. Please return this form in the enclosed envelope so that your concerns may be addressed as appropriate.

If you have any questions, please contact Doug Murphy, Project Manager at 717-783-3773.

Sincerely,

Douglas P. Murphy

for: Steven A. Moore, P.E.
Highway Design Engineer

Attachments

Engineering District 8-0

MUNICIPAL OFFICIALS RESPONSE FORM

Bridge Replacement Project

County: Franklin **Municipality:** Washington Township **Date:** 10/6/2011

S.R.-Sect.: 0016-037 **Project Name:** Memorial Bridge Replacement

PennDOT Contact Person: Doug Murphy, Project Manager **Telephone:** 717-783-3773

PLEASE COMPLETE AND RETURN

1. Contact Person: Michael A. Christopher Title: Township Manager

   Telephone No.: 717-762-3128

   Address: 13013 Welty Road
   Waynesboro, PA 17268

2. Do you have utilities within the project limits? X Yes _____ No

   If yes, type of utility: Sanitary sewer Condition: Good

   Do any of these facilities need replacement or repair? _____ Yes X No

   Description of proposed work: _____

   Do you have plans to install new utility facilities within the project limits in the near future? _____ Yes X No

   If yes, target date: _____

   Description of proposed work: _____

3. Please list any known special events that may be affected by the proposed project: (i.e., parades, fairs, festivals, etc.)

   A. Special Event: N/A Date(s): _____

   Contact Person: _____ Telephone No.: _____

   Description and Location: _____

   Comments/Concerns: _____

   B. Special Event: _____ Date(s): _____

   Contact Person: _____ Telephone No.: _____

   Description and Location: _____

   Comments/Concerns: _____

(continued on next sheet)

C. Special Event: _____ Date(s): 10/6/2011

Contact Person: _____ Telephone No.: _____

Description and Location: _____

Comments/Concerns: _____

4. Please list any emergency services that may be affected by the proposed project:

A. Emergency Service: Waynesboro Fire Department

Location: 29 South Potomac Street Waynesboro, PA 17268

Contact Person: Chief David Martin Telephone No.: 717-762-2515

Comments/Concerns: Delays as a result of construction in fire response time.

B. Emergency Service: Waynesboro Ambulance Squad

Location: 603 West Main Street, Waynesboro, PA 17268

Contact Person: Chief Casey Rock Telephone No.: 717-762-5338

Comments/Concerns: Delays as a result of construction in ambulance response time.

5. School District: Waynesboro Area School District

Contact Person: James Robertson Telephone No.: 717-762-1191 ext:1101

Comments/Concerns: School bus delays

6. Do you know of any design considerations or factors which should be considered by the Department in developing its plans? Yes, see the enclosed letter.

7. Additional Comments/Concerns: As requested before, Washington Township would like to request a long term traffic study be done to determine if additional lanes should be added to this bridge now to accomodate future traffic needs.

cc (upon return):
Traffic
Utilities
Municipal Services
County Manager 8-3

Please return to:
Doug Murphy, Project Manager
PennDOT Engineering District 8-0
Highway Design Unit
2140 Herr Street
Harrisburg, PA 17103-1699

Distribution Date: 10/6/2011
Initials: DPM

Date Received in District: 10/6/2011
Initials: DPM

WASHINGTON TOWNSHIP SUPERVISORS
13013 WELTY ROAD, WAYNESBORO, PA 17268
PHONE (717) 762-3128 FAX (717) 762-1775

1779

October 5, 2011

Doug Murphy, Design Unit
PennDOT District 8-0
2140 Herr Street
Harrisburg, PA 17103-1699

RE: Memorial Bridge replacement
SR 0016-037

Dear Mr. Murphy:

In November of last year, Washington Township wrote to Representative Todd Rock who scheduled a meeting with Waynesboro Borough officials to discuss this bridge replacement project and outline our concerns with the project.

The Township Supervisors once again would like to share their bridge replacement thoughts with the Department by offering the following comments and suggestions:

1. The Township agrees and believes the bridge should have a walkway on one side or the other.

2. The architecture of the bridge is important and should mirror the original structure as much as possible.

3. The Township believes replacing this structure with just 2 lanes now would be a mistake since the life span of bridges is over 50 years. We would like to request that a traffic study be conducted on this section of PA Route 16 to determine if a wider bridge should be constructed now.

Washington Township experienced a 21.2% increase in population in the 2010 census and the county's population increased by 15.7%. All indications are that this growth will continue into the future. As a result of this growth we believe constructing just 2 lanes now would be a mistake.

Thank you for this opportunity to express our views on this bridge replacement project. If you wish to meet to discuss this project further please feel free to contact me.

Very Truly Yours,

Michael A. Christopher
Township Manager

CC: Waynesboro Borough

WASHINGTON TOWNSHIP SUPERVISORS
13013 WELTY ROAD, WAYNESBORO, PA 17268
PHONE (717) 762-3128 FAX (717) 762-1775

1779

October 25, 2011

Doug Murphy, Design Unit
PennDOT District 8-0
2140 Herr Street
Harrisburg, PA 17103-1699

RE: Memorial Bridge replacement
SR 0016-037

Dear Mr. Murphy:

On behalf of the Washington Township Supervisors I would like to thank you for providing information on the size of the proposed replacement bridge at the western edge of the Borough of Waynesboro.

Providing 3 lanes, a sidewalk on one side, and architectural consideration for what is there now is exactly what the Township was asking for.

Based on the above we believe this new bridge will be a great addition to the community.

The Township looks forward to working with you on this project in the future.

Very Truly Yours,

Michael A. Christopher
Township Manager

CC: Rep. Rock

Department of Transportation
Engineering District 8
Harrisburg

Date: November 1, 2010
Subject: Meeting at Waynesboro
SR 0016-037 Franklin County
Memorial Bridge Replacement
MPMS No. 74889
To: File
From: Doug Murphy, Project Manager

A meeting was held at Rep. Todd Rock's office in Waynesboro to discuss the bridge replacement.

In attendance:

- State Representative Todd Rock
- Lloyd Hamberger - Waynesboro Manager
- Kevin Grubbs – Waynesboro Engineer
- Craig Newcomer – President of the Borough Council
- Harry Morningstar – Downtown business owner
- Ben Greenawalt – Waynesboro Council
- Ronnie Martin – Waynesboro Council
- Jason H. Cohen - Waynesboro Council
- PennDOT - Doug Murphy, Dave Rock, Stuart Hondel, Kris Feldmyer

In general, the community leaders were concerned that the bridge will be replaced with a bland soulless PennDOT bridge. They would like an aesthetically pleasing bridge that befits the community. I assured them that since the bridge was historical that we would use context sensitive design and meet the community needs in the design of the new bridge. Although I was not sure I could specify a "soul".

They would like the bridge to have a feeling of a "gateway" into Waynesboro. Or the bridge should be replaced to its original design as a memorial to the war veterans.

Those present think the new bridge should be widened to accommodate today's traffic. They feel the bridge is somewhat dangerous since it is narrow, especially when you meet a truck at the bridge. (Bridge is 24' wide). They also would like to see sidewalks across the bridge and maybe lighting. Mentioned was possible development near the bridge in Washington Township.

Waynesboro & Washington Township (not at the meeting) have a Joint Comprehensive Plan.

I agreed to meet with the borough and township in the future, once we get into the design phase to present them some of the options we come up with for the bridge design. All concerned were pleased that PennDOT will take in the needs of the community when we design the new bridge and that they will be involved in the decision making process.

Meeting was adjourned.

SR 0016-033, Franklin County
Memorial Bridge
November 1, 2010

NAME	REPRESENTING	PHONE / EMAIL
Doug Murphy	District 8-0	doumurphy@state.pa.us 717-783-3773
Todd Rock	State Rep.	749-7384
Stuart Honodel	8-3	stonodel@state.pa.us
Harry Morningstar Jr	Main St. Waynesboro, Inc Design Committee Chair	717-377-8517 HGMORNINGSTAR@YAHOO.COM
Craig L Newcomer	Waynesboro Council	717-830-3487 Craig.newcomer@yahoo.com
Dave Rock	8-3 Penn DOT	264-4171
Ben Greenawalt	Waynesboro Council	(717)762-1844
Ronnie Martin	Waynesboro Council	RBMWAR@AOL.COM (717) 729-0772
Jason H. Cole	Waynesboro Borough	jason@waynesboropa.org
Kris Feldmeyer	8-3 PennDOT	264-4171 Kfeldmeyer@state.pa.us
Kevin Grubbs	Borough Waynesboro Engineering Dept.	kevin@waynesboropa.org
Lloyd Hambesger	Borough Manager WSD	Lloyd@waynesboropa.org