

# DETERMINATION OF EFFECT REPORT

## S.R. 3007, Section 009 over Middle Creek

### Bridge Replacement Project



Franklin Township, Snyder County, Pennsylvania

ER # - pending

Prepared for:



Pennsylvania Department of Transportation  
Engineering District 3-0  
715 Jordan Avenue  
Montoursville, Pennsylvania 17754

Prepared by:



A.D. Marble & Company  
3913 Hartzdale Drive  
Suite 1302  
Camp Hill, Pennsylvania 17011

June 2010

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## ABSTRACT

This Determination of Effect report documents an assessment of the potential effect of the Pennsylvania Department of Transportation's (PennDOT's) proposed replacement of the existing S.R. 3007, Section 009 Bridge (Iron Bridge Road) over Middle Creek and associated roadway improvements on historic resources listed in or eligible for listing in the National Register of Historic Places (National Register). The Iron Bridge crosses Middle Creek in a rural area of Franklin Township, Snyder County, Pennsylvania. The current bridge, which was constructed ca. 1890, is a single-span, 115-foot long, pin-connected Pratt through-truss. The bridge is currently supported by original stone abutments with concrete bridge seats that were added in 1996. The Iron Bridge was determined eligible for listing in the National Register in December 2006 (Appendix A). No other historic resources are located within the Area of Potential Effect (APE).

No archaeological work for this project has been performed to date, and no future work is anticipated as there is no archaeological potential within the project area.

The proposed bridge replacement project will impact the Iron Bridge. Under the direction of 36 CFR 800.5 and 800.6, the Definition of Effect and Criteria of Adverse Effect were applied to this undertaking. This analysis resulted in a finding that the proposed project will have an *Adverse Effect* on the National Register-eligible Iron Bridge.

This analysis was conducted from November 2009 to April 2010 for PennDOT District 3-0 in conjunction with the Federal Highway Administration (FHWA) and in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended. The Section 106 process seeks to accommodate historic preservation concerns with the needs of federal undertakings.

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## 1.0 INTRODUCTION

## 1.0 INTRODUCTION

This report summarizes the results of a Determination of Effects assessment conducted in association with the proposed replacement of the existing Iron Bridge that carries S.R. 3007, Section 009 (Iron Bridge Road) over Middle Creek in Franklin Township, Snyder County, Pennsylvania (Figure 1). The proposed project consists of the replacement of the Iron Bridge, which was determined eligible for listing in the National Register of Historic Places (National Register) on December 6, 2006. The project area is located in a rural area within Franklin Township. The area is predominantly wooded with a residential property to the southeast and agricultural lands to the north.

The purpose of this Determination of Effects Report is to document the potential effects of the proposed project on historic properties located within the Area of Potential Effect (APE). The National Register-eligible Iron Bridge is the only historic property located within the APE for this project (Figure 2). Appendix A contains the documentation for this resource. Application of the Definition of Effect and Criteria of Adverse Effect has resulted in a finding that the proposed improvements will have an Adverse Effect on the Iron Bridge.

No archaeological work for this project has been performed to date, and no future work is anticipated as there is no archaeological potential within the project area.

The Iron Bridge is listed in the Pennsylvania Department of Transportation's (PennDOT's) 2009-2020 Twelve Year Program, with 80 percent federal funding. This study was conducted from November 2009 to April 2010 for PennDOT Engineering District 3-0 in conjunction with the Federal Highway Administration (FHWA) as part of the Section 106 process. The work was conducted in accordance with all state and federal guidelines for an architectural survey, including: Section 106 of the National Historic Preservation Act of 1966, as amended; the procedures for the protection of historic and cultural properties set forth in 36 CFR 800, as amended; 23 CFR 771, as amended; guidance published by the Advisory Council on Historic Preservation (ACHP); Sections 1(3) and 2(b) of Executive Order 11593; and the National Environmental Policy Act of 1966. This legislation and guidance requires that the effects of any

federally assisted undertaking on historically significant buildings, structures, districts, objects, or sites be taken into account during the project planning process. Significant resources are those listed in or determined eligible for listing in the National Register.

# Figure 1 Project Location

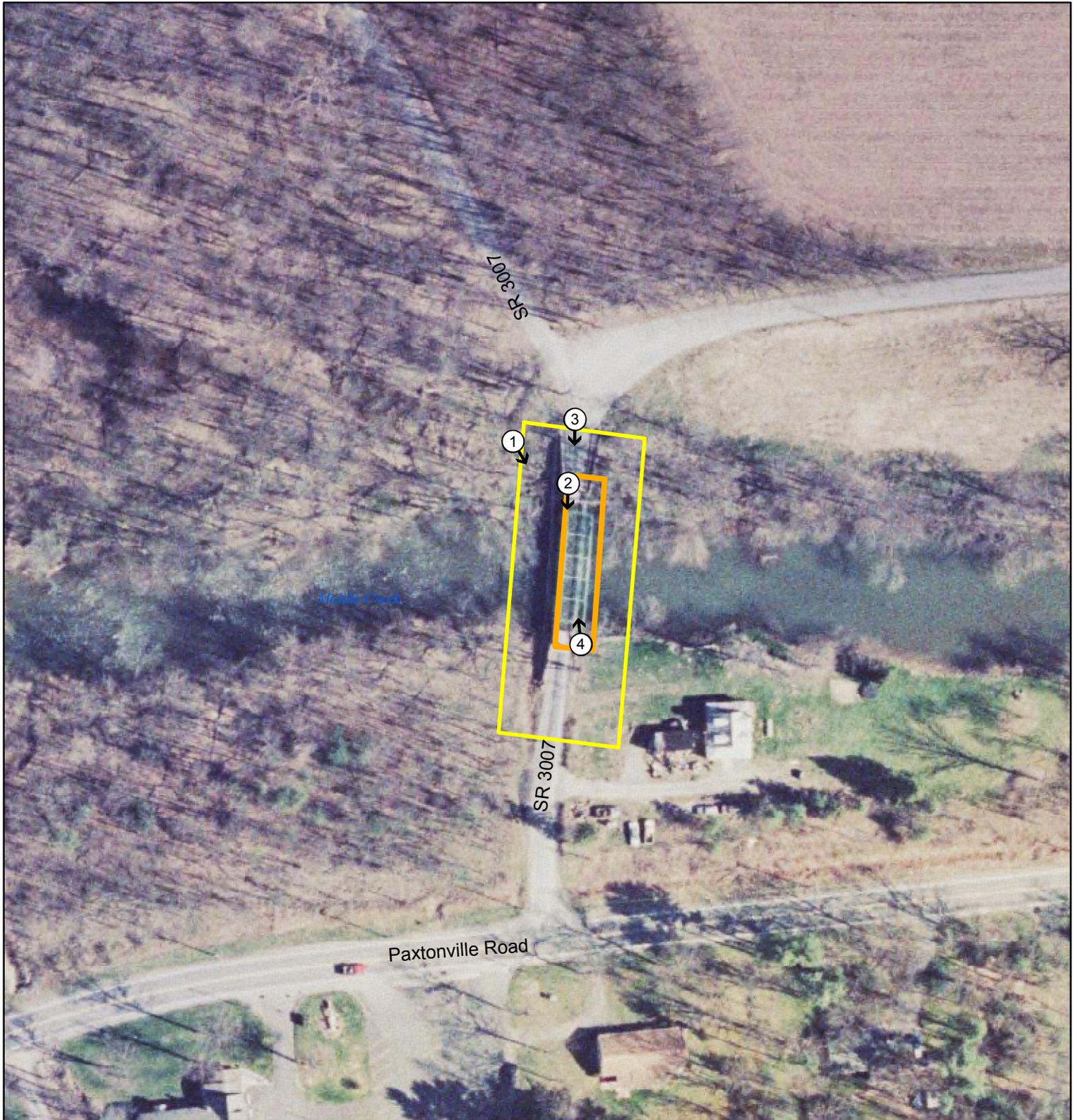
S.R. 3007, Section 009 over Middle Creek Bridge Replacement Project  
Determination of Effect Report  
Franklin Township, Snyder County, Pennsylvania



S.R. 3007, Section 009 over Middle Creek Bridge Replacement Project  
Determination of Effect Report

# Figure 2 Area of Potential Effect (APE), Photograph Location, and National Register Boundary Map

S.R. 3007, Section 009 over Middle Creek Bridge Replacement Project  
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0 50 100  
Feet



Photo Location



Area of Potential Effect



National Register Boundary

Source: PASDA: DCNR PAMAP Program - Color Orthophotos - Cycle 1 (2004).

## 2.0 PROJECT DESCRIPTION

## **2.0 PROJECT DESCRIPTION**

### **2.1 Introduction**

The proposed project is located where S.R. 3007 (Iron Bridge Road) crosses Middle Creek in Franklin Township, Snyder County, Pennsylvania (Figure 1). The bridge is located immediately north of the intersection of Iron Bridge Road and S. R. 3008 (Paxtonville Road). The bridge is located in a predominantly wooded area with agricultural lands to the north and a significantly altered mid-twentieth-century residential property to the southeast. The Iron Bridge is the only historic property located within the APE for this proposed project (Figure 2).

The existing Iron Bridge was built ca. 1890 and underwent rehabilitation in 1961 and again in 1996 (Appendix A). The Iron Bridge is a one-lane, 115-foot long, single-span, pin-connected Pratt through-truss bridge that carries S.R. 3007 (Iron Bridge Road, which is classified as a “rural local road”) over Middle Creek. The bridge has lightly built trusses with lower chords and diagonals of eye bars. The upper chords, end posts, and verticals consist of channels with lacing or lattice (Photographs 1 through 4; orientation on Figure 2). The bridge underwent a rehabilitation in 1996, which consisted of repairing the stringers and open grate deck as well as strengthening the floorbeams. All original connection methods were retained. The clear roadway width measures 13 feet, 10 inches and there is a height restriction of 11 feet, 3 inches. The abutments are constructed of stone masonry and have concrete seats that were added in 1996. The wingwalls are constructed of stone masonry.

The most recent bridge inspection report of the Iron Bridge reports that the deterioration of the superstructure condition continues to accelerate. The allowable load posting was therefore reduced from 12 tons to 9 tons in 2008. The Iron Bridge has been rated as structurally deficient and functionally obsolete. The proposed project calls for the replacement of the existing structure with a modern structure capable of supporting current legal loads.

### **2.2 Project Purpose and Need**

The project need is discussed in detail in the Alternatives Analysis located in Appendix B. In summary, the purpose of the proposed project is to provide a safe crossing of Middle Creek for



**Photograph 1:** Overall view of Iron Bridge showing stone abutments and roadway approach. The National Register boundary for the bridge includes the entire footprint. View looking southeast (March 2008).



**Photograph 2:** View of Iron Bridge showing the steel open-grate deck. Note the lattice portal bracing and inverted fishbelly-shaped upper laterals. View looking north (March 2008).



**Photograph 3:** Overall view of Iron Bridge showing the north portal. Note the weight limit and modern guiderails. View looking south (March 2008).



**Photograph 4:** Detail view of plaque on bridge's south portal indicating design by the Variety Iron Works of Cleveland, Ohio. View looking north (March 2008).

the community along Paxtonville Road, Furnace Road, and Iron Bridge Road. The Iron Bridge over Middle Creek is an aging structure that does not meet current design and safety standards and does not satisfy the transportation needs of the community. The superstructure is deteriorating and shows cracking at the top cover plates under the stringers, loss of sections of the lower pin plates, and deep pitting and section loss along the outer edges of the web cover plate surrounding the lower pin connection. There is evidence that the weight posting is not being followed, thus causing increased damage to the bridge structure. Observations made by local residents suggest that drivers ignored the “official” detour on U.S. 522 and failed to obey the weight restriction signs on the Iron Bridge during a bridge replacement on U.S. 522 in Middleburg Borough in 2008. PennDOT maintenance forces have noted that they routinely have to replace the 11’-3” clearance bar which serves to protect the truss from vehicles taller than the allowable height clearance indicating that the posted height restriction (and likely the posted weight restriction) is being ignored. The existing width of the bridge is such that only one vehicle can be accommodated at a time, and the existing 11’-3” height restriction and 9 ton load capacity restrict access for emergency vehicles, school buses, and farming equipment, thus creating a disservice to the community living along Paxtonville Road, Furnace Road, and Iron Bridge Road. The nearest crossing of Middle Creek for a vehicle whose weight exceeds the posted limit is in Middleburg Borough. The circuitous route to get from the Furnace Road/Paxtonville Road intersection to the Iron Bridge/Furnace Road intersection is 5.4 miles, adding over ten minutes in travel time for emergency vehicles. At the public meeting of March 30, 2010, the community provided input on the needs that should be addressed by this project (Appendix C). In particular, the community emphasized that the weight, height, and width restrictions on the bridge negatively impact commerce in this agricultural community, and that the school district and EMS services would also benefit from a wider facility without height or weight restrictions.

### **2.3 Alternatives Analysis**

From November, 2009 to April, 2010, Urban Engineers, Inc. conducted a detailed Alternatives Analysis, which can be found in Appendix B, and is summarized below. The Alternatives Analysis for S.R. 3007, Section 009 Bridge over Middle Creek was conducted using the *AASHTO Guidelines for Historic Bridge Rehabilitation and Replacement*, March 2007, as

presented by Lichtenstein Consulting Engineers. PennDOT studied various alternatives to increase the safety of the crossing, including:

1. Do nothing
2. Remove the existing bridge and not provide a crossing at this location
3. Preserve (rehabilitate) the existing bridge
4. Remove the existing bridge and build a new bridge in the same location

Each alternative was assessed based on its ability to address the specific project need identified for the site: Provide a structurally safe facility that meets the transportation needs of the surrounding community.

Based on the analysis considerations, Alternative 4 (removal of the existing bridge and replacement with a new bridge in the same location) is the preferred action as it meets the need of the project. Alternatives 1, 2 and 3 do not adequately address this project need (Table 1). Alternative 3 retains the existing bridge structure but does not address the height and width restrictions of the bridge which local farmers have noted impedes their ability to move equipment. Other members of this community have emphasized that the height and width restrictions do indeed impact their travel and commerce. Representatives from the Midd West School District and Emergency Services Providers indicated that they would benefit from a wider facility that does not have height, width and weight restrictions. The rehabilitation of the Iron Bridge proposed under Alternative 3 would range in cost from approximately \$1,000,000 to provide a 15-ton posted weight limit to \$2,200,000 to provide for legal loads. Rehabilitating the bridge to accommodate 15 tons would consist of replacing the stringers, floor beams, and deck, and painting of the entire superstructure. If it is desirable to bring the existing bridge up to a legal load carrying capacity, the required rehabilitation would be so extensive that it would result in a significant visual alteration of the bridge, even though it would retain the physical components. Replacing the Iron Bridge with a new bridge in its current location as proposed under Alternative 4 would meet the project's need. (Urban Engineers, Inc. 2010).

**Table 1. Project Need Matrix.**

(YES=Alternative meets the stated NEED)	
ALTERNATIVES	NEED
	<b>Provide a structurally safe facility that meets the transportation needs of the surrounding community.</b>
1 - Do nothing	NO
2 - Remove the existing bridge and not provide a crossing at this location.	NO
3 - Preserve (rehabilitate) the existing bridge.	NO
4 - Remove the existing bridge and build a new bridge in the same location.	YES

## 2.4 Area of Potential Affect

According to 36 CFR 800: Protection of Historic Properties 1986, revised 1999, the APE is defined as:

...the geographic area within which an undertaking may cause changes in the character or use of historic properties, if any such properties exist. The APE includes resources that may be directly or indirectly impacted by project activities, including acquisition of property, property easements, and/or visual and audible effects.

The APE is defined as the area within which the proposed project might have a direct or indirect impact on historic properties. Potential impact types include direct physical impacts, visual impacts, audible impacts, and secondary and cumulative impacts, and the APE takes into consideration each of these possibilities. The APE of the S.R. 3007, Section 009 over Middle Creek Bridge Project consists of the corridor surrounding the bridge. It extends 45 feet east and west of the centerline of the existing roadway and includes the entire National Register boundary of the Iron Bridge (Figure 2). No other historic properties are located within the APE.

## 2.5 Agencies Consulted and Public Participation

PennDOT has coordinated with public officials concerning this project and notified adjacent property owners. Section 106 consulting parties have been identified, and the following list of potentially interested organizations and adjacent property owners has been approved by FHWA:

- Kitty Henderson, Executive Director, Historic Bridge Foundation;
- Stephen Buonopane, PE, Ph. D, Bucknell University, Civil & Environmental Engineering Department;
- Snyder County Historical Society;
- Neil A. Courtney and Beth S. Courtney;
- Roy W. Risser and Sons;
- Robert Reigle, Jr.; and
- John F. Kauffman, II.

Invitation letters were sent out to the above-listed parties on August 10, 2009. Stephen Buonopane of the Bucknell University Civil & Environmental Engineering Department and Kitty Henderson of the Historic Bridge Foundation responded to the invitation and are included as consulting parties at this time. A sample of the invitation letter that was sent to each of the potential consulting parties and the response form can be found in Appendix C. Draft effect reports were provided to the two consulting parties in November 2009. Written comments from each consulting party as well PennDOT's responses can be found in Appendix C.

On March 30, 2010, a public meeting was held with Franklin Township to discuss the community's needs at this location. At the meeting, alternatives were presented and questionnaires were provided to the attendees to solicit additional input. A summary of the results of the public meeting can be found in Appendix C.

## **2.6 Archaeology**

No archaeological investigations have been completed to date, nor are they expected in the future due to the nature of the proposed work and project limits.

## 3.0 IRON BRIDGE

## **3.0 IRON BRIDGE**

### **3.1 Description of Resource**

The Iron Bridge is a one-span, pin-connected Pratt through-truss bridge (Photographs 1 through 4). The out-to-out width of the bridge is approximately 15 feet, 8 inches. The bridge is 115 feet long with an 11-foot, 3-inch vertical clearance. The Iron Bridge is supported on fieldstone abutments with concrete bridge seats that were added in 1996. The lightly built trusses have lower chords and diagonals of eye bars. Upper chords, end posts, and verticals consist of channels with lacing or lattice. The bridge has lattice portal bracing and built-up laterals with an inverted fishbelly shape. The floorbeams were strengthened and the stringers and open-grate deck were repaired in 1996; however, the original method of connecting to floorbeams and trusses was retained using U-shaped hangers from the lower chord pins and post tensioned lower chords. The earlier railings were replaced with W-beam guide railings set to the inside of the trusses. The flared wingwalls have stone parapets, and a plaque is located on each portal, reading “The Variety Iron Works, Bridge Builders, and Cleveland, Ohio.”

The bridge was previously recommended eligible as a part of the Pennsylvania State Bridge Survey and was determined eligible for listing in the National Register in December 2006 (Appendix A). The Iron Bridge was determined eligible as a historically and technologically significant example of its type and design, with distinctive details representative of a fabricator that is not heavily represented in Pennsylvania. The Iron Bridge is an early example of a pin-connected Pratt through-truss. Although the exact date has not been documented, it is estimated that The Variety Iron Works of Cleveland, Ohio (1888-1901), constructed the bridge ca. 1890 based on the company history and style of the bridge. The Variety Iron Works began fabricating metal truss bridges ca. 1888, and most of the company’s surviving work dates from the early 1890s. Although the firm used standard period details, their lightly built designs that incorporate lattice and inverted fishbelly laterals are uncommon (A.G. Lichtenstein & Associates, Inc. 2000). The National Register boundary for the Iron Bridge includes the superstructure and substructure of the bridge.

### **3.2 Effect Evaluation**

Since a National Register-listed property (the Iron Bridge) exists within the project APE, it was necessary to assess potential project impacts on the historic property. Project impacts were assessed based upon the guidelines specified in the Section 106 regulations (1999; revised 2004), specifically 36 CFR Part 800, Protection of Historic and Cultural Properties, as published in the Federal Register and on the Advisory Council on Historic Preservation's (ACHP's) Internet website (ACHP website, accessed 1 July 2009).

### **3.3 Definition of Effect**

An *Effect* is defined as an alteration to the characteristics of a historic property that qualify it for inclusion in or eligibility for the National Register. The two possible results of identification and evaluation are presented below.

#### *3.3.1 No Historic Properties Affected*

If the agency official finds that either there are no historic properties present, or that there are historic properties present but the undertaking will have no effect upon them as defined in Section 800.16(i), the agency official shall provide documentation of this finding, as set forth in Section 800.11(d), to the State Historic Preservation Office/Tribal Historic Preservation Office (SHPO/THPO). The agency official shall notify all consulting parties, including Native American tribes and Native Hawaiian organizations, and make the documentation available for public inspection prior to approving the undertaking. If the SHPO/THPO or the ACHP (if it has entered the Section 106 process) do not object within 30 days of receipt of an adequately documented finding, the agency official's responsibilities under Section 106 are fulfilled.

#### *3.3.2 Historic Properties Affected*

If the agency official finds that there are historic properties that might be affected by the undertaking, or the SHPO/THPO or the ACHP object to the agency official's finding under Section 800.11(d) (1), the agency official shall notify all consulting parties, including Native American tribes or Native Hawaiian organizations, and invite their views on the effects and assess adverse effects, if any, in accordance with Section 800.5.

### **3.4 Criteria of Adverse Effect**

An *Adverse Effect* is found when an undertaking may alter, directly or indirectly, the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified following the original evaluation of the property's eligibility for inclusion in the National Register. Adverse Effects may include reasonably foreseeable impacts that could be caused by the undertaking and that may be cumulative, may occur later in time, or may occur farther removed in distance. Adverse Effects on historic properties include, but are not limited to:

- (i) Physical destruction of or damage to all or part of the property;
- (ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines;
- (iii) Removal of the property from its historic location;
- (iv) Change of the character of the property's use or of physical features within the property's setting that contributes to its historic significance;
- (v) Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;
- (vi) Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance (Section 800.5(a)).

#### *3.4.1 No Adverse Effect*

The agency official shall maintain a record of the finding and provide information on the finding to the public on request that is consistent with the confidentiality provisions of Section 800.11(c). Implementation of the undertaking in accordance with the finding as documented fulfills the agency official's responsibilities under Section 106 and 36 CFR Part 800, Section 800.11. If the agency official will not conduct the undertaking as proposed in the finding, the agency official shall reopen consultation under Section 800.5(a).

### 3.4.2 Adverse Effect

If an Adverse Effect is found, the agency official shall consult further to resolve the Adverse Effect pursuant to Section 800.6. Section 800.6 of the regulations implementing the National Historic Preservation Act describes the resolution of Adverse Effect. The procedures for resolution include continuing consultation with the agency and the SHPO, resolving Adverse Effects, and preparing a Memorandum of Agreement (MOA).

### 3.5 Description of Proposed Work

The proposed project involves the replacement of the existing Iron Bridge in Franklin Township, Snyder County, Pennsylvania. The superstructure and substructure of the existing National Register-eligible Iron Bridge will be removed entirely. Approach work to the north and south of the bridge will widen the roadway and improve the vertical geometry. A new bridge able to accommodate two lanes of traffic will be constructed. The replacement structure will consist of a two-span composite pre-stressed concrete spread box beam bridge.

### 3.6 Results of the Application of Definition of Effect and Criteria of Adverse Effect

The Iron Bridge was determined eligible for listing in the National Register in 2006 (Appendix A). The Iron Bridge will be removed and replaced as part of the proposed project.

**Table 2. Results of the Application of Definition of Effect for the Iron Bridge.**

<b>Definition of Effect</b>	<b>Evaluation</b>
An <i>Effect</i> may occur when there is alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register as defined in Section 800.16(i).	The National Register-eligible Iron Bridge will be replaced as part of this proposed project.
<b>Finding:</b>	The proposed action will have an <i>Effect</i> on the Iron Bridge, resulting in a finding of <i>Historic Properties Affected</i> . Pursuant to 36 CFR § 800.11(e), the Criteria of Adverse Effect must be applied.

The Iron Bridge over Middle Creek will be removed entirely and replaced with a new box beam bridge, resulting in an Adverse Effect as detailed below in Table 3. No features of the bridge will be retained *in situ*.

**Table 3. Results of the Application of Criteria of Adverse Effect for the Iron Bridge.**

<p>An <i>Adverse Effect</i> is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property’s eligibility for the National Register of Historic Places. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative.</p>	
<b>Criteria of Adverse Effect</b>	<b>Evaluation</b>
<p><i>Adverse Effects</i> on historic properties include but may not be limited to:</p>	
(i) Physical destruction of or damage to all or part of the property;	The project will involve the removal of the existing structure and abutments, resulting in a loss of integrity of materials, design, and workmanship.
(ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision for handicapped access that is not consistent with the Secretary’s Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines;	The project will involve the removal and replacement of the existing iron Pratt through-truss bridge with a new two- span box beam bridge. Therefore, the proposed work will not be consistent with the Secretary’s standards.
(iii) Removal of the property from its historic location;	The project will involve the removal of the existing bridge from its historic location.
(iv) Change of the character of the property’s use or of physical features within the property’s setting that contribute to its historic significance;	The historic truss bridge will no longer serve traffic over Middle Creek, resulting in a loss of integrity of association.
(v) Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property’s significant historic features;	The project will remove the historic bridge and replace it with a modern structure, resulting in a loss of integrity of feeling and setting.
(vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and	The project will result in the removal of the historic structure. A marketing plan to sell and relocate the bridge may be prepared, but if the structure is not reused it could fall into a state of disrepair and eventually be dismantled for recycling.
(vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property’s historic significance.	The project could result in the transfer, lease, or sale of this property, although it is not under federal ownership at this time. A marketing plan to sell the bridge may be a component of mitigation efforts for this project.
<p><b>Finding:</b> The proposed project will result in an <i>Adverse Effect</i> on the Iron Bridge as the superstructure and the substructure will be removed and replaced with modern elements.</p>	

### 3.7 Potential Mitigation Measures

Mitigation measures will be undertaken to alleviate the proposed project impact on the National Register-eligible Iron Bridge. Mitigation will be developed by PennDOT in conjunction with consulting parties. Potential mitigation measures include a bridge marketing program for the sale and relocation of the bridge so that it could be reused for pedestrian access, materials testing, or a public outreach component such as brochures or interpretative signage.

## 4.0 SUMMARY

#### **4.0 SUMMARY**

This Determination of Effect report, which was prepared for PennDOT, describes the evaluation of the potential impacts of the S.R. 3007, Section 009 (Iron Bridge Road) over Middle Creek Bridge Project to historic resources that are listed in or determined eligible for listing in the National Register. The project is located in Franklin Township, Snyder County, Pennsylvania. The proposed improvements involve the National Register-eligible Iron Bridge (Appendix A). The proposed project will involve the removal and replacement of the bridge in order to provide a safe crossing of Middle Creek that would meet the needs of the local community in accordance with current engineering design standards.

Application of the Definition of Effect and Criteria of Adverse Effect has resulted in a finding that the proposed project will have an Adverse Effect on the Iron Bridge.

No archaeological investigations have been completed to date, nor are they expected in the future due to the nature of the proposed work and project limits.

## REFERENCES

## REFERENCES

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2007 *AASHTO Guidelines for Historic Bridge Rehabilitation and Replacement*. Lichtenstein Consulting Engineers, Paramus, New Jersey.

Urban Engineers, Inc.

2010 *Alternatives Analysis for S.R. 3007, Section 009 Bridge Over Middle Creek, Franklin Township, Snyder County, Pennsylvania*. May 2010. Urban Engineers, Inc., Philadelphia, Pennsylvania.

Weeks, Kay D. and Anne E. Grimmer

1995 *The Secretary of the Interior's Standards for the Treatment of Historic Properties*. U.S. Department of the Interior, National Park Service, Heritage Preservation Services, Washington, D.C.

**APPENDIX A:  
PREVIOUS DOCUMENTATION**

PENNSYLVANIA HISTORIC BRIDGE INVENTORY & EVALUATION

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BMS #: 54300700100215      DIST: 3      UTM:  
OLD BMS #:      CTY: SNYDER      OWNER: C PADOT  
MUNICIPALITY: FRANKLIN      LOCATION: 2 MI WEST MIDDLEBURG  
FACILITY CARRIED: SR 3007  
NAME/ FEATURE INTERSECTED: SR 3007 OVER MIDDLE CREEK  
TYPE: THRU TRUSS      DESIGN: PRATT  
MATERIAL: METAL  
#SPANS: 1      LENGTH: 115 (35.1 m)      WIDTH: 15.8 (4.8 m)  
YR BUILT: 1890CA      ALTERATION: 1995      SOURCE: STYLE/HISTORY  
DESIGNER/BUILDER: VARIETY IRON WORKS (CLEVELAND, OH)

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**SETTING/CONTEXT:**

The bridge carries 1 lane of a 2 lane road over a stream in rural setting with active farms and scattered modern houses. At the SE quadrant is an altered mid-20th century house. The other immediate quadrants are woods or fields. The setting does not appear to have the cohesiveness or integrity of a historic district.

**CURRENT NATIONAL REGISTER STATUS:** Previously Not Evaluated

**SURVEY NR RECOMMENDATION:** Eligible

**SUMMARY:**

The 1 span, 115'-long, pin-connected Pratt thru truss bridge built ca. 1890 is supported on stone abutments with concrete bridge seats added (1995). The lightly built trusses have lower chords and diagonals of eye bars, and upper chords, end posts, and verticals of channels with lacing. The bridge has lattice portal bracing and built-up upper laterals with an inverted fishbelly shape. The floorbeams, stringers and deck were replaced in 1995, but the floorbeams were reconnected to the trusses in the original manner with U-shaped hangers from the lower chord pins. The end panel lower chord members were post tensioned with rods placed to the inside of the eye bars. The bridge is among the early examples of its type/design in the region. The 1995 deck replacement was sensitive to the original fabric/appearance. The Variety Iron Works, a Cleveland, Ohio, fabricator, built bridges from ca. 1888-1907, but was most active in the 1890s. The bridge's date of construction is undocumented by available records but ca. 1890 is appropriate based on company history and style. The bridge is a historically and technologically significant example of its type/design with distinctive details like the lattice web end posts and the fact that is a rare instate example of the fabricator.

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**PHOTO INDEX (DATE):** 2022:25-30 (3/00)

**REVIEWED BY/ DATE:** JPH (5/00)

54 3007 0010 0215

**Sources:** Condit, Carl. *American Building Art 19th Century*. New York: Oxford University Press, 1960.

Darnell, Victor. *Directory of American Bridge Building Companies, 1840-1901*. Washington, D.C.: Society for Industrial Archeology, 1984.

PADOT. Dist. 3-0. Bridge Inspection File.

Simmons, David. Ohio Historical Society. *Historical Notes on the Variety Iron Works*.

**Physical Description:** The 1 span, 115'-long, pin-connected Pratt thru truss bridge is supported on fieldstone abutments with concrete bridge seats added (1995). The bearings were also rehabilitated at that time. The lightly built trusses have lower chords and diagonals of eye bars, and upper chords, end posts, and verticals of channels with lacing or lattice. The bridge has lattice portal bracing and built-up upper laterals with an inverted fishbelly shape. The floorbeams, stringers and deck were replaced in 1995, but the floorbeams were reconnected to the trusses in the original manner with U-shaped hangers from the lower chord pins. The end panel lower chord members were post tensioned with rods placed to the inside of the eye bars. Earlier railings have been replaced by W-beam guide rail railings set to the inside of the trusses (1995). Stone parapets are set atop the flared wingwalls. A plaque indicates the fabricator, "Variety Iron Works, Bridge Builders, Cleveland, Ohio," but does not provide a date of construction.

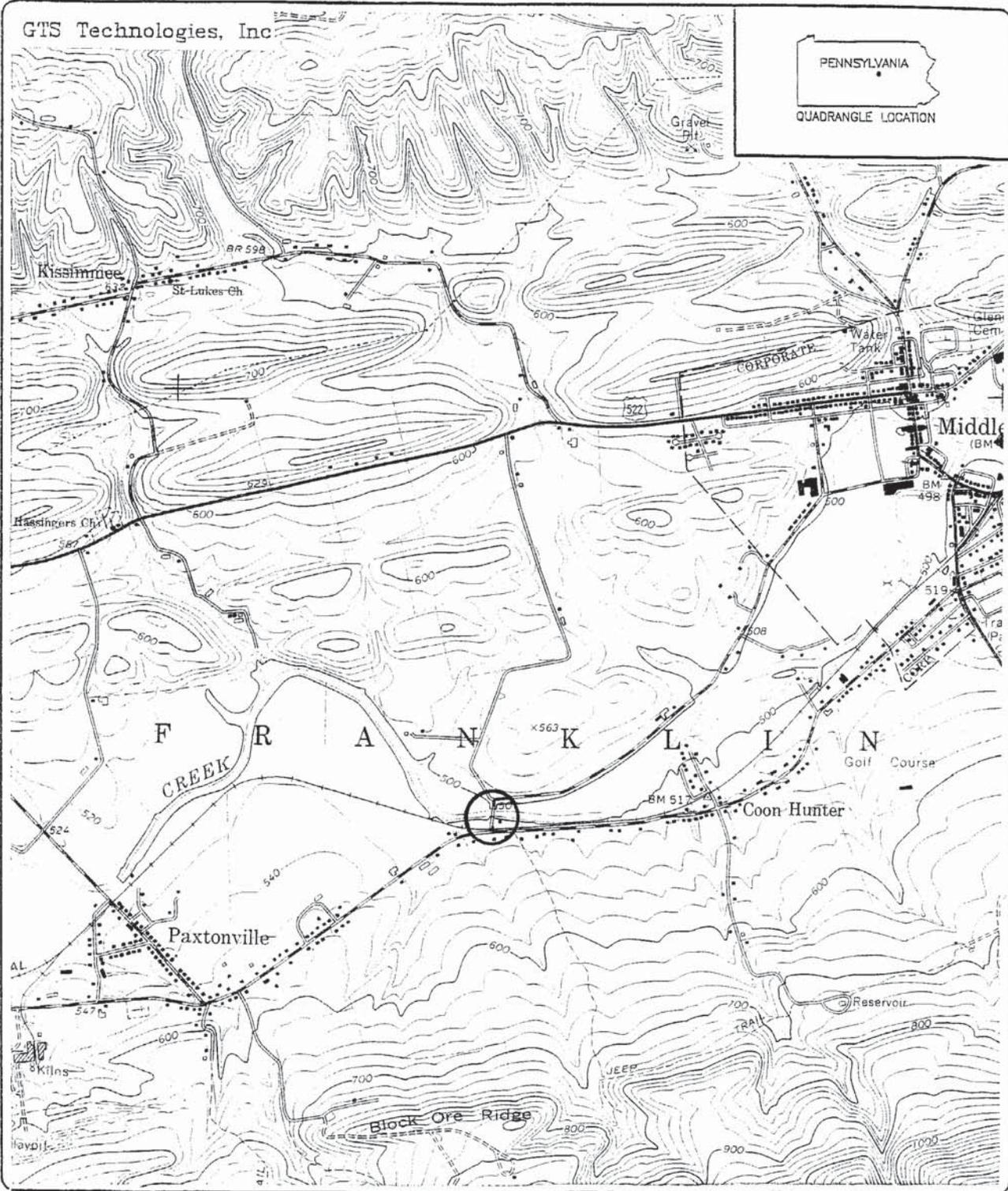
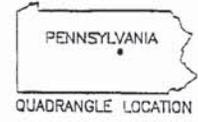
**Historical and Technological Significance:** The ca. 1890 pin-connected Pratt thru truss bridge is historically and technologically significant as among the early surviving examples of its type/design with distinctive details in the region by a fabricator that is not heavily represented by other extant examples in Pennsylvania (criterion C). The lattice web detail of the end posts is not common. It is an early detail. The 1995 deck replacement was sensitive to the original fabric/appearance. The bridge's date of construction is undocumented by available records but ca. 1890 is appropriate based on company history and style. The Variety Iron Works of Cleveland, Ohio, was established ca. 1867 as a manufacturer of boilers, and plate and sheet iron. The firm branched off into metal truss bridges ca. 1888 when it added a bridge fabrication shop to its works. Most identified surviving examples of the company's work in Ohio are from the early 1890s. Variety Iron Works was a relatively minor fabricator in comparison to larger competitors based in Ohio but it did carve out a regional niche in the highway bridge market operating into at least the first decade of the 20th century. This example of the firm's work has mostly standard period details, although it is lightly built and the inverted fishbelly shape upper laterals are not common.

Pin-connected metal truss bridges were developed and extensively used by the

railroads beginning about 1850. By the mid 1870s, a variety of cast and wrought iron truss bridges developed by the railroads were being marketed for highway applications, but by 1890, the Pratt truss emerged as the most popular of the pin-connected designs because of its simplicity of design and economy of fabrication and erection, especially the use of eye bars to facilitate field connections. The design was patented in 1844 and it has vertical members, originally composed of wood, in compression and diagonal members in tension. Later examples are composed of members made up of standard shapes like rolled plate, angle, or channels and did not require expensive custom castings for the connection nodes of the earliest examples. Most highway metal truss bridges built before 1895 were the Pratt or variations of the Pratt design. Advances in metallurgy and improvements in field pneumatic riveting led to the transition from pinned to riveted (rigid) connections by the late 1890s. Riveted connection Pratt truss bridges were built into the 20th century. There are over 375 Pratt truss bridges in the state dating from 1870 through 1955.

**Boundary Description and Justification:** The bridge is evaluated individually significant. The boundary is limited to the superstructure and substructure of the bridge.

GTS Technologies, Inc

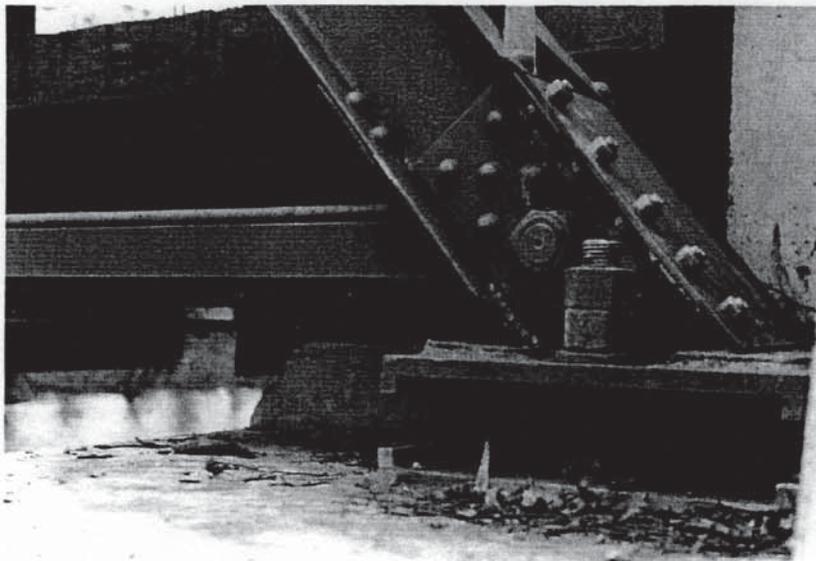


SNYDER COUNTY  
BMS# 54 3007 0010 0215  
MIDDLEBURG U.S.G.S. PA QUADRANGLE

54 3007 0010 0215



2022:27. Underneath view.

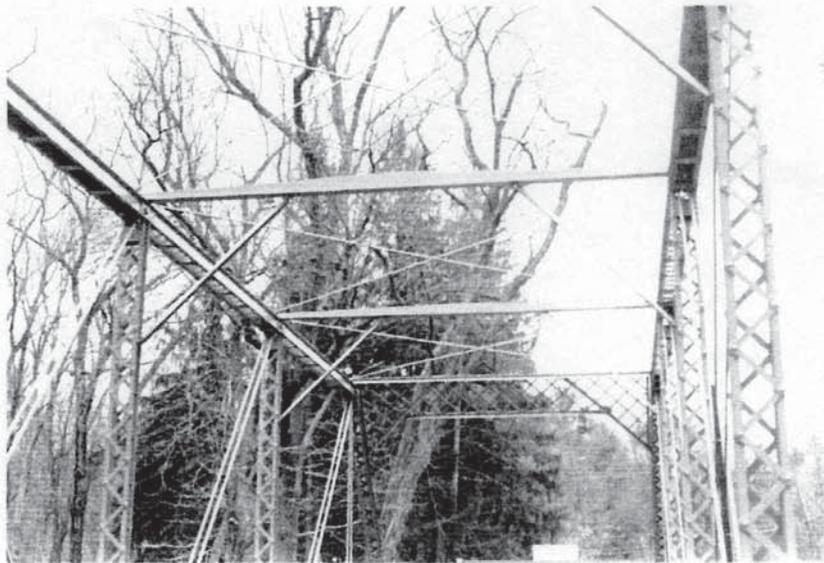


2022:28. Bearing detail and post tensioning of lower chord at end panel.

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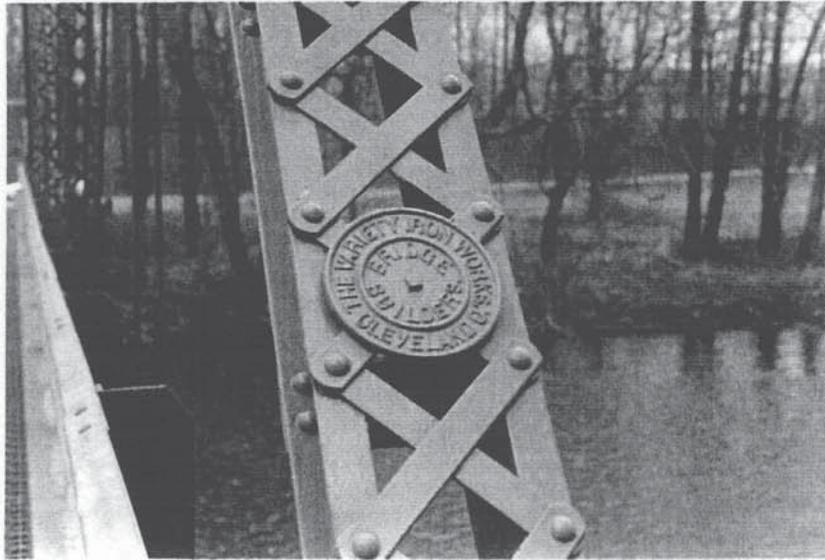


2022:25. Through view looking south.



2022:26. Truss detail. Note inverted fishbelly shape of upper lateral strut.

54 3007 0010 0215



2022:29. Plaque and end post detail.



2022:30. Elevation (best view possible).

**APPENDIX B:  
ALTERNATIVES ANALYSIS**



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**ALTERNATIVES ANALYSIS  
FOR  
SR 3007 SECTION 009  
BRIDGE OVER MIDDLE CREEK**

**FRANKLIN TOWNSHIP  
SNYDER COUNTY, PENNSYLVANIA**

**Prepared For:**



**Pennsylvania Department of Transportation  
District 3-0**

**May, 2010**

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## **APPENDICES**

- A. Maps:**
  - **Location Map**
  - **Flood Insurance Rate Map – Panel 0120 D**
- B. Photographs**
- C. Minutes from Franklin Township Public Meeting Held on 3/30/10**
- D. Cost Comparison of Alternatives**

# **ALTERNATIVES ANALYSIS FOR THE SR 3007 BRIDGE OVER MIDDLE CREEK**

## **BACKGROUND**

The Pennsylvania Department of Transportation owns the SR 3007 Bridge over Middle Creek, in Franklin Township, Snyder County, Pennsylvania. The bridge is locally known as *The Iron Bridge*. The bridge is listed in PennDOT's 2009-2020 Twelve Year Program. Though still in use, the bridge's width, height and weight restrictions limit the types of traffic that can travel across the bridge.

The Iron Bridge spans Middle Creek approximately 1 mile west of Middleburg Borough. The existing structure is a simple span truss bridge with a steel grate deck. The bridge is supported by stone and mortar abutments on each approach. The bridge has an approximate out-to-out width of 15'-8" with a 13'-10" clear roadway and a 11'-3" height restriction. The clear span between abutments is approximately 115'. The bridge provides an average under clearance of approximately 11.5' above the water surface.

The current average daily traffic (ADT) on this road is 412 vehicles (2010 estimate). The 2008 estimated ADT was 234 vehicles. The 2008 estimate was a projection from a 2002 traffic count on SR 3007. The traffic counter location during this count was located north of the SR 3007/Furnace Road (T-429) intersection thus not reflecting an accurate count of vehicles utilizing the bridge. The revised 2010 estimate of 412 vehicles is based on a traffic count obtained immediately adjacent to the bridge and is substantiated by previous counts in 1994 (418 vehicles) and 1989 (367 vehicles), both of which were taken adjacent to the bridge.

The bridge was posted for a weight limit of 9 tons in 1971. After a rehabilitation in 1996, the posting was raised to 12 tons. In 2008, the weight restriction was lowered to its current posting of 9 tons. Trucks make up 3% of the vehicles however the weight restriction on the bridge constrains the number of trucks able to utilize the bridge. The posted speed limit is 35 miles per hour. There have been no recorded accidents at the location of this bridge within the past 6 years however PennDOT maintenance forces noted that they routinely have to replace the 11'-3" clearance bar which serves to protect the truss from vehicles taller than the allowable height clearance indicating that the posted height restriction is being ignored.

The bridge last underwent an extensive rehabilitation in 1996. Prior to that, the bridge underwent an extensive rehabilitation in 1961. The bridge's most recent inspection report from 2008 indicated that it was necessary to lower the allowable load posting from 12 to 9 tons and suggested that a rehabilitation or replacement is imminently necessary. This is evidence that the required maintenance of this bridge is accelerating. The funding for this bridge is currently being provided through PennDOT's 2009-2020 Twelve Year Program, with 80% being federal funds. This structure has been rated as Structurally Deficient and Functionally Obsolete with a Sufficiency Rating of 21.8 where a rating of 0 is totally deficient and 100 is perfect. The rating report can be accessed at: [ftp://ftp.state.pa.us/public/pdf/InfoBridge/A1\\_STATE.xls](ftp://ftp.state.pa.us/public/pdf/InfoBridge/A1_STATE.xls).

The project area is a rural agricultural setting. Middle Creek is located in the Susquehanna River Watershed and flows west to east underneath the bridge. Iron Bridge Road (S.R. 3007) comes to a T-intersection with S.R. 3008 (Paxtonville Road) approximately 210 feet south of the bridge. Approximately 60 feet north of the bridge, Iron Bridge Road turns to the northwest and T-429 (Furnace Road) intersects with Iron Bridge Road from the east, paralleling Middle Creek. North of this intersection, in the northeast quadrant, between Iron Bridge Road and Furnace Road, is a small wooded area. Middle Creek is not listed as a water trail by the Pennsylvania Fish and Boat Commission (PFBC), but is listed as ‘navigable by law’, indicating that the landowners do not own the stream channel.

The area around the bridge is located within a FEMA Flood Insurance detailed area of study within the 100-year floodplain of Middle Creek. It is anticipated that replacement of this bridge will not have a significant encroachment on the floodplain. Replacement should not have a significant adverse impact on natural and beneficial floodplain values and will not support base floodplain development. Construction of a replacement bridge will not involve the interruption or termination of a transportation facility needed for emergency vehicles or providing a community’s only evacuation route, however emergency responders have noted that although emergency vehicles cannot use the existing bridge, the emergency responders themselves do use the bridge when reporting to an emergency situation.

The following maps are provided in **Appendix A** for background information:

- Project Location Map
- FEMA Flood Insurance Rate Map – Panel 0120 D

## SUMMARY OF PUBLIC MEETING WITH FRANKLIN TOWNSHIP

On March 30, 2010 a public meeting was held with Franklin Township officials, residents and EMS providers to discuss what the community’s needs are at this location. Approximately 60 people attended this meeting. The population of Franklin Township is about 2,200. PennDOT’s obligations under Section 106 of the National Historic Preservation Act were discussed. Three alternatives were presented to the community and the effects of each were discussed. These included the following:

1. Removing the bridge
2. Rehabilitating the bridge
3. Replacing the bridge

Following an open discussion about the project, questionnaires were provided to the attendees which solicited the community’s input regarding the bridge. The questionnaire asked specifically what would meet the community’s needs at this location. The following summarizes the results of the questionnaire:

1. What interest do you represent?

- 30 - Residential
- 1 - Business
- 4 - Emergency Services
- 3 - Government
- 2 - Agricultural Use
- 1 - School District
- 1 - Traveling Convenience

2. How often do you use the existing Iron Bridge?

- 0 - Never
- 0 - Rarely
- 17 - Weekly
- 18 - Daily

3. Would removing the bridge (eliminating the stream crossing) create an inconvenience for you?

- 35 - Yes
- 0 - No

4. How often would you use the existing Iron Bridge if rehabilitated to carry 12 tons?

- 0 - Never
- 2 - Rarely
- 15 - Weekly
- 16 - Daily

5. Would you benefit from the weight limit on the existing bridge being increased or removed?

- 11 - Yes
- 23 - No

6. What minimum weight limit would be needed to provide that benefit?

- 1 - 24 Ton
- 3 - 25 Ton
- 1 - 30 Ton
- 1 - 36 Ton
- 4 - 40 Ton

7. Would you benefit from a new bridge that is wider and does not have a height restriction?

- 22 - Yes
- 11 - No

8. What minimum width would be needed to provide that benefit?

- 1 - 26 ft
- 10 -24 ft
- 1 - 28 ft
- 1 - 20 ft
- 2- 36 ft

9. How often would you use the bridge if it were replaced?

- 0 - Never
- 0 – Rarely
- 14 - Weekly
- 18 - Daily

10. PennDOT has identified three potential alternatives. Which alternative do you prefer?

- 0 (0%) - Removal (No stream crossing)
- 6 (17%) - Rehabilitation (with weight/height restriction)
- 25 (72%) – Replacement
- 0 (0%) - No Preference
- 4 (11%) - Either Rehab/Replace

## DISCUSSION OF RESPONSES TO COMMUNITY’S NEEDS

11 of the 35 responses to the question regarding the weight restriction said that they would benefit from removing the weight restriction. Local farmers in the area indicated at the meeting that they are unable to move much of their farming equipment over the bridge because of the weight restrictions.

22 of the 35 responses to the question regarding providing a wider bridge with no height restriction indicated that they would benefit. Again several farmers indicated that they are not able to utilize the bridge to move much of their farming equipment due to the bridge’s weight, height and width restrictions. Several responses from local residents noted that they do not feel safe crossing this bridge and avoid using it because of its width restrictions.

Of the 3 options discussed, 25 of the 35 responses indicated that they would prefer that the bridge be replaced. 6 preferred rehabilitation while 4 favored either rehabilitation or replacement. No responders favored removing the bridge.

Representatives of the Midd-West School District indicated at the meeting that although the school district’s own buses do not use the bridge, another bus company – a contracted vendor of the school district – does use the bridge.

Representatives from the local EMS Services noted that although fire companies have adjusted to not using the existing bridge, EMS responders travel across the bridge to get

to the firehouse or locations of fires, etc, and if EMS equipment could travel across a new bridge it would reduce response times.

The results of this public meeting emphasized that the restrictions of this bridge, particularly the weight, height and width restrictions, do indeed impact travel and commerce in this agricultural community. Additionally, responses from the school district and EMS services indicated that they would benefit from a wider facility that does not have height or weight restrictions.

## PROJECT NEED

PennDOT seeks to provide the traveling public with safe, prudent and cost effective transportation facilities. PennDOT must also consider the effects of any federally assisted undertaking on historically significant buildings, structures, districts, objects, or sites in accordance with the National Historic Preservation Act of 1966. Considering all aspects of this project location and sound engineering judgment, the following Project Need has been established:

### **Provide a structurally safe facility that meets the transportation needs of the surrounding community.**

In establishing this need, much consideration was drawn from input provided by the local community. Many members of this community have noted that the 9 ton weight restriction, 11'-3" height restriction and 13'-10" roadway width restriction creates a lack of flexibility for travel and does not meet their transportation needs. At a public meeting held in March, 2010 to discuss the bridge, several attendees expressed a desire for a facility which could accommodate emergency vehicles, school buses and farming equipment.

Several farmers have noted that the existing bridge's height, weight and width restrictions prevent them from utilizing the bridge to move farming equipment. PennDOT maintenance forces noted that they routinely have to replace the 11'-3" clearance bar which serves to protect the truss from vehicles taller than the allowable height clearance indicating that the posted height restriction - and likely the posted weight restriction - are being ignored. The bridge's sufficiency rating of 21.8 indicates that the primary structural elements of the bridge are in a serious deteriorated condition. Several responses from local residents at the public meeting noted that they do not feel safe crossing this bridge and avoid using it because of its height and width restrictions.

A facility which could accommodate emergency vehicles at this location would reduce response times for emergency service providers in the community. The nearest crossing of Middle Creek for a vehicle whose weight exceeds the posted limit is in the village of Paxtonville. The circuitous route to get from the Furnace Road/Paxtonville Road intersection to the Iron Bridge/Furnace Road intersection is 5.4 miles. These alternate crossing locations are shown on the Project Location Map in Appendix A.

## STUDY OVERVIEW

The Iron Bridge is considered ELIGIBLE for the National Register of Historic Places as it is a historically and technologically significant example of its type and design and a rare instate example of a bridge by The Variety Iron Works of Cleveland, Ohio. The Iron Bridge is an early example of a pin-connected Pratt through-truss and has distinctive details such as the lattice web end posts that are typical of Variety Iron Works bridges.

The National Historic Preservation Act of 1966 and Section 4(f) of the US Department of Transportation Act of 1966 specify processes considering preservation or replacement of historic bridges.

This report has been prepared to outline the alternatives considered for improvements at the Iron Bridge.

The alternatives to be considered are as follows:

1. Do nothing
2. Remove the existing bridge and not provide a crossing at this location
3. Preserve (rehabilitate) the existing bridge
4. Remove the existing bridge and build a new bridge in the same location

*This study was conducted using the AASHTO Guidelines for Historic Bridge Rehabilitation and Replacement, March, 2007 (by Lichtenstein Consulting Engineers)*

## IRON BRIDGE DESCRIPTION

The existing structure is a simple span metal pinned Pratt through truss bridge with a steel grate deck. The bridge is supported by stone and mortar abutments on each approach. The bridge has an approximate out-to-out width of 15'-8" with a 13'-10" clear roadway and a 11'-3" height restriction. The clear span between abutments is approximately 115'. The bridge provides an average under clearance of approximately 11.5' above the water surface. This structure is currently rated for 9 tons.

## HISTORIC ASPECT OF THE IRON BRIDGE

The Iron Bridge is considered ELIGIBLE for the National Register of Historic Places as it is a historically and technologically significant example of its type and design. The Iron Bridge is an early example of a pin-connected Pratt through truss and has distinctive details such as the lattice web end posts that are typical of Variety Iron Works bridges.

Built by The Variety Iron Works of Cleveland, Ohio, the structure located on SR 3007 exhibits several distinctive features that make it unique when compared to other metal pinned Pratt through-truss bridges built by Variety Iron Works. Examples found at other

locations (Cambria County, Pennsylvania & Clinton County, Michigan), exhibit a top chord that is a built-up box beam, with lattice acting as the top wall, channels along the side walls and plates (providing lateral support) spaced at a regular interval along its bottom wall. In their end panels, the lattice is replaced by a solid plate. For SR 3007, lattice is present throughout the whole length of the span, including the end panels (See Figure 1). Evidence of the two structures mentioned above can be found on the website: [www.historicbridges.org](http://www.historicbridges.org).

Research has found that the two other examples mentioned above were erected in the 1890's. PennDOT's records indicate that the structure on SR 3007 was constructed in 1932, but the design and scant records for Variety Iron Works suggests that circa 1890 is more likely. It is likely that the 1932 date is when the record was compiled on this bridge. Rehabilitations in 1961 and 1996 have resulted in numerous new steel elements being incorporated into the structure.

The structure supporting SR 3007 over Middle Creek is in better visual condition than the other two bridges mentioned above. Although it may look structurally adequate, the latest bridge inspection report has noted that the bridge is in serious structural condition which will be explained in detail below.



**Figure 1: SR 3007, Top Chord (Lattice) Located in End Panel**

## STRUCTURAL AND FUNCTIONAL CONSIDERATIONS

The following items are judged based on the NBIS (National Bridge Inspection Standards). Ratings are generally on a scale of 0 to 9 (9 = excellent or new condition).

### Structure Condition

Superstructure: NBIS Rating = 4 (Strengthen or Replace) Continued deterioration of verticals connection at lower pin. Floor beams pulled toward abutments during loop rod replacement. Welds to top cover plates under stringers appear to have random cracks. Lower pin plates have areas of 100 percent section loss. Lower truss chords have deep pitting and section loss along outer edges of web cover plate surrounding lower pin connection. A 2 ½" long hole is present in bottom end chord adjacent to cover plate around lower pin. Evidence of posting abuse.

Substructure: NBIS Rating = 6 (Satisfactory) Structural Elements show minor deterioration.

Paint system: NBIS Rating = 2 (Critical) Heavy spot rust and section loss of web adjacent cover plates. Near left end has 2 ½" hole in bottom chord (see Superstructure).

### Bridge and Roadway Geometry

Deck geometry appraisal: NBIS Rating = 2 (Intolerable) – Due to the bridge's width and vertical clearance. Structure mounted. Travel lane 14.0' wide.

Approach alignment appraisal: NBIS Rating = 4 (Minimum Tolerable) Vertical and horizontal curve along far approach. Reduced sight distance & considerable speed reduction.

Load Carrying Capacity: This structure is currently rated for 9 tons.

### Safety Features

There are no safety features on the approach to the bridge. There are low stone masonry walls on each approach. Adding a current standard system would reduce the curb-to-curb roadway width on the bridge deck.

In summary, an approach guide rail system and upgraded bridge railing system will need to be provided if the bridge will carry vehicular traffic.

## **Waterway Adequacy**

The existing bridge is severely perched due to existing vertical geometry at the project site. As typical in perched bridge scenarios, the approaches overtop before the flow impacts the low chord of the bridge. The left approach begins overtopping at approximately the 5-year event and is overtopped by 1' during the 10-year event. The right approach is approximately 3.5' higher in elevation than the left approach and does not begin to overtop until the 100-year event. The 50-year event is the last event that passes through the existing structure without coming in contact with the low chord of the bridge. The 100-year event comes in contact with the superstructure of the bridge at a water surface elevation of 503.78' NAVD88. The hydraulic opening of the existing structure is 1,264 SF based on a face-to-face span of 110' and an average underclearance of 11.5' (13.25' max.). The floodplain width immediately upstream of the bridge is 450' for the 100-year event. Figure 2 shows the stream elevations at the 2 through 500 year flood events at the Iron Bridge.

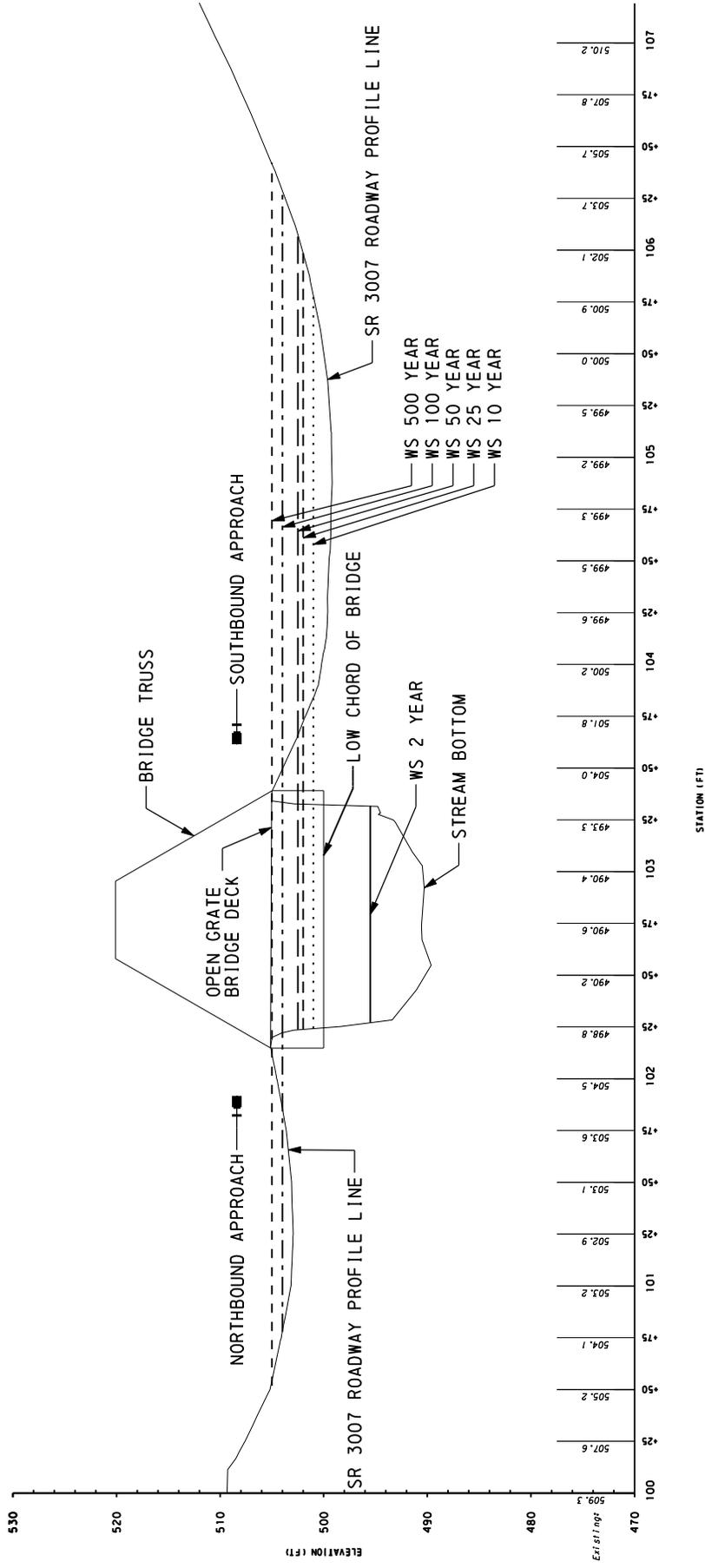


FIGURE 2  
SR 3007 OVER MIDDLE CREEK FLOOD ELEVATIONS

## HISTORICAL AND ENVIRONMENTAL CONSIDERATIONS

The bridge is known to be eligible for the historic register. There is no known historic district associated with the bridge or the site in general. The National Register boundary includes only the substructure and superstructure of the bridge.

Wetlands were delineated and are located in the northwest and northeast quadrants of the bridge. Any new structure here, depending on the location, would have a small impact to the adjacent wetlands.

Discussions with the Chairman of the Board of Supervisors have noted that no person or organization in Franklin Township has expressed interest in preserving this bridge. In March, 2010 a public meeting was held with Franklin Township to discuss options for this location and to determine the community's needs here.

## DESIGN CONSIDERATIONS (CRITERIA)

### General

- Functional Classification System: Rural Local Road
- Rural Design Criteria (English)
- Terrain: Rolling
- Design Speed: 35 mph – DM-2 Page 1-10

### Traffic Data

- Current ADT (2010): 412
- Future ADT (2030): 612
- ADTT: 12

Element	Existing		Design Criteria (35 mph)		Notes
	Bridge	Road	Bridge	Road	
Pavement Width	N/A	18 feet	N/A	18 feet	Ref. DM-2, pg. 1-28
Shoulder Width	N/A	0 feet*	N/A	2 feet	Ref. DM-2, pg. 1-28
Cross slopes	0% on bridge*		2% min- 8% max		Ref. DM-2, pg. 1-28
Vertical Grades	9.8%		0.5% min. and 10% max.		Ref. DM-2, pg. 1-28
Horizontal-rad.	Tangent	Tangent	Rmin= 465 feet		AASHTO Green Book Ex. 3-15
SSD/HLSD	145 feet*		305 feet		Ref. DM-2, pg. 1-28
Bridge Widths	13'-10'' *	N/A	***24 feet	N/A	Ref. DM-2, pg. 1-28
Bridge Capacity	9 tons**	N/A	PHL-93	N/A	Ref. DM-2, pg. 1-36
Vertical Clearance	11'-3''*	N/A	14.5'	N/A	AASHTO Green Book, pg. 763

### Notes:

- The items marked as \* indicate the existing feature does not meet current criteria.
- \*\*Less than legal loads (36 tons)
- \*\*\* This is based on using 3R Bridge Width Criteria Documentation
- The bridge widths shown are curb to curb or rail to rail. Only a new bridge is required to carry the PHL-93 loading. A rehabilitated bridge to remain in place may have a reduced capacity to HS-15.

## CONSIDERATION OF ALTERNATIVES

AASHTO's Guidelines for Historic Bridge Rehabilitation and Replacement provides a decision making process to follow in deciding when a bridge can be made adequate and when it cannot. Step 1 of this process is to understand what factors about the bridge makes it historic. The Iron Bridge is considered eligible for the National Register of Historic Places because it is an early example of a pin-connected Pratt through truss and has distinctive details such as lattice web end posts. The bridge may be considered of high historic significance as it is a rare early example of this particular type of bridge. It is not associated with a historic district and little public interest has been expressed concerning preservation of the bridge.

Step 2 of this process involves applying structural and functional considerations – how to balance function with historic and environmental issues. Step 3 addresses any historical and environmental considerations not addressed in Step 2. Step 4 of this process involves applying the decision-making thresholds and based on the considerations evaluated in Steps 2 and 3, helps to establish and support a decision to determine when rehabilitation of a historic bridge is feasible and when it is not. Steps 2, 3 and 4 of this decision-making process will be discussed after the following evaluation of the considered alternatives.

### **Alternative 1: Do nothing**

This option is not recommended for further consideration since the structure poses a threat to life and property. Without attention, the bridge will continue to deteriorate and will eventually fail. Failure may cause property damage from local flooding or injury to persons on or near the bridge. Without attention, this bridge will eventually need to be closed and would not provide for a safe crossing of Middle Creek at this location. Without a viable creek crossing in this area, travel and commerce in the community would be impacted. Emergency responders have indicated that although emergency vehicles cannot utilize the bridge, many of their volunteer members use it when responding to emergencies. School buses are not permitted to use the bridge (although some do) which encumbers the busing of schoolchildren in the area. Local farmers have noted that they cannot utilize the bridge to accommodate their modern farming equipment.

This alternative DOES NOT meet the Project Need and has been dismissed from further study.

### **Alternative 2: Remove the existing bridge and not provide a crossing at this location.**

This option would consist of removing the bridge and eliminating the crossing of Middle Creek at this location. Removing the bridge would not meet the Project's Need to provide a safe transportation facility at this location. 35 questionnaires were returned with input from attendees at the March 30, 2010 public meeting. None indicated that removing the bridge was their preferred alternative.

This alternative DOES NOT meet the Project Need and has been dismissed from further study.

### **Alternative 3: Preserve (rehabilitate) the existing bridge**

**The cost and scale of the rehabilitation would depend on what posted weight restriction would be desired at this location.** Rehabilitating the existing bridge for safe utilization by passenger vehicles would essentially maintain the status quo for the bridge. In following *AASHTO'S Guidelines for Historic Bridge Rehabilitation and Replacement's Decision Making Process*, this bridge would be classified in Group II as the load carrying capacity would be adequate for passenger vehicles. Based on this grouping, the bridge would have rehabilitation potential. In addition, maintenance of the bridge will have to be performed on a regular basis. With a NBI rating on the superstructure of 4, the truss will require replacement of several structural members. Rehabilitation entails replacing these members with the truss being supported by a shoring system designed to remove all dead load from the truss while these repairs are being made. To maintain the historic value, areas of the truss with section loss and deterioration should be replaced in-kind which involves fabricating identical structural members. The rehabilitation would also consist of replacing the stringers, floor beams and deck, with a complete painting of the superstructure. The cost associated with this rehabilitation is \$1,000,000. This cost does not include any future maintenance costs associated with maintaining the posted live load capability. It is anticipated that future rehabilitation work will be necessary in order to maintain the bridge's NBI rating. After the rehabilitation, the bridge's posted weight restriction could be improved to 15 tons, however 10 responders to the questionnaire provided at the public meeting indicated that a posting less than 24 tons would not meet their needs.

Rehabilitating the existing bridge for all legal vehicles would consist of strengthening the existing truss which would entail retrofitting, or augmenting the existing structure with additional elements. In following *AASHTO'S Guidelines for Historic Bridge Rehabilitation and Replacement*, this bridge would be classified in Group VI as the load carrying capacity, superstructure/substructure condition and geometry would be inadequate. As noted in these guidelines, bridges in this group are severely deteriorated and deficient. When a bridge is deficient in all categories and those deficiencies cannot be corrected in a feasible and prudent manner, it is very unlikely to have rehabilitation potential. The problems may be too great for keeping it on-system. With a NBI rating on the superstructure of 4, the bridge is unlikely to have rehabilitation potential. Even with the rehabilitation work described here, it is very unlikely that the load carrying capability could be raised to allow for all vehicles. Currently the bridge is posted for 9 tons. In order for the bridge to carry all legal vehicles, the structure will need to support 36 tons. Approaches to addressing this deficiency (lighter deck, adding high strength material, replacing deteriorated material in-kind) will not be enough to reach the maximum legal load of 36 tons.

Alternatively, it would be possible to superimpose a new structure around/through the existing truss. This new structure will handle all the current live loads while relieving the

existing truss of any live load carrying responsibility. A similar project took place in Lower Frederick Township, Montgomery County, PA. Completed in 1998, a new structure carrying Gerloff Road over Swamp Creek utilized a steel-tied arch around and through an existing wrought iron Phoenix Pratt truss originally constructed in 1888. Evidence of Gerloff Road mentioned above can be found on the website: [www.highsteel.com/project\\_gallery/bridges/GerloffRoad.cfm](http://www.highsteel.com/project_gallery/bridges/GerloffRoad.cfm). It is estimated that a retrofitted structure similar to this will cost approximately \$2,200,000. The Gerloff Road Bridge was used as an example in creating the estimate.

This alternative considers rehabilitating the structure however it only would address the bridge's weight restrictions and not its height and width restrictions. There is no rehabilitation that could eliminate the height and width restrictions of this bridge. Rehabilitating this structure to accommodate all legal loads would likely provide for the accommodation of most emergency vehicles and school buses. However, the height and width restrictions would prevent it from meeting the need to accommodate farming equipment and EMS vehicles currently restricted by their height and width. Further, several members of the community noted that they do not feel safe using this bridge because of its width restriction.

This alternative DOES NOT meet the Project Need.

#### **Alternative 4: Remove the existing bridge and build a new bridge in the same location.**

This alternative considers removing the existing bridge and replacing it with a new bridge at the same location. It meets the need to provide a safe crossing of Middle Creek for the community along Paxtonville Road, Furnace Road and Iron Bridge Road while providing a roadway and bridge that fits the site for modern traffic. It would meet the needs of all users including school buses, emergency vehicles, farming equipment, and local residences.

This alternative would provide a two-span, prestressed concrete spread box beam bridge. Each span would be 74' and the curb to curb roadway width would be 24' providing 10' lanes and 2' shoulders in each direction. There would be no height or width restrictions.

In summary:

The feedback provided from the public meeting held with Franklin Township indicated that the restrictions of this bridge, particularly with regard to weight, height and width, have been a hindrance to travel and commerce in this community. The school district and emergency services providers indicated that they would benefit from a wider facility that does not have height or weight restrictions.

This alternative would provide a structurally safe transportation facility that meets current engineering design standards. It would also provide a structure that can accommodate emergency vehicles, school buses, farming equipment and meets the transportation needs of the local community.

This alternative DOES meet the Project Need.

### Historical and Environmental Considerations of Each Alternative

AASHTO's Guidelines for Historic Bridge Rehabilitation and Replacement note several factors that should be considered when evaluating alternatives (Steps 2 and 3 of the decision-making process). These include the following:

1. Are there additional environmental constraints like wetlands, historic archaeological sites, takings, or other NEPA issues that must be considered? If so, do they affect the feasibility of particular methods to rehabilitate or replace the bridge?

*There are wetlands adjacent to the north bank of Middle Creek. Approximately 0.006 acres of wetlands would be temporarily disturbed during construction activities if the bridge were to be rehabilitated. Approximately 0.021 acres of wetlands would be temporarily disturbed during construction activities if the bridge were to be replaced. Approximately 33 square feet of wetlands would be permanently impacted if the bridge were to be replaced.*

*This is an agricultural community, several farmers have noted that the existing bridge cannot accommodate modern farming equipment.*

2. Does the required work to address deficiencies exceed what is generally considered to be prudent? This includes cost and other effects to non-4(f) resources like communities or natural resources.

*If the existing bridge were rehabilitated to meet legal loads, it would cost about \$1,000,000 more than a complete replacement and still would not meet the Project's Need and therefore cannot be considered prudent.*

3. Can the project goal be achieved without an adverse effect to historic properties?

*No. As the bridge itself is the only potential historic property, the goal of providing a facility that meets the Project's Need cannot be achieved without an adverse effect to the bridge.*

4. Is the SHPO placing too much emphasis on visual effect of proposed modifications at the expense of losing an opportunity to otherwise retain a historic bridge?

*There is no rehabilitation that could meet the Project's Need. The rehabilitation required to eliminate the bridge's posted weight restriction would compromise those elements that indeed make the bridge historic.*

5. With the understanding that safety cannot be compromised, is rehabilitation possible using *de minimis* impacts or a design exception?

***No. As noted in the discussion of alternatives, any rehabilitation work cannot be considered inconsequential. A Design Exception would not necessarily apply as the rehabilitation work would be related to maintaining the integrity of the existing structure. A full replacement would correct any deficient geometric aspects.***

6. Does the project meet the regulatory definition of adverse effect but still preserve what makes the bridge historic? In this instance it may be the feasible and prudent alternative even though it is determined to have an adverse effect.

***Depending on the scale of rehabilitation discussed in Alternative 3, the existing structure could be preserved however the bridge would look quite different once the work is completed and may well be considered to have an adverse effect to the historic nature of the bridge.***

7. Is required work so extensive that, while feasible, it is not prudent given the initial cost and effect on a historic bridge?

***Yes. In Alternative 3, depending on the scale of the rehabilitation work, it may be considered so extensive that it would not be deemed prudent given the initial cost and adverse effect to the bridge.***

8. Are the engineering conclusions well supported? Was avoiding or not using the historic bridge considered?

***Yes. The Project's Need was carefully considered in evaluating rehabilitation versus replacement of this bridge. A 'Do Nothing' alternative was considered as well. The rehabilitation being considered consists of either replacing structural members or constructing a new structure around and through the existing bridge.***

9. Can the project goal be achieved using minimally acceptable or tolerable design criteria?

***No. Members of the community in this agricultural district noted that the bridge cannot accommodate modern farming equipment and it impedes their travel and commerce. No rehabilitation alternative would meet the Project's Need.***

10. Can the roadway be reclassified to lower the definition of what is structurally and geometrically adequate?

***No. The roadway's classification of 'rural local' is PennDOT's lowest classification for a roadway.***

11. Is the project need and purpose statement appropriate to the setting? For example, is a 40'-wide bridge scoped for a project that has a lengthy 24'-wide approach roadway with no improved shoulders?

***The proposed bridge width of 24' is the minimum width allowed on this type of roadway facility with the current traffic volumes present.***

12. Have non-construction alternatives to meeting the project goal been explored?

*A 'Do Nothing' alternative has been considered and deemed not recommended for further consideration.*

13. Have the views and values of the community been appropriately addressed?

*A public meeting with Franklin Township was held on March 30, 2010 to discuss the needs of the community and solicit input concerning this bridge. The concerns expressed have been incorporated into the Project's Need.*

14. Is preservation being used as the reason to resolve land use and zoning issues thus skewing the importance of the bridge to the detriment of sound engineering and/or safety?

*No land use or zoning issues have come up that would distort the historic importance of the bridge.*

Summary of the Evaluation of Alternatives versus the Project's Need

(YES=Alternative meets the stated NEED)	
ALTERNATIVES	NEED Provide a structurally safe facility that meets the transportation needs of the surrounding community.
1 - Do nothing	NO
2 - Remove the existing bridge and not provide a crossing at this location.	NO
3 - Preserve (rehabilitate) the existing bridge	NO
4 - Remove the existing bridge and build a new bridge in the same location.	YES

## APPLYING THE DECISION MAKING THRESHOLDS

Step 4 of the decision making process is to apply the thresholds of what can be considered feasible and prudent when supporting the decision to rehabilitate or replace a historic bridge. From an engineering perspective, it is feasible to rehabilitate the bridge to accommodate legal loads and remove the posted weight restriction. However, no rehabilitation of the existing bridge could address the width and height restrictions and the community has noted that the restrictions of this bridge do indeed impact their lives.

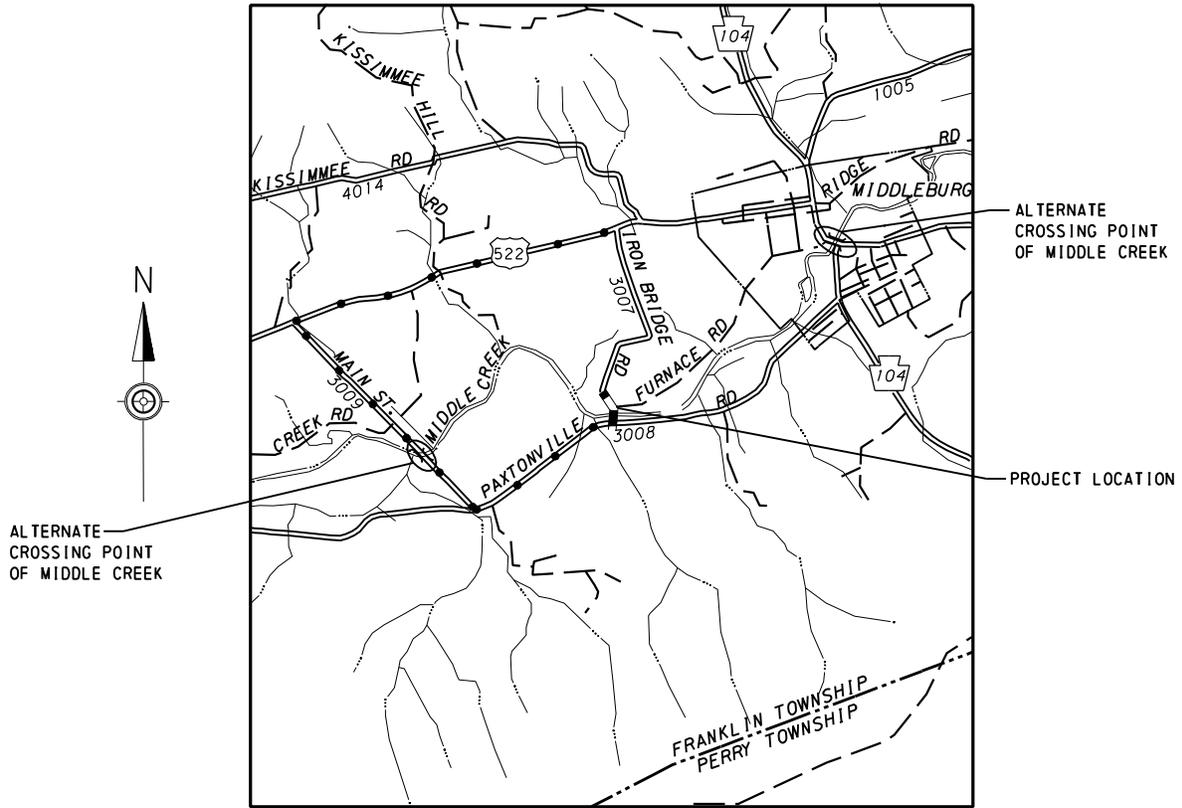
As noted in the bridge's inspection reports, the rate of deterioration has been accelerating. The bridge last underwent rehabilitation in 1996. AASHTO's Guidelines note that if maintenance costs are extremely high and if major work would again be required in less than 25 years, rehabilitation should not be considered. If rehabilitation which preserved the historic aspects of the bridge were performed, it is safe to say with reasonable certainty that an extensive rehabilitation or replacement would likely be required within 25 years. A new bridge at this location would likely need little maintenance in the next 50 years.

The rehabilitation required to bring the existing bridge up to a legal load carrying capacity is not considered feasible and prudent. Although the aspects of the existing bridge that make it historic would be preserved, the bridge would visually look much different and still not satisfy the transportation needs of the surrounding community. Given the compromising of the bridge's historic effects and the accompanying high cost, this alternative cannot realistically be considered feasible and prudent.

Replacing the bridge with a new bridge in its current location would meet the Project's Need. Based on this, Alternative 4 is the most feasible and prudent course of action. Alternative 4 would provide a structurally safe facility that meets the transportation needs of the surrounding community.

Should any parties express interest in re-using the bridge at another location for pedestrian, bicycle or other use, PennDOT should assist in facilitating this relocation as the bridge does have significance in the Commonwealth's transportation history. At the time of this Analysis, no party has expressed interest in accepting the existing bridge for use at another location.

## **APPENDIX A: MAPS**



### LOCATION MAP

SCALE IN MILES



#### LEGEND

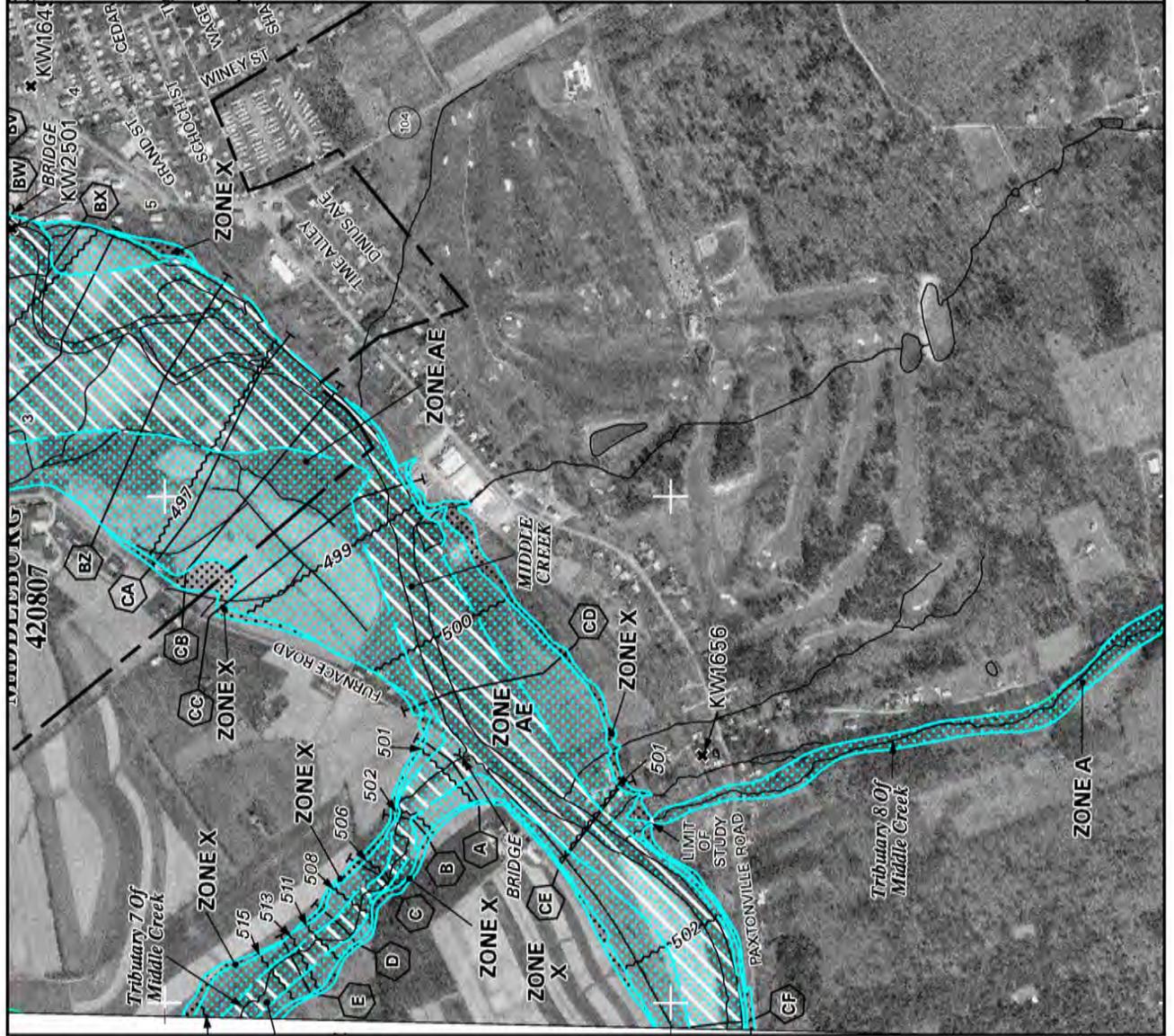
- PROJECT
- STATE HIGHWAY
- TOWNSHIP ROAD
- MUNICIPAL BOUNDARY
- DETOUR ROUTE

# FLOOD INSURANCE RATE MAP- PANEL 120 OF 300

Insurance is available in this community, contact your local Flood Insurance Program at (800) 638-6620.



MAP SCALE 1" = 1000'



## NATIONAL FLOOD INSURANCE PROGRAM

**PANEL 0120D**

**FIRM**  
**FLOOD INSURANCE RATE MAP**  
 SNYDER COUNTY,  
 PENNSYLVANIA  
 (ALL JURISDICTIONS)

**PANEL 120 OF 300**  
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:	NUMBER	PANEL	SUFFIX
MIDDLEBURY TOWNSHIP OF FRANKLIN TOWNSHIP OF MIDDLEBURY BOROUGH OF MIDDLEBURY TOWNSHIP OF PERRY TOWNSHIP OF	42087	0120	D
	42088	0120	D
	42087	0120	D
	42088	0120	D

Notice to User: The Map Number shown below should be used when ordering this Community Rating System Report. The above should be used on insurance applications for the subject community.

**MAP NUMBER**  
**42105C0120D**

**EFFECTIVE DATE:**  
**NOVEMBER 16, 2007**

Federal Emergency Management Agency



This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

## APPENDIX B: PHOTOGRAPHS



**SR 3007 NORTH APPROACH, FACING SOUTH**



**SR 3007 FACING SOUTH**



**SR 3007 FACING SOUTH**



**SR 3007 FACING NORTH**



**SR 307 SOUTH APPROACH, FACING NORTH**



**SOUTH SIDE OF SR 307, FACING NORTH**



**SR 3007 NORTH ABUTMENT, FACING NORTHWEST**



**SR 3007 SOUTH ABUTMENT, FACING WEST**

**APPENDIX C: MEETING MINUTES FROM FRANKLIN TOWNSHIP  
PUBLIC MEETING HELD ON 3/30/10**

## **MEMORANDUM OF MEETING –Final**

DATE: March 30, 2010

SUBJECT: SR 3007 Section 009 – Iron Bridge Road over Middle Creek  
Franklin Township, Snyder County

LOCATION: Franklin Township Municipal Building  
Middleburg, PA

ATTENDEES: See attached sign-in sheet

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A public meeting was held at Franklin Township's municipal building at 7:00 p.m. on March 30, 2010 to discuss PennDOT's options for the SR 3007 (Iron Bridge Road) bridge over Middle Creek. This meeting was on the agenda of Franklin Township's monthly Supervisors meeting. Three options were presented and discussed. These included removing the bridge, rehabilitating the bridge and replacing the bridge. The following summarizes the discussion and comments provided at this meeting:

1. Chris Mileto opened the meeting and provided questionnaires to the attendees. He explained why PennDOT was holding this meeting and then presented each option. He noted that a decision regarding which direction PennDOT would proceed would be made in April, 2010 and the project would commence in spring of 2011.
2. Matt Hamel explained the historic significance of the existing bridge and noted the procedures that PennDOT must follow under Section 106 of the National Historic Preservation Act. He noted that before any work commences on a historic property, PennDOT must consider the effects of such undertakings.
3. Gary Williams gave an overview of recent and upcoming bridge work in Snyder County and explained the need for public input for this bridge since the bridge is historic. He noted that based on PennDOT's initial coordination with the school district and emergency services, it was questioned whether the bridge was needed. He added that in order to accommodate legal loads (36 tons) all but about four members of the existing bridge would need to be replaced on each truss.
4. After the presentation, an open discussion proceeded and the following was noted:
  - A. Public Comments:
    1. It was noted that Midd West School District buses do not use the existing bridge; however another bus company – a contracted vendor of the school district – does use the bridge.
    2. Someone noted that the average daily traffic of 234 seemed low and questioned when the count was taken. Gary Williams explained that the exact date of the

count was not available (at the meeting), however PennDOT's traffic counts are attuned to represent a typical weekday. He noted that PennDOT will investigate when the count was taken and determine if 234 vehicles was indeed accurate.

3. A local farmer noted that removing the bridge would impact his operations due to longer travel times for moving equipment.
4. The following was noted regarding EMS Services and the existing bridge:
  - a. Although Fire companies have adjusted to not using the existing bridge, EMS responders travel across bridge to get to the firehouse or location of fires, etc. and if EMS equipment could travel across a new bridge it would reduce response times.
  - b. Removing the bridge would negatively impact the nearby Fireman's Carnival, which provides 75% of the company's annual fundraising. The carnival is held each August and lasts 5 days. Many patrons of the carnival utilize the bridge while traveling to and from the event.
  - c. Height and weight restrictions are problems for tankers and other equipment which weigh over 20 tons.
  - d. It was noted that the fire company would like access to the stream in lieu of a dry hydrant.
5. Someone remarked that replacement seems to make the most sense based on anticipated life cycle costs.
6. It was noted by two local farmers that rehabilitation could not accommodate their need to move farm equipment, which often requires a 20 ton capacity and a higher height requirement than the currently posted restriction of 11'.
7. Stephen Buonopane from Bucknell University asked why the rehabilitation and replacement costs have changed from those listed in the Alternatives Analysis prepared in 11/09. Gary Williams explained that both alternatives have been explored more thoroughly. The rehabilitation option was expanded to provide a 50-year rehabilitation life which includes additional replacement of members, work on the wingwalls, painting and low-chord joint repairs. The replacement option estimate was fine-tuned based on the most recent estimates PennDOT has been receiving for similar project.
8. Someone asked that if the bridge were to be rehabilitated, would it still be considered historic? Matt Hamel and Gary Williams explained that it would be based on the extent of the rehabilitation. If it were rehabilitated to accommodate its current posting of 9 tons, then it would require replacing several members with replica pieces. If the bridge were rehabilitated to accommodate legal loads, the

finished bridge may indeed look significantly different than the existing and very well may lose those aspects that make it historic.

9. It was asked how will the project affect winter maintenance responsibilities? The state currently maintains SR 3007 on one side of the bridge and the township maintains SR 3007 on the other side. Chris Mileto noted that for the rehabilitation option, these responsibilities probably would not change. The maintenance responsibilities would be re-determined if the bridge were replaced.
10. A local farmer asked if rehabilitation would change the existing bridge width? The current width is not sufficient for farm equipment. Gary Williams noted that rehabilitation would not increase the bridge width.
11. It was noted that considering some of the newer bridges that have already required replacements, the durability of the truss is impressive as it has lasted over 100 years.
12. Someone noted that removal doesn't seem to be an option. When considering the cost of improvements being made in Middleburg (\$20-30 million to the school district) it makes sense to upgrade/replace the bridge based on the relatively minimal initial cost difference (over rehabilitation).
13. Someone asked if a new bridge would increase truck traffic enough to require other improvements to SR 3007. Chris Mileto noted that such improvements have not been considered yet and that the scope of this project involves just the bridge.
14. Someone asked what is the proposed width of the Paxtonville (SR 3009) bridge over Middle Creek (which will be constructed during the summer of 2010)? The Paxton Street bridge width is 28 feet and will include 4-foot-wide shoulders, which can accommodate pedestrians without sidewalks.
15. Someone noted that they would like to see a 28' wide bridge on SR 3007. Chris Mileto explained that PennDOT bridges vary in width from 24' to 40'. The width is determined based on the number of vehicles, roadway classification, adjacent roadway widths and posted speed limits. A new bridge here would likely have a 24' width.
16. Someone inquired if a new bridge could be built adjacent to the existing bridge with the existing bridge left in place? Matt Hamel and Gary Williams noted that PennDOT is willing to consider this scenario, however PennDOT would not maintain two bridges at the location – i.e. another organization would have to assume ownership of the existing bridge. They further noted that there are several other factors that must be considered such as the environmental impacts from a new shifted alignment and the potential to increase the floodplain with 2 structures spanning the creek at this location.

17. Someone noted that replacement makes more sense than rehabilitation and made the analogy of buying a new car versus a used car and the problems often associated with used cars.
18. Gary Williams reiterated that the rehabilitation option must be seriously considered due to the historical implications.

**FOLLOW-UP ITEMS:**

Item	Action	Responsible Party	Date
1	Attendees will be notified of selected alternative. Questionnaire responses should be attached to these minutes.	CSM	4/30/10
1	Provide minutes to Paula Snook at Franklin Township	CSM	4/16/10
4.A.2	Investigate where traffic count was taken. Was count taken adjacent to structure? Is count accurate?	CSM	4/9/10

It is believed that the above represents an accurate transcription of the events which transpired during this meeting. Your notification of any errors or omissions is essential as the foregoing is intended to become part of the records and the basis upon which we will proceed.

Respectfully Submitted,  
URBAN ENGINEERS, INC.

Jeffrey A. Roken, PE

JAR/jar  
cc: Attendees  
File 6159

## **APPENDIX D: COST COMPARISON OF ALTERNATIVES**



SEG. 0010 OFFSET 0215 SUBJECT REHAB TRUSS; FUTURE SHEET NO. 1 OF 1  
MAINTENANCE ESTIMATES BY LEA DATE 5/24/2010  
 CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_

REHABILITATION SCOPE OF WORK (2012 CONSTRUCTION) :

- REPLACE STRINGERS
- REPLACE FLOOR BEAMS
- REPLACE DECK
- PAINT ENTIRE SUBSTRUCTURE
- STRUCTURAL STEEL REPAIR TO RAISE POSTING TO 15 TONS

FUTURE MAINTENANCE (2032)

- PAINT ( $\$200,000$  CURRENT ESTIMATE) \* (20 YEARS \* 3% INFLATION/YEAR)  
 =  $\$320,000$  (2032 FUTURE MAINT.)

NOTE: BASED ON PAINTING HISTORY FOR TRUSS STRUCTURES,  
 PAINT SYSTEMS HAVE A 15 TO 20 YEAR LIFE

FUTURE MAINTENANCE (2052)

- PAINT ( $\$200,000$  CURRENT ESTIMATE) \* (40 YEARS \* 3% INFLATION/YEAR)  
 =  $\$440,000$
- STEEL REPAIRS  
 ASSUME 25% BASED ON CURRENT REHAB. ESTIMATE  
 FOR TRUSS  $(0.25) * (\$160,000) = \$40,000$   
 ASSUME 25% OF FLOOR SYSTEM AND DECKING WILL  
 NEED REPLACED  $\Rightarrow (0.25) * (\$293,800) = \$73,450$   
 TOTAL =  $\$113,450$   
 ( $\$113,450$  CURRENT ESTIMATE) \* (40 YEARS \* 3% INFLATION/YEAR)  
 =  $\$249,590$

TOTAL =  $\$689,590$  (2052 FUTURE MAINT.)

o BASED ON 50 YEAR LIFE OF 2012 REHABILITATION, THE  
 FUTURE MAINTENANCE COST ESTIMATE WOULD BE  $\$1,009,590$ .  
 TRUSS STRUCTURE WOULD REQUIRE REPLACEMENT OR  
 MAJOR REHABILITATION AFTER 50 YEAR DESIGN LIFE.





SUBJECT \_\_\_\_\_

SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

JOB NO. \_\_\_\_\_

BY \_\_\_\_\_ DATE \_\_\_\_\_

CHK'D \_\_\_\_\_ DATE \_\_\_\_\_

REV \_\_\_\_\_ DATE \_\_\_\_\_

ALTERNATIVE 3  
RETROFIT EXISTING BRIDGESR 3007 ALTERNATIVE ANALYSIS COST ESTIMATEGERLOFF ROAD

- SPAN length = 134'
- 108 TONS OF NEW STEEL

SR 3007

- EXISTING SPAN  $\approx$  112.0
- ESTIMATE STEEL REQUIRED = (108 TONS)  $(112/134) = 91$  TONS
- Al Pizzi estimates  $\approx$  \$5/POUND

ESTIMATED SUPERSTRUCTURE COST FOR NEW STRUCTURE  
 $(91 \text{ TONS}) (2000\$/\text{TON}) (\$5/\#) = \$910,000$

- CLASS 3 EXCAVATION =  $(1337 \text{ cy} + 1144 \text{ cy}) (\$23/\text{cy}) = \$58,443$
- CLASS AA CEMENT =  $(4 \text{ cy} + 4 \text{ cy}) (\$1500/\text{cy}) = \$12,000$
- CLASS A CEMENT =  $(116 \text{ cy} + 90 \text{ cy}) (\$900/\text{cy}) = \$185,400$
- STRUCTURAL BACKFILL =  $(815 \text{ cy} + 614 \text{ cy}) (\$40/\text{cy}) = \$57,160$
- REBAR =  $(16,880\# + 14,029\#) (\$1.35/\#) = \$41,727$
- REBAR, EPOXY COATED =  $(108\# + 108\#) (\$1.50/\#) = \$324$
- REHAB EXISTING TRUSS (BLAST EXIST PAINT ... INSTALL NEW PAINT), INCLUDES CONTAINMENT  $\rightarrow$  \$50,000
- REMOVAL OF EXISTING ABUTMENTS \$30,000

SUB-TOTAL = \$1,345,054

 $\rightarrow$  15% CONTINGENCY = \$201,758

TOTAL \$1,546,800

 $\rightarrow$  SAY \$1,547,000

**PRELIMINARY COST ESTIMATE  
ALTERNATIVE 4  
S.R. 3007, SECTION 009**

DESCRIPTION	Item #	UNIT	QUANTITY	UNIT COST	TOTAL
<b>ROADWAY:</b>					
CLEARING AND GRUBBING	0201-0001	LS	1	\$25,000.00	\$25,000.00
CLASS 1 EXCAVATION	0203-0001	CY	173	\$40.00	\$6,920.00
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BASE COURSE	0309-0322	SY	466	\$45.00	\$20,970.00
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE	0409-0385	SY	466	\$15.00	\$6,990.00
SUBBASE 6" DEPTH (NO. 2A)	0350-0106	SY	466	\$15.00	\$6,990.00
TOPSOIL FURNISHED AND PLACED	0802-0001	SY	160	\$40.00	\$6,400.00
TYPE 2-S GUIDERAIL	0620-1075	LF	162.5	\$25.00	\$4,062.50
TYPICAL AND ALTERNATE CONCRETE BRIDGE BARRIER TRANSITION WITHOUT INLET PLACEMENT	0620-0010	EA	4	\$2,000.00	\$8,000.00
TYPE 2 STRONG POST END TREATMENT	0620-1250	EA	3	\$3,200.00	\$9,600.00
TERMINAL SECTIONS, SINGLE	0620-0004	EA	3	\$400.00	\$1,200.00
GUIDE RAIL MOUNTED DELINEATOR TYPE D, (W/W)	0937-0114	EA	8	\$25.00	\$200.00
ROCK, CLASS R-7	0850-0025	CY	420	\$50.00	\$21,000.00
<b>SUB TOTAL ROADWAY</b>					<b>\$117,332.50</b>
25% CONTINGENCY (ROADWAY ONLY)					\$29,333.13
<b>ROADWAY TOTAL</b>					<b>\$146,665.63</b>
<b>STRUCTURES:</b>					
Structure Total	LS	LS	1	\$756,000.00	\$756,000.00
<b>SUB TOTAL ROADWAY &amp; STRUCTURES</b>					<b>\$902,665.63</b>
EROSION & SEDIMENT POLLUTION CONTROL (10%)	LS	LS	1	\$90,266.56	\$90,266.56
MAINTENANCE & PROTECTION OF TRAFFIC DURING CONSTRUCTION (5%)	LS	LS	1	\$45,133.28	\$45,133.28
UTILITY ADJUSTMENTS (5%)	LS	LS	1	\$45,133.28	\$45,133.28
CONSTRUCTION SURVEYING	LS	LS	1	\$15,000.00	\$15,000.00
<b>SUB TOTAL ROADWAY &amp; STRUCTURES</b>					<b>\$1,098,198.75</b>
MOBILIZATION (5%)	LS	LS	1	\$54,909.94	\$54,909.94
<b>CONSTRUCTION TOTAL</b>					<b>\$1,153,108.69</b>
<b>TOTAL (2010 Dollars @4%/YEAR ESCALATION)</b>					<b>\$1,199,233.04</b>
<b>CALL</b>					<b>\$1,200,000.00</b>

Department of Transportation  
www.dot.state.pa.us

NO. SNYDOR SHEET NO. 1 OF 1  
S.R. 3007 SUBJECT REPLACE TRUSS BRIDGE BY LGA DATE 5/24/2010  
SEG. 0010 OFFSET 0215 W/ CONC. BEAM BRIDGE: FUTURE CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_  
MAINT. ESTIMATES.

REPLACE TRUSS BRIDGE W/ CONC. BEAM BRIDGE (2012 CONSTRUCTION)

FUTURE MAINTENANCE (2027)

- PLACE EPOXY DECK OURLAY  
 $(24.0' \text{ CURB-TO-CURB}) * (148.0' \text{ LENGTH}) = 3,552 \text{ FT}^2$   
 $(3,552 \text{ FT}^2) * (\$5/\text{FT}^2 \text{ CURRENT ESTIMATE}) = \$17,760$   
 $(\$17,760 \text{ CURRENT ESTIMATE}) * (15 \text{ YEARS} * 3\% \text{ INFLATION/YR})$   
 $= \$25,752$

NOTE 2 BASED ON LOW ADT, EPOXY OURLAY IS PROJECTED TO HAVE 35 YEAR LIFE

FUTURE MAINTENANCE (2062)

- PLACE EPOXY DECK OURLAY  
 $(\$17,760 \text{ CURRENT ESTIMATE}) * (50 \text{ YEARS} * 3\% \text{ INFLATION/YR})$   
 $= \$41,400$

FUTURE MAINTENANCE (2097)

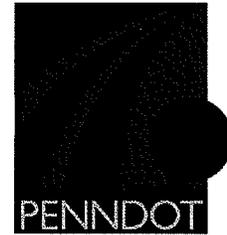
- PLACE EPOXY DECK OURLAY  
 $(\$17,760 \text{ CURRENT ESTIMATE}) * (70 \text{ YEARS} * 3\% \text{ INFLATION/YR})$   
 $= \$55,056$

OO BASED ON 100 YEAR LIFE OF 2012 REPLACEMENT, THE FUTURE MAINTENANCE COST ESTIMATES WOULD BE \$125,208. CONCRETE STRUCTURE WOULD REQUIRE REPLACEMENT OR MAJOR REHABILITATION AFTER 100 YEAR DESIGN LIFE

**APPENDIX C:  
PUBLIC INVOLVEMENT AND COORDINATION**

COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF TRANSPORTATION

[www.dot.state.pa.us](http://www.dot.state.pa.us)  
Engineering District 3-0  
715 Jordan Avenue  
Montoursville, Pennsylvania 17754-0218



August 10, 2009

Melinda Stuck  
Snyder County Historical Society  
PO Box 276  
Middleburg, PA 17842

**REFERENCE: S.R. 3007, Section 009, Bridge Over Middle Creek  
(Iron Bridge) Replacement Project  
Franklin Township, Snyder County, Pennsylvania**

Dear Ms. Stuck:

The Pennsylvania Department of Transportation (PennDOT), on behalf of the Federal Highway Administration (FHWA), is identifying individuals and organizations with a demonstrated interest in the S.R.3007, Section 009, Bridge Over Middle Creek (Iron Bridge) Replacement Project, and its potential to affect historic resources (see attached project description). PennDOT is offering the opportunity for you or your organization to participate in consultation regarding historic resources pursuant to the Advisory Council on Historic Preservation's (ACHP) 36 CFR Part 800 regulations implementing Section 106 of the National Historic Preservation Act. This Act defines a historic property as a prehistoric or historic building, site, district, structure, or object included in or eligible for inclusion in the National Register of Historic Places.

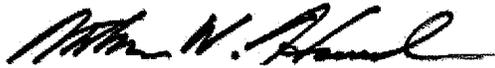
To meet the spirit and intent of Section 106, the FHWA will request the views of consulting parties on findings and determinations regarding historic properties for the Iron Bridge Replacement Project. For this project, in addition to PennDOT and the Pennsylvania Historical and Museum Commission (the State Historic Preservation Officer), consulting parties may include representatives of local governments, federally recognized Indian tribes, and others who meet the definition of a consulting party. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess effects to historic resources, and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties.

The FHWA will consider whether individuals or organizations meet the test of a demonstrated interest in the project. Those with a demonstrated interest in the undertaking may participate as consulting parties due to the nature of their legal or economic relation to the undertaking or affected properties, or their concern with the undertaking's effects on historic properties [36 CFR§800.2 (c) (5)]. Consulting parties will be requested to provide their views regarding the findings and determinations to

FHWA, and they will be asked to provide their views within the time frames prescribed in the ACHP regulations, usually 30 days. Organizations will be asked to nominate one representative to participate on behalf of the group.

**Please complete the enclosed form and return it in the pre-addressed envelope within 15 days of receipt.** If the form is not returned within 15 days, it will be assumed that you or your organization does not wish to become a consulting party in the Iron Bridge Replacement Project at this time. This invitation is based upon your potential demonstrated interest. Designs may change or be refined as this project develops, and this may affect whether you continue to have a demonstrated interest in the project. If you have any questions, contact the project manager, Chris Mileto, PennDOT District 3-0, at (570) 368-4391, or PennDOT District 3-0 Cultural Resources Professional, Matt Hamel at (570) 368-4414.

Sincerely,



Matt Hamel  
District 3-0 Cultural Resources Professional  
for  
Sandra Tosca, PE  
District Executive

Enclosures: Response Form  
Project Description

C: Ross A Mantione, FHWA  
Susan Zacher, PHMC  
Kara Russell, PennDOT EQAD  
Chris Mileto, PennDOT District 3-0  
Matt Hamel, PennDOT District 3-0  
Jeff Roken, Urban Engineers

**S.R. 3007, Section 009, Bridge over Middle Creek  
(Iron Bridge) Replacement Project**

**Franklin Township, Snyder County, Pennsylvania**

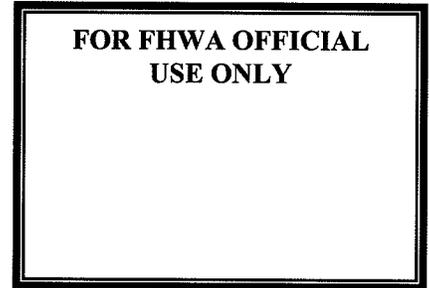
**Project Description**

The proposed project is located where S.R. 3007 (Iron Bridge Road) crosses Middle Creek in Franklin Township, Snyder County, Pennsylvania. The project is located in a predominantly rural area. The existing bridge is a single span pin-connected Pratt through truss built in ca. 1890. The Iron Bridge was determined eligible for listing in the National Register of Historic Places as a historically and technologically significant example of its type and design with distinctive details that identify it as a rare instate example of the fabricator. While the bridge is in use, it does not meet the needs of the community as it is only one lane wide and cannot accommodate emergency vehicles or school busses. The project proposes to replace the existing bridge with a new bridge in the same location that meets standard design and safety criteria.

**S.R. 3007, Section 009  
Bridge Replacement Project  
Snyder County**

**Section 106 Consulting Party Response Form**

**TO:** A.D. Marble & Company  
Attn: Shauna J. Haas  
375 E. Elm Street, Suite 200  
Conshohocken, PA 19428  
e-mail: shaas@admarble.com  
Phone: 484-533-2500 Fax: 484-533-2599



**FROM:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**DATE:** \_\_\_\_\_

e-mail: \_\_\_\_\_

Telephone/Fax Numbers: \_\_\_\_\_ / \_\_\_\_\_

**Yes.** I, or my organization, would like to be a consulting party in the Section 106 process for the S.R. 3007, Section 009 bridge replacement project.

\_\_\_\_\_ will be represented by \_\_\_\_\_

(Organization)

\_\_\_\_\_ (Please indicate above the mailing  
(Representative)

address of the representative if different than the addressee).

\_\_\_\_\_ I am a representative of a local government with jurisdiction over the area in which the project occurs. (If so, please go to the last question)

**No.** I, or my organization, do(es) not wish to participate as a consulting party for the S.R. 3007, Section 009 bridge replacement project.

**Future Participation.** As the project progresses into effects, I, or my organization, would like the opportunity to reconsider participation.

\_\_\_\_\_ I am a representative of a local government with jurisdiction over the area in which the project occurs. (If so, please go to the last question)

**Individual's or Organization's Demonstrated Interest**

*Please Check Appropriate Box(es)*

- 1. legal interest
- 2. economic interest
- 3. historic property(s) concerns

Briefly justify your Demonstrated Interest \_\_\_\_\_

Do you know of another potential consulting party for this project?  
Please list their name and phone number below.

RECEIVED  
AUG 20 2009

A.D. MARBLE & COMPANY, INC.

S.R. 3007, Section 009  
Bridge Replacement Project  
Snyder County

Section 106 Consulting Party Response Form

TO: A.D. Marble & Company  
Attn: Shauna J. Haas  
375 E. Elm Street, Suite 200  
Conshohocken, PA 19428  
e-mail: shaas@admarble.com  
Phone: 484-533-2500 Fax: 484-533-2599

FOR FHWA OFFICIAL  
USE ONLY

FROM: STEPHEN BUONOPANE  
DEPT OF CIVIL ENGRG  
BUCKNELL UNIV.

LEWISBURG PA 17837 DATE: AUG 18 2009

e-mail:

Telephone/Fax Numbers: 570-577-1685 / 570-577-3915

X

Yes  I or my organization, would like to be a consulting party in the Section 106 process for the S.R. 4007, Section 009 bridge replacement project.

\_\_\_\_\_ will be represented by  
(Organization)

\_\_\_\_\_ (Please indicate above the mailing  
(Representative)

address of the representative if different than the addressee).

\_\_\_\_\_ I am a representative of a local government with jurisdiction over the area in which the project occurs. (If so, please go to the last question)

No. I, or my organization, do(es) not wish to participate as a consulting party for the S.R. 4007, Section 009 bridge replacement project.

X

**Future Participation.** As the project progresses into effects, I, or my organization, would like the opportunity to reconsider participation.

\_\_\_\_\_ I am a representative of a local government with jurisdiction over the area in which the project occurs. (If so, please go to the last question)

**Individual's or Organization's Demonstrated Interest**

Please Check Appropriate Box(es)

- 1. legal interest
- 2. economic interest
- 3. historic property(s) concerns

Briefly justify your Demonstrated Interest STRUCTURAL ENGINEER

WITH EXPERIENCE IN HISTORIC BRIDGES & REHABILITATION  
INCLUDING IN PENNSYLVANIA

Do you know of another potential consulting party for this project?

Please list their name and phone number below.

*Stephen G Buonopane*

## **MEMORANDUM OF MEETING –Final**

DATE: March 30, 2010

SUBJECT: SR 3007 Section 009 – Iron Bridge Road over Middle Creek  
Franklin Township, Snyder County

LOCATION: Franklin Township Municipal Building  
Middleburg, PA

ATTENDEES: See attached sign-in sheet

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A public meeting was held at Franklin Township's municipal building at 7:00 p.m. on March 30, 2010 to discuss PennDOT's options for the SR 3007 (Iron Bridge Road) bridge over Middle Creek. This meeting was on the agenda of Franklin Township's monthly Supervisors meeting. Three options were presented and discussed. These included removing the bridge, rehabilitating the bridge and replacing the bridge. The following summarizes the discussion and comments provided at this meeting:

1. Chris Mileto opened the meeting and provided questionnaires to the attendees. He explained why PennDOT was holding this meeting and then presented each option. He noted that a decision regarding which direction PennDOT would proceed would be made in April, 2010 and the project would commence in spring of 2011.
2. Matt Hamel explained the historic significance of the existing bridge and noted the procedures that PennDOT must follow under Section 106 of the National Historic Preservation Act. He noted that before any work commences on a historic property, PennDOT must consider the effects of such undertakings.
3. Gary Williams gave an overview of recent and upcoming bridge work in Snyder County and explained the need for public input for this bridge since the bridge is historic. He noted that based on PennDOT's initial coordination with the school district and emergency services, it was questioned whether the bridge was needed. He added that in order to accommodate legal loads (36 tons) all but about four members of the existing bridge would need to be replaced on each truss.
4. After the presentation, an open discussion proceeded and the following was noted:
  - A. Public Comments:
    1. It was noted that Midd West School District buses do not use the existing bridge; however another bus company – a contracted vendor of the school district – does use the bridge.
    2. Someone noted that the average daily traffic of 234 seemed low and questioned when the count was taken. Gary Williams explained that the exact date of the

count was not available (at the meeting), however PennDOT's traffic counts are attuned to represent a typical weekday. He noted that PennDOT will investigate when the count was taken and determine if 234 vehicles was indeed accurate.

3. A local farmer noted that removing the bridge would impact his operations due to longer travel times for moving equipment.
4. The following was noted regarding EMS Services and the existing bridge:
  - a. Although Fire companies have adjusted to not using the existing bridge, EMS responders travel across bridge to get to the firehouse or location of fires, etc. and if EMS equipment could travel across a new bridge it would reduce response times.
  - b. Removing the bridge would negatively impact the nearby Fireman's Carnival, which provides 75% of the company's annual fundraising. The carnival is held each August and lasts 5 days. Many patrons of the carnival utilize the bridge while traveling to and from the event.
  - c. Height and weight restrictions are problems for tankers and other equipment which weigh over 20 tons.
  - d. It was noted that the fire company would like access to the stream in lieu of a dry hydrant.
5. Someone remarked that replacement seems to make the most sense based on anticipated life cycle costs.
6. It was noted by two local farmers that rehabilitation could not accommodate their need to move farm equipment, which often requires a 20 ton capacity and a higher height requirement than the currently posted restriction of 11'.
7. Stephen Buonopane from Bucknell University asked why the rehabilitation and replacement costs have changed from those listed in the Alternatives Analysis prepared in 11/09. Gary Williams explained that both alternatives have been explored more thoroughly. The rehabilitation option was expanded to provide a 50-year rehabilitation life which includes additional replacement of members, work on the wingwalls, painting and low-chord joint repairs. The replacement option estimate was fine-tuned based on the most recent estimates PennDOT has been receiving for similar project.
8. Someone asked that if the bridge were to be rehabilitated, would it still be considered historic? Matt Hamel and Gary Williams explained that it would be based on the extent of the rehabilitation. If it were rehabilitated to accommodate its current posting of 9 tons, then it would require replacing several members with replica pieces. If the bridge were rehabilitated to accommodate legal loads, the

finished bridge may indeed look significantly different than the existing and very well may lose those aspects that make it historic.

9. It was asked how will the project affect winter maintenance responsibilities? The state currently maintains SR 3007 on one side of the bridge and the township maintains SR 3007 on the other side. Chris Mileto noted that for the rehabilitation option, these responsibilities probably would not change. The maintenance responsibilities would be re-determined if the bridge were replaced.
10. A local farmer asked if rehabilitation would change the existing bridge width? The current width is not sufficient for farm equipment. Gary Williams noted that rehabilitation would not increase the bridge width.
11. It was noted that considering some of the newer bridges that have already required replacements, the durability of the truss is impressive as it has lasted over 100 years.
12. Someone noted that removal doesn't seem to be an option. When considering the cost of improvements being made in Middleburg (\$20-30 million to the school district) it makes sense to upgrade/replace the bridge based on the relatively minimal initial cost difference (over rehabilitation).
13. Someone asked if a new bridge would increase truck traffic enough to require other improvements to SR 3007. Chris Mileto noted that such improvements have not been considered yet and that the scope of this project involves just the bridge.
14. Someone asked what is the proposed width of the Paxtonville (SR 3009) bridge over Middle Creek (which will be constructed during the summer of 2010)? The Paxton Street bridge width is 28 feet and will include 4-foot-wide shoulders, which can accommodate pedestrians without sidewalks.
15. Someone noted that they would like to see a 28' wide bridge on SR 3007. Chris Mileto explained that PennDOT bridges vary in width from 24' to 40'. The width is determined based on the number of vehicles, roadway classification, adjacent roadway widths and posted speed limits. A new bridge here would likely have a 24' width.
16. Someone inquired if a new bridge could be built adjacent to the existing bridge with the existing bridge left in place? Matt Hamel and Gary Williams noted that PennDOT is willing to consider this scenario, however PennDOT would not maintain two bridges at the location – i.e. another organization would have to assume ownership of the existing bridge. They further noted that there are several other factors that must be considered such as the environmental impacts from a new shifted alignment and the potential to increase the floodplain with 2 structures spanning the creek at this location.

17. Someone noted that replacement makes more sense than rehabilitation and made the analogy of buying a new car versus a used car and the problems often associated with used cars.
18. Gary Williams reiterated that the rehabilitation option must be seriously considered due to the historical implications.

**FOLLOW-UP ITEMS:**

Item	Action	Responsible Party	Date
1	Attendees will be notified of selected alternative. Questionnaire responses should be attached to these minutes.	CSM	4/30/10
1	Provide minutes to Paula Snook at Franklin Township	CSM	4/16/10
4.A.2	Investigate where traffic count was taken. Was count taken adjacent to structure? Is count accurate?	CSM	4/9/10

It is believed that the above represents an accurate transcription of the events which transpired during this meeting. Your notification of any errors or omissions is essential as the foregoing is intended to become part of the records and the basis upon which we will proceed.

Respectfully Submitted,  
URBAN ENGINEERS, INC.

Jeffrey A. Roken, PE

JAR/jar  
cc: Attendees  
File 6159

**APPENDIX D:  
QUALIFICATIONS OF RESEARCHERS**

