

# Request for Qualifications

**City of Canton, Ohio**  
Purchasing Department  
218 Cleveland Ave. SW, 4<sup>th</sup> floor  
Canton, Ohio 44702

9<sup>th</sup> St SW Bridge Replacement Project, GP 1298

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**Item/Project**

Engineering Department

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**Responsible Department**

Wednesday, June 5, 2019 at 4:00 PM local time

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**Proposals Due By**

**Proposal Submitted By:**

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**Company Name**

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**Street Address**

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**City**

**State**

**Zip**

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**Contact Person**

**Phone No.**

**Email Address**

**9<sup>th</sup> St SW Bridge Replacement Project  
GP 1298  
City of Canton, Ohio  
Qualifications Due Date: Wednesday, June 5, 2019 at 4:00pm**

Requests for Qualification for Professional Engineering Services are being sought for the 9<sup>th</sup> St SW Bridge Replacement Project, GP 1298 by the Canton City Engineering Department. The project shall be designed in accordance with current ODOT Location and Design Manual. The design and plans for the bridge will be prepared in accordance with the current edition of the ODOT Bridge Design Manual. Interested Engineering firms must submit a qualification package to City of Canton Purchasing Department, 218 Cleveland Ave. SW, 4<sup>th</sup> Floor, Canton, OH 44702. Three (3) complete copies of the package must be received no later than 4:00 pm on Wednesday, June 5, 2019.

Firms (or Teams) must be ODOT pre-qualified in the categories listed below for this project in the Required Pre-Qualification section. The entire qualification package must not exceed 20 pages. Consultants will be ranked based on the following areas: the firm's background, experience on similar past projects, past project performance and references, the project team, the project technical approach, and the general presentation of the submittal. All sub-consultants on the project team must be identified and their role described. The qualification package must provide adequate information needed to judge each of the proceeding categories, and consultants may utilize the allotted 20 pages as they see fit to do so. The City reserves the right to require an oral technical proposal to aid in the ranking process. Once the firms are ranked, the City will commence fee and contract negotiations with the top ranked firm.

**Required Pre-Qualification**, Combination of Prime Consultant and Subconsultants:

DESIGN SERVICES:  
Roadway, Non-complex Design  
Right-of-Way Plan Development, Limited  
Bridge Design, Level 1  
Bridge Design, Level 2

It is anticipated that the selected Consultant will be authorized to proceed by approximately the end of June, 2019.

**Selection Procedures**

A consultant will be selected based on the Qualifications for Professional Engineering Services. The requirements for the qualifications and the Consultant Selection Rating Form that will be used to select the consultant are shown below.

Firms interested in being considered for selection should respond by submitting three (3) hard copies and one digital full PDF of their qualifications to the following address by 4:00 PM on the response due date listed above.

City of Canton Purchasing Department  
218 Cleveland Ave. SW, 4<sup>th</sup> Floor  
Canton, OH 44702

Responses received after 4:00 PM on the response due date will not be considered.

## **Requirements for Qualifications for Professional Engineering Services, Selection Process**

### **A. Instructions for Preparing and Submitting Qualification Package**

1. Provide the information requested in the Qualifications Package Content (Item B below), in the same order listed, in a letter signed by an officer of the firm. Do not send additional forms, resumes, brochures, or other material.
2. Qualifications packages shall be limited to twenty (20) 8½" x 11" pages except as noted in the Project Approach (Item B.5 below). The transmittal letter, index page, and section divider pages (if included) will not counted towards the 20 pages.

### **B. Qualifications Package Content**

1. List the types of services for which your firm is currently prequalified by the Ohio Department of Transportation.
2. List significant sub-consultants, their current pre-qualification categories and the percentage of work to be performed by each subconsultant.
3. List the Project Manager and other key staff members, including key sub-consultant staff. Include project engineers for important disciplines and staff members that will be responsible for the work.

Address the experience of the key staff members on similar projects, and the staff qualifications relative to the selection subfactors noted.

4. Address your firm's Cost Containment practices by listing your current overhead rate and the firm's overall cost containment practices for controlling indirect costs,
5. Provide a description of your Project Approach. Confirm that the firm has visited the site and address your firm's technical approach, understanding of the project, project specific cost containment practices, innovative ideas and any other relevant information concerning your firm's qualifications for the project. The Project Approach may include 11" x 17" pages for diagrams. These pages shall be included in the twenty (20) page limit.

**Consultant Selection Criteria for  
Canton City Engineering Department Projects**

<b>Category</b>	<b>Total Value</b>
Firm's Background	10
Similar Project Experience	10
Past Project Performance and References	25
Project Team	25
Project Technical Approach	25
General Presentation	5
<b>Total</b>	<b>100</b>

## **General Project Description**

The project is located along 9<sup>th</sup> St SW in Canton, Ohio in Stark County. The limits of the project are I.R. 77 on the west and Schroyer Ave. SW on the east with a total project length of approximately 500 feet (including pavement transitions). The City of Canton proposes to contract with an ODOT pre-qualified consultant to complete engineering activities required for complete replacement of the bridge carrying 9th St. SW over the Nimishillen Creek, including completing a Feasibility Study to evaluate bridge options, a topographical survey and geotechnical investigation and, upon agreement of the replacement structure type, submission of Stage 2, Stage 3 and Final Tracings. A preliminary study was conducted by MS Consultants, Inc. and is attached to this RFQ for review.

Construction of the project is targeted for 2021.

### **Questions**

Please direct all questions regarding this Request for Qualifications in writing by **Wednesday, May 29, 2019 at 4:00 PM** to:

Katie Wise, Assistant Director of Purchasing  
[kathryn.wise@cantonohio.gov](mailto:kathryn.wise@cantonohio.gov)

### **Evaluation and Next Steps**

Responding firms will be evaluated and ranked pursuant to Ohio Revised Code Sections 153.65-153.73 based on the above criteria. The City will then commence fee and contract negotiations with the selected firm most qualified to perform the services for each separate project as described above. The final scope of engineering services will also be established during these negotiations.

The City of Canton reserves the right to reject any and all proposals and to accept the proposal deemed most beneficial to the City of Canton.

**By order of the Director of Public Service:  
John M. Highman, Jr.**

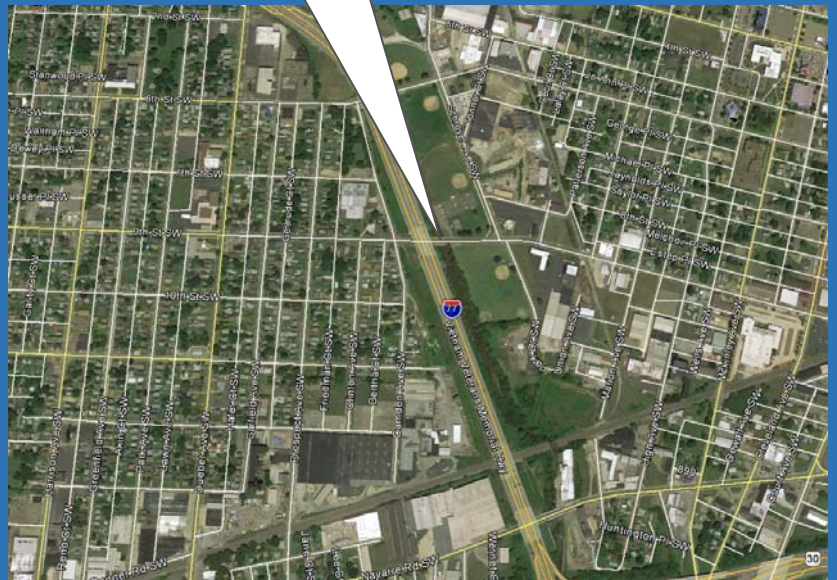
**Published in The Repository:  
May 21 and May 28, 2019**

# STRUCTURE TYPE STUDY

## 9th Street S.W. Bridge Replacement over West Branch of Nimishillen Creek

May 2, 2019

9th Street S.W. Bridge



**City of Canton Engineer**  
2436 30<sup>th</sup> Street NE  
Canton, Ohio 44705



**ms consultants, inc.**  
engineers, architects, planners

**ms consultants, inc.**  
engineers, architects, planners  
333 East Federal Street  
Youngstown, OH 44503  
330-744-5321

**9<sup>th</sup> Street S.W. Bridge over West Branch of Nimishillen Creek**  
**Structure Type Study**  
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## **I. Introduction**

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This report investigates and compares three separate bridge alternatives for the replacement of the 9<sup>th</sup> Street S.W. Bridge over West Branch of Nimishillen Creek in the City of Canton, in Stark County, Ohio. Each structure alternative was designed based on the existing roadway alignment.

The methodology used in this study is as outlined in section 201.2 of the ODOT Bridge Design Manual for a Structure Type Study.

For this project, the following criteria were considered:

- Profile Grade – no changes shall be made to the existing profile grade.
- Project Cost – includes a construction cost estimation based on major cost drivers for each proposed structure. Life-cycle cost analyses were also performed to outline costs associated with probable major maintenance required over the life of the proposed structure.
- Right-of-Way – no right-of-way acquisition shall be required.
- Minimum Structure Width – based upon requirements of ODOT Location and Design Manual.

Geotechnical Recommendations and Hydraulic Analysis are not included in this report, but may be included for future submissions. These items are not anticipated to affect the preferred alternative choice.



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## II. Existing Conditions

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### Existing Site and Structure Description

9<sup>th</sup> Street S.W. is a municipal street in the City of Canton, Stark County, Ohio that runs west-east and has an existing ADT of approximately 4,278. The 9<sup>th</sup> Street S.W. Bridge over West Branch Nimishillen Creek (SFN#: 7661118) is located between 10<sup>th</sup> Street S.W. (south) and 7<sup>th</sup> Street S.W. (north).

Built in 1945 and undergoing rehabilitation in 1982, the 9<sup>th</sup> Street S.W. Bridge is a two-lane structure carrying 9<sup>th</sup> Street S.W. over the West Branch of Nimishillen Creek, which flows north to south below 9<sup>th</sup> Street S.W. The existing structure is a two-span bridge with an overall length of approximately 85'-0" that consists of a reinforced concrete superstructure, abutments, and pier on spread footings. The superstructure is comprised of rolled steel beams. The wingwalls at all quadrants are turn-back. The existing deck is reinforced concrete with a brick wearing surface and has a roadway width of 50'-0", measured from face-to-face of existing curb. 7'-0" sidewalks flank the roadway on the north and south sides of the existing structure. The existing structure is on a tangent alignment with 20 degree right forward skew.

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### III. Proposed Work

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#### General Considerations

The existing horizontal alignment across the structure is a tangent alignment. All structure alternatives have a roadway width of 38'-0" face-to-face of curb, per the ODOT L&D Manual. 6'-0" sidewalks are located on both the north and south side of the superstructure. The overall structure width, including 1'-0" railings, will be 52'-4" for all alternatives. Each alternative will feature a 1" monolithic wearing surface.

The three alternatives presented in this type study are simple-span structures with a 75'-0" span length and semi-integral abutments.

The City of Canton has requested that an existing concrete arch component be incorporated in this structure, if possible. However, due to the span of the arch measuring approximately 54'-9", it is significantly undersized to be suitable for this project and the 75'-0" span to which the structure alternatives have been developed. Also, using the arches structural supports would considerably reduce the hydraulic opening of the creek below. It may be possible that the arches may be used as an aesthetic treatment on the structure, however such an application would not be practical due to the excessive dead load from the arches.

## **Alternative Discussion**

Three alternatives were considered for a replacement structure. Alternatives were investigated utilizing a single-span arrangement with an abutment bearing-to-bearing length of 75'-0". Steel and concrete superstructures were investigated.

All three structure alternatives have been designed to minimize impact on the West Branch of Nimishillen Creek, running north to south below the 9<sup>th</sup> Street S.W. Bridge. All alternatives are proposed to have abutments bearing on steel piles.

### Alternative 1

Alternative 1 is a simple-span structure featuring a 75'-0" span length, a reinforced concrete deck, and semi-integral reinforced concrete abutments. The superstructure is comprised of steel beams.

### Alternative 2

With a 75'-0" simple-span length, Alternative 2 is a pre-stressed concrete I-beam structure supported on semi-integral reinforced concrete abutments. The deck is reinforced concrete.

### Alternative 3

Alternative 3 is a simple-span structure featuring a 75'-0" span length, a reinforced concrete deck, and semi-integral reinforced concrete abutments. The superstructure is characterized by pre-stressed concrete box beams.

**9<sup>th</sup> Street S.W. Bridge over West Branch of Nimishillen Creek**  
**Structure Type Study**  
**Proposed Work**

An estimate of the structure construction costs is provided below for each alternative. For further development of structure construction costs, see *Section IV – Structure Alternatives Life Cycle Cost Analysis*.

Alternative	Structure Initial Cost	Description
<p style="text-align: center;"><b>1</b> 75'-0" Simple-Span Steel Beam</p>	\$1,237,676	Utilizing steel beams on semi-integral abutments on driven piles, this alternative provides a clear span across the waterway, improving the hydraulic opening without creating stream obstructions.
<p style="text-align: center;"><b>2</b> 75'-0" Simple-Span Prestressed Concrete I-Beam</p>	\$1,252,531	This simple-span prestressed concrete I-beam alternative rests on semi-integral abutments on driven steel piles and spans the stream below, increasing hydraulic opening without creating obstructions in the waterway.
<p style="text-align: center;"><b>3</b> 75'-0" Simple-Span Spread Box Beam</p>	\$1,236,589	This alternative is a 3-span concrete box beam structure resting on semi-integral abutments on steel piles. This option improves hydraulic opening, and does not require obstructions in the existing waterway.

## IV. Structural Alternatives Life Cycle Cost Analysis

### Life Cycle Events

The life cycle cost analysis was completed to provide an additional tool in accessing the economics of the alternative structure types. The time period used is 75 years. Only the following major life cycle events were used:

Life Cycle Event	Year 25	Year 40	Year 50
Asphalt Overlay	X	X	
Deck Replacement			X
Structural Steel Painting		X	

### Present Worth Factor (PWF)

The life cycle cost analysis is based on the ASTM *Standard Practice for Measuring Life-Cycle Costs of Buildings and Building Systems* (ASTM E917-02). The real discount rate, from which inflation premium has been removed, is used for discounting real (constant-dollar) values, as is often required in cost-effectiveness analyses. The value for the real discount rate used in this analysis is approximately 3%.

The Present Worth Factor (PWF) was calculated for each life cycle interval to express estimates of future costs in constant 2019 dollars,

where:

$$PWF = \frac{1}{(1+i)^n}$$

i= real discount rate = 3%

n = life cycle interval in years

Below are the calculated PWF for each life cycle event:

Year 25 PWF = 0.478

Year 40 PWF = 0.307

Year 50 PWF = 0.228

**9<sup>th</sup> Street S.W. Bridge over West Branch of Nimishillen Creek**  
**Structure Type Study**  
**Structural Alternatives Life Cycle Cost Analysis**

**Maintenance of Substructures**

Since the life cycle maintenance costs of substructures are somewhat difficult to determine, it was assumed that the cost of maintaining the substructures is approximately the same for all alternatives. Also, the costs for maintaining substructures for the options being considered are insignificant relative to the major maintenance costs associated with the superstructures. It is our opinion that omitting the substructure maintenance costs will not impact which option is the preferred alternative. Therefore, in view of the fact that the life cycle cost is primarily for comparison purposes, the items pertaining to maintenance of the substructures were not included in the life cycle cost analysis.

**Summary**

The tables on the following sheets show the estimated construction costs for the major structure items and the life cycle costs for maintenance of each structure alternative over the anticipated 75 year life of the structures. The matrix below summarizes the life cycle cost of each alternative.

<b>Alternative</b>	<b>Structure Life Cycle Cost</b>
<b>1</b> 75'-0" Simple-Span Steel Beam	\$1,355,193
<b>2</b> 75'-0" Simple-Span Prestressed Concrete I-Beam	\$1,356,247
<b>3</b> 75'-0" Simple-Span Spread Box Beam	\$1,340,305

# ALTERNATIVE 1

## COST ESTIMATE 75' SINGLE SPAN STEEL BEAM

ITEM	ITEM EXT.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
202	11203	Item 202 - Portions of Structure Removed, over 20 Foot Span, as per plan	LUMP			\$115,000
202	22900	Item 202 - Approach Slab Removed	267	S.Y.	\$54.00	\$14,400
202	23500	Item 202 - Wearing Course Removed	739	S.Y.	\$12.00	\$8,867
503	11100	Item 503 - Cofferdams and Excavation Bracing	LUMP			\$90,000
503	21100	Item 503 - Unclassified Excavation	241	C.Y.	\$110.00	\$26,530
505	11100	Item 505 - Pile Driving Equipment Mobilization	LUMP			\$25,000
507	00100	Item 507 - Steel Piles HP10X42, Furnished	1280	FT.	\$25.00	\$32,000
507	00150	Item 507 - Steel Piles HP10X42, Driven	1120	FT.	\$16.00	\$17,920
509	10000	Item 509 - Epoxy Coated Reinforcing Steel	60365	POUND	\$1.70	\$102,621
511	34446	Item 511 - Class QC2 Concrete with QC/QA, Bridge Deck	171	C.Y.	\$725.00	\$123,764
511	43512	Item 511 - Class QC1 Concrete with QC/QA, Abutment including Footing	170	C.Y.	\$590.00	\$100,213
511	51510	Item 511 - Class QC2 Concrete, Sidewalk	53	C.Y.	\$750.00	\$39,979
512	10100	Item 512 - Sealing of Concrete Surfaces (Epoxy-Urethane)	305	S.Y.	\$15.00	\$4,575
513	10220	Item 513 - Structural Steel Members, Level 1	93500	POUND	\$1.65	\$154,275
513	20000	Item 513 - Welded Stud Shear Connectors	690	EACH	\$4.00	\$2,760
516	13600	Item 516 - 1" Preformed Expansion Joint Filler	8	S.F.	\$9.00	\$72
516	13900	Item 516 - 2" Preformed Expansion Joint Filler	64	S.F.	\$10.00	\$640
516	14021	Item 516 - Semi-Integral Abutment Expansion Joint Seal	132	FT.	\$40.00	\$5,280
516	44000	Item 516 - Elastomeric Bearing (w/Internal Laminates (Neoprene) and Load Plate)	12	EACH	\$950.00	\$11,400
517	76300	Item 517 - Railing, Misc.: Steel Ornamental Railing	154	FT.	\$250.00	\$38,572
518	21200	Item 518 - Porous Backfill with Geotextile Fabric (Cont.)	77	C.Y.	\$110.00	\$8,470
518	40000	Item 518 - 6" Perforated Corrugated Plastic Pipe	172	FT.	\$9.00	\$1,548
518	40010	Item 518 - 6" Non-Perforated Corrugated Plastic Pipe, INCLUDING SPECIALS	32	FT.	\$17.50	\$560
526	25000	Item 526 - Reinforced Concrete Approach Slabs (T=15")	291	S.Y.	\$235.00	\$68,385
526	90010	Item 526 - Type A Installation	113	FT.	\$150.00	\$16,950
601	32000	Item 601 - Rock Channel Protection, Type A with Filter	106	C.Y.	\$125.00	\$13,250
846	00110	Item 846 - Polymer Modifier Asphalt Expansion Joint System	47	C.F.	\$350.00	\$16,358
		Roadway, Drainage and MOT	LUMP			\$125,000
		<b>INCIDENTAL ITEMS</b>				
103	05000	Item 103 - Premium for Contract Performance and Payment Bond	LUMP			\$11,644.00
619	16000	Item 619 - Field Office, Type A	4	MNTH	\$2,500.00	\$10,000.00
623	10000	Item 623 - Construction Layout Stakes and Surveying	LUMP			\$11,644.00
624	10000	Item 624 - Mobilization	LUMP			\$40,000.00

*Total 2019 Cost = \$1,237,676*

**Total 2023 Cost (14.9% Inflation) = \$1,422,090**

# ALTERNATIVE 1

## LIFE CYCLE COST 75' SINGLE SPAN STEEL BEAM

ITEM	ITEM EXT.	DESCRIPTION	Year 0	Year 25	Year 40	Year 50
202	11203	Item 202 - Portions of Structure Removed, over 20 Foot Span, as per plan	\$115,000			\$72,664
202	22900	Item 202 - Approach Slab Removed	\$14,400			\$15,699
202	23500	Item 202 - Wearing Course Removed	\$8,867			\$6,442
503	11100	Item 503 - Cofferdams and Excavation Bracing	\$90,000			
503	21100	Item 503 - Unclassified Excavation	\$26,530			
505	11100	Item 505 - Pile Driving Equipment Mobilization	\$25,000			
507	00100	Item 507 - Steel Piles HP10X42, Furnished	\$32,000			
507	00150	Item 507 - Steel Piles HP10X42, Driven	\$17,920			
509	10000	Item 509 - Epoxy Coated Reinforcing Steel	\$102,621			\$72,551
511	34446	Item 511 - Class QC2 Concrete with QC/QA, Bridge Deck	\$123,764			\$123,764
511	43512	Item 511 - Class QC1 Concrete with QC/QA, Abutment including Footing	\$100,213			
511	51510	Item 511 - Class QC2 Concrete, Sidewalk	\$39,979			
512	10100	Item 512 - Sealing of Concrete Surfaces (Epoxy-Urethane)	\$4,575			
513	10220	Item 513 - Structural Steel Members, Level 1	\$154,275			
513	20000	Item 513 - Welded Stud Shear Connectors	\$2,760			
516	13600	Item 516 - 1" Preformed Expansion Joint Filler	\$72			
516	13900	Item 516 - 2" Preformed Expansion Joint Filler	\$640			
516	14021	Item 516 - Semi-Integral Abutment Expansion Joint Seal	\$5,280			
516	44000	Item 516 - Elastomeric Bearing (w/Internal Laminates (Neoprene) and Load Plate)	\$11,400			
517	76300	Item 517 - Railing, Misc.: Steel Ornamental Railing	\$38,572			\$38,572
518	21200	Item 518 - Porous Backfill with Geotextile Fabric (Cont.)	\$8,470			
518	40000	Item 518 - 6" Perforated Corrugated Plastic Pipe	\$1,548			
518	40010	Item 518 - 6" Non-Perforated Corrugated Plastic Pipe, INCLUDING SPECIALS	\$560			
526	25000	Item 526 - Reinforced Concrete Approach Slabs (T=15")	\$68,385			\$68,385
526	90010	Item 526 - Type A Installation	\$16,950			
601	32000	Item 601 - Rock Channel Protection, Type A with Filter	\$13,250			
846	00110	Item 846 - Polymer Modifier Asphalt Expansion Joint System	\$16,358			
		Roadway, Drainage and MOT	\$125,000			
		INCIDENTAL ITEMS				
103	05000	Item 103 - Premium for Contract Performance and Payment Bond	\$11,644			
619	16000	Item 619 - Field Office, Type A	\$10,000			
623	10000	Item 623 - Construction Layout Stakes and Surveying	\$11,644			
624	10000	Item 624 - Mobilization	\$40,000			
		Overlay		\$14,657	\$14,657	
		Painting			\$49,671	
<b>YEAR 2019 COST</b>			<b>\$1,237,676</b>	<b>\$14,657</b>	<b>\$64,328</b>	<b>\$398,077</b>

<b>PRESENT WORTH FACTOR</b>	1.000	0.478	0.307	0.228
<b>LIFE CYCLE COST (75-YEAR BRIDGE LIFE)</b>	\$1,237,676	\$7,006	\$19,749	\$90,762

<b>TOTAL LIFE CYCLE COST</b>	<b>\$1,355,193</b>
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## ALTERNATIVE 2

### COST ESTIMATE 75' SINGLE SPAN PRESTRESSED CONCRETE I-BEAM

ITEM	ITEM EXT.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
202	11203	Item 202 - Portions of Structure Removed, over 20 Foot Span, as per plan	LUMP			\$115,000
202	22900	Item 202 - Approach Slab Removed	267	S.Y.	\$54.00	\$14,400
202	23500	Item 202 - Wearing Course Removed	739	S.Y.	\$12.00	\$8,867
503	11100	Item 503 - Cofferdams and Excavation Bracing	LUMP			\$90,000
503	21100	Item 503 - Unclassified Excavation	241	C.Y.	\$110.00	\$26,530
505	11100	Item 505 - Pile Driving Equipment Mobilization	LUMP			\$25,000
507	00100	Item 507 - Steel Piles HP10X42, Furnished	1280	FT.	\$25.00	\$32,000
507	00150	Item 507 - Steel Piles HP10X42, Driven	1120	FT.	\$16.00	\$17,920
509	10000	Item 509 - Epoxy Coated Reinforcing Steel	62412	POUND	\$1.70	\$106,101
511	34446	Item 511 - Class QC2 Concrete with QC/QA, Bridge Deck	176	C.Y.	\$725.00	\$127,771
511	43512	Item 511 - Class QC1 Concrete with QC/QA, Abutment including Footing	176	C.Y.	\$590.00	\$103,819
511	51510	Item 511 - Class QC2 Concrete, Sidewalk	53	C.Y.	\$750.00	\$39,979
512	10100	Item 512 - Sealing of Concrete Surfaces (Epoxy-Urethane)	472	S.Y.	\$15.00	\$7,080
515	14080	Item 515 - Straight Strand Prestressed Concrete Bridge I-Beam Members, Level 2, Type WF42-49	6	EACH	\$25,000.00	\$150,000
515	20000	Item 515 - Intermediate Diaphragms	5	EACH	\$1,600.00	\$8,000
516	13600	Item 516 - 1" Preformed Expansion Joint Filler	8	S.F.	\$9.00	\$72
516	13900	Item 516 - 2" Preformed Expansion Joint Filler	64	S.F.	\$10.00	\$640
516	14021	Item 516 - Semi-Integral Abutment Expansion Joint Seal	132	FT.	\$40.00	\$5,280
516	44000	Item 516 - Elastomeric Bearing (w/Internal Laminates (Neoprene) and Load Plate)	12	EACH	\$950.00	\$11,400
517	76300	Item 517 - Railing, Misc.: Steel Ornamental Railing	154	FT.	\$250.00	\$38,572
518	21200	Item 518 - Porous Backfill with Geotextile Fabric (Cont.)	77	C.Y.	\$110.00	\$8,470
518	40000	Item 518 - 6" Perforated Corrugated Plastic Pipe	172	FT.	\$9.00	\$1,548
518	40010	Item 518 - 6" Non-Perforated Corrugated Plastic Pipe, INCLUDING SPECIALS	32	FT.	\$17.50	\$560
526	25000	Item 526 - Reinforced Concrete Approach Slabs (T=15")	291	S.Y.	\$235.00	\$68,385
526	90010	Item 526 - Type A Installation	113	FT.	\$150.00	\$16,950
601	32000	Item 601 - Rock Channel Protection, Type A with Filter	106	C.Y.	\$125.00	\$13,250
846	00110	Item 846 - Polymer Modifier Asphalt Expansion Joint System	47	C.F.	\$350.00	\$16,358
		Roadway, Drainage and MOT	LUMP			\$125,000
<b>INCIDENTAL ITEMS</b>						
103	05000	Item 103 - Premium for Contract Performance and Payment Bond	LUMP			\$11,790
619	16000	Item 619 - Field Office, Type A	4	MNTH	\$2,500.00	\$10,000
623	10000	Item 623 - Construction Layout Stakes and Surveying	LUMP			\$11,790
624	10000	Item 624 - Mobilization	LUMP			\$40,000

Total 2019 Cost = \$1,252,531

Total 2023 Cost (14.9% Inflation) = \$1,439,158

## ALTERNATIVE 2

### LIFE CYCLE COST 75' SINGLE SPAN PRESTRESSED CONCRETE I-BEAM

ITEM	ITEM EXT.	DESCRIPTION	Year 0	Year 25	Year 40	Year 50
202	11203	Item 202 - Portions of Structure Removed, over 20 Foot Span, as per plan	\$115,000			\$72,664
202	22900	Item 202 - Approach Slab Removed	\$14,400			\$15,699
202	23500	Item 202 - Wearing Course Removed	\$8,867			\$6,442
503	11100	Item 503 - Cofferdams and Excavation Bracing	\$90,000			
503	21100	Item 503 - Unclassified Excavation	\$26,530			
505	11100	Item 505 - Pile Driving Equipment Mobilization	\$25,000			
507	00100	Item 507 - Steel Piles HP10X42, Furnished	\$32,000			
507	00150	Item 507 - Steel Piles HP10X42, Driven	\$17,920			
509	10000	Item 509 - Epoxy Coated Reinforcing Steel	\$106,101			\$74,900
511	34446	Item 511 - Class QC2 Concrete with QC/QA, Bridge Deck	\$127,771			\$127,771
511	43512	Item 511 - Class QC1 Concrete with QC/QA, Abutment including Footing	\$103,819			
511	51510	Item 511 - Class QC2 Concrete, Sidewalk	\$39,979			
512	10100	Item 512 - Sealing of Concrete Surfaces (Epoxy-Urethane)	\$7,080			
515	14080	Item 515 - Straight Strand Prestressed Concrete Bridge I-Beam Members, Level 2, Type WF42-49	\$150,000			
515	20000	Item 515 - Intermediate Diaphragms	\$8,000			
516	13600	Item 516 - 1" Preformed Expansion Joint Filler	\$72			
516	13900	Item 516 - 2" Preformed Expansion Joint Filler	\$640			
516	14021	Item 516 - Semi-Integral Abutment Expansion Joint Seal	\$5,280			
516	44000	Item 516 - Elastomeric Bearing (w/Internal Laminates (Neoprene) and Load Plate)	\$11,400			
517	76300	Item 517 - Railing, Misc.: Steel Ornamental Railing	\$38,572			\$38,572
518	21200	Item 518 - Porous Backfill with Geotextile Fabric (Cont.)	\$8,470			
518	40000	Item 518 - 6" Perforated Corrugated Plastic Pipe	\$1,548			
518	40010	Item 518 - 6" Non-Perforated Corrugated Plastic Pipe, INCLUDING SPECIALS	\$560			
526	25000	Item 526 - Reinforced Concrete Approach Slabs (T=15")	\$68,385			\$68,385
526	90010	Item 526 - Type A Installation	\$16,950			
601	32000	Item 601 - Rock Channel Protection, Type A with Filter	\$13,250			
846	00110	Item 846 - Polymer Modifier Asphalt Expansion Joint System	\$16,358			
		Roadway, Drainage and MOT	\$125,000			
		INCIDENTAL ITEMS				
103	05000	Item 103 - Premium for Contract Performance and Payment Bond	\$11,790			
619	16000	Item 619 - Field Office, Type A	\$10,000			
623	10000	Item 623 - Construction Layout Stakes and Surveying	\$11,790			
624	10000	Item 624 - Mobilization	\$40,000			
		Overlay		\$14,657	\$14,657	
<b>YEAR 2019 COST</b>			<b>\$1,252,531</b>	<b>\$14,657</b>	<b>\$14,657</b>	<b>\$404,432</b>
<b>PRESENT WORTH FACTOR</b>			<b>1.000</b>	<b>0.478</b>	<b>0.307</b>	<b>0.228</b>
<b>LIFE CYCLE COST (75-YEAR BRIDGE LIFE)</b>			<b>\$1,252,531</b>	<b>\$7,006</b>	<b>\$4,500</b>	<b>\$92,211</b>
<b>TOTAL LIFE CYCLE COST</b>			<b>\$1,356,247</b>			

## ALTERNATIVE 3

### COST ESTIMATE 75' SINGLE SPAN PRESTRESSED CONCRETE BOX BEAM

ITEM	ITEM EXT.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
202	11203	Item 202 - Portions of Structure Removed, over 20 Foot Span, as per plan	LUMP			\$115,000
202	22900	Item 202 - Approach Slab Removed	267	S.Y.	\$54.00	\$14,400
202	23500	Item 202 - Wearing Course Removed	739	S.Y.	\$12.00	\$8,867
503	11100	Item 503 - Cofferdams and Excavation Bracing	LUMP			\$90,000
503	21100	Item 503 - Unclassified Excavation	241	C.Y.	\$110.00	\$26,530
505	11100	Item 505 - Pile Driving Equipment Mobilization	LUMP			\$25,000
507	00100	Item 507 - Steel Piles HP10X42, Furnished	1280	FT.	\$25.00	\$32,000
507	00150	Item 507 - Steel Piles HP10X42, Driven	1120	FT.	\$16.00	\$17,920
509	10000	Item 509 - Epoxy Coated Reinforcing Steel	62412	POUND	\$1.70	\$106,101
511	34446	Item 511 - Class QC2 Concrete with QC/QA, Bridge Deck	176	C.Y.	\$725.00	\$127,771
511	43512	Item 511 - Class QC1 Concrete with QC/QA, Abutment including Footing	176	C.Y.	\$590.00	\$103,819
511	51510	Item 511 - Class QC2 Concrete, Sidewalk	53	C.Y.	\$750.00	\$39,979
512	10100	Item 512 - Sealing of Concrete Surfaces (Epoxy-Urethane)	430	S.Y.	\$15.00	\$6,450
515	12100	Item 515 - Prestressed Concrete Composite Box Beam Bridge Members, Level 1, CB42-36	6	EACH	\$23,000.00	\$138,000
515	20000	Item 515 - Intermediate Diaphragms	5	EACH	\$1,600.00	\$8,000
516	13600	Item 516 - 1" Preformed Expansion Joint Filler	8	S.F.	\$9.00	\$72
516	13900	Item 516 - 2" Preformed Expansion Joint Filler	64	S.F.	\$10.00	\$640
516	14021	Item 516 - Semi-Integral Abutment Expansion Joint Seal	132	FT.	\$40.00	\$5,280
516	41100	Item 516 - 1/8" Preformed Bearing Pad	24	EACH	\$50.00	\$1,200
516	44000	Item 516 - Elastomeric Bearing (w/Internal Laminates (Neoprene) and Load Plate)	24	EACH	\$300.00	\$7,200
517	76300	Item 517 - Railing, Misc.: Steel Ornamental Railing	154	FT.	\$250.00	\$38,572
518	21200	Item 518 - Porous Backfill with Geotextile Fabric (Cont.)	77	C.Y.	\$110.00	\$8,470
518	40000	Item 518 - 6" Perforated Corrugated Plastic Pipe	172	FT.	\$9.00	\$1,548
518	40010	Item 518 - 6" Non-Perforated Corrugated Plastic Pipe, INCLUDING SPECIALS	32	FT.	\$17.50	\$560
526	25000	Item 526 - Reinforced Concrete Approach Slabs (T=15")	291	S.Y.	\$235.00	\$68,385
526	90010	Item 526 - Type A Installation	113	FT.	\$150.00	\$16,950
601	32000	Item 601 - Rock Channel Protection, Type A with Filter	106	C.Y.	\$125.00	\$13,250
846	00110	Item 846 - Polymer Modifier Asphalt Expansion Joint System	47	C.F.	\$350.00	\$16,358
		Roadway, Drainage and MOT	LUMP			\$125,000
<b>INCIDENTAL ITEMS</b>						
103	05000	Item 103 - Premium for Contract Performance and Payment Bond	LUMP			\$11,634
619	16000	Item 619 - Field Office, Type A	4	MNTH	\$2,500.00	\$10,000
623	10000	Item 623 - Construction Layout Stakes and Surveying	LUMP			\$11,634
624	10000	Item 624 - Mobilization	LUMP			\$40,000

Total 2019 Cost = \$1,236,589

Total 2023 Cost (14.9% Inflation) = \$1,420,841

## ALTERNATIVE 3

### LIFE CYCLE COST 75' SINGLE SPAN PRESTRESSED CONCRETE BOX BEAM

ITEM	ITEM EXT.	DESCRIPTION	Year 0	Year 25	Year 40	Year 50
202	11203	Item 202 - Portions of Structure Removed, over 20 Foot Span, as per plan	\$115,000			\$72,664
202	22900	Item 202 - Approach Slab Removed	\$14,400			\$15,699
202	23500	Item 202 - Wearing Course Removed	\$8,867			\$6,442
503	11100	Item 503 - Cofferdams and Excavation Bracing	\$90,000			
503	21100	Item 503 - Unclassified Excavation	\$26,530			
505	11100	Item 505 - Pile Driving Equipment Mobilization	\$25,000			
507	00100	Item 507 - Steel Piles HP10X42, Furnished	\$32,000			
507	00150	Item 507 - Steel Piles HP10X42, Driven	\$17,920			
509	10000	Item 509 - Epoxy Coated Reinforcing Steel	\$106,101			\$74,900
511	34446	Item 511 - Class QC2 Concrete with QC/QA, Bridge Deck	\$127,771			\$127,771
511	43512	Item 511 - Class QC1 Concrete with QC/QA, Abutment including Footing	\$103,819			
511	51510	Item 511 - Class QC2 Concrete, Sidewalk	\$39,979			
512	10100	Item 512 - Sealing of Concrete Surfaces (Epoxy-Urethane)	\$6,450			
515	12100	Item 515 - Prestressed Concrete Composite Box Beam Bridge Members, Level 1, CB42-36	\$138,000			
515	20000	Item 515 - Intermediate Diaphragms	\$8,000			
516	13600	Item 516 - 1" Preformed Expansion Joint Filler	\$72			
516	13900	Item 516 - 2" Preformed Expansion Joint Filler	\$640			
516	14021	Item 516 - Semi-Integral Abutment Expansion Joint Seal	\$5,280			
516	41100	Item 516 - 1/8" Preformed Bearing Pad	\$1,200			
516	44000	Item 516 - Elastomeric Bearing (w/Internal Laminates (Neoprene) and Load Plate)	\$7,200			
517	76300	Item 517 - Railing, Misc.: Steel Ornamental Railing	\$38,572			\$38,572
518	21200	Item 518 - Porous Backfill with Geotextile Fabric (Cont.)	\$8,470			
518	40000	Item 518 - 6" Perforated Corrugated Plastic Pipe	\$1,548			
518	40010	Item 518 - 6" Non-Perforated Corrugated Plastic Pipe, INCLUDING SPECIALS	\$560			
526	25000	Item 526 - Reinforced Concrete Approach Slabs (T=15")	\$68,385			\$68,385
526	90010	Item 526 - Type A Installation	\$16,950			
601	32000	Item 601 - Rock Channel Protection, Type A with Filter	\$13,250			
846	00110	Item 846 - Polymer Modifier Asphalt Expansion Joint System	\$16,358			
		Roadway, Drainage and MOT	\$125,000			
		INCIDENTAL ITEMS				
103	05000	Item 103 - Premium for Contract Performance and Payment Bond	\$11,634			
619	16000	Item 619 - Field Office, Type A	\$10,000			
623	10000	Item 623 - Construction Layout Stakes and Surveying	\$11,634			
624	10000	Item 624 - Mobilization	\$40,000			
		Overlay		\$14,657	\$14,657	
<b>YEAR 2019 COST</b>			<b>\$1,236,589</b>	<b>\$14,657</b>	<b>\$14,657</b>	<b>\$404,432</b>

<b>PRESENT WORTH FACTOR</b>	1.000	0.478	0.307	0.228
<b>LIFE CYCLE COST (75-YEAR BRIDGE LIFE)</b>	\$1,236,589	\$7,006	\$4,500	\$92,211

<b>TOTAL LIFE CYCLE COST</b>	<b>\$1,340,305</b>
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## V. Recommendations

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### Recommendations

Three structure types have been evaluated to replace the existing 9<sup>th</sup> Street S.W. Bridge. Each of these structures was designed to meet AASHTO design criteria and with similar levels of detail to facilitate fair comparison metrics.

**Based preliminarily on construction costs and City of Canton preference, Alternative 1 (Simple-Span Steel Beam Bridge with 75'-0" span) is recommended as the preferred alternative.**

**Since the total construction cost difference between the three alternatives is a maximum of 1.3%, all three alternatives are viable structure options.**

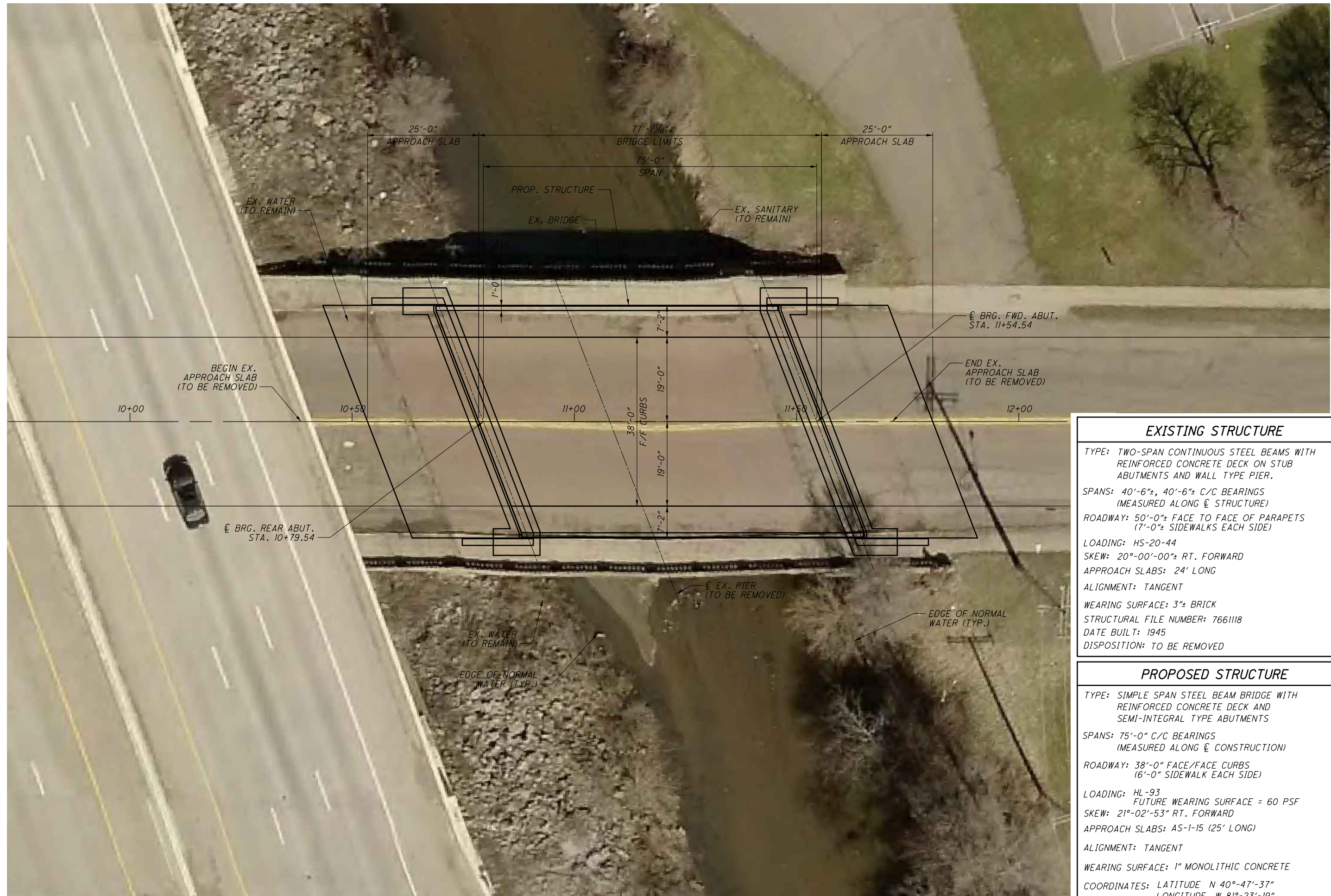
9<sup>th</sup> Street Bridge over West Branch of Nimishillen Creek  
Structure Type Study  
Preliminary General Plan and Transverse Section for Preferred Alternative

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**VI. Preliminary General Plan and Transverse Section for Preferred Alternative**

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**Preliminary General Plan  
and Transverse Section  
for Preferred Alternative**



**EXISTING STRUCTURE**

TYPE: TWO-SPAN CONTINUOUS STEEL BEAMS WITH REINFORCED CONCRETE DECK ON STUB ABUTMENTS AND WALL TYPE PIER.

SPANS: 40'-6"±, 40'-6"± C/C BEARINGS (MEASURED ALONG CL STRUCTURE)

ROADWAY: 50'-0"± FACE TO FACE OF PARAPETS (7'-0"± SIDEWALKS EACH SIDE)

LOADING: HS-20-44

SKREW: 20°-00'-00"± RT. FORWARD

APPROACH SLABS: 24' LONG

ALIGNMENT: TANGENT

WEARING SURFACE: 3"± BRICK

STRUCTURAL FILE NUMBER: 766118

DATE BUILT: 1945

DISPOSITION: TO BE REMOVED

**PROPOSED STRUCTURE**

TYPE: SIMPLE SPAN STEEL BEAM BRIDGE WITH REINFORCED CONCRETE DECK AND SEMI-INTEGRAL TYPE ABUTMENTS

SPANS: 75'-0" C/C BEARINGS (MEASURED ALONG CL CONSTRUCTION)

ROADWAY: 38'-0" FACE/FACE CURBS (16'-0" SIDEWALK EACH SIDE)

LOADING: HL-93  
FUTURE WEARING SURFACE = 60 PSF

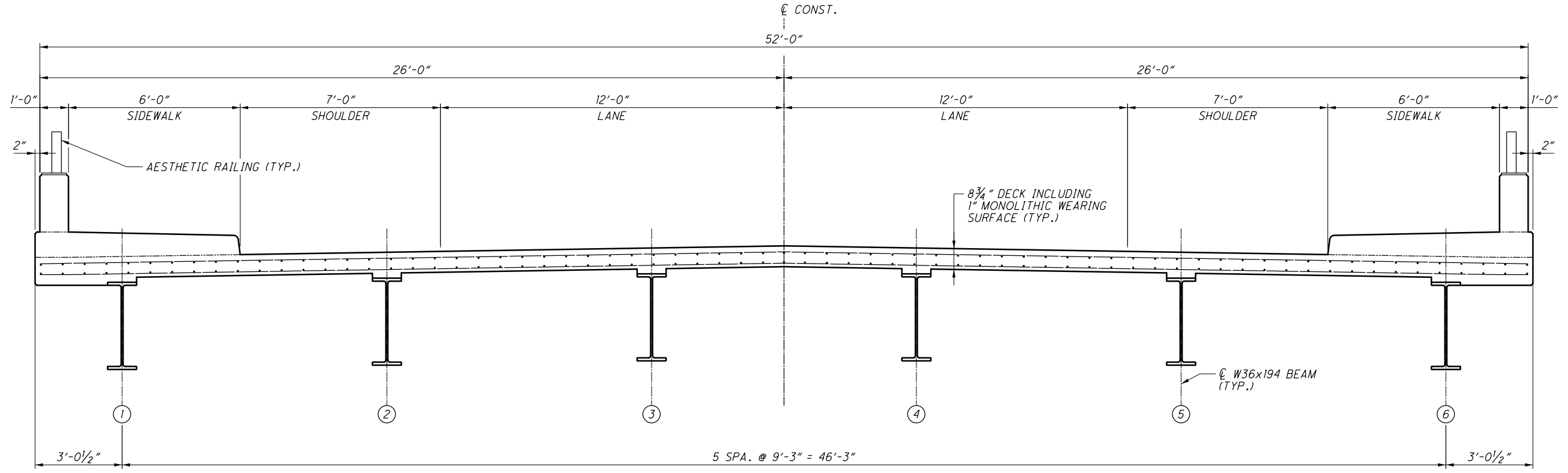
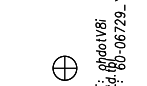
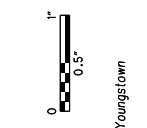
SKREW: 21°-02'-53" RT. FORWARD

APPROACH SLABS: AS-1-15 (25' LONG)

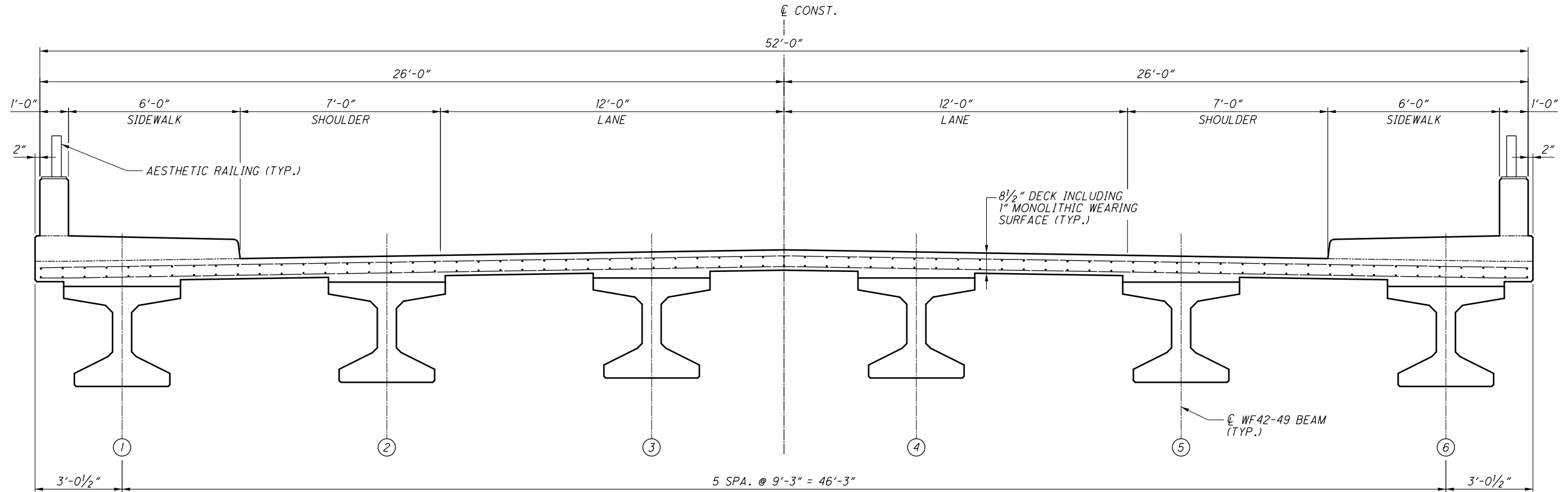
ALIGNMENT: TANGENT

WEARING SURFACE: 1" MONOLITHIC CONCRETE

COORDINATES: LATITUDE N 40°-47'-37"  
LONGITUDE W 81°-23'-19"



**TRANSVERSE SECTION - ALTERNATIVE 1**

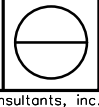


**TRANSVERSE SECTION - ALTERNATIVE 2**

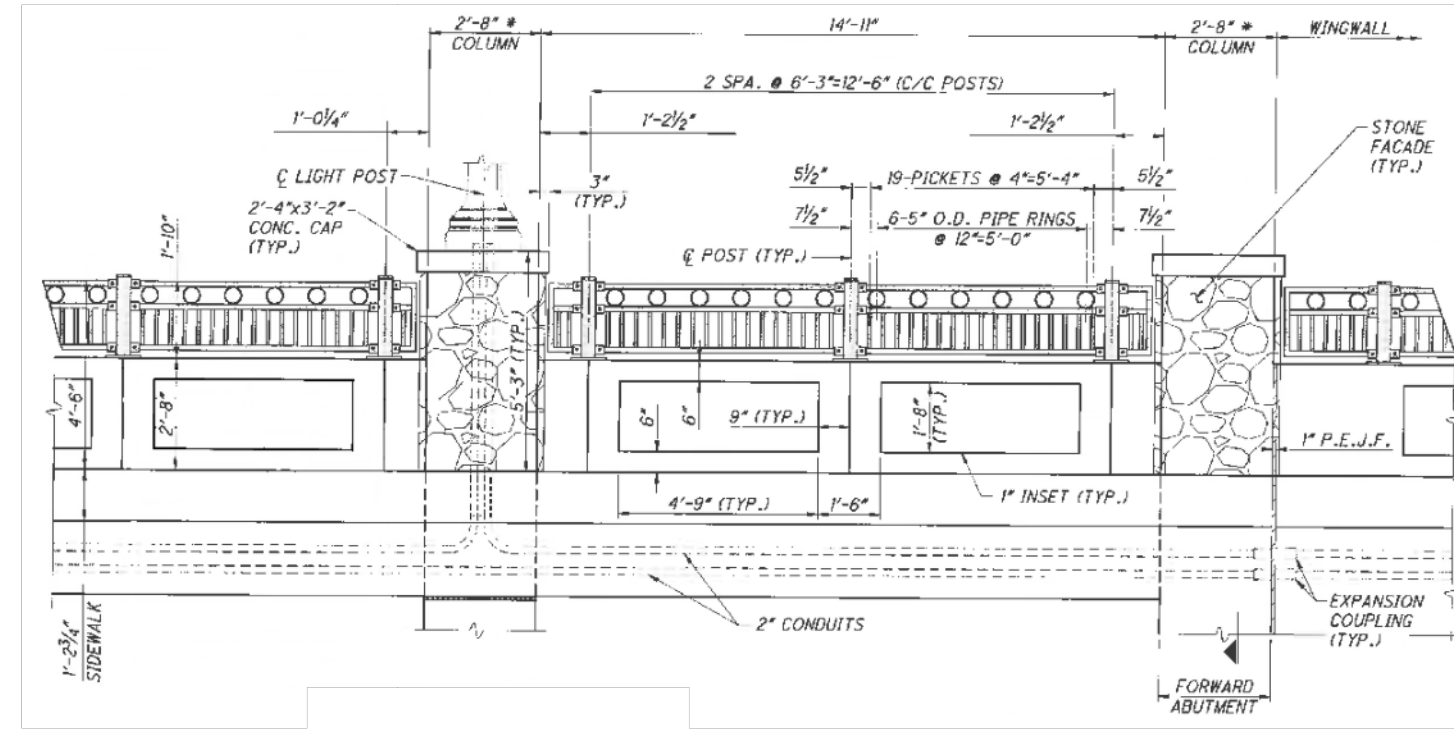
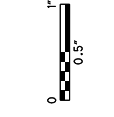
DATE	REVIEWED	DRAWN	DESIGNED
FILE NUMBER	TVB	TVB	TVB
TBD	REVIS	WER	WER

**TRANSVERSE SECTION**  
9TH ST., S.W., BRIDGE  
OVER WEST BRANCH OF NIMISHILLEN CREEK

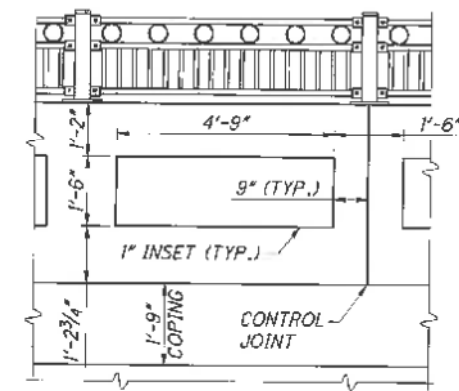
**STA-9THSW-13.25**







**PARTIAL AESTHETIC RAILING DETAIL**  
(INSIDE FACE OF BARRIER)



**PARTIAL AESTHETIC RAILING DETAIL**  
(OUTSIDE FACE OF BARRIER)

