City of Pittsburgh Contract and Scope of Work for Fern Hollow Bridge Rehabilitation

Pittsburgh, PA

HWY22MH003

(65 pages)

PW/BTE/BR/MAS-07107

CITY OF PITTSBURGH

Department of Public Works

Luke Ravenstahl, Mayor

Guy Costa, Director

September 5, 2007

RECEIVED
SEP 11 2007
MICHAEL BAKER JR., INC.

Mr. Ronald S. Capp, P.E.
Project Manager
Michael Baker Jr., Inc.
100 Airside Business Park
Moon Township, PA 15108

RE: Forbes Avenue Bridge over Fern Hollow
Structural Engineering Services
Open-Ended Contract No. 05301
BTE Project No. 07300-5
Work Order No. 5

Dear Mr. Capp:

We are in receipt of your Scope of Work and Cost Proposal dated August 21, 2007 (copy attached), for engineering services related to drainage replacement and minor repairs consisting of: arresting further propagation of the structural steel crack in the north knee brace of floorbeam #6, replacement of deteriorated frame leg cross bracing members, and application of rust inhibiting coating at critical areas.

We find your proposal in the total not-to-exceed amount of [redacted] acceptable. You may consider this letter as authorization to proceed.

The new authorization increases the fee authorized to date as follows:

	TOTAL CONTRACT	Forbes Ave. Bridge over Fern Hollow	
Previous Authorizations	[redacted]	[redacted]	W.O. # 2-A
Current Authorization			W.O. # 5
Total Authorizations to Date			

If you have any questions, please call Chuck McClain, P.E., Project Manager, at 412-255-2034.

Very truly yours,

[redacted] 9/14/07

[redacted]
Guy Costa
Director

GC/PFH/CSM/MAS:jdc

Attachment

cc: Ray Jablonowski (w/attach.) / Patrick Hassett (w/attach.) / Caroline Greco (w/attach.) / Beverly Ochs-Pobicki (w/attach.) Chuck McClain (w/attach.) / Mark Stem (w/attach.) / File

☐ **HEADQUARTERS**
Room 301 City-County Building
414 Grant Street Pittsburgh, PA 15219
412-255-8850 Fax: 412-255-8847

■ **BUREAU OF TRANSPORTATION AND ENGINEERING**
Room 301 City-County Building
414 Grant Street Pittsburgh, PA 15219
412-255-8850 Fax: 412-255-8847

☐ **BUREAU OF OPERATIONS**
611 Second Avenue
Pittsburgh, PA 15219
412-255-2790 Fax: 412-255-8981

☐ **BUREAU OF ENVIRONMENTAL SERVICES**
3001 Railroad Street
Pittsburgh, PA 15201
412-255-2773 Fax: 412-255-2452

www.city.pittsburgh.pa.us

Baker

Michael Baker Jr., Inc.
A Unit of Michael Baker Corporation

Airside Business Park
100 Airside Drive
Moon Township, PA 15108

(412) 269-6300
FAX (412) 375-3997

11

REFERRED [redacted]
TO [redacted]
FOR
FOLLOW-UP

August 21, 2007

Mr. Guy Costa, Director
Department of Public Works
Bureau of Transportation and Engineering
Room 301, City-County Building
414 Grant Street
Pittsburgh, PA 15219-2455

Subject: Structural Engineering Services
Open-Ended Contract No. 05301
Work Order No. 5 (Forbes Avenue Bridge – Frick Park) - Repairs

Dear Mr. Costa:

In accordance with our meeting with Mr. Chuck McClain on July 31, 2007, and subsequent telephone conversations, we have developed the attached Scope of Work and Price Proposal for design and preparation of plans and specifications for partial repairs to the subject structure. These repairs will include replacement of the bridge downspouting system, replacement of a portion of cross-bracing, and application of a corrosion inhibiting coating to portions of the rigid frame legs.

This scope of work does not include any repairs to the frame legs since those repairs cannot be accomplished without temporarily closing the bridge to traffic. Also, design of those repairs would require a costly structural analysis of the rigid frame. The drainage problems on this structure are the primary cause of structural corrosion. The repairs included in this current scope of work are intended to correct that drainage problem and arrest any further structural corrosion.

Hopefully you will find everything satisfactory; however, we would be pleased to meet at your convenience to discuss any questions, or make any necessary modifications to this proposal.

Please do not hesitate to call me at 412-269-7931, or Joe Salvadori at 412-269-7947, if any questions arise or if any additional information is needed.

Sincerely yours,

MICHAEL BAKER JR., INC.

[redacted]

Ronald S. Capp, P.E.
Project Manager

Attachments

Challenge Us.

CITY OF PITTSBURGH
FORBES AVENUE BRIDGE
WORK ORDER NO. 5

SCOPE OF WORK

Plans and Specifications will be prepared for the following repair work:

1. Drainage System
Replacement of existing downspouting pipes and brackets. These extend from the bridge deck scuppers and connect to the existing underground drainage system. This work will also include cleaning of the existing scuppers as well as cleaning of the underground drainage pipe system into which the downspouting will be reconnected.

2. Crack in Knee Brace of Floorbeam #6 at North Girder
Repairs to this crack will consist only of drilling a hole at the end of the crack, intended to arrest further propagation of the crack. This work will include performance of a magnetic particle inspection or dye penetrant test to verify the end of the crack.

3. Replacement of Cross Bracing
Replacement of a portion of the cross bracing of the frame legs. This includes the cross bracing members and gusset plates from mid-height of the legs to the shoes, for both the east and west legs.

4. Application of Rust Inhibiting Coating
Blast cleaning and application of a rust inhibiting coating on the frame legs and lower bracing members.

5. Shop Drawing Review and Construction Consultation
This work will include review of Contractor/Fabricator submitted shop drawings for the downspouting and cross bracing, as well as responding to questions during fabrication and construction.

CITY OF PITTSBURGH DEPARTMENT OF PUBLIC WORKS
STRUCTURAL ENGINEERING SERVICES
OPEN ENDED CONTRACT

WORK ORDER NO. 5 COST SUMMARY
FORBES AVENUE BRIDGE
REPLACEMENT OF DRAINAGE SYSTEM AND CROSS-BRACING

Direct Labor Costs		
	Project Manager	[redacted]
	Project Engineer	
	Staff Engineer	
	Inspector	
	Secretary	
Overhead @ [redacted]		[redacted]
Fixed Fee @ [redacted] of DL		
Direct Costs other than Payroll		
Escalation of Direct and Indirect Payroll Costs*		
	TOTAL ENGINEERING COST for PART I:	[redacted]
Rigging and Traffic Control		
	TOTAL COST for PART I:	[redacted]

*No escalation is anticipated.

Total Estimated Man-hours	340
Proposed Method of Payment:	Cost Plus Fixed Fee
Proposed Work Order Period:	3 Months

Consultant: Michael Baker Jr., Inc.
Airside Business Park
Moon Township, Pennsylvania 15108
Federal I.D. Number 25-1228-838

Contact Person: Joseph E. Salvador, P.E.
[redacted]

Prepared By: Ronald S. Capp, P.E.

The following drawings are anticipated:

General Plan & Elevation	1 Sheet
General Notes	1 Sheet
Index, Summary of Repairs, Quantity Block	1 Sheet
Downspouting Details	2 Sheets
Bracing and Bracing Details	2 Sheets
	8 Sheets

Design, plans, and specifications will be prepared in accordance with PennDOT procedures and format.

Preliminary drawings and specifications will be submitted to the City for review at approximately the 75% stage and a review meeting held to discuss any questions which may be raised. City comments will be addressed and the plans and specifications will be finalized and submitted for the City's final review and approval.

Preparation of formal bidding documents and provision of bid phase services are not included in this scope of work since it is understood that the City can award this work to a Contractor without a formal bid process. Baker will, however, be available to meet with the City and their Contractor to answer any questions and clarify the intent of the drawings prior to the Contractor developing an estimate for the work.

OTHER DIRECT COSTS ESTIMATE

PRINTING FOR PRODUCT DELIVERABLES:

700	B/W Photocopies (8.5" x 11") @	[redacted]	EACH	[redacted]
200	B/W Photocopies (11" x 17") @		EACH	
	Color Photocopies (11" x 17") @		EACH	
50	B/W Prints (24" x 36") @		EACH	
10	Mylar (24"x 36") @		EACH	

PRINTING TOTAL

OVERNIGHT MAIL:

4	Packages @		/Package

MILEAGE:

200	MILES @		/MILE

MEETINGS/TRAVEL:

NUMBER OF MEETINGS =				
AVERAGE NUMBER OF PEOPLE @ MEETINGS=				
AIR TRAVEL:			/PERSON/TRIP x	
			/PERSON/TRIP x	
FLEET VEHICLE:			/Day x	0
			/Overnight x	0

TOTAL OTHER DIRECT COSTS: [redacted]

MAN-HOUR AND COST ESTIMATE - DESIGN OF DRAINAGE SYSTEM AND CROSS-BRACING

MAN-HOURS/CLASSIFICATION	Project Mgr.	Project Engineer	Staff Engineer	Draftsman	Secretary	Total
Design and Plan Preparation	8	40	72	120		240
Specifications, Quantities, Cost Estimate		12	12		2	26
Meetings	8	8				16
Shop Drawing Review and Construction Consultation	2	8	12	16	2	40
Project Management and Administration	16				2	18
TOTAL MAN-HOURS PER CLASSIFICATION	34	68	96	136	6	340
HOURLY RATE*	[redacted]					
TOTAL DIRECT LABOR PER CLASSIFICATION						

*Average Rates

Total Direct Labor	[redacted]
Overhead @	[redacted]
Fixed Fee @	
Other Direct Costs	
Total Contract Value	[redacted]

McNamara, Denise

From: Capp, Ron
Sent: Wednesday, September 12, 2007 4:33 PM
To: Lang, Guy
Cc: Salvadori, Joseph E
Subject: Forbes Avenue Bridge Repairs

Guy,

Prior to our meeting, you can take a look at the Inspection Report and other information at:

J:\BMS\Projects\Inspection\Forbes Avenue Bridge

The scope of our repairs at this time will be:

1. Replacement of Downspouting System. (leave scuppers in place, but clean them out) 2. Replacement of the lower set of Cross Bracing between the frames' inclined legs 3. Coating of the lower portion of Inclined Legs with a Rust Inhibiting Coating 4. Crack repair by drilling a hole at the end, then having them inspect the hole by mag particle ? to verify it is at the end of the crack.

We'll go over all this when we meet,.....just wanted to give you some advance information.
Ron

McNamara, Denise

From: Capp, Ron
Sent: Tuesday, October 23, 2007 2:40 PM
To: charles.mcclain@city.pittsburgh.pa.us
Cc: Lang, Guy
Subject: Forbes Avenue Bridge Repairs

Chuck,
Attached are Preliminary Drawings (75%), and Preliminary Quantities and Cost Estimate for Repairs to the Forbes Avenu e Bridge. I'm also placing two copies of these in the mail to you today.
After you've taken a look at these, please let me kn...

Baker

Michael Baker Jr., Inc.
A Unit of Michael Baker Corporation

Airside Business Park
100 Airside Drive
Moon Township, PA 15108
(412) 269-6300
FAX (412) 375-3997

Letter of Transmittal

To:	Department of Public Works Bureau of Transportation and Engineering	S.O. No.:	112530
	Room 301, City-County Building 414 Grant Street	Project:	Open Ended Contract 05301 Work Order No. 5 Forbes Avenue Bridge Repairs
	Pittsburgh, PA 15219-2455		
Attn:	Mr. Charles McClain	Date:	October 23, 2007

We are forwarding the following: ☒ Attached ☐ Under Separate Cover ☐ Other

DWG. NO.	NO. COPIES	TITLE OR DESCRIPTION	COMMENTS
Dwgs. 1 - 5	2	Forbes Avenue Bridge over Fern Hollow and Nine Mile Creek, Frick Park	Preliminary Drawings (75%)
Pages 1 - 4	2	Quantities and Cost Estimate	Preliminary Estimate (75%)

THESE ARE TRANSMITTED as checked below:

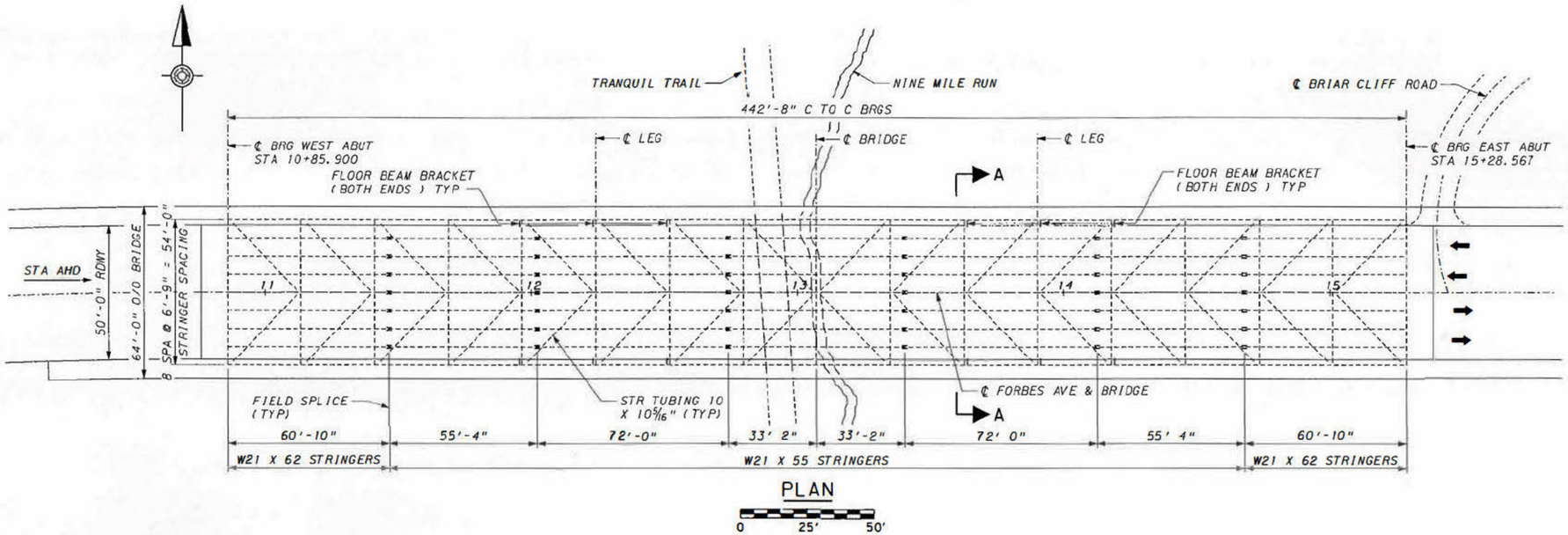
☐ As requested	☐ No exception taken	☐ Revise and resubmit
☒ For review and comment	☐ Rejected - See remarks	☐ Submit specified items
☐ For your information	☐ Proceed subject to corrections noted	☐ Other

GENERAL COMMENTS:
These documents are provided for your preliminary review and comments.

Michael Baker Jr., Inc.

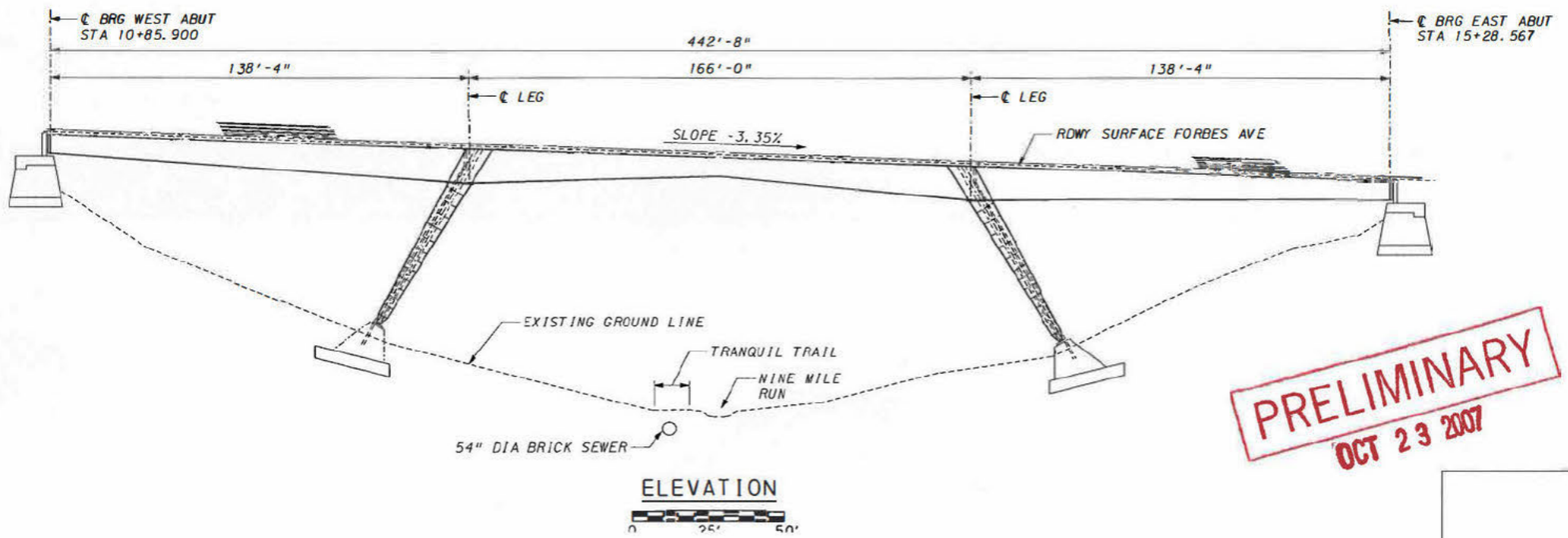
By: Ronald S. Capp, P.E.
Title: Project Manager
Page: 1 of 1

112530
cc: GRLang, RSCapp/PFile



PLAN

0 25' 50'



ELEVATION

0 25' 50'

INDEX OF DRAWINGS	
SHEET NO	TITLE
1	GENERAL PLAN AND ELEVATION
2	GENERAL NOTES
3	TYPICAL SECTION AND KNEE BRACE REPAIR
4	FRAME LEGS AND BRACING REPAIRS
5	DOWNSPOUT REPAIRS

NOTES:

SHOP DRAWINGS MUST INDICATE THAT EXISTING DIMENSIONS THAT RELATE TO THE AFFECTED WORK HAVE BEEN FIELD VERIFIED BEFORE SHOP DRAWINGS CAN BE APPROVED. NO PAYMENT OR APPROVAL WILL BE GIVEN UNTIL ALL DIMENSIONS ARE FIELD VERIFIED.

FOR SECTION A-A, SEE SHEET 3.

PRELIMINARY
OCT 23 2007

STRUCTURE NO. 02730100003033

D.E.C. PROJECT NO. ---

CITY OF PITTSBURGH
DEPARTMENT OF ENGINEERING AND CONSTRUCTION
FORBES AVENUE BRIDGE OVER FERN HOLLOW
AND NINE MILE CREEK, FRICK PARK

BRIDGE REHABILATATION

GENERAL PLAN AND ELEVATION

DESIGNED BY	
CHECKED BY	
DRAWN BY	RJK
CHECKED BY	

$$--- ---DESIGN FILE-NAME--------$$

PROJECT ENGINEER

SCALE: AS NOTED
DATE:

SHEET NO. 1 OF ---

ACCESSION NO.
CASE NO.

MBI-NTSB-0011

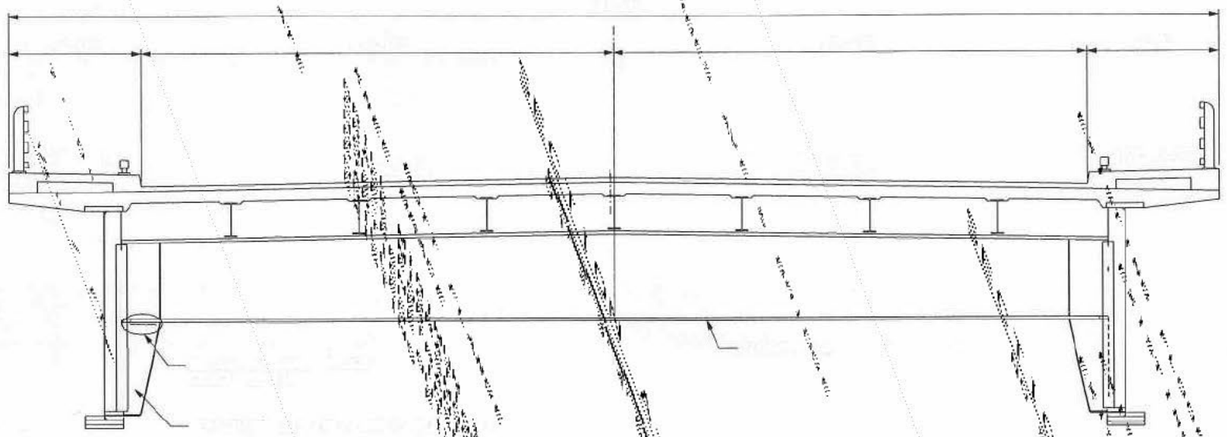
2. C ... B CE ... LOORBEAM 6 ... O ... GI DER

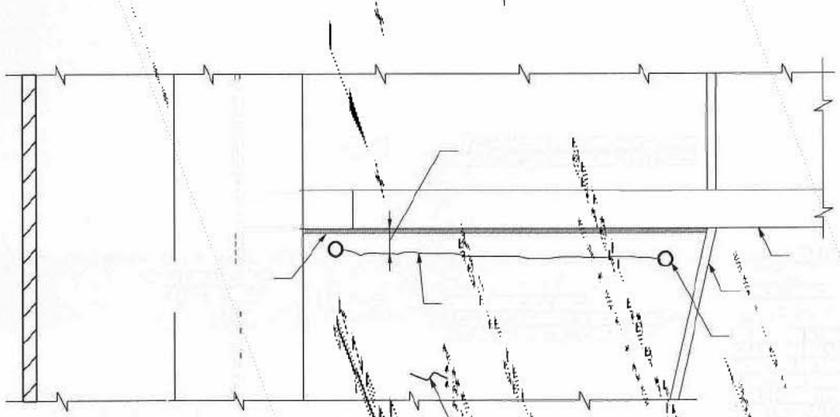
3. E L C E ... C OSS BRACI G

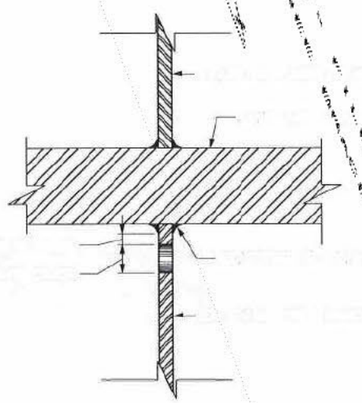
4. A LIC ... HIBITING COA I G

PRELIMINARY

MBI-NTSB-0012

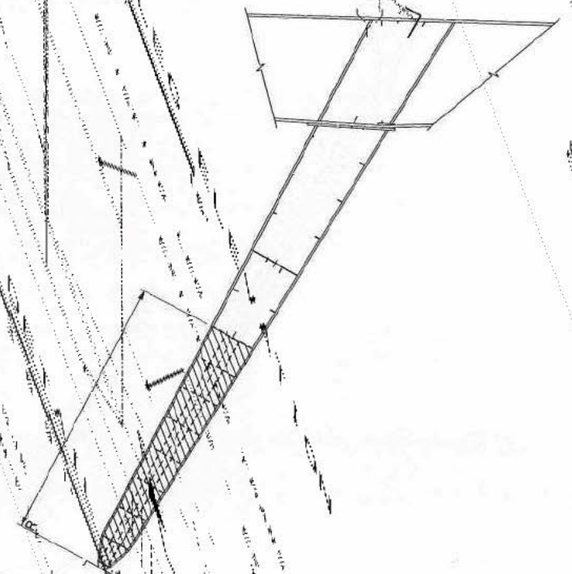


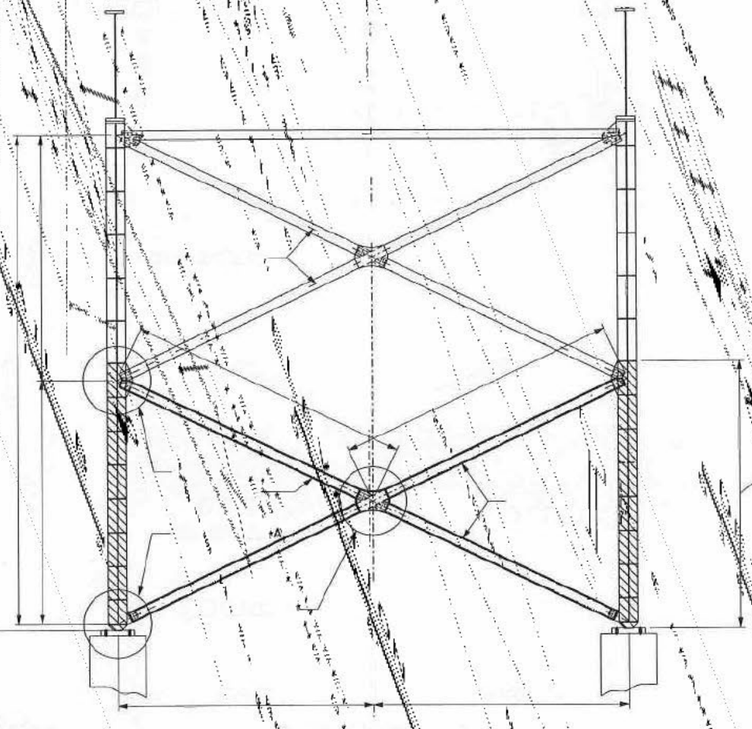


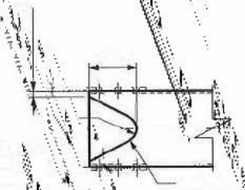


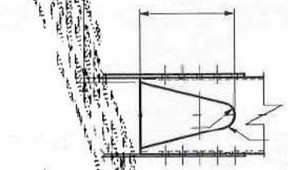
PRELIMINARY

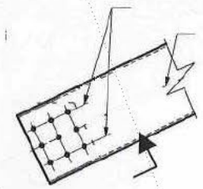
MBI-NTSB-0013

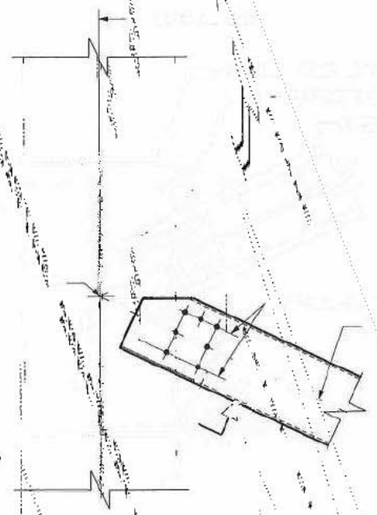


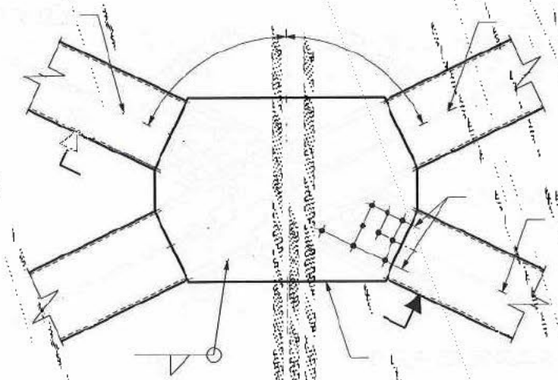




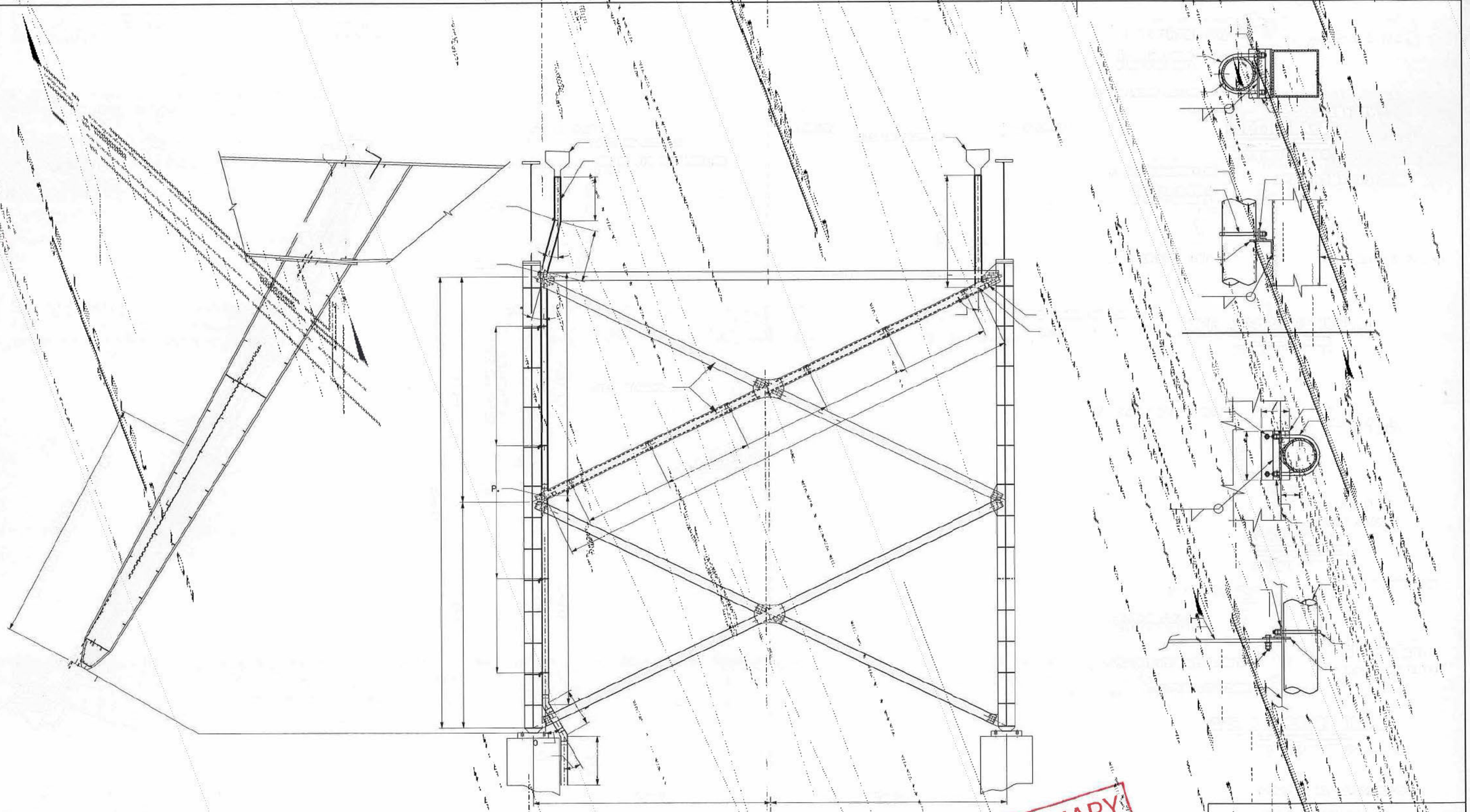








PRELIMINARY



PRELIMINARY

SO No.: 112530
Subject: Forbes Avenue Bridge Repairs
Quantities & Cost Estimate
Summary
Computed By: GRL Checked By: _____ Date: 10/5/2007

Baker
Engineering & Energy
ChallengeUs.

Filename: J:\BMS\Projects\Inspection\Forbes Avenue Bridge\[Bridge Repairs Cost Estimate 10-23-07.xls]Summary

Description	Unit	Total	Unit Cost	Total Cost
Rust Inhibiting Coating	LS	1	[redacted]	
Downspouting	LF	300		
Cross Bracing	LF	240		
Miscellaneous fab. structural repairs (four gusset plates)	LBS	490		
Crack repair	EA	1		
Erection Costs	LS	1		

Contin[redacted]

Notes:

A contingency is included due to the preliminary nature of this estimate.

Costs of downspouting includes misc. items such as elbows, connections, etc.

PRELIMINARY

MBI-NTSB-0016

Quantity of coating of the lower portion of legs with rust inhibiting coating
reference existing design drawings

surface area (approx.)

Flanges 2' (width) x 2 (faces) x 27.33'	109.32 sq. ft
web (3'+5')/2 ave. x 2 (faces) x 27.33'	218.64 sq. ft
long. Stiffeners 2(5.5/12) x 1 side x (27.33-2.5)	23 sq. ft
transverse stiffeners 2 faces x (8+2)each x (3'+5')/2 ave. lengthx 7"/12(wi	47 sq. ft
surface area per leg	**397 sq. ft**
number of legs	4
Total suface area to be coated	1589.55 sq. ft

Total suface area to be coated	**1,600 S.F.**

Lump sum cost: phone conversation 9-27-07 with KTA-Tator, Inc.
Jim Macher [redacted]
for cleaning steel and application of coating

Therefore, 1600 sq. ft. x $9/SF = [redacted]

MBI-NTSB-0017

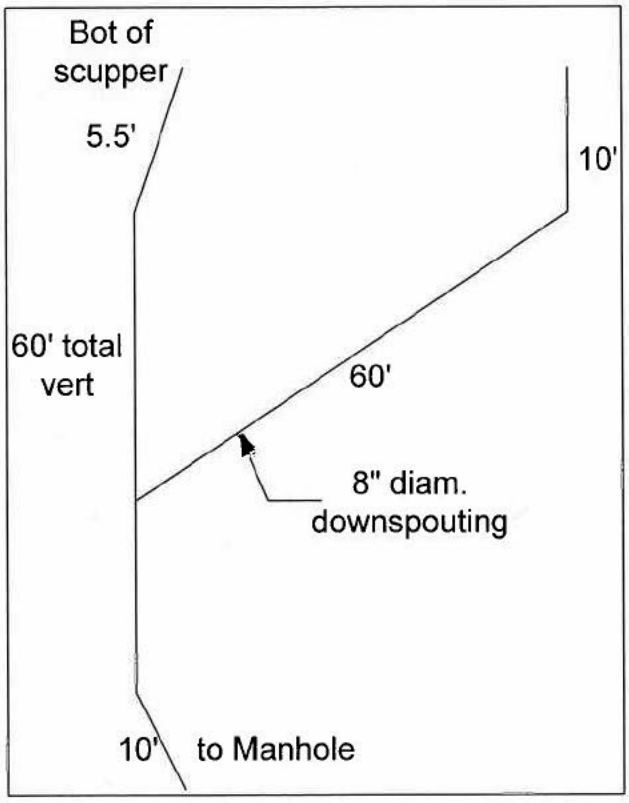
Quantity of Downspouting

Located along each inclined leg and diagonal bracing

cost includes installation of supports to inclined leg and bracing

Vertical run along inclined leg	60.0 ft.
length below scuppers 5.5' + 10'	15.5 ft.
diagonal length along bracing	60.0 ft.
approx. length bot. of leg to manhole	10.0 ft.
subtotal - length along one leg	146.0 ft.

Total length required for both legs	**300 L.F.**



MBI-NTSB-0018

Quantity for lower replacement of bracing at each leg

reference existing design drawings
existing bracing consists of four welded plates to construct a rectangle
assume the new section to be a HSS 12 X 12 X .375
this matches the outside dimensions of the existing box and
meets or exceeds the moments of inertia

diagonal length point to point **59.79 ft.**

two required for each leg
total required = 4 x 59.79' = 239.16

total weight of bracing .58 lbs/lf 13,871 lb (information only)
assum[redacted](as per phone conversation w/ MC Iron Works, Henry Lerc
cost: 58 lbs/lf x[redacted]x 1.20 contractors markup =[redacted]use [redacted]per L.F.

Total length for lower bracing replacement	**240 L.F.**

Fabricated Structural Steel

at the intersection of the new cross bracing
gusset plates are required
all other locations assume existing gusset plates can be reused
two required at each intersection (both sides) - two locations

1/2" thickness	0.5 inches
length	36.0 inches
height	24.0 inches

total weight for one plate 122.5 lbs
4 plates required

Total weight for gussets	**490 LBS.**

MBI-NTSB-0019

McNamara, Denise

From: Capp, Ron
Sent: Thursday, August 21, 2008 10:16 AM
To: Vannoy, Scott
Subject: Forbes Avenue Bridge

Scott,

I need to talk with you about this project. We inspected it and developed some repair plans. The City wants to meet at the bridge and discuss access issues and some changes to the plans.

Let me know when you have a few minutes. It'll be easier for me to explain the issues.

I need to get back to the City and let them know when a meeting can be arranged.

Thanks,
Ron

McNamara, Denise

From: Capp, Ron
Sent: Thursday, August 21, 2008 12:09 PM
To: Vannoy, Scott
Subject: Re: Forbes Avenue Bridge

Scott,
We can talk in the morning. I don't know who to send. Guy Lang handled development of the repair plans. Neither he nor I have been to the site. Joe Salvadori handled the inspection which was performed by Tom Hooks and Russ Howells.

I do...

McNamara, Denise

From: Capp, Ron
Sent: Monday, August 25, 2008 5:12 PM
To: Lang, Guy
Subject: Forbes Avenue Bridge

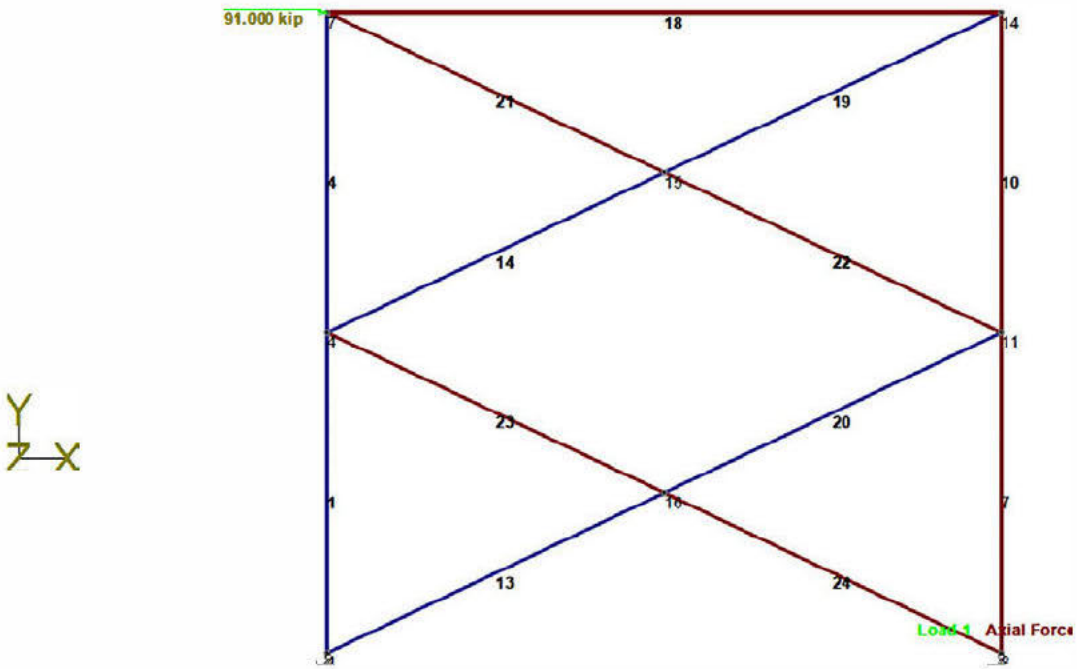
Guy,

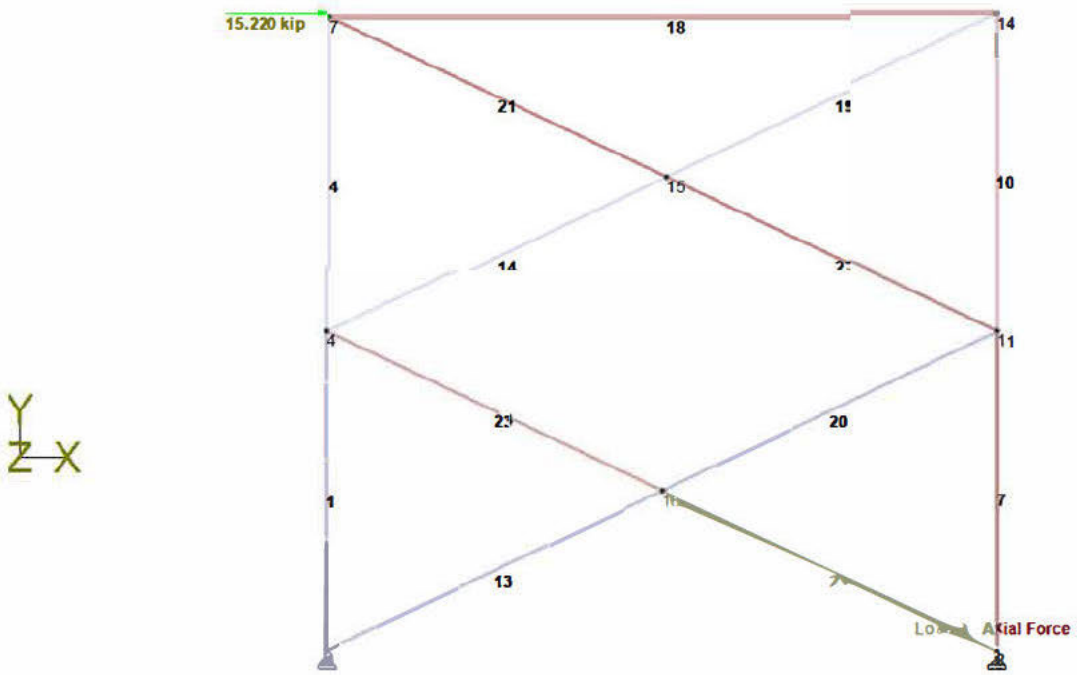
If you get a chance, could you start taking a brief look at how we would handle splicing new material onto the "corroded" ends of the existing bracing. I'm assuming the corrosion is near the ends.

We can discuss briefly some time Tuesday. I just want to do a little prep for Wednesday's meeting, at least to be able to see what problems may be involved in this approach if they can't replace the entire member.

Ron

```
STAAD TRUSS
START JOB INFORMATION
ENGINEER DATE 29-Aug-08
END JOB INFORMATION
INPUT WIDTH 79
UNIT FEET KIP
JOINT COORDINATES
1 0 0.66667 0; 4 0 26.333 0; 7 0 52 0; 8 54 0.66667 0; 11 54 26.333 0;
14 54 52 0; 15 27 39.1665 0; 16 27 13.4998 0;
MEMBER INCIDENCES
1 1 4; 4 4 7; 7 8 11; 10 11 14; 13 1 16; 14 4 15; 18 7 14; 19 15 14; 20 16 11;
21 7 15; 22 15 11; 23 4 16; 24 16 8;
DEFINE MATERIAL START
ISOTROPIC STEEL
E 4.176e+006
POISSON 0.3
DENSITY 0.489024
ALPHA 6.5e-006
DAMP 0.03
END DEFINE MATERIAL
MEMBER PROPERTY AMERICAN
1 7 TAPERED 1.5 0.041667 3.211 2 0.1875 2 0.1875
4 10 TAPERED 4.756 0.057292 4.867 2 0.1875 2 0.1875
MEMBER PROPERTY AMERICAN
13 14 18 TO 24 PRIS AX 0.104167 IZ 0.015914
CONSTANTS
BETA 90 MEMB 1 4 7 10
MATERIAL STEEL ALL
SUPPORTS
1 8 PINNED
MEMBER TRUSS
13 14 18 TO 24
LOAD 1 LOADTYPE None  TITLE WIND ON STRUCTURE (WS)
JOINT LOAD
7 FX 91
LOAD 2 LOADTYPE None  TITLE WIND ON LIVE LOAD (WL)
JOINT LOAD
7 FX 15.22
LOAD COMB 3 GROUP II
1 1.0
LOAD COMB 4 GROUP III
1 0.3 2 1.0
PERFORM ANALYSIS
FINISH
```




15.220 kip
7
18
14
21
19
4
15
10
14
11
23
20
1
7
13
Axial Force

Beam End Forces

Sign convention is as the action of the joint on the beam.

			Axial	Shear		Torsion	Bending	
Beam	Node	L/C	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip˙in)	My (kip˙in)	Mz (kip˙in)
1	1	1:WIND ON ST	-61.542	0	0	0	0	0
		2:WIND ON LI\	-10.293	0	0	0	0	0
		3:GROUP II	-61.542	0	0	0	0	0
		4:GROUP III	-28.756	0	0	0	0	0
	4	1:WIND ON ST	61.542	0	0	0	0	0
		2:WIND ON LI\	10.293	0	0	0	0	0
		3:GROUP II	61.542	0	0	0	0	0
		4:GROUP III	28.756	0	0	0	0	0
4	4	1:WIND ON ST	-24.965	0	0	0	0	0
		2:WIND ON LI\	-4.175	0	0	0	0	0
		3:GROUP II	-24.965	0	0	0	0	0
		4:GROUP III	-11.665	0	0	0	0	0
	7	1:WIND ON ST	24.965	0	0	0	0	0
		2:WIND ON LI\	4.175	0	0	0	0	0
		3:GROUP II	24.965	0	0	0	0	0
		4:GROUP III	11.665	0	0	0	0	0
7	8	1:WIND ON ST	68.218	0	0	0	0	0
		2:WIND ON LI\	11.410	0	0	0	0	0
		3:GROUP II	68.218	0	0	0	0	0
		4:GROUP III	31.875	0	0	0	0	0
	11	1:WIND ON ST	-68.218	0	0	0	0	0
		2:WIND ON LI\	-11.410	0	0	0	0	0
		3:GROUP II	-68.218	0	0	0	0	0
		4:GROUP III	-31.875	0	0	0	0	0
10	11	1:WIND ON ST	18.289	0	0	0	0	0
		2:WIND ON LI\	3.059	0	0	0	0	0
		3:GROUP II	18.289	0	0	0	0	0
		4:GROUP III	8.545	0	0	0	0	0
	14	1:WIND ON ST	-18.289	0	0	0	0	0
		2:WIND ON LI\	-3.059	0	0	0	0	0
		3:GROUP II	-18.289	0	0	0	0	0
		4:GROUP III	-8.545	0	0	0	0	0
13	1	1:WIND ON ST	-58.154	0	0	0	0	0
		2:WIND ON LI\	-9.726	0	0	0	0	0
		3:GROUP II	-58.154	0	0	0	0	0
		4:GROUP III	-27.173	0	0	0	0	0
	16	1:WIND ON ST	58.154	0	0	0	0	0
		2:WIND ON LI\	9.726	0	0	0	0	0
		3:GROUP II	58.154	0	0	0	0	0
		4:GROUP III	27.173	0	0	0	0	0
14	4	1:WIND ON ST	-42.602	0	0	0	0	0
		2:WIND ON LI\	-7.125	0	0	0	0	0
		3:GROUP II	-42.602	0	0	0	0	0

Beam End Forces Cont...

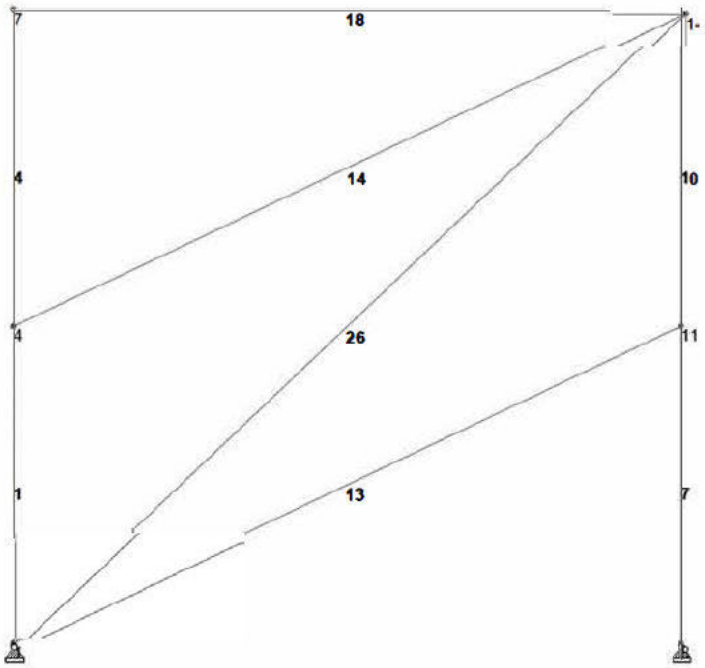
Beam	Node	L/C	Axial	Shear		Torsion	Bending	
			Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip˙in)	My (kip˙in)	Mz (kip˙in)
		4:GROUP III	-19.906	0	0	0	0	0
	15	1:WIND ON ST	42.602	0	0	0	0	0
		2:WIND ON LI'	7.125	0	0	0	0	0
		3:GROUP II	42.602	0	0	0	0	0
		4:GROUP III	19.906	0	0	0	0	0
18	7	1:WIND ON ST	38.477	0	0	0	0	0
		2:WIND ON LI'	6.435	0	0	0	0	0
		3:GROUP II	38.477	0	0	0	0	0
		4:GROUP III	17.978	0	0	0	0	0
	14	1:WIND ON ST	-38.477	0	0	0	0	0
		2:WIND ON LI'	-6.435	0	0	0	0	0
		3:GROUP II	-38.477	0	0	0	0	0
		4:GROUP III	-17.978	0	0	0	0	0
19	15	1:WIND ON ST	-42.602	0	0	0	0	0
		2:WIND ON LI'	-7.125	0	0	0	0	0
		3:GROUP II	-42.602	0	0	0	0	0
		4:GROUP III	-19.906	0	0	0	0	0
	14	1:WIND ON ST	42.602	0	0	0	0	0
		2:WIND ON LI'	7.125	0	0	0	0	0
		3:GROUP II	42.602	0	0	0	0	0
		4:GROUP III	19.906	0	0	0	0	0
20	16	1:WIND ON ST	-58.154	0	0	0	0	0
		2:WIND ON LI'	-9.726	0	0	0	0	0
		3:GROUP II	-58.154	0	0	0	0	0
		4:GROUP III	-27.173	0	0	0	0	0
	11	1:WIND ON ST	58.154	0	0	0	0	0
		2:WIND ON LI'	9.726	0	0	0	0	0
		3:GROUP II	58.154	0	0	0	0	0
		4:GROUP III	27.173	0	0	0	0	0
21	7	1:WIND ON ST	58.154	0	0	0	0	0
		2:WIND ON LI'	9.726	0	0	0	0	0
		3:GROUP II	58.154	0	0	0	0	0
		4:GROUP III	27.173	0	0	0	0	0
	15	1:WIND ON ST	-58.154	0	0	0	0	0
		2:WIND ON LI'	-9.726	0	0	0	0	0
		3:GROUP II	-58.154	0	0	0	0	0
		4:GROUP III	-27.173	0	0	0	0	0
22	15	1:WIND ON ST	58.154	0	0	0	0	0
		2:WIND ON LI'	9.726	0	0	0	0	0
		3:GROUP II	58.154	0	0	0	0	0
		4:GROUP III	27.173	0	0	0	0	0
	11	1 WIND ON ST	-58.154	0	0	0	0	0
		2:WIND ON LI'	-9.726	0	0	0	0	0
		3:GROUP II	-58.154	0	0	0	0	0

Beam End Forces Cont...

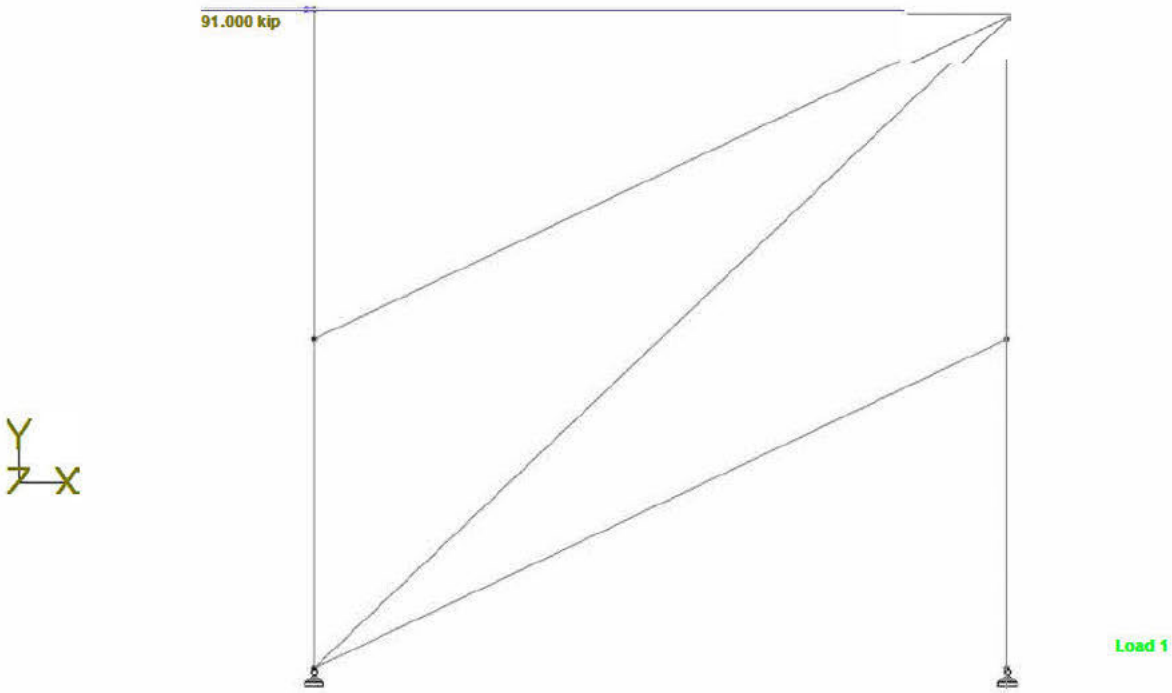
Beam	Node	L/C	Axial Fx (kip)	Shear Fy (kip)	Shear Fz (kip)	Torsion Mx (kip-in)	Bending My (kip-in)	Bending Mz (kip-in)
		4:GROUP III	-27.173	0	0	0	0	0
23	4	1:WIND ON ST	42.602	0	0	0	0	0
		2:WIND ON LI	7.125	0	0	0	0	0
		3:GROUP II	42.602	0	0	0	0	0
		4:GROUP III	19.906	0	0	0	0	0
	16	1:WIND ON ST	-42.602	0	0	0	0	0
		2:WIND ON LI	-7.125	0	0	0	0	0
		3:GROUP II	-42.602	0	0	0	0	0
		4:GROUP III	-19.906	0	0	0	0	0
24	16	1:WIND ON ST	42.602	0	0	0	0	0
		2:WIND ON LI	7.125	0	0	0	0	0
		3:GROUP II	42.602	0	0	0	0	0
		4:GROUP III	19.906	0	0	0	0	0
	8	1:WIND ON ST	-42.602	0	0	0	0	0
		2:WIND ON LI	-7.125	0	0	0	0	0
		3:GROUP II	-42.602	0	0	0	0	0
		4:GROUP III	-19.906	0	0	0	0	0

```
STAAD TRUSS
START JOB INFORMATION
ENGINEER DATE 29-Aug-08
END JOB INFORMATION
INPUT WIDTH 79
UNIT FEET KIP
JOINT COORDINATES
1 0 0.66667 0; 4 0 26.333 0; 7 0 52 0; 8 54 0.66667 0; 11 54 26.333 0;
14 54 52 0;
MEMBER INCIDENCES
1 1 4; 4 4 7; 7 8 11; 10 11 14; 13 1 11; 14 4 14; 18 7 14; 26 1 14;
DEFINE MATERIAL START
ISOTROPIC STEEL
E 4.176e+006
POISSON 0.3
DENSITY 0.489024
ALPHA 6.5e-006
DAMP 0.03
ISOTROPIC STRUCTROPE
E 3.456e+006
POISSON 0.3
END DEFINE MATERIAL
MEMBER PROPERTY AMERICAN
1 7 TAPERED 1.5 0.041667 3.211 2 0.1875 2 0.1875
4 10 TAPERED 4.756 0.057292 4.867 2 0.1875 2 0.1875
MEMBER PROPERTY AMERICAN
13 14 18 PRIS AX 0.104167 IZ 0.015914
MEMBER PROPERTY AMERICAN
26 PRIS AX 0.010908
CONSTANTS
BETA 90 MEMB 1 4 7 10
MATERIAL STEEL MEMB 1 4 7 10 13 14 18
MATERIAL STRUCTROPE MEMB 26
SUPPORTS
1 8 PINNED
MEMBER TRUSS
13 14 18
MEMBER CABLE
26 TENSION 0
LOAD 1 LOADTYPE None  TITLE WIND ON STRUCTURE (WS)
JOINT LOAD
7 FX 91
LOAD 2 LOADTYPE None  TITLE WIND ON LIVE LOAD (WL)
JOINT LOAD
```

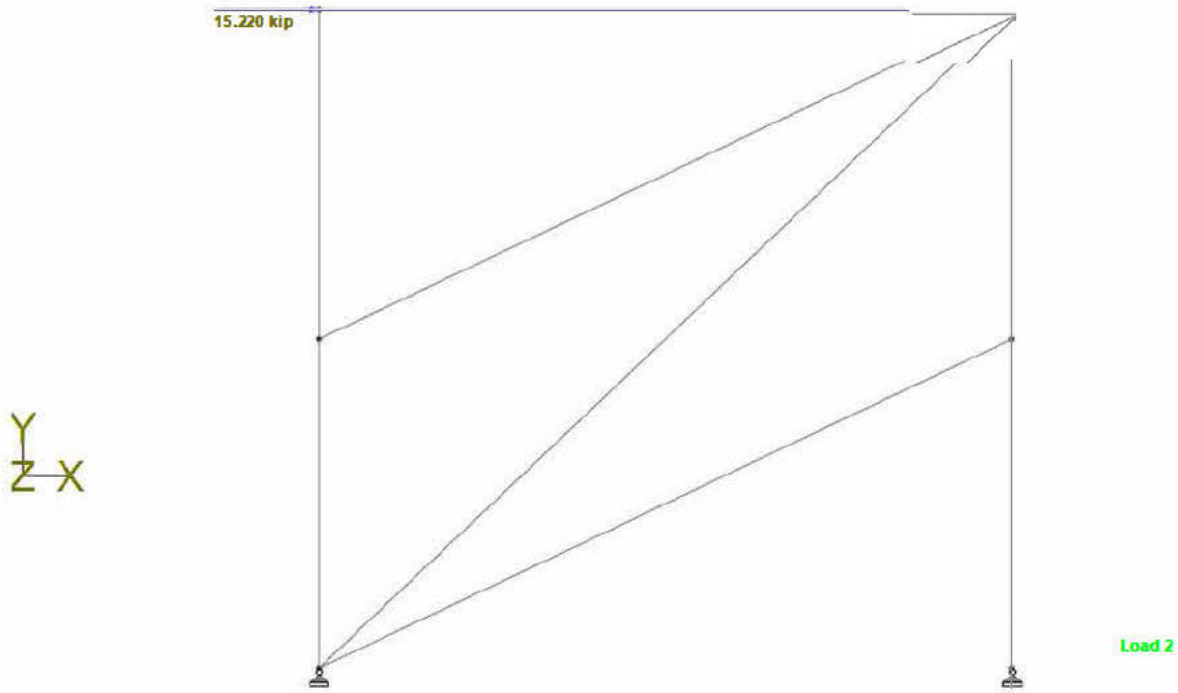
```
7 FX 15.22
LOAD COMB 3 GROUP II
1 1.0
LOAD COMB 4 GROUP III
1 0.3 2 1.0
PERFORM ANALYSIS
FINISH
```



MBI-NTSB-0031



MBI-NTSB-0032



MBI-NTSB-0033

Beam	L/C	Node	Axial Force (kip)	Shear-Y (kip)	Shear-Z (kip)	Torsion (kip-in)	Moment-Y (kip-in)	Moment-Z (kip-in)
1	1	1	0.000	0	0	0	0	0
		4	-0.000	0	0	0	0	0
	2	1	0.000	0	0	0	0	0
		4	-0.000	0	0	0	0	0
	3	1	0.000	0	0	0	0	0
		4	-0.000	0	0	0	0	0
	4	1	0.000	0	0	0	0	0
		4	-0.000	0	0	0	0	0
4	1	4	0	0	0	0	0	0
		7	0	0	0	0	0	0
	2	4	0	0	0	0	0	0
		7	0	0	0	0	0	0
	3	4	0	0	0	0	0	0
		7	0	0	0	0	0	0
	4	4	0	0	0	0	0	0
		7	0	0	0	0	0	0
7	1	8	86.506	0	0	0	0	0
		11	-86.506	0	0	0	0	0
	2	8	14.468	0	0	0	0	0
		11	-14.468	0	0	0	0	0
	3	8	86.506	0	0	0	0	0
		11	-86.506	0	0	0	0	0
	4	8	40.420	0	0	0	0	0
		11	-40.420	0	0	0	0	0
10	1	11	86.506	0	0	0	0	0
		14	-86.506	0	0	0	0	0
	2	11	14.468	0	0	0	0	0
		14	-14.468	0	0	0	0	0
	3	11	86.506	0	0	0	0	0
		14	-86.506	0	0	0	0	0
	4	11	40.420	0	0	0	0	0
		14	-40.420	0	0	0	0	0
13	1	1	-0.000	0	0	0	0	0
		11	0.000	0	0	0	0	0
	2	1	-0.000	0	0	0	0	0
		11	0.000	0	0	0	0	0
	3	1	-0.000	0	0	0	0	0
		11	0.000	0	0	0	0	0
	4	1	0.000	0	0	0	0	0
		11	0.000	0	0	0	0	0
14	1	4	0.000	0	0	0	0	0
		14	-0.000	0	0	0	0	0
	2	4	0.000	0	0	0	0	0
		14	-0.000	0	0	0	0	0
	3	4	0.000	0	0	0	0	0

Cont...

Beam	L/C	Node	Axial Force (kip)	Shear-Y (kip)	Shear-Z (kip)	Torsion (kip-in)	Moment-Y (kip-in)	Moment-Z (kip-in)
		14	-0.000	0	0	0	0	0
	4	4	0.000	0	0	0	0	0
		14	-0.000	0	0	0	0	0
18	1	7	91.000	0	0	0	0	0
		14	-91.000	0	0	0	0	0
	2	7	15.220	0	0	0	0	0
		14	-15.220	0	0	0	0	0
	3	7	91.000	0	0	0	0	0
		14	-91.000	0	0	0	0	0
	4	7	42.520	0	0	0	0	0
		14	42.520	0	0	0	0	0
26	1	1	-125.556	0	0	0	0	0
		14	125.556	0	0	0	0	0
	2	1	-21.000	0	0	0	0	0
		14	21.000	0	0	0	0	0
	3	1	-125.556	0	0	0	0	0
		14	125.556	0	0	0	0	0
	4	1	-58.666	0	0	0	0	0
		14	58.666	0	0	0	0	0

MBI-NTSB-0035

McNamara, Denise

From: Capp, Ron
Sent: Wednesday, September 3, 2008 1:35 PM
To: Charles.McClain@city.pittsburgh.pa.us; Mark.Stem@city.pittsburgh.pa.us
Cc: Lang, Guy; Schoedel, Rich
Subject: Forbes Avenue Bridge

Follow Up Flag: Follow up
Flag Status: Flagged

Chuck/Mark,
As requested, we have analyzed the existing bracing to verify what capacity it has, and find that it cannot meet required design specifications for wind loading. As we've discussed, replacing the bracing presents many difficulties in both...

McNamara, Denise

From: Capp, Ron
Sent: Thursday, September 4, 2008 4:18 PM
To: Lang, Guy; Schoedel, Rich
Subject: Fwd: RE: Forbes Avenue Bridge

Guy/Rich,
Could you please start thinking about a response to this. I'd like to try and reply to Mark Friday morning.
As far as the tensioning,.....my thought was that we just snug up the cable and not put any force in it. Maybe I mis led ...

McNamara, Denise

From: Schoedel, Rich
Sent: Thursday, September 4, 2008 4:27 PM
To: Lang, Guy; Capp, Ron
Subject: Fwd: RE: Forbes Avenue Bridge

tension in cables will be just sufficient so that they are not slack and less than the reserve capacity of the bracing. I'd rec ommend that the cables are galvanized. We can discuss options to gaurd against vandalism.

Richard Schoedel, PE
Michael Bak...

McNamara, Denise

From: Capp, Ron
Sent: Friday, September 5, 2008 7:08 AM
To: Stem, Mark
Cc: Charles.McClain@city.pittsburgh.pa.us; Lang, Guy; Schoedel, Rich
Subject: RE: Forbes Avenue Bridge

Mark,
I apologize for my misleading statement regarding force in the cable. We did not intend for the cables to have any initial tension. They would be tightened only to take out any slack. The capacity of the cable would be to handle 100 kips. Th ey...

McNamara, Denise

From: Capp, Ron
Sent: Friday, September 5, 2008 4:54 PM
To: Lang, Guy; Schoedel, Rich
Subject: Fwd: RE: Forbes Avenue Bridge

Another e mail from the City.
I believe we had discovered that cables between the legs will not work.
I have no idea what kind of saddle arrangement he's talking about.
Once again, before I respond, I'd like to discuss this Monday morning.
>>> ...

This item has been archived by the CA Message Manager. View Restore

McNamara, Denise

From: Capp, Ron
Sent: Monday, September 8, 2008 8:38 AM
To: Stem, Mark
Cc: Charles.McClain@city.pittsburgh.pa.us; Lang, Guy; Schoedel, Rich
Subject: RE: Forbes Avenue Bridge

Mark,
We had, to some extent, considered cables on the inside; however, we felt that the outside "guy cables" might be simple r and easier to install. (That may not necessarily be true since the "dead men" or rock anchors need to resist a large forc e.)...

Forbes Avenue Bridge Repairs
(Responses to City Comments)

---

1) Downspout Expansion Joints – ***No expansion joints are needed for the downspouts on this bridge.***

2) Will we need downspout expansion joints? If so, who will design/detail them? ***The proposed downspouts were developed in accordance with standard PennDOT details as per BC751M, and for this situation, no expansion joints are needed.***

3) Hopefully there won't be any interference between the cables and the downspout systems (looks like 1.125" clearance between pipe & cables). ***The location with least clearance, as you've indicated, is near the base of the leg where little or no vibration occurs; however, the clearance is considered adequate.***

4) The entire length of downspout is being replaced; line weight on sheet 5 of 5 seems somewhat inconsistent. ***The line weights will be improved for clarity.***

5) Is it practical to keep the downspouts away from the leg enough that if (or when) the pipe/joints split open, that the winter runoff will not saturate the legs? ***It is not intended for the downspouts to split. Relocating the downspouting/scuppers or modifiying the downspouting attachments to the legs is impractical. In discussing this question, however, the possibility of free drop scuppers arose. Although most frequently utilized over waterways, they have been used at other locations, often with conical diffusers attached to break up the flow of the water. If used, downspouting from the scuppers would extend far enough below the structural steel so falling water would not hit the legs. This would also improve the clearance between the proposed drainage system and the cables.***

6) With a 24 week lead time to get the cables fabricated, the work can't be done before next Spring. ***We were not aware of this lengthy fabrication/supply time and are checking with other fabricators.***

7) Since the work probably won't be done until after the weather warms up again, should we clean & paint the legs before installing the downspouts? ***If the work must be delayed until Spring, coating of the legs could be performed at that time, and yes, it would be done prior to installing downspouts.***

8) Correct me if I'm wrong: once the lower bracing lets go, the new cables can resist the entire amount of applied lateral load (up to the 50 P.S.F. design load). When new, the lateral stiffness from the upper bracing was probably pretty equal to the lateral stiffness from the lower bracing, thus causing little, if any, minor axis bending in the frame legs at the mid-height gusset plates. Intuitively I imagine that

with the same lateral load, the new cable system will sway more than the old bracing system. If that is the case, then the bridge will sway laterally until an applied load is resisted; partly by the new cables and partly by the upper bracing inducing minor axis bending moments in the frame legs at the mid height gusset plates. Will the loss of the lower bracing cause the bridge to sway laterally under normal traffic loads? If minor axis bending stresses are induced in this way could a fatigue situation arise, possibly at the stiffener welds, over an estimated 15 year period? The bridge inspectors witnessed a street light on the bridge fall after a bus passed it; vibrations induced by the bus seem to be the most probable cause of the street light failure (rusted base).

The new cables can resist the entire amount of laterally applied wind loading. The original design would have assumed no minor axis bending in the legs. If the cable bracing were to carry all the wind loading, there is still no bending in the legs. The assumptions made for wind loading are based on a constant application of wind, when in reality, wind gusting can occur and could possibly result in very slight movement The bridge will not sway laterally under normal traffic loads. We cannot address the issue regarding the street light pole failure, other that to say if it occurred due to vibrations induced by a bus, those vibrations would have been vertical in nature and due to loading by the bus.

SO No.: 112530
Subject: Forbes Avenue Bridge Repairs
Quantities & Cost Estimate
Summary
Computed By: GRL Checked By: RMS Date: 10/8/2008

Baker
Engineering & Energy

Filename: J:\BMS\Projects\Inspection\Forbes Avenue Bridge\[Repairs Cost Estimate 9-12-08.xls]Summary

SUMMARY OF QUANTITIES AND CONSTRUCTION COST ESTIMATE

Description	Unit	Total	Unit Cost	Total Cost
Downspouting*	LF	272	[redacted]	
7/8" Diameter Galvanized Structural Strands**	LS	1		
Fabricated Structural Steel	LBS	850		
Crack repair	EA	1		

NOTES:

All costs are installed costs and include applicable erection costs

* Costs of downspouting includes misc. items such as elbows, connections, etc.

** includes miscellaneous items such as Type 6 Sockets, Open Strand Sockets , Heavy Hex Nuts and threaded rods.

MBI-NTSB-0044

SO No.: 112530

Subject: Forbes Avenue Bridge Repairs

Baker
Engineering & Energy

Computed By: RMS Checked By: GRL Date: 10/8/2008

J:\BMS\Projects\Inspection\Forbes Avenue Bridge\[Repairs Cost Estimate 9-12-08.xls]Cost of Bracing

Note: **Information obtained from *2008 RS Means Heavy Construction Cost Data, 22nd Annual Edition***

Crew for Bracing Retrofit

Qty		Bare Costs		Inc O&P		Cost Per Labor Hour	
		Hr	Daily	Hr	Daily	Bare Costs	Inc O&P
2	Laborers	[redacted]					
1	Labor Foren						
1	Scissor Lift						
24	LH Totals =						

Daily Output = 1 Location/day

Labor Hours = 24 hrs

2008 Bare Costs			Total Incl	2008 Bare Costs				Total
Labor	Equip.	Total	O&P	Qty	Labor	Equip.	Total	Includ O&P
[redacted]								

Cost of Material = [redacted] Per Wirerope Works Inc Quote 10-7-08

Freight = based upon [redacted] per LF

Labor =

Total LS

SO No.: 112530
Subject: Forbes Avenue Bridge Repairs
Quantities & Cost Estimate
Summary
Computed By: GRL Checked By: RMS Date: 10/8/2008

Baker
Engineering & Energy

Filename: J:\BMS\Projects\Inspection\Forbes Avenue Bridge\[Repairs Cost Estimate 9-12-08.xls]downspout

Quantity of Downspouting

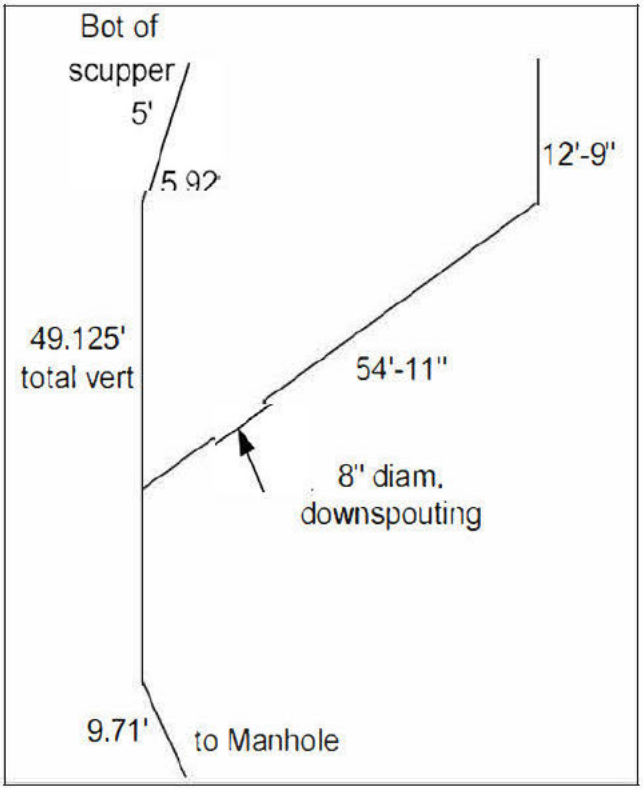
8" diameter PVC Pipe

Located along each inclined leg and diagonal bracing

cost includes installation of supports to inclined leg and bracing

Vertical run along inclined leg	54.9 ft.
length below scuppers 5.5' + 10'	15.5 ft.
diagonal length along bracing	54.9 ft.
approx. length bot. of leg to manhole	10.0 ft.
subtotal - length along one leg	136.0 ft.

Total length required for both legs	**272 LF**



Quantity for Zinc-Coated Structural Strands

reference existing design drawings and Structural Strand and Wire Rope Catalog

from calculations there are 4 lengths of strands having lengths of
70.24' and 74.56'
used length from attachment to attachment, conservative

two required for each leg
total required = 4 x 70.24' = 281.0 LF
total required = 4 x 74.56' = 298.2 LF

total length of strands 579 LF

Total length of 7/8" Diameter Strands	**580 LF**

Fabricated Structural Steel

Connection plates 13" x 13" x 3/4" thk - for attachment by bolting to existing flanges of legs

3/4" thickness	0.75 inches
length	13.0 inches
width	13.0 inches

total weight for one plate 35.9 lb
8 plates required per leg times two legs = 16
575.07 lb

Lug plate 6" x 10" x 3/4" thk, at top attached to conn. plate by welding
total weight for one plate =(6" x 10" - 2(2" x 2" / 2)) x .75" / 12^3 x 490 =

clip at two corners

11.2 lb (each)
8 required
89.76 lb

MBI-NTSB-0047

Lug plate with stiffeners at bottom attached to conn. Plate by welding consisting of three plates 6" x 6" x 3/4" thk.

22.97 lb	wt. of three plates
8	locations
184 lb	

Total weight for connection plates	**850.00 lbs**

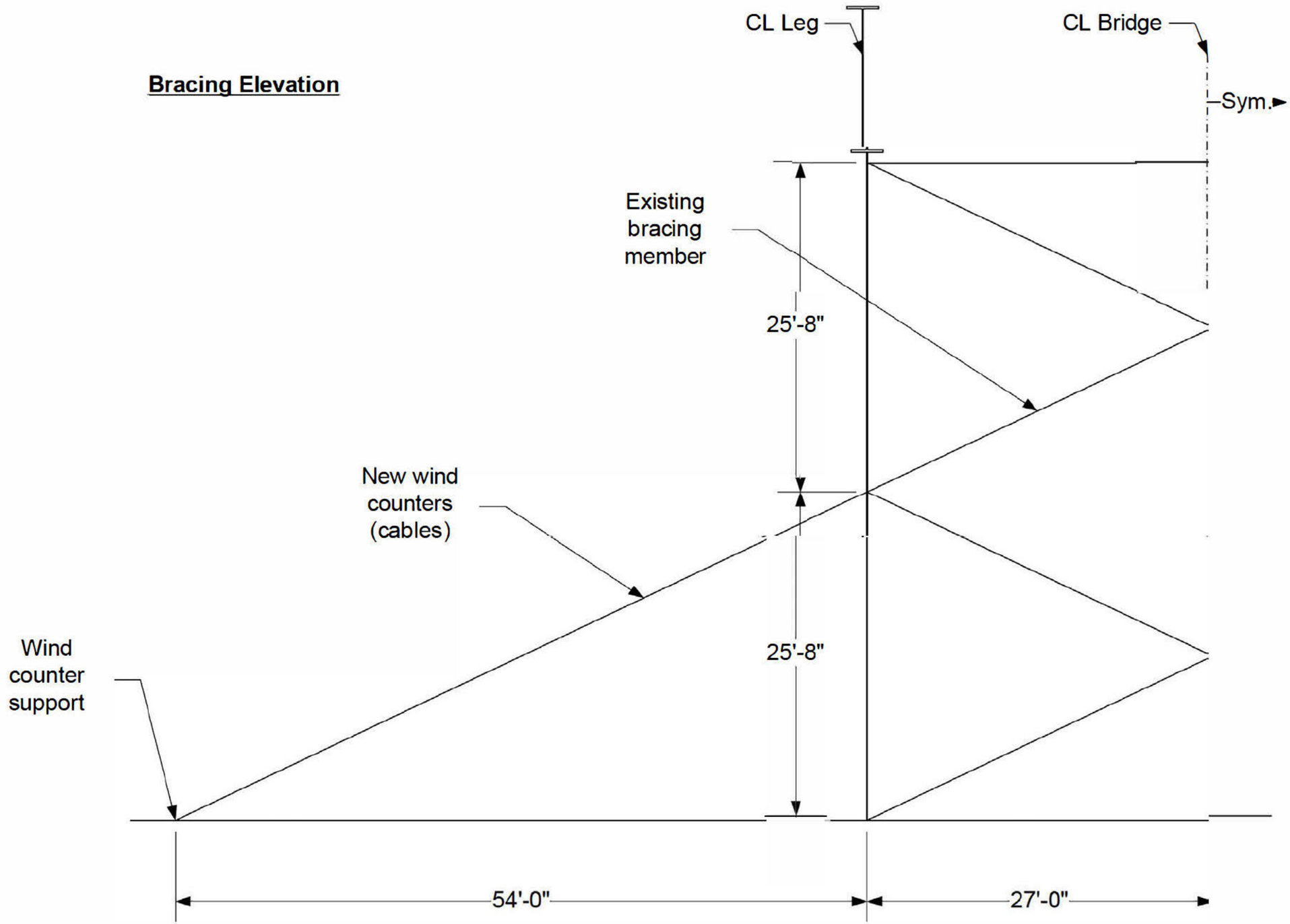
Miscellaneous Items (Included in Strands)
assembly material:

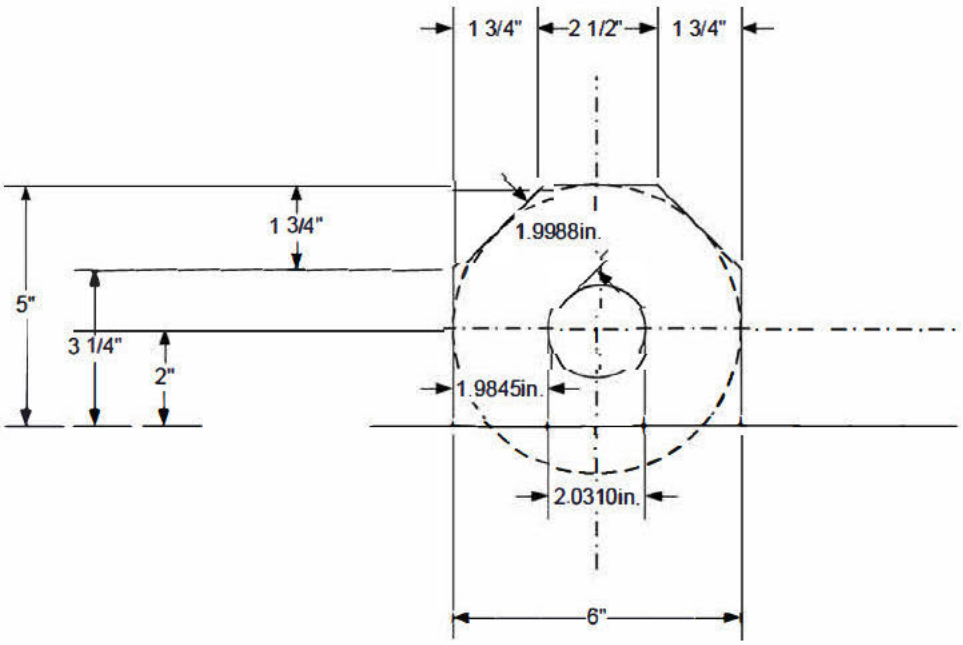
two heavy hex nuts at one end	16 reqd
Type 6 Sockets (Table 10) bottom, for rods	8 reqd
Open Strand Socket w/ 2" diameter pin) top thru lug	8 reqd

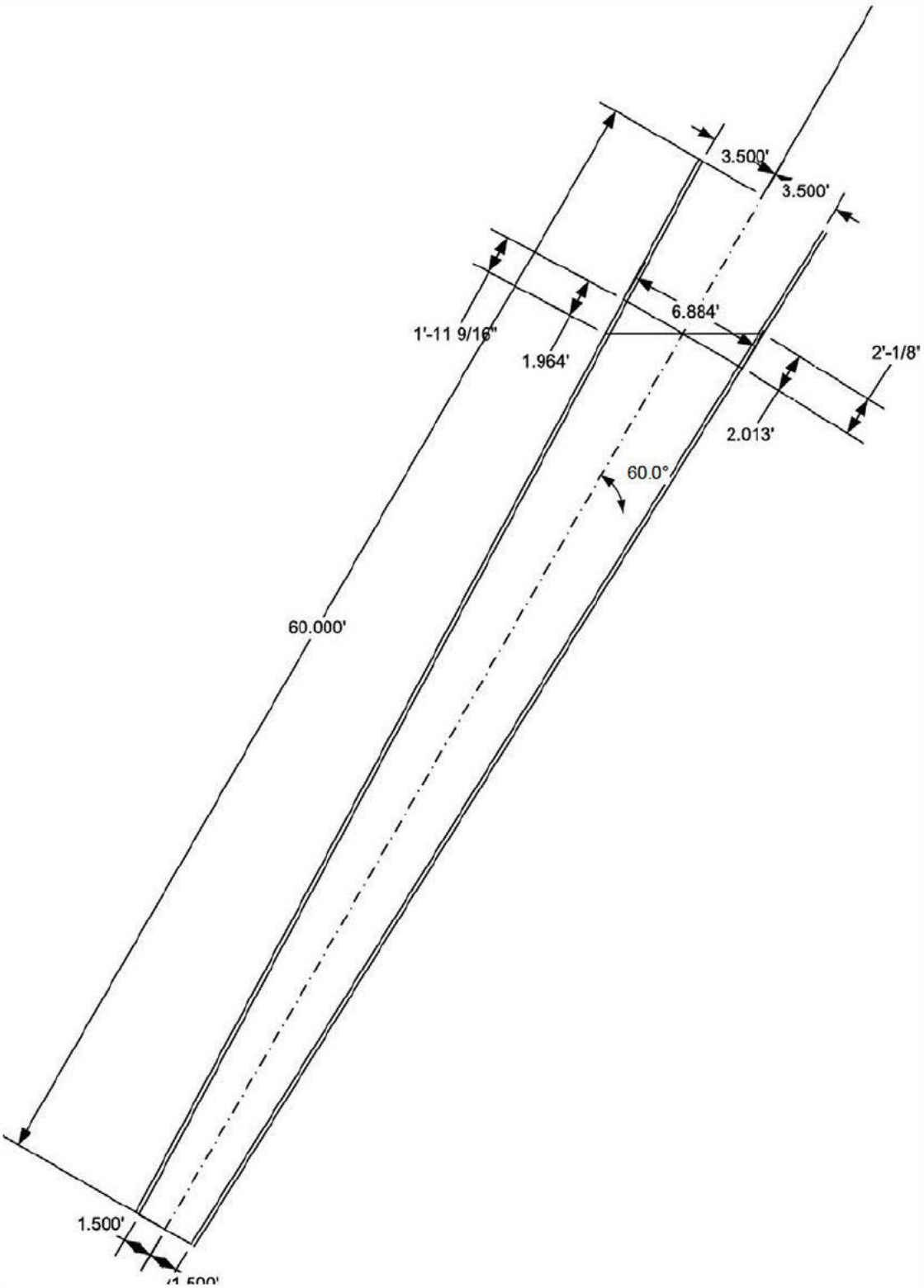
for connection plate to frame leg flange:
7/8" diam. HS Bolts w/ HHN and washer

16 locations with 8 each	128 reqd

Bracing Elevation




1 3/4"
2 1/2"
1 3/4"
1 3/4"
1.9988in.
5"
3 1/4"
2"
1.9845in.
2.0310in.
6"



Michael Baker Jr., Inc.
A Unit of Michael Baker Corporation

Airside Business Park
100 Airside Drive
Moon Township, PA 15108

(412) 269-6300
FAX (412) 375-3997

October 10, 2008

Mr. Guy Costa, Director
Department of Public Works
Bureau of Transportation and Engineering
Room 301, City-County Building
414 Grant Street
Pittsburgh, PA 15219-2455

Attention: Mr. Charles S. McClain, P.E.

Subject: Structural Engineering Services
Open-Ended Contract No. 05301
Project Number 07300-5
Work Order No. 5 (Forbes Avenue Bridge Repairs)

Gentlemen:

Submitted herewith, as per your request, are the following Final Documents providing for installation of cable wind bracing, replacement of drainage system, and crack repair for the Forbes Avenue Bridge:

Repair Drawings 1 thru 5 of 5	1 Full Size Set of Prints 2 Half Size Sets of Prints
Quantities and Cost Estimate	2 Copies

These Drawings have been Sealed and Signed.

As discussed by telephone, no application of a "Rust Inhibiting Coating" to the inclined legs of this structure will be included with this work at this time. It is anticipated that the work shown on these plans will be performed within the next several months and the temperatures and weather conditions expected during November and December will not allow the application of any coating systems. Also, further investigation is necessary to determine the preferred type of coating to be used.

I trust this will provide the documents you requested; however, if any questions arise, or if any additional information is needed, please do not hesitate to call me at 412-269-7931

Sincerely yours,

MICHAEL BAKER JR., INC.

[redacted]

Ronald S. Capp, P.E.
Project Manager

Enclosures

SO No.: 112530
Subject: Forbes Avenue Bridge Repairs
Quantities & Cost Estimate
Summary
Computed By: GRL Checked By: RMS Date: 10/8/2008

Baker
Engineering & Energy

Filename: J:\BMS\Projects\Inspection\Forbes Avenue Bridge\[Repairs Cost Estimate 10-8-08.xls]Summary

SUMMARY OF QUANTITIES AND CONSTRUCTION COST ESTIMATE

Description	Unit	Total	Unit Cost	Total Cost
Downspouting*	LF	272	[redacted]	
7/8" Diameter Galvanized Structural Strands**	LS	1		
Fabricated Structural Steel	LBS	850		
Crack repair	EA	1		

NOTES:

All costs are installed costs and include applicable erection costs

* Costs of downspouting includes misc. items such as elbows, connections, etc.

** includes miscellaneous items such as Type 6 Sockets, Open Strand Sockets , Heavy Hex Nuts and threaded rods.

SO No.: 112530
Subject: Forbes Avenue Bridge Repairs

Baker
Engineering & Energy

Computed By: RMS Checked By: GRL Date: 10/8/2008

J:\BMS\Projects\Inspection\Forbes Avenue Bridge\[Repairs Cost Estimate 10-8-08.xls]Cost of Bracing

Note:* Information obtained from *2008 RS Means Heavy Construction Cost Data, 22nd Annual Edition

Crew for Bracing Retrofit

		Bare Costs		Inc O&P		Cost Per Labor Hour	
Qty		Hr	Daily	Hr	Daily	Bare Costs	Inc O&P
2	Laborers	[redacted]					
1	Labor Foreman						
1	Scissor Lift						
24	LH Totals =						

Daily Output = 1 Location/day
Labor Hours = 24 hrs

2008 Bare Costs			Total Incl O&P		2008 Bare Costs			Total
Labor	Equip.	Total		Qty	Labor	Equip.	Total	Includ O&P
[redacted]								

Cost of Material = [redacted] Per Wirerope Works Inc Quote 10-7-08
Freight = based upon $[redacted] per LF
Labor =
Total LS =

Baker
Engineering & Energy

Quantity of Downspouting

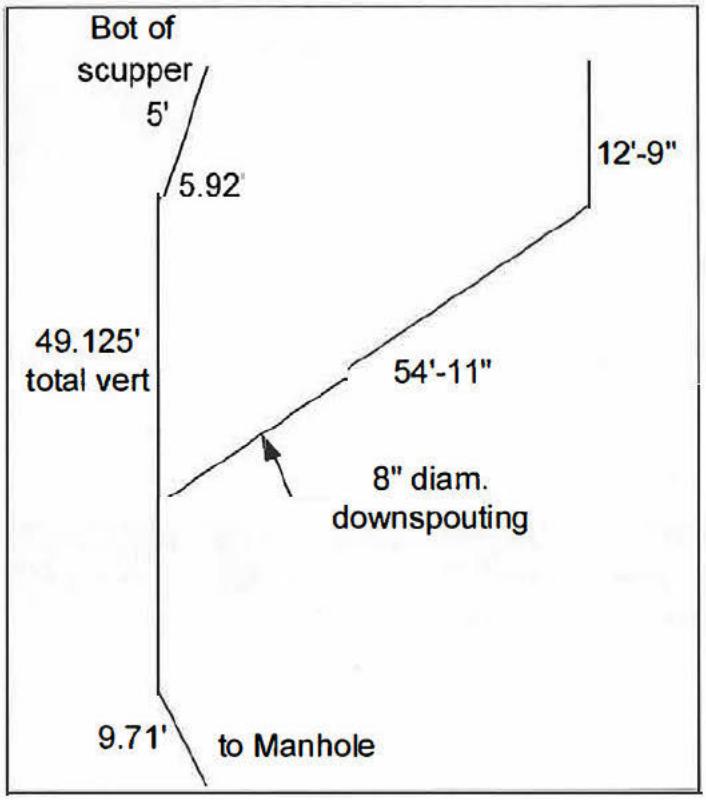
8" diameter PVC Pipe

Located along each inclined leg and diagonal bracing

cost includes installation of supports to inclined leg and bracing

Vertical run along inclined leg	54.9 ft.
length below scuppers 5.5' + 10'	15.5 ft.
diagonal length along bracing	54.9 ft.
approx. length bot. of leg to manhole	10.0 ft.
subtotal - length along one leg	136.0 ft.

Total length required for both legs	**272 LF**



Baker
Engineering & Energy

Quantity for Zinc-Coated Structural Strands

reference existing design drawings and Structural Strand and Wire Rope Catalog

from calculations there are 4 lengths of strands having lengths of
70.24' and 74.56'
used length from attachment to attachment, conservative

two required for each leg
total required = 4 x 70.24' = 281.0 LF
total required = 4 x 74.56' = 298.2 LF

total length of strands 579 LF

Total length of 7/8" Diameter Strands	**580 LF**

Fabricated Structural Steel

Connection plates 13" x 13" x 3/4" thk - for attachment by bolting to existing flanges of legs

3/4" thickness	0.75 inches
length	13.0 inches
width	13.0 inches

total weight for one plate 35.9 lb
8 plates required per leg times two legs = 16
575.07 lb

Lug plate 6" x 10" x 3/4" thk. at top attached to conn. plate by welding
total weight for one plate =(6" x 10" - 2(2" x 2" / 2)) x .75" / 12^3 x 490 =

clip at two corners

11.2 lb (each)
8 required
89.76 lb

Lug plate with stiffeners at bottom attached to conn. Plate by welding consisting of three plates 6" x 6" x 3/4" thk.

22.97 lb	wt. of three plates
8	locations
184 lb	

Total weight for connection plates	**850.00 lbs**

Miscellaneous Items (Included in Strands)
assembly material:

two heavy hex nuts at one end	16 reqd
Type 6 Sockets (Table 10) bottom, for rods	8 reqd
Open Strand Socket w/ 2" diameter pin) top thru lug	8 reqd

for connection plate to frame leg flange:
7/8" diam. HS Bolts w/ HHN and washer
16 locations with 8 each — 128 reqd

MBI-NTSB-0057

QUOTATION

Wirerope Works, Inc.
manufacturer of Bethlehem Wire Rope®

DATE: October 10, 2008

TO: Michael Baker Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township PA 15108

ATTN: Richard Schoedel, PE

SUBJECT: Budget Quote for Forbes Avenue Bridge - Pittsburgh PA

Thank you for your inquiry, referenced above. We are pleased to quote the following:

8 each approximately 73' of 7/8" Galvanized Structural Strand with Galvanized Open Strand Socket one end and Galvanized Type 6 Anchor Socket and Threaded Rod assembly other end. Assembly to be prestretched, measured under load, longitudinally striped and Proofloaded. Ship in coils on pallets. Ron length is 27" overall, including about 3" in the socket threads. Two Galvanized Heavy Hex Nuts provided with each Rod.

PRICE: [redacted] Net Lump Sum

NOTE: There will be a Surcharge added to the above pricing, subject to the current amount in effect at time of shipment. The cost at this time is [redacted] per foot net.

SHIPMENT: 22 - 24 Weeks After Receipt of Order
FREIGHT: F.O.B. Williamsport, PA – Freight Collect
TERMS: 30 Days Net - Subject to Credit Approval

Thank you for this opportunity to quote. If you have any questions, please do not hesitate to call us at 800-999-4402.

Sincerely,

Debbie Beck
Debbie Beck
Manager Customer Service

Jim Klepfer [redacted]
Regional Sales Manager

Wirerope Works, Inc.
Quotation
October 10, 2008

MBI-NTSB-0059

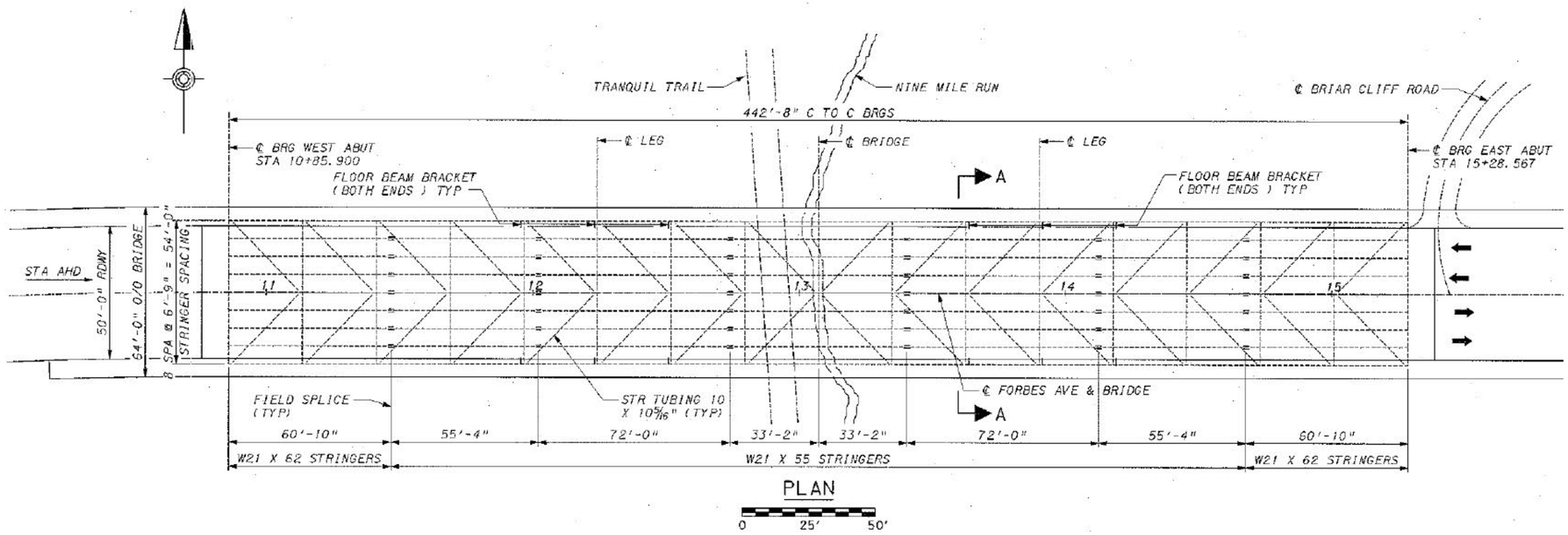
PRICES QUOTED ARE FOR STANDARD PACKAGING, STANDARD MILL CERTIFICATION, AND SHIPMENT VIA COMMON CARRIER UNLESS OTHERWISE SPECIFIED.

THIS QUOTATION IS SUBJECT TO YOUR ACCEPTANCE WITHIN 30 DAYS. THE PROVISIONS OF THE TERMS AND CONDITIONS OF SALE ARE MADE A PART OF THIS QUOTATION. BETHLEHEM WIRE ROPE 7 AND STRAND PRODUCTS WILL BREAK IF ABUSED, MISUSED OR OVERUSED. REGULAR INSPECTION AND MAINTENANCE ARE NECESSARY. CONSULT INDUSTRY RECOMMENDATIONS AND STANDARDS BEFORE USING.

Wirerope Works, Inc.
Phone 570-326-5146

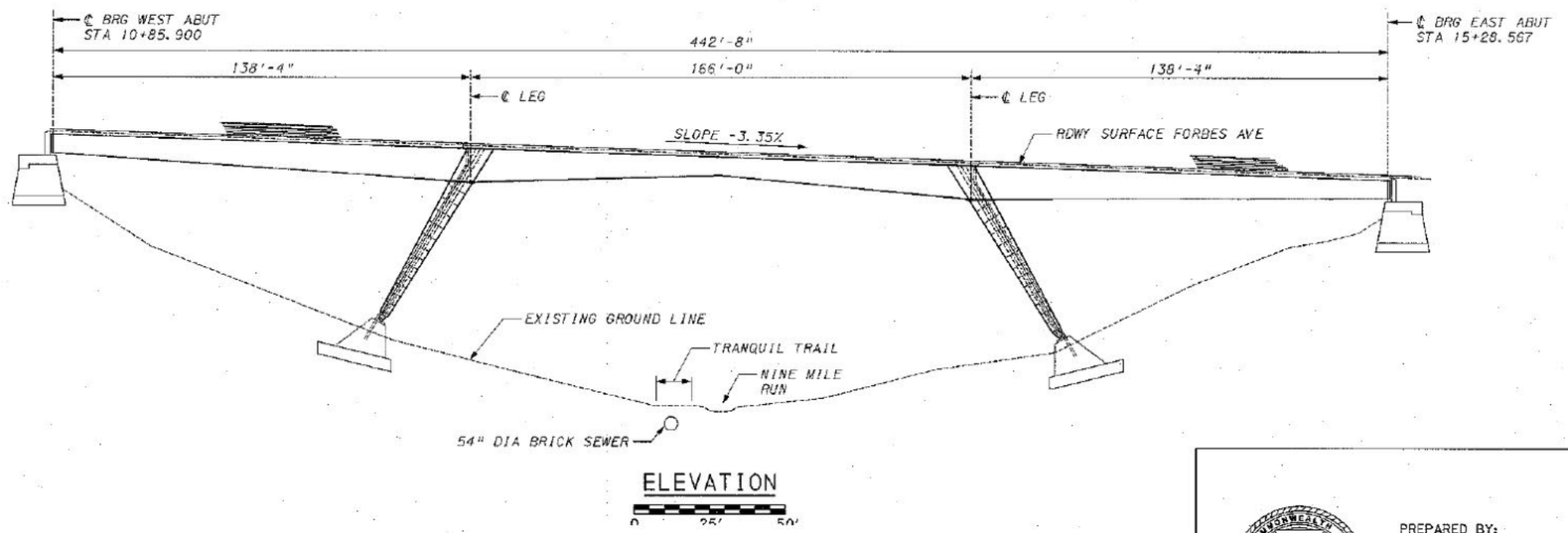
100 Maynard Street
Fax 570-327-4274

Williamsport, PA 17701
e-mail info@wireropeworks.com



PLAN

0 25' 50'



ELEVATION

0 25' 50'

INDEX OF DRAWINGS	
SHEET NO	TITLE
1	GENERAL PLAN AND ELEVATION
2	GENERAL NOTES AND APPROXIMATE QUANTITIES
3	TYPICAL SECTION AND KNEE BRACE REPAIR
4	FRAME LEGS AND BRACING RETROFIT
5	DOWNSPOUT REPAIRS

NOTES:

SHOP DRAWINGS MUST INDICATE THAT EXISTING DIMENSIONS THAT RELATE TO THE AFFECTED WORK HAVE BEEN FIELD VERIFIED BEFORE SHOP DRAWINGS CAN BE APPROVED. NO PAYMENT OR APPROVAL WILL BE GIVEN UNTIL ALL DIMENSIONS ARE FIELD VERIFIED.

FOR SECTION A-A, SEE SHEET 3.

STRUCTURE NO. 02730100003033

B.T.E. PROJECT NO. 07300-5

CITY OF PITTSBURGH
DEPARTMENT OF PUBLIC WORKS
BUREAU OF TRANSPORTATION AND ENGINEERING

FORBES AVENUE BRIDGE OVER FERN HOLLOW
AND NINE MILE CREEK, FRICK PARK

BRIDGE REHABILATATION

GENERAL PLAN AND ELEVATION

DESIGNED BY	GRL
CHECKED BY	RSC
DRAWN BY	RJK
CHECKED BY	GRL

$$-------DESIGN-FILE-NAME-------$$

COMMONWEALTH OF PENNSYLVANIA
PROFESSIONAL
RONALD S. CAPP
ENGINEER
PE 017251-E

PREPARED BY:

MICHAEL BAKER JR, INC.
AIRSIDE BUSINESS PARK
100 AIRSIDE DRIVE
MOON TOWNSHIP, PA 15108

Ronald S Capp 10/10/08

MBI-NTSB-0060

SCALE: AS NOTED	SHEET NO.	ACCESSION NO.
DATE:	1 OF 5	CASE NO.

J:\DESIGN\City of Pgh Open End Agmt\Work order no.5\Revision_1\ForbesRehab_01.dgn

GENERAL NOTES

MATERIALS AND WORKMANSHIP

PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH SPECIFICATIONS PUBLICATION 408/2003, ANSI/AASHTO/AWS/D1.5-95 BRIDGE WELDING CODE, 2002, AND CONTRACT SPECIAL PROVISIONS.

STRANDS FOR RETROFITTED CROSS BRACING DESIGNED FOR 50 PSF AS PER AASHTO STANDARD SPECIFICATIONS 15TH EDITION (1994).

GENERAL

SUPERSTRUCTURE DIMENSIONS ARE FOR A NORMAL TEMPERATURE OF 68 DEGREES F.

ALL DIMENSIONS ARE HORIZONTAL EXCEPT AS NOTED.

USE CARE WHEN REMOVING PORTIONS OF THE EXISTING STRUCTURE TO PREVENT DAMAGE TO THE REMAINING PORTIONS. REPAIR OR REPLACE ANY REMAINING COMPONENTS DAMAGED BY REMOVAL OPERATIONS AT NO ADDITIONAL COST TO THE DEPARTMENT.

VERIFY ALL DIMENSIONS AND GEOMETRY OF THE EXISTING STRUCTURE IN THE FIELD AS NECESSARY FOR PROPER FIT OF THE PROPOSED CONSTRUCTION PRIOR TO FABRICATION. ADJUST NEW STEEL MEMBERS ACCORDINGLY FOR PROPER FIT IF REQUIRED.

STRUCTURAL STEEL

PROVIDE STRUCTURAL STEEL CONFORMING TO AASHTO M270, GRADE 50 DESIGNATION EXCEPT WHERE NOTED OTHERWISE.

DO NOT USE FORM SUPPORT SYSTEMS THAT WILL CAUSE UNACCEPTABLE OVERSTRESS OR DEFORMATION TO PERMANENT BRIDGE MEMBERS.

THE CONTRACTOR IS RESPONSIBLE FOR SAFE ERECTION OF STEEL ITEMS. PROVIDE ALL NECESSARY BRACING FOR STRUCTURAL STEEL ELEMENTS UNTIL THE ELEMENTS ARE IN A STABLE (FINAL) ERECTED CONDITION. SUBMIT AN ERECTION PLAN TO THE ENGINEER FOR APPROVAL A MINIMUM OF 30 DAYS PRIOR TO ERECTION.

FOR RETROFITTED CROSS BRACING USE ⅞"ø ZINC-COATED STRUCTURAL STRANDS CLASS A COATING E=24000 KSI WITH A BREAKING STRENGTH OF 46.0 TONS AS MANUFACTERED BY WILLIAMSPORT WIREROPE WORKS 100 MARYLAND STREET WILLIAMSPORT, PA 17701, OR EQUAL.

PROVIDE GALVANIZED 1¾"ø THREADED RODS 60 KSI TENSILE STRENGTH, ASTM A307 FOR STRANDS LOWER END CONNECTIONS AND ADJUSTMENTS IN TENSION.

FASTENERS

FASTENERS ARE ⅞" DIAMETER MECHANICALLY GALVANIZED HIGH STRENGTH BOLTS, ASTM A325, EXCEPT AS NOTED.

USE NEW HIGH STRENGTH BOLTS FOR ALL WORK REQUIRING BOLTED CONNECTIONS. RE-USE OF EXISTING FASTENERS IS NOT PERMITTED.

FIELD CONDITIONS MAY DIFFER FROM THOSE INDICATED BY THE DESIGNATIONS FOR EXISTING BOLTS SHOWN ON THE PLANS. THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL OF STEEL, AS INDICATED OR SPECIFIED, REGARDLESS OF FASTENER TYPE. REMOVAL OF EXISTING FASTENERS IS INCIDENTAL TO OR INCLUDED IN THE ITEMS OF WORK.

WELDING NOTES

REMOVE BY APPLICATION OF HEAT ANY MOISTURE PRESENT AT POINT OF WELD. PROVIDE WINDBREAKS FOR PROTECTION FROM DIRECT WIND.

PRIOR TO PLACING THE WELD, THOROUGHLY BLAST OR POWER TOOL CLEAN ALL PORTIONS OF NEW AND EXISTING SURFACES TO RECEIVE WELDS OF ALL FOREIGN MATTER, INCLUDING PAINT FILM, FOR A DISTANCE OF 2 INCHES FROM EACH SIDE OF THE OUTSIDE LINES OF THE WELD.

BRIDGE REHABILITATION NOTES

DO NOT CONSIDER ANY OF THE DATA ON THE EXISTING STRUCTURE SUPPLIED IN THE ORIGINAL DESIGN DRAWINGS OR MADE AVAILABLE TO YOU BY THE DEPARTMENT OR ITS AUTHORIZED AGENTS AS POSITIVE REPRESENTATIONS OF ANY OF THE CONDITIONS THAT YOU WILL ENCOUNTER IN THE FIELD.

THE INFORMATION SHOWN ON THE PLANS FOR THE EXISTING BRIDGE IS NOT PART OF THE PLANS, PROPOSAL, OR CONTRACT AND IS NOT TO BE CONSIDERED A BASIS FOR COMPUTATION OF THE UNIT PRICES USED FOR BIDDING PURPOSES. THERE IS NO EXPRESSED OR IMPLIED AGREEMENT THAT INFORMATION IS CORRECTLY SHOWN. THE BIDDER IS NOT TO RELY ON THIS INFORMATION, BUT IS TO ASSUME THE POSSIBILITY THAT CONDITIONS AFFECTING THE COST AND/OR QUANTITIES OF WORK TO BE PERFORMED MAY DIFFER FROM THOSE INDICATED. THE EXISTING BRIDGE REFERENCE DRAWINGS ARE AS FOLLOWS:

ORIGINAL DESIGN PLANS:

RECONSTRUCTION OF FORBES AVENUE BRIDGE
OVER FERN HOLLOW AND APPROACHES
(30 SHEETS) NOVEMBER 1970

CONN FABRICATING & ENGINEERING CO.
NEW CASTLE, PA
SHOP DRAWINGS (27 SHEETS)
JUNE 27, 1972

DRAINAGE DETAILS (SHEETS 32 & 33)
APRIL 18, 1973
DEPARTMENT OF PUBLIC WORKS
BUREAU OF TRANSPORTATION AND ENGINEERING
CITY-COUNTY BUILDING
414 GRANT STREET
PITTSBURGH, PA 15219-2455

CONSTRUCTION SITE ACCESS

BE ADVISED THAT THERE IS LIMITED ACCESS TO THE BRIDGE SITE FROM UNDERNEATH. FRICK PARK HAS A PEDESTRIAN TRAIL (TRANQUIL TRAIL) THAT RUNS UNDER THE STRUCTURE.

UTILITY NOTES

COORDINATE, LOCATE, AND CONDUCT ALL WORK RELATED TO PUBLIC AND PRIVATE UTILITIES IN ACCORDANCE WITH PUBLICATION 408/2003 SECTIONS 105.06 AND 107.12.

PRIOR TO ANY EXCAVATION OR DEMOLITION WORK, CONTACT THE PA ONE CALL SYSTEM, INC. AT 1-800-242-1776 AND COMPLY WITH THE PROVISIONS OF PA ACT 287 OF 1994 AS AMENDED BY ACT 187 OF 1996. IDENTIFY ALL OVERHEAD LINES AND NOTIFY AND COMPLY WITH THE APPLICABLE UTILITY COMPANY'S CLEARANCE REQUIREMENTS. DESIGNER'S SERIAL NUMBER FOR THE CITY OF PITTSBURGH IS #0180500.

SUMMARY OF REHABILITATION ITEMS

1. DRAINAGE SYSTEM

REMOVAL OF EXISTING AND INSTALLATION OF DOWNSPOUTING PIPES AND BRACKETS. THESE EXTEND FROM THE BRIDGE DECK SCUPPERS AND CONNECT TO THE EXISTING UNDERGROUND DRAINAGE SYSTEM. THIS WORK WILL ALSO INCLUDE CLEANING OF THE EXISTING SCUPPERS AS WELL AS CLEANING OF THE UNDERGROUND DRAINAGE PIPE SYSTEM INTO WHICH THE DOWNSPOUTING WILL BE RECONNECTED.

2. CRACK IN KNEE BRACE OF FLOORBEAM #6 AT NORTH GIRDER

REPAIRS TO THIS CRACK WILL CONSIST ONLY OF DRILLING A HOLE AT THE END OF THE CRACK, INTENDED TO ARREST FURTHER PROPAGATION OF THE CRACK. THIS WORK WILL INCLUDE PERFORMANCE OF A MAGNETIC PARTICLE INSPECTION OR DYE PENETRANT TEST TO VERIFY THE END OF THE CRACK.

3. CROSS BRACING RETOFIT

RETROFITTING OF THE CROSS BRACING BY THE ADDITION OF ZINC COATED STRUCTURAL WIRE ROPE ATTACHED TO THE TOP AND BOTTOM FOR BOTH THE EAST AND WEST LEGS.

APPROXIMATE QUANTITIES

DESCRIPTION	UNIT	TOTAL
DOWNSPOUTING	LF	272
CROSS BRACING RETROFIT	LS	1
FABRICATED STRUCTURAL STEEL	LBS	850
CRACK REPAIR	EA	1

DESIGNED BY	GRL
CHECKED BY	RSC
DRAWN BY	RJK
CHECKED BY	GRL

$$--------DESIGN-FILE-NAME--------$$

STRUCTURE NO. 02730100003033

B.T.E. PROJECT NO. 07300-5

CITY OF PITTSBURGH
DEPARTMENT OF PUBLIC WORKS
BUREAU OF TRANSPORTATION AND ENGINEERING

FORBES AVENUE BRIDGE OVER FERN HOLLOW
AND NINE MILE CREEK, FRICK PARK

BRIDGE REHABILATATION
GENERAL NOTES
AND APPROXIMATE QUANTITIES

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
RONALD S. CAPP
ENGINEER
FE 017351-E

SCALE: AS NOTED DATE:	SHEET NO. 2 OF 3	ACCESSION NO. CASE NO.

MBI-NTSB-0061

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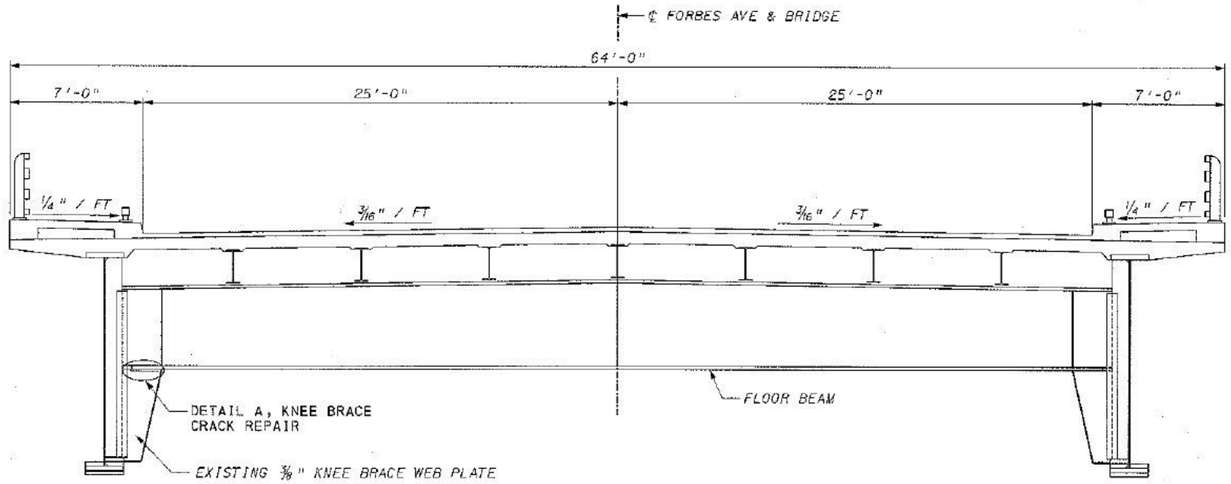
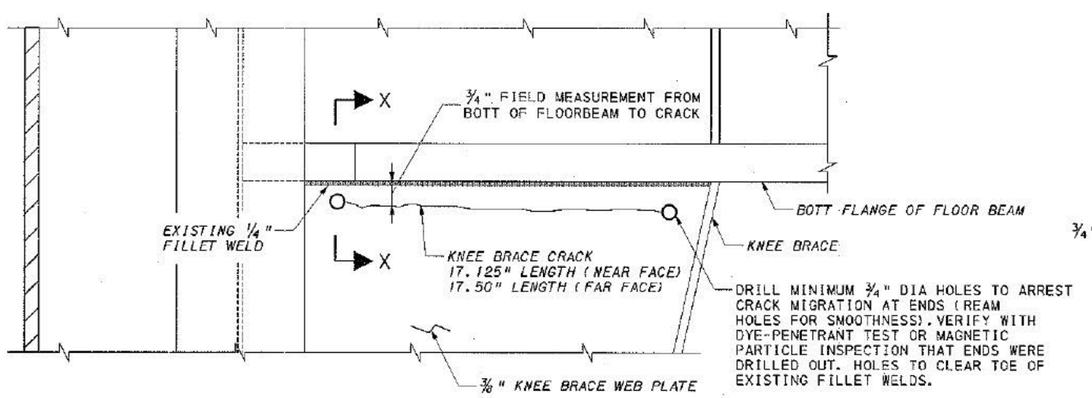


SECTION A-A

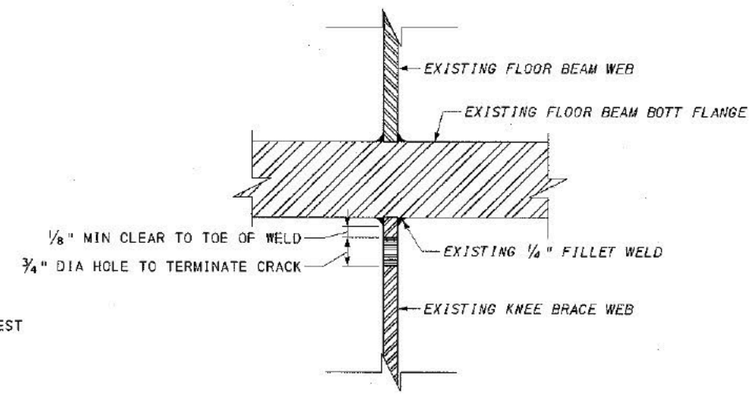
0 1' 2' 3' 4' 5' 6'



DETAIL A

KNEE BRACE REPAIR

0 1 2 3 6 9 1'



SECTION X-X

NO SCALE

NOTES:

SHOP DRAWINGS MUST INDICATE THAT EXISTING DIMENSIONS THAT RELATE TO THE AFFECTED WORK HAVE BEEN FIELD VERIFIED BEFORE SHOP DRAWINGS CAN BE APPROVED. NO PAYMENT OR APPROVAL WILL BE GIVEN UNTIL ALL DIMENSIONS ARE FIELD VERIFIED.

STRUCTURE NO. 02730100003033

B.T.E. PROJECT NO. 07300-5

CITY OF PITTSBURGH
DEPARTMENT OF PUBLIC WORKS
BUREAU OF TRANSPORTATION AND ENGINEERING

FORBES AVENUE BRIDGE OVER FERN HOLLOW AND NINE MILE CREEK, FRICK PARK

BRIDGE REHABILATATION

TYPICAL SECTION & KNEE BRACE REPAIR

DESIGNED BY	GRL
CHECKED BY	RSC
DRAWN BY	RJK
CHECKED BY	GRL

SCALE: AS NOTED | SHEET NO. 3 OF 5 | ACCESSION NO.
DATE: | CASE NO.

RONALD S. CAPP
PROFESSIONAL ENGINEER
PE 017251-E

MBI-NTSB-0062

$$-------DESIGN-FILE-NAME-------$$

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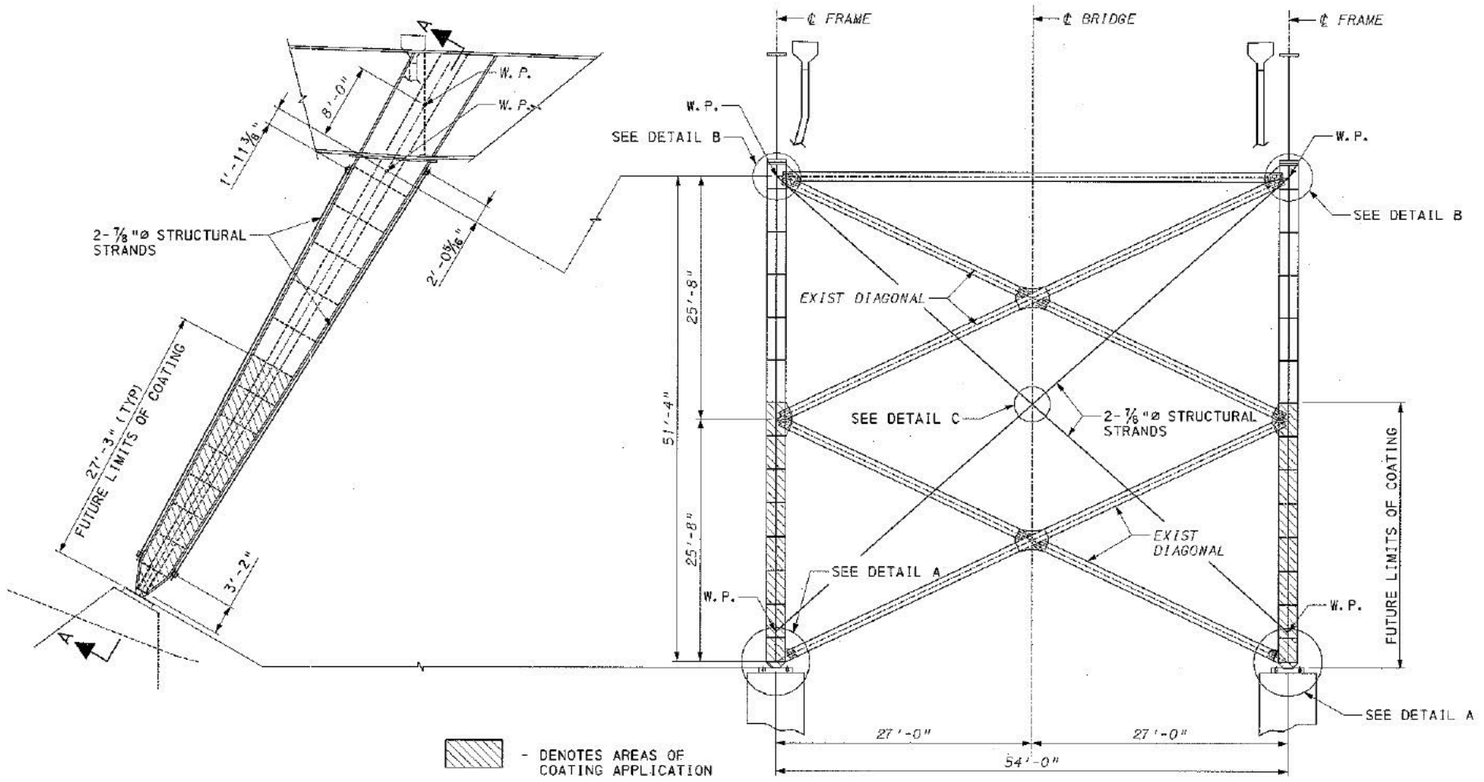
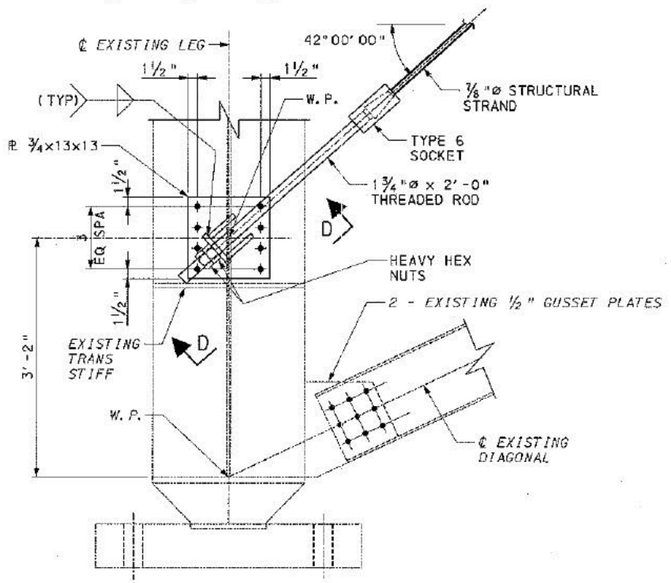


TYPICAL FRAME LEG ELEVATION

0 8' 16'

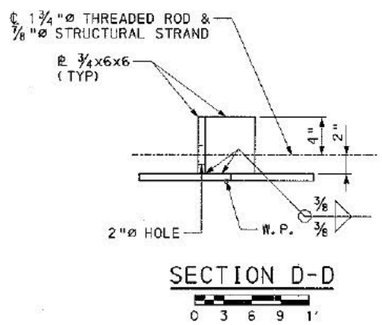
ELEVATION A-A

0 8' 16'



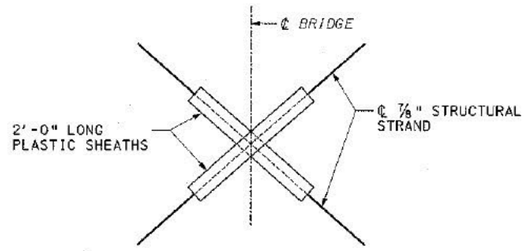
DETAIL A

0 3 6 9 1' 2'



SECTION D-D

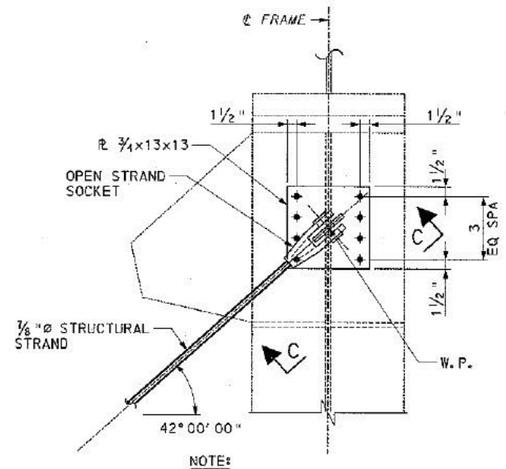
0 3 6 9 1'



NOTE:
FASTEN SHEATHS TO STRANDS AS PER MANUFACTURER RECOMMENDATIONS

DETAIL C

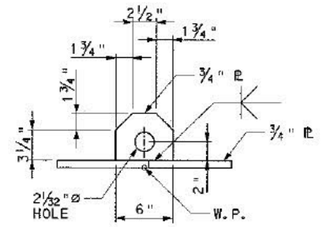
NO SCALE



NOTE:
HORIZONTAL AND DIAGONAL BRACING NOT SHOWN FOR CLARITY.

DETAIL B

0 3 6 9 1' 2'



NOTE:
OPEN STRAND SOCKET NOT SHOWN FOR CLARITY.

SECTION C-C

0 3 6 9 1'

NOTES:

SHOP DRAWINGS MUST INDICATE THAT EXISTING DIMENSIONS THAT RELATE TO THE AFFECTED WORK HAVE BEEN FIELD VERIFIED BEFORE SHOP DRAWINGS CAN BE APPROVED. NO PAYMENT OR APPROVAL WILL BE GIVEN UNTIL ALL DIMENSIONS ARE FIELD VERIFIED.

FOR DOWNSPOUT REPAIRS, SEE SHEET 5.

ALL WELDS MIN UNLESS NOTED OTHERWISE.

STRUCTURE NO. 02730100003033

DESIGNED BY	GRL
CHECKED BY	RSC
DRAWN BY	RJK
CHECKED BY	GRL

$$-------DESIGN-FILE-NAME-------$$

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL RONALD S. CAPP ENGINEER PE 017251-E

B. T. E. PROJECT NO. 07300-5

CITY OF PITTSBURGH
DEPARTMENT OF PUBLIC WORKS
BUREAU OF TRANSPORTATION AND ENGINEERING

FORBES AVENUE BRIDGE OVER FERN HOLLOW AND NINE MILE CREEK, FRICK PARK

BRIDGE REHABILATATION

FRAME LEGS AND BRACING RETROFIT

SCALE: AS NOTED | SHEET NO. 4 OF 5 | ACCESSION NO.
DATE: | CASE NO.

MBI-NTSB-0063

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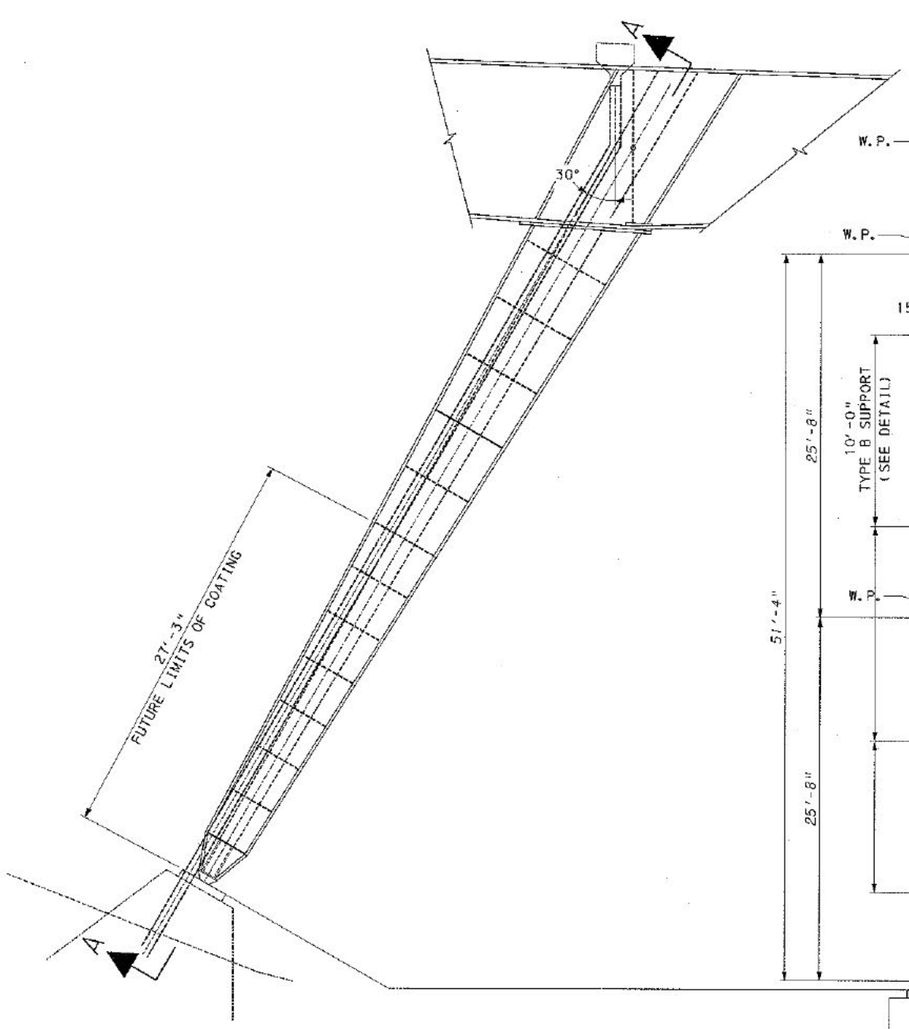
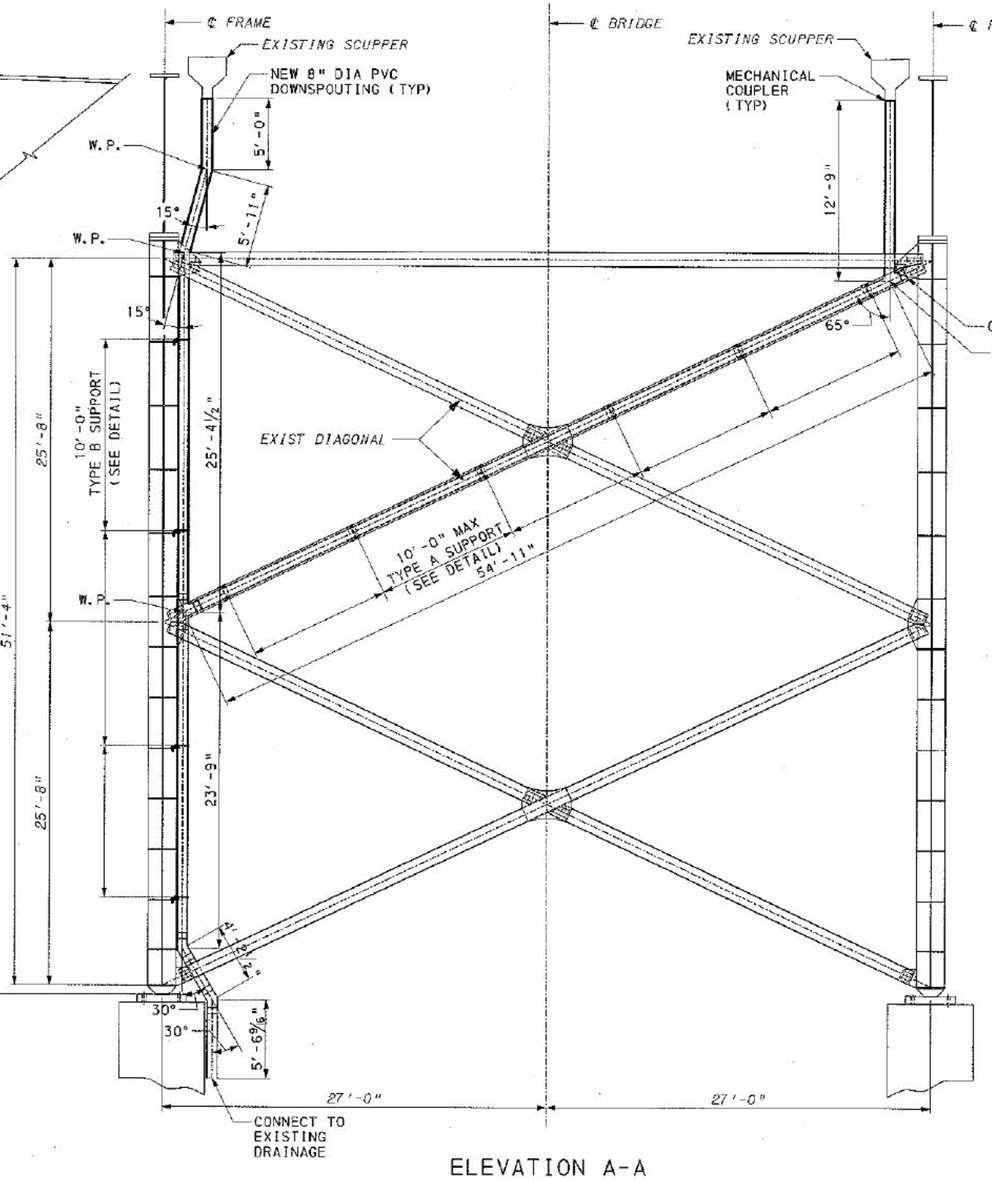


FRAME LEG ELEVATION

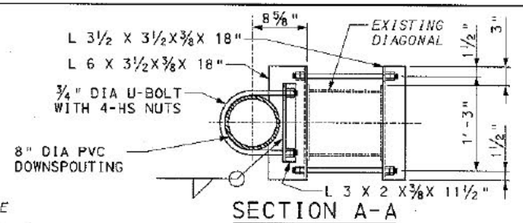
0 8' 16'



ELEVATION A-A

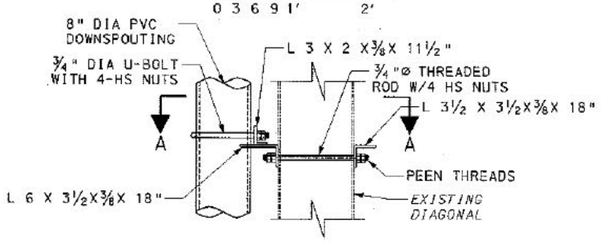
(2 LOCATIONS)

0 8' 16'



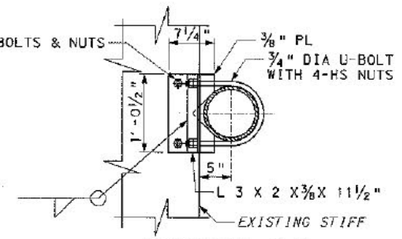
SECTION A-A

0 3 6 9 1' 2'



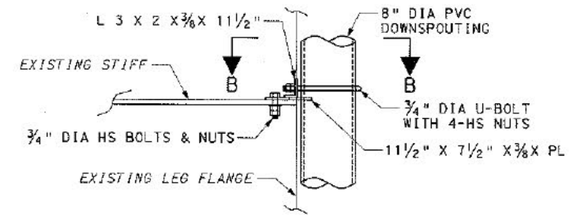
TYPE A SUPPORT DETAIL

0 3 6 9 1' 2'



SECTION B-B

0 3 6 9 1' 2'



TYPE B SUPPORT DETAIL

0 3 6 9 1' 2'

NOTES:

ALL NEW DOWNSPOUTING AND FITTINGS SHALL BE PVC IN ACCORDANCE WITH PENNDOT PUBLICATION 408 1051.2.

SEE PENNDOT STANDARD DRAWING BC-751M FOR DETAILS NOT SHOWN.

MBI-NTSB-0064

DESIGNED BY	CRL
CHECKED BY	RSC
DRAWN BY	RJK
CHECKED BY	CRL

$$--------DESIGN-FILE-NAME--------$$

STRUCTURE NO. 02730100003033

B.T.E. PROJECT NO. 07300-5

CITY OF PITTSBURGH
DEPARTMENT OF PUBLIC WORKS
BUREAU OF TRANSPORTATION AND ENGINEERING

FORBES AVENUE BRIDGE OVER FERN HOLLOW AND NINE MILE CREEK, FRICK PARK

BRIDGE REHABILATATION

DOWNSPOUT REPAIRS

SCALE: AS NOTED	SHEET NO. 5 OF 5	ACCESSION NO.
DATE:		CASE NO.

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL RONALD S. CAPP ENGINEER PE 017251-E

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