



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

JENNIFER COHAN
SECRETARY

VIA WEBSITE POSTING

February 19, 2020

Contract No. T201907404.01
Federal Aid Project No. NH-N059(46)
Rehabilitation of I-95, Bearing Replacements
New Castle County

Ladies and Gentlemen:

Enclosed is Addendum No. 2 for the referenced contract consisting of the following:

1. The Bid Proposal Cover, revised, to be substituted for the same page of the Proposal.
2. One (1) page, Special Provision, 850532 - Temporary Lighting, page 77, revised, to be substituted for the same page in the Proposal.
3. The following plan sheet has been added: 1A.
4. The following plan sheets have been revised: 28, 62, 94, and 107.

Please note the revisions listed above and submit your bid based upon this information.

Sincerely,

~signature on file~

Connie Ivins
Competitively Bid Contracts Coordinator
Delaware Department of Transportation

STATE OF DELAWARE



DEPARTMENT OF TRANSPORTATION

BID PROPOSAL

for

CONTRACT T201907404.01

FEDERAL AID PROJECT NO. NH-N059(46)

CFDA NO. 20.205

REHABILITATION OF I-95, BEARING REPLACEMENTS

NEW CASTLE COUNTY

ADVERTISEMENT DATE: January 20, 2020

COMPLETION TIME: 411 Calendar Days

SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
DELAWARE DEPARTMENT OF TRANSPORTATION
AUGUST 2016

Bids will be received in the Bidder's Room at the Delaware Department of Transportation's Administration Building, 800 Bay Road, Dover, Delaware prior to 2:00 P.M. local time ~~February 18~~
March 3, 2020

Construction Methods:

The Plans show, in general, a conceptual layout with the location and installation details of various electrical and relocated work to be performed under this Contract. It is the Contractor's responsibility to validate the conceptual layout by performing design and submitting it for approval following the procedure noted below.

It is the Contractor's responsibility to provide, at least sixty days prior to the installation of the Temporary Lighting, Temporary Lighting Design drawings to the Department for their review and approval. The Temporary Lighting Design drawings shall include the following:

1. Layout drawings showing the location of all temporary lighting equipment.
2. Details of lighting and electrical equipment to be used.
3. Details of electrical power source.
4. Specific technical details including catalog cuts on all lighting fixtures to be provided, including power rating and photometric charts.
5. Details of any hoods, louvers, shields or other means to control glare.
6. Lighting calculations confirming that the illumination requirements will be met by the Contractor's temporary lighting design.
7. Other design plans and details are requested by the Department to validate and approve the Contractor's temporary lighting design.

The layout drawings shall be on sheet size approved by the Engineer and at an appropriate scale to adequately describe the work. Layout drawings must be submitted and approved for all Phases of Construction.

The Temporary Lighting design shall provide at least 5.0 average maintained foot-candles with an average / minimum uniformity ratio of approximately 15:1 or less across the pavement of the court.

~~When there is no longer a requirement on the site for the temporary lighting units, the wood poles and luminaires shall become the Contractor's property.~~ The temporary lighting shall remain at the termination of the contract at which time ownership and maintenance will become the responsibility of the Department.

The Contractor shall coordinate all the necessary activities for electrical power with the owner of the Electrical Utility in the area and obtain the required electrical service.

It is the Department's intent to provide a continuously operating temporary lighting system. Should an operational problem be reported to the Contractor at any time during use of the unit, the Contractor shall have ~~30 minutes~~ 24 hours after receipt of notification to rectify the problem to the Engineer's satisfaction. Failure of the Contractor to make this effort may result in deduction of payment for the time the system is not satisfactorily operating. To this end, the Contractor shall designate an on-site representative, other than the Project Superintendent, who shall be the Department's contact person on all issues related to the temporary lighting system. The Contractor shall also designate a Manufacturer's Representative to be on call for technical assistance or as otherwise necessary.

Basis of Payment:

Payment for the temporary lighting shall be made at the lump sum unit price for the "Temporary Lighting" item, which price and payment shall constitute full compensation for designing, coordination, furnishing and installing all materials including, but not limited to, all the work and materials mentioned above in this Special Provision; for all switches, hardware, attachments, appurtenances and incidentals necessary to make the temporary lights safe, operational and functional, during the period required on the job, for removal of all materials when no longer required and for all labor, tools and equipment necessary to complete the item.

The Contractor shall be responsible for all electrical connection and service charges required for the temporary lighting and shall make payments directly to the Electrical Utility Company.

7/19/2019

ADDENDUM PREPARED BY

WRA Whitman, Requardt and Associates, LLP
Engineers - Architects - Environmental Planners Est. 1915

William A. Geschke 02/11/2020
DATE

THIS SEAL APPLIES TO THE FOLLOWING SHEETS CHANGED UNDER ADDENDUM #1: BID PROPOSAL COVER AND SHEETS 36 & 77

SEAL

ADDENDUM PREPARED BY

Pennoni PENNONI ASSOCIATES INC.
121 CONTINENTAL DRIVE
SUITE 207
NEWARK, DE 19713

Charles J. Pennoni 02/12/2020
DATE

THIS SEAL APPLIES TO THE FOLLOWING SHEETS CHANGED UNDER ADDENDUM #2: SHEETS 26, 94, 107

SEAL

ADDENDUM PREPARED BY

WRA Whitman, Requardt and Associates, LLP
Engineers - Architects - Environmental Planners Est. 1915

William A. Geschke 02/12/2020
DATE

THIS SEAL APPLIES TO THE FOLLOWING SHEETS CHANGED UNDER ADDENDUM #2: 62 & BID PROPOSAL SHEET 77

SEAL

N:\31887-00\A\Contract\Bearing\CAD\AR01_402.dgn 2/17/2020 2:16:42 PM

ADDENDA / REVISIONS

ADDENDUM 1, SHEET ADDED	D.A.N. 02/11/2020
ADDENDUM 2	D.A.N. 02/12/2020

NOT TO SCALE

**REHABILITATION OF I-95,
BEARING REPLACEMENTS**

CONTRACT	BRIDGE NO.
T201907404	DESIGNED BY: K. AMBROSE
COUNTY	CHECKED BY: D. NIZAMOFF
NEW CASTLE	

ADDENDA AND REVISIONS

AR-01

SECTION
WRA
SHEET NO.
1A

BRIDGE JACKING NOTES:

- CONTRACTOR SHALL VERIFY COMPATIBILITY OF THE JACKING ASSEMBLY WITH HYDRAULIC JACK (SEE NOTE 16) PRIOR TO FABRICATION. ALTERNATE JACKING SCHEMES OR ASSEMBLIES MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL. SUBMISSION SHALL INCLUDE DETAILED SHOP DRAWINGS AND CALCULATIONS SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF DELAWARE. ANY ALTERNATIVE DESIGN SHALL BE STRUCTURALLY EQUIVALENT AND MAY BE REJECTED BY THE ENGINEER FOR ANY REASON INCLUDING REASONS NOT RELATED TO STRUCTURAL EQUIVALENCY. NO ADDITIONAL PAYMENT WILL BE MADE FOR ALTERNATE JACKING SCHEMES OR ASSEMBLIES.

THE CONTRACTOR SHALL SUBMIT A JACKING PROCEDURE TO THE ENGINEER FOR APPROVAL. NO WORK ON THE INSTALLATION OF THE JACKING ASSEMBLY SHALL OCCUR UNTIL APPROVAL OF THE JACKING PROCEDURE IS OBTAINED. THE PROCEDURE SHALL CONTAIN, AT A MINIMUM, THE FOLLOWING INFORMATION:

A. CATALOG CUTS OF ALL OF THE JACKS TO BE USED.

B. CALIBRATION CERTIFICATES AND CALIBRATION CHARTS FOR EACH JACK TO BE USED.

C. A COMPLETE SCHEMATIC OF THE JACKING SYSTEM, INCLUDING THE JACKS, HOSES, GAUGES, VALVES, MANIFOLDS AND PUMPS.

D. A NARRATIVE ON THE METHOD TO BE USED TO DETERMINE THE VERTICAL DISPLACEMENTS AT EACH BEAM LOCATION DURING JACKING AND HOW THE DISPLACEMENT LIMITS WILL BE CHECKED AND MAINTAINED DURING THE JACKING.

E. A NARRATIVE ON THE METHOD TO BE USED TO KEEP THE LIFTING RATES OF THE JACK SIMILAR AND AT A RATE SLOW ENOUGH TO BE ABLE TO VERIFY THE VERTICAL DISPLACEMENTS BEFORE THE LIMITS ARE EXCEEDED.

F. A COMPLETE SEQUENCE OF CONSTRUCTION NARRATIVE.
- THE CONTRACTOR SHALL VERIFY ALL EXISTING FIELD DIMENSIONS PRIOR TO ORDERING OR FABRICATING THE JACKING DIAPHRAGM, JACKING ASSEMBLY, AND PRIOR TO DRILLING HOLES IN EXISTING STEEL BEAMS.
- ALL STEEL PLATES AND STEEL ROLLED SHAPES SHALL BE AASHTO M270 GRADE 50 MATERIAL.
- UNLESS OTHERWISE NOTED, ALL BOLTS SHALL BE 7/8" DIAMETER ASTM F3125 GR. A325. ALL BOLTS ARE DESIGNED WITH THE THREADS INCLUDED IN THE SHEAR PLANE. ALL HOLES FOR BOLTS SHALL BE 1/4" DIAMETER. INSTALL BOLTS BY TURN OF NUT METHOD IN ACCORDANCE WITH SUBSECTION 615.03.D.6.c.v11 OF THE STANDARD SPECIFICATIONS.
- ALL METAL WORK AND ALL WELDING SHALL BE PERFORMED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, SECTION 615.
- JACKING ASSEMBLY AND JACKING STIFFENERS SHALL BE SET PLUMB.
- WORK SHALL CONSIST OF JACKING THE EXISTING BEAMS, REMOVING THE EXISTING BEARINGS, AND INSTALLING NEW ELASTOMERIC BEARINGS. FOR LOCATIONS OF BEARING REPLACEMENTS, SEE DWGS. BB-01 AND BB-02. ADDITIONAL CONCRETE REPAIR WORK THAT MAY BE REQUIRED PRIOR TO PERFORMING JACKING OPERATIONS IS DETAILED ON DWGS. PR-01 TO PR-08.
- THE ENGINEER SHALL BE PRESENT DURING ALL JACKING OPERATIONS TO ENSURE CONFORMANCE WITH ALL PERTINENT CONTRACT PROVISIONS.
- IN THE PRESENCE OF THE ENGINEER, THE CONTRACTOR SHALL INSPECT THE CONDITION OF THE EXISTING STEEL BEAMS FOR ANY DEFECTS WHICH MAY IMPACT THE LOAD CARRYING CAPACITY OF THE BEAM DURING JACKING. IF ANY DEFECTS ARE FOUND, THE CONTRACTOR SHALL STOP WORK AT THAT LOCATION AND DISCUSS WITH THE ENGINEER IMMEDIATELY.
- WHERE CONCRETE REPAIRS TO THE PIER CAPS AND PEDESTALS OVERLAP WITH THE JACKING OPERATIONS, THE CONCRETE SHALL BE REPAIRED PRIOR TO THE JACKING OPERATIONS. ALL CONCRETE REPAIRS SHALL BE PERFORMED AND WILL BE PAID FOR AS SHOWN ON DWG. PN-02. JACKING OPERATIONS SHALL NOT BE PERFORMED UNTIL THE REPAIRED AREAS HAVE REACHED A COMPRESSIVE STRENGTH OF 3,000 PSI.
- THE CONTRACTOR SHALL HAVE THE PROPOSED BEARING ASSEMBLIES FOR THE BEARING LINE BEING REPLACED ON SITE PRIOR TO COMMENCING WITH JACKING OPERATIONS. THE PROPOSED BEARING ASSEMBLIES MUST BE ACCEPTED BY THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
- THE HYDRAULIC JACKS FOR THE SAME BEARING LINE REQUIRED TO LIFT THE EXISTING BEAMS SHALL BE OPERATED CONCURRENTLY (MANIFOLDED) TO PROVIDE AN EQUAL AND BALANCED LIFTING FORCE SUCH THAT THE BRIDGE IS LIFTED EVENLY.

THE MAXIMUM DIFFERENTIAL DISPLACEMENT BETWEEN ANY TWO ADJACENT BEAMS IS NOT TO EXCEED 1/8" AT ANY TIME.

THE MAXIMUM VERTICAL DISPLACEMENT OF ANY BEAM FROM THE EXISTING LOCATION SHALL NOT EXCEED 1/4" AT ANY TIME.
- THE CONTRACTOR SHALL USE ONLY JACKS WITH LOCK-NUTS CAPABLE OF SUPPORTING A LOAD EQUAL TO THE RATED CAPACITY OF THE JACK. IN THE EVENT THE JACK LOSES HYDRAULIC PRESSURE THE CONTRACTOR SHALL ADVANCE THE LOCK-NUTS ON ALL JACKS SUCH THAT THE MAXIMUM DISTANCE BETWEEN THE TOP OF A JACK AND THE LOCK-NUT DOES NOT EXCEED 1/8" AT ANY TIME DURING THE JACKING PROCEDURE.
- NO REPAIR WORK SHALL BE PERFORMED UNTIL THE JACKING OPERATION IS COMPLETE AND THE BRIDGE IS FULLY SUPPORTED BY THE JACKING ASSEMBLY (JACKING DIAPHRAGM, LOCK-NUT JACK, SPACER COLUMN, ETC.)
- LIVE LOAD SHALL BE TEMPORARILY REMOVED FROM THE BRIDGE DURING JACKING UNTIL THE BRIDGE IS FULLY SUPPORTED BY THE JACKING ASSEMBLIES.
- THE HYDRAULIC JACKS SHALL HAVE A MINIMUM CAPACITY OF 150 TONS. THE FACTORED LOADS FOR JACKING WERE USED TO SIZE THE JACKING DIAPHRAGM, JACKING ASSEMBLY, AND HYDRAULIC JACK. THE JACKING DIAPHRAGM, JACKING ASSEMBLY, AND HYDRAULIC JACK DOES NOT ACCOUNT FOR CONDITIONAL CONSTRUCTION LOADS. THEY WILL NEED TO BE REDESIGNED FOR FACTORED DEAD LOADS AND ANY APPLIED CONSTRUCTION LOADS. REDESIGN OF THESE ELEMENTS WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- THE FACTORED LOADS FOR JACKING USE A DEAD LOAD FACTOR OF 1.30 AND A LIVE LOAD FACTOR OF 1.75. THE FACTORED LOADS SHOWN WERE USED FOR THE DESIGN OF THE JACKING ASSEMBLY AND THE HYDRAULIC JACK.
- NON-SHRINK GROUT SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, SECTION 1047.02. GROUT SHALL CURE WITH A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI PRIOR TO INSTALLING THE BEARINGS. MINIMUM AND MAXIMUM LEVELING PAD THICKNESS SHALL MEET MANUFACTURER'S REQUIREMENTS.
- EXISTING STEEL CONNECTION PLATES THAT ARE TO BE CONNECTED TO NEW JACKING DIAPHRAGMS SHALL BE THOROUGHLY CLEANED AND PRIMED PRIOR TO PLACING NEW STEEL IN CONFORMANCE WITH SECTION 616. THE INSIDE SURFACE OF THE JACKING DIAPHRAGM THAT IS TO CONNECT TO THE CONNECTION PLATE SHALL RECEIVE A SHOP PRIME COAT. THE REMAINDER OF THE JACKING DIAPHRAGM SHALL BE PRIMED AND PAINTED IN ACCORDANCE WITH SECTION 616.
- THE INSIDE SURFACES OF THE TWO BENT PLATES SHALL BE SHOP PRIMED. THE OUTSIDE FACES OF THE BENT PLATES SHALL BE SHOP PRIMED AND PAINTED.

JACKING STIFFENERS SHALL BE SHOP WELDED TO THE JACKING DIAPHRAGMS. THE CONTRACTOR SHALL CLIP THE INSIDE CORNERS OF THE STIFFENER PLATES 3/4" x 3/4".
- AT PIER 6, SPAN 7, BEAMS 9-16 SHALL BE JACKED FOR REPLACEMENT OF BEARINGS. JACKING OF BEAMS 1-8 IS NOT REQUIRED.
- BRIDGE JACKING SHALL BE PAID FOR UNDER ITEM 604000 - JACKING BRIDGE. REMOVAL AND DISPOSAL OF EXISTING END DIAPHRAGMS TO BE REPLACED WITH JACKING DIAPHRAGMS IS INCLUDED IN ITEM 604000 - JACKING BRIDGE.

SUGGESTED SEQUENCE OF CONSTRUCTION:

THE FOLLOWING IS A SUGGESTED SEQUENCE OF CONSTRUCTION FOR THE JACKING OPERATIONS.

- INSTALL ALL NECESSARY TEMPORARY WORK PLATFORMS AND/OR RIGGING. CARE SHALL BE TAKEN NOT TO INTERFERE WITH PROPOSED LOCATIONS OF BEARING DEVICES, JACKING DIAPHRAGMS, AND JACKING ASSEMBLIES.
- REMOVE EXISTING DIAPHRAGMS AT LOCATIONS OF PROPOSED JACKING DIAPHRAGMS. REMOVE EXISTING CONNECTION PLATES AND GRIND SMOOTH ANY WELD WHERE PROPOSED JACKING CONNECTIONS ARE LOCATED.
- INSTALL ALL TEMPORARY OR PERMANENT JACKING DIAPHRAGMS AS NECESSARY. 
- PLACE A NON-SHRINK GROUT PAD BENEATH THE JACKING ASSEMBLY AND THE EXISTING BEAM SEAT TO ENSURE FULL AND LEVEL BEARING AND CURE TO SPECIFIED STRENGTH.
- INSTALL ALL JACKING ASSEMBLIES AS SHOWN ON DWG. RH-02.
- REMOVE NUTS AND WASHERS OF THE EXISTING ANCHOR BOLTS.
- PERFORM ROLLING ROAD BLOCKS IN ACCORDANCE WITH TA-35H WHEN JACKING BEAMS OFF THEIR RESPECTIVE BEARINGS. THE CONTRACTOR SHALL PROVIDE TWO TRAFFIC OFFICERS FOR ANY ROLLING ROAD BLOCK OPERATION IN ACCORDANCE WITH TA-35H. LIFTING OF BRIDGE VIA HYDRAULIC PRESSURE UNDER LIVE LOAD IS PROHIBITED.
- SECURE JACKING DIAPHRAGMS IN PLACE WITH LOCK-NUTS OF THE HYDRAULIC JACKS AT LOCATIONS AS SHOWN IN THE JACKING SCHEMES ON DWG. RH-02. PROVIDE FOR SUPERSTRUCTURE EXPANSION.
- RELEASE LOAD IN JACK TO TRANSFER ALL LOAD TO THE JACKING ASSEMBLY AND LOCK-NUT.
- REMOVE EXISTING WELDS BETWEEN THE SOLE PLATE AND THE BOTTOM FLANGE OF THE EXISTING BEAM. CARE SHALL BE TAKEN NOT TO DAMAGE THE EXISTING BEAM. ANY DAMAGE TO THE EXISTING BEAM CAUSED BY THE CONTRACTOR'S REMOVAL METHODS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AS DIRECTED BY THE ENGINEER. SUBMIT THE WELD REMOVAL PROCEDURE TO THE ENGINEER FOR APPROVAL.
- REMOVE EXISTING ANCHOR BOLTS AS SHOWN ON DWGS. BB-01 AND BB-02.
- REMOVE EXISTING BEARING ASSEMBLY. CARE SHALL BE TAKEN NOT TO DAMAGE THE EXISTING STEEL BEAM DURING ANY CUTTING OF THE EXISTING BEARING.
- CLEAN THE BOTTOM SURFACE OF THE EXISTING BEAM AND APPLY PRIMER IN ACCORDANCE WITH SECTION 616. PAYMENT FOR CLEANING AND PAINTING WILL BE INCIDENTAL TO ITEM 604000 - JACKING BRIDGE.
- THE TOP OF THE EXISTING BEARING LOCATION SHALL BE LEVEL AND FREE OF DEBRIS. IF REQUIRED, NON-SHRINK GROUT SHALL BE USED TO LEVEL AND PROVIDE A SMOOTH BEARING SURFACE FOR THE PROPOSED BEARING. PAYMENT FOR THIS WORK WILL BE INCIDENTAL TO ITEM 604000 - JACKING BRIDGE.
- INSTALL PROPOSED BEARINGS. FOR THE SUGGESTED SEQUENCE OF INSTALLATION FOR BEARINGS, SEE DWG. BB-02.
- DO NOT LOWER BEAMS UNTIL ALL REPAIRS AND BEARING INSTALLATIONS ARE COMPLETE AND TO THE SATISFACTION OF THE ENGINEER.
- PERFORM ROLLING ROAD BLOCKS IN ACCORDANCE WITH TA-35H WHEN JACKING BEAMS OFF THEIR RESPECTIVE JACKING ASSEMBLIES AND LOCK NUTS. THE CONTRACTOR SHALL PROVIDE TWO TRAFFIC OFFICERS FOR ANY ROLLING ROAD BLOCK OPERATION IN ACCORDANCE WITH TA-35H. LIFTING OF BRIDGE VIA HYDRAULIC PRESSURE UNDER LIVE LOAD IS PROHIBITED.
- REMOVE ALL JACKING ASSEMBLIES. NON-SHRINK GROUT LEVELING PADS USED UNDER JACKING ASSEMBLIES ~~AND PROPOSED JACKING DIAPHRAGMS~~ MAY BE LEFT IN PLACE WITH APPROVAL OF THE ENGINEER. 

LOADS FOR JACKING						UNFACTORED		FACTORED	
SPAN NO.	SUBSTRUCTURE UNIT	BEAM NO.	BEAM SPACING ALONG C OF BEARING	BEAM MEMBER	ANGLE A*	DL+15%	DL+LL+IMP	DL+15%	DL+LL+IMP
SPAN 2 SPAN 4 SPAN 6 SPAN 7	PIER 1 PIER 3 PIER 5 PIER 6,NB**	B1/B8/B9/B16	7'-0"±	36WF230 (B1/B16) W36x230 (B8/B9)	54°-00'-00"±	71.9 KIP	153.7 KIP	118.6 KIP	224.4 KIP
		B2-B7/B10-B15	7'-0"±	36WF230 (B2-6/B11-15) W36x230 (B7/B10)	54°-00'-00"±	56.9 KIP	151.5 KIP	93.9 KIP	229.9 KIP

* FOR LOCATION OF ANGLE A, SEE DWG. RH-02.
** SEE NOTE 21.

ADDENDA / REVISIONS				SCALE AS NOTED	REHABILITATION OF I-95, BEARING REPLACEMENTS	CONTRACT	BRIDGE NO.	1 744 059	JACKING NOTES AND LOADS	RH-01	
 REVISED SEQUENCE OF CONSTRUCTION NOTES		C. MALKIN 2/12/2020				T201907404	DESIGNED BY: B. DEELY			SECTION	PAI
						COUNTY	CHECKED BY: C. MALKIN			SHEET NO.	26
						NEW CASTLE					

LOADS FOR JACKING						UNFACTORED**		FACTORED**	
SPAN NO.	SUBSTRUCTURE UNIT	BEAM NO.	BEAM SPACING ALONG C OF BEARING	BEAM MEMBER	ANGLE A*	DL +15%	DL +LL +IMP	DL +15%	DL +LL +IMP
SPAN 33N	PIER 34N	33N-1	7' -7"±	36 WF 150	90° -32' -23"±	37 KIP	95 KIP	48 KIP	153 KIP
		33N-2 TO 33N-5	7' -7"±	36 WF 150	90° -32' -23"±	46 KIP	120 KIP	60 KIP	192 KIP
		33N-6	7' -7"±	36 WF 150	90° -32' -23"±	37 KIP	95 KIP	48 KIP	153 KIP
SPAN 34N	PIER 35N	34N-1	7' -7"±	36 WF 150	90° -51' -33"±	51 KIP	110 KIP	67 KIP	173 KIP
		34N-2 TO 34N-5	7' -7"±	36 WF 150	90° -51' -33"±	57 KIP	131 KIP	75 KIP	207 KIP
		34N-6	7' -7"±	36 WF 150	90° -51' -33"±	46 KIP	106 KIP	60 KIP	167 KIP
SPAN 35N	PIER 35N	35N-1	7' -7"±	36 WF 150	91° -03' -13"±	51 KIP	110 KIP	67 KIP	173 KIP
		35N-5	7' -7"±	36 WF 150	91° -03' -13"±	57 KIP	131 KIP	75 KIP	207 KIP
		34N-6	7' -7"±	36 WF 150	91° -03' -13"±	46 KIP	106 KIP	60 KIP	167 KIP
SPAN 36N	PIER 37N	36N-1	7' -7"±	36 WF 150	91° -20' -11"±	47 KIP	106 KIP	62 KIP	167 KIP
		36N-5	7' -7"±	36 WF 150	91° -20' -11"±	59 KIP	133 KIP	76 KIP	210 KIP
		36N-6	7' -7"±	36 WF 150	91° -20' -11"±	47 KIP	106 KIP	62 KIP	167 KIP
SPAN 37N	PIER 37N	37N-1	7' -7"±	36 WF 150	91° -17' -55"±	51 KIP	110 KIP	67 KIP	173 KIP
		37N-2 TO 37N-5	7' -7"±	36 WF 150	91° -17' -55"±	57 KIP	131 KIP	75 KIP	207 KIP
		37N-6	7' -7"±	36 WF 150	91° -17' -55"±	46 KIP	106 KIP	60 KIP	167 KIP
SPAN 37N	PIER 38N	37N-6	7' -7"±	36 WF 150	91° -17' -55"±	46 KIP	106 KIP	60 KIP	167 KIP
SPAN 38N	PIER 39N	38N-1	7' -7"±	36 WF 150	91° -17' -55"±	51 KIP	110 KIP	67 KIP	173 KIP
		38N-6	7' -7"±	36 WF 150	91° -17' -55"±	46 KIP	106 KIP	60 KIP	167 KIP
SPAN 39N	PIER 39N	39N-6	7' -7"±	36 WF 150	91° -17' -55"±	46 KIP	106 KIP	60 KIP	167 KIP
SPAN 39N	PIER 40N	39N-6	7' -7"±	36 WF 150	91° -17' -55"±	46 KIP	106 KIP	60 KIP	167 KIP
SPAN 40N	PIER 41N	40N-1	7' -7"±	36 WF 150	91° -17' -55"±	51 KIP	110 KIP	67 KIP	173 KIP
		40N-2 TO 40N-5	7' -7"±	36 WF 150	91° -17' -55"±	57 KIP	131 KIP	75 KIP	207 KIP
		40N-6	7' -7"±	36 WF 150	91° -17' -55"±	46 KIP	106 KIP	60 KIP	167 KIP
SPAN 41N	PIER 41N	41N-1	7' -7"±	36 WF 150	91° -17' -55"±	51 KIP	110 KIP	67 KIP	173 KIP
		41N-5	7' -7"±	36 WF 150	91° -17' -55"±	57 KIP	131 KIP	75 KIP	207 KIP
		41N-6	7' -7"±	36 WF 150	91° -22' -18"±	46 KIP	106 KIP	60 KIP	167 KIP
SPAN 50N	PIER 51N	50N-1	7' -7"±	36 WF 150	90° -00' -00"±	49 KIP	108 KIP	63 KIP	170 KIP
		50N-2 TO 50N-5	7' -7"±	36 WF 150	90° -00' -00"±	60 KIP	134 KIP	78 KIP	210 KIP
		50N-6	7' -7"±	36 WF 150	90° -00' -00"±	49 KIP	108 KIP	63 KIP	170 KIP
SPAN 51N	PIER 51N	51N-1	7' -7"±	36 WF 150	90° -00' -00"±	46 KIP	102 KIP	60 KIP	160 KIP
		51N-2 TO 51N-5	7' -7"±	36 WF 150	90° -00' -00"±	56 KIP	131 KIP	73 KIP	207 KIP
		51N-6	7' -7 1/8"±	36 WF 150	90° -03' -35"±	62 KIP	144 KIP	80 KIP	229 KIP
SPAN 51N	PIER E6	51N-7	6' -10"±	W36 X 135	99° -30' -40"±	62 KIP	142 KIP	81 KIP	225 KIP
		51N-8	6' -10"±	W36 X 135	97° -36' -41"±	49 KIP	119 KIP	64 KIP	188 KIP
		51N-9	6' -10"±	W36 X 135	95° -38' -52"±	49 KIP	119 KIP	64 KIP	188 KIP
		51N-10	6' -10"±	W36 X 135	93° -35' -11"±	46 KIP	102 KIP	60 KIP	160 KIP
SPAN 58N	PIER 58N	58N-10	4' -11"±	36 WF 300	93° -13' -52"±	66 KIP	118 KIP	86 KIP	181 KIP
SPAN 59N	PIER 59N	59N-10	6' -9 1/2"±	36 WF 150	93° -10' -46"±	44 KIP	95 KIP	58 KIP	149 KIP

*FOR LOCATION OF ANGLE A, SEE DWG. RH-03.
 **EXISTING LOADS FOR JACKING ARE TAKEN FROM LOAD RATINGS PROVIDED BY DELDOT AND PERFORMED BY OTHERS.

NOTES:

- SEE DWG. RH-03 TO RH-05 FOR JACKING SCHEMES.
- SEE DWG. RH-06 AND RH-07 FOR JACKING DETAILS.
- SEE DWG. RH-02 FOR ADDITIONAL LOADS FOR JACKING SOUTHBOUND SPANS.

BRIDGE JACKING NOTES:

- CONTRACTOR SHALL VERIFY COMPATIBILITY OF THE JACKING ASSEMBLY WITH THE HYDRAULIC JACK (SEE NOTE 15) PRIOR TO FABRICATION. ALTERNATE JACKING SCHEMES OR ASSEMBLIES MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL. SUBMISSION SHALL INCLUDE DETAILED SHOP DRAWINGS AND CALCULATIONS SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF DELAWARE. ANY ALTERNATE DESIGN SHALL BE STRUCTURALLY EQUIVALENT AND MAY BE REJECTED BY THE ENGINEER FOR ANY REASON INCLUDING REASONS NOT RELATED TO STRUCTURAL EQUIVALENCY. NO ADDITIONAL PAYMENT WILL BE MADE FOR ALTERNATE JACKING SCHEMES OR ASSEMBLIES.
- THE CONTRACTOR SHALL VERIFY ALL EXISTING FIELD DIMENSIONS PRIOR TO ORDERING OR FABRICATING THE JACKING DIAPHRAGM, TEMPORARY BEARING STIFFENERS, AND JACKING ASSEMBLY, AND PRIOR TO DRILLING HOLES IN EXISTING STEEL BEAMS.
- ALL STEEL PLATES AND STEEL ROLLED SHAPES SHALL BE AASHTO M 270, GRADE 50 MATERIAL.
- UNLESS OTHERWISE NOTED, ALL BOLTS SHALL BE ASTM F3125 GR. A325. ALL BOLTS ARE DESIGNED WITH THE THREADS INCLUDED IN THE SHEAR PLANE. ALL HOLES FOR BOLTS SHALL BE 1/8" DIAMETER LARGER THAN THE DIAMETER OF THE BOLT. REFER TO THE PERTINENT PLAN SHEETS FOR BOLT SIZES.
- ALL METAL WORK AND ALL WELDING SHALL BE PERFORMED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, SECTION 615.
- JACKING ASSEMBLY, JACKING STIFFENERS, AND TEMPORARY BEARING STIFFENERS SHALL BE SET PLUMB TO VERTICAL.
- WORK SHALL CONSIST OF JACKING THE EXISTING BEAMS, REMOVING THE EXISTING BEARINGS, AND INSTALLING NEW STEEL PLATE FIXED BEARINGS AND BRONZE PLATE EXPANSION BEARINGS. FOR LOCATIONS OF BEARING REPLACEMENTS, SEE DWG. BB-01 TO BB-05. ADDITIONAL CONCRETE REPAIR WORK THAT MAY BE REQUIRED PRIOR TO PERFORMING JACKING OPERATIONS IS DETAILED ON DWGS. PR-01 TO PR-20.
- THE ENGINEER SHALL BE PRESENT DURING ALL JACKING OPERATIONS TO ENSURE CONFORMANCE WITH ALL PERTINENT CONTRACT PROVISIONS.
- IN THE PRESENCE OF THE ENGINEER, THE CONTRACTOR SHALL INSPECT THE CONDITION OF THE EXISTING STEEL BEAMS FOR ANY DEFECTS WHICH MAY IMPACT THE LOAD CARRYING CAPACITY OF THE BEAM DURING JACKING. IF ANY DEFECTS ARE FOUND THE CONTRACTOR SHALL STOP WORK AT THAT LOCATION AND NOTIFY THE ENGINEER IMMEDIATELY.

WHERE CONCRETE REPAIRS TO THE PIER CAPS AND PEDESTALS OVERLAP WITH THE JACKING OPERATIONS, THE CONCRETE SHALL BE REPAIRED PRIOR TO THE JACKING OPERATIONS. ALL CONCRETE REPAIRS SHALL BE PERFORMED AND WILL BE PAID FOR AS SHOWN ON DWG. PN-03. JACKING OPERATIONS SHALL NOT BE PERFORMED UNTIL THE REPAIRED AREAS HAVE REACHED A COMPRESSIVE STRENGTH OF 3,000 PSI.
- THE CONTRACTOR SHALL HAVE THE PROPOSED BEARING ASSEMBLIES FOR THE BEARING LINE BEING REPLACED ON SITE PRIOR TO COMMENCING WITH JACKING OPERATIONS. THE PROPOSED BEARING ASSEMBLIES MUST BE ACCEPTED BY THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
- THE ENTIRE LINE OF BEARINGS MAY BE JACKED AT THE SAME TIME AND IF SUCH THE JACKS SHALL BE MANIFOLDED.

WHEN MULTIPLE HYDRAULIC JACKS ARE USED FOR THE JACKING OPERATION, THEY SHALL BE OPERATED CONCURRENTLY (MANIFOLDED) TO PROVIDE AN EQUAL AND BALANCED LIFTING FORCE.

THE MAXIMUM DIFFERENTIAL DISPLACEMENT BETWEEN ANY TWO ADJACENT BEAMS IS NOT TO EXCEED 1/8" AT ANY TIME.

THE MAXIMUM VERTICAL DISPLACEMENT OF ANY BEAM FROM THE EXISTING LOCATION IS NOT TO EXCEED 1/4" AT ANY TIME.
- THE CONTRACTOR SHALL USE ONLY JACKS WITH LOCK-NUTS CAPABLE OF SUPPORTING A LOAD EQUAL TO THE RATED CAPACITY OF THE JACK IN THE EVENT THE JACK LOSES HYDRAULIC PRESSURE. THE CONTRACTOR SHALL ADVANCE THE LOCK-NUTS ON ALL JACKS SUCH THAT THE MAXIMUM DISTANCE BETWEEN THE TOP OF A JACK AND THE LOCK-NUT DOES NOT EXCEED 1/8" AT ANY TIME DURING THE JACKING PROCEDURE.
- NO REPAIR WORK SHALL BE PERFORMED UNTIL THE JACKING OPERATION IS COMPLETE AND THE BRIDGE IS FULLY SUPPORTED BY THE JACKING ASSEMBLY (JACKING DIAPHRAGM, LOCK-NUT JACK, SPACER COLUMN, ETC.).
- LIVE LOAD SHALL BE TEMPORARILY REMOVED FROM THE BRIDGE DURING JACKING UNTIL THE BRIDGE IS FULLY SUPPORTED BY THE JACKING ASSEMBLIES.
- THE HYDRAULIC JACKS FOR THE TYPICAL JACKING SCHEME SHALL HAVE A MINIMUM CAPACITY OF 200 TONS. THE MAXIMUM FACTORED LOADS OF ALL SPANS WERE USED TO SIZE THE HYDRAULIC JACK.
- THE FACTORED LOADS FOR JACKING USE A DEAD LOAD FACTOR OF 1.30 AND A LIVE LOAD FACTOR OF 1.75. THE FACTORED LOADS SHOWN IN THE TABLE WERE USED FOR THE DESIGN OF THE JACKING DIAPHRAGMS AND JACKING ASSEMBLIES, EXCLUDING THE HYDRAULIC JACK.
- CONTRACTOR SHALL PROVIDE A DETAIL FOR APPROVAL BY THE ENGINEER THAT ALLOWS FOR MOVEMENT OF THE JACKING SYSTEM UNDER NORMAL THERMAL CONDITIONS AS NOTED IN THE DETAIL ON DWG. RH-06 PRIOR TO FABRICATION.

SUGGESTED SEQUENCE OF CONSTRUCTION:

- THE FOLLOWING IS A SUGGESTED SEQUENCE OF CONSTRUCTION FOR THE JACKING OPERATIONS.
- INSTALL ALL NECESSARY TEMPORARY WORK PLATFORMS AND/OR RIGGING. CARE SHALL BE TAKEN NOT TO INTERFERE WITH PROPOSED LOCATIONS OF BEARING DEVICES, JACKING DIAPHRAGMS, AND JACKING ASSEMBLIES.
 - INSTALL ALL TEMPORARY OR PERMANENT JACKING DIAPHRAGMS AS NECESSARY.
 - PLACE NON-SHRINK GROUT LEVELING PADS AS REQUIRED AND CURE TO SPECIFIED STRENGTH.
 - INSTALL ALL JACKING ASSEMBLIES AS NECESSARY.
 - REMOVE NUTS AND WASHERS OF THE EXISTING ANCHOR BOLTS.
 - PERFORM ROLLING ROAD BLOCKS IN ACCORDANCE WITH TA-35H WHEN JACKING BEAMS OFF THEIR RESPECTIVE BEARINGS. THE CONTRACTOR SHALL PROVIDE TWO TRAFFIC OFFICERS FOR ANY ROLLING ROAD BLOCK OPERATION IN ACCORDANCE WITH TA-35H.
 - SECURE JACKING DIAPHRAGMS IN PLACE WITH LOCK-NUT JACKS AT LOCATIONS AS SHOWN IN THE JACKING SCHEMES ON DWG. RH-03 TO RH-05.
 - RELEASE LOAD IN JACK TO TRANSFER ALL LOAD TO THE JACKING ASSEMBLY AND LOCK-NUT JACK.
 - REMOVE EXISTING WELDS BETWEEN THE SOLE PLATE AND THE BOTTOM FLANGE OF THE EXISTING BEAM. CARE SHALL BE TAKEN NOT TO DAMAGE THE EXISTING BEAM. ANY DAMAGE TO THE EXISTING BEAM CAUSED BY THE CONTRACTOR'S REMOVAL METHODS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AS DIRECTED BY THE ENGINEER.
 - EXISTING ANCHOR BOLTS ARE TO REMAIN IN PLACE FOR PROPOSED BEARINGS UNLESS OTHERWISE NOTED. CARE SHALL BE TAKEN NOT TO DAMAGE THE EXISTING ANCHOR BOLTS. ANY DAMAGE TO THE EXISTING ANCHOR BOLTS CAUSED BY THE CONTRACTOR'S REMOVAL METHODS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AS DIRECTED BY THE ENGINEER.
 - REMOVE EXISTING BEARING ASSEMBLY. TO REMOVE THE BEARING ASSEMBLY, IT MAY BE NECESSARY TO CUT OR REMOVE THE PINTLES BETWEEN THE MASONRY PLATE, SLIDING (BRONZE) PLATE, AND/OR THE SOLE PLATE. IT MAY ALSO BE NECESSARY TO CUT THE MASONRY PLATE TO REMOVE FROM THE ANCHOR BOLTS. CARE SHALL BE TAKEN NOT TO DAMAGE THE EXISTING STEEL BEAM OR ANCHOR BOLTS TO REMAIN DURING ANY CUTTING OF THE EXISTING BEARING.
 - CLEAN THE BOTTOM SURFACE OF THE EXISTING BEAM AND APPLY PRIMER IN ACCORDANCE WITH SECTION 616. PAYMENT FOR CLEANING AND PAINTING WILL BE INCIDENTAL TO ITEM 604000 - JACKING BRIDGE.
 - THE TOP OF THE EXISTING BEARING PEDESTAL SHALL BE LEVEL AND FREE OF DEBRIS. IF REQUIRED, NON-SHRINK GROUT SHALL BE USED TO LEVEL AND PROVIDE A SMOOTH BEARING SURFACE FOR THE PROPOSED BEARING. PAYMENT FOR THIS WORK WILL BE INCIDENTAL TO ITEM 604000 - JACKING BRIDGE.
 - INSTALL PROPOSED BEARINGS. FOR THE SUGGESTED SEQUENCE OF INSTALLATION SEE THE RESPECTIVE NOTES AND DETAILS.
 - PERFORM ROLLING ROAD BLOCKS IN ACCORDANCE WITH TA-35H WHEN JACKING BEAM(S) OFF OF THE JACKING ASSEMBLY AND LOCK-NUTS. LOWER JACKS TO TRANSFER BEAM LOADS. THE CONTRACTOR SHALL PROVIDE TWO TRAFFIC OFFICERS FOR ANY ROLLING ROAD BLOCK OPERATION IN ACCORDANCE WITH TA-35H.
 - REMOVE ALL TEMPORARY BEARING STIFFENERS, TEMPORARY JACKING DIAPHRAGMS, AND JACKING ASSEMBLIES. FILL DRILLED HOLES IN EXISTING BEAMS WITH NEW HIGH-STRENGTH BOLTS CONFORMING TO ASTM F3125 GRADE A325. NON-SHRINK GROUT LEVELING PADS USED UNDER JACKING ASSEMBLIES MAY BE LEFT IN PLACE WITH APPROVAL OF THE ENGINEER.
 - CONSTRUCT SHEAR BLOCKS WHERE APPLICABLE, SEE DWGS. PR-21 AND PR-22 FOR DETAILS.
 - AS AN ALTERNATIVE, THE TEMPORARY JACKING DIAPHRAGMS MAY BE LEFT IN PLACE AND PAINTED IN ACCORDANCE WITH SECTION 616 AT NO ADDITIONAL COST TO THE DEPARTMENT.

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ADDENDA / REVISIONS		NOT TO SCALE	REHABILITATION OF I-95, BEARING REPLACEMENTS	CONTRACT	BRIDGE NO.	1 748 N&S	JACKING NOTES AND LOADS FOR JACKING NORTHBOUND SPANS	RH-01
ADDED SEQUENCE OF CONSTRUCTION NOTE 18				T201907404	DESIGNED BY: K. AMBROSE	SECTION		
D.A.N. 02/12/2020				COUNTY	CHECKED BY: D. NIZAMOFF	WRA		
				NEW CASTLE		SHEET NO.		
					62			

BRIDGE JACKING NOTES:

1. CONTRACTOR SHALL VERIFY COMPATIBILITY OF THE JACKING ASSEMBLY WITH HYDRAULIC JACK (SEE NOTE 16) PRIOR TO FABRICATION. ALTERNATE JACKING SCHEMES OR ASSEMBLIES MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL. SUBMISSION SHALL INCLUDE DETAILED SHOP DRAWINGS AND CALCULATIONS SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF DELAWARE. ANY ALTERNATIVE DESIGN SHALL BE STRUCTURALLY EQUIVALENT AND MAY BE REJECTED BY THE ENGINEER FOR ANY REASON INCLUDING REASONS NOT RELATED TO STRUCTURAL EQUIVALENCY. NO ADDITIONAL PAYMENT WILL BE MADE FOR ALTERNATE JACKING SCHEMES OR ASSEMBLIES.

THE CONTRACTOR SHALL SUBMIT A JACKING PROCEDURE TO THE ENGINEER FOR APPROVAL. NO WORK ON THE INSTALLATION OF THE JACKING ASSEMBLY SHALL OCCUR UNTIL APPROVAL OF THE JACKING PROCEDURE IS OBTAINED. THE PROCEDURE SHALL CONTAIN, AT A MINIMUM, THE FOLLOWING INFORMATION:

- A. CATALOG CUTS OF ALL OF THE JACKS TO BE USED.
- B. CALIBRATION CERTIFICATES AND CALIBRATION CHARTS FOR EACH JACK TO BE USED.
- C. A COMPLETE SCHEMATIC OF THE JACKING SYSTEM, INCLUDING THE JACKS, HOSES, GAUGES, VALVES, MANIFOLDS AND PUMPS.
- D. A NARRATIVE ON THE METHOD TO BE USED TO DETERMINE THE VERTICAL DISPLACEMENTS AT EACH BEAM LOCATION DURING JACKING AND HOW THE DISPLACEMENT LIMITS WILL BE CHECKED AND MAINTAINED DURING THE JACKING.
- E. A NARRATIVE ON THE METHOD TO BE USED TO KEEP THE LIFTING RATES OF THE JACK SIMILAR AND AT A RATE SLOW ENOUGH TO BE ABLE TO VERIFY THE VERTICAL DISPLACEMENTS BEFORE THE LIMITS ARE EXCEEDED.
- F. A COMPLETE SEQUENCE OF CONSTRUCTION NARRATIVE.

2. THE CONTRACTOR SHALL VERIFY ALL EXISTING FIELD DIMENSIONS PRIOR TO ORDERING OR FABRICATING THE JACKING DIAPHRAGM, JACKING ASSEMBLY, AND PRIOR TO DRILLING HOLES IN EXISTING STEEL BEAMS.

3. ALL STEEL PLATES AND STEEL ROLLED SHAPES SHALL BE AASHTO M270 GRADE 50 MATERIAL.

4. UNLESS OTHERWISE NOTED, ALL BOLTS SHALL BE 7/8" DIAMETER ASTM F3125 GR. A325. ALL BOLTS ARE DESIGNED WITH THE THREADS INCLUDED IN THE SHEAR PLANE. ALL HOLES FOR BOLTS SHALL BE 1/8" DIAMETER. INSTALL BOLTS BY TURN OF NUT METHOD IN ACCORDANCE WITH SUBSECTION 615.03.D.6.c.v11 OF THE STANDARD SPECIFICATIONS.

5. ALL METAL WORK AND ALL WELDING SHALL BE PERFORMED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, SECTION 615.

6. JACKING ASSEMBLY AND JACKING STIFFENERS SHALL BE SET PLUMB.

7. WORK SHALL CONSIST OF JACKING THE EXISTING BEAMS, REMOVING THE EXISTING BEARINGS, AND INSTALLING NEW ELASTOMERIC AND DISC BEARINGS. FOR LOCATIONS OF BEARING REPLACEMENTS, SEE DWGS. BB-01 TO BB-04. ADDITIONAL CONCRETE REPAIR WORK THAT MAY BE REQUIRED PRIOR TO PERFORMING JACKING OPERATIONS IS DETAILED ON DWGS. PR-01 TO PR-03.

8. THE ENGINEER SHALL BE PRESENT DURING ALL JACKING OPERATIONS TO ENSURE CONFORMANCE WITH ALL PERTINENT CONTRACT PROVISIONS.

9. IN THE PRESENCE OF THE ENGINEER, THE CONTRACTOR SHALL INSPECT THE CONDITION OF THE EXISTING STEEL BEAMS FOR ANY DEFECTS WHICH MAY IMPACT THE LOAD CARRYING CAPACITY OF THE BEAM DURING JACKING. IF ANY DEFECTS ARE FOUND, THE CONTRACTOR SHALL STOP WORK AT THAT LOCATION AND DISCUSS WITH THE ENGINEER IMMEDIATELY.

10. WHERE CONCRETE REPAIRS TO THE PIER CAPS AND PEDESTALS OVERLAP WITH THE JACKING OPERATIONS, THE CONCRETE SHALL BE REPAIRED PRIOR TO THE JACKING OPERATIONS. ALL CONCRETE REPAIRS SHALL BE PERFORMED AND WILL BE PAID FOR AS SHOWN ON DWG. PN-02. JACKING OPERATIONS SHALL NOT BE PERFORMED UNTIL THE REPAIRED AREAS HAVE REACHED A COMPRESSIVE STRENGTH OF 3,000 PSI.

11. THE CONTRACTOR SHALL HAVE THE PROPOSED BEARING ASSEMBLIES FOR THE BEARING LINE BEING REPLACED ON SITE PRIOR TO COMMENCING WITH JACKING OPERATIONS. THE PROPOSED BEARING ASSEMBLIES MUST BE ACCEPTED BY THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

12. THE HYDRAULIC JACKS FOR THE SAME BEARING LINE REQUIRED TO LIFT THE EXISTING BEAMS SHALL BE OPERATED CONCURRENTLY (MANIFOLDED) TO PROVIDE AN EQUAL AND BALANCED LIFTING FORCE SUCH THAT THE BRIDGE IS LIFTED EVENLY.

THE MAXIMUM DIFFERENTIAL DISPLACEMENT BETWEEN ANY TWO ADJACENT BEAMS IS NOT TO EXCEED 1/8" AT ANY TIME.

THE MAXIMUM VERTICAL DISPLACEMENT OF ANY BEAM FROM THE EXISTING LOCATION SHALL NOT EXCEED 1/4" AT ANY TIME.

13. THE CONTRACTOR SHALL USE ONLY JACKS WITH LOCK-NUTS CAPABLE OF SUPPORTING A LOAD EQUAL TO THE RATED CAPACITY OF THE JACK. IN THE EVENT THE JACK LOSES HYDRAULIC PRESSURE THE CONTRACTOR SHALL ADVANCE THE LOCK-NUTS ON ALL JACKS SUCH THAT THE MAXIMUM DISTANCE BETWEEN THE TOP OF A JACK AND THE LOCK-NUT DOES NOT EXCEED 1/8" AT ANY TIME DURING THE JACKING PROCEDURE.

14. NO REPAIR WORK SHALL BE PERFORMED UNTIL THE JACKING OPERATION IS COMPLETE AND THE BRIDGE IS FULLY SUPPORTED BY THE JACKING ASSEMBLY (JACKING DIAPHRAGM, LOCK-NUT JACK, SPACER COLUMN, ETC).

15. LIVE LOAD SHALL BE TEMPORARILY REMOVED FROM THE BRIDGE DURING JACKING UNTIL THE BRIDGE IS FULLY SUPPORTED BY THE JACKING ASSEMBLIES.

16. THE HYDRAULIC JACKS SHALL HAVE A MINIMUM CAPACITY OF 200 TONS. THE FACTORED LOADS FOR JACKING WERE USED TO SIZE THE JACKING DIAPHRAGM, JACKING ASSEMBLY, AND HYDRAULIC JACK. THE JACKING DIAPHRAGM, JACKING ASSEMBLY, AND HYDRAULIC JACK DOES NOT ACCOUNT FOR CONDITIONAL CONSTRUCTION LOADS. THEY WILL NEED TO BE REDESIGNED FOR FACTORED DEAD LOADS AND ANY APPLIED CONSTRUCTION LOADS. REDESIGN OF THESE ELEMENTS WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

BRIDGE JACKING NOTES (CONTINUED):

17. THE FACTORED LOADS FOR JACKING USE A DEAD LOAD FACTOR OF 1.30 AND A LIVE LOAD FACTOR OF 1.75. THE FACTORED LOADS SHOWN WERE USED FOR THE DESIGN OF THE JACKING ASSEMBLY AND THE HYDRAULIC JACK.

18. NON-SHRINK GROUT SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, SECTION 1047.02. GROUT SHALL CURE WITH A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI PRIOR TO INSTALLING THE JACKING ASSEMBLY. MINIMUM AND MAXIMUM LEVELING PAD THICKNESS SHALL MEET MANUFACTURER'S REQUIREMENTS.

19. EXISTING STEEL CONNECTION PLATES THAT ARE TO BE CONNECTED TO NEW JACKING DIAPHRAGMS SHALL BE THOROUGHLY CLEANED AND PRIMED PRIOR TO PLACING NEW STEEL IN CONFORMANCE WITH SECTION 616. THE INSIDE SURFACE OF THE JACKING DIAPHRAGM THAT IS TO CONNECT TO THE CONNECTION PLATE SHALL RECEIVE A SHOP PRIME COAT. THE REMAINDER OF THE JACKING DIAPHRAGM SHALL BE PRIMED AND PAINTED IN ACCORDANCE WITH SECTION 616.

20. BRIDGE JACKING SHALL BE PAID FOR UNDER ITEM 604000 - JACKING BRIDGE. REMOVAL AND DISPOSAL OF EXISTING END DIAPHRAGMS TO BE REPLACED WITH JACKING DIAPHRAGMS IS INCLUDED IN ITEM 604000 - JACKING BRIDGE.

SUGGESTED SEQUENCE OF CONSTRUCTION:

THE FOLLOWING IS A SUGGESTED SEQUENCE OF CONSTRUCTION FOR THE JACKING OPERATIONS.

1. INSTALL ALL NECESSARY TEMPORARY WORK PLATFORMS AND/OR RIGGING. CARE SHALL BE TAKEN NOT TO INTERFERE WITH PROPOSED LOCATIONS OF BEARING DEVICES, JACKING DIAPHRAGMS, AND JACKING ASSEMBLIES.
2. REMOVE EXISTING DIAPHRAGMS AT LOCATIONS OF PROPOSED JACKING DIAPHRAGMS (PIERS E10/H1). REMOVE EXISTING CONNECTION PLATES AND GRIND SMOOTH ANY WELD WHERE PROPOSED JACKING CONNECTIONS ARE LOCATED.
3. INSTALL ALL TEMPORARY OR PERMANENT JACKING DIAPHRAGMS AS NECESSARY. 
4. PLACE A NON-SHRINK GROUT PAD BENEATH THE JACKING ASSEMBLY AND THE EXISTING BEAM SEAT TO ENSURE FULL AND LEVEL BEARING AND CURE TO SPECIFIED STRENGTH.
5. INSTALL ALL JACKING ASSEMBLIES AS SHOWN ON DWGS. RH-02 THROUGH RH-04.
6. REMOVE NUTS AND WASHERS OF THE EXISTING ANCHOR BOLTS.
7. PERFORM ROLLING ROAD BLOCKS IN ACCORDANCE WITH TA-35H WHEN JACKING BEAMS OFF THEIR RESPECTIVE BEARINGS. THE CONTRACTOR SHALL PROVIDE TWO TRAFFICE OFFICERS FOR ANY ROLLING ROAD BLOCK OPERATION IN ACCORDANCE WITH TA-35H. LIFTING OF BRIDGE VIA HYDRAULIC PRESSURE UNDER LIVE LOAD IS PROHIBITED.
8. SECURE JACKING DIAPHRAGMS IN PLACE WITH LOCK-NUTS OF THE HYDRAULIC JACKS AT LOCATIONS AS SHOWN IN THE JACKING SCHEMES ON DWGS. RH-02 TO RH-04. PROVIDE FOR SUPERSTRUCTURE EXPANSION.
9. RELEASE LOAD IN JACK TO TRANSFER ALL LOAD TO THE JACKING ASSEMBLY AND LOCK-NUT.

SUGGESTED SEQUENCE OF CONSTRUCTION (CONTINUED):

10. FOR DISC BEARING REPLACEMENTS AT PIERS E7 AND E8, ADDITIONAL REMOVAL SEQUENCE REQUIRED AS FOLLOWS:

- A. REMOVE AND REPLACE ONLY ONE OF THE INTERIOR BEARINGS (FOR PROPOSED TYPE GE-1) PRIOR TO REMOVING THE OTHER THREE BEARINGS. SEE NOTES 11-16 BELOW. THE OTHER THREE EXISTING BEARINGS SHALL REMAIN IN PLACE DURING THE REPLACEMENT TO ENSURE LATERAL FORCES ARE RESTRAINED BY THE EXISTING KEEPER PLATES.
- B. ONCE ONE OF THE TYPE GE-1 GUIDED DISC BEARINGS IS INSTALLED AND LATERAL FORCES ARE ABLE TO BE RESISTED BY THE GUIDED DISC BEARING, REMOVE AND REPLACE THE OTHER TYPE GE-1 GUIDED DISC BEARING. SEE NOTES 11-16 BELOW.
- C. AFTER THE TYPE GE-1 GUIDED DISC BEARINGS ARE INSTALLED, THE TWO EXTERIOR BEARINGS SHALL BE REMOVED AND REPLACED. SEE NOTES 11-16 BELOW.

11. REMOVE EXISTING WELDS BETWEEN THE SOLE PLATE AND THE BOTTOM FLANGE OF THE EXISTING BEAM. CARE SHALL BE TAKEN NOT TO DAMAGE THE EXISTING BEAM. ANY DAMAGE TO THE EXISTING BEAM CAUSED BY THE CONTRACTOR'S REMOVAL METHODS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AS DIRECTED BY THE ENGINEER. SUBMIT THE WELD REMOVAL PROCEDURE TO THE ENGINEER FOR APPROVAL.

12. REMOVE EXISTING ANCHOR BOLTS AS SHOWN ON DWGS. BB-01 AND BB-02.

13. REMOVE EXISTING BEARING ASSEMBLY. CARE SHALL BE TAKEN NOT TO DAMAGE THE EXISTING STEEL BEAM DURING ANY CUTTING OF THE EXISTING BEARING.

14. CLEAN THE BOTTOM SURFACE OF THE EXISTING BEAM AND APPLY PRIMER IN ACCORDANCE WITH SECTION 616. PAYMENT FOR CLEANING AND PAINTING WILL BE INCIDENTAL TO ITEM 604000 - JACKING BRIDGE.

15. THE TOP OF THE EXISTING BEARING LOCATION SHALL BE LEVEL AND FREE OF DEBRIS. IF REQUIRED, NON-SHRINK GROUT SHALL BE USED TO LEVEL AND PROVIDE A SMOOTH BEARING SURFACE FOR THE PROPOSED BEARING. PAYMENT FOR THIS WORK WILL BE INCIDENTAL TO ITEM 604000 - JACKING BRIDGE.

16. INSTALL PROPOSED BEARINGS. FOR THE SUGGESTED SEQUENCE OF INSTALLATION FOR BEARINGS, SEE DWGS. BB-02 AND BB-03.

17. DO NOT LOWER BEAMS UNTIL ALL REPAIRS AND BEARING INSTALLATIONS ARE COMPLETE AND TO THE SATISFACTION OF THE ENGINEER.

18. PERFORM ROLLING ROAD BLOCKS IN ACCORDANCE WITH TA-35H WHEN JACKING BEAMS OFF THEIR RESPECTIVE JACKING ASSEMBLIES AND LOCK NUTS. THE CONTRACTOR SHALL PROVIDE TWO TRAFFICE OFFICERS FOR ANY ROLLING ROAD BLOCK OPERATION IN ACCORDANCE WITH TA-35H. LIFTING OF BRIDGE VIA HYDRAULIC PRESSURE UNDER LIVE LOAD IS PROHIBITED.

19. REMOVE ALL JACKING ASSEMBLIES. NON-SHRINK GROUT LEVELING PADS USED UNDER JACKING ASSEMBLIES AND PROPOSED JACKING DIAPHRAGMS MAY BE LEFT IN PLACE WITH APPROVAL OF THE ENGINEER. 

LOADS FOR JACKING						UNFACTORED		FACTORED	
SPAN NO.	SUBSTRUCTURE UNIT	GIRDER NO.	BEAM SPACING ALONG ξ OF BEARING	BEAM MEMBER	ANGLE A*	DL+15%	DL+LL+IMP	DL+15%	DL+LL+IMP
SPAN E7	PIER E7	S1	7' - 2" \pm	PLATE GIRDER	89° 56' 17.4" \pm	46.3 KIP	103.4 KIP	76.4 KIP	160.1 KIP
		S2	7' - 2" \pm	PLATE GIRDER	89° 56' 14.8" \pm	55.9 KIP	123.3 KIP	92.2 KIP	190.6 KIP
		S3	7' - 2" \pm	PLATE GIRDER	89° 56' 12.1" \pm	69.2 KIP	140.7 KIP	114.2 KIP	215.0 KIP
		S4	7' - 2" \pm	PLATE GIRDER	89° 56' 09.4" \pm	99.1 KIP	189.9 KIP	163.4 KIP	287.8 KIP
SPAN E8	PIER E8	S1	7' - 2" \pm	PLATE GIRDER	89° 51' 53.9" \pm	46.3 KIP	103.4 KIP	76.4 KIP	160.1 KIP
		S2	7' - 2" \pm	PLATE GIRDER	89° 51' 42.7" \pm	55.9 KIP	123.3 KIP	92.2 KIP	190.6 KIP
		S3	7' - 2" \pm	PLATE GIRDER	89° 51' 31.0" \pm	69.2 KIP	140.7 KIP	114.2 KIP	215.0 KIP
		S4	7' - 2" \pm	PLATE GIRDER	89° 51' 18.6" \pm	99.1 KIP	189.9 KIP	163.4 KIP	287.8 KIP
SPAN E9	PIER E10	S1	7' - 0 1/8" \pm	W36x160	85° 06' 06.7" \pm	50.5 KIP	117.9 KIP	83.3 KIP	183.6 KIP
		S2	7' - 0 1/8" \pm	W36x150	85° 01' 10.4" \pm	38.0 KIP	109.1 KIP	62.6 KIP	173.8 KIP
		S3	7' - 0 1/8" \pm	W36x135	84° 56' 02.3" \pm	36.7 KIP	107.3 KIP	60.5 KIP	171.2 KIP
		S4	7' - 0 1/8" \pm	W36x135	84° 50' 41.7" \pm	39.1 KIP	98.4 KIP	64.5 KIP	154.6 KIP
SPAN E11	PIER H1	S1	8' - 2 3/8" \pm	W36x135	69° 55' 08.5" \pm	62.3 KIP	145.0 KIP	102.8 KIP	225.8 KIP
		S2	8' - 2 3/8" \pm	W36x135	70° 58' 13.3" \pm	51.6 KIP	141.0 KIP	85.2 KIP	223.6 KIP
		S3	8' - 2 3/8" \pm	W36x135	72° 05' 47.3" \pm	47.8 KIP	134.0 KIP	78.9 KIP	213.0 KIP
		S4	8' - 2 3/8" \pm	W36x135	73° 18' 16.9" \pm	47.8 KIP	134.0 KIP	78.9 KIP	213.0 KIP
		S5	8' - 2 3/8" \pm	W36x135	74° 36' 11.1" \pm	46.7 KIP	117.2 KIP	77.0 KIP	184.1 KIP

*FOR LOCATION OF ANGLE A, SEE DWGS. RH-02 THROUGH RH-04.

2:17:56 PM - 01/10/2020

ADDENDA / REVISIONS	
 REVISED SEQUENCE OF CONSTRUCTION NOTES	C. MALKIN 2/12/2020

SCALE AS NOTED	REHABILITATION OF I-95, BEARING REPLACEMENTS	CONTRACT	BRIDGE NO.	1 758E 6149
		T201907404	DESIGNED BY:	B. MARSHALL
		COUNTY	CHECKED BY:	C. MALKIN
		NEW CASTLE		

JACKING NOTES	RH-01
	SECTION
	PAI
	SHEET NO.
	94

BRIDGE JACKING NOTES:

1. CONTRACTOR SHALL VERIFY COMPATIBILITY OF THE JACKING ASSEMBLY WITH HYDRAULIC JACK (SEE NOTE 15) PRIOR TO FABRICATION. ALTERNATE JACKING SCHEMES OR ASSEMBLIES MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL. SUBMISSION SHALL INCLUDE DETAILED SHOP DRAWINGS AND CALCULATIONS SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF DELAWARE. ANY ALTERNATIVE DESIGN SHALL BE STRUCTURALLY EQUIVALENT AND MAY BE REJECTED BY THE ENGINEER FOR ANY REASON INCLUDING REASONS NOT RELATED TO STRUCTURAL EQUIVALENCY. NO ADDITIONAL PAYMENT WILL BE MADE FOR ALTERNATE JACKING SCHEMES OR ASSEMBLIES.

THE CONTRACTOR SHALL SUBMIT A JACKING PROCEDURE TO THE ENGINEER FOR APPROVAL. NO WORK ON THE INSTALLATION OF THE JACKING ASSEMBLY SHALL OCCUR UNTIL APPROVAL OF THE JACKING PROCEDURE IS OBTAINED. THE PROCEDURE SHALL CONTAIN, AT A MINIMUM, THE FOLLOWING INFORMATION:

- A. CATALOG CUTS OF ALL OF THE JACKS TO BE USED.
 - B. CALIBRATION CERTIFICATES AND CALIBRATION CHARTS FOR EACH JACK TO BE USED.
 - C. A COMPLETE SCHEMATIC OF THE JACKING SYSTEM, INCLUDING THE JACKS, HOSES, GAUGES, VALVES, MANIFOLDS AND PUMPS.
 - D. A NARRATIVE ON THE METHOD TO BE USED TO DETERMINE THE VERTICAL DISPLACEMENTS AT EACH BEAM LOCATION DURING JACKING AND HOW THE DISPLACEMENT LIMITS WILL BE CHECKED AND MAINTAINED DURING THE JACKING.
 - E. A NARRATIVE ON THE METHOD TO BE USED TO KEEP THE LIFTING RATES OF THE JACK SIMILAR AND AT A RATE SLOW ENOUGH TO BE ABLE TO VERIFY THE VERTICAL DISPLACEMENTS BEFORE THE LIMITS ARE EXCEEDED.
 - F. A COMPLETE SEQUENCE OF CONSTRUCTION NARRATIVE.
2. THE CONTRACTOR SHALL VERIFY ALL EXISTING FIELD DIMENSIONS PRIOR TO ORDERING OR FABRICATING THE JACKING DIAPHRAGM, JACKING ASSEMBLY, AND PRIOR TO DRILLING HOLES IN EXISTING STEEL BEAMS.
 3. ALL STEEL PLATES AND STEEL ROLLED SHAPES SHALL BE AASHTO M270 GRADE 50 MATERIAL.
 4. UNLESS OTHERWISE NOTED, ALL BOLTS SHALL BE 7/8" DIAMETER ASTM F3125 GR. A325. ALL BOLTS ARE DESIGNED WITH THE THREADS INCLUDED IN THE SHEAR PLANE. ALL HOLES FOR BOLTS SHALL BE 1/8" DIAMETER. INSTALL BOLTS BY TURN OF NUT METHOD IN ACCORDANCE WITH SUBSECTION 615.03.D.6.c.vII OF THE STANDARD SPECIFICATIONS.
 5. ALL METAL WORK AND ALL WELDING SHALL BE PERFORMED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, SECTION 615.
 6. JACKING ASSEMBLY AND JACKING STIFFENERS SHALL BE SET PLUMB.
 7. WORK SHALL CONSIST OF JACKING THE EXISTING BEAMS, REMOVING THE EXISTING BEARINGS, AND INSTALLING NEW ELASTOMERIC AND DISC BEARINGS. FOR LOCATIONS OF BEARING REPLACEMENTS, SEE DWGS. BB-01 AND BB-02. NO ADDITIONAL CONCRETE REPAIR WORK IS ANTICIPATED FOR JACKING.
 8. THE ENGINEER SHALL BE PRESENT DURING ALL JACKING OPERATIONS TO ENSURE CONFORMANCE WITH ALL PERTINENT CONTRACT PROVISIONS.
 9. IN THE PRESENCE OF THE ENGINEER, THE CONTRACTOR SHALL INSPECT THE CONDITION OF THE EXISTING STEEL BEAMS FOR ANY DEFECTS WHICH MAY IMPACT THE LOAD CARRYING CAPACITY OF THE BEAM DURING JACKING. IF ANY DEFECTS ARE FOUND, THE CONTRACTOR SHALL STOP WORK AT THAT LOCATION AND DISCUSS WITH THE ENGINEER IMMEDIATELY.
 10. THE CONTRACTOR SHALL HAVE THE PROPOSED BEARING ASSEMBLIES FOR THE BEARING LINE BEING REPLACED ON SITE PRIOR TO COMMENCING WITH JACKING OPERATIONS. THE PROPOSED BEARING ASSEMBLIES MUST BE ACCEPTED BY THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
 11. THE HYDRAULIC JACKS FOR THE SAME BEARING LINE REQUIRED TO LIFT THE EXISTING BEAMS SHALL BE OPERATED CONCURRENTLY (MANIFOLDED) TO PROVIDE AN EQUAL AND BALANCED LIFTING FORCE SUCH THAT THE BRIDGE IS LIFTED EVENLY.

THE MAXIMUM DIFFERENTIAL DISPLACEMENT BETWEEN ANY TWO ADJACENT BEAMS IS NOT TO EXCEED 1/8" AT ANY TIME.

THE MAXIMUM VERTICAL DISPLACEMENT OF ANY BEAM FROM THE EXISTING LOCATION SHALL NOT EXCEED 1/4" AT ANY TIME.

12. THE CONTRACTOR SHALL USE ONLY JACKS WITH LOCK-NUTS CAPABLE OF SUPPORTING A LOAD EQUAL TO THE RATED CAPACITY OF THE JACK. IN THE EVENT THE JACK LOSES HYDRAULIC PRESSURE THE CONTRACTOR SHALL ADVANCE THE LOCK-NUTS ON ALL JACKS SUCH THAT THE MAXIMUM DISTANCE BETWEEN THE TOP OF A JACK AND THE LOCK-NUT DOES NOT EXCEED 1/8" AT ANY TIME DURING THE JACKING PROCEDURE.
13. NO REPAIR WORK SHALL BE PERFORMED UNTIL THE JACKING OPERATION IS COMPLETE AND THE BRIDGE IS FULLY SUPPORTED BY THE JACKING ASSEMBLY (JACKING DIAPHRAGM, LOCK-NUT JACK, SPACER COLUMN, ETC.)
14. LIVE LOAD SHALL BE TEMPORARILY REMOVED FROM THE BRIDGE DURING JACKING UNTIL THE BRIDGE IS FULLY SUPPORTED BY THE JACKING ASSEMBLIES.
15. THE HYDRAULIC JACKS SHALL HAVE A MINIMUM CAPACITY OF 200 TONS. THE FACTORED LOADS FOR JACKING WERE USED TO SIZE THE JACKING DIAPHRAGM, JACKING ASSEMBLY, AND HYDRAULIC JACK. THE JACKING DIAPHRAGM, JACKING ASSEMBLY, AND HYDRAULIC JACK DOES NOT ACCOUNT FOR CONDITIONAL CONSTRUCTION LOADS. THEY WILL NEED TO BE REDESIGNED FOR FACTORED DEAD LOADS AND ANY APPLIED CONSTRUCTION LOADS. REDESIGN OF THESE ELEMENTS WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
16. THE FACTORED LOADS FOR JACKING USE A DEAD LOAD FACTOR OF 1.30 AND A LIVE LOAD FACTOR OF 1.75. THE FACTORED LOADS SHOWN WERE USED FOR THE DESIGN OF THE JACKING ASSEMBLY AND THE HYDRAULIC JACK.
17. NON-SHRINK GROUT SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, SECTION 1047.02. GROUT SHALL CURE WITH A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI PRIOR TO INSTALLING THE JACKING ASSEMBLY. MINIMUM AND MAXIMUM LEVELING PAD THICKNESS SHALL MEET MANUFACTURER'S REQUIREMENTS.
18. EXISTING STEEL CONNECTION PLATES THAT ARE TO BE CONNECTED TO NEW JACKING DIAPHRAGMS SHALL BE THOROUGHLY CLEANED AND PRIMED PRIOR TO PLACING NEW STEEL IN CONFORMANCE WITH SECTION 616. THE INSIDE SURFACE OF THE JACKING DIAPHRAGM THAT IS TO CONNECT TO THE CONNECTION PLATE SHALL RECEIVE A SHOP PRIME COAT. THE REMAINDER OF THE JACKING DIAPHRAGM SHALL BE PRIMED AND PAINTED IN ACCORDANCE WITH SECTION 616.
19. JACKING STIFFENERS SHALL BE SHOP WELDED TO THE JACKING DIAPHRAGMS. THE CONTRACTOR SHALL CLIP THE INSIDE CORNERS OF THE STIFFENER PLATES 3/4" X 3/4".
20. BRIDGE JACKING SHALL BE PAID FOR UNDER ITEM 604000 - JACKING BRIDGE. REMOVAL AND DISPOSAL OF EXISTING END DIAPHRAGMS TO BE REPLACED WITH JACKING DIAPHRAGMS IS INCLUDED IN ITEM 604000 - JACKING BRIDGE.

SUGGESTED SEQUENCE OF CONSTRUCTION:

THE FOLLOWING IS A SUGGESTED SEQUENCE OF CONSTRUCTION FOR THE JACKING OPERATIONS.

1. INSTALL ALL NECESSARY TEMPORARY WORK PLATFORMS AND/OR RIGGING. CARE SHALL BE TAKEN NOT TO INTERFERE WITH PROPOSED LOCATIONS OF BEARING DEVICES, JACKING DIAPHRAGMS, AND JACKING ASSEMBLIES.
2. REMOVE EXISTING DIAPHRAGMS AT LOCATIONS OF PROPOSED JACKING DIAPHRAGMS. REMOVE EXISTING CONNECTION PLATES AND GRIND SMOOTH ANY WELD WHERE PROPOSED JACKING CONNECTIONS ARE LOCATED.
3. INSTALL ALL TEMPORARY OR PERMANENT JACKING DIAPHRAGMS AS NECESSARY. ⚠
4. PLACE A NON-SHRINK GROUT PAD BENEATH THE JACKING ASSEMBLY AND THE EXISTING BEAM SEAT TO ENSURE FULL AND LEVEL BEARING AND CURE TO SPECIFIED STRENGTH.
5. INSTALL ALL JACKING ASSEMBLIES AS SHOWN ON DWGS. RH-02 AND RH-03.
6. REMOVE NUTS AND WASHERS OF THE EXISTING ANCHOR BOLTS.
7. PERFORM ROLLING ROAD BLOCKS IN ACCORDANCE WITH TA-35H WHEN JACKING BEAMS OFF THEIR RESPECTIVE BEARINGS. THE CONTRACTOR SHALL PROVIDE TWO TRAFFICE OFFICERS FOR ANY ROLLING ROAD BLOCK OPERATION IN ACCORDANCE WITH TA-35H. LIFTING OF BRIDGE VIA HYDRAULIC PRESSURE UNDER LIVE LOAD IS PROHIBITED.
8. SECURE JACKING DIAPHRAGMS IN PLACE WITH LOCK-NUTS OF THE HYDRAULIC JACKS AT LOCATIONS AS SHOWN IN THE JACKING SCHEMES ON DWGS. RH-02 TO RH-04. PROVIDE FOR SUPERSTRUCTURE EXPANSION.
9. RELEASE LOAD IN JACK TO TRANSFER ALL LOAD TO THE JACKING ASSEMBLY AND LOCK-NUT.
10. REMOVE EXISTING WELDS BETWEEN THE SOLE PLATE AND THE BOTTOM FLANGE OF THE EXISTING BEAM. CARE SHALL BE TAKEN NOT TO DAMAGE THE EXISTING BEAM. ANY DAMAGE TO THE EXISTING BEAM CAUSED BY THE CONTRACTOR'S REMOVAL METHODS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AS DIRECTED BY THE ENGINEER. SUBMIT THE WELD REMOVAL PROCEDURE TO THE ENGINEER FOR APPROVAL.
11. EXISTING ANCHOR BOLTS ARE TO REMAIN IN PLACE FOR PROPOSED BEARINGS AS SHOWN ON DWG. BB-02. CARE SHALL BE TAKEN NOT TO DAMAGE THE EXISTING ANCHOR BOLTS. ANY DAMAGE TO THE EXISTING ANCHOR BOLTS CAUSED BY THE CONTRACTOR'S REMOVAL METHODS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AS DIRECTED BY THE ENGINEER.
12. REMOVE EXISTING BEARING ASSEMBLY. CARE SHALL BE TAKEN NOT TO DAMAGE THE EXISTING STEEL BEAM DURING ANY CUTTING OF THE EXISTING BEARING.
13. CLEAN THE BOTTOM SURFACE OF THE EXISTING BEAM AND APPLY PRIMER IN ACCORDANCE WITH SECTION 616. PAYMENT FOR CLEANING AND PAINTING WILL BE INCIDENTAL TO ITEM 604000 - JACKING BRIDGE.
14. THE TOP OF THE EXISTING BEARING LOCATION SHALL BE LEVEL AND FREE OF DEBRIS. IF REQUIRED, NON-SHRINK GROUT SHALL BE USED TO LEVEL AND PROVIDE A SMOOTH BEARING SURFACE FOR THE PROPOSED BEARING. PAYMENT FOR THIS WORK WILL BE INCIDENTAL TO ITEM 604000 - JACKING BRIDGE.
15. INSTALL PROPOSED BEARINGS. FOR THE SUGGESTED SEQUENCE OF INSTALLATION FOR BEARINGS, SEE DWG. BB-02.
16. DO NOT LOWER BEAMS UNTIL ALL REPAIRS AND BEARING INSTALLATIONS ARE COMPLETE AND TO THE SATISFACTION OF THE ENGINEER.
17. PERFORM ROLLING ROAD BLOCKS IN ACCORDANCE WITH TA-35H WHEN JACKING BEAMS OFF THEIR RESPECTIVE JACKING ASSEMBLIES AND LOCK NUTS. THE CONTRACTOR SHALL PROVIDE TWO TRAFFICE OFFICERS FOR ANY ROLLING ROAD BLOCK OPERATION IN ACCORDANCE WITH TA-35H. LIFTING OF BRIDGE VIA HYDRAULIC PRESSURE UNDER LIVE LOAD IS PROHIBITED.
18. REMOVE ALL JACKING ASSEMBLIES. NON-SHRINK GROUT LEVELING PADS USED UNDER JACKING ASSEMBLIES AND PROPOSED JACKING DIAPHRAGMS MAY BE LEFT IN PLACE WITH APPROVAL OF THE ENGINEER. ⚠

LOADS FOR JACKING						UNFACTORED		FACTORED	
SPAN NO.	SUBSTRUCTURE UNIT	GIRDER NO.	BEAM SPACING ALONG C OF BEARING	BEAM MEMBER	ANGLE A*	DL+15%	DL+LL+IMP	DL+15%	DL+LL+IMP
SPAN F2	PIER F2	S1	7' -2"±	PLATE GIRDER	89°55' 35.0"±	52.3 KIP	115.9 KIP	86.3 KIP	170.5 KIP
		S2	7' -2"±	PLATE GIRDER	89°55' 31.3"±	77.6 KIP	151.9 KIP	128.0 KIP	217.7 KIP
		S3	7' -2"±	PLATE GIRDER	89°55' 27.5"±	114.9 KIP	197.3 KIP	189.5 KIP	274.1 KIP
		S4	7' -2"±	PLATE GIRDER	89°55' 23.6"±	157.6 KIP	257.6 KIP	260.1 KIP	353.2 KIP
SPAN F3	PIER F3	S1	7' -2 1/8"±	PLATE GIRDER	87°21' 42.6"±	57.2 KIP	128.7 KIP	94.3 KIP	199.4 KIP
		S2	7' -2 1/8"±	PLATE GIRDER	87°03' 44.6"±	49.1 KIP	130.4 KIP	81.0 KIP	206.1 KIP
		S3	7' -2 1/8"±	PLATE GIRDER	86°45' 14.7"±	48.4 KIP	129.6 KIP	79.9 KIP	205.0 KIP
		S4	7' -2 1/8"±	PLATE GIRDER	86°26' 11.8"±	51.2 KIP	117.2 KIP	84.4 KIP	182.0 KIP

*FOR LOCATION OF ANGLE A, SEE DWGS. RH-02 THROUGH RH-03.

2:17:58 PM 2/17/2020

ADDENDA / REVISIONS		CONTRACT		BRIDGE NO.		SECTION	
⚠ REVISED SEQUENCE OF CONSTRUCTION NOTES C. MALKIN 2/12/2020		T201907404		1 758F 6149		RH-01	
		COUNTY		DESIGNED BY: B. MARSHALL		SECTION	
		NEW CASTLE		CHECKED BY: C. MALKIN		PAI	
						SHEET NO.	
						107	

SCALE AS NOTED

REHABILITATION OF I-95,
BEARING REPLACEMENTS

JACKING NOTES