03-06-2015 LETTING ITEM 146

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| I-24 | (64-3B)I-7 | MASSAC | 18 * | 1 |
| | ILLINOIS | CONTRACT NO. 78448 | | |

* 18+2 = 20 TOTAL SHEETS

D-99-008-15

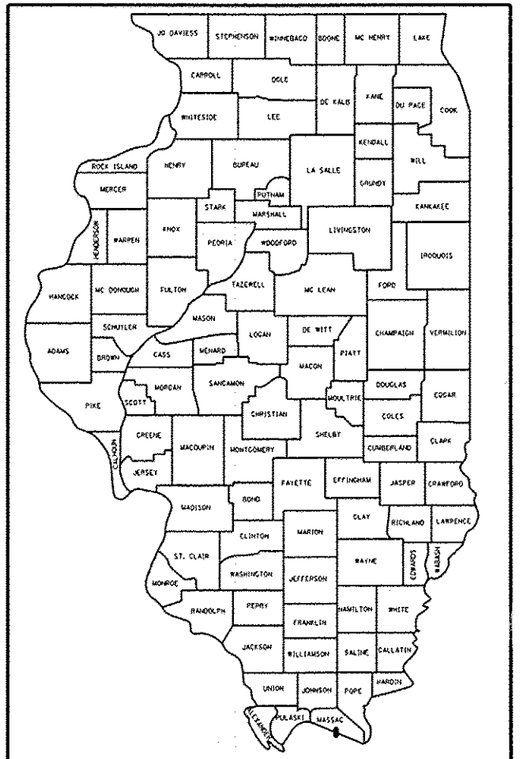
# STATE OF ILLINOIS
# DEPARTMENT OF TRANSPORTATION
# DIVISION OF HIGHWAYS

# PROPOSED
# HIGHWAY PLANS

## FAI ROUTE 24 (I-24)
## SECTION (64-3B)I-7

## BEARING REPLACEMENT
## MASSAC COUNTY, ILLINOIS
## McCRACKEN COUNTY, KENTUCKY

C-99-013-15




LOCATION OF SECTION INDICATED THUS: –

**FOR INDEX OF SHEETS, SEE SHEET NO. 2**

**FOR SUMMARY OF QUANTITIES, SEE SHEET NO. 3-4**

**TRAFFIC DATA**

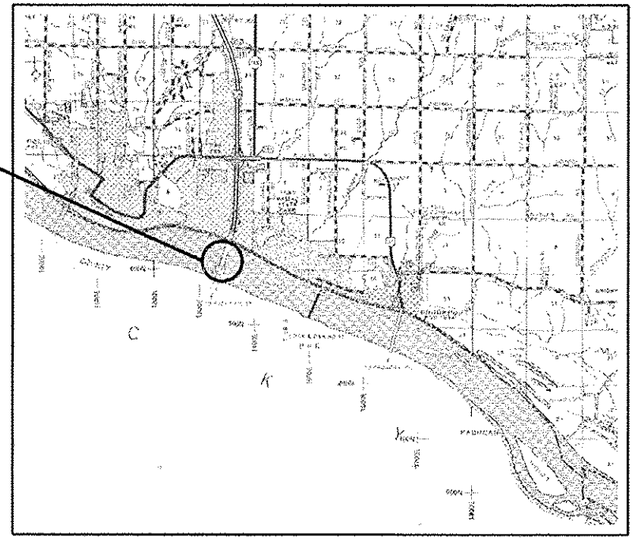
**I-24 TRAFFIC DATA**

2014 ADT = 29,600 (TWO WAY)
20% TRUCKS

**TOWNSHIPS:**

COUNTY UNIT ROAD DISTRICT

EXISTING STRUCTURE NO.
064-0035 ILLINOIS
073-0024-B0100 KENTUCKY
FAI 24 OVER THE OHIO RIVER



STRUCTURE LENGTH = 5,634 FT.

N

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

SUBMITTED Dec 16 20 14
Jeffrey L Keirn
DEPUTY DIRECTOR OF HIGHWAYS, REGION ENGINEER
Jan 30 20 15
John D. Baranzelli P.E. /BR
acting ENGINEER OF DESIGN AND ENVIRONMENT
Jan 30 20 15
Omer Osman, P.E. /BR
DIRECTOR OF HIGHWAYS, CHIEF ENGINEER

J.U.L.I.E.
JOINT UTILITY LOCATION INFORMATION FOR EXCAVATION
1-800-892-0123
OR 811

**PROJECT MANAGER: DAVID PICHE (618) 351-5227**

**CONTRACT NO. 78448**

**PRINTED BY THE AUTHORITY OF THE STATE OF ILLINOIS**

## GENERAL NOTES

1) IN ADDITION TO THE REQUIREMENTS OF ARTICLE 107.16 THE CONTRACTOR SHALL PROTECT THE SURFACE OF ALL BRIDGE DECKS AND BRIDGE APPROACH PAVEMENTS IN A MANNER SATISFACTORY TO THE ENGINEER BEFORE ANY EQUIPMENT IS ALLOWED TO CROSS THE STRUCTURE. PROTECTION SHALL BE PROVIDED FOR ALL EQUIPMENT AS DEFINED IN ARTICLE 101.16 REGARDLESS IF TRACK MOUNTED OR WHEELED.

2) IF THE CONTRACTOR CHOOSES TO MODIFY THE SUGGESTED SEQUENCE OF CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT A REVISED SEQUENCE OF CONSTRUCTION AND TRAFFIC CONTROL LAYOUT DETAILS FOR REVIEW AND ACCEPTANCE BY THE ENGINEER.

3) COMMITMENTS: NONE AS OF DECEMBER 19, 2014.

## INDEX OF SHEETS



* INCLUDES SHEETS 18A AND 18B.

## ILLINOIS HIGHWAY STANDARDS

| | |
|---|---|
| 000001-06 | STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS |
| 001001-02 | AREAS OF REINFORCEMENT BARS |
| 701101-04 | OFF-ROAD, MULTILANE 15' TO PAVEMENT EDGE |
| 701400-08 | APPROACH TO LANE CLOSURE FREEWAY/EXPRESSWAY |
| 701401-09 | LANE CLOSURE FREEWAY/EXPRESSWAY |
| 701402-10 | LANE CLOSURE FREEWAY/EXPRESSWAY, WITH BARRIER |
| 701901-04 | TRAFFIC CONTROL DEVICES |
| 704001-07 | TEMPORARY CONCRETE BARRIER |

701428

Prepared By: _____ DISTRICT STUDIES & PLANS ENGINEER

Examined By: _____ DISTRICT LAND ACQUISITION ENGINEER

Examined By: _____ DISTRICT PROGRAM DEVELOPMENT ENGINEER

Examined By: _____ DISTRICT OPERATIONS ENGINEER

Examined By: _____ DISTRICT PROJECT IMPLEMENTATION ENGINEER

Examined By: _____ DISTRICT CONSTRUCTION ENGINEER

Examined By: _____ DISTRICT MATERIALS ENGINEER

| | | | |
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| | | DRAWN - | REVISED - |
| | PLOT SCALE = 100.0000 ' / in. | CHECKED - | REVISED - |
| | PLOT DATE = 12/15/2014 | DATE - | REVISED - |

**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

**INDEX OF SHEETS, GENERAL NOTES, STANDARDS**

SCALE: | SHEET NO. OF SHEETS | STA. | TO STA.

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| 24 | (64-3B)I-7 | MASSAC | 18 | 2 |
| | | CONTRACT NO. 78448 | | |
| | ILLINOIS FED. AID PROJECT | | | |

# SUMMARY OF QUANTITIES

| CODE NUMBER | ITEM DESCRIPTION | UNIT | CONSTRUCTION TYPE CODE 14<br>STATE FUNDING 50% ILLINOIS & 50% KENTUCKY<br>SN 064-0035<br>TOTAL QUANTITY |
|---|---|---|---|
| 50102400 | CONCRETE REMOVAL | CU YD | 1.1 |
| | | | |
| 50300225 | CONCRETE STRUCTURES | CU YD | 46.7 |
| | | | |
| 50800205 | REINFORCEMENT BARS, EPOXY COATED | POUND | 5130 |
| | | | |
| 52100530 | ANCHOR BOLTS, 1 1/4" | EACH | 16 |
| | | | |
| 52100540 | ANCHOR BOLTS, 1 1/2" | EACH | 32 |
| | | | |
| 52100560 | ANCHOR BOLTS, 2" | EACH | 40 |
| | | | |
| 67000400 | ENGINEER'S FIELD OFFICE, TYPE A | CAL MO | 10 |
| | | | |
| 67100100 | MOBILIZATION | L SUM | 1 |
| | | | |
| 70103815 | TRAFFIC CONTROL SURVEILLANCE | CAL DA | 30 |
| | | | |
| 70106800 | CHANGEABLE MESSAGE SIGN | CAL MO | 10 |
| | | | |
| 70400100 | TEMPORARY CONCRETE BARRIER | FOOT | 1000 |
| | | | |
| 70400200 | RELOCATE TEMPORARY CONCRETE BARRIER | FOOT | 2600 |
| | | | |
| 70600250 | IMPACT ATTENUATORS, TEMPORARY (NON- REDIRECTIVE), TEST LEVEL 3 | EACH | 5 |
| | | | |
| 70600350 | IMPACT ATTENUATORS, RELOCATE (NON- REDIRECTIVE), TEST LEVEL 3 | EACH | 13 |
| | | | |
| X5210220 | HIGH LOAD MULTI-ROTATIONAL BEARINGS, GUIDED EXPANSION, 750K | EACH | 4 |

| | | | |
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| | | DRAWN - | REVISED - |
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| Default | PLOT DATE = 12/22/2014 | DATE - | REVISED - |

**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

**SUMMARY OF QUANTITIES**

SCALE: | SHEET OF SHEETS | STA. | TO STA.

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| 24 | (64-3B)I-7 | MASSAC | 18 | 3 |
| | | CONTRACT NO. 78448 | | |
| | ILLINOIS FED. AID PROJECT | | | |

# SUMMARY OF QUANTITIES - CONT

CONSTRUCTION TYPE CODE 14

STATE FUNDING 50% ILLINOIS & 50% KENTUCKY
SN 064-0035

| CODE NUMBER | ITEM DESCRIPTION | UNIT | TOTAL QUANTITY |
|---|---|---|---|
| | | | |
| X0900011 | HIGH LOAD MULTI-ROTATIONAL BEARINGS, GUIDED EXPANSION, 1100K | EACH | 8 |
| | | | |
| X0325656 | HIGH LOAD MULTI-ROTATIONAL BEARINGS, GUIDED EXPANSION, 2000K | EACH | 4 |
| | | | |
| X0900012 | HIGH LOAD MULTI-ROTATIONAL BEARINGS, GUIDED EXPANSION, 3100K | EACH | 4 |
| | | | |
| X7010216 | TRAFFIC CONTROL AND PROTECTION, (SPECIAL) | L SUM | 1 |
| | | | |
| X7010410 | SPEED DISPLAY TRAILER | CAL MO | 10 |
| | | | |
| Z0001905 | STRUCTURAL STEEL REPAIR | POUND | 23,730 |
| | | | |
| Z0003802 | REMOVAL OF EXISTING BEARINGS | EACH | 20 |
| | | | |
| Z0031200 | JACKING AND CRIBBING | EACH | 20 |
| | | | |
| 22 | | | |
| | | | |
| | | | |
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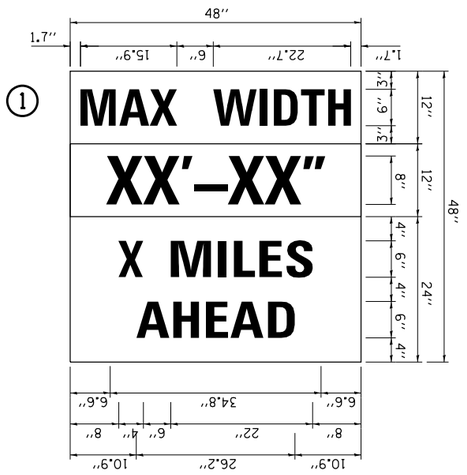
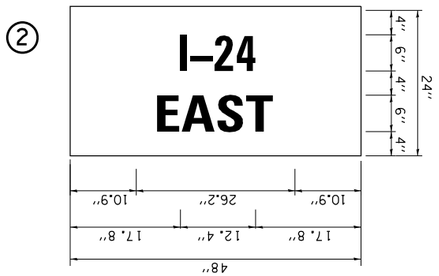
| | PLOT SCALE = 100.0000 ' / in. | DRAWN - | REVISED - | | | 24 | (64-3B)I-7 | MASSAC | 18 | 4 |
| Default | PLOT DATE = 12/22/2014 | CHECKED - | REVISED - | | | | | CONTRACT NO. 78448 | | |
| | | DATE - | REVISED - | | SCALE: SHEET OF SHEETS STA. TO STA. | | | ILLINOIS FED. AID PROJECT | | |

## SIGN LEGEND

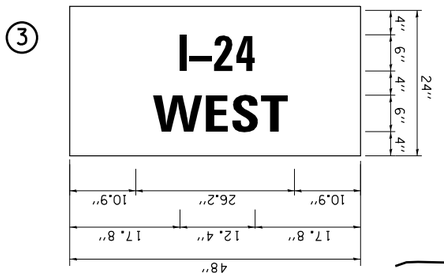



**W12–I103**

W12-I103 (WIDTH IS 8D);
NO BORDER, BLACK ON WHITE;
"MAX WIDTH" D;
NO BORDER, BLACK ON ORANGE;
"XX'-XX"" D;
NO BORDER, BLACK ON WHITE;
"X MILES" D; "AHEAD" D




NO BORDER, BLACK ON WHITE;
"I-24" D;
NO BORDER, BLACK ON WHITE;
"EAST" D




NO BORDER, BLACK ON WHITE;
"I-24" D;
NO BORDER, BLACK ON WHITE;
"WEST" D




## WIDE LOAD SIGNING PLAN

## DETOUR NOTES:

1. THE CONTRACTOR SHALL FURNISH THE POSTS AND ERECT THE SIGNS AT THE LOCATIONS AS DIRECTED BY THE ENGINEER. ALL SIGNS SHALL BE POST MOUNTED.

   THE ABOVE NOTED WORK, INCLUDING SIGNS, POSTS, HARDWARE AND LABOR SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE, EACH, FOR TRAFFIC CONTROL AND PROTECTION, (SPECIAL) AND NO OTHER COMPENSATION WILL BE ALLOWED.

   THE WIDTH SHOWN ON THE W12-I103 SIGN SHALL BE 14'-1'' FOR E.B TRAFFIC AND 14'-1'' FOR W.B. TRAFFIC OR AS DIRECTED BY THE ENGINEER. THE "X" MILES AHEAD WILL BE DETERMINED BY THE ENGINEER.

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| | | DRAWN - | REVISED - |
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| | PLOT DATE = 12/16/2014 | DATE - | REVISED - |

**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

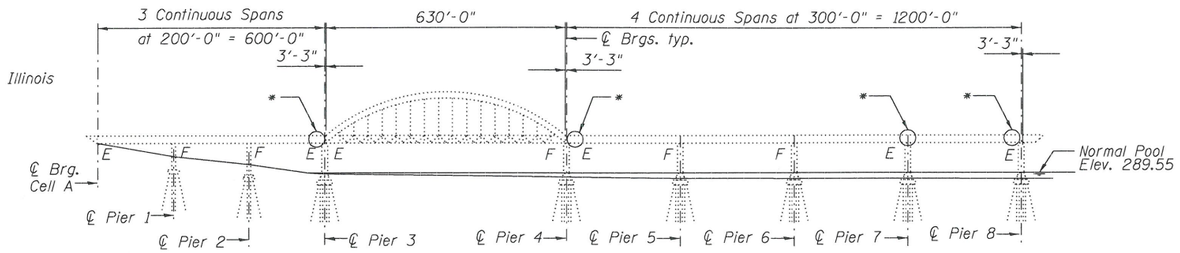
**WIDE LOAD SIGNING PLAN**

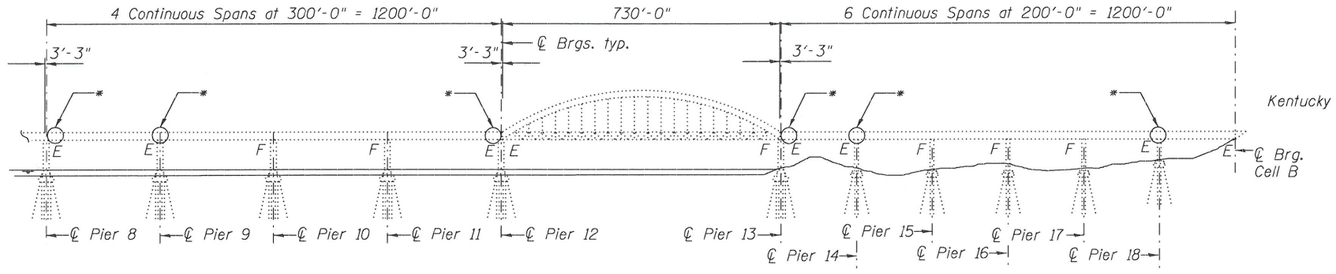
SCALE: | SHEET NO. OF SHEETS | STA. TO STA.

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| 24 | (64-3B)I-7 | MASSAC | 18 | 5 |
| | | CONTRACT NO. 78448 | | |
| | ILLINOIS FED. AID PROJECT | | | |

Traffic: Traffic to be maintained utilizing stage construction.

Salvage: No Salvage.




## ELEVATION

(Looking East)

*Remove and replace existing rocker bearings with HLMR Expansion Bearings and Concrete Pedestals. Existing tied arch span rocker bearings are not to be replaced.

## TOTAL BILL OF MATERIAL

| ITEM | UNIT | SUPER | SUB | TOTAL |
|---|---|---|---|---|
| Concrete Removal | Cu. Yd. | —— | 1.1 | 1.1 |
| Concrete Structures | Cu. Yd. | —— | 46.7 | 46.7 |
| Reinforcement Bars, Epoxy Coated | Pound | —— | 5,130 | 5,130 |
| Anchor Bolts, 1¼" | Each | 16 | —— | 16 |
| Anchor Bolts, 1½" | Each | 32 | —— | 32 |
| Anchor Bolts, 2" | Each | 40 | —— | 40 |
| High Load Multi-Rotational Bearings, Guided Expansion, 750K | Each | 4 | —— | 4 |
| Structural Steel Repair | Pound | 23,750 | —— | 23,750 |
| Removal of Existing Bearings | Each | 20 | —— | 20 |
| Jacking and Cribbing | Each | 20 | —— | 20 |
| High Load Multi-Rotational Bearings, Guided Expansion, 1100K | Each | 8 | —— | 8 |
| High Load Multi-Rotational Bearings, Guided Expansion, 2000K | Each | 4 | —— | 4 |
| High Load Multi-Rotational Bearings, Guided Expansion, 3100K | Each | 4 | —— | 4 |
| | | | | |

## GENERAL NOTES

Except as otherwise specified, fasteners shall be ASTM A325 Type 1, mechanically galvanized bolts. Bolts $\frac{7}{8}$ in. ϕ, open holes $\frac{15}{16}$ in. ϕ, unless otherwise noted.

All structural steel shall be AASHTO M 270, Grade 50. Steel used in the jacking and cribbing shall be AASHTO M 270, Grade 50 unless otherwise noted.

No field welding is permitted except as specified in the contract documents.

Reinforcement bars designated (E) shall be epoxy coated.

Plan dimensions and details relative to existing plans are subject to nominal construction variations. The Contractor shall field verify existing dimensions and details affecting new construction and make necessary approved adjustments prior to construction or ordering of materials. Such variations shall not be cause for additional compensation for a change in scope of the work, however, the Contractor will be paid for the quantity actually furnished at the unit price bid for the work.

Bearing seat surfaces shall be constructed or adjusted to the designated elevations within a tolerance of $\frac{1}{8}$ inch (0.01 ft.). Adjustment shall be made either by grinding the surface or by shimming the bearings.

The existing structural steel coating contains lead. The Contractor shall take appropriate precautions to deal with the presence of lead on this project.

The Inorganic Zinc Rich Primer / Acrylic / Acrylic Paint System shall be used for shop and field painting of new structural steel except where otherwise noted. The color of the final finish coat shall be Gray, Munsell No. 5B 7/1. Cost included with Structural Steel Repair.

Existing structural steel that will be in contact with new structural steel shall be cleaned and painted prior to erection as required by the Special Provision "Cleaning and Painting Contact Surface Areas of Existing Steel Structures".

The Contractor shall perform the work with care, so that any materials which are to remain in place shall not be damaged. If the Contractor damages any materials which are to remain in place, the damaged materials shall be replaced or repaired in a manner satisfactory to the Engineer at the expense of the Contractor.

The Contractor shall ensure that no infringement of the navigational underclearance or channel occurs while doing the work. Any infringement shall be approved by the United States Coast Guard. The Contractor shall contact Mr. Eric Washburn, Coast Guard 8th District, 1222 Spruce Street, St. Louis, MO 63103, (314) 269-2378 for requirements needed to obtain the necessary permits. Emergency Contact U.S.C.G. 24-Hour Watch Center (502) 779-5422.

The combined weight of construction vehicles, construction equipment including work platforms, and stockpiled materials, shall not exceed 40 tons at any given time at each bearing replacement location. The Contractor shall submit construction weights and associated sequencing to the Engineer for approval.

## INDEX OF SHEETS



## LOADING HS20-44 (NEW CONSTRUCTION)

Allow 0#/sq. ft. for future wearing surface.

**DESIGN TRAFFIC LANES**

HLMR Expansion Bearings: Four lanes, max. loading configuration
Jacking and Cribbing: Three lanes, staged configuration

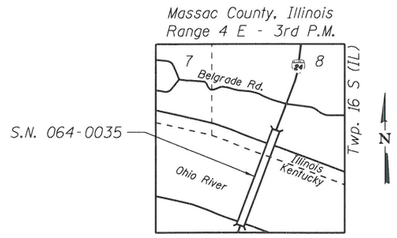
## DESIGN SPECIFICATIONS

2002 AASHTO Standard Specifications for Highway Bridges, 17th Edition and the AASHTO Manual for Bridge Evaluation, 2nd Edition, with 2011 and 2013 Interims.

## DESIGN STRESSES (NEW CONSTRUCTION)

**FIELD UNITS**

f'c = 3,500 psi
fy = 60,000 psi (Reinforcement)
fy = 50,000 psi (M270 Grade 50 Structural Steel)




## LOCATION SKETCH

LICENSED STRUCTURAL ENGINEER
RACHEL L. MERTZ
081.006526
STATE OF ILLINOIS

1/27/15

RACHEL L. MERTZ
EDWARDSVILLE, ILLINOIS
ILLINOIS LICENSED STRUCTURAL ENGINEER NO. 081-006526
EXPIRES 11/30/2016

# GENERAL ELEVATION
# F.A.I. ROUTE 24 - SEC. (64-3B)I-7
# MASSAC COUNTY
# STRUCTURE NO. 064-0035

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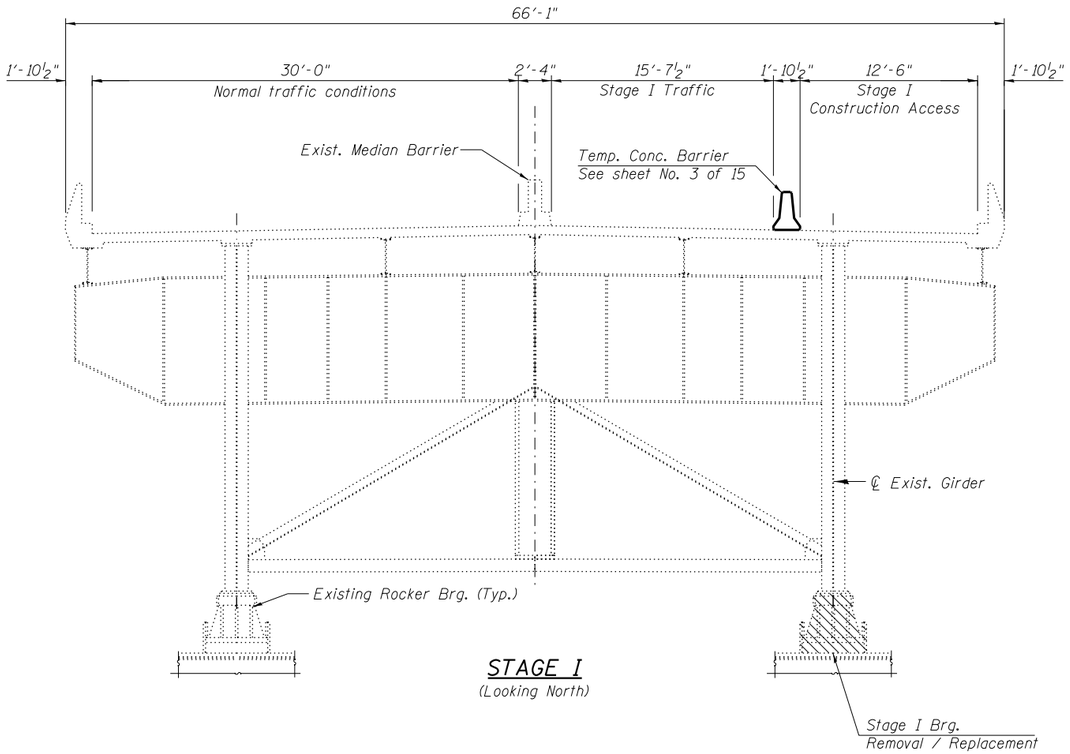
| | | |
|---|---|---|
| USER NAME = | DESIGNED - APL | REVISED |
| | CHECKED - MEL | REVISED |
| PLOT SCALE = | DRAWN - EAR | REVISED |
| PLOT DATE = 01/27/2015 | CHECKED - APL | REVISED |

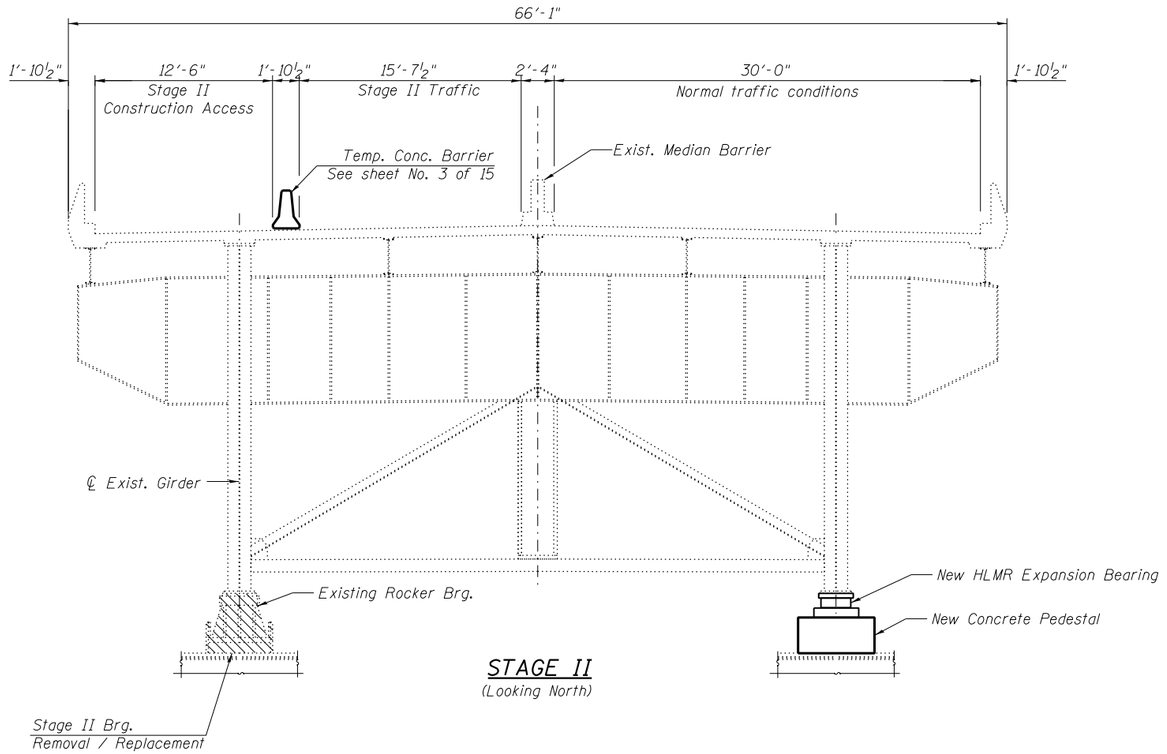
**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

SHEET NO. 1 OF 15 SHEETS

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| I-24 | (64-3B)I-7 | MASSAC | 18 | 6 |
| | | CONTRACT NO. 78448 | | |
| | ILLINOIS FED. AID PROJECT | | | |




## STAGE I
(Looking North)




## STAGE II
(Looking North)

## CONSTRUCTION SEQUENCE

*Traffic will be maintained utilizing stage construction. All lanes will be open to traffic during holiday periods as defined in Article 107.09 of the Standard Specifications.*

*Jacking and cribbing have been designed to support only three lanes of staged traffic. Bearing replacements must be phased so the structure is not supported by jacking and cribbing when the bridge is fully opened during holiday periods.*

*Traffic shall be removed from the portion of the structure to be jacked prior to and during the entire time the load is supported by the hydraulic pressure of the jacks. See Special Provisions.*

*Bearing replacements shall be phased such that adjacent piers will not be supported by jacking and cribbing at the same time.*

*The Contractor shall sequence construction in order to complete work in one construction season. A suggested construction sequence is as follows:*

*Stage I*

*Phase I: Simultaneously perform east side bearing replacements at Piers 3N, 8N, 8S, 12N and 14.*

*Phase II: Simultaneously perform east side bearing replacements at Piers 4S, 7, 9, 13S and 18.*

*Stage II*

*Phase I: Simultaneously perform west side bearing replacements at Piers 3N, 8N, 8S, 12N and 14.*

*Phase II: Simultaneously perform west side bearing replacements at Piers 4S, 7, 9, 13S and 18.*

*The Contractor shall remove the jacking and cribbing and all elements required for the jacking operation when the bearing replacement is complete. Anchor rods and anchor bolts required for jacking and cribbing shall be burned flush with the concrete surface. Jacking and cribbing including temporary bearings and jacking plates, beams and brackets shall be reused for bearing replacements at similar locations. At the Contractor's discretion, jacking stiffeners and connection angles may be left in-place or reused for bearing replacements at similar locations. Open holes in the existing girder shall be filled with A325 bolts of the same diameter as the removed bolt.*

## BEARING REPLACEMENT PROCEDURE

*1. Lay out the new bearing and jacking stiffeners for both temporary and permanent bearing locations. Ensure that bearing plates bear fully and evenly on the top of girder bottom flanges and that connection angles lie flat against the girder webs. Using the holes in the pre-drilled connection angles as a template, drill holes in the girder webs. Verify full bearing of the new stiffeners on the bottom flanges and fasten the stiffeners to the girder webs.*

*2. As required at each location, install the jacking and cribbing and temporary bearings in accordance with the plans.*

*3. Using a manifold, extend the jacks at a given location until the temporary bearings bear snugly and evenly on the girder bottom flange. Fasten the top assembly of the temporary bearings to the girder bottom flange.*

*4. Raise the girders ($\frac{1}{8}$" max), lock the jacks and remove the existing bearings.*

*5. Where required, remove portions of concrete as indicated in the drawings, being careful not to damage concrete that is to remain in place. Prepare the exposed concrete surface for bonding with new concrete. Form the new concrete pedestals, set the anchor bolts and reinforcement, and place the new pedestal concrete. Forms may be removed and load applied to the new bearing pedestals per the Standard Specifications.*

*6. Install the new HLMR bearings, including any necessary shim plates. Position the bearings appropriately for the temperature at the time of initial loading.*

*7. Lower the girder onto the new bearing. Verify the location of the upper bearing plate on the girder, and fasten the upper plate to the girder bottom flange.*

*8. Disconnect and remove jacking stiffeners, temporary bearings, jacking and cribbing, and where applicable, jacking brackets. Fill all open holes in the girder web and bottom flange with appropriately sized bolts, complete with washer and nut tightened by the turn of the nut method.*

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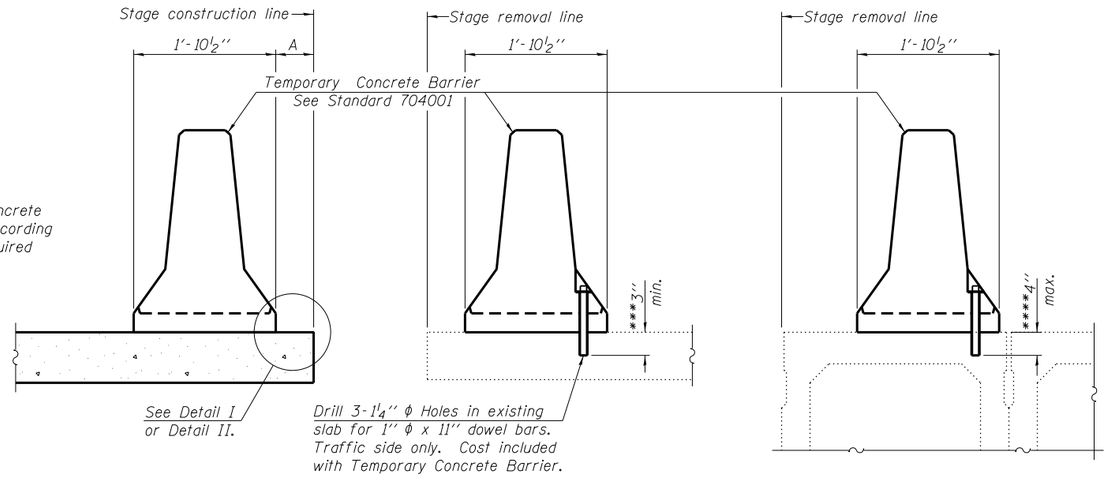
| | | |
|---|---|---|
| USER NAME = | DESIGNED - APL | REVISED |
| | CHECKED - MEL | REVISED |
| PLOT SCALE = | DRAWN - EAR | REVISED |
| PLOT DATE = 01/27/2015 | CHECKED - APL | REVISED |

**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

**TYPICAL STAGE CONSTRUCTION DETAILS AND SEQUENCE OF CONSTRUCTION**
**STRUCTURE NO. 064-0035**
SHEET NO. 2 OF 15 SHEETS

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| I-24 | (64-3B)I-7 | MASSAC | 18 | 7 |
| | | CONTRACT NO. 78448 | | |
| | ILLINOIS FED. AID PROJECT | | | |

When "A" is 3'-6" or less, the temporary concrete barrier shall be anchored to the new slab according to Detail I or Detail II. No anchorage is required when "A" is greater than 3'-6".




NEW SLAB

EXISTING SLAB

EXISTING DECK BEAM

## NOTES

Detail I - With Bar Splicer or Couplers:
Connect one (1) 1" x 7' 'x "W" steel PL to the top layer of couplers with 2-⅝" ϕ bolts screwed to coupler at approximate ℄ of each barrier panel.

Detail II - With Extended Reinforcement Bars:
Connect one (1) 1" x 7" x "W" steel PL to the concrete slab or concrete wearing surface with 2-⅝" ϕ Expansion Anchors or cast in place inserts spaced between the top layer of reinforcement at approximate ℄ of each barrier panel.

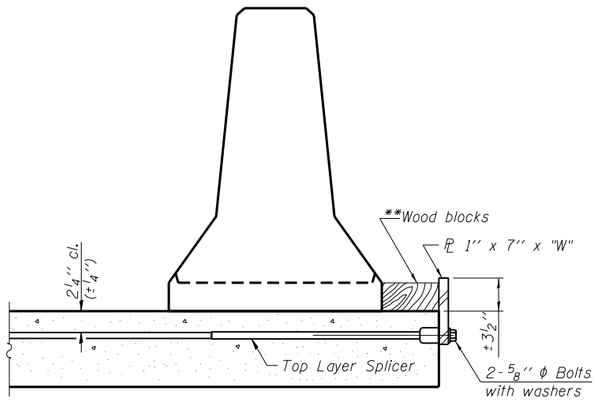
Cost of anchorage is included with Temporary Concrete Barrier.

The 1" x 7" x "W" plate shall not be removed until stage II construction forms and all reinforcement bars are in place and the concrete is ready to be placed.

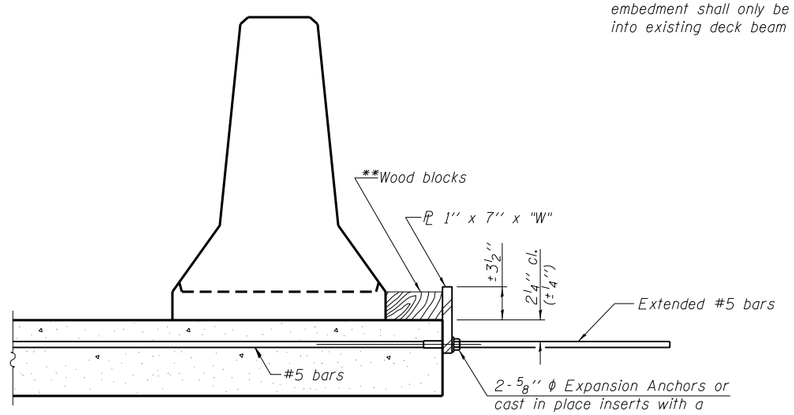
## SECTIONS THRU SLAB OR DECK BEAM

*** Dimension shown is minimum required embedment into concrete. If hot-mix asphalt wearing surface is present, minimum embedment shall be in addition to wearing surface depth.

**** If existing deck beam is to remain in place after stage construction, embedment shall only be into wearing surface and not into existing deck beam concrete.



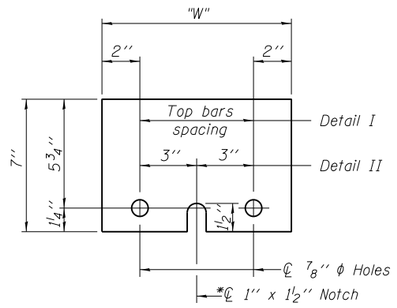

DETAIL I




DETAIL II

** Wood blocks may be omitted when required to provide minimum stage traffic lane width. When the wood blocks are omitted, the concrete barrier shall be in direct contact with the steel retainer plate.

"W" = Top bars spacing + 4"




STEEL RETAINER PL 1" x 7" x "W"

* Required only with Detail II

R-27

7-1-10

| | | | |
|---|---|---|---|
| USER NAME = | DESIGNED - APL | REVISED | |
| | CHECKED - MEL | REVISED | |
| PLOT SCALE = | DRAWN - EAR | REVISED | |
| PLOT DATE = 01/27/2015 | CHECKED - APL | REVISED | |

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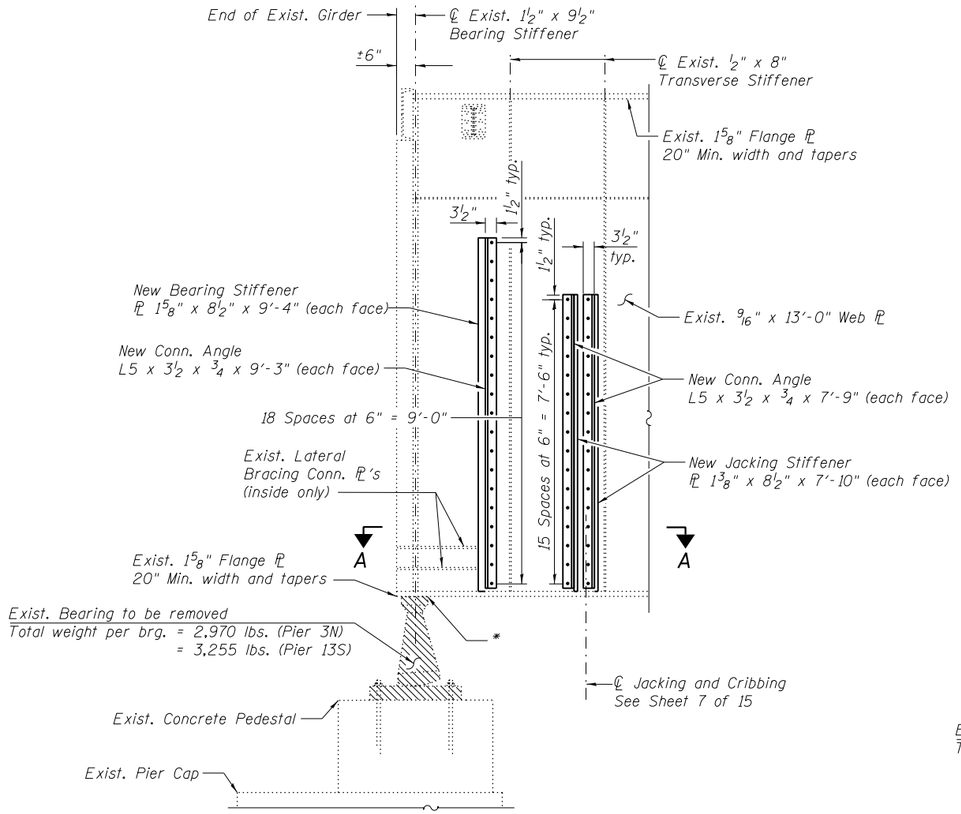
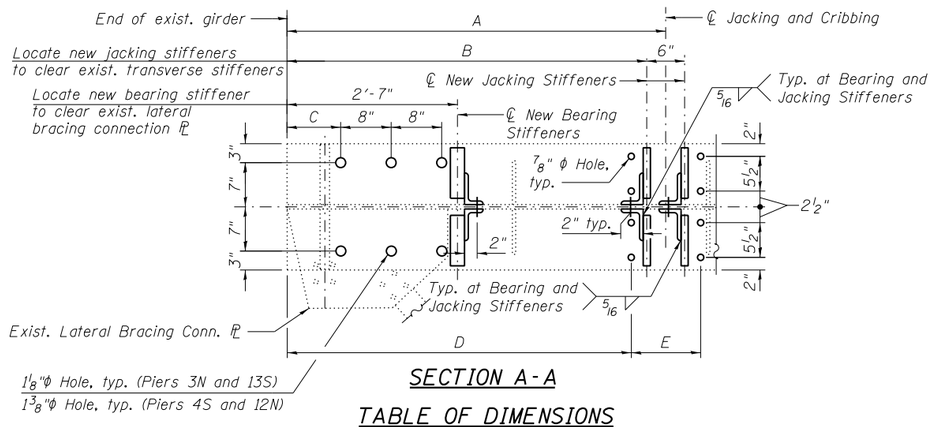
**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

**TEMPORARY CONCRETE BARRIER FOR STAGE CONSTRUCTION**
**STRUCTURE NO. 064-0035**
SHEET NO. 3 OF 15 SHEETS

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| I-24 | (64-3B)I-7 | MASSAC | 18 | 8 |
| | | CONTRACT NO. 78448 | | |
| | ILLINOIS FED. AID PROJECT | | | |



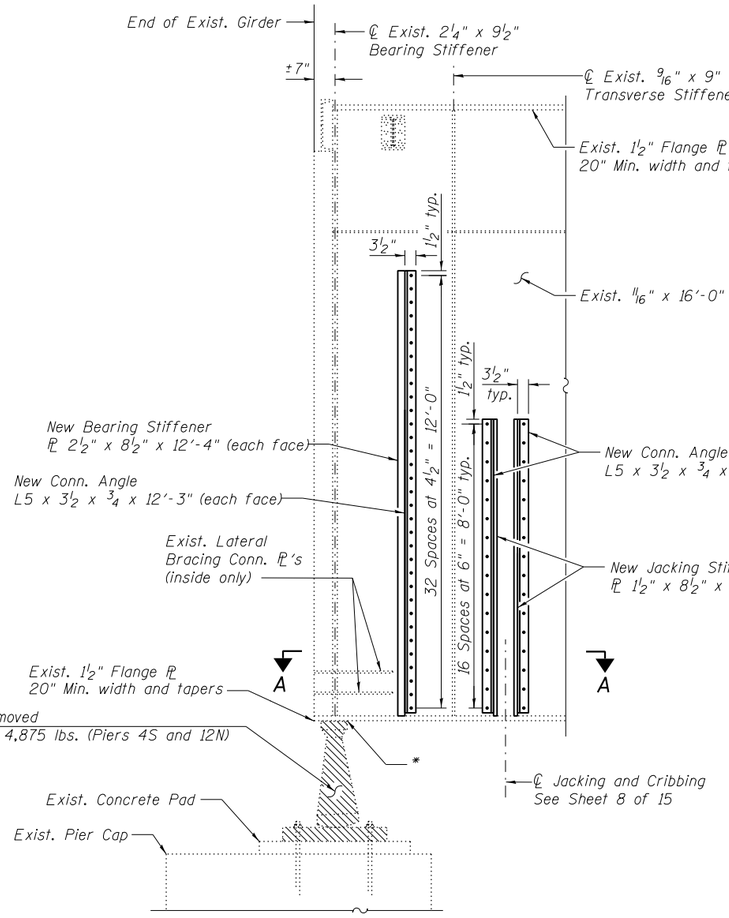

## BEARING / JACKING STIFFENER DETAILS AND BEARING REMOVAL PIERS 3N AND 13S




## SECTION A-A

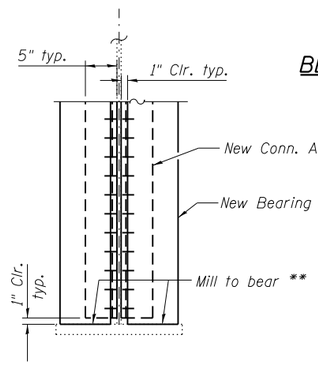
## TABLE OF DIMENSIONS

| Location | A | B | C | D | E |
|---|---|---|---|---|---|
| Pier 3N | 4'-6⅜" | 4'-3⅜" | 8½" | 3'-11⅞" | 13" |
| Pier 13S | 4'-5⅛" | 4'-2⅛" | 8½" | 3'-10⅝" | 13" |
| Pier 4S | 4'-10⅛" | 4'-7⅛" | 11¾" | 4'-2⅝" | 15" |
| Pier 12N | 4'-9¼" | 4'-6¼" | 11¾" | 4'-1¾" | 15" |




* Existing PL to be removed using the air-arc method and grind smooth all weld material remaining on the bottom flange.

## BEARING / JACKING STIFFENER DETAILS AND BEARING REMOVAL PIERS 4S AND 12N




## STIFFENER DETAIL

** Stiffener plate shall fit within 10/1000" for a minimum 75% of bearing area

## BILL OF MATERIAL

| Item | Unit | Total |
|---|---|---|
| Structural Steel Repair | Pound | 14,430 |
| Removal of Existing Bearings | Each | 8 |

Notes:

Install additional bearing stiffeners and jacking stiffeners prior to jacking operations.

Additional bearing stiffeners and associated connection angles included in quantity for Structural Steel Repair.

Cost for jacking stiffeners and associated connection angles included with Jacking and Cribbing.

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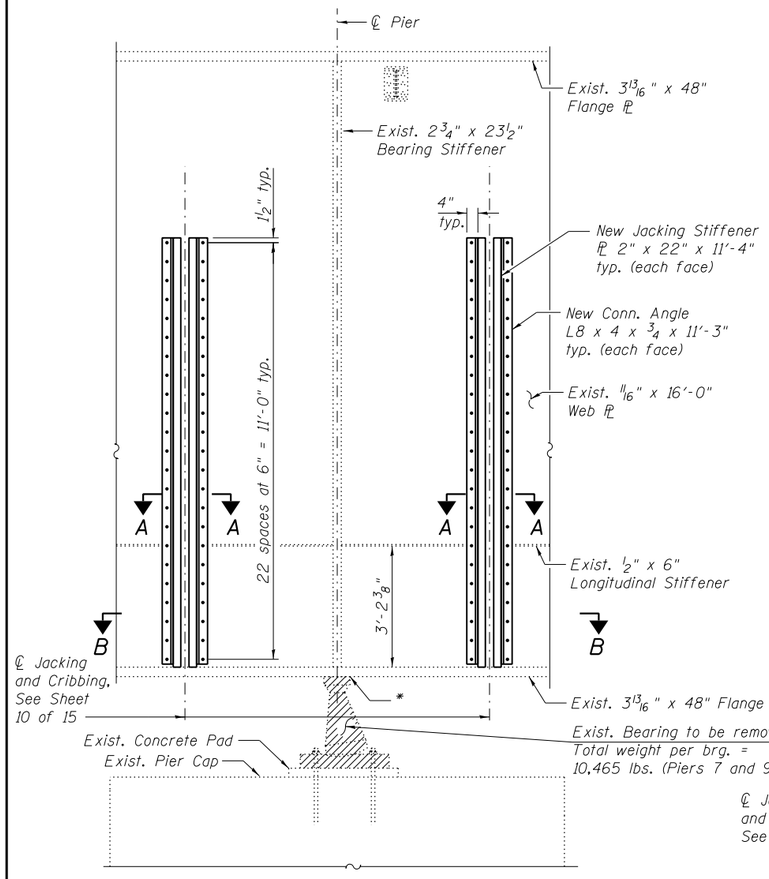
| | | |
|---|---|---|
| USER NAME = | DESIGNED - APL | REVISED |
| | CHECKED - MEL | REVISED |
| PLOT SCALE = | DRAWN - EAR | REVISED |
| PLOT DATE = 01/27/2015 | CHECKED - APL | REVISED |

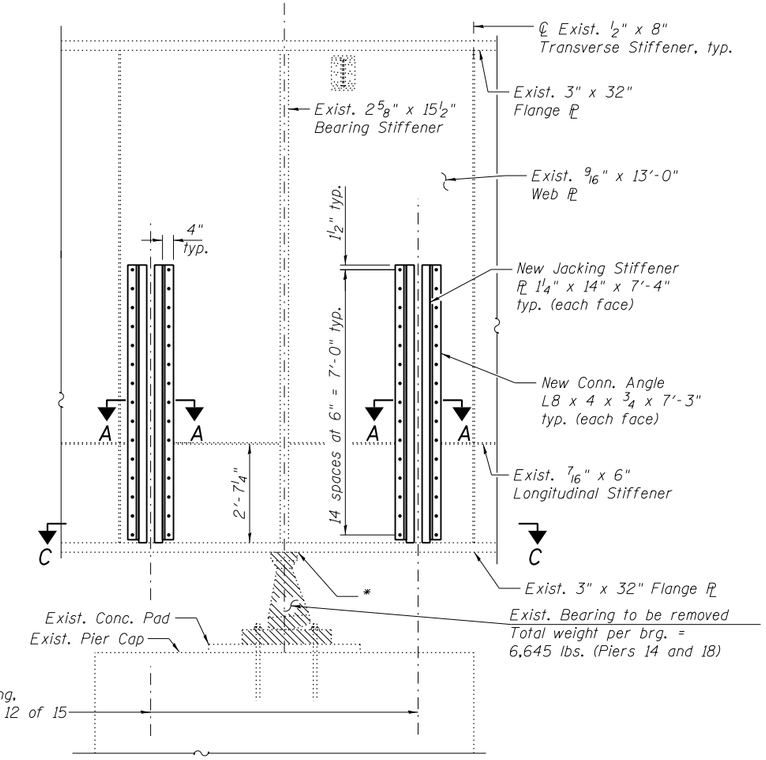
**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

**BEARING REMOVAL AND JACKING STIFFENER DETAILS – 1**
**STRUCTURE NO. 064-0035**
SHEET NO. 4 OF 15 SHEETS

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| I-24 | (64-3B)I-7 | MASSAC | 18 | 9 |
| | | CONTRACT NO. 78448 | | |
| | ILLINOIS FED. AID PROJECT | | | |

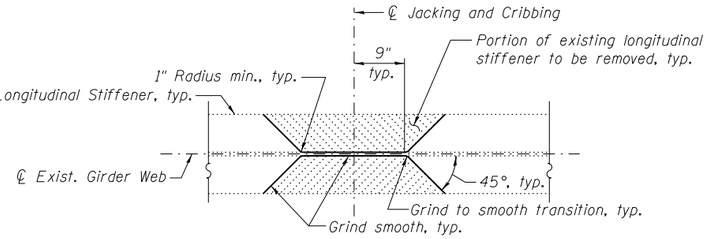



* Existing PL to be removed using the air-arc method and grind smooth all weld material remaining on the bottom flange.




## JACKING STIFFENER DETAILS AND BEARING REMOVAL PIERS 7 AND 9

## JACKING STIFFENER DETAILS AND BEARING REMOVAL PIERS 14 AND 18




## SECTION A-A

*New jacking stiffeners and connection angles not shown for clarity.*

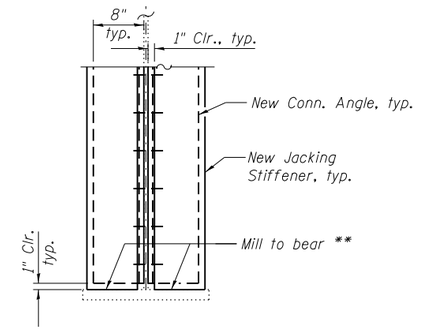
*Cut existing longitudinal stiffeners along web as shown, keeping a minimum distance of 1/4" between the cut and the face of the web with removal of remaining material by grinding as described below. The cut adjacent to the face of the web shall be made with a 1" minimum radius at the web. The cut shall be made parallel to the web without angling the cut towards the web. Equipment and method of cutting shall be approved by the Engineer. Any method of removal to be used shall ensure that no damage is done to the existing web. Cutting shall be done in a manner such that the paint on the opposite face of the web is not damaged. If damage to the paint occurs due to cutting, the damaged area shall be repainted at the Contractor's expense and procedures shall be modified to prevent damage at subsequent removal locations.*

*Remove material between cut and web by grinding and grind smooth at web surface and cut edges of stiffener. Web plate surfaces and cut edges of stiffeners shall have a roughness average (Ra) of 250 μin. or less. Grinding equipment shall be approved by the Engineer. The grinding operation should not gouge the girder web plate.*

*The web surface at the modification shall be inspected using dye penetrant or magnetic particle (MT) methods. Any cracks found shall be identified and reported to the Bureau of Bridges and Structures for further disposition.*

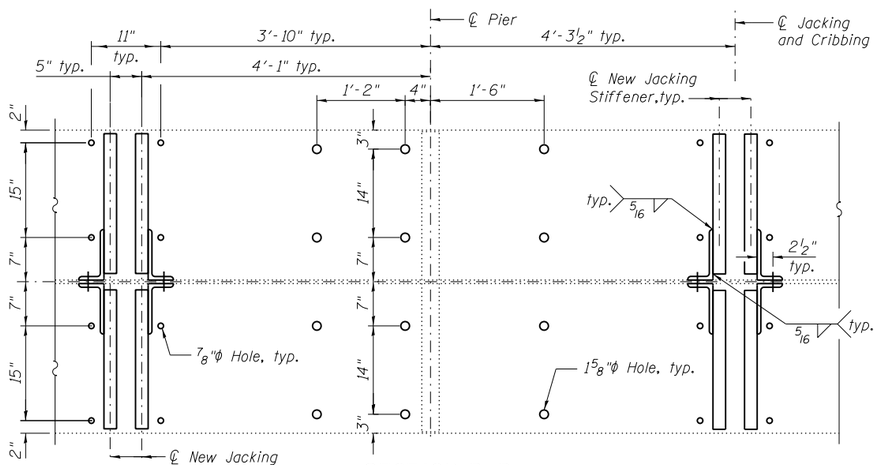
*The exposed steel surfaces shall be cleaned and painted using an aluminum epoxy mastic primer according to Article 506.05 of the Standard Specifications.*

*Cost of partial stiffener removal, including grinding, testing, and cleaning and painting is included with Jacking and Cribbing.*

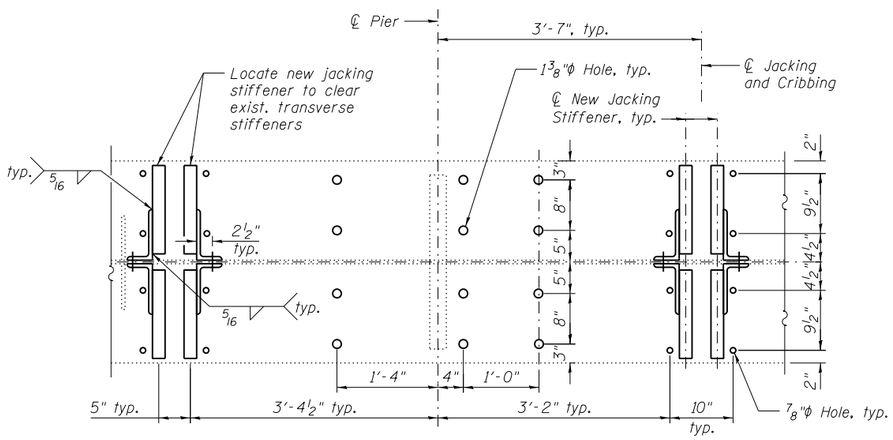



## STIFFENER DETAIL

** Stiffener plate shall fit within 10/1000" for a minimum 75% of bearing area




## SECTION B-B




## SECTION C-C

*Notes:*

*Install jacking stiffeners prior to jacking operations. Cost for jacking stiffeners and associated connection angles included with Jacking and Cribbing.*

## BILL OF MATERIAL

| Item | Unit | Total |
|---|---|---|
| Removal of Existing Bearings | Each | 8 |

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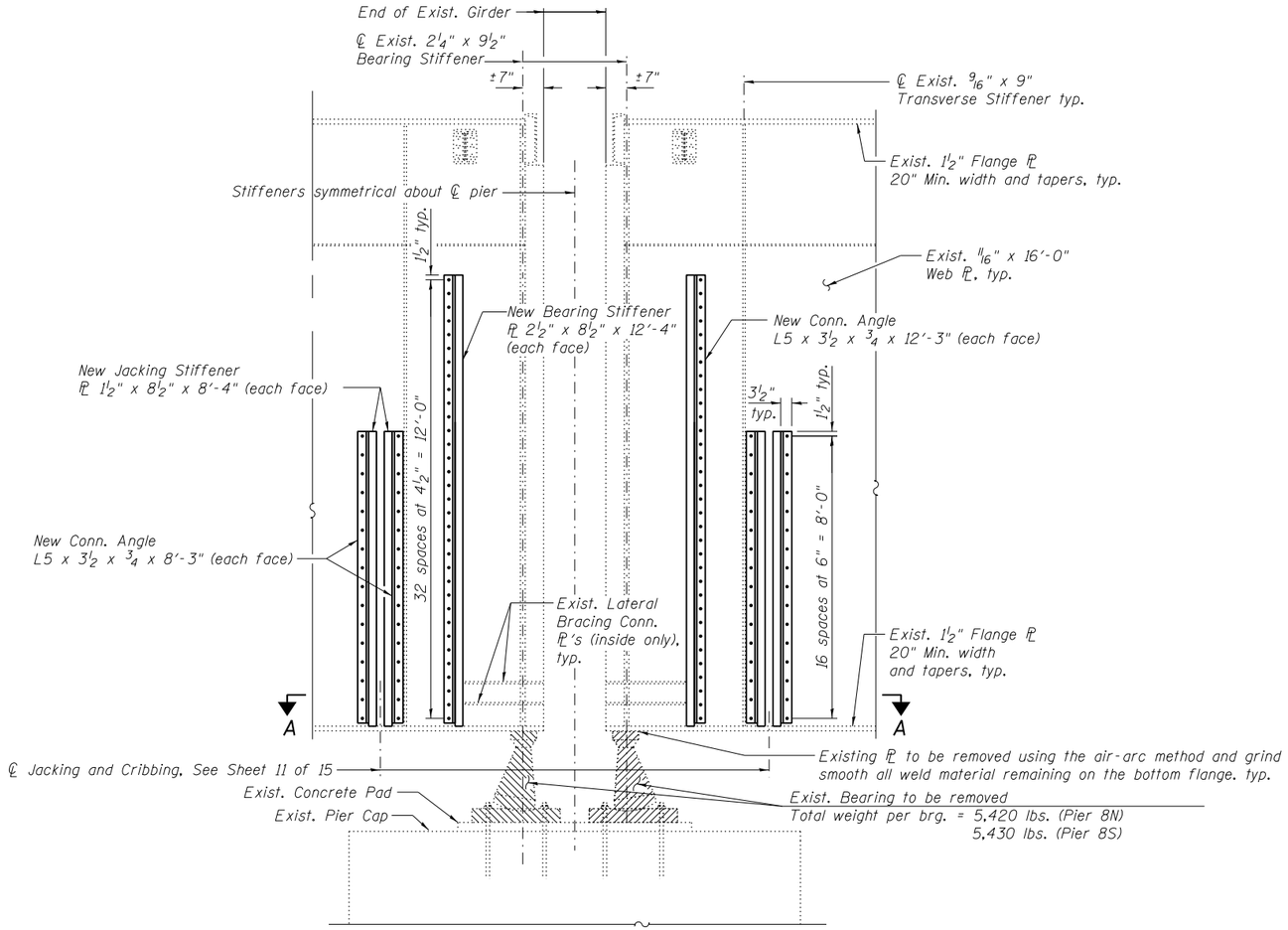
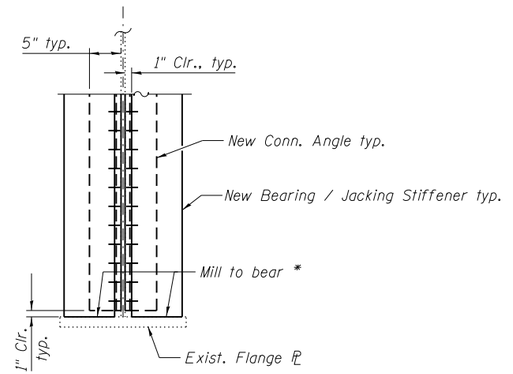
| | | |
|---|---|---|
| USER NAME = | DESIGNED - APL | REVISED |
| | CHECKED - MEL | REVISED |
| PLOT SCALE = | DRAWN - EAR | REVISED |
| PLOT DATE = 01/27/2015 | CHECKED - APL | REVISED |

**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

**BEARING REMOVAL AND JACKING STIFFENER DETAILS – 2**
**STRUCTURE NO. 064-0035**
SHEET NO. 5 OF 15 SHEETS

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| I-24 | (64-3B)I-7 | MASSAC | 18 | 10 |
| | | CONTRACT NO. 78448 | | |
| | ILLINOIS FED. AID PROJECT | | | |

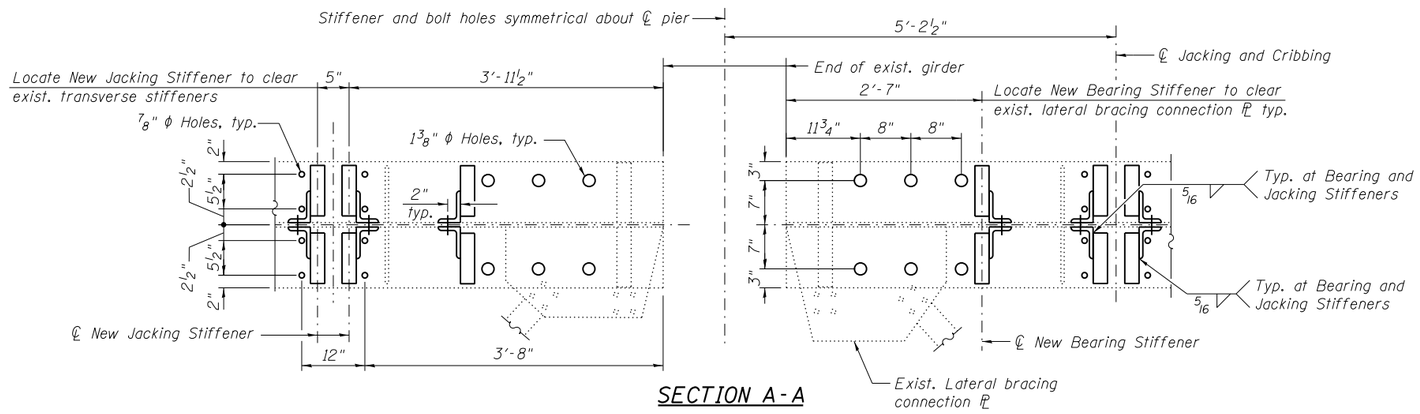



## STIFFENER DETAIL

* Stiffener plate shall fit within 10/1000" for a minimum 75% of bearing area

## BEARING / JACKING STIFFENER DETAILS AND BEARING REMOVAL PIERS 8N AND 8S




## SECTION A-A

## BILL OF MATERIAL

| Item | Unit | Total |
|---|---|---|
| Structural Steel Repair | Pound | 9,320 |
| Removal of Existing Bearings | Each | 4 |

Notes:

Install additional bearing stiffeners and jacking stiffeners prior to jacking operations.

Additional bearing stiffeners and associated connection angles included in quantity for Structural Steel Repair.

Cost for jacking stiffeners and associated connection angles included with Jacking and Cribbing.

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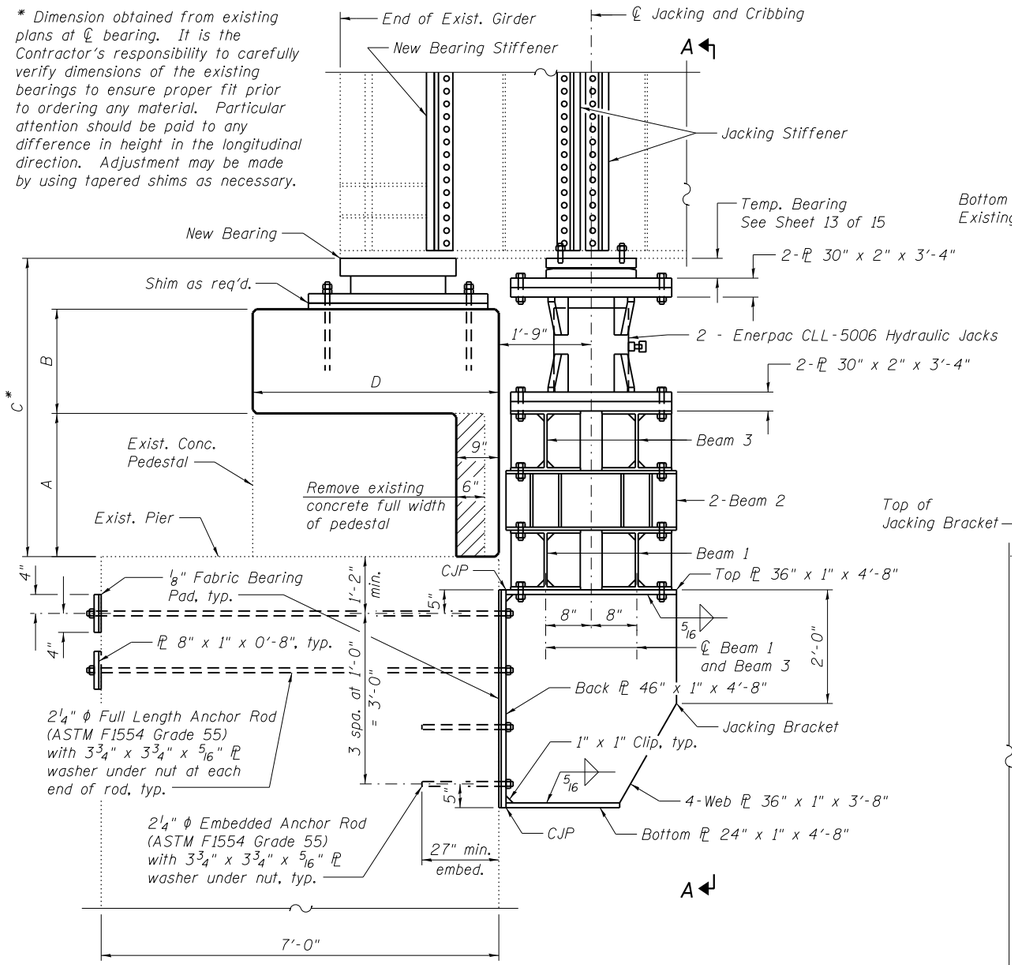
| | | |
|---|---|---|
| USER NAME = | DESIGNED - APL | REVISED |
| | CHECKED - MEL | REVISED |
| PLOT SCALE = | DRAWN - EAR | REVISED |
| PLOT DATE = 01/27/2015 | CHECKED - APL | REVISED |

**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

**BEARING REMOVAL AND JACKING STIFFENER DETAILS – 3**
**STRUCTURE NO. 064-0035**
SHEET NO. 6 OF 15 SHEETS

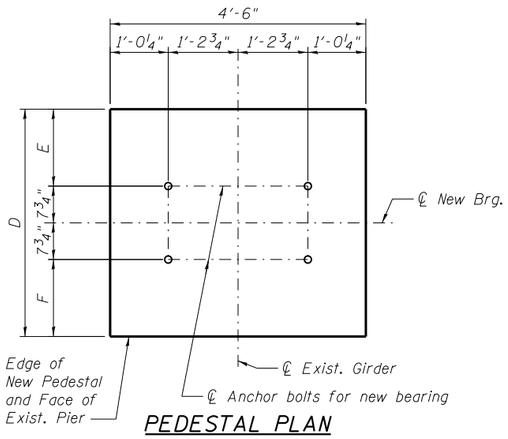
| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| I-24 | (64-3B)I-7 | MASSAC | 18 | 11 |
| | | CONTRACT NO. 78448 | | |
| | ILLINOIS FED. AID PROJECT | | | |

* Dimension obtained from existing plans at ℄ bearing. It is the Contractor's responsibility to carefully verify dimensions of the existing bearings to ensure proper fit prior to ordering any material. Particular attention should be paid to any difference in height in the longitudinal direction. Adjustment may be made by using tapered shims as necessary.




## ELEVATION

Jack and Cribbing for Pier 3N shown.
Jack and Cribbing for Pier 13S similar (See Sheet 9 of 15)




## PEDESTAL PLAN

## LEGEND

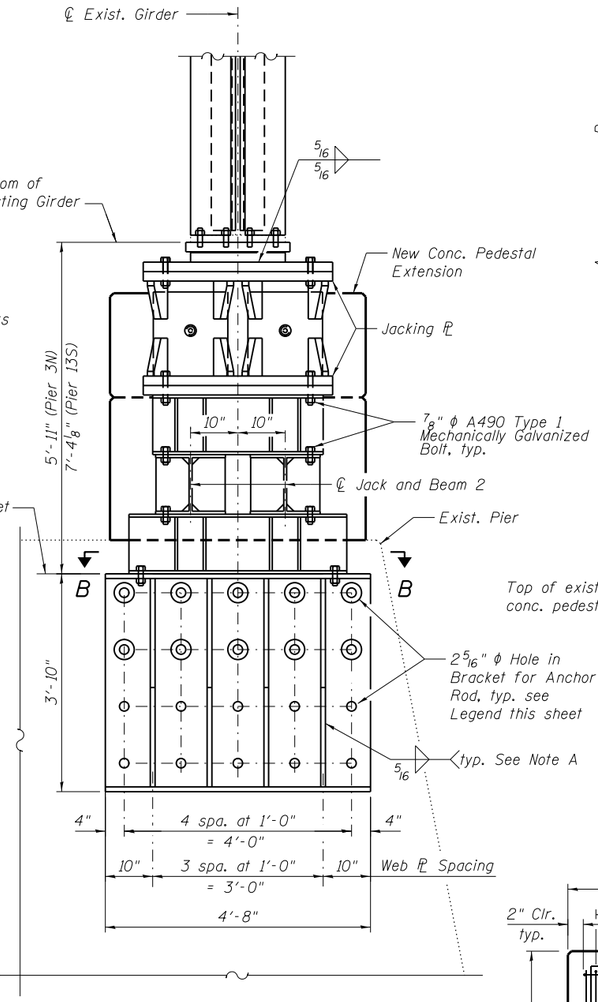
(Jacking Bracket)

○ Hole with threaded anchor rod, 27" embedment

◎ Hole with threaded anchor rod, full length

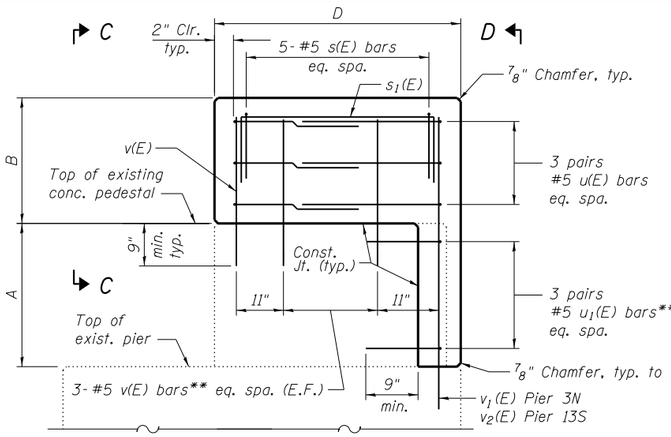
## TABLE OF DIMENSIONS

| Dim. | Pier 3N | Pier 13S |
|---|---|---|
| A | 2'-5¼" | 3'-10⅛" |
| B | 1'-10⅞" | 1'-11⅛" |
| C | 5'-2" | 6'-7⅛" |
| D | 4'-4" | 4'-1⅝" |
| E | 2'-3⅜" | 9⅛" |
| F | 2'-2¼" | 7⅞" |



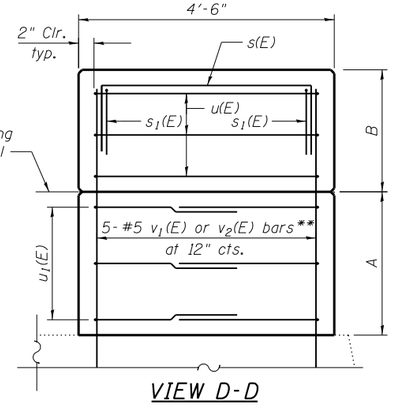

## VIEW A-A

Note A:
A PJP weld on one side may be substituted for the shown fillet welds on both sides.

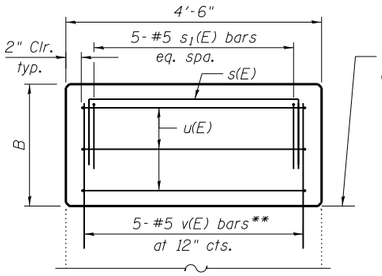




## PEDESTAL ELEVATION

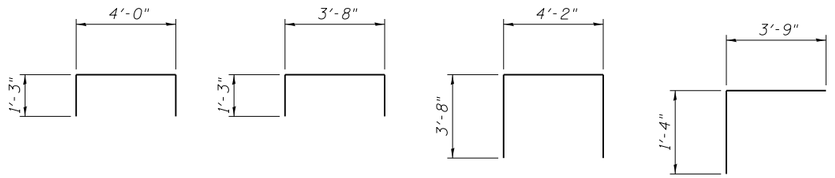
** Drill and Epoxy Grout




## VIEW D-D




## VIEW C-C




BAR s(E) BAR s1(E) BAR u(E) BAR u1(E)

## BILL OF MATERIAL FOR PIERS 3N AND 13S (BOTH ENDS)

| Bar | No. | Size | Length | Shape |
|---|---|---|---|---|
| s(E) | 20 | #5 | 6'-6" | ⌐¬ |
| s1(E) | 20 | #5 | 6'-2" | ⌐¬ |
| | | | | |
| u(E) | 24 | #5 | 11'-6" | ⌐¬ |
| u1(E) | 24 | #5 | 5'-1" | ⌐ |
| | | | | |
| v(E) | 44 | #5 | 2'-7" | — |
| v1(E) | 10 | #5 | 5'-0" | — |
| v2(E) | 10 | #5 | 6'-5" | — |
| Concrete Removal | | | Cu. Yd. | 1.1 |
| Concrete Structures | | | Cu. Yd. | 7.0 |
| Reinforcement Bars, Epoxy Coated | | | Pound | 920 |
| Jacking and Cribbing | | | Each | 4 |

Notes:

Epoxy grout vertical bars in concrete pedestal in accordance with Article 584 of the Standard Specifications. Cost is included with Reinforcement Bars, Epoxy Coated.

Space reinforcement in pedestal to miss new anchor bolts for bearings.

CJP corner welds between top and bottom plates and back plate shall be 100% UT tested in accordance with AASHTO/AWS D1.5 Bridge Welding Code. Acceptance criteria shall be for "tension welds".

Install full length and embedded anchor rods using an IDOT approved non-shrink grout. Drill and set full length and embedded anchor rods per the jacking bracket installation procedures and the manufacturer's directions.

Provide a fabric bearing pad at the concrete and steel interfaces shown on the plans in accordance with Article 1082 of the Standard Specifications. Cost is included with Jacking and Cribbing.

Expected jacking load per jack = 375 Kips for Pier 3N and 365 Kips for Pier 13S.

Calculated weight of structural steel required for one Jacking and Cribbing (Each) detailed on this sheet = 12,110 lbs. for Pier 3N and 14,000 lbs. for Pier 13S (includes weight of jacking stiffeners and connection angles, temporary bearing, jacking plates, beams and bracket, fasteners, and full length and embedded anchor rods).

For additional details including Section B-B, see Sheet 9 of 15.

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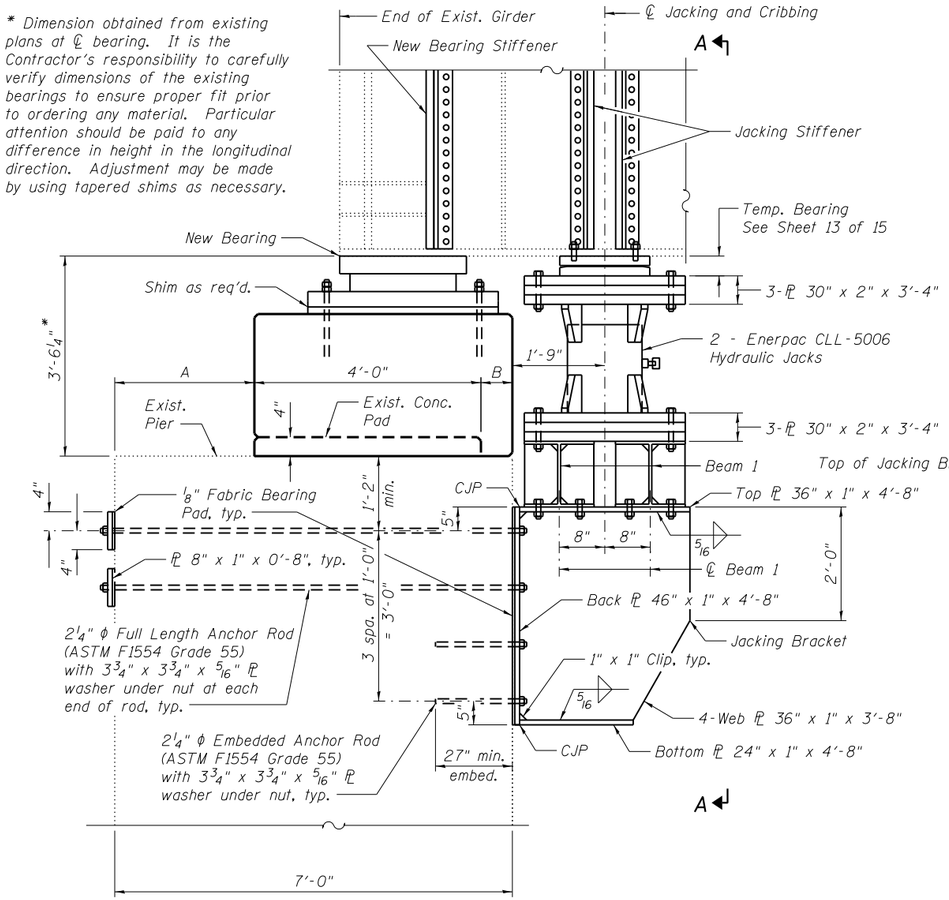
| | | |
|---|---|---|
| USER NAME = | DESIGNED - CDB | REVISED |
| | CHECKED - ACK | REVISED |
| PLOT SCALE = | DRAWN - PRC | REVISED |
| PLOT DATE = 01/27/2015 | CHECKED - RLM | REVISED |

**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

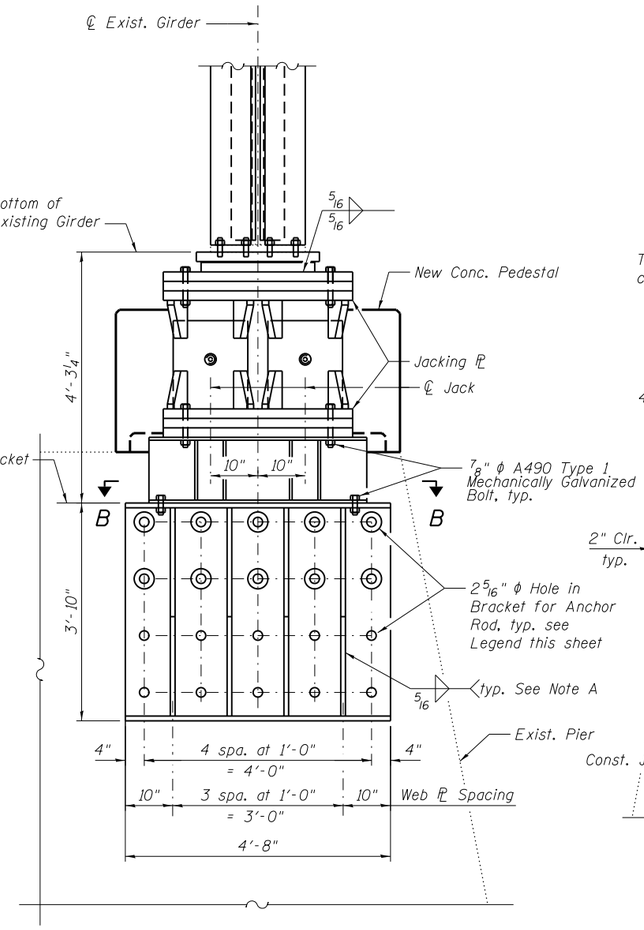
**JACKING AND CONCRETE PEDESTAL DETAILS – PIERS 3N AND 13S**
**STRUCTURE NO. 064-0035**
SHEET NO. 7 OF 15 SHEETS

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| I-24 | (64-3B)I-7 | MASSAC | 18 | 12 |
| | | CONTRACT NO. 78448 | | |
| | | ILLINOIS FED. AID PROJECT | | |

* Dimension obtained from existing plans at ℄ bearing. It is the Contractor's responsibility to carefully verify dimensions of the existing bearings to ensure proper fit prior to ordering any material. Particular attention should be paid to any difference in height in the longitudinal direction. Adjustment may be made by using tapered shims as necessary.

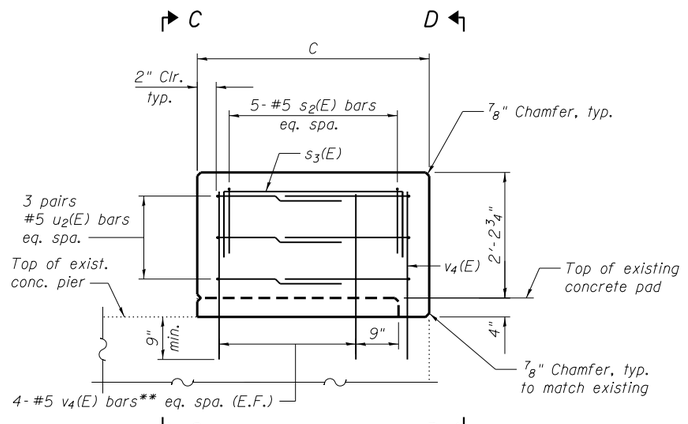



ELEVATION



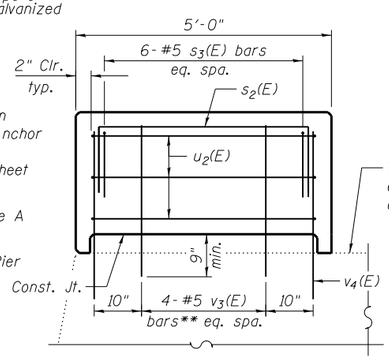

VIEW A-A

Note A:
A PJP weld on one side may be substituted for the shown fillet welds on both sides.

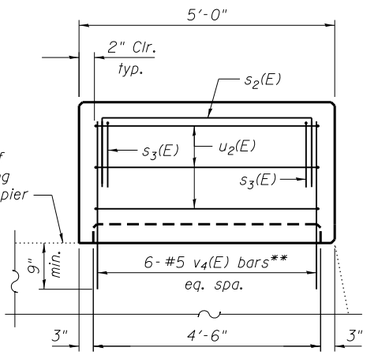




PEDESTAL ELEVATION

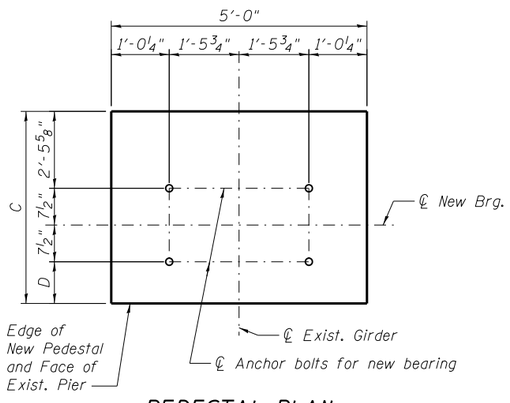
** Drill and Epoxy Grout




VIEW C-C



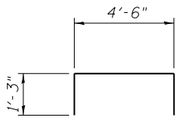

VIEW D-D



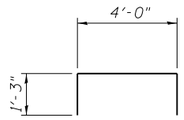

PEDESTAL PLAN

## TABLE OF DIMENSIONS

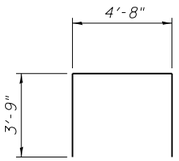
| Dim. | Pier 4S | Pier 12N |
|---|---|---|
| A | 2'-5 1/2" | 2'-6 3/8" |
| B | 6 1/2" | 5 5/8" |
| C | 4'-6 1/2" | 4'-5 5/8" |
| D | 9 7/8" | 9" |




BAR $s_2(E)$




BAR $s_3(E)$




BAR $u_2(E)$

## LEGEND

(Jacking Bracket)

○ Hole with threaded anchor rod, 27" embedment

◎ Hole with threaded anchor rod, full length

## BILL OF MATERIAL FOR PIERS 4S AND 12N (BOTH ENDS)

| Bar | No. | Size | Length | Shape |
|---|---|---|---|---|
| $s_2(E)$ | 20 | #5 | 7'-0" | ⌐ ¬ |
| $s_3(E)$ | 24 | #5 | 6'-6" | ⌐ ¬ |
| | | | | |
| $u_2(E)$ | 24 | #5 | 12'-2" | ⌐ ¬ |
| | | | | |
| $v_3(E)$ | 16 | #5 | 2'-10" | — |
| $v_4(E)$ | 56 | #5 | 3'-2" | — |
| Concrete Structures | | | Cu. Yd. | 7.7 |
| Reinforcement Bars, Epoxy Coated | | | Pound | 850 |
| Jacking and Cribbing | | | Each | 4 |

Notes:

Epoxy grout vertical bars in concrete pedestal in accordance with Article 584 of the Standard Specifications. Cost is included with Reinforcement Bars, Epoxy Coated.

Space reinforcement in pedestal to miss new anchor bolts for bearings.

CJP corner welds between top and bottom plates and back plate shall be 100% UT tested in accordance with AASHTO/AWS D1.5 Bridge Welding Code. Acceptance criteria shall be for "tension welds".

Install full length and embedded anchor rods using an IDOT approved non-shrink grout. Drill and set full length and embedded anchor rods per the jacking bracket installation procedures and the manufacturer's directions.

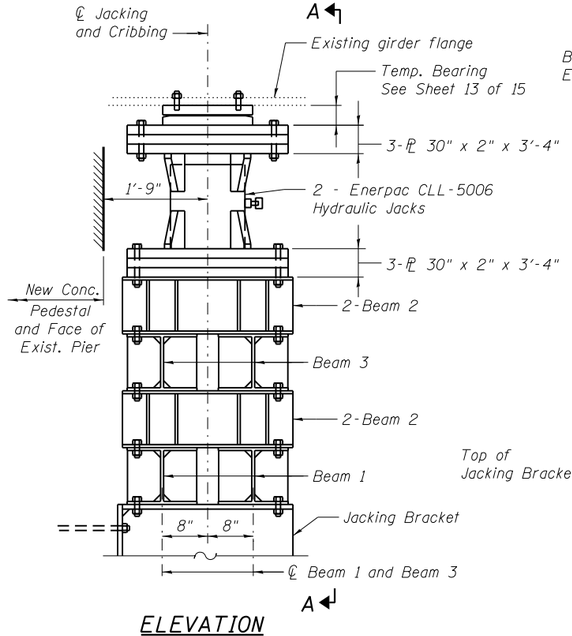
Provide a fabric bearing pad at the concrete and steel interfaces shown on the plans in accordance with Article 1082 of the Standard Specifications. Cost is included with Jacking and Cribbing.

Expected jacking load per jack = 550 Kips.

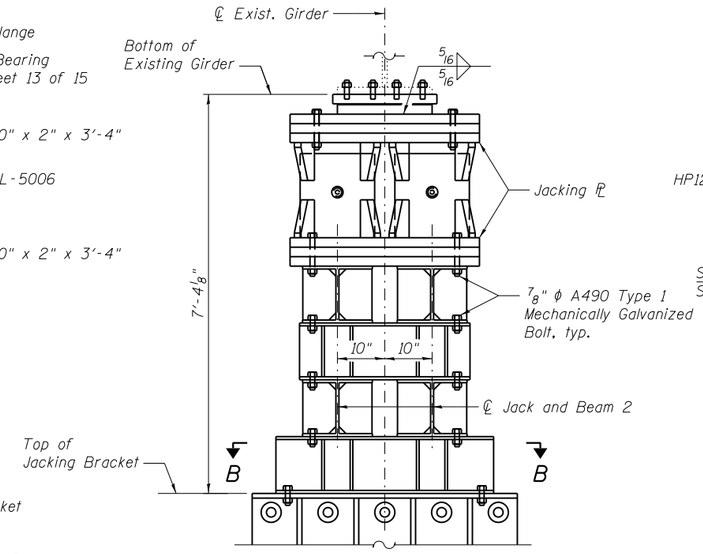
Calculated weight of structural steel required for one Jacking and Cribbing (Each) detailed on this sheet = 12,770 lbs. (includes weight of jacking stiffeners and connection angles, temporary bearing, jacking plates, beams and bracket, fasteners, and full length and embedded anchor rods).

Pressure transducer piping and timber protection are mounted to the east end of Pier 12 in the vicinity of the bearing replacement. This equipment is essential for the automatic control of the navigation lights which are to remain operational at all times during construction. The Contractor shall perform the bearing replacement with care to ensure the existing equipment is not damaged during construction.

For additional details including Section B-B, see Sheet 9 of 15.



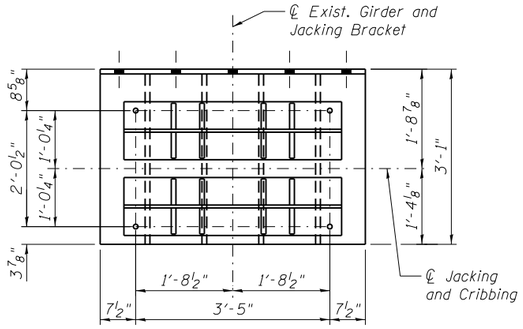

ELEVATION



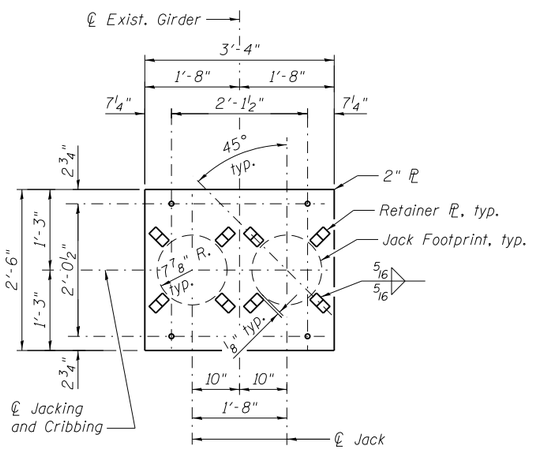

VIEW A-A

## JACKING AND CRIBBING AT PIER 13S

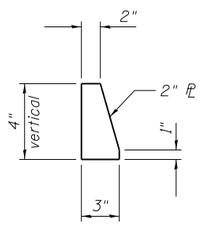
*For additional details, see Sheet 7 of 15.*



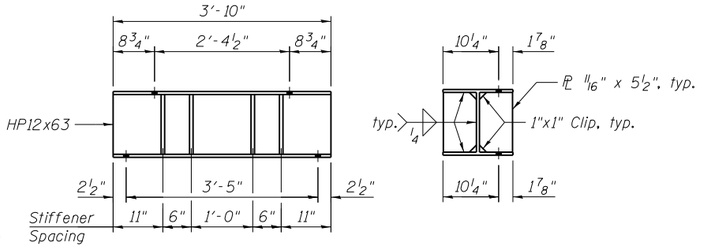

SECTION B-B



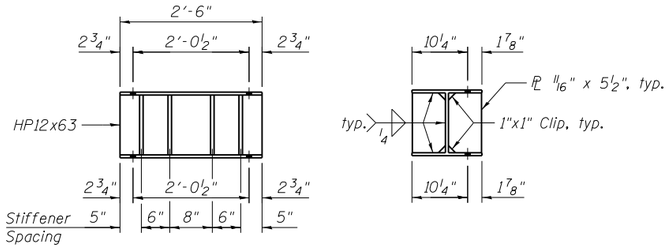

JACKING PLATE



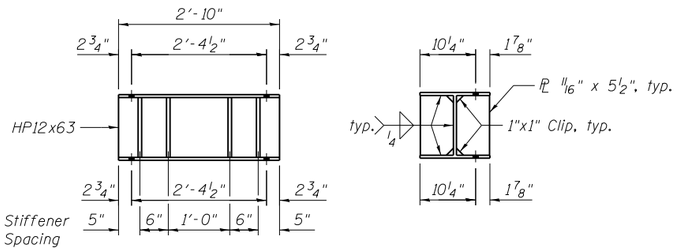

RETAINER PLATE




BEAM 1




BEAM 2




BEAM 3

## JACKING BRACKET INSTALLATION

1. Prior to drilling holes through existing concrete, locate existing reinforcing bars within concrete using rebar detection equipment. Mark locations of existing reinforcing bars near proposed holes to ensure that existing reinforcing bars are not damaged during drilling.

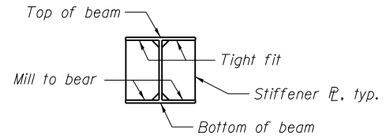
2. Using a template, pre-drill anchor holes in the piers as indicated in the plans. Holes for the anchor rods shall be in accordance with the non-shrink grout manufacturer's recommendations.

3. Using another template at the bracket side of the pier, insert the through-rods, leaving the appropriate projection at both the front and back faces of the concrete pier. Center the rods within the holes and verify that the rods are aligned so that the top plate of the jacking bracket will sit level. Grout the annulus around the rods using an approved non-shrink grout.

4. After the grout has taken initial set, install fabric bearing pads, backing plates and plate washers at the back-side of the pier. Secure the plate with snug tightened nuts.

5. Install the fabric bearing pad and jacking bracket at the front face of the pier, place washers, and snug tighten the nuts on the through-rods to secure the bracket.

6. Install the embedded anchor rods using an approved non-shrink grout. Install plate washers and hand tighten the nuts for the embedded anchor rods.




TYPICAL STIFFENER DETAIL

| | | | |
|---|---|---|---|
| USER NAME = | DESIGNED - CDB | REVISED | |
| | CHECKED - ACK | REVISED | |
| PLOT SCALE = | DRAWN - PRC | REVISED | |
| PLOT DATE = 01/27/2015 | CHECKED - RLM | REVISED | |

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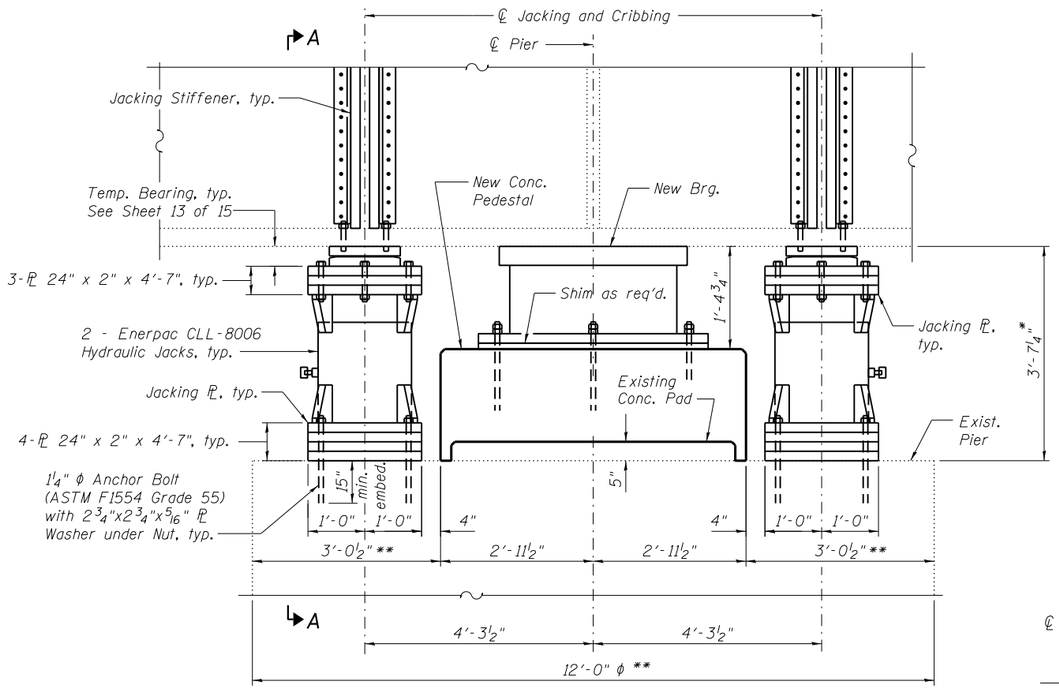
**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

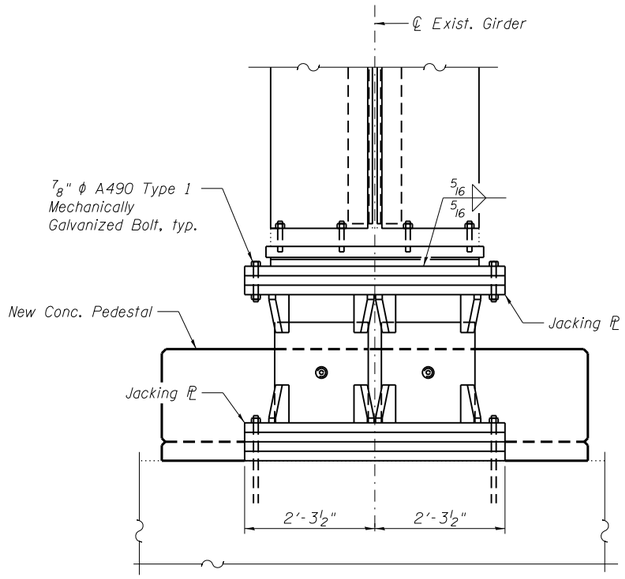
**CRIBBING DETAILS – PIERS 3N, 4S, 12N AND 13S**
**STRUCTURE NO. 064-0035**
SHEET NO. 9 OF 15 SHEETS

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| I-24 | (64-3B)I-7 | MASSAC | 18 | 14 |
| | | CONTRACT NO. 78448 | | |
| | ILLINOIS FED. AID PROJECT | | | |

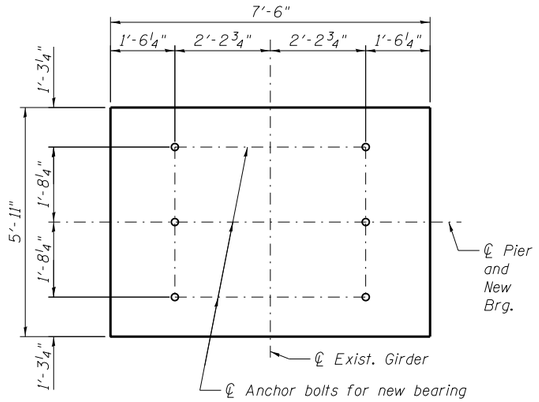



## ELEVATION

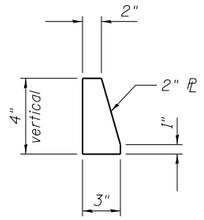
** Measured at centerline of girder



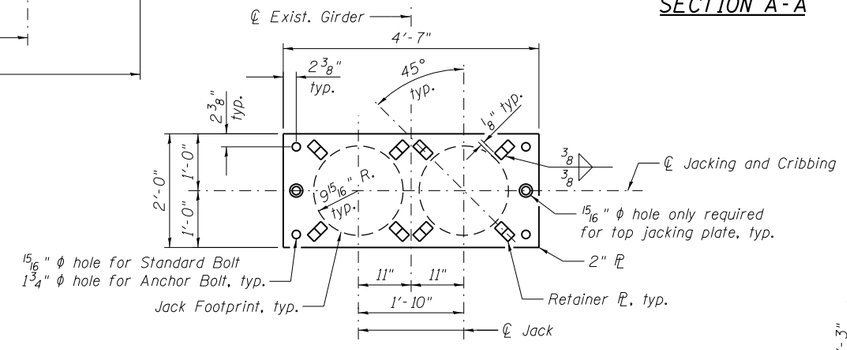

## SECTION A-A



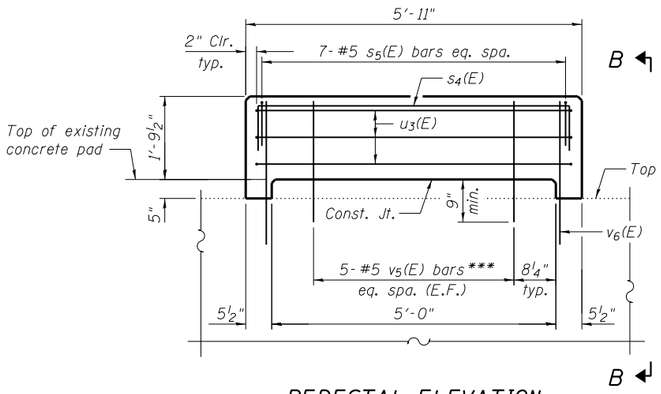

## PEDESTAL PLAN



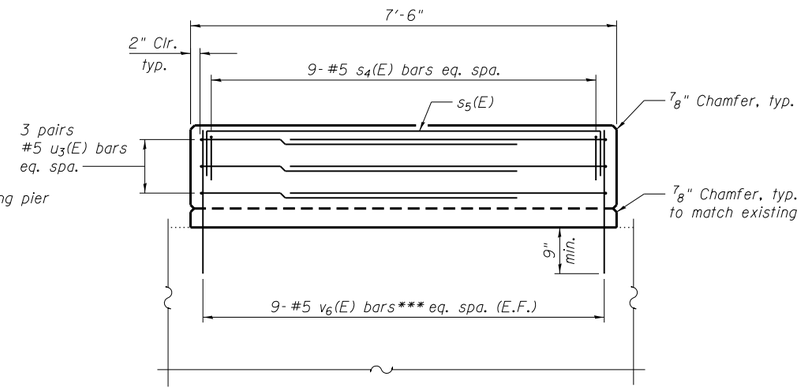

## RETAINER PLATE




## JACKING PLATE

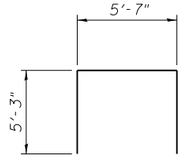



## PEDESTAL ELEVATION

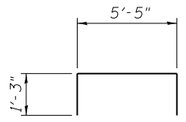



## VIEW B-B

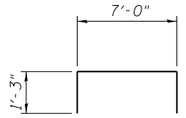
*** Drill and Epoxy Grout




## BAR u3(E)




## BAR s4(E)




## BAR s5(E)

* Dimension obtained from existing plans at ℄ bearing.
It is the Contractor's responsibility to carefully verify dimensions of the existing bearings to ensure proper fit prior to ordering any material.
Particular attention should be paid to any difference in height in the longitudinal direction.
Adjustment may be made by using tapered shims as necessary.

## BILL OF MATERIAL
## FOR PIERS 7 AND 9 (BOTH ENDS)

| Bar | No. | Size | Length | Shape |
|---|---|---|---|---|
| $s_4(E)$ | 36 | #5 | 7'-11" | ⌐¬ |
| $s_5(E)$ | 28 | #5 | 9'-6" | ⌐¬ |
| | | | | |
| $u_3(E)$ | 24 | #5 | 16'-1" | ⌐¬ |
| | | | | |
| $v_5(E)$ | 40 | #5 | 2'-5" | — |
| $v_6(E)$ | 72 | #5 | 2'-10" | — |
| Concrete Structures | | | Cu. Yd. | 12.3 |
| Reinforcement Bars, Epoxy Coated | | | Pound | 1,300 |
| Jacking and Cribbing | | | Each | 4 |

Notes:

Epoxy grout vertical bars in concrete pedestal in accordance with Article 584 of the Standard Specifications. Cost is included with Reinforcement Bars, Epoxy Coated.

Space reinforcement in pedestal to miss new anchor bolts for bearings.

Jacking plate anchor bolts shall be installed in accordance with Article 521.06 of the Standard Specifications. Cost is included with Jacking and Cribbing.

Expected jacking load per jack = 760 Kips.

Calculated weight of structural steel required for one Jacking and Cribbing (Each) detailed on this sheet = 29,110 lbs. (includes weight of jacking stiffeners and connection angles, temporary bearing, jacking plates, fasteners, and jacking plate anchor bolts).

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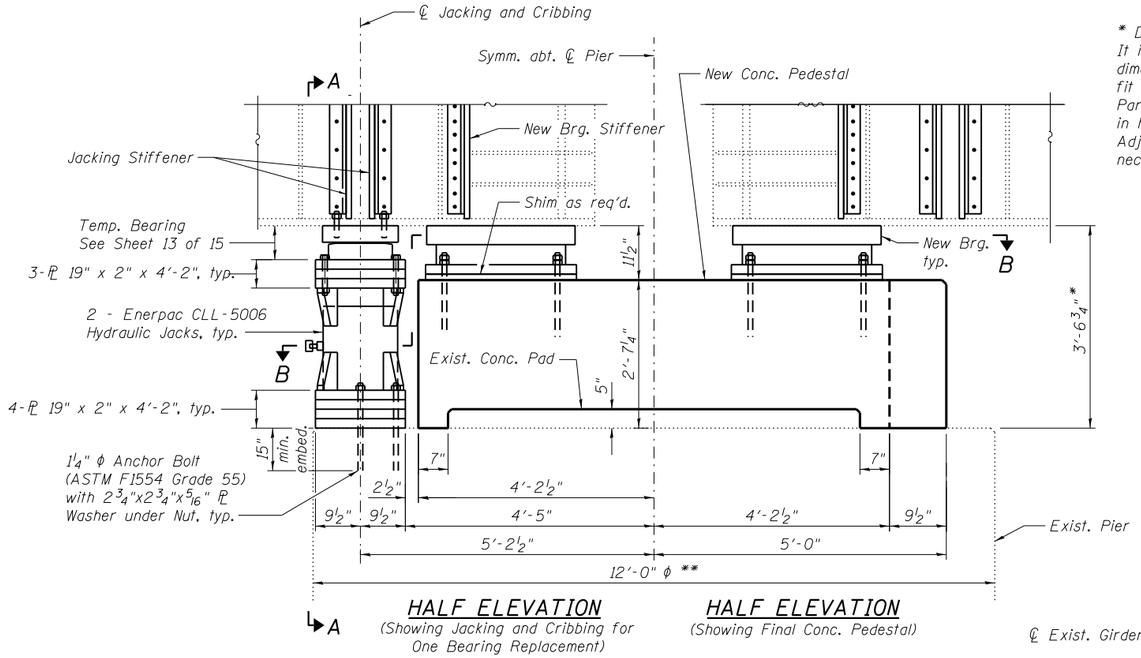
| | | |
|---|---|---|
| USER NAME = | DESIGNED - APL | REVISED |
| | CHECKED - ACK | REVISED |
| PLOT SCALE = | DRAWN - PRC | REVISED |
| PLOT DATE = 01/27/2015 | CHECKED - RLM | REVISED |

**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

**JACKING AND CONCRETE PEDESTAL DETAILS – PIERS 7 AND 9**
**STRUCTURE NO. 064-0035**
SHEET NO. 10 OF 15 SHEETS

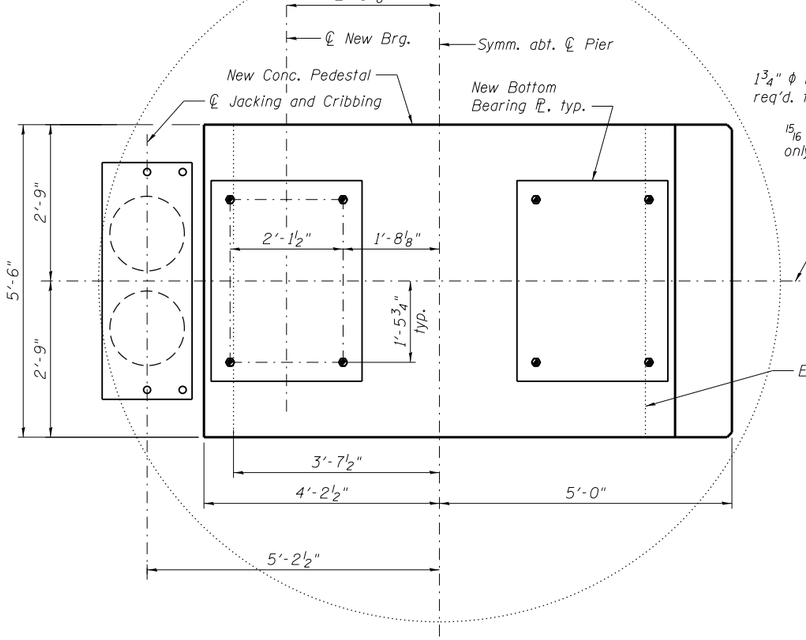
| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| I-24 | (64-3B)I-7 | MASSAC | 18 | 15 |
| | | CONTRACT NO. 78448 | | |
| | ILLINOIS FED. AID PROJECT | | | |




HALF ELEVATION
(Showing Jacking and Cribbing for One Bearing Replacement)

HALF ELEVATION
(Showing Final Conc. Pedestal)

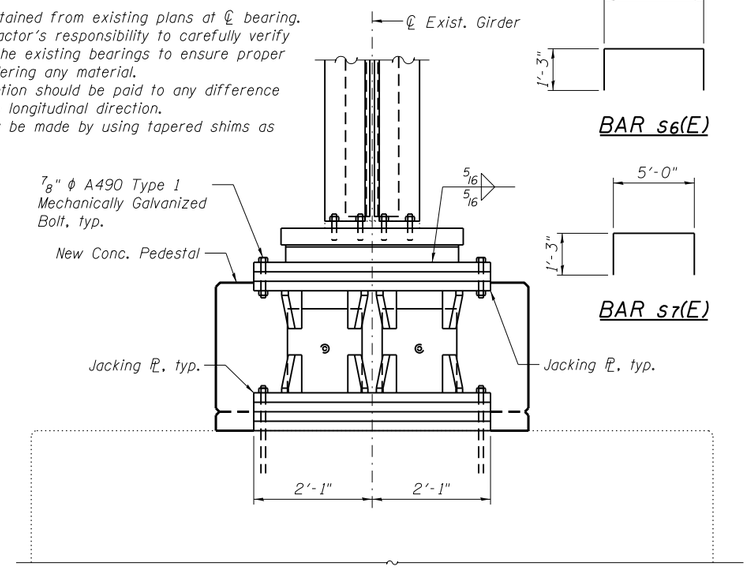
** Measured at centerline of girders



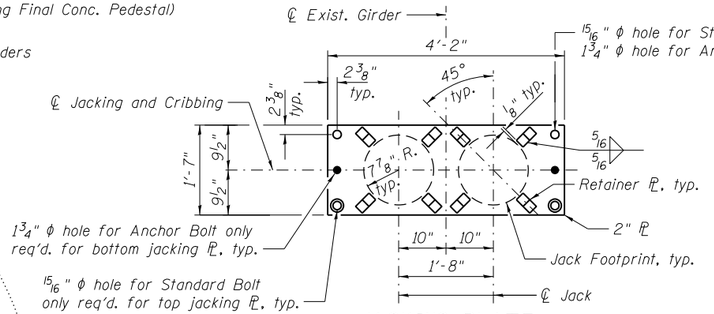

HALF SECTION B-B
(Showing Jack Placement)

HALF SECTION B-B
(Showing Final Conc. Pedestal)

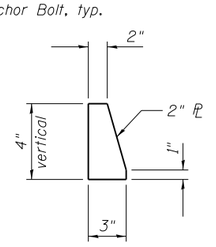
* Dimension obtained from existing plans at ℄ bearing. It is the Contractor's responsibility to carefully verify dimensions of the existing bearings to ensure proper fit prior to ordering any material. Particular attention should be paid to any difference in height in the longitudinal direction. Adjustment may be made by using tapered shims as necessary.



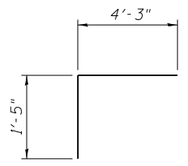

SECTION A-A




JACKING PLATE




RETAINER PLATE



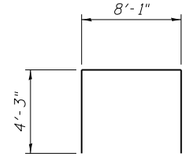

BAR u5(E)




BAR s6(E)



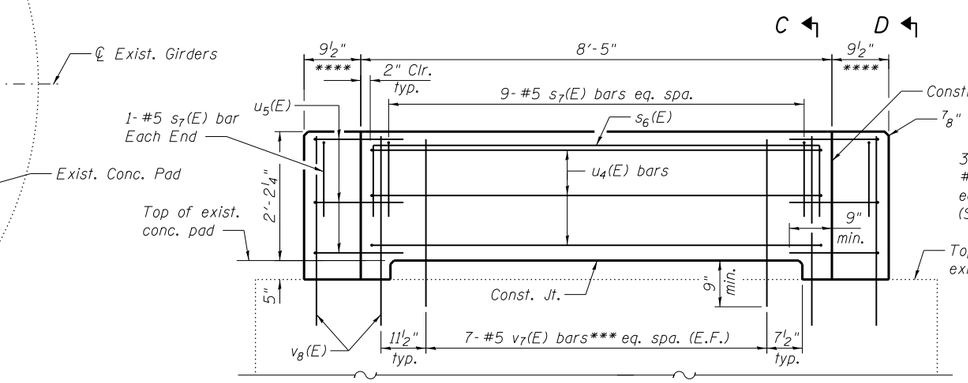

BAR s7(E)



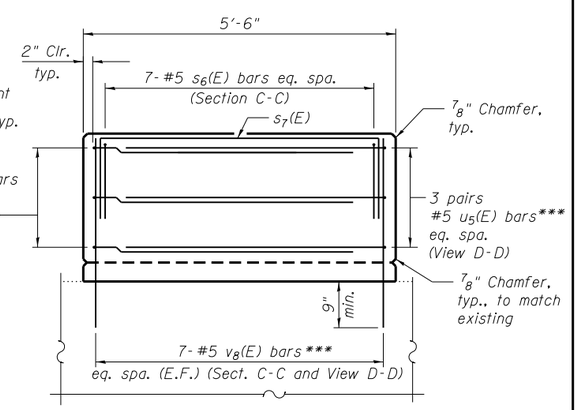

BAR u4(E)

## BILL OF MATERIAL FOR PIER 8 (BOTH ENDS)

| Bar | No. | Size | Length | Shape |
|---|---|---|---|---|
| $s_6(E)$ | 14 | #5 | 10'-5" | ⌐ |
| $s_7(E)$ | 22 | #5 | 7'-6" | ⌐ |
| | | | | |
| $u_4(E)$ | 12 | #5 | 16'-7" | ⌐ |
| $u_5(E)$ | 24 | #5 | 5'-8" | ⌐ |
| | | | | |
| $v_7(E)$ | 28 | #5 | 2'-10" | — |
| $v_8(E)$ | 56 | #5 | 3'-3" | — |
| Concrete Structures | | | Cu. Yd. | 9.4 |
| Reinforcement Bars, Epoxy Coated | | | Pound | 950 |
| Jacking and Cribbing | | | Each | 4 |




PEDESTAL ELEVATION




SECTION C-C
VIEW D-D

Space $u_5(E)$ bars to miss $u_4(E)$ bars in pedestal

**** This portion of the concrete pedestal is to be poured after the new bearing is installed and the jacking and cribbing has been removed.

*** Drill and Epoxy Grout

Notes:

Epoxy grout vertical bars in concrete pedestal in accordance with Article 584 of the Standard Specifications. Cost is included with Reinforcement Bars, Epoxy Coated.

Space reinforcement in pedestal to miss new anchor bolts for bearings.

Jacking plate anchor bolts shall be installed in accordance with Article 521.06 of the Standard Specifications. Cost is included with Jacking and Cribbing.

Expected jacking load per jack = 550 Kips.

Calculated weight of structural steel required for one Jacking and Cribbing (Each) detailed on this sheet = 7,250 lbs. (includes weight of jacking stiffeners and connection angles, temporary bearing, jacking plates, fasteners, and jacking plate anchor bolts).

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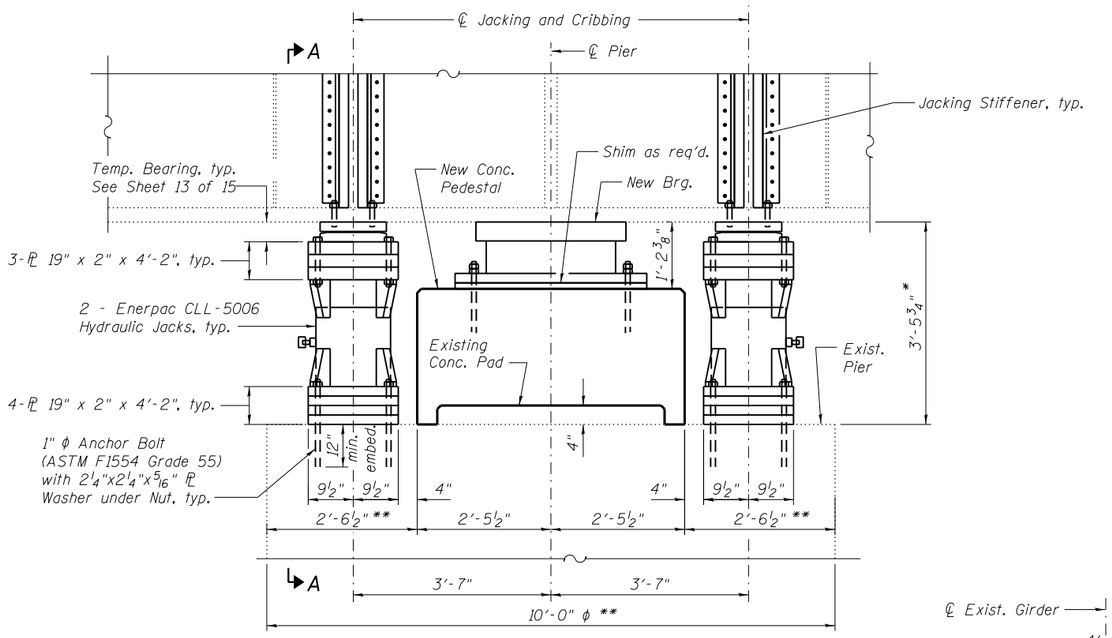
| | | |
|---|---|---|
| USER NAME = | DESIGNED - APL | REVISED |
| | CHECKED - ACK | REVISED |
| PLOT SCALE = | DRAWN - PRC | REVISED |
| PLOT DATE = 01/27/2015 | CHECKED - RLM | REVISED |

**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

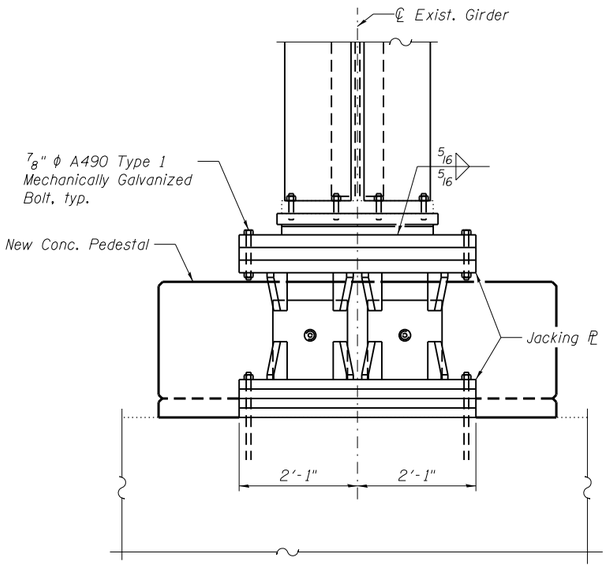
**JACKING AND CONCRETE PEDESTAL DETAILS – PIER 8**
**STRUCTURE NO. 064-0035**
SHEET NO. 11 OF 15 SHEETS

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| I-24 | (64-3B)I-7 | MASSAC | 18 | 16 |
| | | CONTRACT NO. 78448 | | |
| | ILLINOIS FED. AID PROJECT | | | |

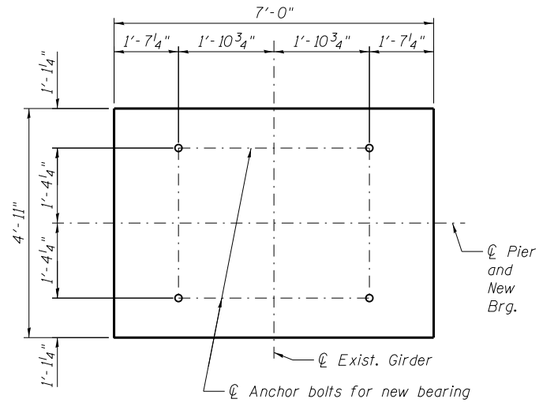



## ELEVATION

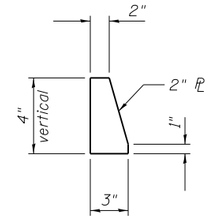
** Measured at centerline of girder



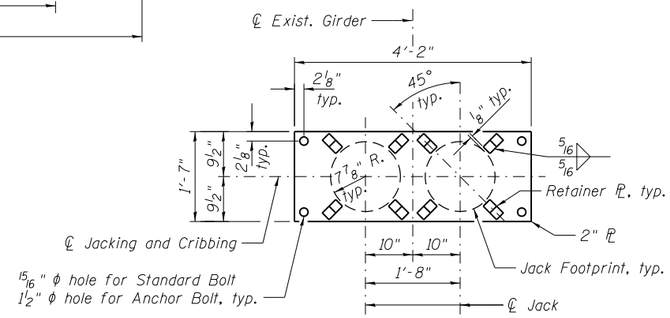

## SECTION A-A



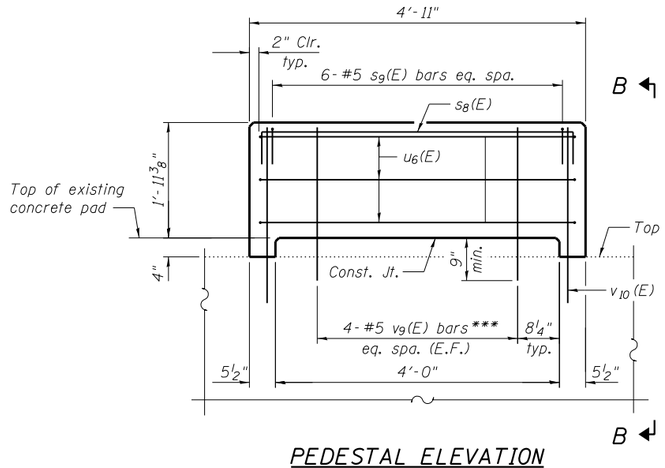

## PEDESTAL PLAN



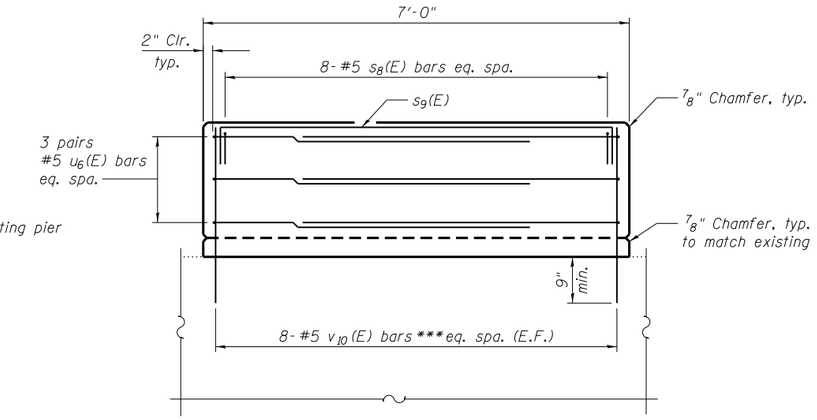

## RETAINER PLATE




## JACKING PLATE

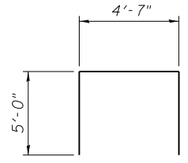



## PEDESTAL ELEVATION

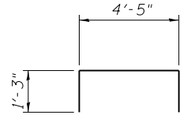



## VIEW B-B

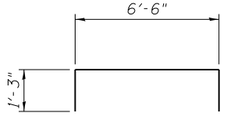
*** Drill and Epoxy Grout




## BAR u6(E)




## BAR s8(E)




## BAR s9(E)

* Dimension obtained from existing plans at ℄ bearing. It is the Contractor's responsibility to carefully verify dimensions of the existing bearings to ensure proper fit prior to ordering any material. Particular attention should be paid to any difference in height in the longitudinal direction. Adjustment may be made by using tapered shims as necessary.

## BILL OF MATERIAL FOR PIERS 14 AND 18 (BOTH ENDS)

| Bar | No. | Size | Length | Shape |
|---|---|---|---|---|
| $s_8$(E) | 32 | #5 | 6'-11" | ⌐¬ |
| $s_9$(E) | 24 | #5 | 9'-0" | ⌐¬ |
| | | | | |
| $u_6$(E) | 24 | #5 | 14'-7" | ⌐¬ |
| | | | | |
| $v_9$(E) | 32 | #5 | 2'-7" | — |
| $v_{10}$(E) | 64 | #5 | 2'-11" | — |
| Concrete Structures | | | Cu. Yd. | 10.3 |
| Reinforcement Bars, Epoxy Coated | | | Pound | 1,110 |
| Jacking and Cribbing | | | Each | 4 |

Notes:

Epoxy grout vertical bars in concrete pedestal in accordance with Article 584 of the Standard Specifications. Cost is included with Reinforcement Bars, Epoxy Coated.

Space reinforcement in pedestal to miss new anchor bolts for bearings.

Jacking plate anchor bolts shall be installed in accordance with Article 521.06 of the Standard Specifications. Cost is included with Jacking and Cribbing.

Expected jacking load per jack = 480 Kips.

Calculated weight of structural steel required for one Jacking and Cribbing (Each) detailed on this sheet = 14,520 lbs. (includes weight of jacking stiffeners and connection angles, temporary bearing, jacking plates, fasteners, and jacking plate anchor bolts).

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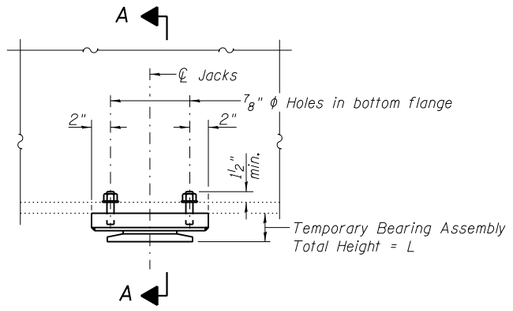
| | | |
|---|---|---|
| USER NAME = | DESIGNED - APL | REVISED |
| | CHECKED - ACK | REVISED |
| PLOT SCALE = | DRAWN - PRC | REVISED |
| PLOT DATE = 01/27/2015 | CHECKED - RLM | REVISED |

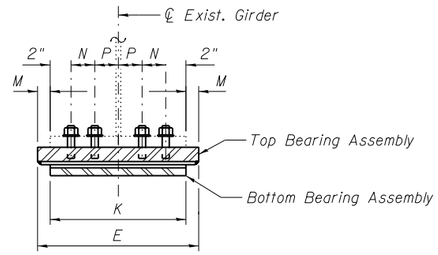
**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

**JACKING AND CONCRETE PEDESTAL DETAILS – PIERS 14 AND 18**
**STRUCTURE NO. 064-0035**
SHEET NO. 12 OF 15 SHEETS

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| I-24 | (64-3B)I-7 | MASSAC | 18 | 17 |
| | | CONTRACT NO. 78448 | | |
| | ILLINOIS FED. AID PROJECT | | | |

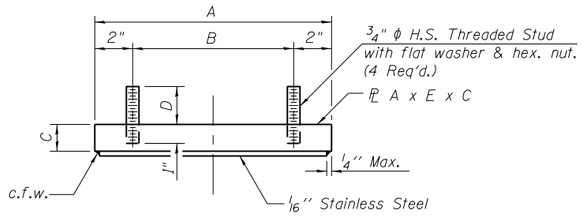



ELEVATION

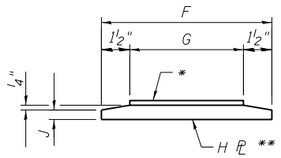



SECTION A-A

## TEMPORARY BEARING




TOP BEARING ASSEMBLY




*1/8" Filled PTFE

** Bottom bearing assembly to be welded to top jacking plate. See Jacking and Concrete Pedestal Detail sheets.

BOTTOM BEARING ASSEMBLY

## FILLED PTFE MATERIAL REQUIREMENTS

Filled PTFE sheets shall be made from PTFE resin uniformly blended with milled glass or carbon fibers. The filler material shall not react chemically with the PTFE but shall adhere to it so that the two act compositely. The filler content shall be 15% for glass fibers and 25% for carbon fibers.

Filled PTFE material shall meet the requirements of Article 1083.02(b) of the Standard Specifications with the following exceptions.

| ASTM STANDARD | PHYSICAL PROPERTY | SHEET WITH 15% GLASS FIBERS | SHEET WITH 25% CARBON FIBERS |
|---|---|---|---|
| D638 | Tensile Strength, min. psi | 2000 | 1300 |
| D638 | Elongation, min. % | 150 | 75 |
| D792 | Specific Gravity | 2.17-2.23 | 2.07-2.13 |

## TEMPORARY BEARING ASSEMBLY TABLE

| Location | Top Bearing Assembly | | | | | Bottom Bearing Assembly | | | | | Miscellaneous | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | J | K | L | M | N | P |
| Piers 3N and 13S | 17" | 13" | 2" | 3 3/8" | 22" | 16" | 13" | 3" | 2 3/4" | 20" | 5 3/16" | 1" | 5 1/2" | 2 1/2" |
| Piers 4S and 12N | 19" | 15" | 2" | 3 1/4" | 27" | 19" | 16" | 2" | 1 3/4" | 25" | 4 3/16" | 3 1/2" | 5 1/2" | 2 1/2" |
| Piers 7 and 9 | 15" | 11" | 2" | 5 5/8" | 51" | 15" | 12" | 2" | 1 3/4" | 49" | 4 3/16" | 1 1/2" | 15" | 7" |
| Piers 8N and 8S | 16" | 12" | 3 1/2" | 3 1/4" | 39 1/2" | 13 1/2" | 10 1/2" | 3 1/2" | 3 1/4" | 37 1/2" | 7 3/16" | 9 3/4" | 5 1/2" | 2 1/2" |
| Piers 14 and 18 | 14" | 10" | 2" | 4 3/4" | 35" | 14" | 11" | 3" | 2 3/4" | 33" | 5 3/16" | 1 1/2" | 9 1/2" | 4 1/2" |

Notes:

The 1/8" Filled PTFE sheet shall be bonded directly to the bottom steel plate with a two-component, medium viscosity epoxy resin, conforming to the requirements of the Federal Specification MMM-A-134, Type I. The bond agent shall be applied on the full area of the contact surfaces.

Bonding of 1/8" Filled PTFE sheet during vulcanizing process will be permitted provided the process and method of adjusting assembly height is approved by the Engineer.

Cost of Temporary Bearings shall be included with Jacking and Cribbing.

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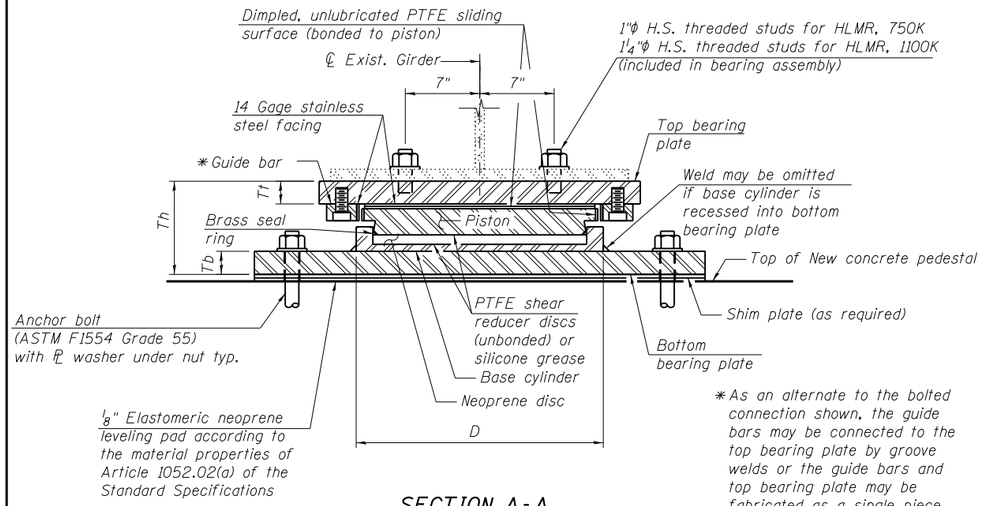
|---|---|---|
| USER NAME = | DESIGNED - RLM | REVISED |
| | CHECKED - APL | REVISED |
| PLOT SCALE = | DRAWN - PRC | REVISED |
| PLOT DATE = 01/27/2015 | CHECKED - RLM | REVISED |

**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

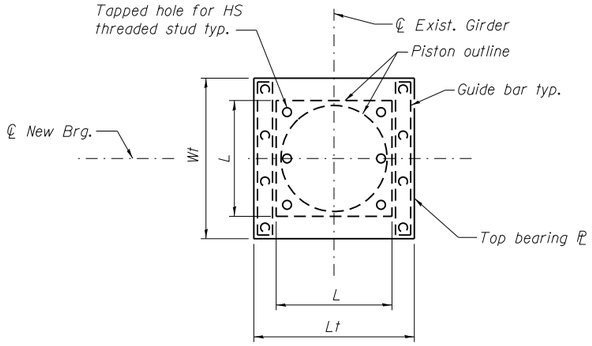
**TEMPORARY BEARING DETAILS**
**STRUCTURE NO. 064-0035**
SHEET NO. 13 OF 15 SHEETS

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| I-24 | (64-3B)I-7 | MASSAC | 18 | 18 |
| | | CONTRACT NO. 78448 | | |
| | ILLINOIS | FED. AID PROJECT | | |

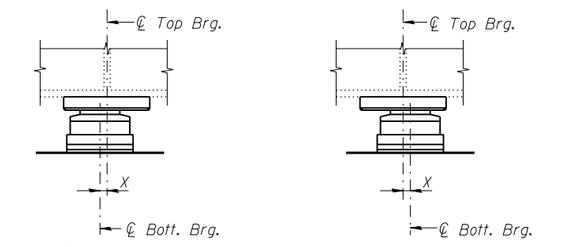



## SECTION A-A

*As an alternate to the bolted connection shown, the guide bars may be connected to the top bearing plate by groove welds or the guide bars and top bearing plate may be fabricated as a single piece.




## TOP BEARING ℄ AND PISTON PLAN




## SETTING ANCHOR BOLTS AT HLMR EXP. BRG.

X=⅛" per each 100' of expansion for every 15° temp. change from the normal temp. of 50°F.

Notes:

All steel for bearings shall conform to the requirements of AASHTO M270 Grade 50, unless otherwise noted.

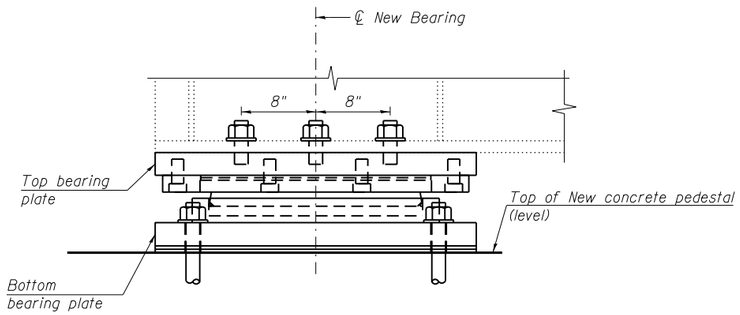
Anchor bolts shall be ASTM F1554 all-thread (or an Engineer-approved alternate material) of the grade(s) and diameter(s) specified. The corresponding specified grade of AASHTO M314 anchor bolts may be used in lieu of ASTM F1554. Anchor bolts may be either cast in place or installed in holes drilled after the supported member is in place. Drilled and set anchor bolts shall be installed according to Article 521.06 of the Standard Specifications.

Total bearing height is estimated based on manufacturer data. Actual bearing height may differ from contract plans. The Contractor shall be responsible for verifying bearing heights and adjusting seat elevations, if required, prior to placing pedestal concrete. Total bearing height is taken at the ℄ of bearing for bevelled top plates.

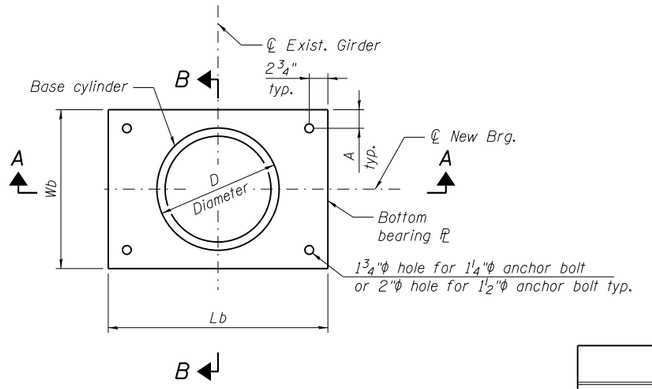
Bearing assemblies shall be designed and assembled to allow for replacement by jacking the superstructure.

Two ⅛ in. adjusting shims shall be provided for each bearing in addition to all other plates.

The anchor bolt sizes and grades shown constitute a calculated seismic structural fuse. Substitution of higher diameter and/or grade anchor bolts will not be allowed.




## SECTION B-B




## BOTTOM BEARING ℄ AND BASE CYLINDER PLAN

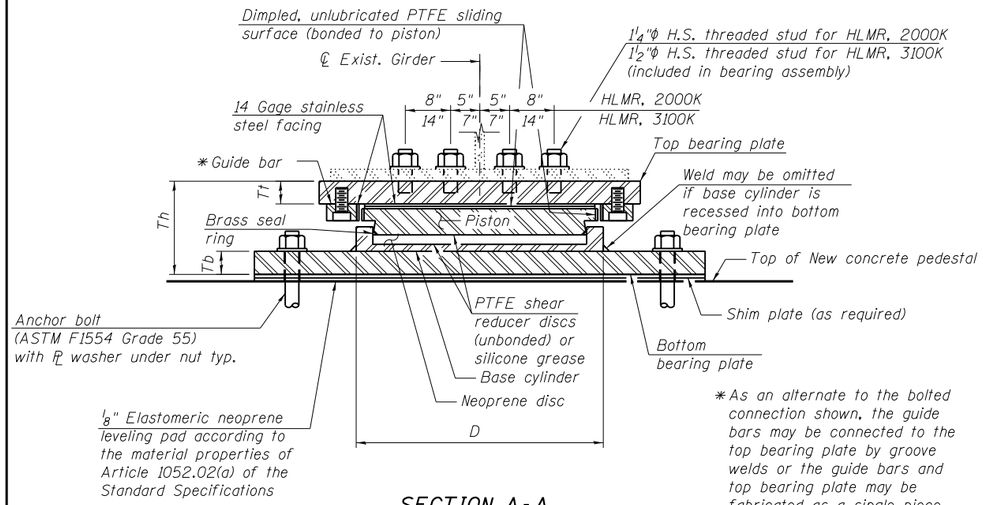
## BILL OF MATERIAL

| Item | Unit | Total |
|---|---|---|
| High Load Multi-Rotational Bearings, Guided Expansion, 750K | Each | 4 |
| High Load Multi-Rotational Bearings, Guided Expansion, 1100K | Each | 8 |
| Anchor Bolts, 1 1/4" | Each | 16 |
| Anchor Bolts, 1 1/2" | Each | 32 |

## BEARING DESIGN DATA

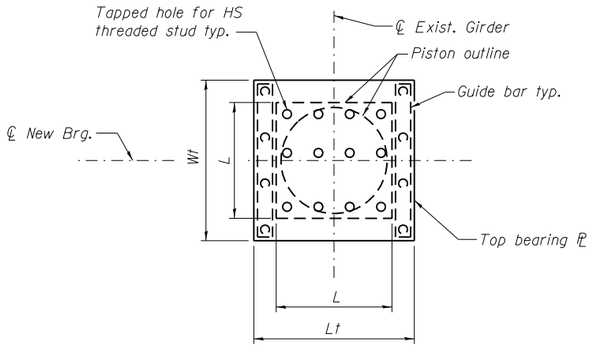
| Type | Location | Vertical Design Load ** (kips) | Horizontal Design Load ** (kips) | Required Rotation Range *** (radians) | Maximum Theoretical Thermal Movement**** from 50°F | Length of Piston, L | Outside Pot Diameter, D | Thickness of Top Plate, Tt | Thickness of Bottom Plate, Tb | Total Height Bearing Assembly, Th | Longitudinal Length of Top Plate, Wt | Transverse Length of Top Plate, Lt | Longitudinal Length of Bottom Plate, Wb | Transverse Length of Bottom Plate, Lb | Anchor Bolt Diameter and Embedment | Plate Washer Size | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HLMR, Guided Expansion, 750K | Piers 3N & 13S | 717 | 143 | 0.009 | 3¾" | 1'-11⅛" | 2'-⅛" | 2⅝" | 1⅜" | 9⅞" | 2'-9" | 2'-5" | 2'-2½" | 2'-11" | 1¼"ϕ x 15" | 2¾" x 2¾" x 5/16" | 5½" |
| HLMR, Guided Expansion, 1100K | Piers 4S, 8N, 8S & 12N | 1083 | 217 | 0.012 | 4¾" | 2'-3⅞" | 2'-4⅞" | 3¼" | 1⅝" | 11½" | 3'-3½" | 2'-10" | 2'-7" | 3'-5" | 1½"ϕ x 18" | 3" x 3" x 5/16" | 2¾" (Piers 8N & 8S) 8" (Piers 4S & 12N) |

** Design Loads are the governing service loads with no dynamic load allowance.
*** Rotation allowances for fabrication tolerances (0.005 radians), installation uncertainties (0.005 radians) are excluded.
**** Total required movement is based on one way expansion (or contraction) of the superstructure along the centerline of girder when bearings are set at 50°F. Bearing movement tolerances are excluded.

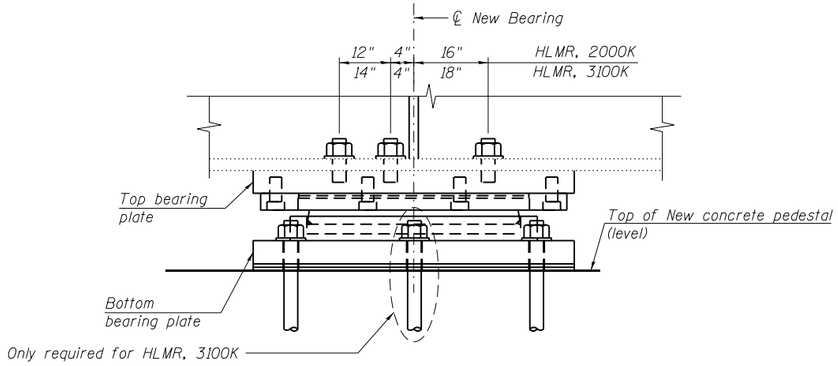



## SECTION A-A

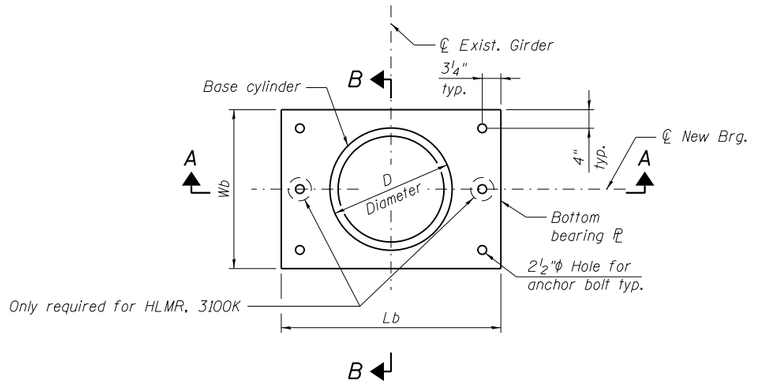
*As an alternate to the bolted connection shown, the guide bars may be connected to the top bearing plate by groove welds or the guide bars and top bearing plate may be fabricated as a single piece.



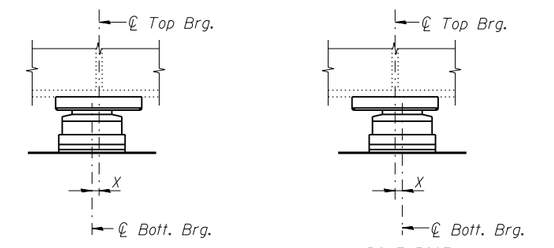

## TOP BEARING ℄ AND PISTON PLAN




## SECTION B-B




## BOTTOM BEARING ℄ AND BASE CYLINDER PLAN




## SETTING ANCHOR BOLTS AT HLMR EXP. BRG.

X=⅛" per each 100' of expansion for every 15° temp. change from the normal temp. of 50°F.

Notes:

All steel for bearings shall conform to the requirements of AASHTO M270 Grade 50, unless otherwise noted.

Anchor bolts shall be ASTM F1554 all-thread (or an Engineer-approved alternate material) of the grade(s) and diameter(s) specified. The corresponding specified grade of AASHTO M314 anchor bolts may be used in lieu of ASTM F1554. Anchor bolts may be either cast in place or installed in holes drilled after the supported member is in place. Drilled and set anchor bolts shall be installed according to Article 521.06 of the Standard Specifications.

Total bearing height is estimated based on manufacturer data. Actual bearing height may differ from contract plans. The Contractor shall be responsible for verifying bearing heights and adjusting seat elevations, if required, prior to placing pedestal concrete. Total bearing height is taken at the ℄ of bearing for bevelled top plates.

Bearing assemblies shall be designed and assembled to allow for replacement by jacking the superstructure.

Two ⅛ in. adjusting shims shall be provided for each bearing in addition to all other plates.

The anchor bolt sizes and grades shown constitute a calculated seismic structural fuse. Substitution of higher diameter and/or grade anchor bolts will not be allowed.

## BILL OF MATERIAL

| Item | Unit | Total |
|---|---|---|
| High Load Multi-Rotational Bearings, Guided Expansion, 2000K | Each | 4 |
| High Load Multi-Rotational Bearings, Guided Expansion, 3100K | Each | 4 |
| Anchor Bolts, 2" | Each | 40 |

## BEARING DESIGN DATA

| Type | Location | Vertical Design Load ** (kips) | Horizontal Design Load ** (kips) | Required Rotation Range *** (radians) | Maximum Theoretical Thermal Movement**** from 50°F | Length of Piston, L | Outside Pot Diameter, D | Thickness of Top Plate, Tt | Thickness of Bottom Plate, Tb | Total Height Bearing Assembly, Th | Longitudinal Length of Top Plate, Wt | Transverse Length of Top Plate, Lt | Longitudinal Length of Bottom Plate, Wb | Transverse Length of Bottom Plate, Lb | Anchor Bolt Diameter and Embedment | Plate Washer Size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HLMR, Guided Expansion, 2000K | Piers 14 & 18 | 1914 | 383 | 0.003 | 2½" | 3'-1⅛" | 3'-2⅛" | 4⅝" | 1⅞" | 14⅜" | 3'-8½" | 3'-7" | 3'-4½" | 4'-4" | 2"ϕ x 24" | 3½" x 3½" x 5/16" |
| HLMR, Guided Expansion, 3100K | Piers 7 & 9 | 3052 | 610 | 0.004 | 2⅞" | 3'-9¼" | 3'-10¼" | 5⅞" | 2" | 16¾" | 4'-5" | 4'-3" | 4'-½" | 5'-0" | 2"ϕ x 24" | 3½" x 3½" x 5/16" |

** Design Loads are the governing service loads with no dynamic load allowance.
*** Rotation allowances for fabrication tolerances (0.005 radians), installation uncertainties (0.005 radians) are excluded.
**** Total required movement is based on one way expansion (or contraction) of the superstructure along the centerline of girder when bearings are set at 50°F. Bearing movement tolerances are excluded.

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| | | |
|---|---|---|
| USER NAME = | DESIGNED - APL | REVISED |
| | CHECKED - MEL | REVISED |
| PLOT SCALE = | DRAWN - EAR | REVISED |
| PLOT DATE = 01/27/2015 | CHECKED - APL | REVISED |

**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

**HIGH LOAD MULTI-ROTATIONAL BEARINGS - 2**
**STRUCTURE NO. 064-0035**
SHEET NO. 15 OF 15 SHEETS

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| I-24 | (64-3B)I-7 | MASSAC | 18 | 18B |
| | | CONTRACT NO. 78448 | | |
| | ILLINOIS FED. AID PROJECT | | | |