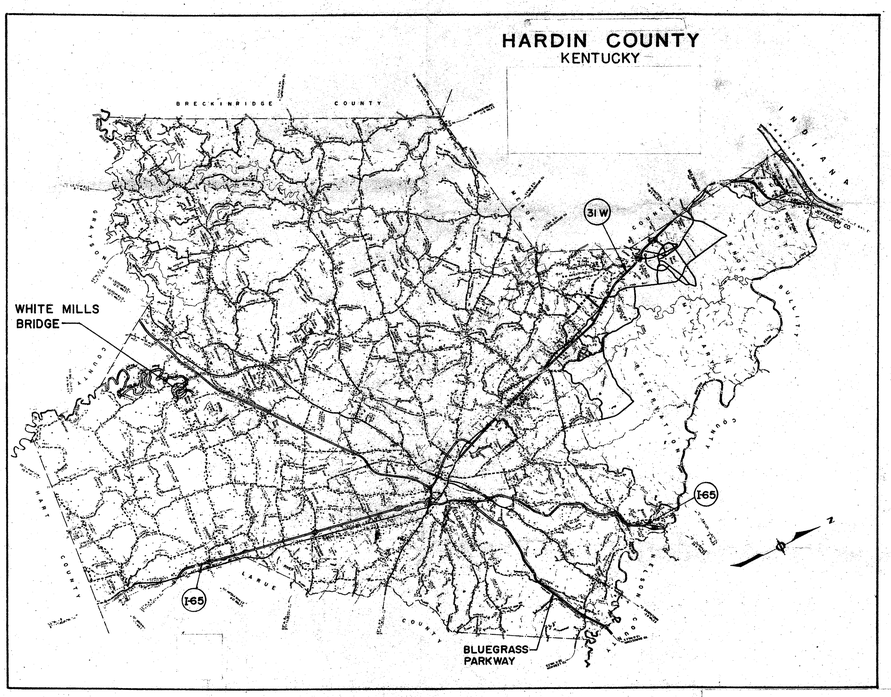
HARDIN COUNTY ROAD DEPARTMENT
HARDIN COUNTY, KY.

BRIDGE OVER NOLIN RIVER
WHITE MILLS, KY.
BRIDGE REPAIR

INDEX OF SHEETS



ESTIMATE OF QUANTITIES

Item		Amount
Remove Existing Bridge Flooring		Lump Sum
Bridge Deck Timber	*	4.25 MBFM
Replace Truss Lower Chord U-Bolts at Joints Lo & Lo'		8 Each
Repair Truss End Posts		4 Each
Repair Truss Verticals		2 Each
Replace Truss Bearings		4 Each
Clamp Truss Diagonals		4 Each
Weld Floorbeams		Lump Sum
Stringer Bearings		14 Each
Structural Steel	*	8,500 LB.
Reinforce Bent F Cap Beam		Lump Sum
Tighten Bent Bracing	*	8 Each
Straighten Bent Braces		Lump Sum
Clean & Paint Structural Steel		Lump Sum
Repair Concrete Pedestals		6 Each
Bituminous Concrete Surface	*	8.0 Ton
Control of Traffic		Lump Sum
Jacking and Supporting		Lump Sum

* Assumed Quantity. This quantity will be changed for final payment to reflect the actual quantity for the project.

SHEET 1

HARDIN COUNTY ROAD DEPARTMENT
Hardin County, Kentucky

BRIDGE OVER NOLIN RIVER
WHITE MILLS, KY.

TITLE SHEET

PREPARED AND SUBMITTED BY:
HAZELET + ERDAL, INC.
CONSULTING ENGINEERS
FILE NO. 1110-01
BY: Robert O Grubbs
DATE: January 21, 1987

STATE OF KENTUCKY
R. O. GRUBBS
2960
REGISTERED PROFESSIONAL ENGINEER

GENERAL NOTES

SPECIFICATIONS: The Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, current edition, shall apply to this project where noted.

DESIGN LOAD: The existing bridge was rated for a Posting live load of 7-1/2 Tons as specified in the AASHTO Manual for Maintenance Inspection of Bridges, 1983 edition, using allowable stresses 25% greater than specified for inventory rating.

MATERIALS DESIGN SPECIFICATIONS:
For Structural Steel
Existing:
Tension, axial or bending . . . . . 18,000 PSI
Compression Truss Members . . . . . $15,325-.35(KL/r)^2$
New:
ASTM A36 . . . . . fs = 20,000 PSI

CONCRETE: Class "A" concrete is to be used for pedestal caps and all other concrete work.

BEVELED EDGES: All exposed edges shall be beveled 7/8" unless otherwise shown.

SHOP DRAWINGS: The Contractor shall submit full sets of prints of the detailed shop drawings for all structural steel to the Engineer for approval in accordance with Section 607.04 of the Kentucky Specifications.

MILL TEST REPORTS: Notarized test reports shall be furnished in triplicate to the Engineer showing that all the materials used for these repairs conform to the requirements of the Specifications.

WELDING SPECIFICATIONS: All welding and welding materials except for reinforcement, shall conform to AWS D.1.1-80 "Structural Welding Code". Modification and additions as stated on the plans, AASHTO 1981 Standard Specifications for Welding of Structural Steel Highway Bridges, and Kentucky Special Provision 4C(85) shall supersede the AWS Specifications. Welding procedures shall be submitted to the Engineer and approved prior to the start of fabrication. The cost of welding, welding materials, straightening, altering and burning new or existing steel is to be included in the unit price bid for the appropriate items.

MATERIALS: AWS and ASTM Specifications,current edition, as designated below, shall govern the materials furnished.

A36-77a	Structural Steel Steel, 36,000 PSI minimum yield
A153-78	Zinc Coating (Hot Dip) on Iron and Steel Hardware
A307-78	Carbon Steel Externally Threaded Standard Fastners, Machine Bolts, Nuts and Top Bolts.
A325-79	High Strength Bolts for Structural Steel Joints, Including Suitable Nuts and Plain Hardened Washers.
B22-79	Copper Alloy UNS No. C91100 Cast Bronze

CONNECTIONS: Unless otherwise provided on the plans, all connections shall be high strength bolts. Tightening shall be done with properly calibrated wrenches.
Open holes shall be:
13/16" diameter for 3/4" diameter bolts
15/16" diameter for 7/8" diameter bolts

PAINTING BURNT AREAS: All areas of new or existing structural steel on which the paint has been damaged by the Contractor with weld burns or by other means after final painting shall be spot painted with primer and given one coat of Aluminum Paint. The cost of this touch up painting is to be included in the price bid for the appropriate items.

CLEANING EXISTING STEEL: All areas of existing steel that are to be in contact with new steel, including areas under bolt heads, shall be cleaned of all dirt, rust, paint and other foreign matter, using a brush and a scraper, before installing the new steel. The cost of this cleaning is to be included in the unit price bid for the appropriate items.

DIMENSIONS: Dimensions shown on these plans are from measurements taken during inspections of the bridge condition. Not all parts to the bridge were measured and considerable dimensional variation exists. The Contractor shall verify dimensions, including thickness of parts and diameters of pins, with field measurements prior to ordering materials or fabricating steelwork.

PROHIBITED FIELD WELDING: Except as shown on the plans, no welding of any nature shall be performed on the load carrying members of the bridge without the written consent of the Engineer, and then only in the manner and at the locations designated in the authorization.

STRUCTURAL LUMBER: The lumber shall be either Douglas Fir, coast type, or Southern Yellow Pine and shall meet the requirements of ASTM D245, current edition. The strength ratio must be 68% and the basic stresses are as follows:
Extreme fiber in bending parallel to grain:
Douglas Fir - 2200 psi
Yellow Pine - 2200 psi
Horizontal shear, maximum:
Douglas Fir - 130 psi
Yellow Pine - 160 psi

PAINTING DECK PLANK CLIPS: All deck plank clips shall be dipped or painted with Type I Red Lead paint. The cost of material and labor used in this work shall be included in the Unit Price bid for Remove Existing Bridge Flooring.

TREPANNED SELF-LUBRICATING BEARING PLATES, BRONZE: Self-lubricating bronze plates shall be an article of standard production by an established manufacturer of such equipment. They shall be in accordance with Sub-section 813.06 Part A of the Kentucky Specifications except as herein midified. Trepanned recesses shall be in accordance with Section 813.06 of the Specifications.

DAMAGE TO THE STRUCTURE: The Contractor is responsible for any and all damage to the structure during reconstruction, even to the replacement of the entire structure and removal of the fallen structure at his expense, should it be allowed to fall for any cause whatsoever.

CLOSING BRIDGE TO TRAFFIC: The bridge shall be closed to traffic during reconstruction. The bridge shall not be closed to traffic until all material for its reconstruction is obtained by the Contractor.

BONDING NEW CONCRETE TO OLD CONCRETE: All new concrete shall be bonded to the old concrete with a two-component epoxy resin system conforming to Section 833 of the Specifications. The cost of this work, including all labor, tools and materials, is to be incidental to the Unit Price bid for Repair Concrete Pedestals.

REMOVE EXISTING BRIDGE FLOORING: The existing deck timber shall be carefully removed and stored in a protected location for future use. The Contractor shall notify the Engineer when the timber has been removed so that he may inspect the stringers and floorbeams. This work also includes replacing the deck planks and installing new running boards and curb boards with new deck plank clips and other hardware. Deck planks not fit for reuse will be designated by the Engineer and new planks shall be used as replacements. The replacement of the deck timber shall be in accordance with the plans. More deck plank clips are required for the replacement than were used in the existing deck. Existing clips in good condition may be reworked and used, see the Plans. The cost of this work is to be included in the lump sum bid for Remove Existing Bridge Flooring.

BRIDGE DECK TIMBER: Timber in accordance with the notes and specifications shall be furnished to the nominal dimensions shown on the plans. The quantity to be paid for will be determined from nominal widths and thicknesses and the actual lengths of the pieces in the finished structure. No allowance for waste will be made due to cutting commercial lengths to the exact lengths required in the finished structure.

REPLACE TRUSS LOWER CHORD U-BOLTS AT JOINTS LO AND LO': This work includes removing old U-Bolts and furnishing and installing new U-Bolts with two nuts each leg in accordance with the plans and notes. The unit price bid shall include all materials and labor for cutting and welding cover plates and removing and installing U-Bolts.

REPAIR TRUSS END POSTS: The existing pin plates on the lower end of the End Posts at Joints Lo and Lo' shall be removed and new pin plates installed in accordance with the plans and notes. The cost of removing rivets, installing the new plates by welding and all labor and materials required shall be included in the unit price bid.

REPAIR TRUSS VERTICALS: The existing pin plates on the lower end of the designated truss vertical members shall be removed and new pin plates installed in accordance with the plans and notes. The cost of removing rivets, installing the new plate by welding and all labor and materials shall be included in the unit price bid for each pin plate.

REPLACE TRUSS BEARINGS: The existing truss bearings and column cap plates shall be removed and new bearings installed. The unit price bid for Replace Truss Bearings shall be full payment for all structural steel of the new bearings, bolts, washers, trepanned self-lubricating bronze plates, weld and welding materials, and all labor necessary to complete the work in accordance with the plans and specifications.

CLAMP TRUSS DIAGONALS: A clamp shall be placed on each intersection of the existing truss diagonal bars in accordance with the plans. The unit price bid shall include all materials and labor required to install the clamps.

WELD FLOORBEAMS: Additional weld is required on each existing truss floorbeam and bent cap beam except the cap beam of Bent B. The cost of welding and weld materials to complete this work in accordance with the plans and specifications shall be included in the lump sum bid for Weld Floorbeams.

STRINGER BEARINGS: New stringer bearings, as shown on the plans, shall be installed under each stringer end at both abutments. The unit price bid for Stringer Bearings shall be full payment for steel bearing plates, neoprene pads, anchor bolts, washers, grout, weld and welding materials, and all labor necessary to complete the work.

STRUCTURAL STEEL: This work includes removing old stringers which will be designated by the Engineer after the deck timber is removed and replacing them with new stringers in accordance with the plans. Existing guardrail post brackets on fascia stringers to be replaced are to be carefully removed and welded into place on the replacement stringer. Existing stringer diaphragms at the abutments are to be removed and discarded. New stringer diaphragms, near the abutments are to be installed in accordance with the plans. The unit price bid for structural steel shall be full payment for all structural steel of the work described above, bolts, washers, welding and weld materials, removing and installing guardrail brackets, removing diaphragms, and all labor and materials necessary to perform the work in accordance with the plans and specifications. The assumed weight of structural steel shown in the Estimate of Quantities will be changed for final payment to reflect the computed weight of the actual new stringers installed on the bridge. No adjustment will be made in the unit price due to an increase or decrease in quantity.

REINFORCE BENT F CAP BEAM: A structural steel plate shall be welded on the bottom of the bottom flange of the cap beam of Bent F in accordance with the plans. The cost of furnishing the plate, welding and welding materials, and labor to install the plate shall be included in the lump sum bid.

TIGHTEN BENT BRACING: Diagonal bracing rods of the bent columns which are designated by the Engineer as being loose shall be tightened as shown on the plans or as directed by the Engineer. The cost of all materials and labor to tighten the rods shall be included in the unit price bid. The assumed number of rods shown in the Estimate of Quantities will be changed for final payment to reflect the actual number of bracing rods tightened by the Contractor. No adjustment will be made in the unit price due to an increase or decrease in quantity.

STRAIGHTEN BENT BRACES: This work includes straightening existing longitudinal bracing beams between Bent Columns at the locations listed.
North Columns of Bents E and F, Upper Brace.
South Columns of Bents C and D, Upper Brace.
Also included in the work is removing and discarding the lower existing longitudinal bracing beam at the North Columns of Bents E and F (attached to Bent E Column only).
The lump sum bid shall include all materials and labor to complete the work described.

CLEAN AND PAINT EXISTING STEEL: All existing structural steel is to be cleaned and painted in accordance with Section 727 of the Specifications. All steel shall receive two coats of paint. The paint shall conform to Section 821 of the Specifications and shall consist of one coat of primer and one coat of leafing aluminum.

Also included in this work is replacing of one section of guardrail where shown on the plans and straightening of guardrail posts at the locations listed to give the guardrail a straight and pleasing appearance.
North Guardrail at Truss Joint L_1'
South Guardrail at Truss Joint L_1

The replacement guardrail section will be furnished by the Hardin County Road Department at their storage yard. The cost of the cleaning, replacement and painting of the guardrail shall be included in the lump sum bid for Clean and Paint Existing Steel.

REPAIR CONCRETE PEDESTALS: At locations shown on the plans, the concrete pedestals, supporting the Bent Columns shall be repaired and receive a concrete cap to prevent standing rain water against the steel. The unit price bid for Repair Concrete Pedestals shall be full payment for all structural steel, weld and welding materials, non-shrinking grout, concrete, reinforcing bars, epoxy bond coat and all labor necessary to complete the work in accordance with the plans and specifications.

BITUMINOUS CONCRETE SURFACE: Bituminous concrete surface shall be placed at locations shown on the plans or as directed by the Engineer to give a smooth transition surface from existing roadway to the bridge and good drainage of approach roadway. Materials, mix, placing and payment for Bituminous Concrete Surfaces shall be in accordance with Section 402.02 of the KBH Specifications.

CONTROL OF TRAFFIC: The Contractor shall be responsible for furnishing, installing and maintaining control of traffic signs and barricades to close the bridge to all traffic. The cost of this work is to be included in the lump sum bid for Control of Traffic.

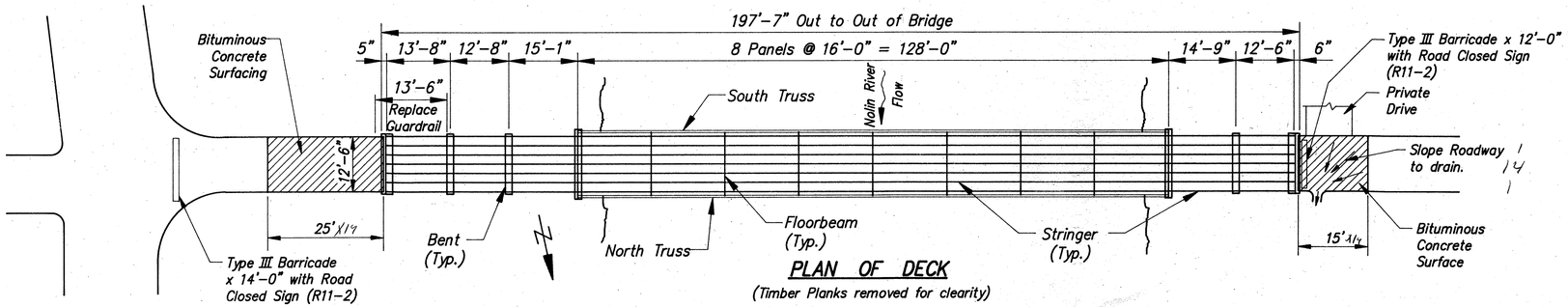
JACKING AND SUPPORTING: This work includes the raising and supporting of the truss span for replacing the truss bearings and repairing the end posts. Subject to approval, the Contractor may choose any method of jacking or lifting that will not cause damage to the bridge. He shall submit his proposed method including the attachments to the trusses, for the Engineers approval before any work is started. The lump sum bid for Jacking and Supporting shall be full payment for furnishing all falsework, materials, equipment, tools, labor, and incidentals necessary to complete the work.

HARDIN COUNTY ROAD DEPARTMENT
Hardin County, Kentucky

BRIDGE OVER NOLIN RIVER
WHITE MILLS, KY.
GENERAL NOTES

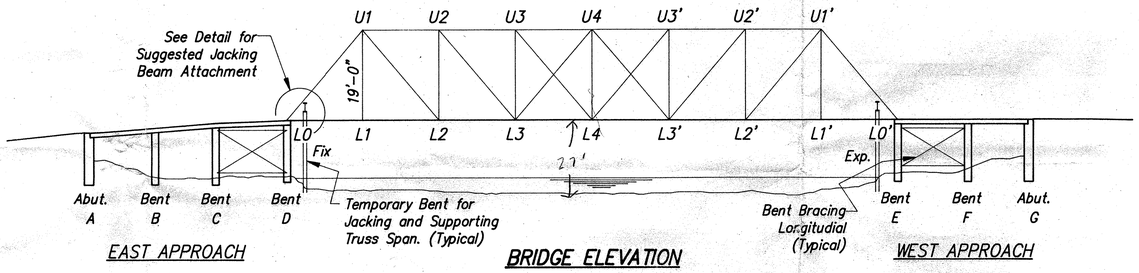
HAZELET + ERDAL, INC.
CONSULTING ENGINEERS
LOUISVILLE, KENTUCKY
FILE NO. 1110-01

CAD C.W.S./D.R.H. CHKD. TTG DATE 9-29-86



PLAN OF DECK

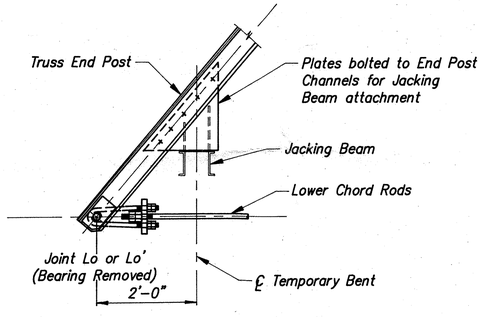
(Timber Planks removed for clearity)



EAST APPROACH

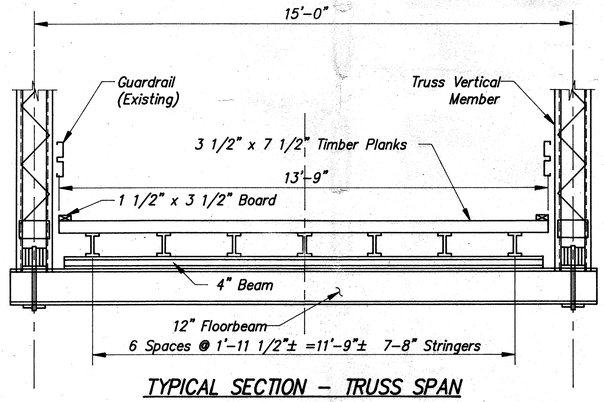
BRIDGE ELEVATION

WEST APPROACH



SUGGESTED TRUSS ATTACHMENT FOR JACKING BEAM

The Contractor may choose any method of jacking or lifting the truss. He shall not weld to the main channels of the End Posts, but he may weld to the reinforcing channels of the Northwest End Post.



TYPICAL SECTION - TRUSS SPAN

SHOWING EXISTING TIMBER DECK

PROCEDURE FOR REPAIRING TRUSS SPAN

Certain items of work for the truss span are to be completed first, in the order listed below, to provide maximum safety for the structure.

1. With barricades and signs, closing the bridge to all traffic in place, remove and store for future reuse all deck timber and notify the Engineer that the stringers and floorbeams may be inspected.
2. Replace the U-Bolts at truss joints Lo and Lo', one joint at a time, in the following manner:
   a. Place a temporary tension cable with a tensioning device from joint Lo to joint L2 (or Lo' to L2').
   b. Tighten cable to relieve part of the stress on the existing U-Bolts.
   c. Remove and replace one U-Bolt at the joint. After installing the first replacement U-Bolt, remove and replace the second one.
   NOTE: It will be necessary to cut a small slot in the lower end of the End Post Cover Plate to install the replacement U-Bolt. Save the removed piece of cover plate and replace it by welding after both new U-Bolts are in place.
3. Lash joint Lo' at both trusses to the top of Bent E to prevent longitudinal movement. Install temporary jacking beam and temporary support bent at End Post Lo-U1 near Bent D and lift the East end of the truss span.
   NOTE: A crane or any other method, approved by the Engineer, for lifting the end of the truss span may be usd in lieu of the temporary bent described.
4. Remove old truss bearings at the lifted end by cutting vertical plates of the old bearings. Protect truss joint pins and do NOT remove them.
5. Lash ends of Lower Chord rods at the U-Bolt attachment plates to the End Posts. Remove old pin plates on the End Post channel webs by removing the rivets.
6. Repair ends of End Posts Lo-U1 by installing new pin plates on the outside of the End Posts and welding around the periphery.
7. Remove cap plates from Bent D columns and install new fixed bearing weldments on top of the columns, being sure to have full bearing between ends of the column channels and the bearings. Where bearing area has been lost due to rusting of the ends of the channels, weld 3/8" reinforcing plates to the channels to replace the lost bearing area.
8. Place the outer vertical plates of the bearings on the joint pins and lower the truss onto the bearings. Bolt the plates of the bearings together. Replace the pin nuts and burr the threads if possible, otherwise tack weld nut to the pin.
9. Remove all lashing and move temporary bent and temporary jacking beam from End Post Lo-U1 to End Post Lo'-U1' near Bent E. Lift West end of the truss span.
10. Repeat steps 4 through 9, repairing End Posts Lo'-U1' and installing the Expansion Bearings on Bent E instead of the Fixed Bearings as stated in Step 7.
11. Remove all lashing and temporary material.
12. Repair the lower ends of the truss vertical members designated on the plans as follows:
    Remove pin nut and old pin plates from the deteriorated channels by removing the rivets. Install new pin plates by welding to the channel webs. Replace pin nut and tack weld to pin if the pin is long enough, otherwise discard the pin nut and weld pin to pin plate.

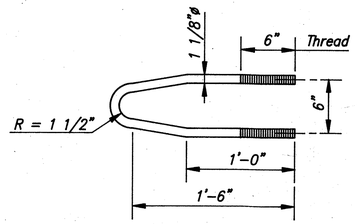
The other items of work for the truss span may be performed in any order selected by the Contractor after completion of Steps 1 through 12 listed above, except the timber deck should not be replaced until cleaning and painting of the stringers has been completed.

HARDIN COUNTY ROAD DEPARTMENT
Hardin County, Kentucky

BRIDGE OVER NOLIN RIVER
WHITE MILLS, KY.
LAYOUT

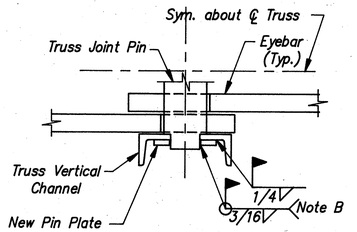
HAZELET + ERDAL, INC.
CONSULTING ENGINEERS
LOUISVILLE, KENTUCKY
FILE NO. 1110-01

CAD M.S./D.H. CHKD. C.S.B. DATE 9-29-86

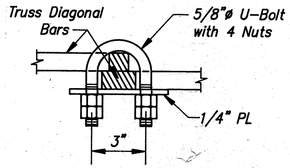


U-BOLT "A"

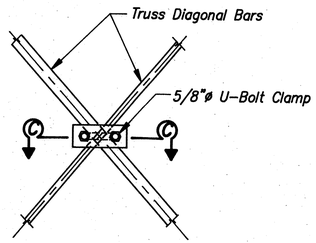
8 Required



SECTION B-B

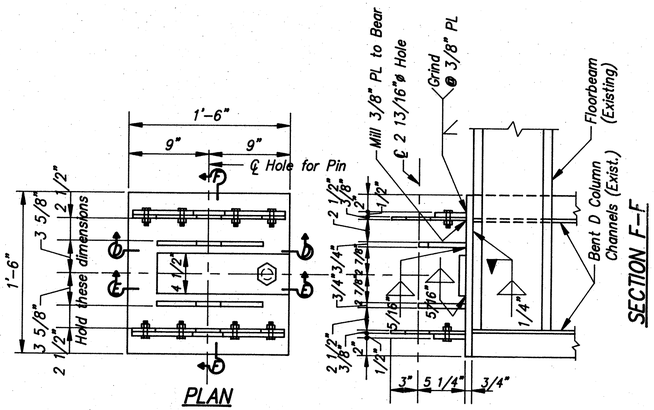


SECTION C-C



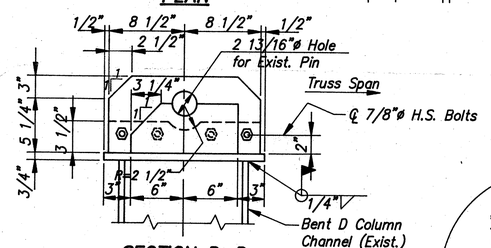
CLAMP AT INTERSECTION OF TRUSS DIAGONALS

Required for Each Truss in Panels $L_3 - L_4$ & $L_4 - L_3'$



PLAN

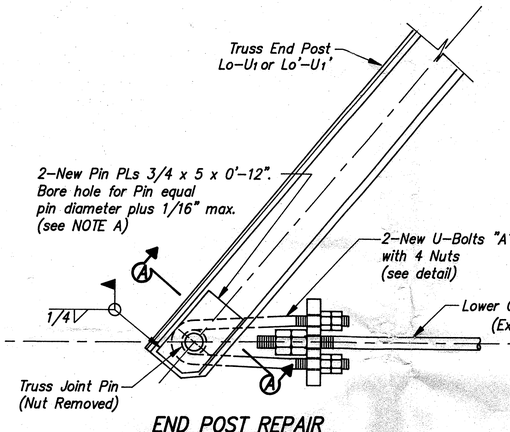
SECTION F-F



SECTION D-D

TRUSS BEARING - FIXED

2 Required @ Bent D



END POST REPAIR

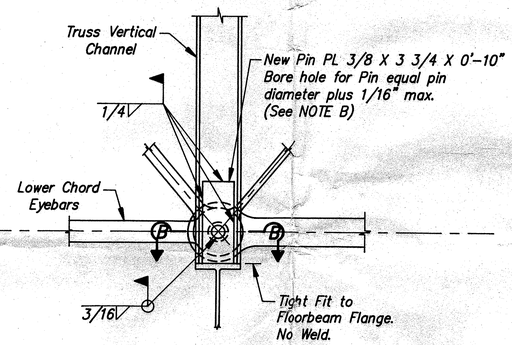
TRUSS BEARING REMOVED

See Repair Procedure for Sequence of Work

Required Locations

North Truss: $L_0 - U_1$ & $L_0' - U_1'$

South Truss: $L_0 - U_1$ & $L_0' - U_1'$

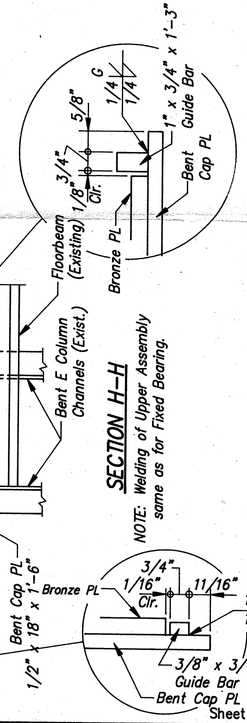


VERTICAL MEMBER LOWER END REPAIR

Required Locations

North Truss: $U_3 - L_3$ (Deck Side Channel)

South Truss: $U_3' - L_3'$ (Deck Side Channel & Outside Channel)



PLAN

SECTION H-H

NOTE: Welding of Upper Assembly same as for Fixed Bearing.

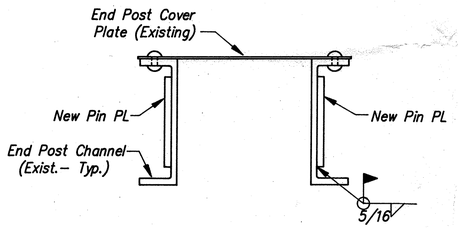
Self-Lubricating Bronze Bearing PL. 1/2 x 15 x 1'-3"

SECTION G-G

TRUSS BEARING - EXPANSION

2 Required @ Bent E

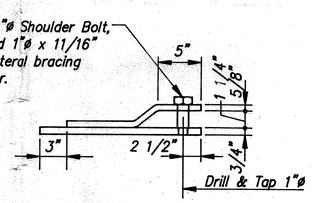
TRUSS MEMBER REPAIRS



SECTION A-A

NOTE A: Remove and discard existing riveted Pin Plate on End Post Channel webs.

NOTE B: Remove and discard any riveted pin plate on truss vertical channel web. After welding New Pin Plate replace nut if 1/2" min. of threads are engaged and tack weld nut to pin. If insufficient length for nut, discard nut and weld pin plate to pin.



SECTION E-E

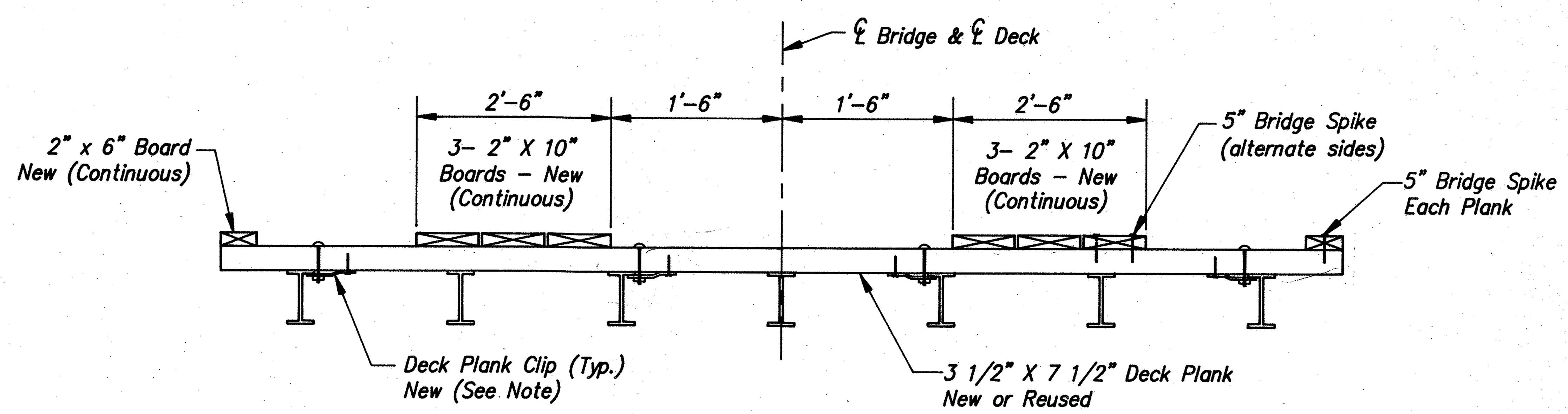
HAZELET + ERDAL, INC.
CONSULTING ENGINEERS
LOUISVILLE, KENTUCKY
FILE NO. 1110-01

HARDIN COUNTY ROAD DEPARTMENT
Hardin County, Kentucky

BRIDGE OVER NOLIN RIVER
WHITE MILLS, KY.
REPAIR DETAILS
TRUSS SPAN

CAD M.S./D.H. CHKD. CSB DATE 9-29-86

Sheet 4



TYPICAL DECK SECTION

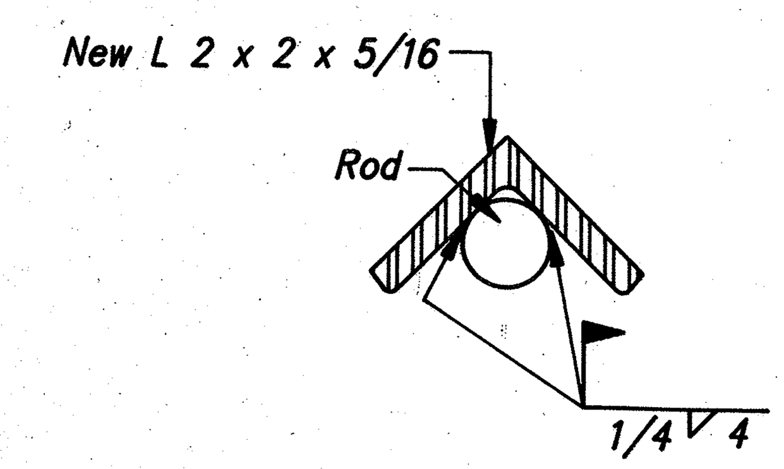
Truss Spans & Approach Spans

All deck timber is to be removed and stored for the Engineers inspection of the stringers and for reuse. Repair of the steel is to be done before replacing the timber. Deck planks that are not fit for reuse will be designated by the Engineer and new planks will be used for replacements. New replacement deck planks shall be the same size as the plank that it replaces such that the finished top of the deck is a smooth surface. Clips securing the deck planks to the stringers shall be placed as follows: On fascia stringers place a clip on every plank alternating sides, on interior stringers place a clip on every third plank (not further apart) alternating sides. Place additional clips on three adjacent planks at the centerline of every span and truss panel so there will be clips on both sides of all stringers. Deck plank clips shall conform to the detail shown. Existing clips in good condition may be reworked and reused.

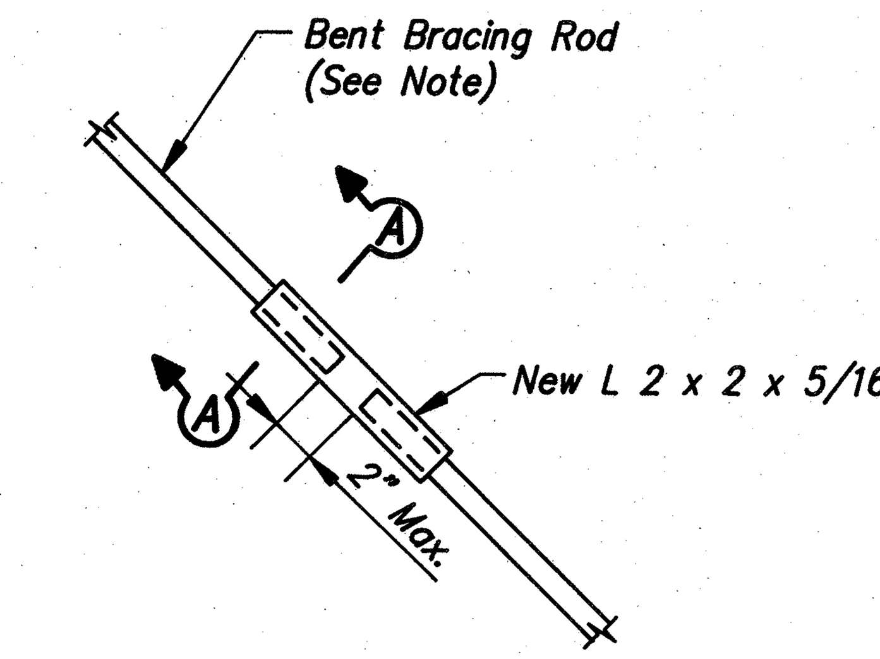
Bridge Spikes shall be 5" long, galvanized spikes furnished by one of the following manufacturers.

Independent Nail Co. Inc., 106 Hale Street, Bridgewater, MA 02324

Dickson Weatherproof Nail Co., 2615 29TH Ave. ~~North, Birmingham, AL 35207~~

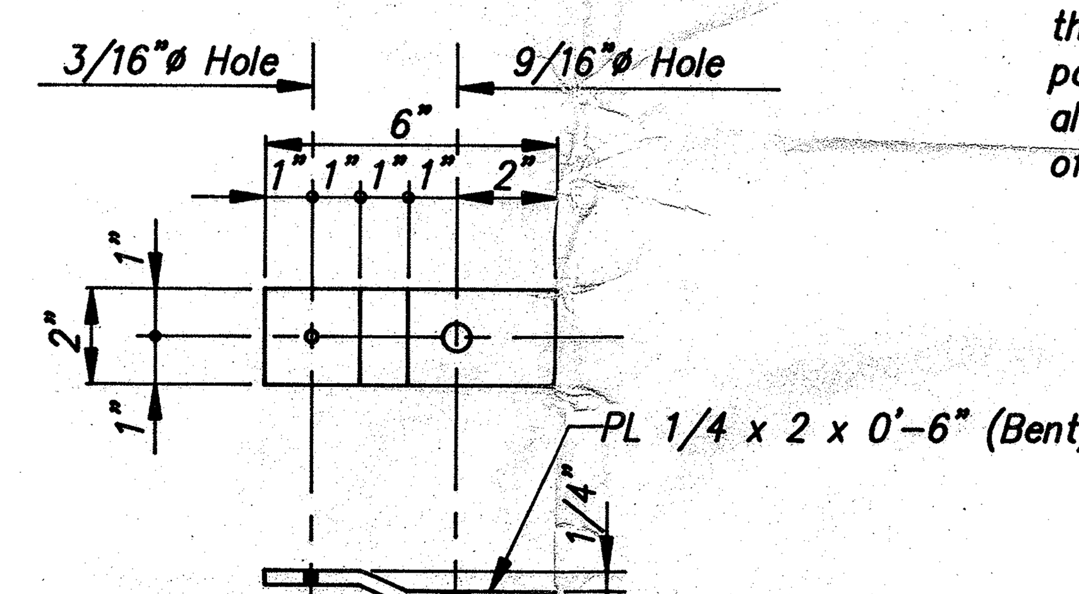


SECTION A-A



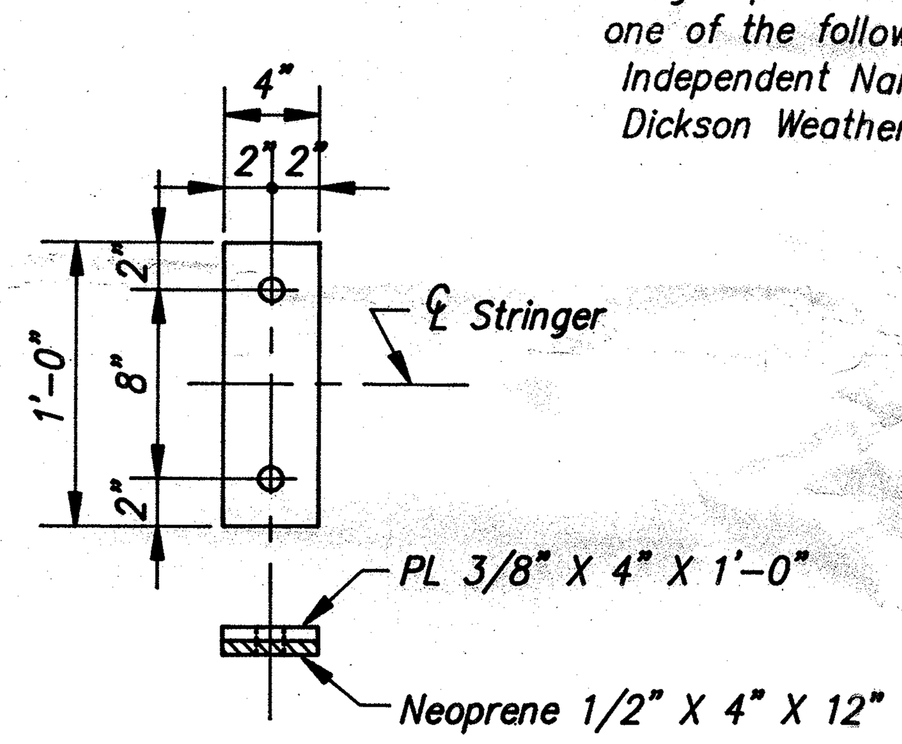
TIGHTENING BENT BRACING ROD-ALTERNATE METHOD

Loose rods designated by the Engineer are to be tightened by cleaning threads and turning existing turnbuckles where possible. Where this is not possible the alternate method, as described, shall be used. Attach a come-along and tighten to approx. 200 pounds tension, cut and remove a short section of rod and weld rod ends to a splice angle as shown in the detail.



DECK PLANK CLIP DETAIL

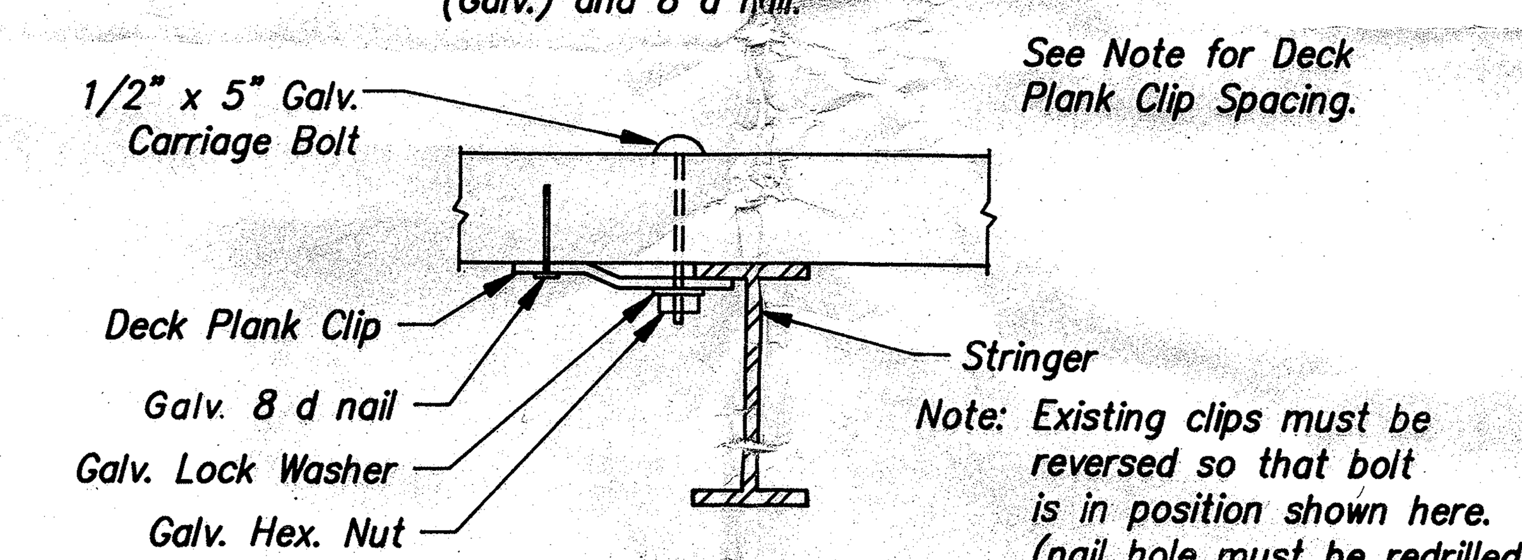
Clip includes 1/2"ø x 5" Carriage Bolt (Galv.) and 8 d nail.



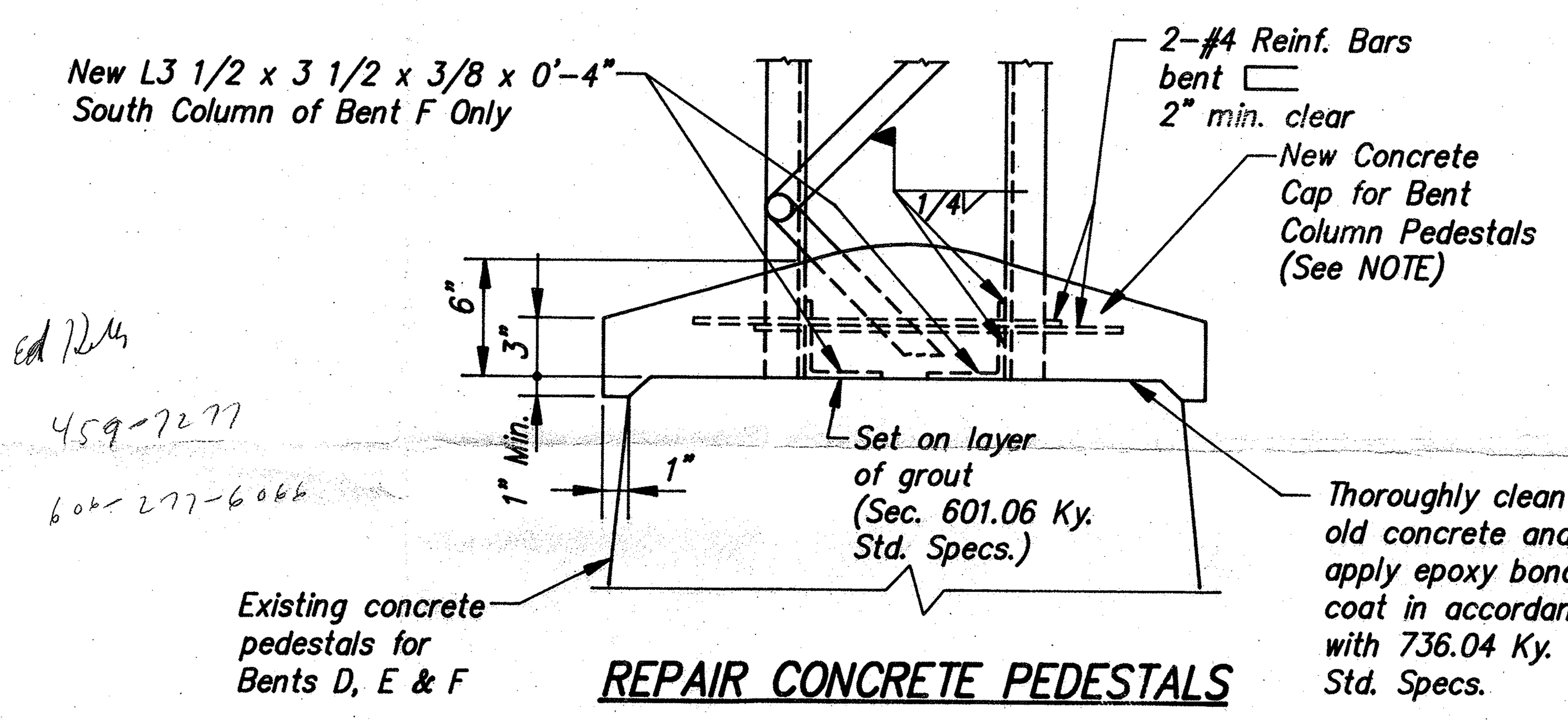
STRINGER BEARING

14 Required

Neoprene shall be 60 or 70 durometer hardness. Bond neoprene pad to steel plate.



DECK PLANK CLIP ERECTION DETAIL

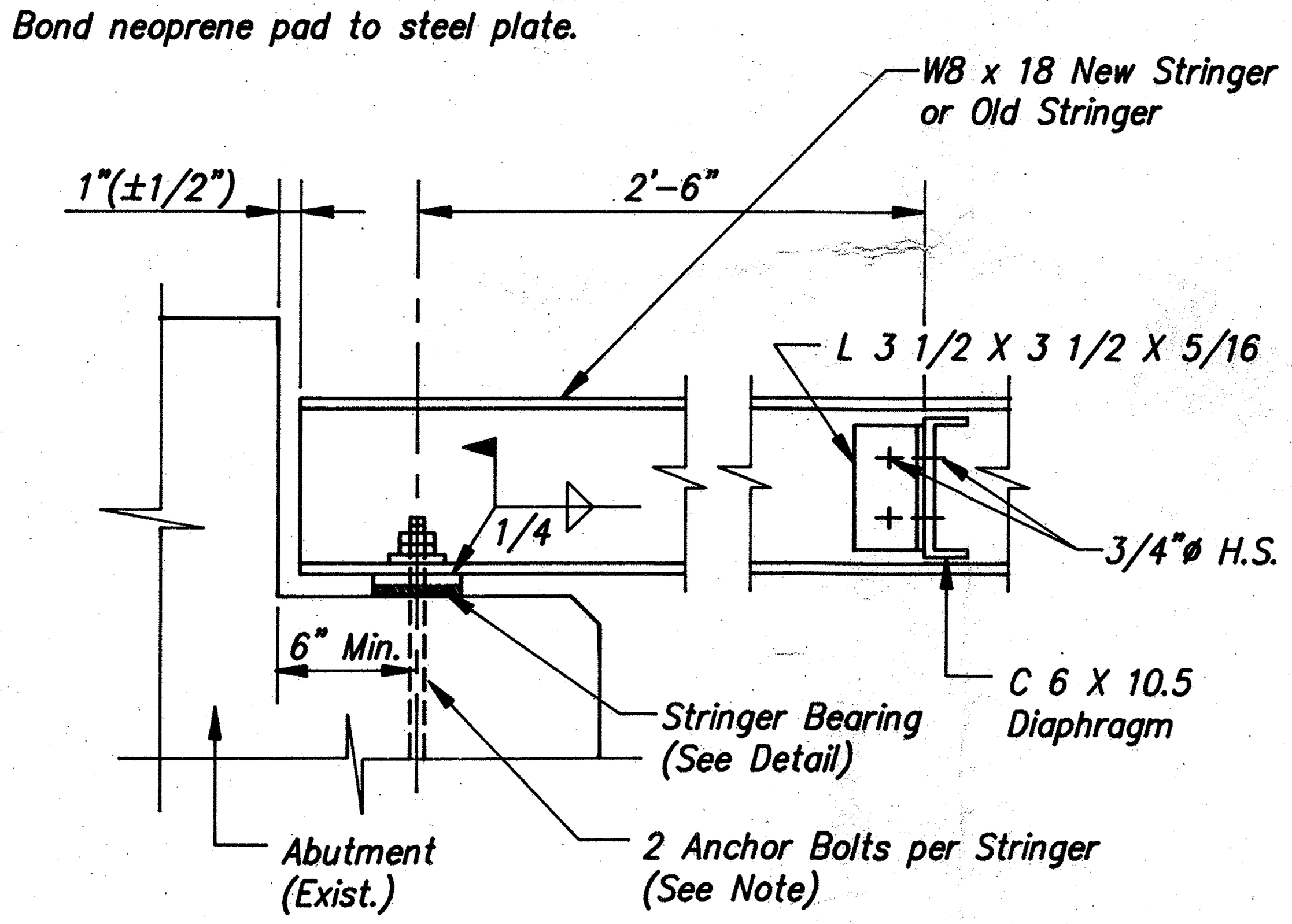


REPAIR CONCRETE PEDESTALS

Pedestal at Bent F shown. Others similar.

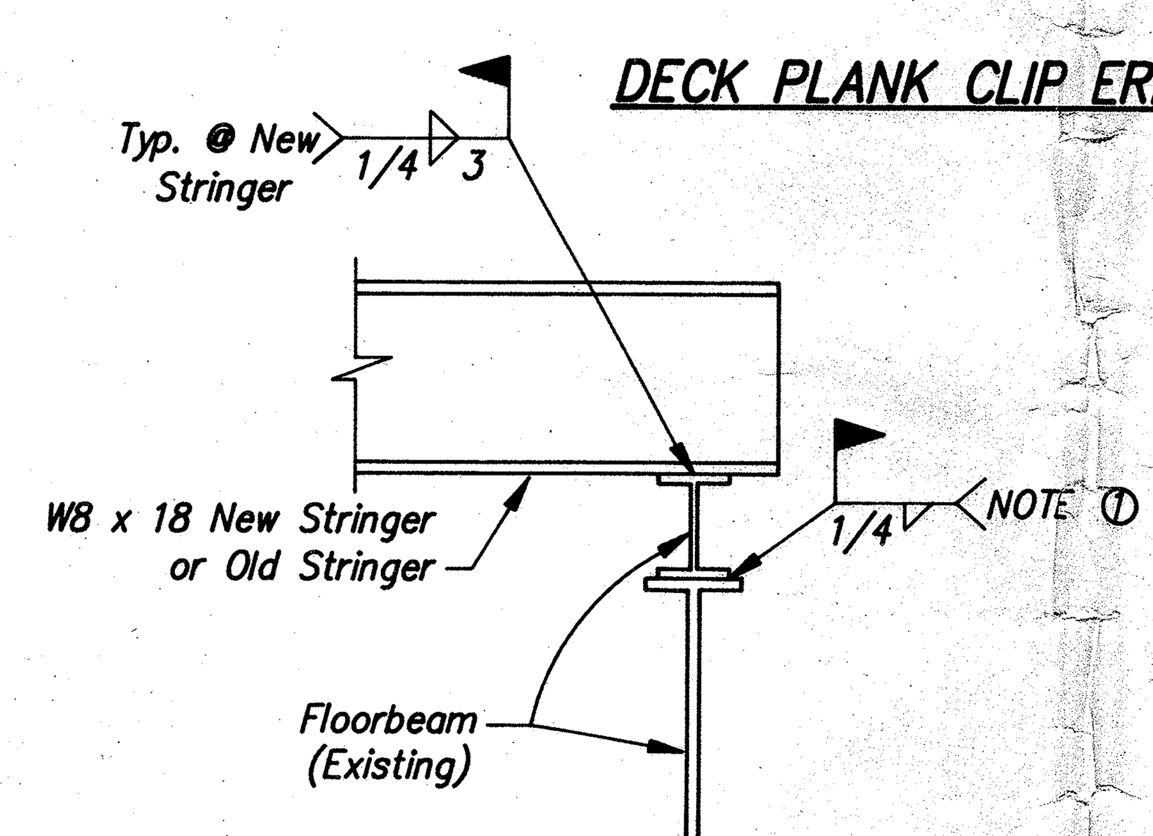
Concrete Cap for Column Pedestals are required for both columns of Bents D, E and F. Concrete shall be Class A in accordance with Ky. Std. Specs.

NOTE: At Bent D Only, an approved non-shrink grout shall be flowed under each column base plate to completely fill the void before placing the concrete of the pedestal cap.



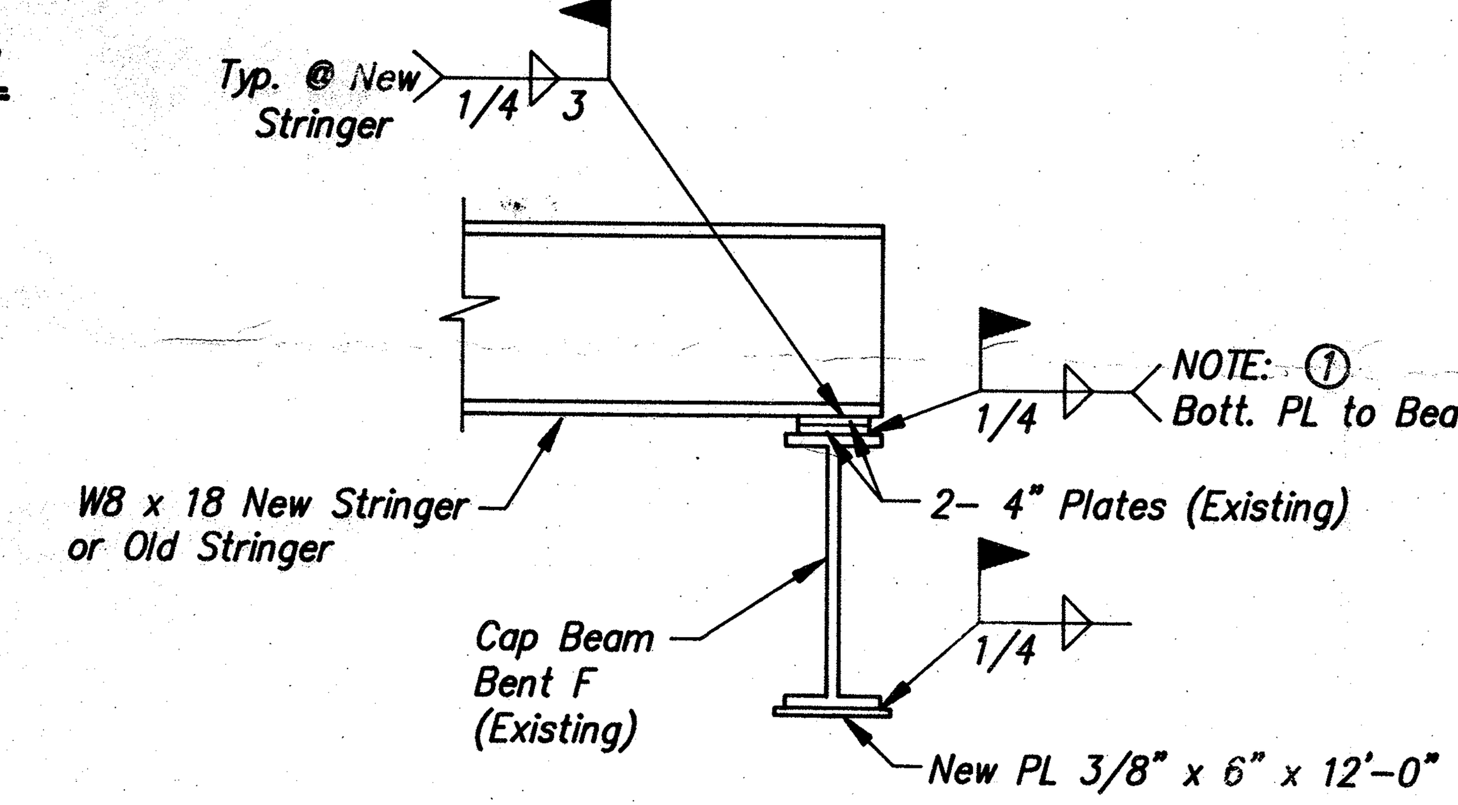
STRINGER BEARINGS AT ABUTMENTS

Anchor Bolts are to be 3/4"ø X 10" long, swedged, with a washer and two nuts and grouted 6" min. into drilled holes in the Abutments. (Remove existing diaphragms at Abutments)



STRINGER AND FLOORBEAM DETAIL

NOTE ① : Add to existing fillet weld length so that each end 3'-0" on each side and across the ends is continuous. Between the ends intermittent welds of 3 inches in 6 inches is minimum.



STRENGTHENING CAP BEAM OF BENT F

Sheet 5

HARDIN COUNTY ROAD DEPARTMENT
Hardin County, Kentucky

BRIDGE OVER NOLIN RIVER
WHITE MILLS, KY.
REPAIR DETAILS
TRUSS SPAN & APPROACH SPANS

HAZELET + ERDAL, INC.
CONSULTING ENGINEERS
LOUISVILLE, KENTUCKY
FILE NO. 1110-01

CAD M.S./D.H. | CHKD. CSB | DATE 9-29-96