

LOCATION MAP

PORTION TO BE IMPROVED
 STATE AND FEDERAL ROUTES
 OTHER ROADS
 DETOUR \longleftrightarrow



LOGAN COUNTY ENGINEERING DEPARTMENT Bickham Covered Bridge Bridge 38-0.29 Richland Township January 2002

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CONVENTIONAL SIGNS

- County Lines -----
- Township Lines -----
- Section Lines -----
- Corporation Line -----
- Fence Line ---X---X---X---
- Center Line -----
- Right of Way -----RW-----
- Existing Right of Way -----
- Property Line -----
- Railroad ++++++
- Trees Stumps (remove) * R * X * P
- Utility Poles Telephone Power Light ϕ ϕ ϕ
- Guardrail ---o---o---o---

Plan Scale 1" = 20'
 Profile Scale Hort. 1" = 20'
 Vert. 1" = 5'
 Cross Section Scale 1" = 5'

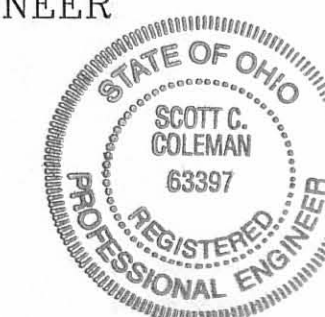
1997 SPECIFICATIONS

EXCEPT WHERE OTHERWISE NOTED, THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, AND THE LOGAN COUNTY SPECIFICATIONS ISSUED WITH THE PROPOSAL, SHALL GOVERN THIS IMPROVEMENT.

WE THE COMMISSIONERS OF LOGAN COUNTY, OHIO IN FORMAL SESSION HEREBY APPROVE THESE PLANS AND CERTIFY THAT THE RIGHT OF WAY IS AVAILABLE. WE ALSO DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL REQUIRE THE CLOSING TO TRAFFIC OF THE HIGHWAY AND THAT DETOURS WILL BE PROVIDED AS INDICATED ON THE PLANS.

APPROVED John Baylis
 APPROVED John Reser
 APPROVED Russell Foyt
 DATE 2-14-02 COMMISSIONERS

APPROVED Scott C. Coleman
 DATE 2-14-02 LOGAN COUNTY ENGINEER

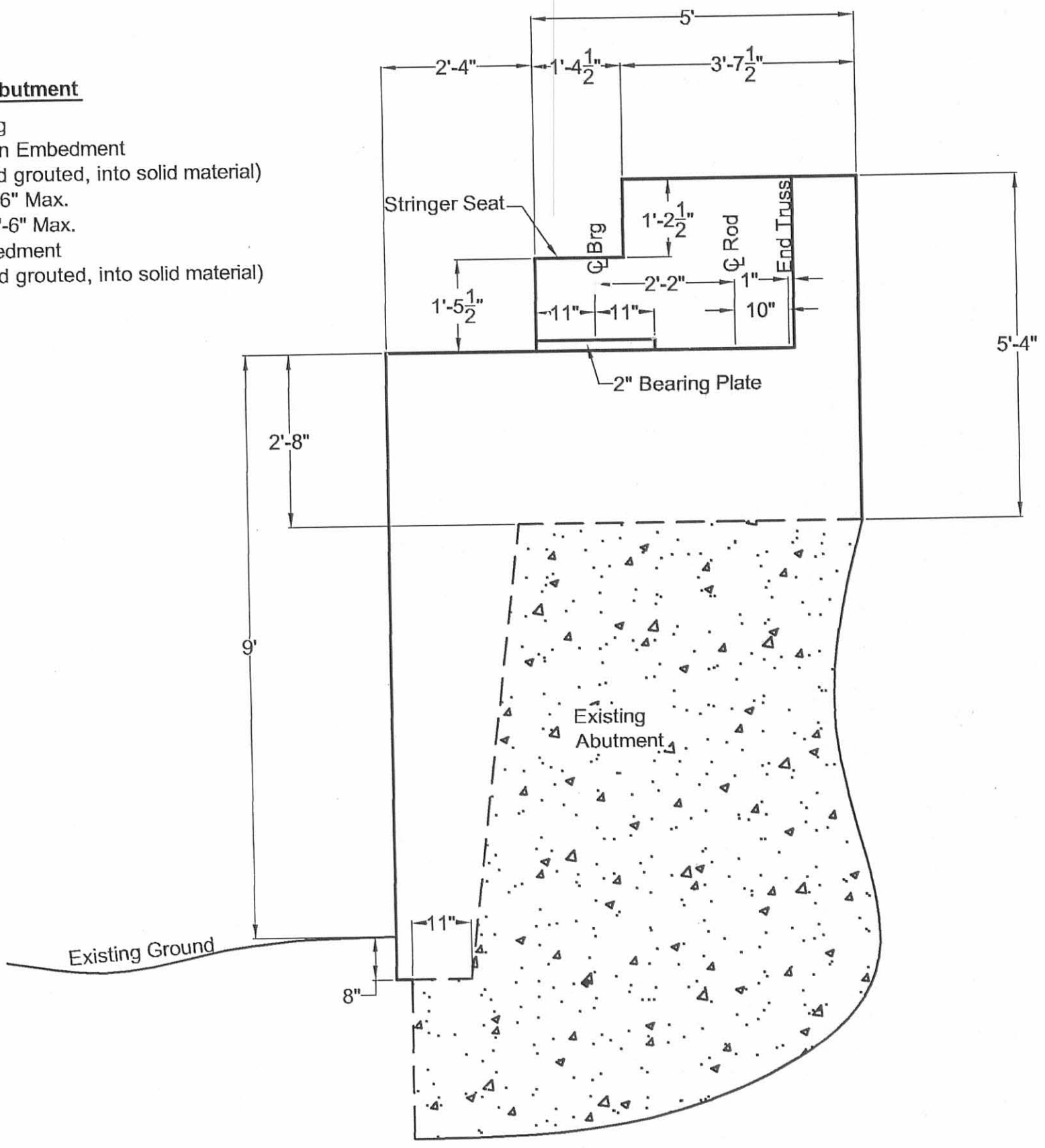
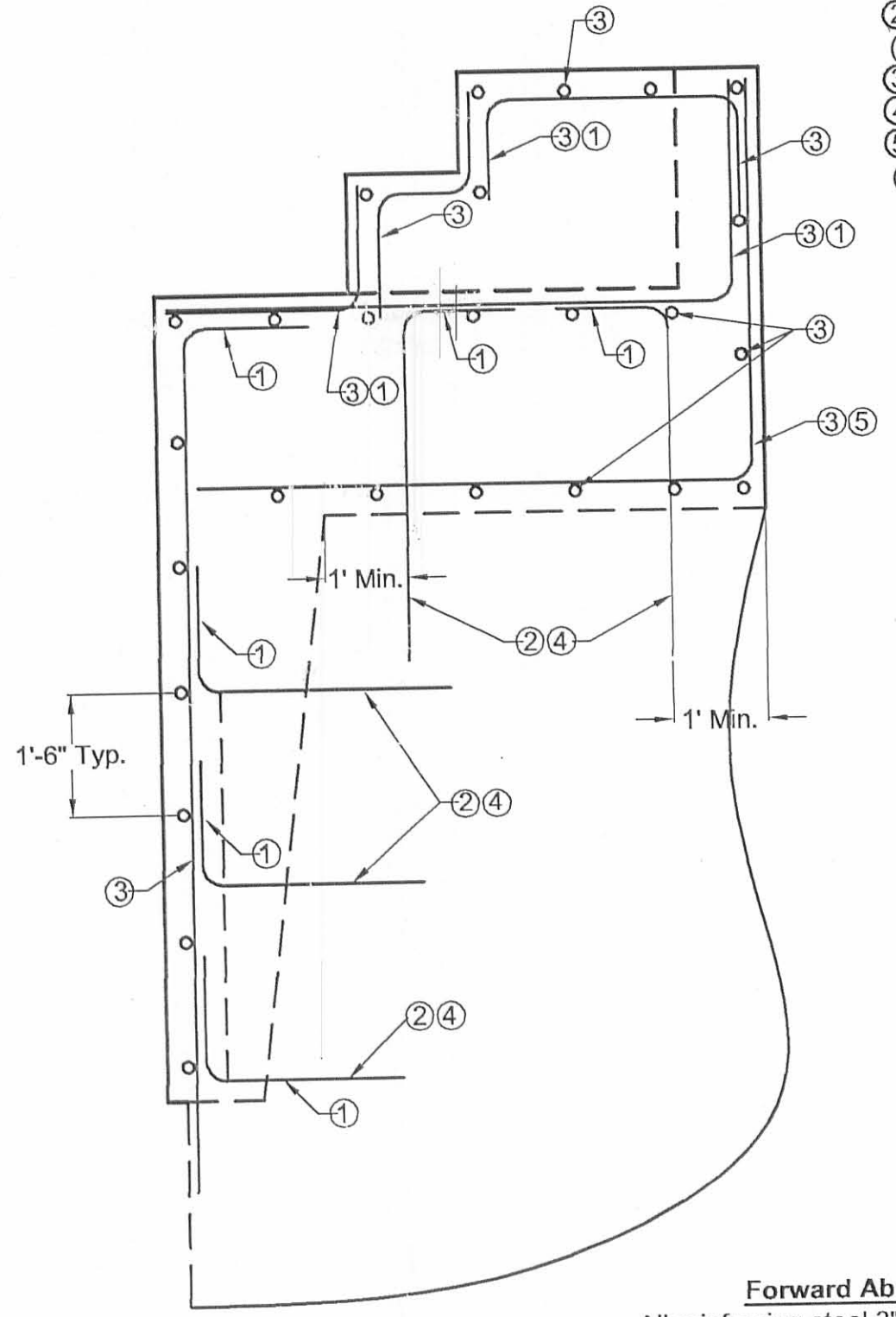
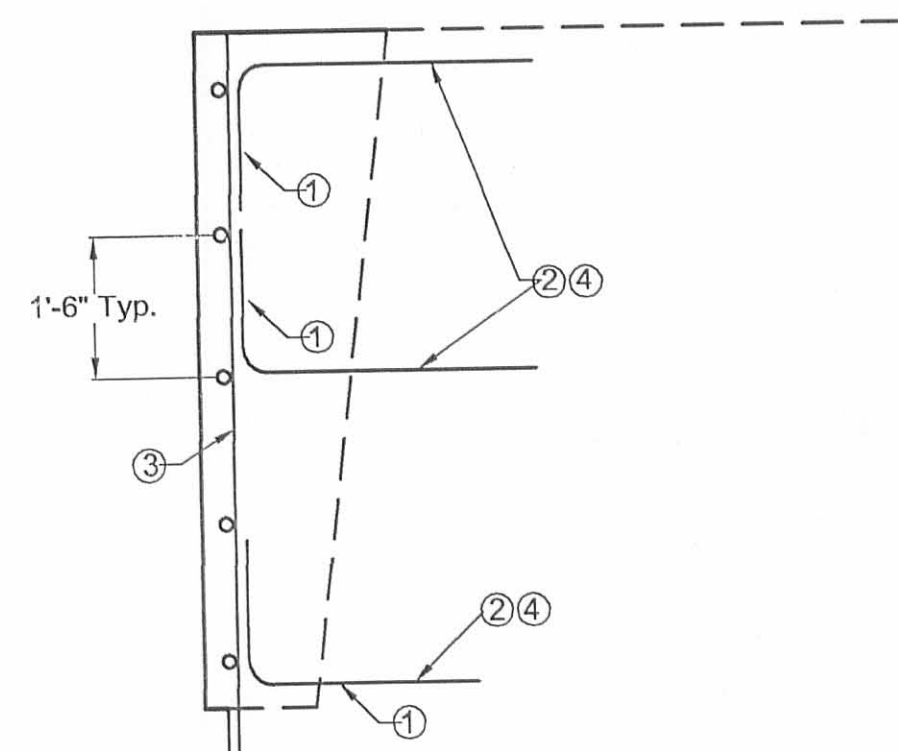
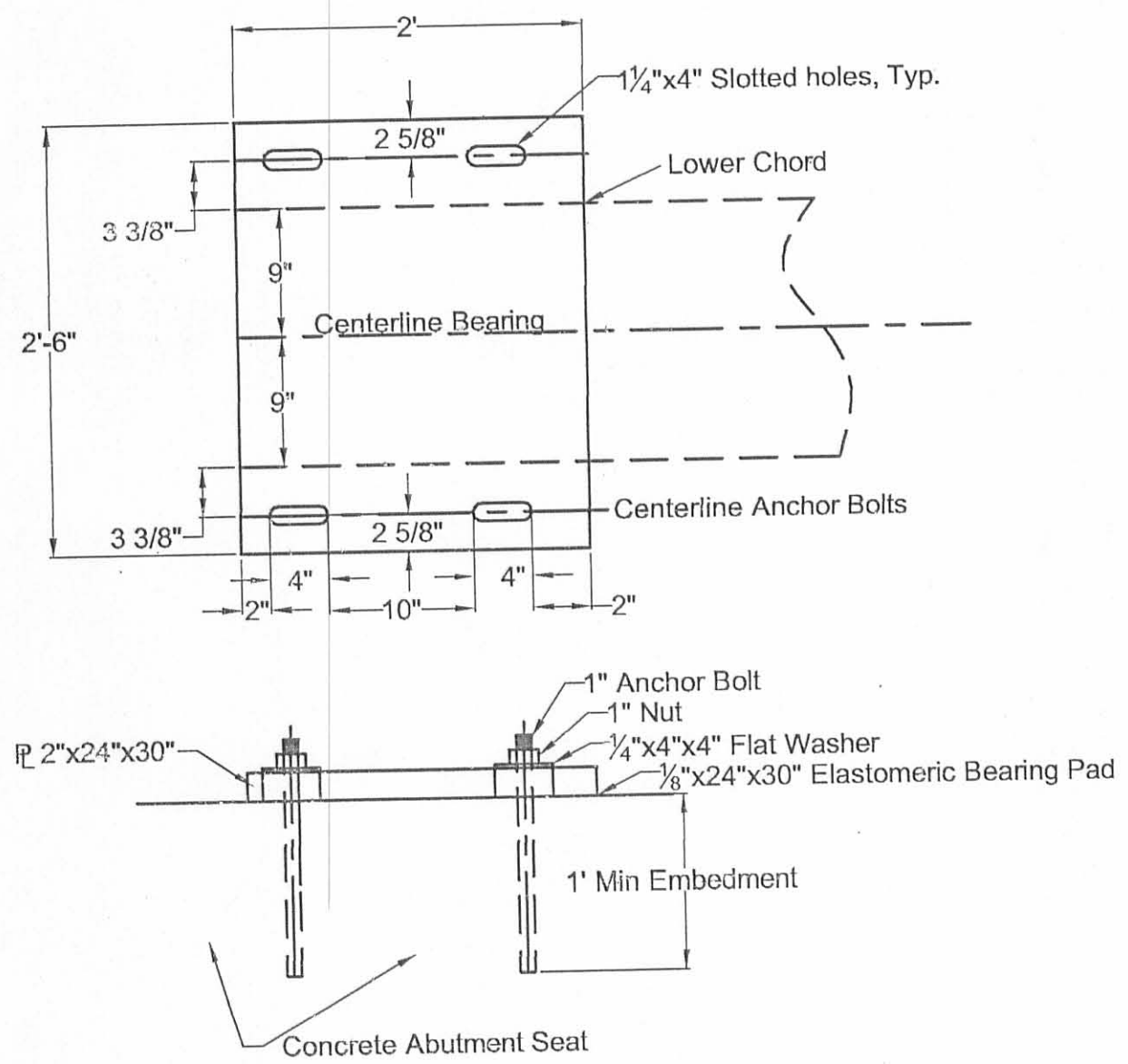
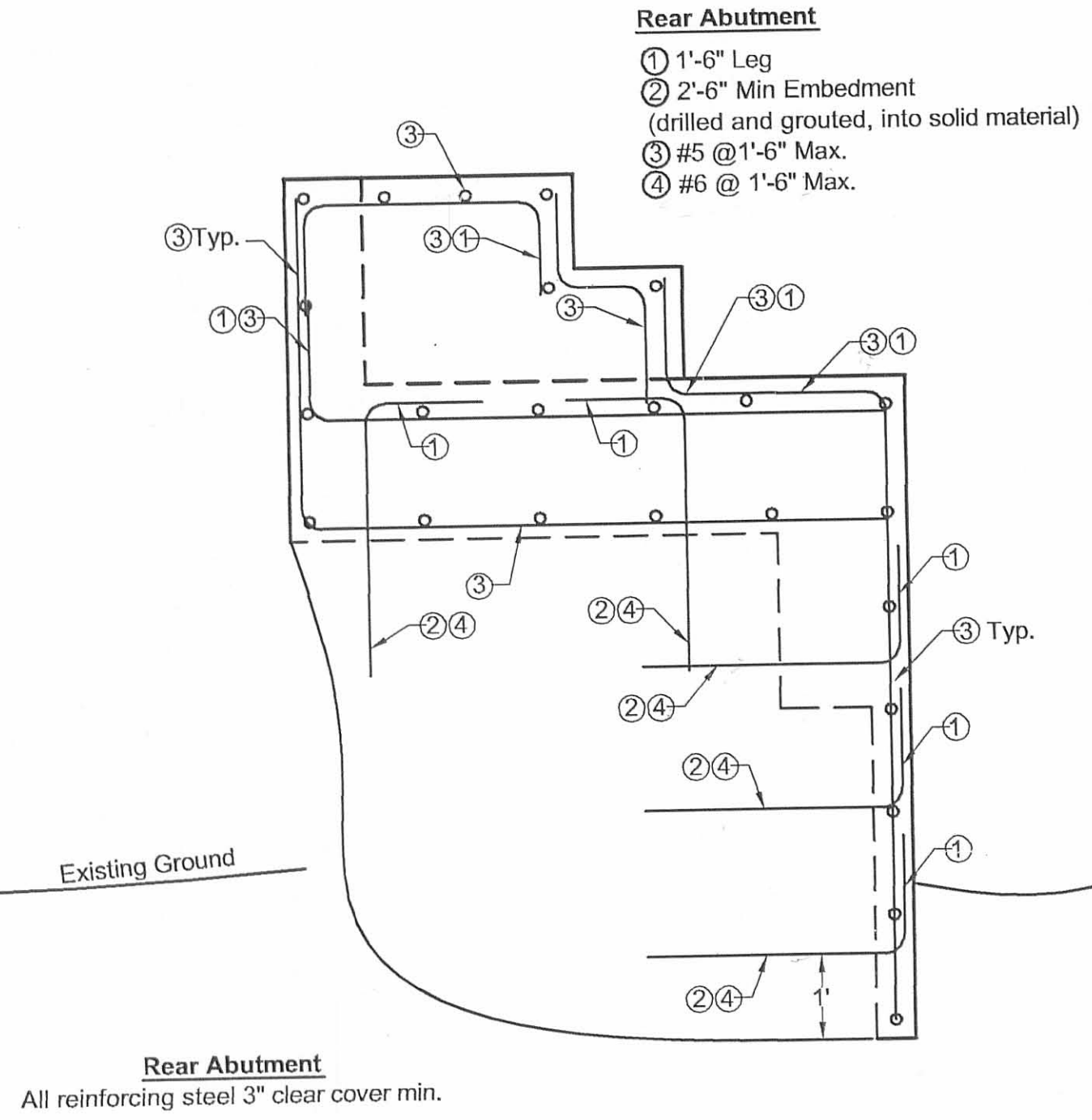
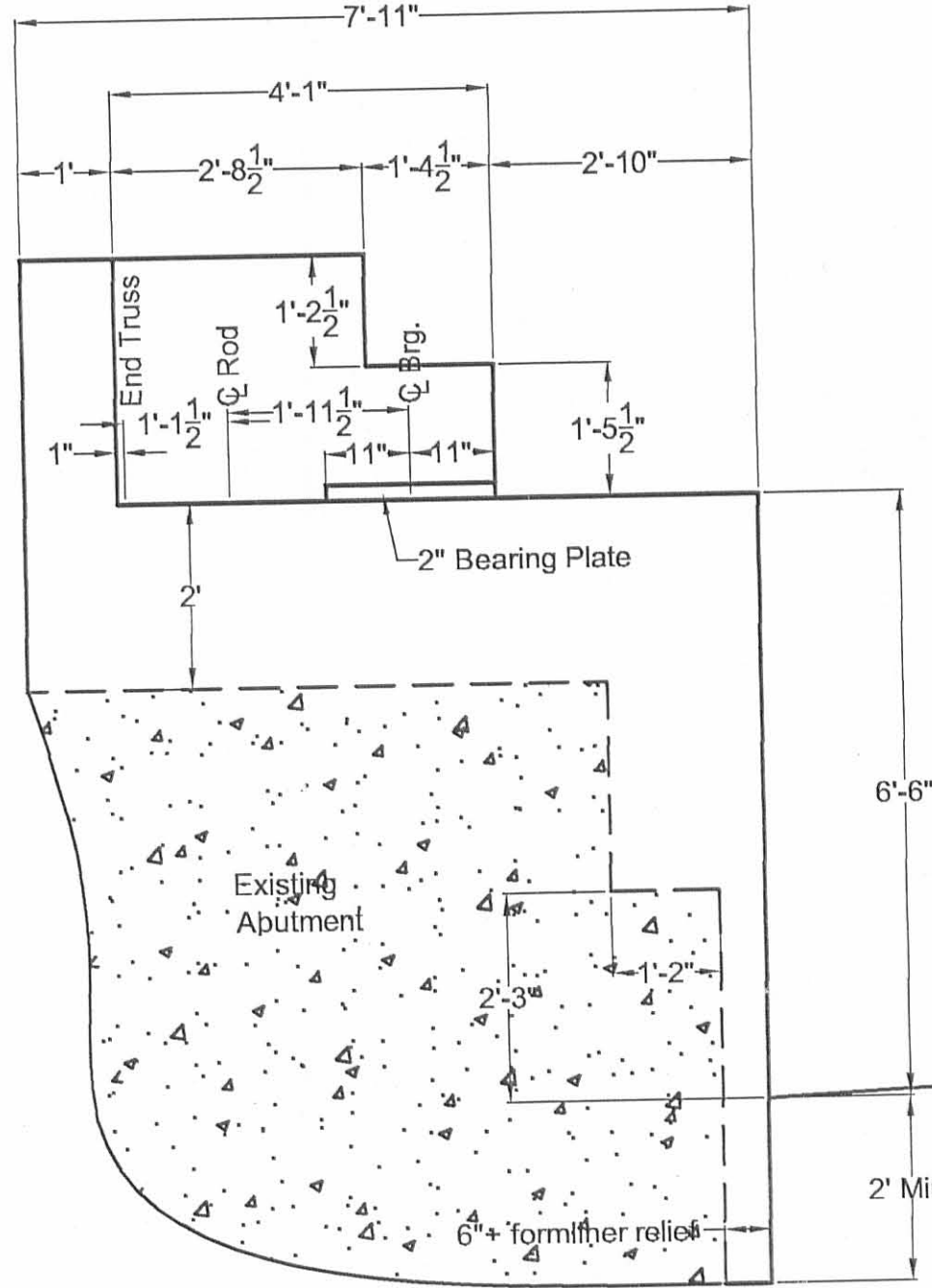
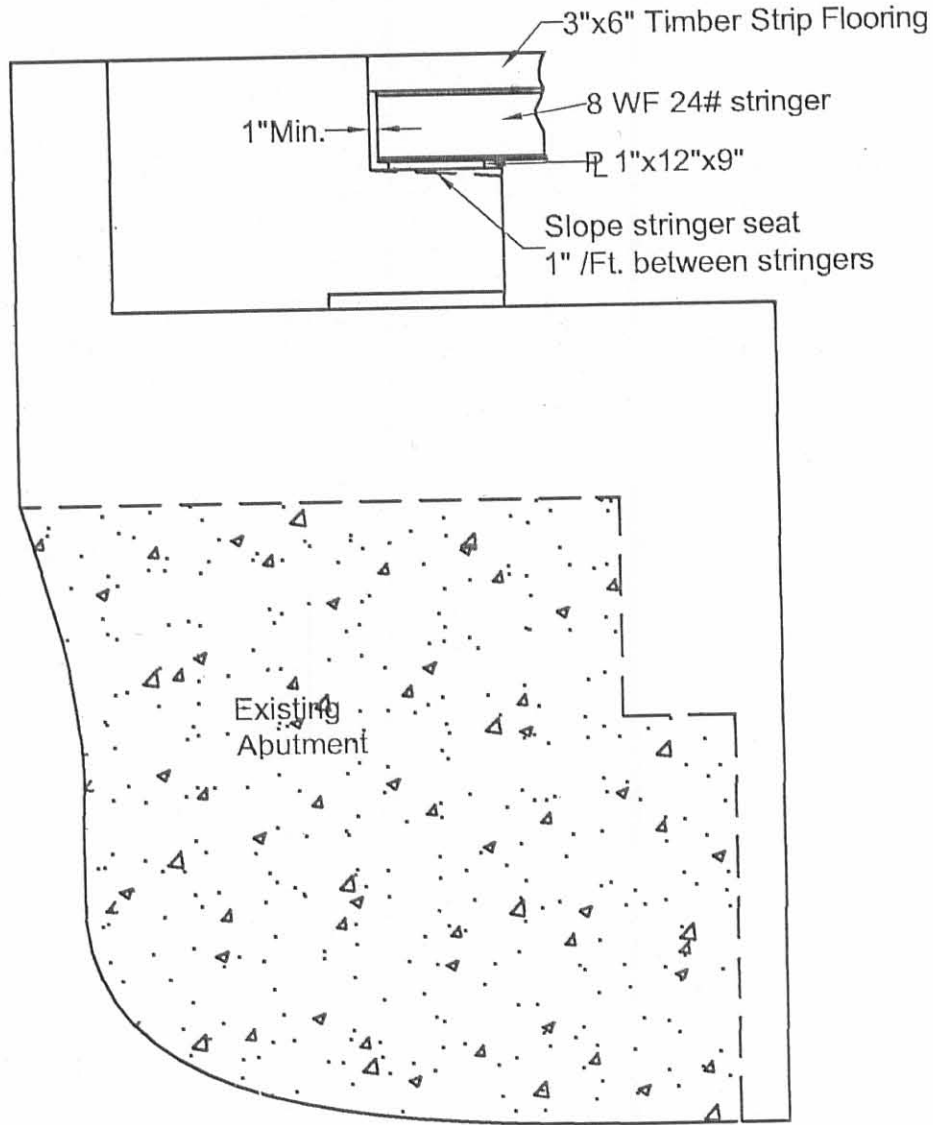
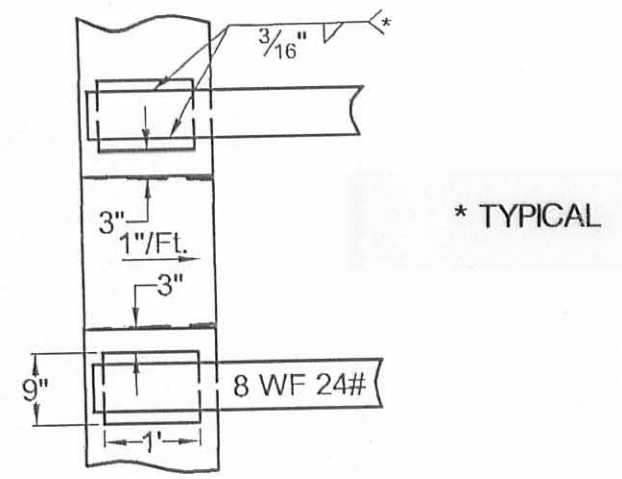


2 WORKING DAYS
 BEFORE YOU DIG
 CALL TOLL FREE 800-362-2764
 OHIO DIVISION OF HIGHWAYS

STANDARD DRAWINGS	
GR-1.1	GR-4.4
GR-1.2	
GR-2.1	
GR-3.4	
GR-4.3	

SUPPLEMENTAL SPECIFICATIONS	
815	
863	
910	

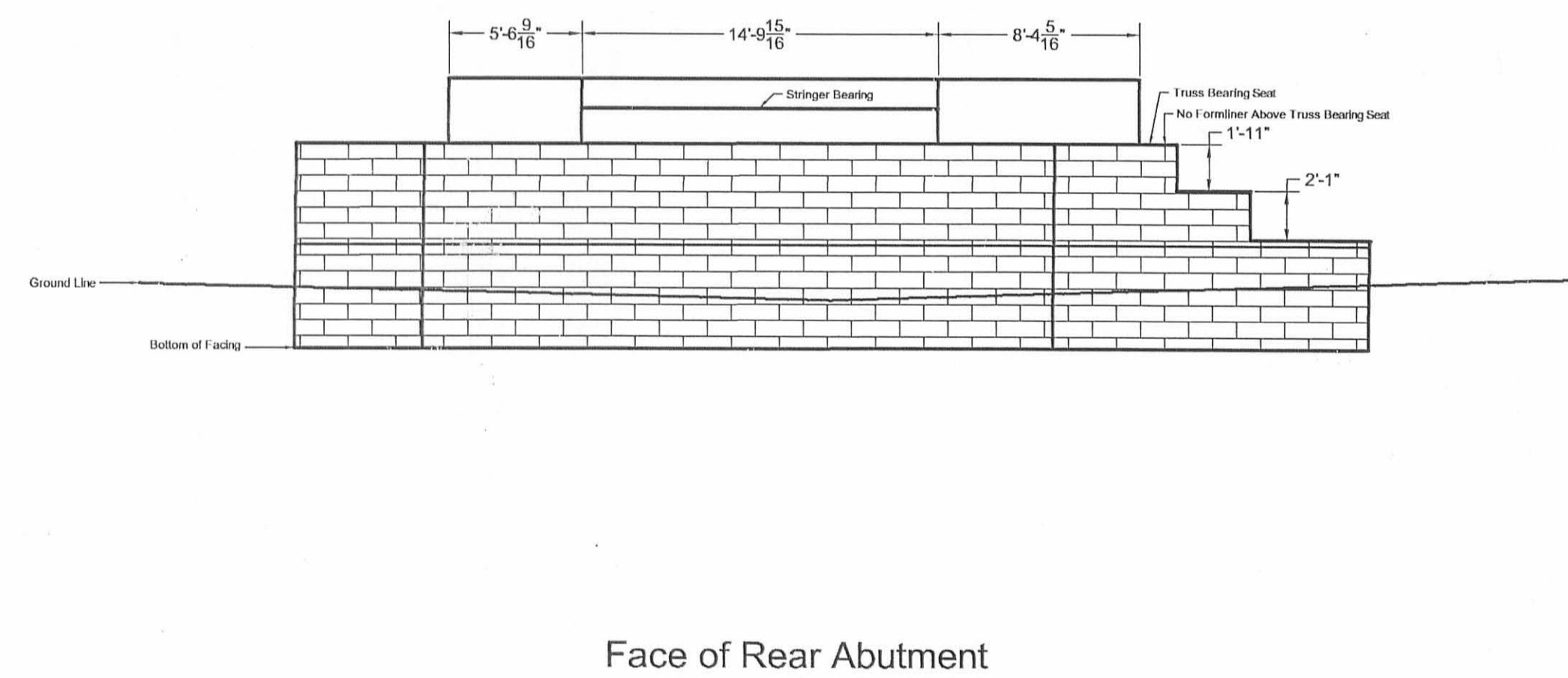
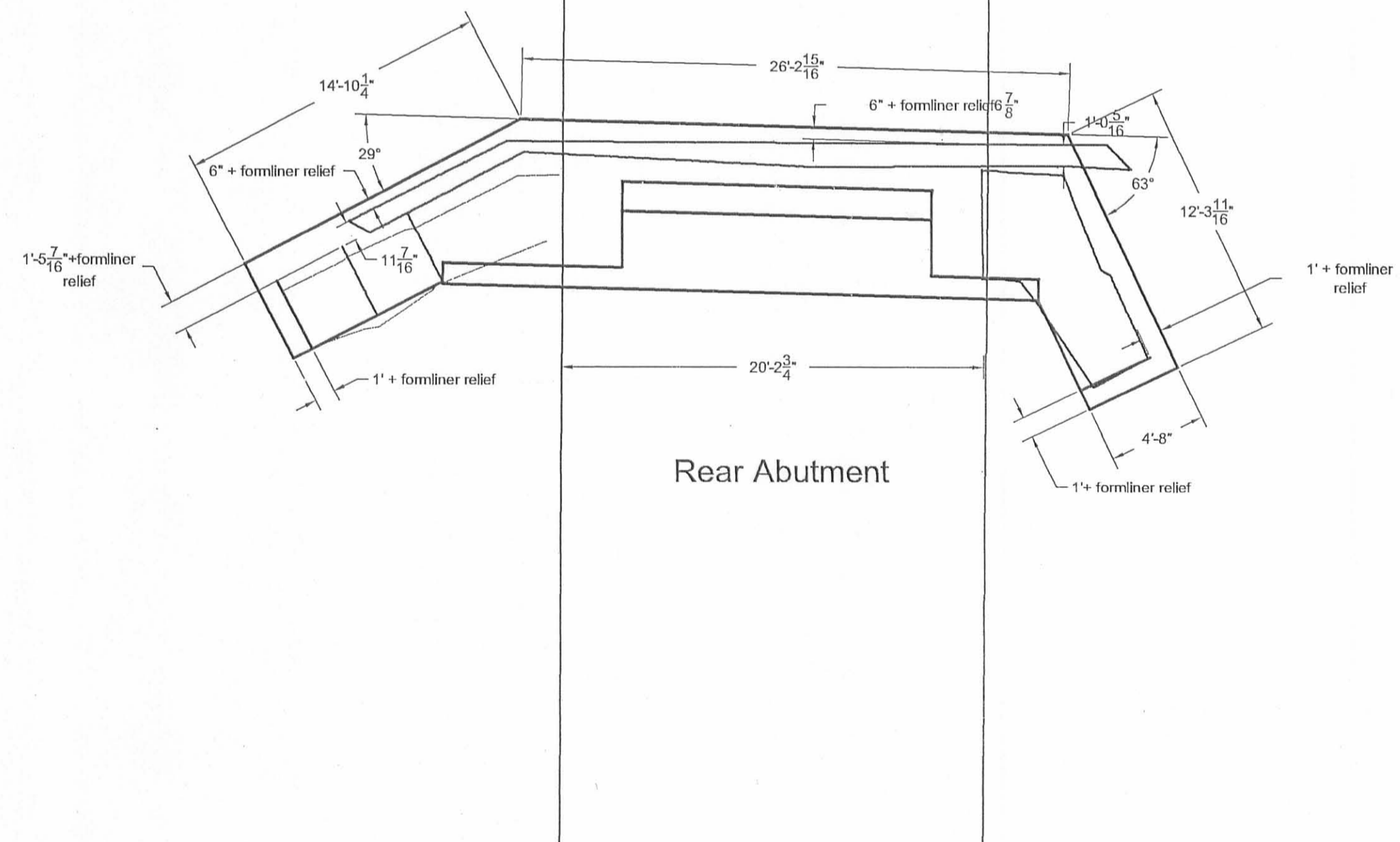
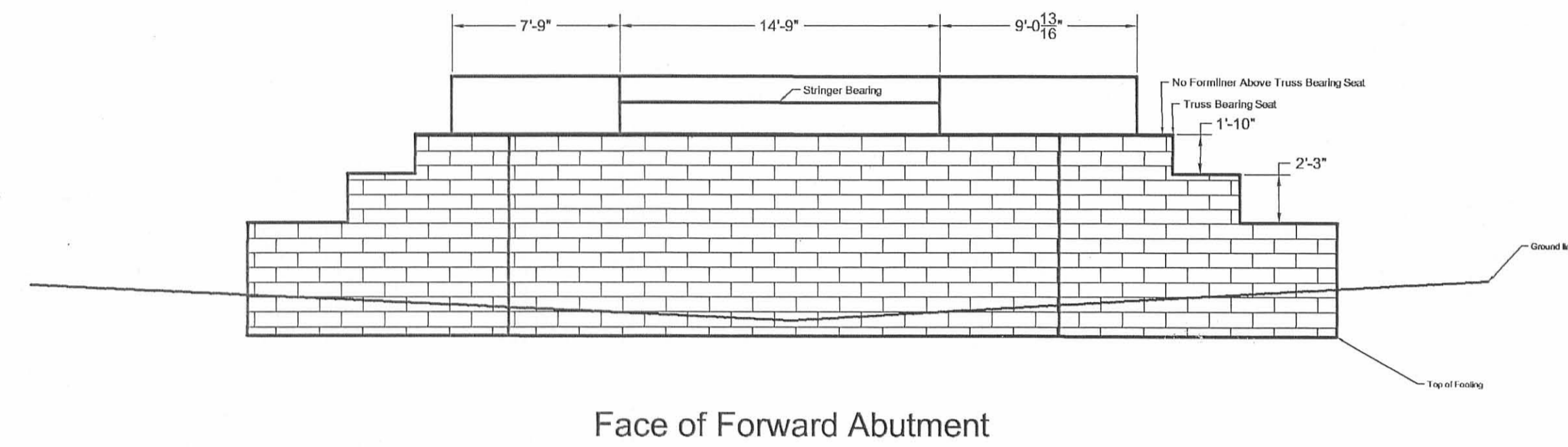
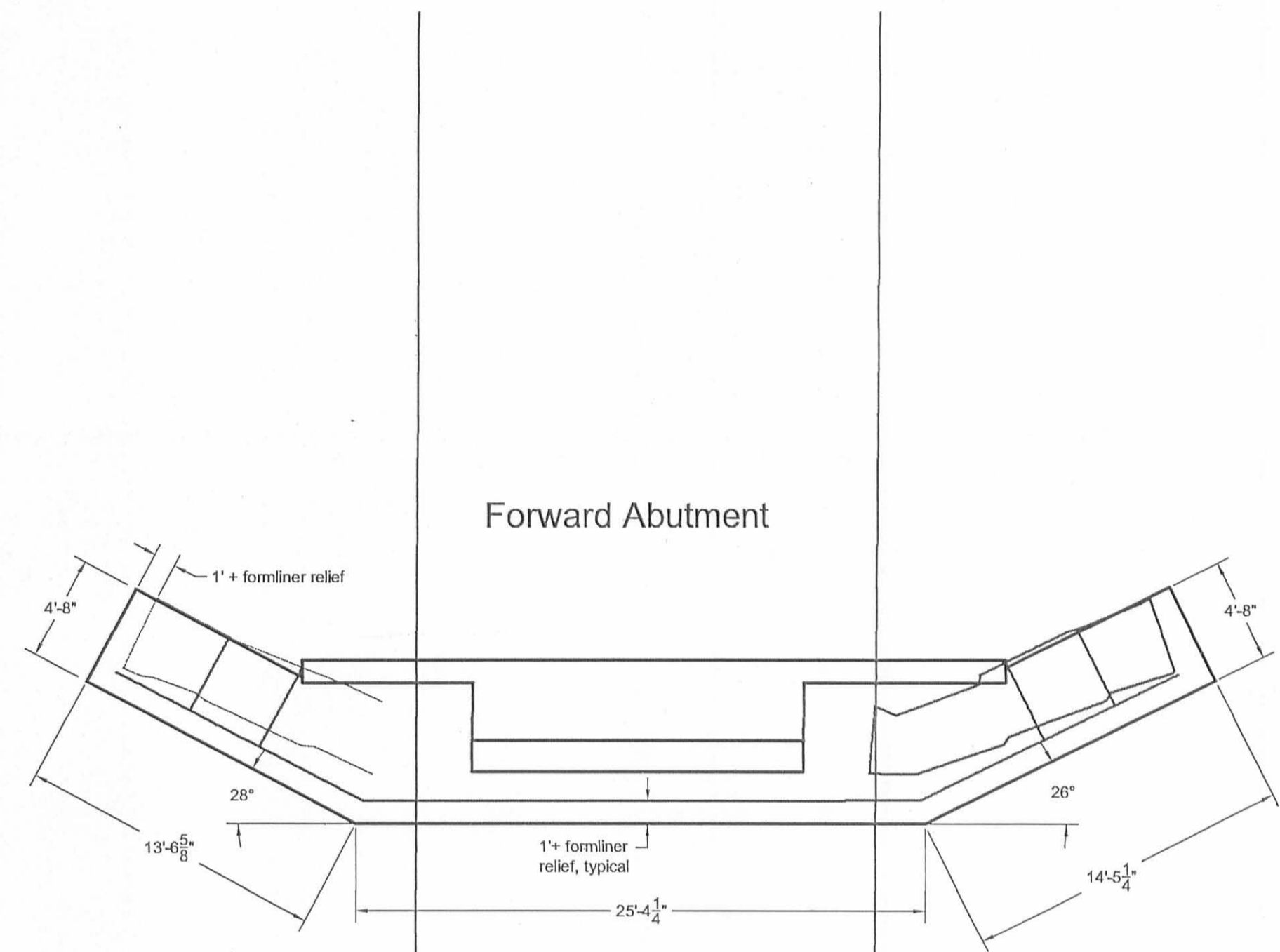
W/O # 2439
 Designed By: Scott C. Coleman P.E., P.S.
 Checked By: Jacquie Staller - Inspector
 DRAWN BY: JLG
 TITLE SHEET
 Bickham Covered Bridge 38-0.29
 Scott C. Coleman P.E., P.S.
 LOGAN COUNTY ENGINEER
 1/13

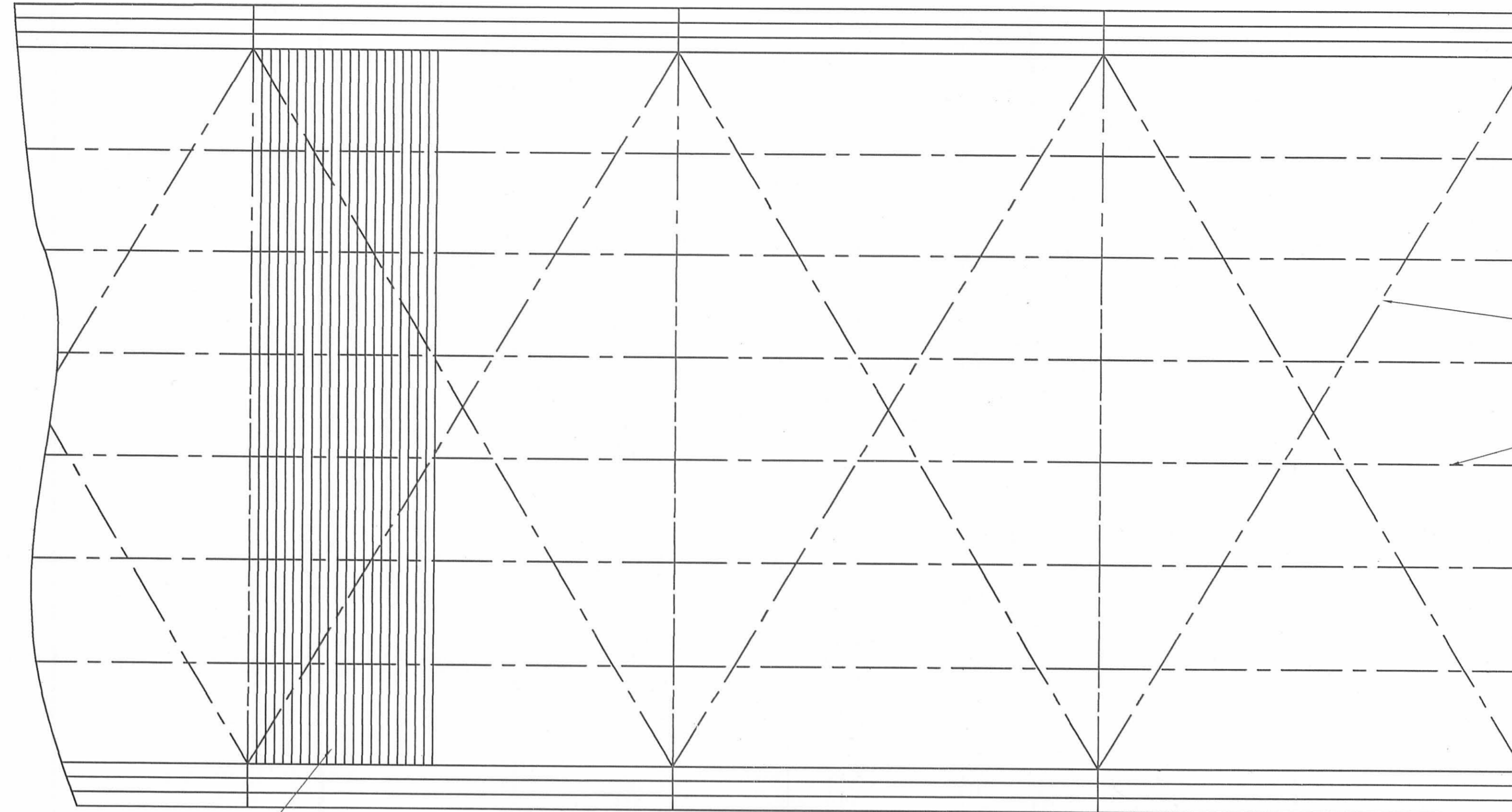


2 WEEKEND DAYS
 BEFORE YOU DIG
 CALL TOLL FREE 800-362-2764
 ONE OF THE LEADING PROVIDERS OF SERVICE

Scale 1/2" = 1'

W.O.# 2439
 Designed By: Scott C. Coleman P.E., P.S.
 Checked By: Jacquie Stalter - Inspector
 Drawn By: JLG
 Logan County Highway Dept.
 Engineer's Office
 Bickham Covered Bridge 38-0.29
 Abutment Details
 Scott C. Coleman P.E., P.S.
 Logan County Engineer
 10/3





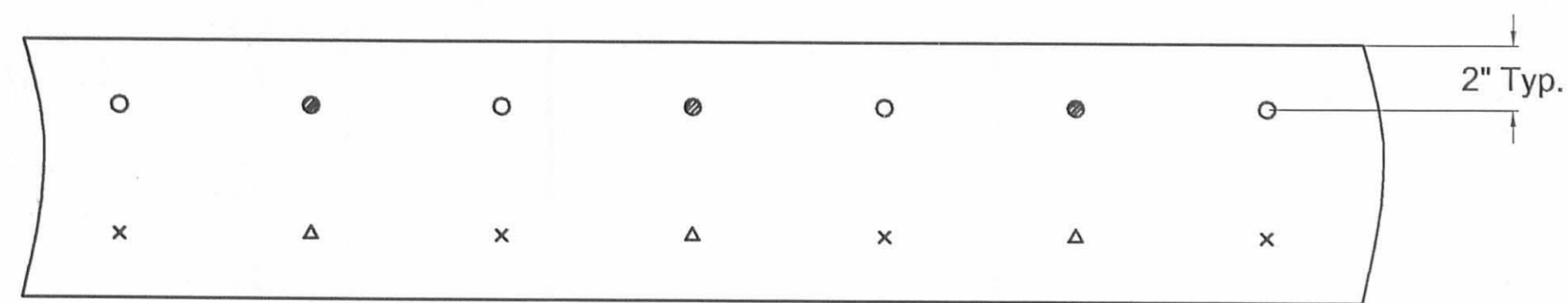
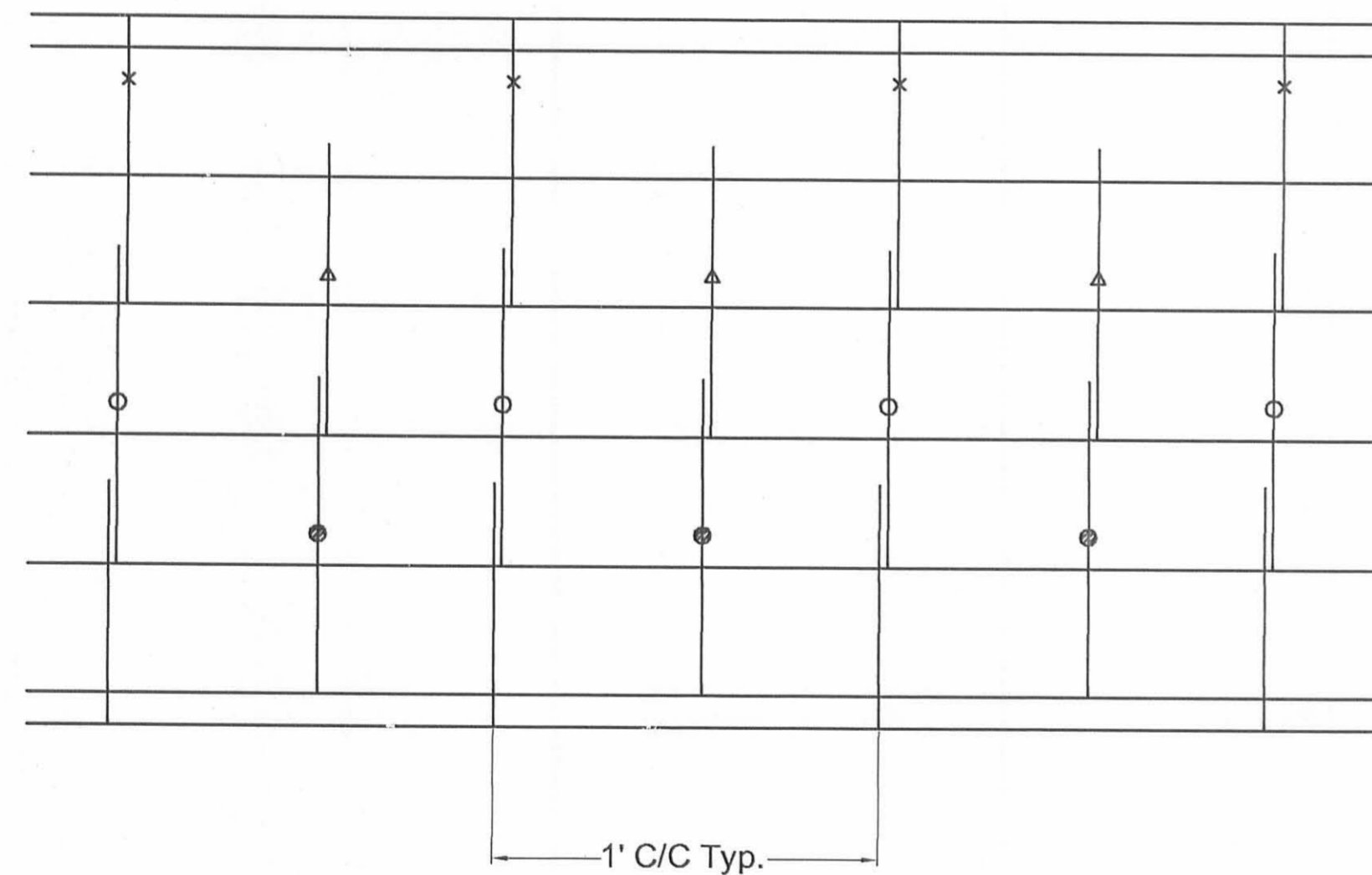
Existing 3"x4" Strip Floor to be Removed and replaced using Nominal 3"x6", Pressure Treated, Dense Structural 65 Southern Yellow Pine. (adjacent strips to be nailed together using 60d galvanized spikes at 12" o/c.)

PLAN VIEW
Existing Floor System
scale exaggerated to show detail

Centerline Existing Cross-Bracing to Remain (typ.)

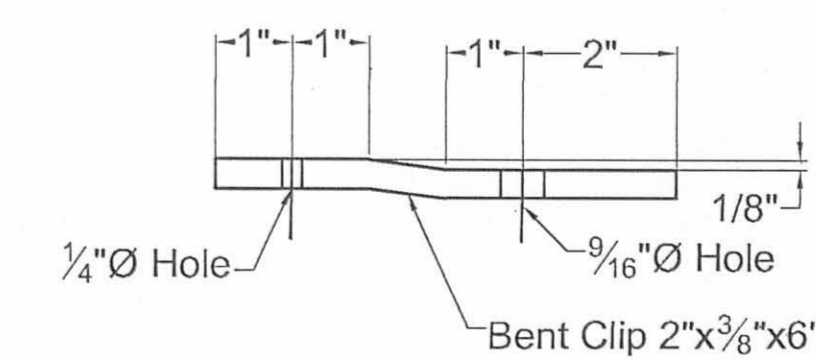
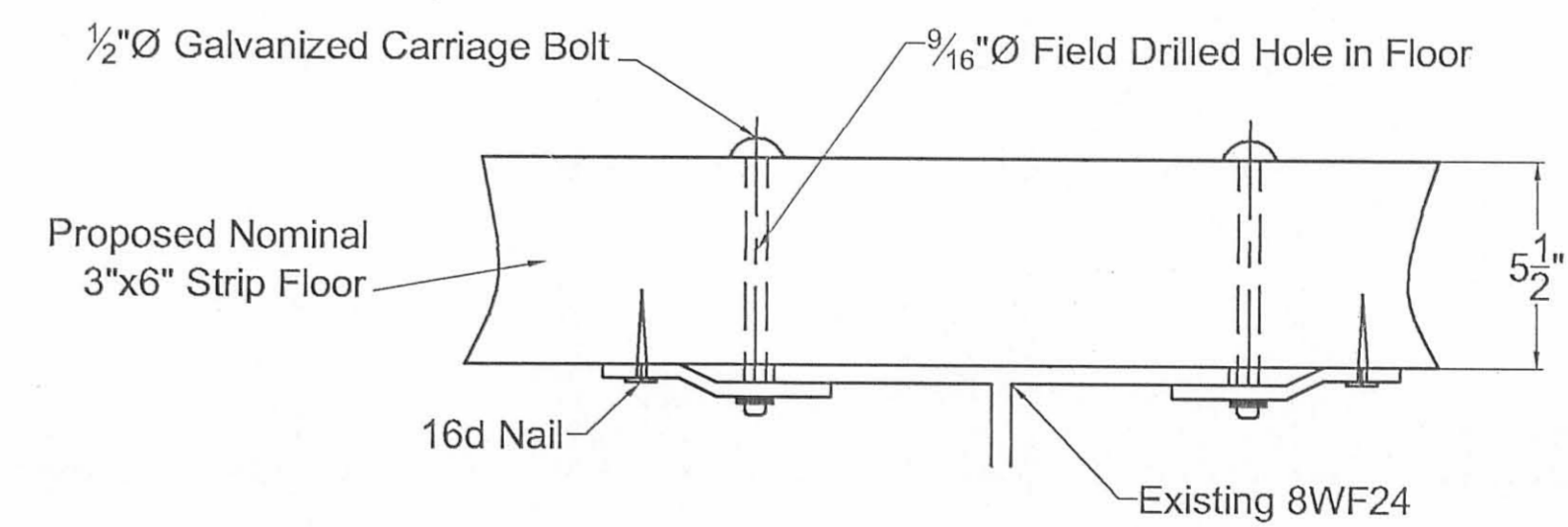
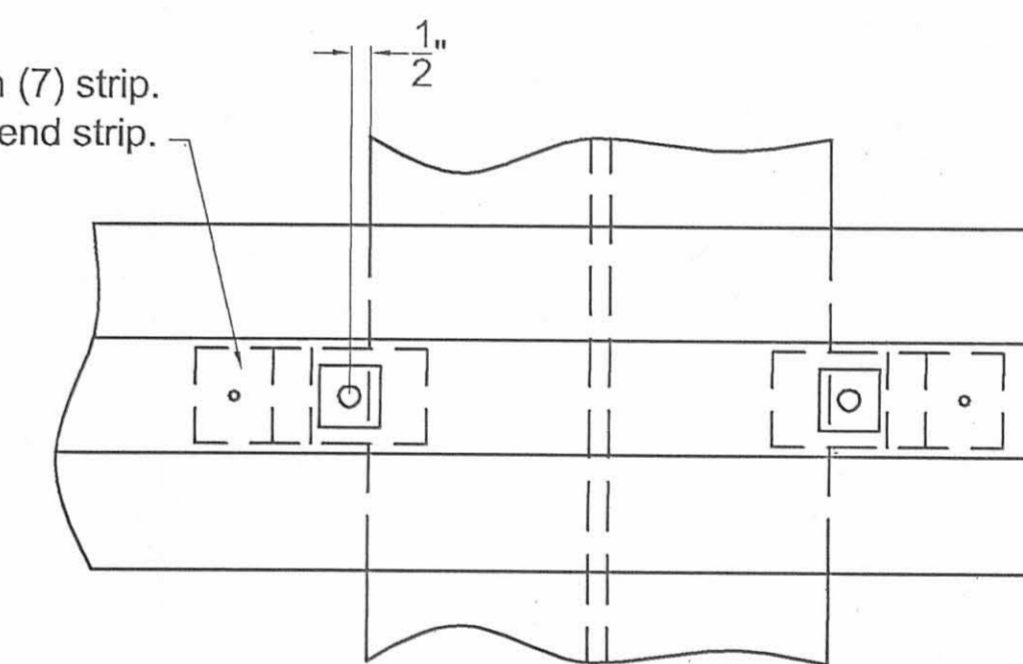
Centerline Existing 8WF24 Stringer to Remain (Typ.)

Centerline Existing 16WF40 Floorbeam to Remain (Typ.)



Stagger Pattern Plan and Elevation
(Proposed Strip Floor)
x o Δ = Nail Row Designations

Clips spaced at every seventh (7) strip.
Use one pair of clips at each beam for end strip.



"Deck Securing" S-Clip Detail

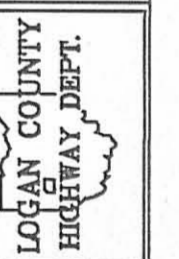
W.O.#
2439

Designed By:
Scott C. Coleman - P.E., P.S.
Checked By:
Jacque Stahler - Inspector

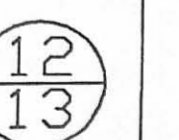
Drawn By:
JLJG

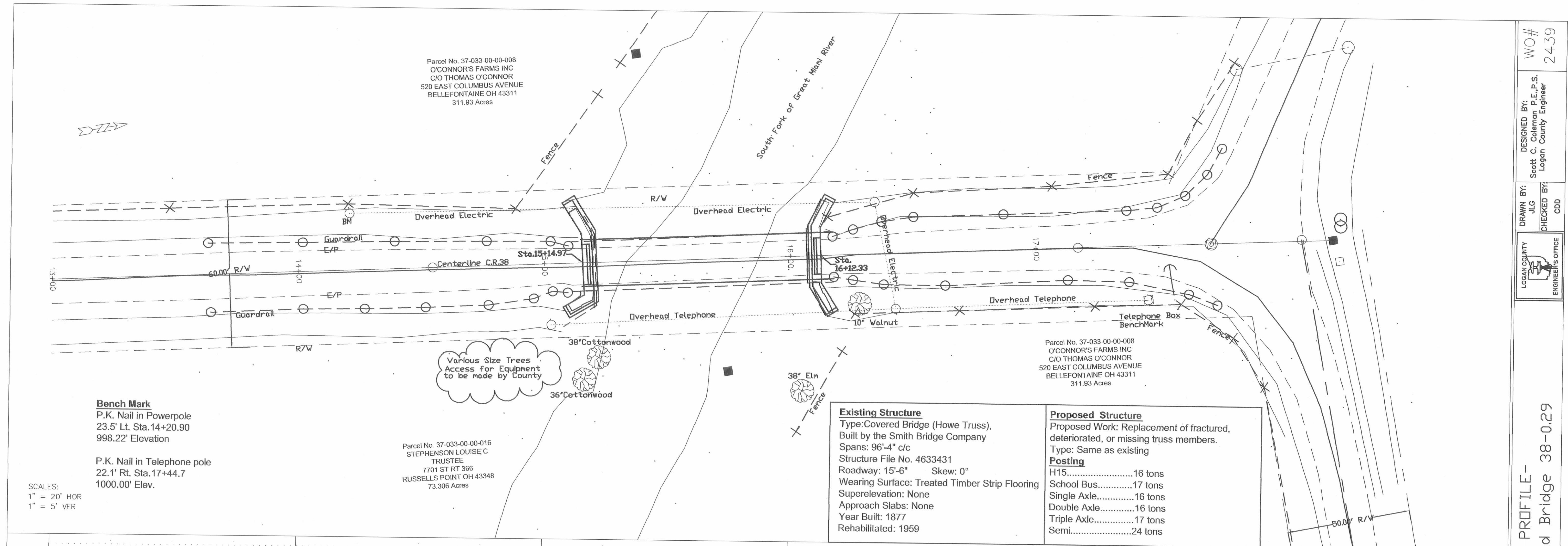


Bickham Covered Bridge 38-0.29
Floor System Plan and Details



Scott C. Coleman P.E., P.S.
Logan County Engineer



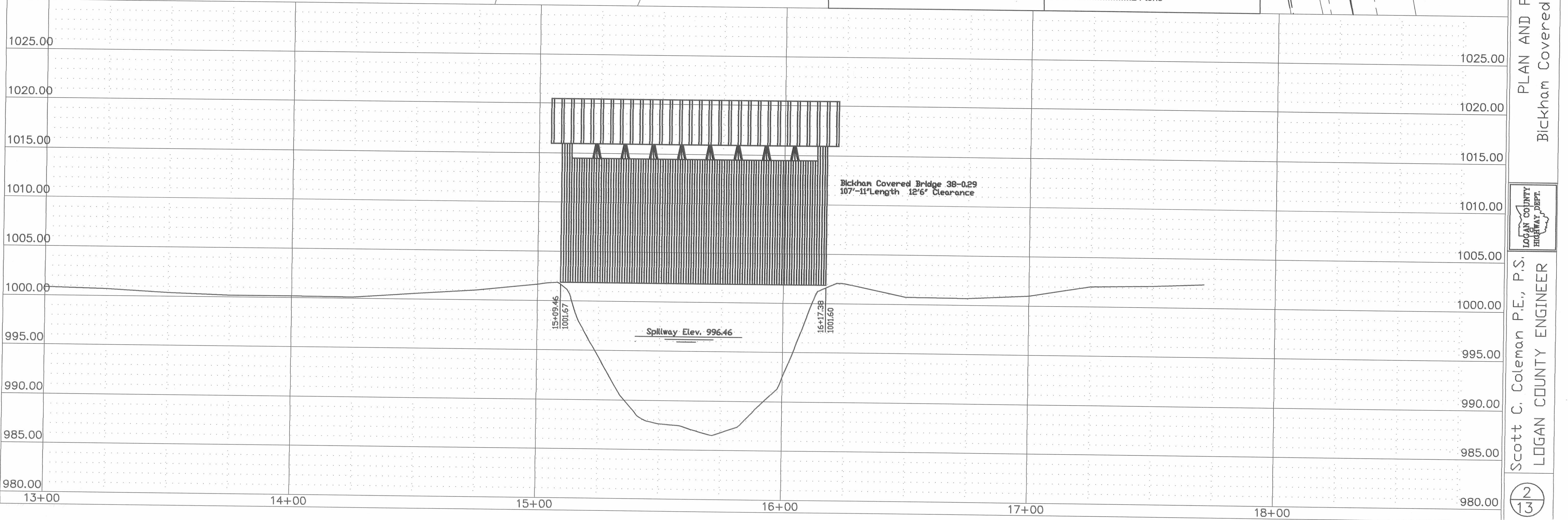


Bench Mark
P.K. Nail in Powerpole
23.5' Lt. Sta. 14+20.90
998.22' Elevation

P.K. Nail in Telephone pole
22.1' Rt. Sta. 17+44.7
1000.00' Elev.

SCALES:
1" = 20' HOR
1" = 5' VER

<p>Existing Structure Type: Covered Bridge (Howe Truss), Built by the Smith Bridge Company Spans: 96'-4" c/c Structure File No. 4633431 Roadway: 15'-6" Skew: 0° Wearing Surface: Treated Timber Strip Flooring Superelevation: None Approach Slabs: None Year Built: 1877 Rehabilitated: 1959</p>	<p>Proposed Structure Proposed Work: Replacement of fractured, deteriorated, or missing truss members. Type: Same as existing</p> <p>Posting H15.....16 tons School Bus.....17 tons Single Axle.....16 tons Double Axle.....16 tons Triple Axle.....17 tons Semi.....24 tons</p>
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LOGAN COUNTY HIGHWAY DEPT.

LOGAN COUNTY ENGINEER'S OFFICE

DESIGNED BY: Scott C. Coleman P.E., P.S. Logan County Engineer

DRAWN BY: JLG

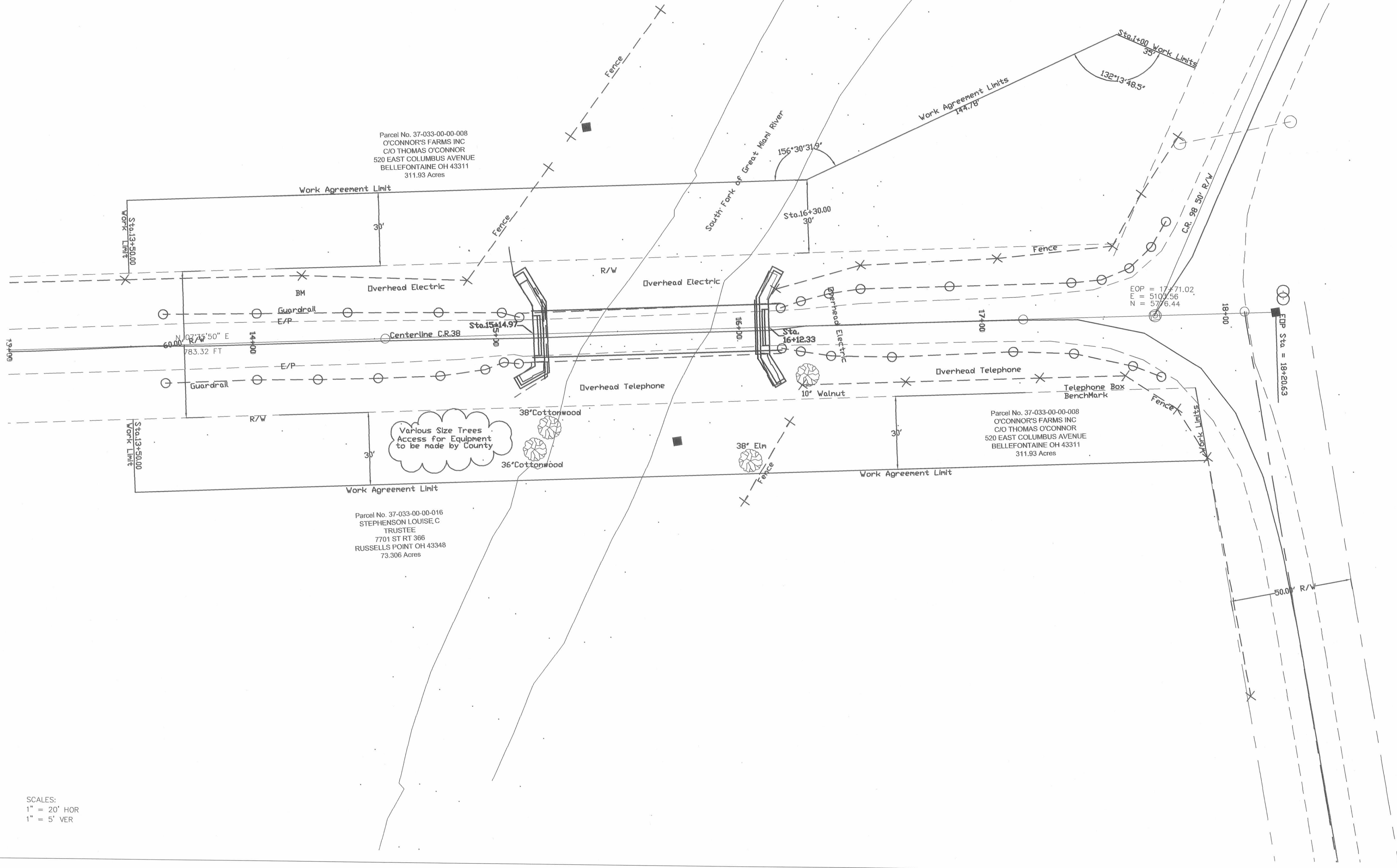
CHECKED BY: CDD

WO# 2439

PLAN AND PROFILE - Bickham Covered Bridge 38-029

Scott C. Coleman P.E., P.S.
LOGAN COUNTY ENGINEER

2/13



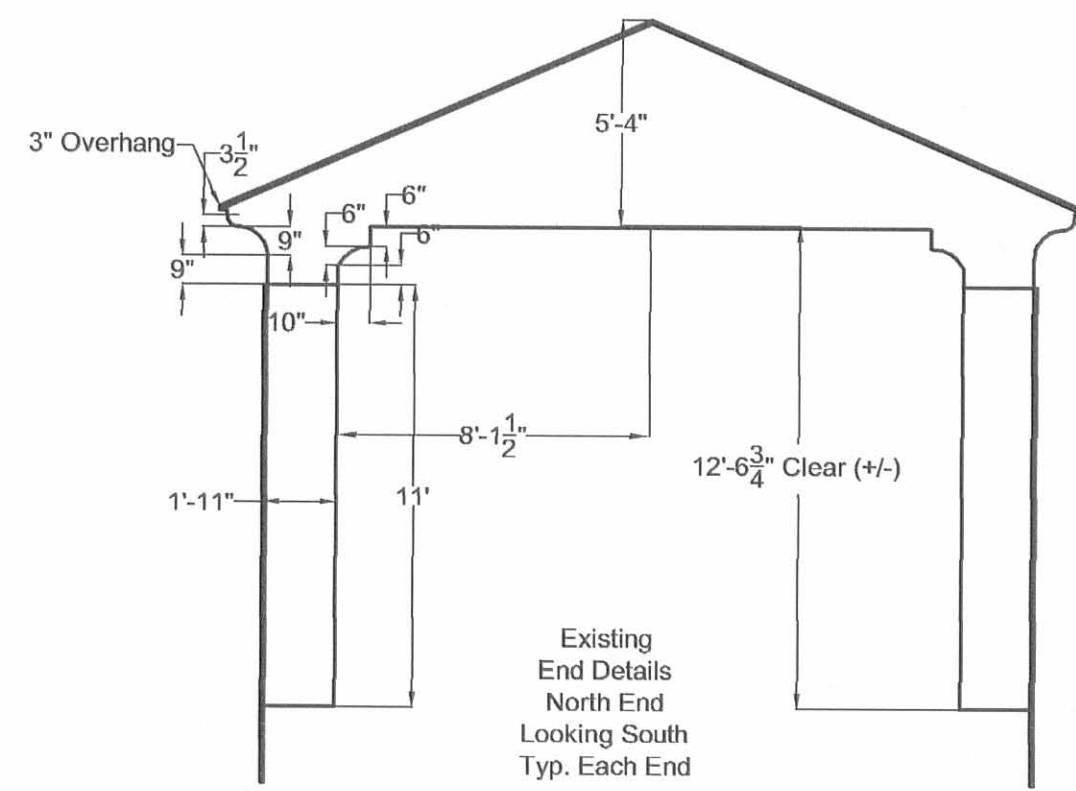
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 O'CONNOR'S FARMS INC
 C/O THOMAS O'CONNOR
 520 EAST COLUMBUS AVENUE
 BELLEFONTAINE OH 43311
 311.93 Acres

Parcel No. 37-033-00-00-016
 STEPHENSON LOUISE C
 TRUSTEE
 7701 ST RT 366
 RUSSELLS POINT OH 43348
 73.306 Acres

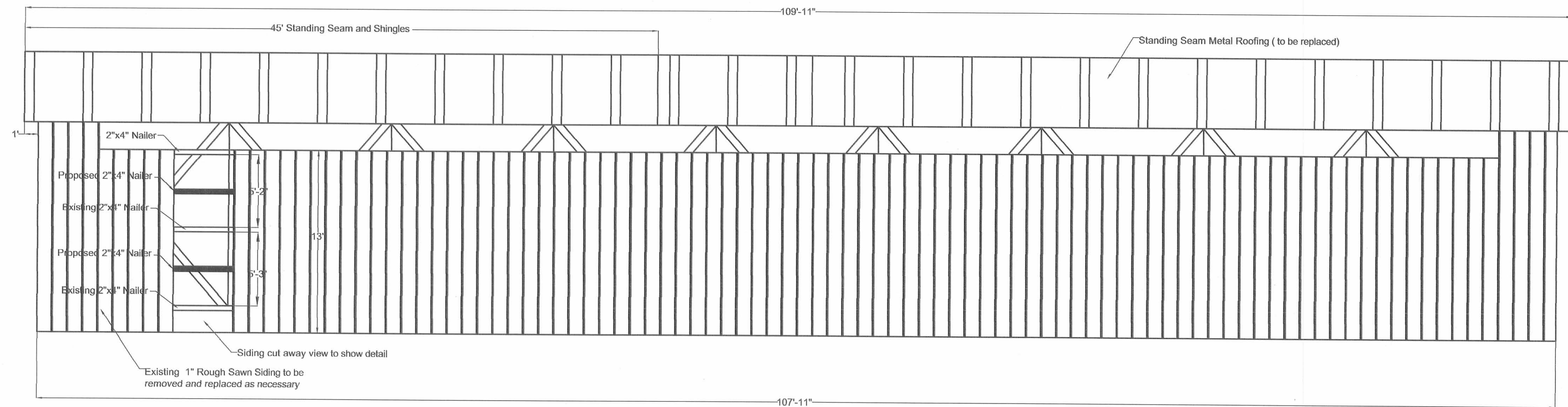
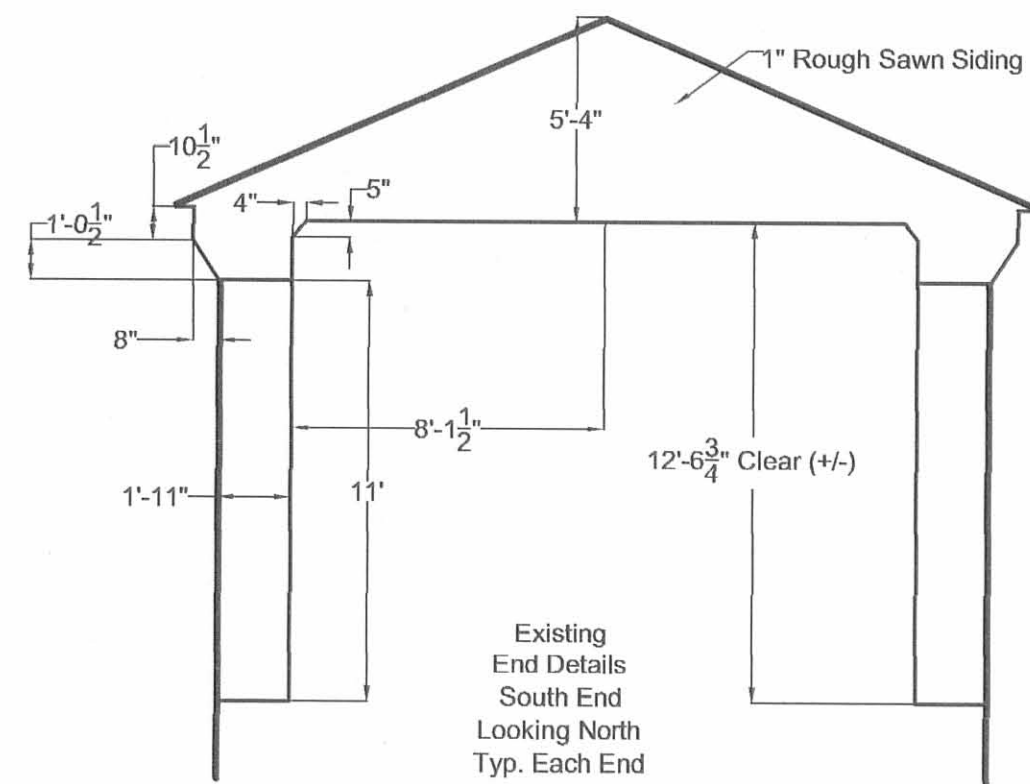
Parcel No. 37-033-00-00-008
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SCALES:
 1" = 20' HOR
 1" = 5' VER

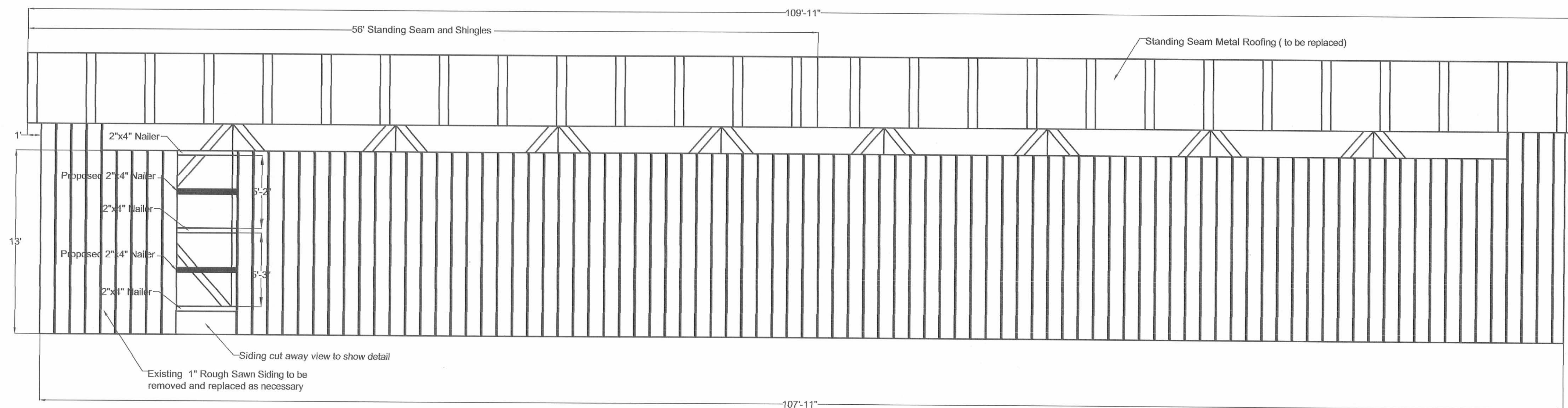
	DESIGNED BY: Scott C. Coleman Logan County Engineer	WO# 2439
	DRAWN BY: JLG	CHECKED BY: JLG
LOGAN COUNTY HIGHWAY DEPT. ENGINEER'S OFFICE		
Work Agreement Limit Detail Sheet Bickham Covered Bridge 38-0.29		
JAMES K. COX P.E., P.S. LOGAN COUNTY ENGINEER		



Finished Details to be Used for Both Ends

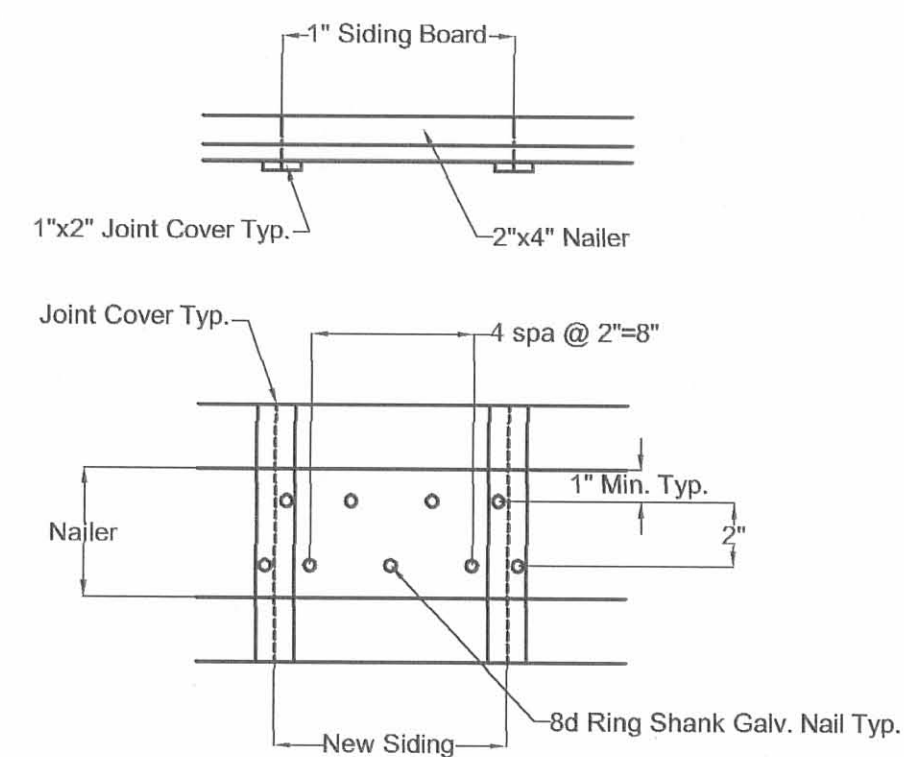


Existing West Side Elevation

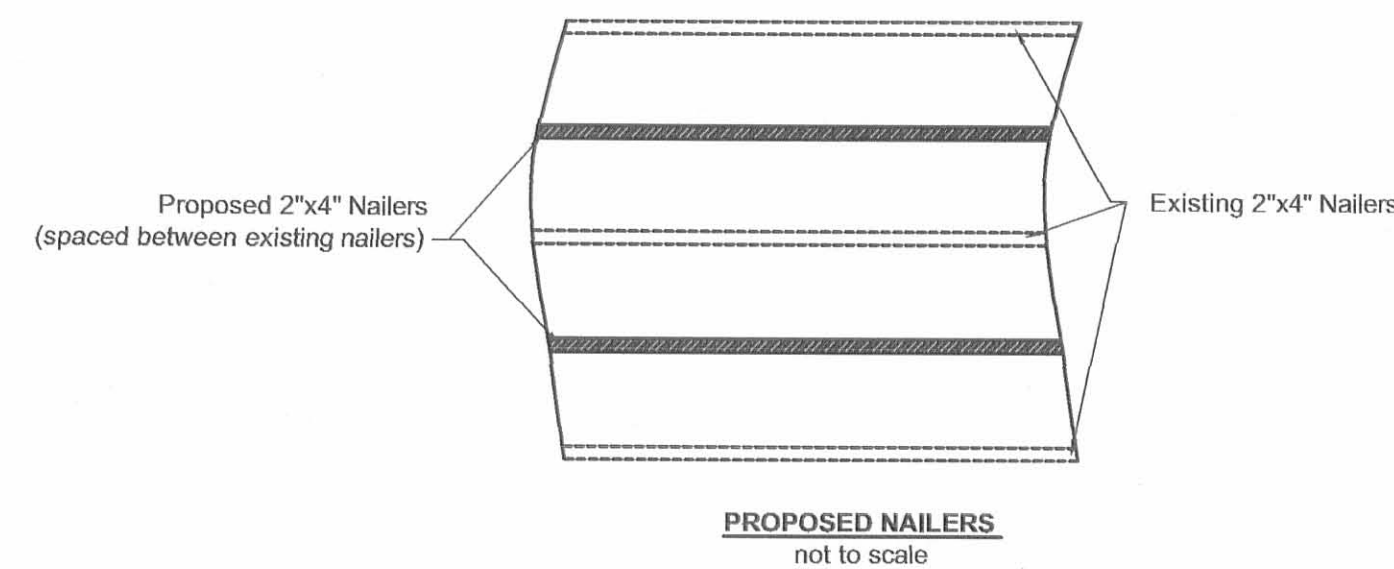


Existing West Side Elevation

Scale 1" = 5'



MINIMUM SIDING NAILING PATTERN
not to scale



DESIGN SPECIFICATIONS

This structure conforms to "Standard Specifications for Highway Bridges" adopted by the American Association of State Highway and Transportation Officials (AASHTO), 1996, including the 1999 interim specifications: the Ohio Department of Transportation (ODOT) Bridge Design Manual; and the 1997 Allowable Stress Design (ASD) National Design Specifications (NDS) for Wood Construction, with 1999 interim.

DESIGN DATA:

DESIGN LOADING H15
Recommended posting: 16 TONS GROSS VEHICLE WEIGHT

BRIDGE TIMBER Eastern White Pine, select structural; Southern Yellow Pine grade No. 1 or better may only be used if member dimensions are unavailable in Eastern White Pine; and Southern Yellow Pine, grade structural 65. All in accordance with the CMS 711.26 and/or as rated by the Northeastern Lumber Manufacturer's Association with four sound and square edges.

Allowable stresses are to be in accordance with the National Design Specification for Wood Construction where moisture content is assumed to be greater than 19 percent. These values are provided in Table A.

STRUCTURAL STEEL ASTM A36, YIELD STRENGTH 36,000 PSI.

REINFORCING STEEL ASTM A615, A616, or A617, Grade 60, unit stress 24,000 PSI. All reinforcing steel shall Galvanized.

CONCRETE Class C Concrete - compressive strength 4,000 PSI.

SUPPLEMENTAL SPECIFICATIONS

815 dated 05-30-96
863 dated 09-09-97
910 dated 04-21-97

SCOPE OF WORK:

The rehabilitation of the Bickham Bridge will include: The replacement of all fractured and deteriorated timber truss and floor system members, repair of the existing wood shingles, replacement of the metal roof and poplar siding, coating the interior of the structure with fire retardant, painting the structure, and other miscellaneous repairs as described in the plans or as directed by the Engineer.

The purpose of the work as detailed in these plans is to repair the structure while maintaining the historical integrity. The included details shall be adhered to so as to maintain the historic nature of the structure. Any miscellaneous additional work shall be constructed on the same manner as the existing bridge.

A planned work schedule shall be reported to the Engineer or his designee at least once a week.

There shall be no work within the stream at any time. The South Fork of the Miami River drains directly into Indian Lake; therefore, the contractor shall be required to make every effort possible to prevent contamination of the stream from the construction activity.

PLAN NOTE:

ENDANGERED SPECIES HABITAT

THIS PROJECT IS WITHIN THE KNOWN RANGE OF THE FEDERALLY ENDANGERED INDIANA BAT. INDIANA BAT HABITAT INCLUDES ANY LIVING OR STANDING DEAD TREE. ANY UNAVOIDABLE CUTTING OF SUCH TREES WILL BE PERFORMED ONLY BEFORE APRIL 15 OR AFTER SEPTEMBER 15 WHEN THE SPECIES WOULD NOT BE UTILIZING SUCH HABITAT.

CLEARING AND GRUBBING WILL BE KEPT AS MINIMAL AS POSSIBLE. NO CLEARING AND GRUBBING WILL BE PERMITTED OUTSIDE THE WORK LIMITS.

CONSTRUCTION SEQUENCE:

- 1. Construct temporary supports as necessary to support and raise the bridge (a minimum of 18" to allow for repairs and reconstruction of abutments
- 2. Remove all existing timber floor strips, while avoiding damage to remaining floor system.
- 3. Evenly jack the structure upward (minimum of 18520lf) from the temporary supports as well as the abutment locations to allow placement abutment caps.
- 4. Align trusses to be vertical.
- 5. Provide necessary temporary restraint and support to allow for the removal and replacement of all deteriorated or fractured timber and steel.
- 6. Remove and replace all deteriorated or fractured timber truss members, and replace all steel angle blocks.
- 7. Remove existing abutment bearings, non-destructively clean both the forward and rear abutment bearing surfaces, set reinforcement, and cast new concrete abutment caps and faces.
- 8. Install 1/8 inch preformed bearing pads and replace steel bearings as shown in the plans.
- 9. Realign all diagonal members as shown in the plans.
- 10. Retighten all vertical tension rod bolts and replace tension rods as designated in the plans.
- 11. Remove temporary supports and center lower chords onto new bearings.
- 12. Thread end panel tension connections into mechanical connectors at bearings.
- 13. Remove existing siding and metal roofing. Salvage and repair wooden shingles beneath metal roof.
- 14. Non-destructively clean the steel floor system and truss members.
- 15. Paint the existing floor system steel and steel rods.
- 16. Paint all timber members as specified in the plan notes.
- 17. Install new siding, metal roof, timber strip floor, and "deck-securing" S-clips and apply fire retardant.
- 18. Replace guardrail and spacer blocks.

SUPERVISOR QUALIFICATIONS:

The contractor shall obtain the services of a person or persons thoroughly knowledgeable in timber frame construction of historic structures. This shall include timber selection, fabrication, and installation. This person shall be known as the timber framer.

The timber framer shall be in charge of and be responsible for all repairs to the trusses and truss bracing (timber framing work). The timber framer shall be present at the job site at all times during the performance of this timber framing work. The timber framer need not be present during other activities.

The timber framer shall have a minimum of five years' experience in timber frame construction of historic structures.

The Engineer will approve or reject the contractor's timber framer within 10 calendar days following submission of the report of names and verifiable resume information. Work on the bridge structure shall not commence until the contractor receives written approval of its timber framer from the Engineer. In the event the contractor elects to substitute an alternate, verifiable resume information shall be submitted to the Engineer prior to that individual's performance of timber framing related work. The Engineer will approve or reject the contractor's proposed substitute within 10 calendar days. Failure to utilize the timber framer whose experience resumes were submitted and approved may be cause for suspension of that portion of the work. Delays caused by the contractor's failure to meet this requirement shall be the contractor's sole responsibility and shall not be cause for extension of time.

EXISTING STRUCTURE VERIFICATION:

The original design plans are not available for this structure. Details and dimensions shown on these plans pertaining to the existing structure have been obtained from field observations and measurements. Consequently, they are indicative of existing structure and proposed work, but they shall be considered tentative and approximate. The contractor is referred to CMS sections 102.05 and 105.02. Contract bid prices shall be based upon recognition of the uncertainties described above and upon prebid examination of the existing structure by the contractor. However, all project work shall be based upon actual details, dimensions, and skew angles, which have been verified by the contractor in the field. The timber sections shall not be ordered until the actual details, dimensions, elevations, and skew angles have been verified by the contractor in the field.

Any additional cost resulting from variations from plan dimensions is the responsibility of the contractor and no additional payment over the unit bid price will be awarded.

All dimensions shown are horizontal except as noted.

REPLACEMENT MEMBER DIMENSIONS:

Prior to the manufacturing of each replacement member, the contractor shall measure the existing structure to determine the required dimensions for the replacement member. The dimensions of the replacement members shall be recorded on the plans and submitted to the Engineer.

Replacement members shall be sized and manufactured to account for shrinkage.

WORK LIMITS:

All of the anticipated work falls within the existing right-of-way and the work agreement as shown on the plans. Any additional work area (including access for pile driving) and required permits, etc. needed by the contractor to perform the work as described shall be the responsibility of the contractor.

ITEM 201 - CLEARING AND GRUBBING:

Mineral clearing and grubbing shall be performed within the area designated on the plans and only to the extent necessary for movement of equipment to abutment, shoring and jacking locations and abutment facing. All trees shall be marked and approved by the Logan County Engineer before removal. All trees designated for removal must be removed between September 15th and April 15th.

ITEM 202 - PORTIONS OF STRUCTURE REMOVED, ABUTMENT SEAT REMOVAL, AS PER PLAN:

Abutment seat removal shall include the removal of abutment seats and loose or unstable portions of the existing stone abutment as necessary to pour the concrete facing and abutment caps as per plan.

Removal shall be conducted in a manner as to protect the unexcavated portions of the existing abutments from damage.

Existing stone wing wall caps shall be salvaged for reuse on the finished abutments. Payment for this work shall be included in Item 202 - Portions of Structure Removed, Abutment Seat Removal, as per plan.

Excavation for the pouring of abutment faces shall be paid for under lump sum pricing for Item 503 - Unclassified Excavation.

Payment will be made at lump sum price bid for Item 202 - Portions of Structure Removed, Abutment Seat Removal, as per plan.

ITEM 202 - PORTIONS OF STRUCTURE REMOVED, AS PER PLAN:

Portions of structure removed shall include the elements indicated in the plans and general notes and are not separately listed for payment. Items to be removed include all existing materials being replaced by new construction, and existing materials being reused in the new construction.

Existing timber members shall be carefully marked, cataloged, removed, disassembled, and protected until designated by the Engineer for reuse, disposal, or salvage. Members designated for salvage shall be transported to the County's work garage located on County Road 13.

Removal of members shall be limited to non-destructive methods.

As each member is removed, it shall be identified by non-destructive means. The Engineer shall approve the method of identification.

The contractor shall avoid damaging the remaining structure during the removal operations. Damage by the contractor's personnel or operations shall be repaired or replaced to the satisfaction of the Engineer at no expense to the owner.

Payment will be made at lump sum price bid for Item 202 - Portions of Structure Removed, as per plan.

ITEM 503 - UNCLASSIFIED EXCAVATION, AS PER PLAN:

This item consists of providing labor, equipment and material necessary for the excavation require for the construction of this project. This shall include, but not be limited to, excavation required for portions of structure removed, excavation required for the forming pour/porions 'g of concrete abutment faces, bearing seats and wing walls, excavation required for jacking and shoring of the structure, excavation required for removal of guardrail and excavation required by the contractor's work plans for the construction of this project.

Payment will be made at lump sum price bid for Item 503 - Unclassified Excavation, as per plan.

ITEM 511 - CLASS C CONCRETE, ABUTMENT, AS PER PLAN:

This item consists of providing all labor, equipment and material necessary for the construction of the forward and rear abutment caps. This shall include, but not be limited to, the necessary concrete, reinforcing steel, drilled and grouted holes, and anchor rods and couplings as shown on the abutment detail sheets. Drilled and grouted holes shall be embedded a minimum of 2-6" into the existing stone abutments, however, the contractor may be required to extend the anchor dowels to an additional depth in order to reach sound material. The contractor shall provide an additional amount of 200 linear feet of #5 galvanized rebar to for use as extra material to prevent delays in work due to reordering. Any cuts or damage to the galvanized material shall be repaired with a cold galvanizing compound prior to use.

Class C Concrete - compressive strength 4,000 PSI.

Concrete coloring - Coloring shall be accomplished by the use of limestone aggregate concrete as approved by the Engineer.

Form liners - Concrete facing shall be formed using concrete form liners matching the existing stone abutments, as approved by the Engineer. Special care shall be taken to adhere to the manufacturer's recommendations, regarding but not limited to storage, handling, UV light exposure, preconstruction mock ups, atmospheric and concrete curing temperatures, release agents, concrete placement, and cleanliness. One type of liner shall be used throughout the job to provide a uniform appearance.

The drilled and grouted holes shall be in accordance with CMS 510.

Payment will be made at the contract bid price for cubic yard of concrete for Item 511 - Class C Concrete, Abutment, as per plan.

ITEM 516 - JACKING AND TEMPORARY SUPPORT OF SUPERSTRUCTURE, AS PER PLAN:

Jacking and temporary support of the existing structure is needed in order to raise the structure, align trusses to be vertical, replace truss members and bearings, construct abutment modifications, and install elastomeric pads on abutments. Allowance for a minimum of 18" of jacking shall be provided in order to allow adequate space for abutment forming and finish work.

This item will consist of providing all labor, equipment and materials necessary to align the truss planes to be vertical, raise the structure, temporarily support the structure during the repair operation, and to lower the structure after the repairs have been made.

Prior to performing any work on the bridge, the contractor shall submit for approval by the Engineer a work plan including sequence of operations and details of temporary supports. Temporary support details shall include construction drawings and truss member stress calculations designed and stamped by a Professional Engineer, licensed in the State of Ohio. Approval of this work plan from the Engineer shall be obtained prior to proceeding with the work.

Payment will be made at lump sum price bid for Item 516 - Jacking and Temporary Support of Superstructure, as per plan.

ITEM 517 - BRIDGE RAILING, DEEP BEAM:

All timber materials used to repair the upper and lower chords, vertical and diagonal members of the truss, shall be rough cut, select structural Eastern White Pine, with 4 sound and square edges; Southern Yellow Pine No. 1 (or better) may only be used if member dimensions are unavailable in Eastern White Pine.

Timber used to replace the siding and nailers shall be No.2 or better yellow poplar.

Timber used to replace the strip floor shall be pressure treated dense structural 65 southern yellow pine.

All other timber used for repairs on this bridge shall be rough sawn Eastern White Pine (select structural) or Southern Yellow Pine No. 1 (or better) having 4 sound and square edges.

All timber and lumber used on this project shall be graded in accordance with ODOT CMS 711.26. The timber may also be graded under the rules of the Northeastern Lumber Manufacturer's Association.

ITEM 521 - BRIDGE TIMBER, MISC.: POPLAR SIDING:

This item shall consist of providing all labor, equipment and materials necessary to install the siding on both sides and both ends of the bridge as required, and to install additional nailing boards.

All siding shall be replaced with 1" thick by 13" long planks and 1" thick by 2" wide joint covers, both of rough-cut poplar. The joint covers shall be routed edges to match the existing joint covers or as approved by the Engineer. Existing siding deemed reusable by the Engineer may be non-destructively cleaned and reused. Left and right fascia siding shall be attached to the three existing nailing boards, as well as the two new nailing boards using 8d ring shank galvanized nails and using a minimum attachment pattern as shown in the plans.

Nailing Boards: Nailing boards are the horizontal stringers fastened to the outside of the vertical truss members. They provide a means of fastening timber siding to the structure. The existing boards that are deteriorated shall be replaced with nailing boards of similar size at the same location. Two additional nailing board rows, of similar size as the existing three rows of boards, shall be attached to the structure. They shall be centered between the existing rows, and attached in a similar fashion as the existing nailers using 16d ring shank galvanized nails.

The material to be used for this item shall be rough sawn yellow poplar having four sound and square edges, and a grade of No. 2 or better. Bark shall be limited to 3/4" in width and 6" - 8" in length.

Portal ends shall be constructed to match the existing details of the North portal.

Payment for nailing boards and joint covers shall be included in the contract unit price per square foot of siding for Item 521 - Bridge Timber, Misc.: Poplar Siding.

Payment will be made at the contract unit price per square foot of siding for Item 521 - Bridge Timber, Misc.: Poplar Siding.

ITEM 521 - BRIDGE TIMBER, MISC.: TRUSSES:

This item consists of providing all labor, equipment and materials necessary to replace fractured or deteriorated truss members including lower and upper chord members, and post verticals, diagonals, splice blocks, spacer blocks, and wooden pegs necessary to fill holes. The members to be replaced are those identified within these plans. Each member to be replaced shall be thoroughly measured and all dimensions reproduced in the new member.

Timber used truss members shall be select structural grade Eastern White Pine; Southern Yellow Pine No. 1 (or better) may only be used if member dimensions are unavailable in Eastern White Pine.

Structural timber to be used for repair of the trusses shall be in accordance with ODOT CMS 711.26 except that the timber is not required to be air-dried or kiln dried. The timber may also be graded under the rules of the Northeastern Lumber Manufacturer's Association.

Following rough sawing and before installation of the members into the bridge, the timbers shall be stored in both the lumberyard and at the project site, so that drying of the members will be maximized. This will include stacking the timber to maximize the flow of air, and providing waterproof cover.

Where practicable, existing bolts shall be reused. Any new bolts shall be sized to match existing and shall be galvanized. The use of threaded rod in place of bolts will not be permitted.

Payment will be made at the contract unit price per thousand board foot of timber for Item 521 - Bridge Timber, Misc.: Trusses. Item 606

ITEM 521 - 6" STRIP FLOOR:

This item consists of providing all labor, equipment and materials necessary to install new strip flooring. All strips shall be replaced with nominal 3x6 pressure treated dense structural 65 southern yellow pine (Fb=1600psi, F=1050psi, Fv=110psi Fc(perpendicular)=440psi, Fc=1000psi, E=1800ksi) or lumber with higher design values in all categories.

Strips shall be free of any checks, splits or shakes. The strips are to be secured to the stringers using new galvanized "deck-securing" S-clips and painted with fire retardant after placement. Each strip shall be nailed to the adjacent strip with 60d galvanized spikes at 12" centers. Prior to installing spikes, each strip shall be firmly seated on top of the stringers.

All galvanized "deck securing" S-clips shall be new and shall be galvanized in accordance with ODOT CMS 711.02.

Payment for all S-clips and hardware shall be included in the contract unit price per square foot of strip floor for Item 521 - 6" Strip Floor.

Payment will be made at the contract unit price per square foot of strip floor for Item 521 - 6" Strip Floor.

ITEM 521 - BRIDGE TIMBER, MISC.: ADDITIONAL:

This project involves the rehabilitation of the historic Bickham Timber Covered Truss Bridge through the repair or replacement of damaged, deteriorated, or otherwise unsuitable members.

Efforts will be made to reuse original bridge members, but those that are found to be unsuitable will be replaced with new members, in order to produce a sound and reliable rehabilitated bridge.

A preliminary assessment of the fitness of members for their reuse in the rehabilitated bridge has been made of the existing bridge, as it stands. A complete and accurate tabulation is not possible because some members are unaccessible or hidden.

The Engineer shall examine all of the original members as soon as possible after they have been taken apart in order to determine the fitness of each member, and begin fabricating the needed replacement members.

A quantity of 1.00 thousand board feet of rough-cut, select structural grade Eastern White Pine or Southern Yellow Pine No. 1 (or better) shall be provided; Southern Yellow Pine No. 1 (or better) may only be used if member dimensions are unavailable in Eastern White Pine. This timber shall be used at the direction of the Engineer for the repair of additional truss members.

This quantity shall also include (as incidental) the labor and materials necessary for the replacement of deteriorated bolts or other connections not already identified in these plans. The Contractor or Engineer shall identify these bolts through the disassembly of the existing bridge.

Payment will be made at the contract unit price per thousand board foot of timber for Item 521 - Bridge Timber, Misc.: Additional.

ITEM 521 - BRIDGE TIMBER, MISC.: REUSED:

This project involves the rehabilitation of the historic Bickham Timber Covered Truss Bridge through the repair or replacement of damaged, deteriorated, or otherwise unsuitable members. Efforts will be made to reuse original bridge members where available.

This quantity shall include the labor for sizing and installation of reused timber and materials necessary for the replacement of deteriorated bolts or other connections not already identified in these plans.

Payment will be made at the contract unit price per thousand board foot of timber for Item 521 - Bridge Timber, Misc.: Reused.

ITEM 606 - GUARDRAIL REPLACEMENT, AS PER PLAN:

This item consists of providing all labor, equipment and materials necessary for the removal and replacement with new galvanized guardrail. Existing guardrail shall be removed/ed from the bridge without damaging any parts of the bridge that are not called out to be replaced and delivered to the Logan County Highway garage, located at 1991 CR 13, for salvage. In the event that members of the bridge or portions of guard/ed rail to be salvaged are damaged, they shall be replaced in kind at no additional cost to the owner.

Payment will be made at the contract unit price per linear foot of guardrail for Item 606 - Guardrail Replaced, as per plan.

TIMBER MATERIAL SPECIFICATIONS:

All timber materials used to repair the upper and lower chords, vertical and diagonal members of the truss, shall be rough cut, select structural Eastern White Pine, with 4 sound and square edges; Southern Yellow Pine No. 1 (or better) may only be used if member dimensions are unavailable in Eastern White Pine.

Timber used to replace the siding and nailers shall be No.2 or better yellow poplar.

Timber used to replace the strip floor shall be pressure treated dense structural 65 southern yellow pine.

All other timber used for repairs on this bridge shall be rough sawn Eastern White Pine (select structural) or Southern Yellow Pine No. 1 (or better) having 4 sound and square edges.

All timber and lumber used on this project shall be graded in accordance with ODOT CMS 711.26. The timber may also be graded under the rules of the Northeastern Lumber Manufacturer's Association.

ITEM 514 - FIELD PAINTING, MISC.: WOOD STAIN:

This item consists of providing all labor, equipment, and materials necessary to apply a wood stain to all exterior exposed wood surfaces of the bridge. This shall include, but not be limited to, the siding, fascia, and eaves. Wood stain shall be Woodscaapes 100 percent Acrylic Solid Color Stain by Sherwin-Williams Company, or an approved equal. The color shall match the original color of the existing exterior components being painted as close as possible and to the satisfaction of the Engineer. Thinning is not permitted.

Two separate coats shall be applied by brush in accordance with the manufacturer's recommendations.

The bridge shall be cleaned of dust and debris prior to application of the wood stain to ensure adherence to the wood. The cleaning shall be to the satisfaction of the Engineer.

Payment will be made at the contract unit price per square foot for Item 514 - Field Painting, Misc.: Wood Stain.

ITEM SPECIAL - STRUCTURE MISC.: METAL ROOFING:

This item consists of providing all labor, equipment and materials necessary to replace the existing metal roof without damaging the original existing shingles and repairing the existing shingles as necessary to provide a sound surface for the installation of metal roofing. The metal roofing shall be baked enamel, double lock standing seam metal roofing, aluminum or galvanized steel, 24 gauge minimum thickness.

Upon receiving the Notice to Proceed, the Contractor shall provide manufacturer's color samples to the Engineer for approval. The Engineer, in consultation with the Logan County Engineer, will determine which, if any, of the samples are acceptable.

The ridge cap shall be the same material, gauge, and color as the roofing.

The metal roofing shall be installed in accordance with the procedures and fasteners recommended by the roofing manufacturer(s).

Furring strips shall be added as required to provide a level surface for the installation of the standing seam metal roof.

The contractor shall avoid further damaging the underlying roof boarding during the removal of the existing roofing; if damaged by the Contractor's personnel or operations, the damages shall be repaired or replaced to the satisfaction of the Engineer at the expense of the Contractor.

Payment will be made at the contract unit price per square foot of roofing for Item Special - Structure Misc.: Metal Roofing.

ITEM SPECIAL - STRUCTURE MISC.: FIRE RETARDANT:

This item consists of providing all labor, equipment and materials necessary to apply fire retardant to all exposed wooden surfaces inside and on the underside of the structure. Fire retardant shall consist of one coat of Flame Control #168 sealer (initial coat) and two coats of Flame Control #149 fire retardant (intermediate and final coat) as provided by flame control coatings at 4120 Hyde Park Boulevard, Niagara Falls, New York 14302, (716)282-1399, or approved equal. The local contact is: Sherwin-Williams Company

316 South Main Street
Bellefontaine, OH 43311-1720
Telephone number (937)592-0806

Specific instructions for application provided by the supplier shall be followed to assure maximum protection.

The bridge shall be cleaned of dust and debris prior to application of the fire retardant to ensure adherence to the wood. The cleaning shall be to the satisfaction of the Engineer. If the surface of application is not deemed clean by the Engineer, it shall be re-cleaned of dust and debris at no additional cost to the owner.

Payment will be made at the contract unit price per square foot for Item Special - Structure Misc.: Fire Retardant.

FASTENERS:

Nails:

Nails shall be used to fasten structural timber together. Nails shall extend at least 1-1/2" into the fastened structural member. Care should be taken so as to avoid splitting the lumber; some drilling may be required. Nails shall be galvanized in accordance with ODOT CMS 711.02. The bid price for fasteners shall be included in the bid price of the item for which fastener is used.

Bolts and Threaded Rods:

Bolts and rods shall conform to ASTM A307 and ANSI B18.2.1

And shall be galvanized and shall be galvanized in accordance with ODOT 711.02. All nuts at wood interfaces shall be furnished with malleable iron washers.

Existing bolts shall be reused where practicable. Where designated by the Engineer, the Contractor shall replace the existing bolt with a new bolt of equal or greater diameter. All-thread rod shall not be substituted for bolts.

Vertical tension rod bolts shall be tightened to a snug fit condition and additionally as required to close the gaps between diagonals and steel angle blocks. Snug tightening shall be defined as the tightness attained when an impact wrench begins to impact, or when the full effort of a man using an ordinary spud wrench is applied. In the event that a bolt/rod is stripped or damaged by the Contractor, the Contractor shall replace, in kind, all damaged parts free of charge to the owner.

PAINTING OF STRUCTURAL STEEL:

All existing floor system structural steel that is to remain in place shall be cleaned and field painted. This shall include, but not be limited to, all floor beams, stringers, crossframes, tension rods, and connections. New steel shall be provided bare for preparation and painting in the field. For purposes of field painting, newly erected steel shall be considered existing steel and, like the existing steel, shall be prepared and painted with a prime, intermediate, and finish coat of paint in conformance with supplemental specifications 815 (Field Painting of Existing Steel, System OZEU) and 910 (OZEU Structural Steel Paint). New steel surfaces shall not be abrasively cleaned. Instead they shall be solvent cleaned, primed and finish painted as specified in the supplemental specification for "Field Painting of Existing Steel, System OZEU". Cost of cleaning and painting of new and existing steel with the OZEU paint system shall be included in the several OZEU Items. The surface area pay quantities are based on the surface area of main members (floor beams and stringers) increased by 15 percent to account for the area of crossframes, bearings, and other steel incidentals being cleaned and painted.

Payment will be made at the contract unit price per square foot of painted surface for Items 815 (Surface Preparation and Existing Field Painting of Existing Steel).

ITEM 863 - STRUCTURAL STEEL MEMBERS, LEVEL ONE (1) FABRICATION, AS PER PLAN:

This item consists of providing all labor, equipment and materials necessary to install replacement steel angle blocks; replacement and new steel bearing pads; miscellaneous nuts, bolts, and washers at locations designated in the plans.

All steel angle blocks shall be replaced with new galvanized steel angle blocks as per plan.

Structural steel to be used for this item shall conform to ASTM A36, and shall be galvanized in accordance with ODOT CMS 711.02. Any cuts or damage to the galvanized material shall be repaired with a cold galvanizing compound prior to use.

New steel shall be cleaned and it shall be prime painted in the field. At the Contractor's option, new steel may be given a preliminary cleaning in the shop. The cost of cleaning and prime painting shall be included on the several OZEU Items. Replacement stringers bearing plates, lower diagonal bearing connections, or steel angle replacement. Payment will be made at lump sum price bid for Item 863 - Structural Steel Members, Level One (1) Fabrication, as per plan.

MATERIAL AND LABOR

The Contractor shall provide all material and labor for the above Items unless otherwise indicated.

NON-DESTRUCTIVE CLEANING AND REMOVAL:

The term non-destructive as used throughout these plans in the context of cleaning and removal shall be defined as follows:

Cleaning shall be done in such a manner that section area of the member being cleaned is not lost. Air cleaning shall be the preferable method over sand and water blasting. The latter method shall only be used after receiving approval from the Engineer.

Removal shall be done in such a manner that section area of the member being removed is not lost. Care shall be taken to protect portions of the structure that are to be salvaged and incorporated into the proposed structure. The use of explosives, headache balls, chipping hammers, and ho/rams will not be permitted.

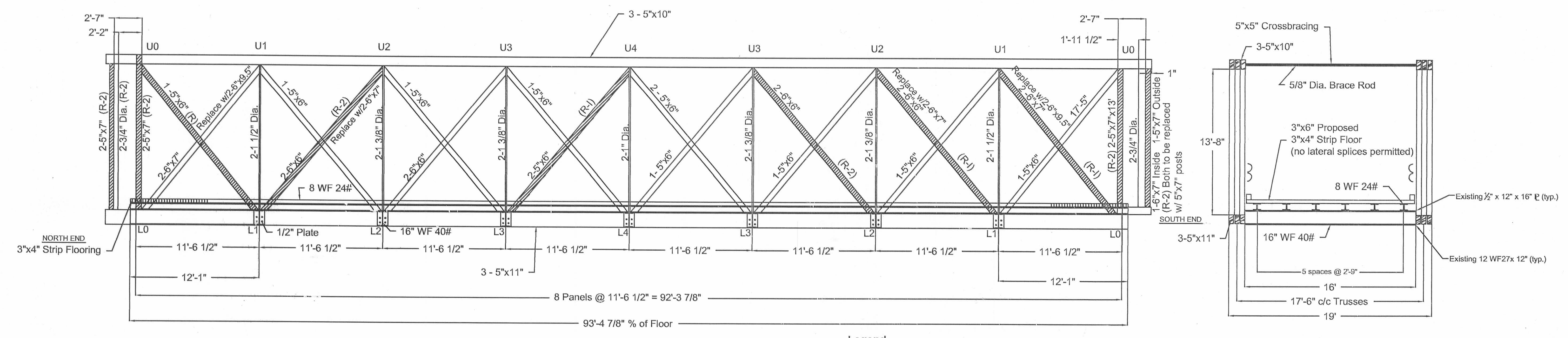
Chipping hammers and small ho/rams may be used for the removal of the existing bridge seats as approved by the Engineer.

W.O.#
2439

Designed By:
Scott C. Coleman P.E., P.S.
Checked By:
Jacque Stahtler - Inspector

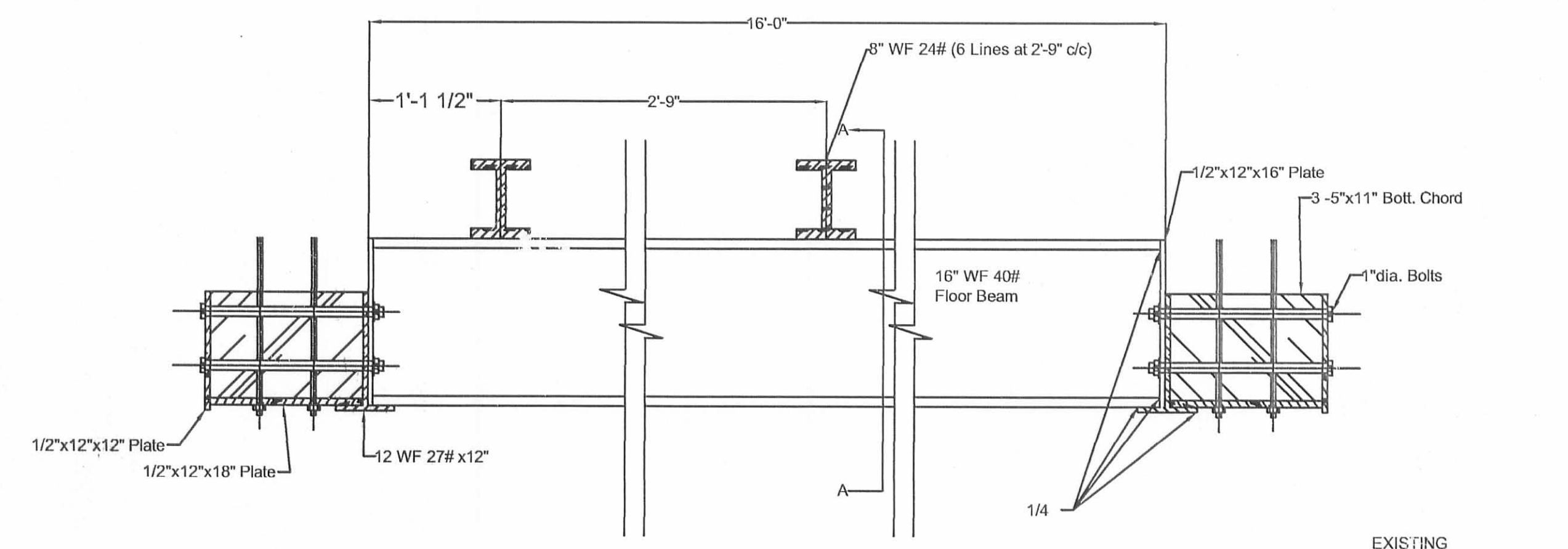
Drawn By:
JLG
Checked By:
SCC

East Truss

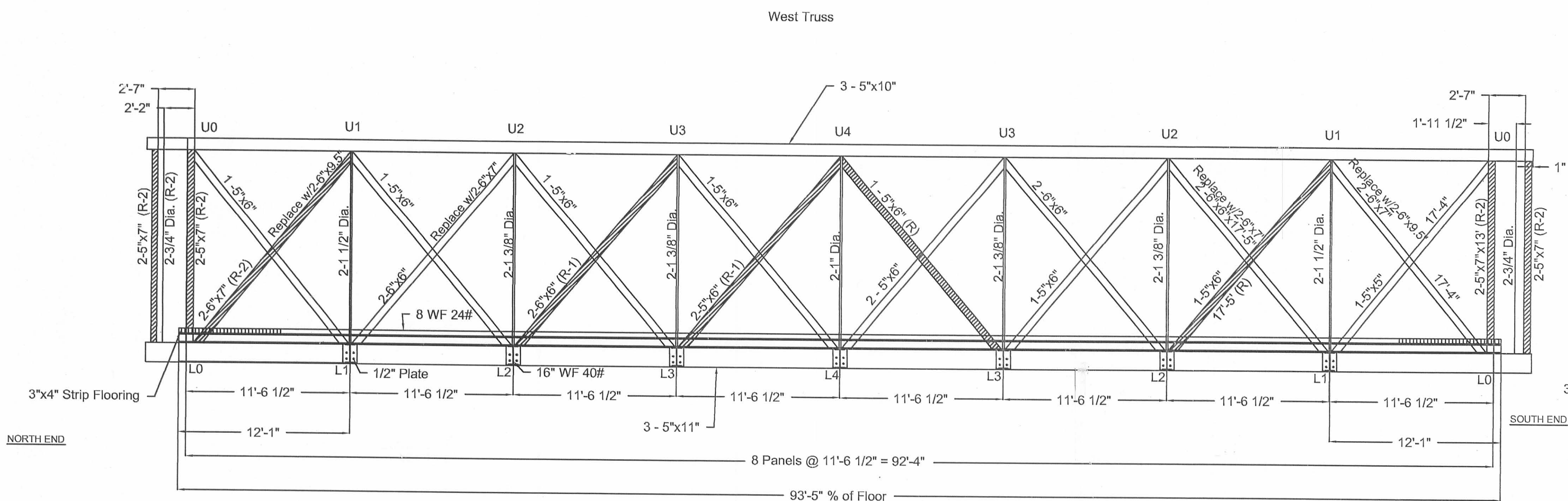


Longitudinal Section After Strengthening
 Scale 1" = 5'
 East Truss

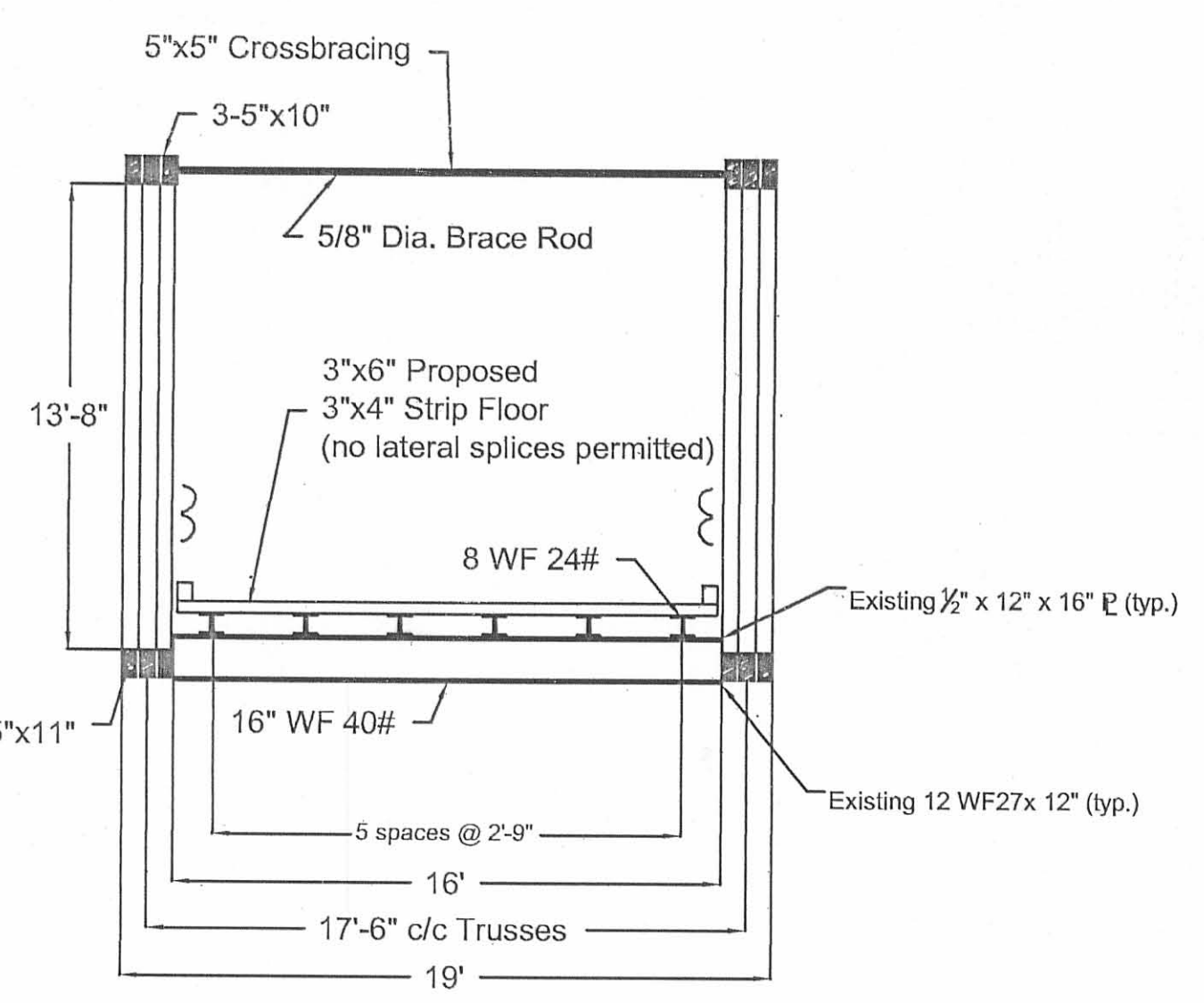
Legend
 R : Replace Member
 R-0 : Replace outside member
 R-1 : Replace inside member
 R-1 : Replace one member
 R-2 : Replace two members



EXISTING FLOOR BEAM AND HANGER DETAILS
 Scale 1" = 1'

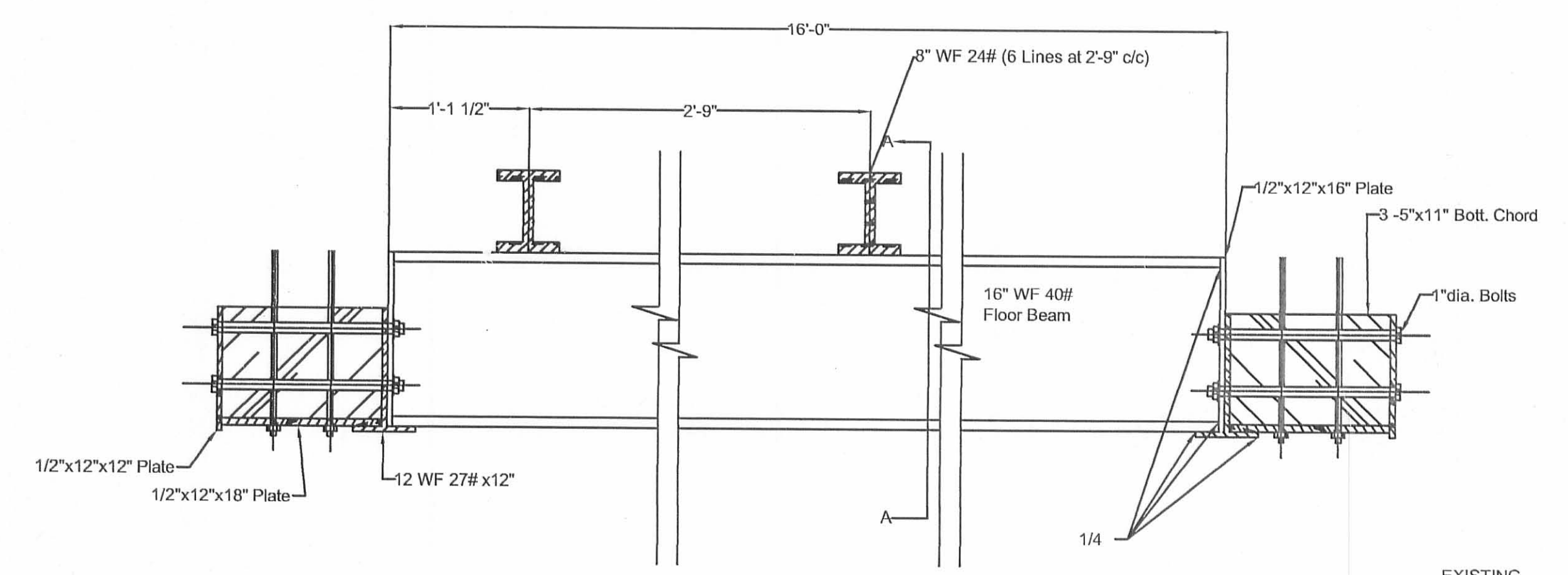


Longitudinal Section After Strengthening
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West Truss

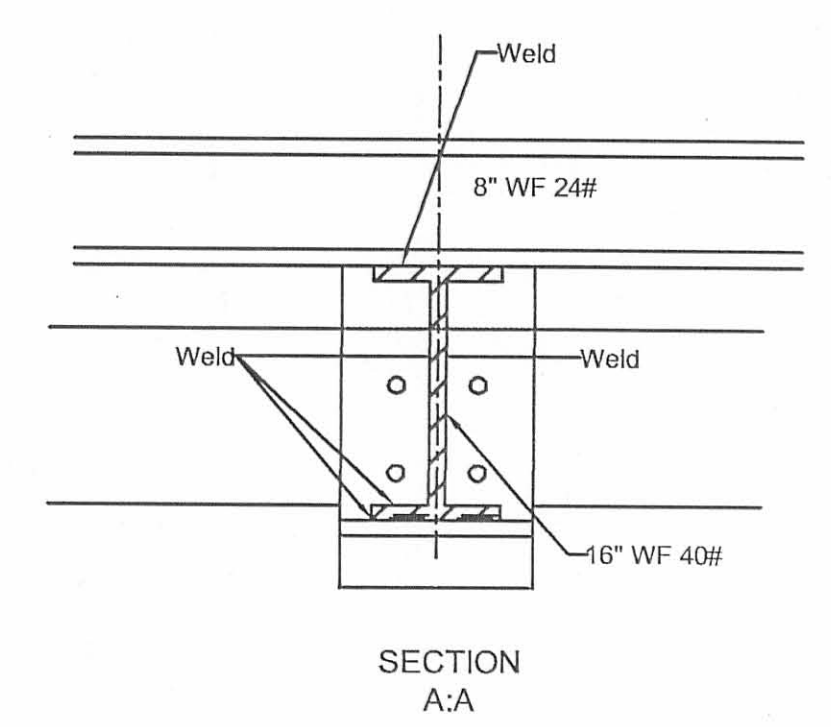


EXISTING SECTION THRU ROADWAY

Legend
 R : Replace Member
 R-0 : Replace outside member
 R-1 : Replace inside member
 R-1 : Replace one member
 R-2 : Replace two members



EXISTING FLOOR BEAM AND HANGER DETAILS
Scale 1" = 1'



SECTION A-A

2 WORKING DAYS
 BEFORE YOU DIG
 CALL TOLL FREE 800-362-2764
 ONE DAY AHEAD PROTECTION SERVICE

WD# 2439

Des.igned By: JLB

CHECKED BY: SCC

LOGAN COUNTY HIGHWAY DEPT. ENGINEER'S OFFICE

Bridge 38-0.20 Covered Bridge
West Truss Detail Sheet

LOGAN COUNTY HIGHWAY DEPT.

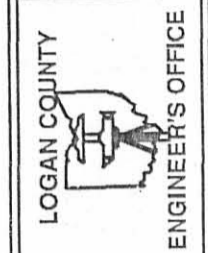
JAMES K. COX P.E., P.S.
LOGAN COUNTY ENGINEER

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13

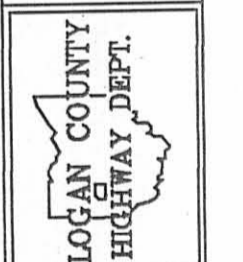
W.O.#
2439

Designed By:
Scott C. Coleman P.E., P.S.

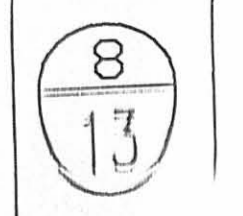
Drawn By:
JLG
Checked By:
SCC



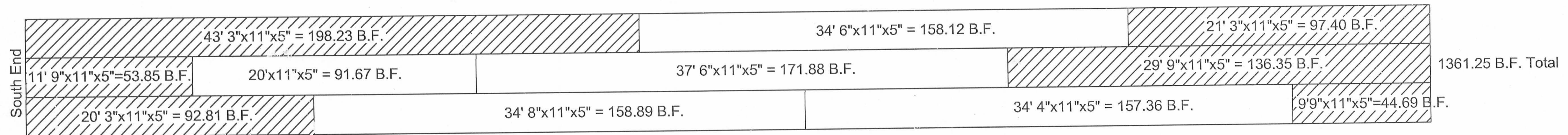
Bickham Covered Bridge 38-0.29
Lower Chord Details



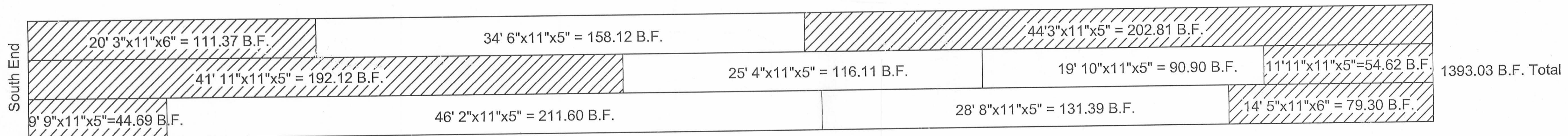
Scott C. Coleman P.E., P.S.
Logan County Engineer



WEST SIDE CHORD DETAILS



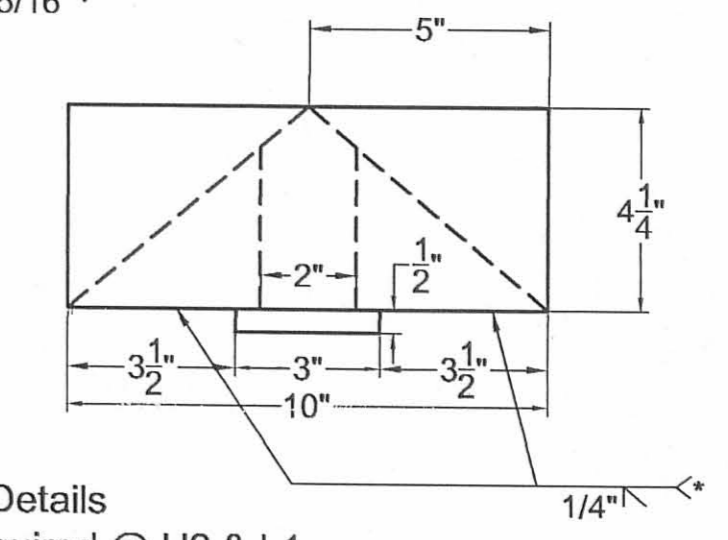
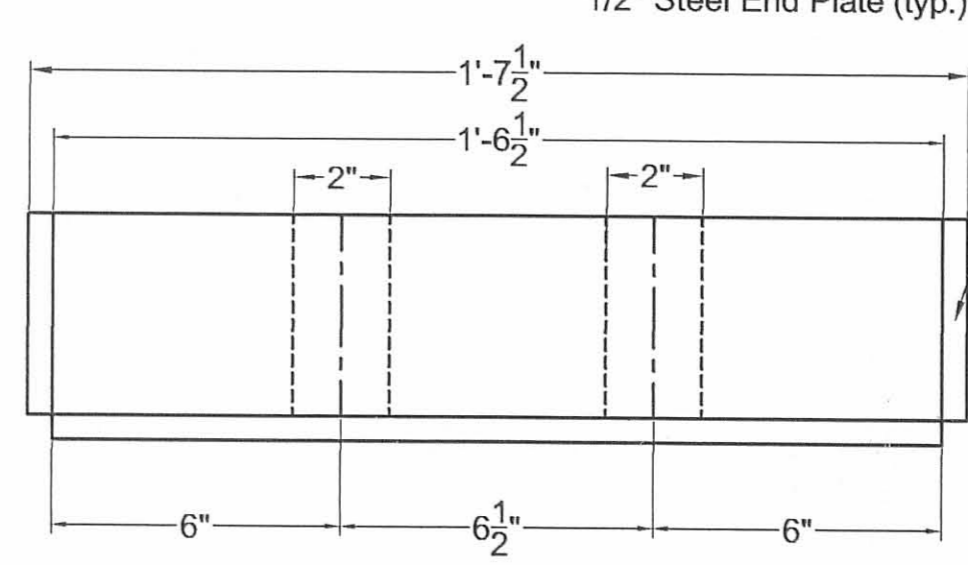
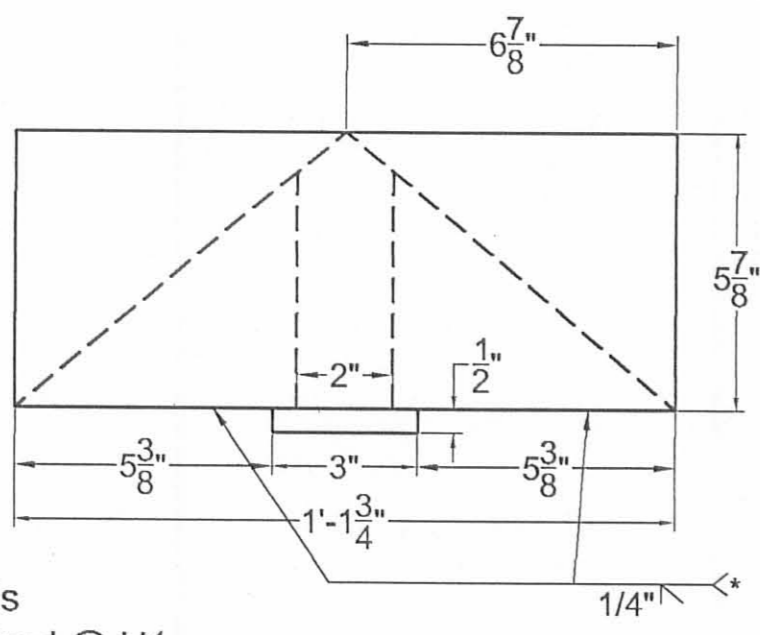
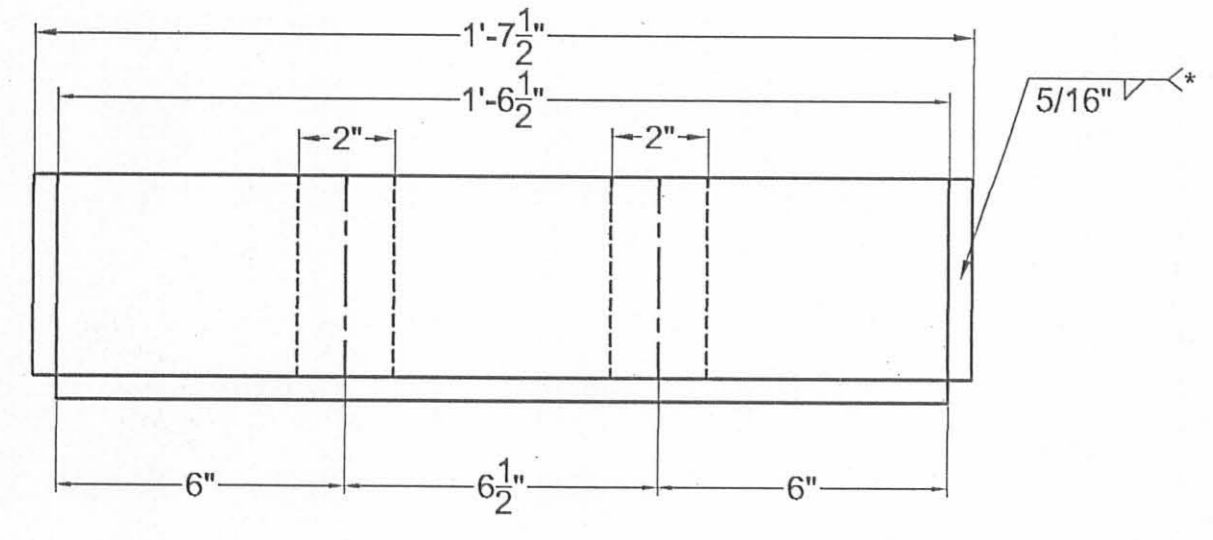
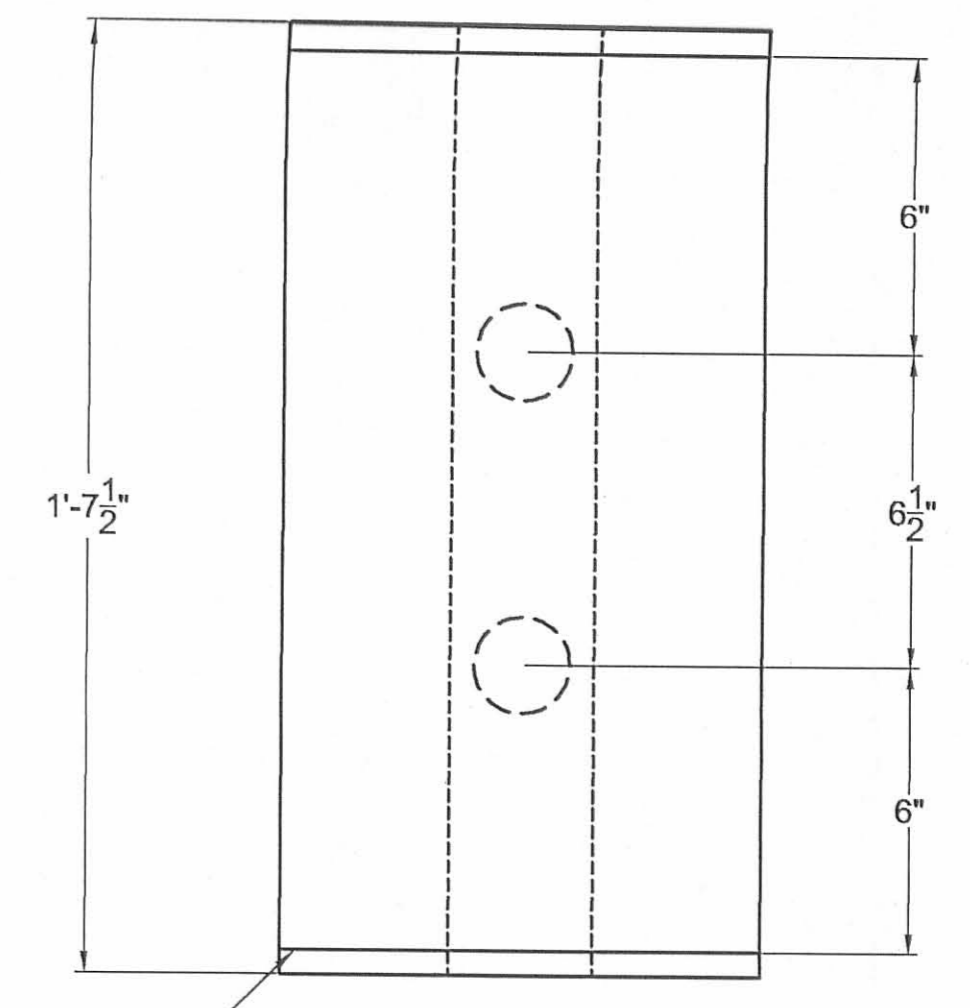
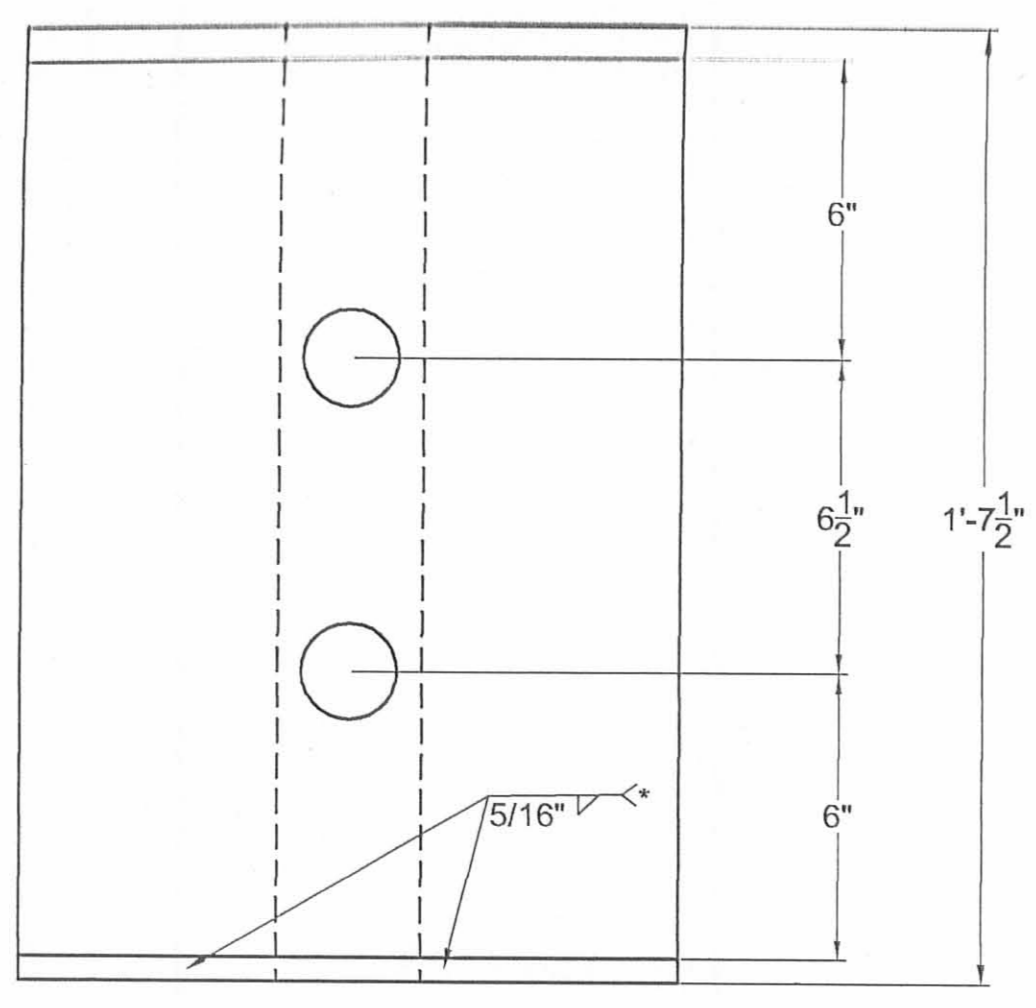
EAST SIDE CHORD DETAILS



Total B.F. in Lower Chords = 2754.28

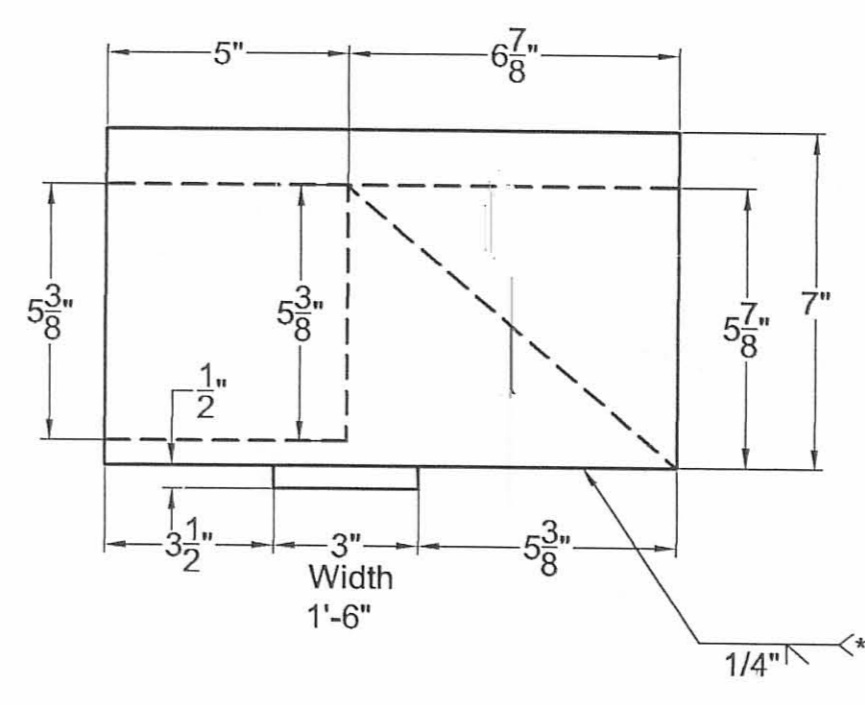
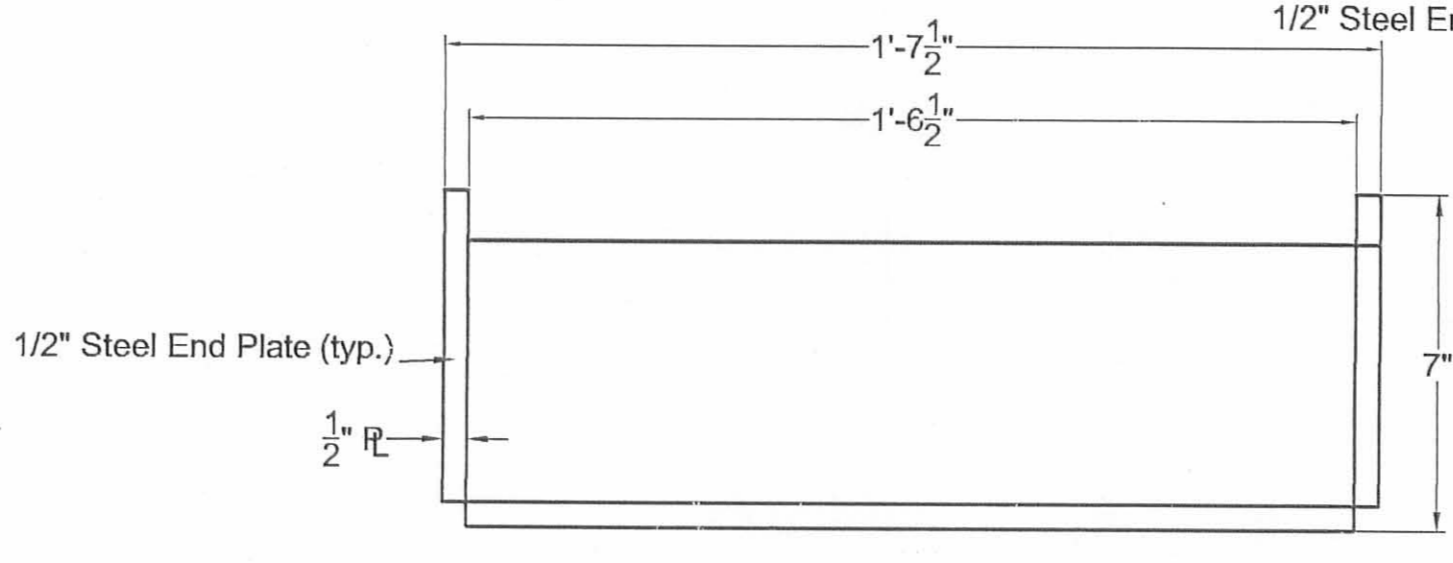
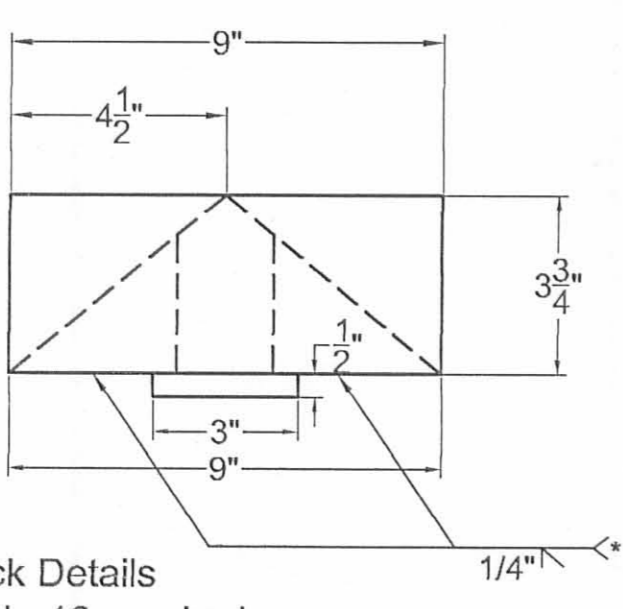
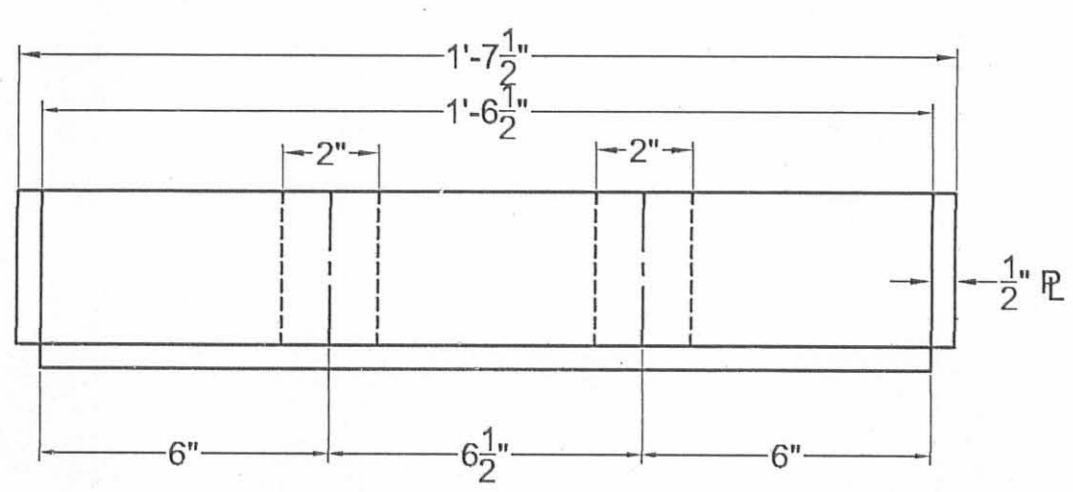
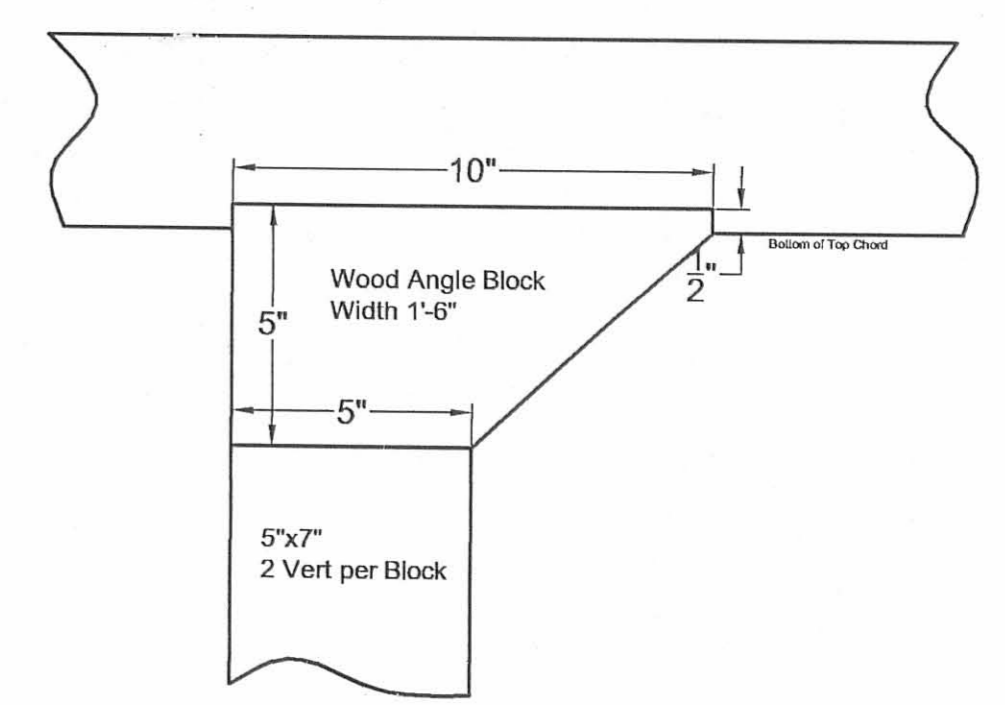
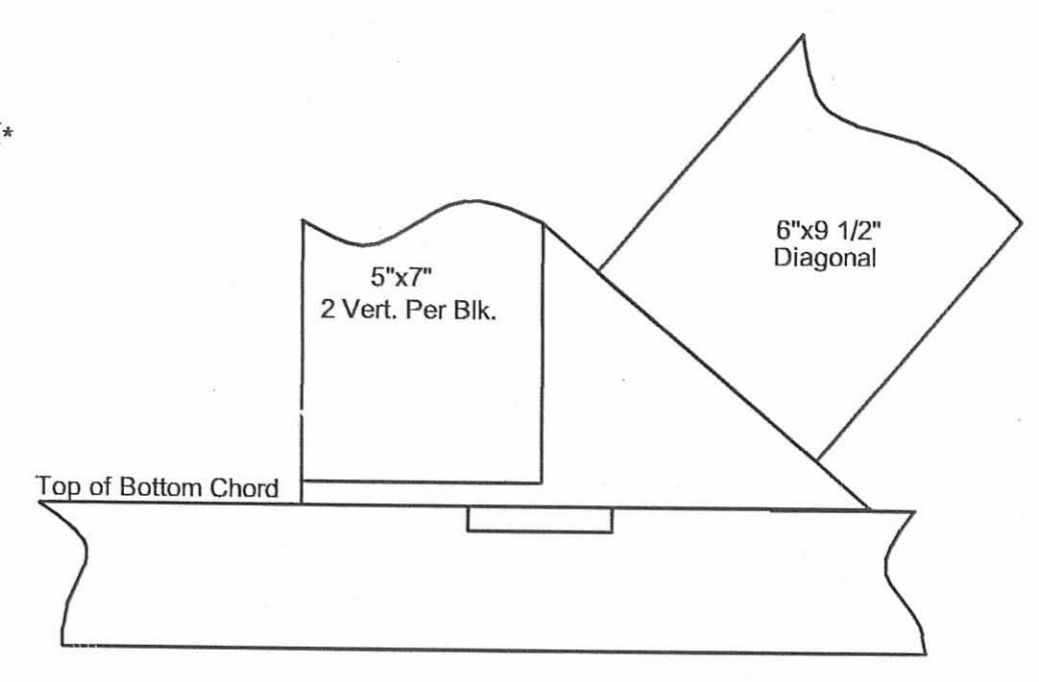
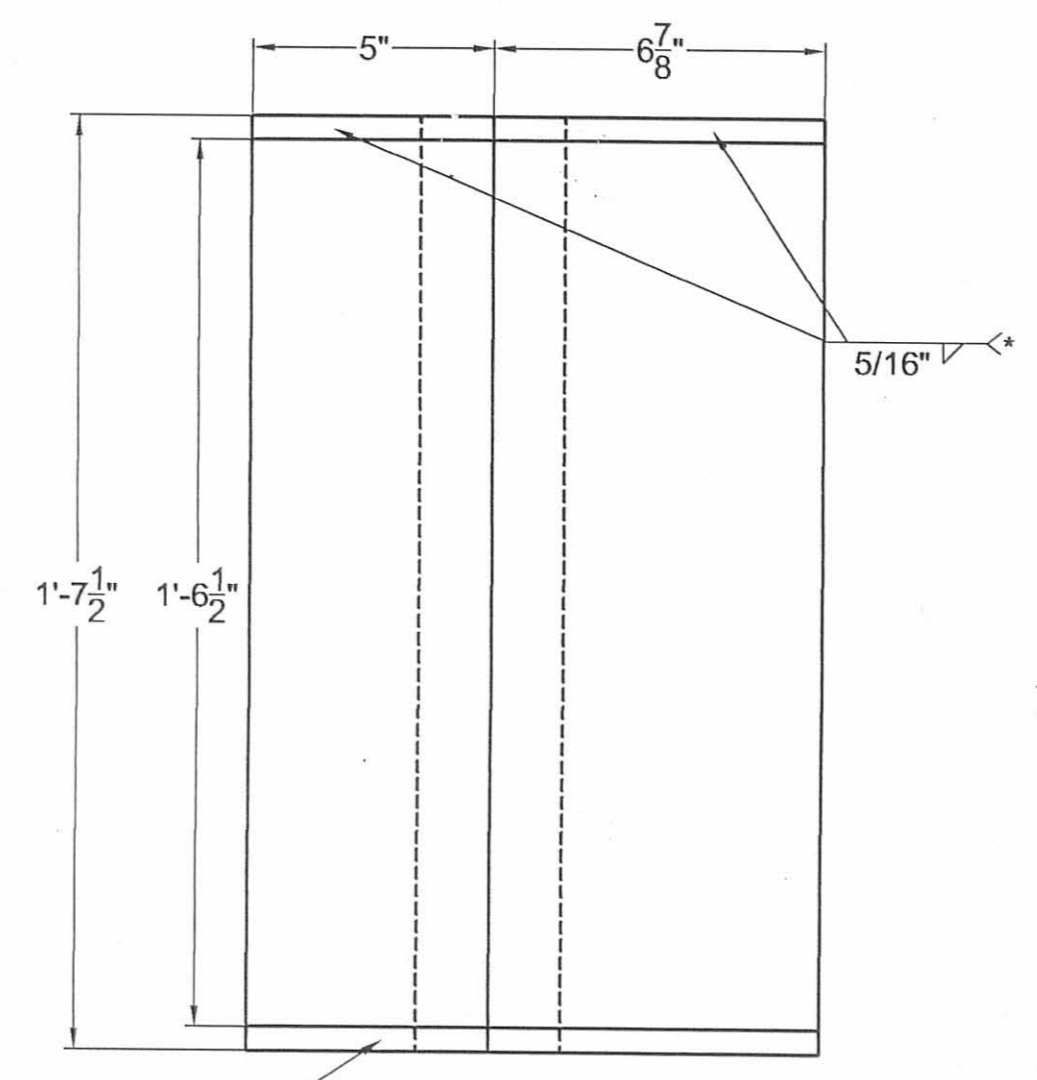
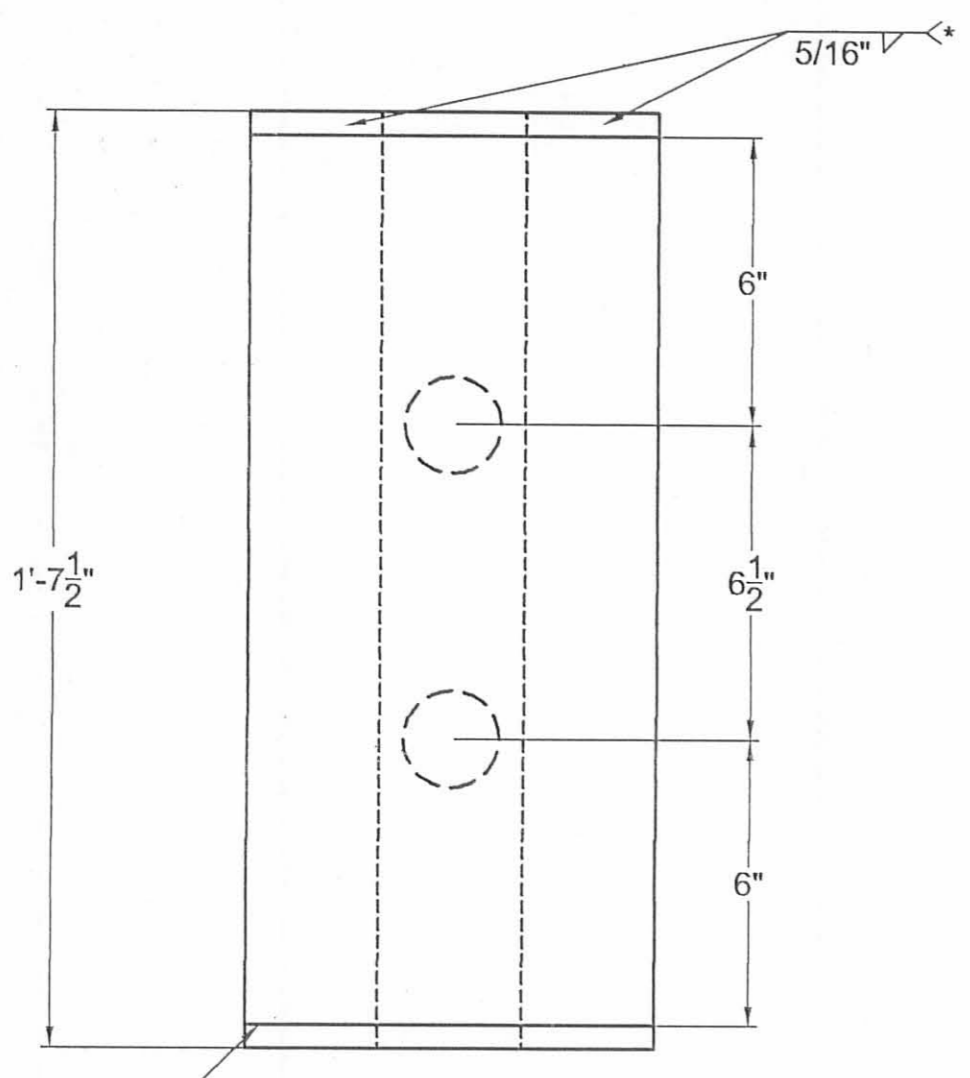
Members Designated for Replacement.

Scale 1" = 5' Hort.
Verticle Scale
exaggerated to show detail



Top Angle Block Details
 4 New Galvanized Steel - required @ U1

Top Angle Block Details
 8 New Galvanized Steel - required @ U2 & L1



Steel Angle Block Details
 New Galvanized Steel - 16 required
 6 required @ U3 & U4
 10 required @ L2, L3, & L4

Bottom Angle Blocks Galvanized Steel
 Typ. 4 Corners
 4 New Angle blocks Required @ L0

Top Angle Blocks (Wood)
 Typ. 4 Corners @ U0

SCALE 1" = 4'

* TYPICAL IF END PLATE IS SEPERATE PIECE