SR 92 Section 750

Stone Masonry Arch Rehabilitation
ECMS #10229

2024 ACEC/PA Diamond Award Recipient – Category J: Small Projects

GPI

Introductions

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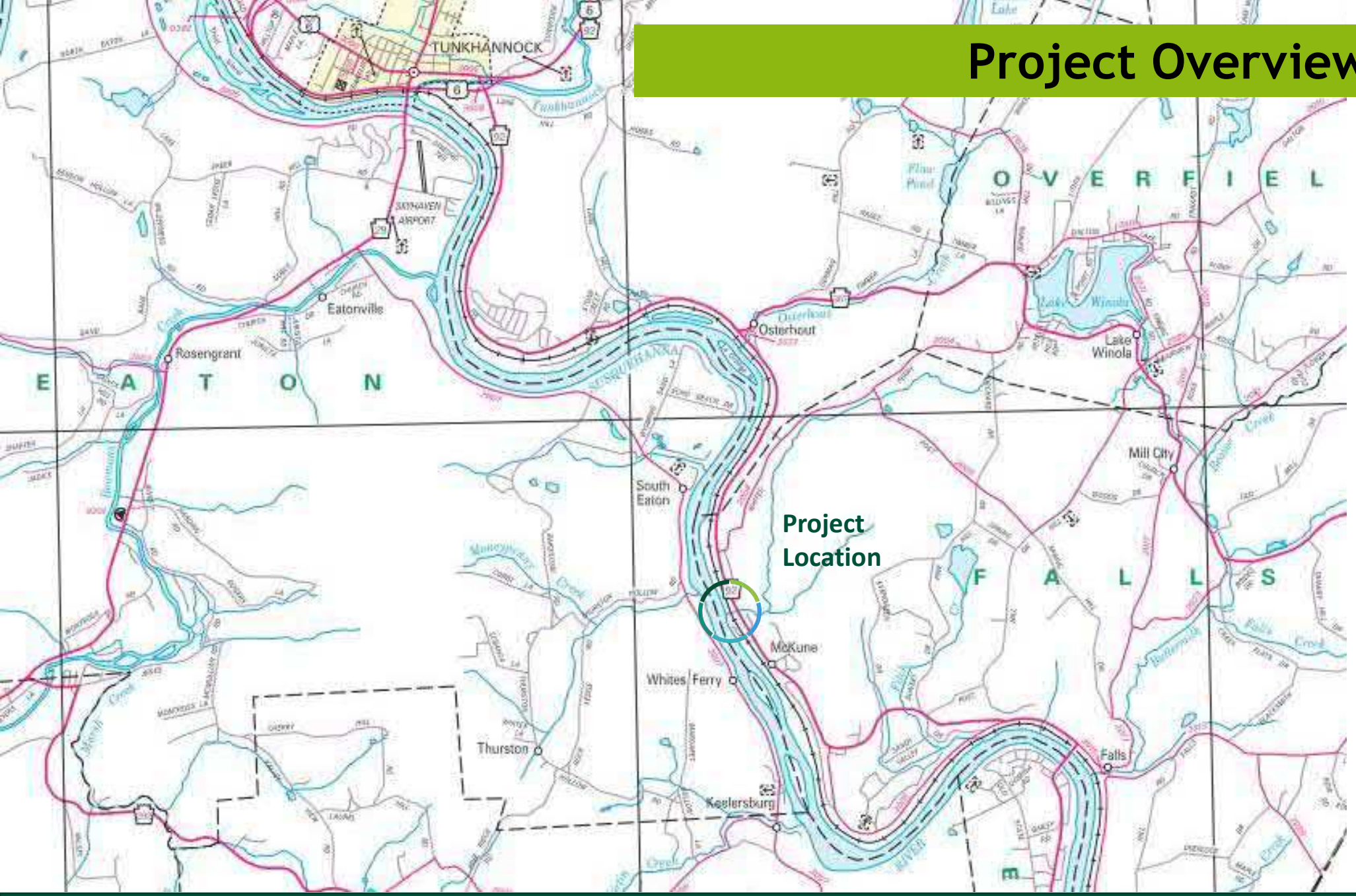
Project Overview / Constraints



Project Overview / Constraints

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Purpose and Need Statement

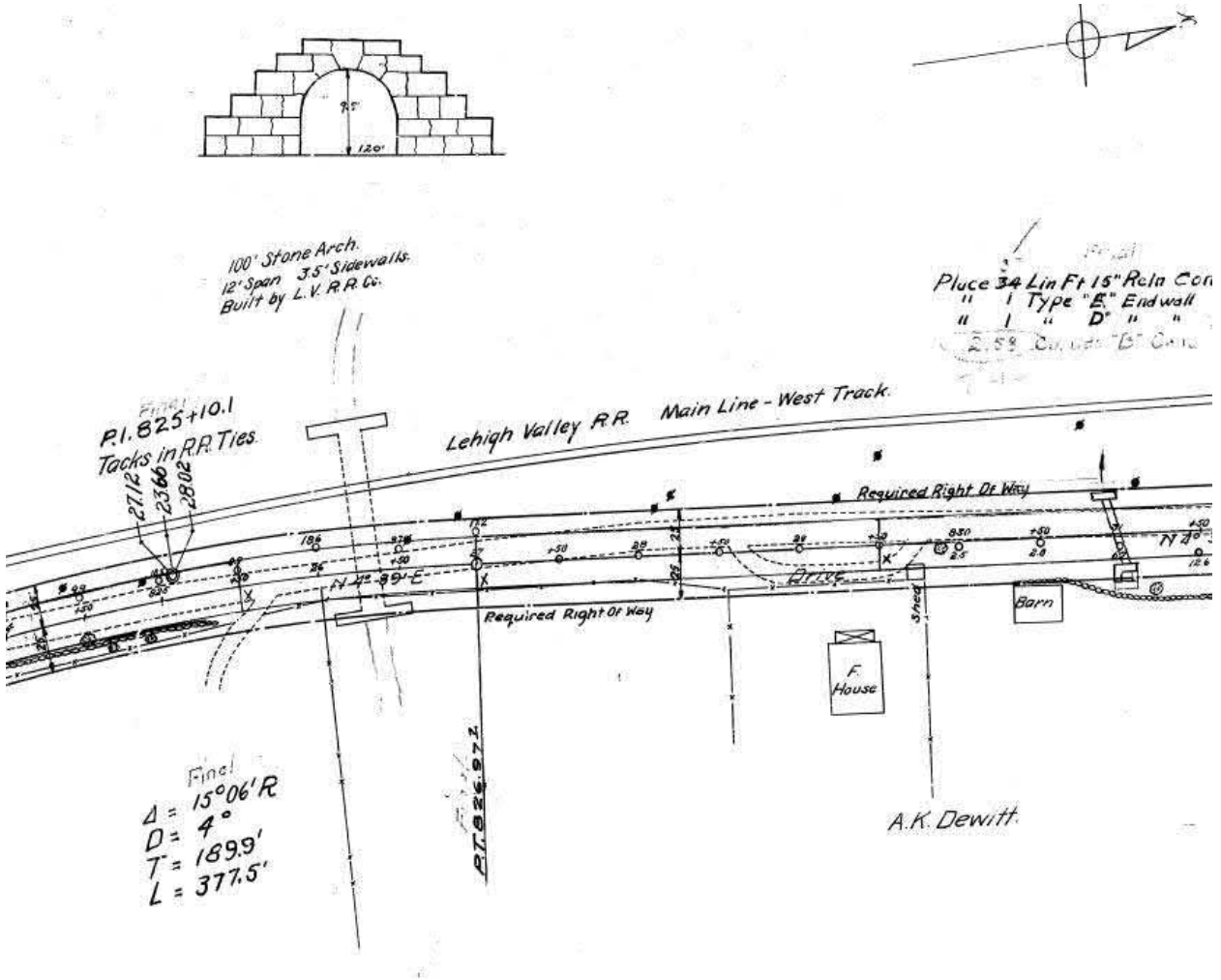
Purpose:

The purpose of the project is to address structural deficiencies while preserving the life of the existing structure and to maintain a safe and efficient access over the roadway to serve local residents, emergency services, etc.

Need:

The project is needed due to structure condition. The existing culvert has stone wingwalls and a culvert with a timber supported base. The wingwalls' stonework has breaks running along the layers due to shifting. The timber base appears to have fractured and settled in multiple locations.

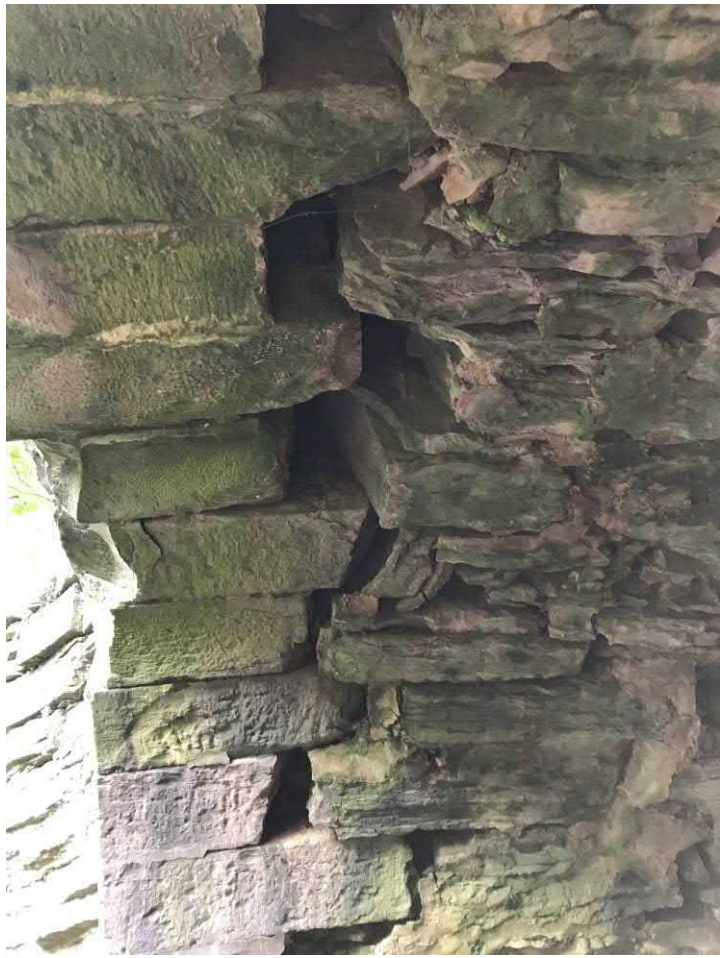
Environmental Conditions



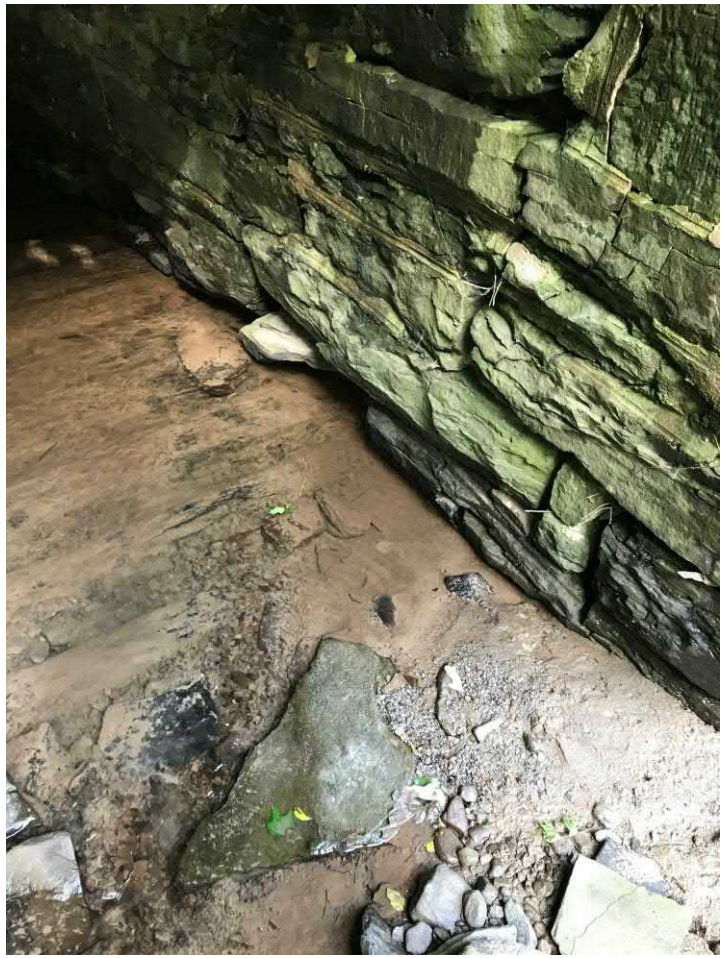
Inspection March 2018 – Recommended Structure Work

- *Culvert Barrel – Priority 1*
  - 4” movement over 12 months at intrados.
- *Headwalls/Wingwalls – Priority 2*
  - Pushed, displaced, settled and/or missing stones at the inlet spandrel and wingwalls.
- *Scour – Priority 2*
  - Advanced scour threatens inlet headwall, wings, and barrel.
- *Debris – Priority 3*
  - Remove vegetated sediment buildup at the far right extending upstream.

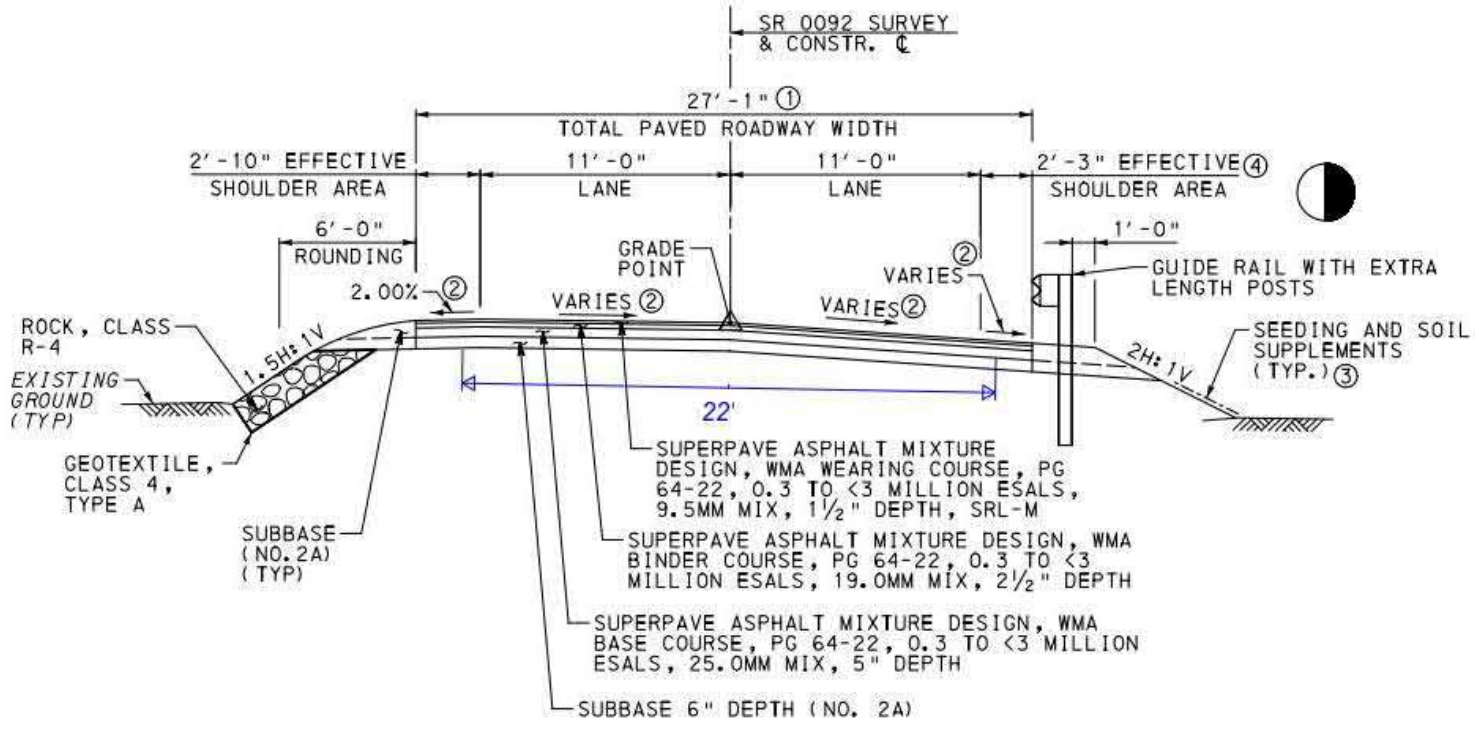
Existing Conditions



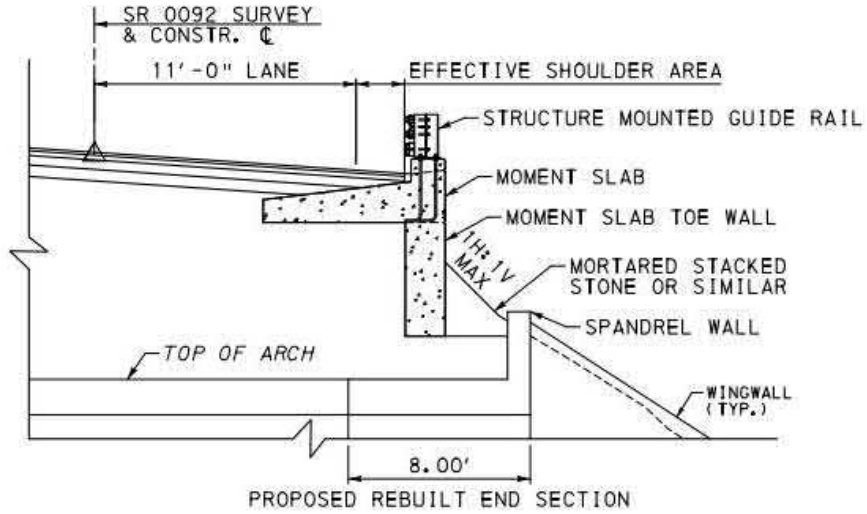
Existing Conditions



LGTS / Moment Slab with Toe Wall



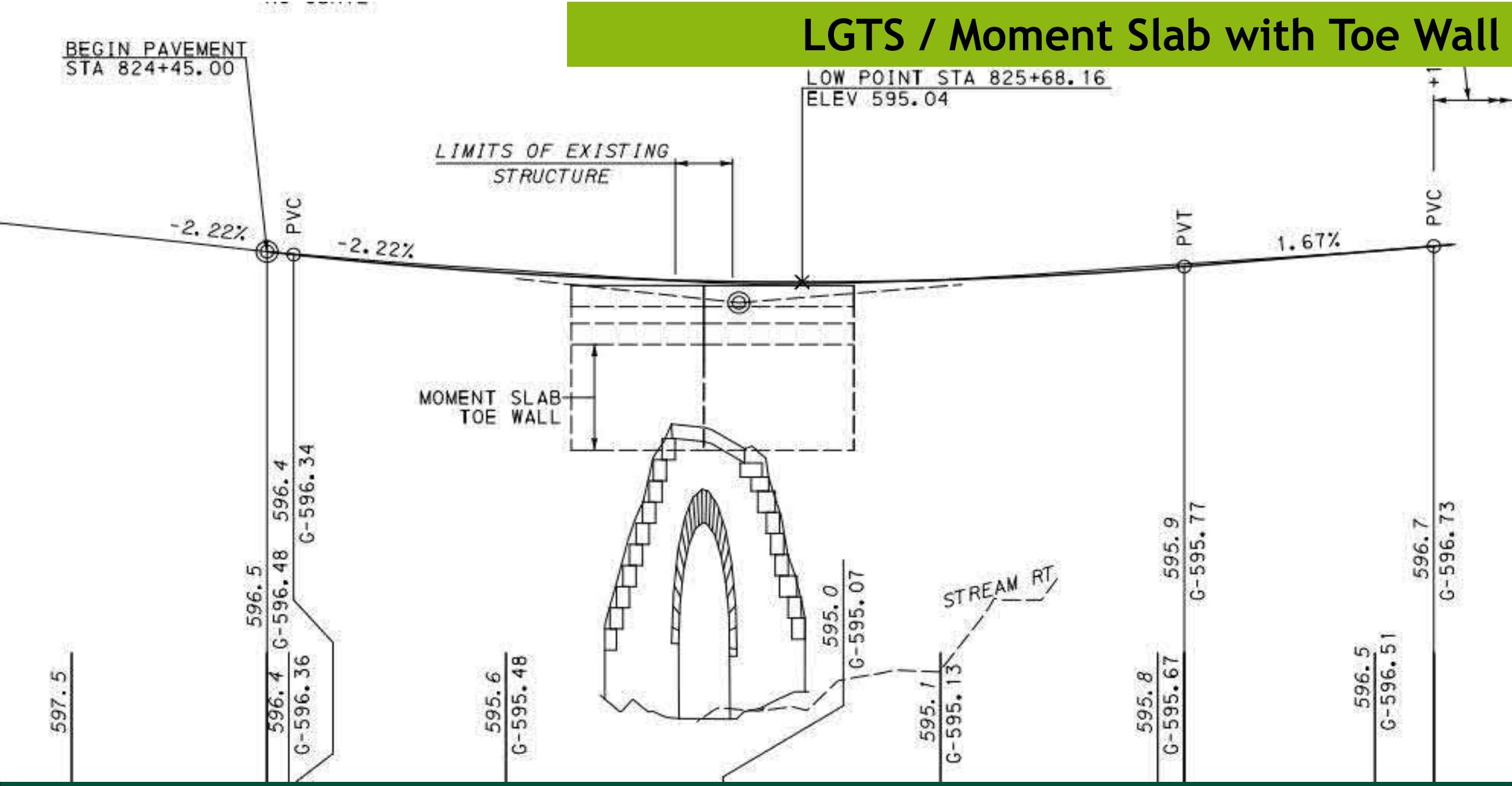
SR 0092
TYPICAL SUPERELEVATED SECTION
NOT TO SCALE



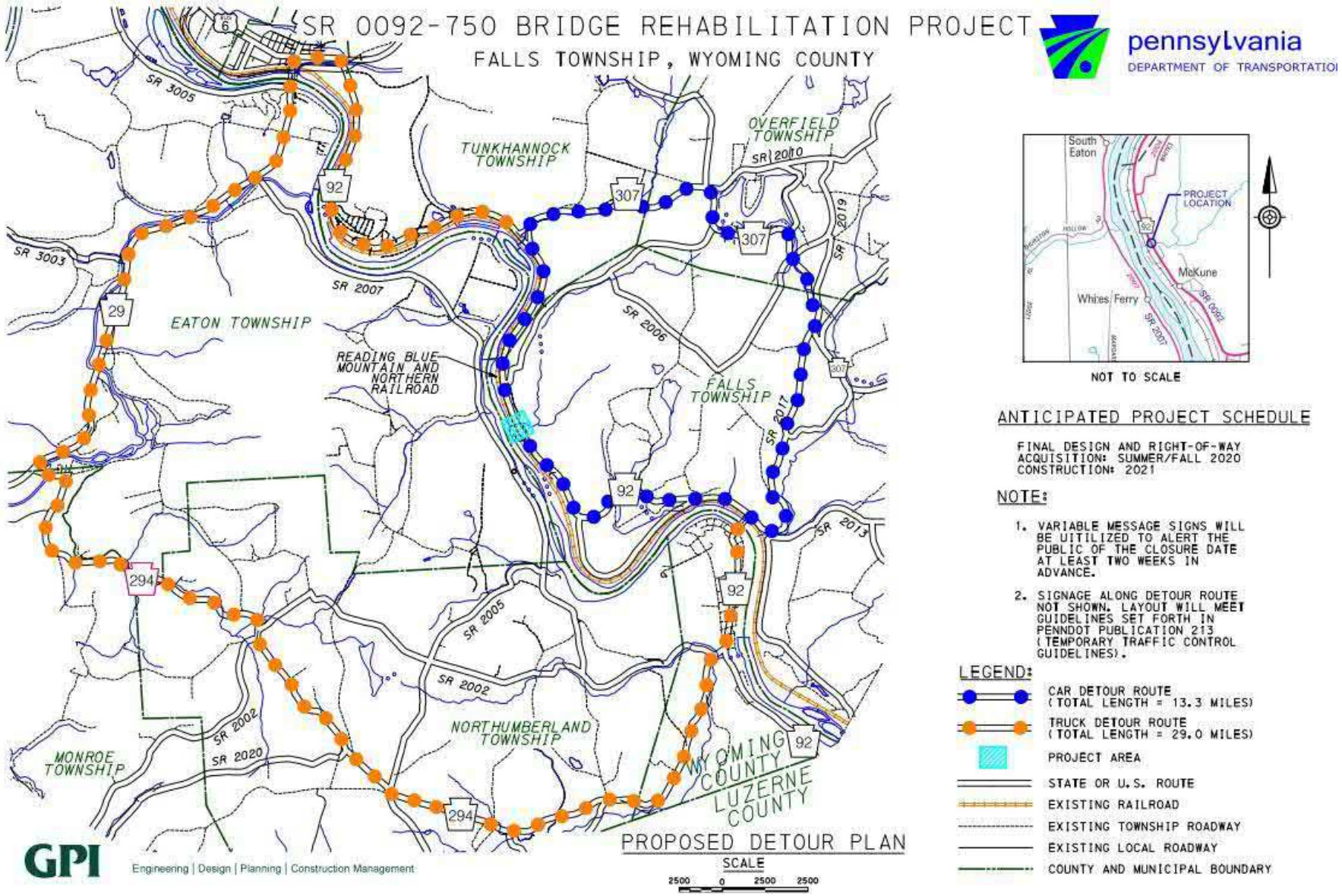
PROPOSED REBUILT END SECTION

SR 0092 ALTERNATE SECTION
NOT TO SCALE

LGTS / Moment Slab with Toe Wall



Traffic Control During Construction



NOT TO SCALE

ANTICIPATED PROJECT SCHEDULE

FINAL DESIGN AND RIGHT-OF-WAY ACQUISITION: SUMMER/FALL 2020
CONSTRUCTION: 2021

NOTE:

1. VARIABLE MESSAGE SIGNS WILL BE UITILIZED TO ALERT THE PUBLIC OF THE CLOSURE DATE AT LEAST TWO WEEKS IN ADVANCE.
2. SIGNAGE ALONG DETOUR ROUTE NOT SHOWN. LAYOUT WILL MEET GUIDELINES SET FORTH IN PENNDOT PUBLICATION 213 (TEMPORARY TRAFFIC CONTROL GUIDELINES).

LEGEND:

- CAR DETOUR ROUTE (TOTAL LENGTH = 13.3 MILES)
- TRUCK DETOUR ROUTE (TOTAL LENGTH = 29.0 MILES)
- PROJECT AREA
- STATE OR U.S. ROUTE
- EXISTING RAILROAD
- EXISTING TOWNSHIP ROADWAY
- EXISTING LOCAL ROADWAY
- COUNTY AND MUNICIPAL BOUNDARY

- 13.3 Mile Posted Detour Route cars, 29.0 mile posted detour trucks on all state roads, limited crossings of the river, expedite construction Mid-May to Mid-October
- Local road review
- Work area to include entire roadway footprint

Preliminary Engineering Milestones:

- Line, Grade, and Typical Section Approval – October 2019
- SHPO Concurrence of Section 106 No Adverse Effect – March 2020
- Township/School District/Emergency Services Coordination Complete & Detour Accepted – March 2020
- March 11, 2020 Covid19 Restrictions in place
- BRPA Environmental Document Approved - April 2020
- Safety Review Approval of Proposed Design – May 2020

Structure Condition of High Concern Must Keep the Project Moving Forward

- No public meetings due to Covid19
- Final Design begins June 2020
- Anticipated Letting March 2021, 1 construction season, no apparent public controversy

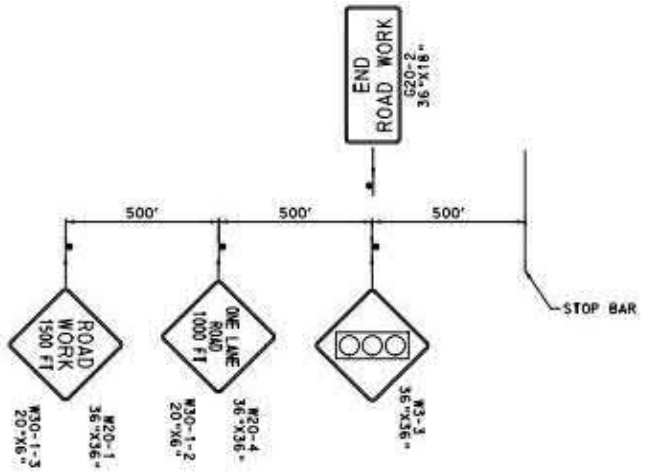
Inspection September 2020 – Weight Posting 20T:

- Now on a 6 month inspection cycle need to get to construction ASAP
- Added a Priority 2 for footing underpinning.

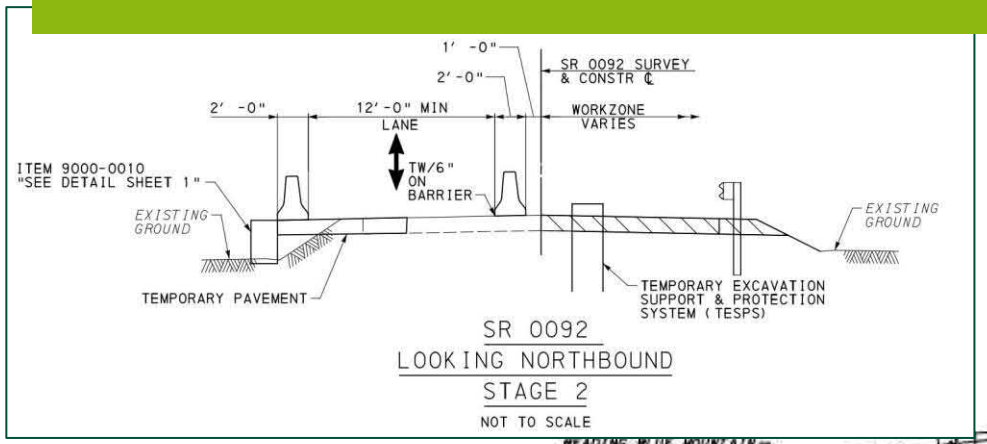
Bid Package Approvals

- Fall 2020 pre-final PS&E, constructability review, and most design approvals in place
- **But** what about the public involvement put on hold by Covid19? Still no public interaction allowed due to Covid. District requires public review due to detour.
- Did a 2 week display of the plan and project info to receive feedback – late October 2020.
- Local representatives at County and State levels contacted by business owners
- pandemic along with excessive detour would severely impact local businesses
- Need to find a way to maintain traffic and still meet the environmental commitments
- Planned construction advertisement – 3 months away

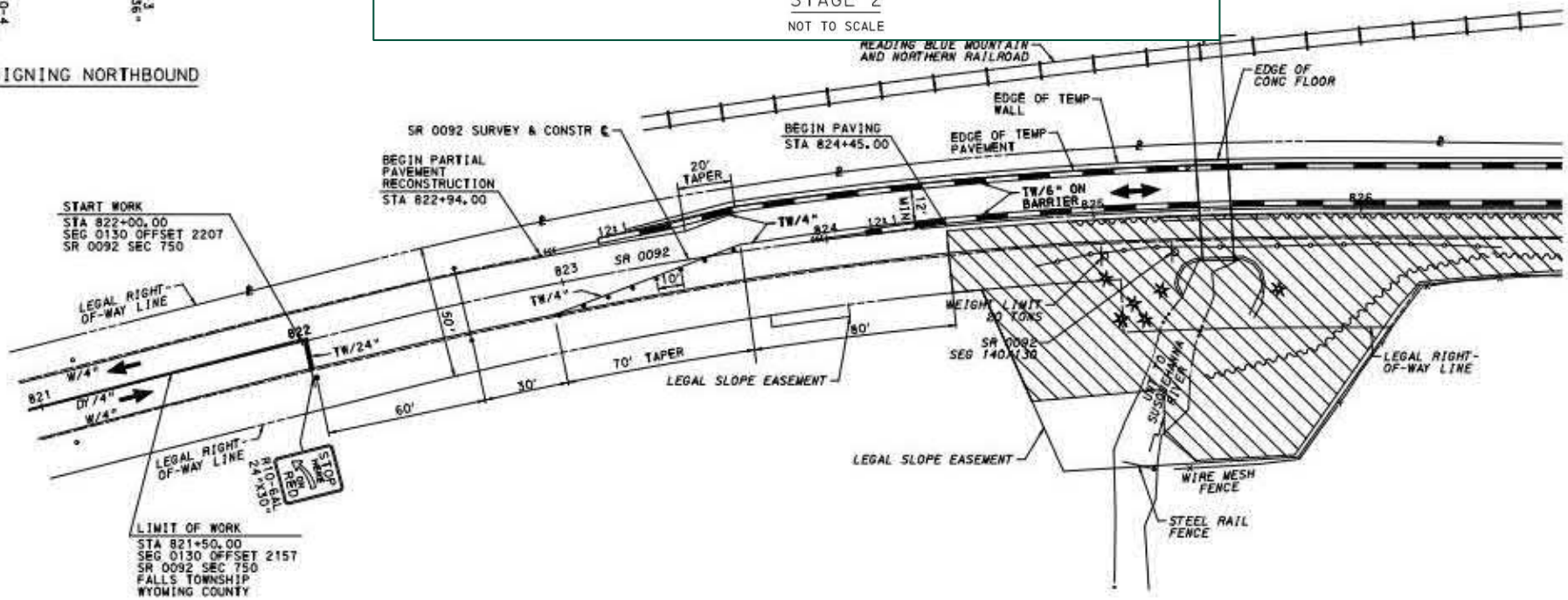
New MPT - Staged Single Lane with Soil Nail Wall



ADVANCE SIGNING NORTHBOUND

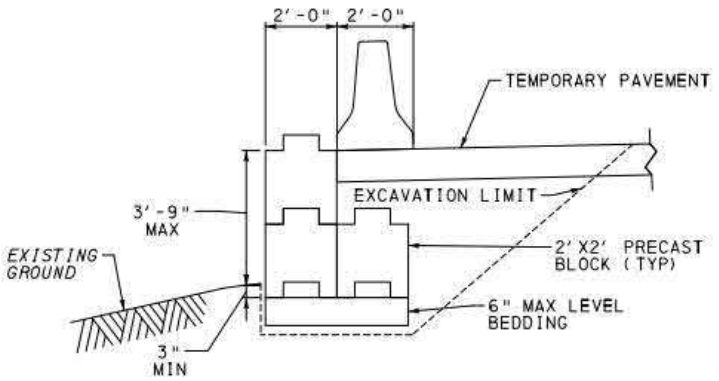


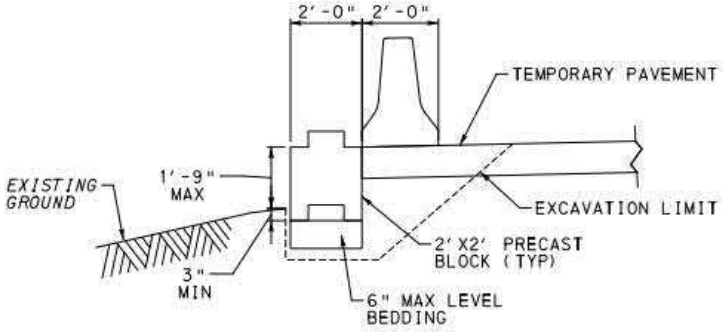
SR 0092
LOOKING NORTHBOUND
STAGE 2
NOT TO SCALE



STAGE 2 - PLAN

Stage 1 Construction - Temporary Widening

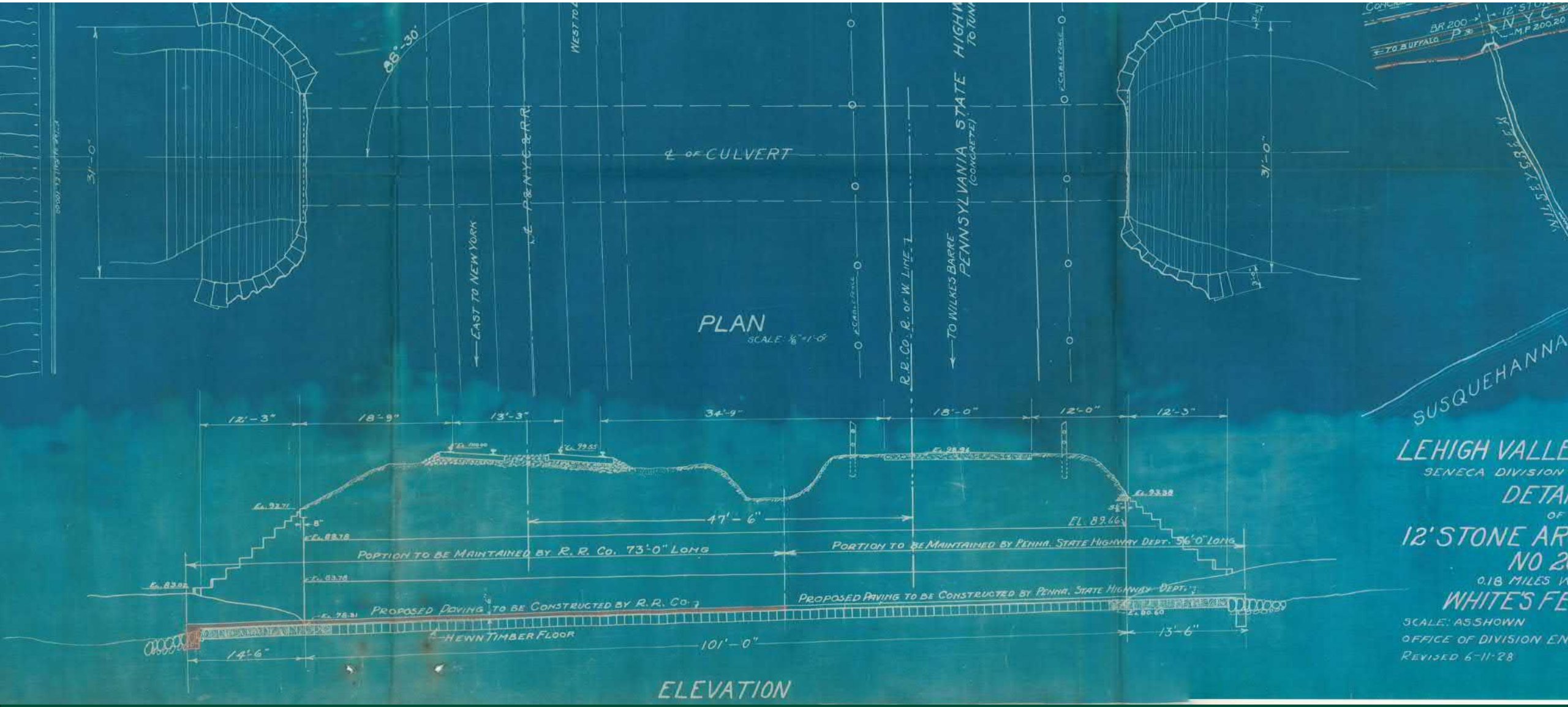




TEMPORARY PREFABRICATED MODULAR WALL
FOR TRAFFIC CONTROL
(ITEM 9000-0010)

NOT TO SCALE

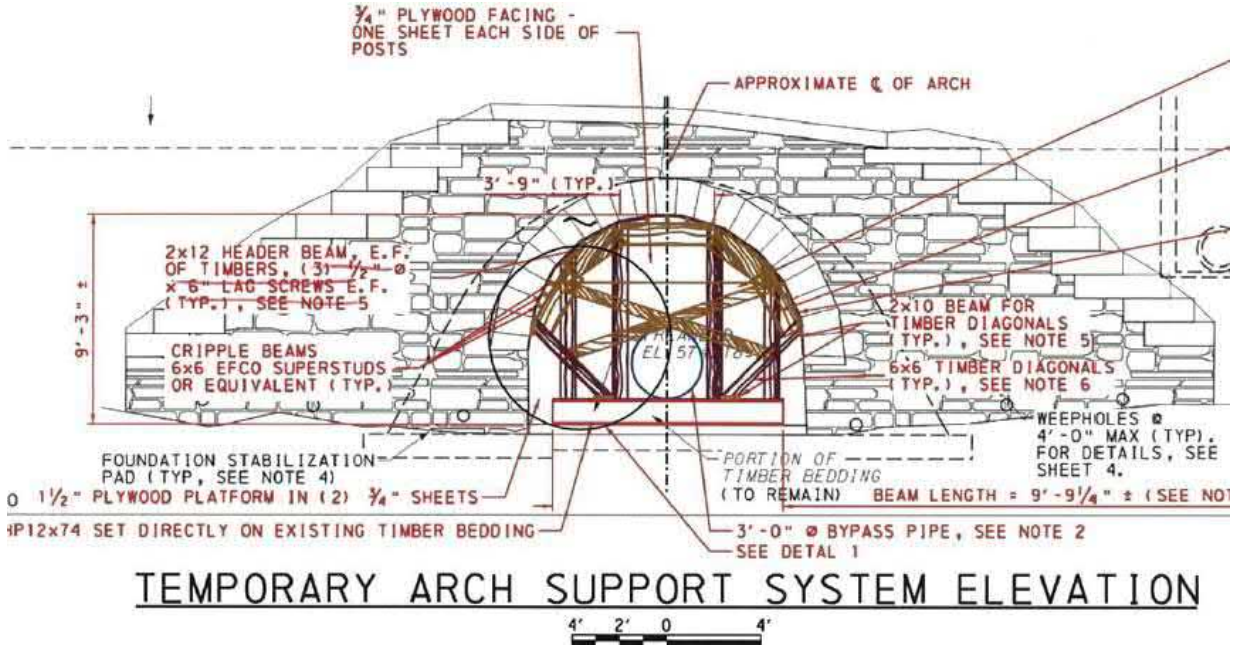
Railroad Provided Existing Structure Plan



Additional Railroad Coordination

Finally in Construction

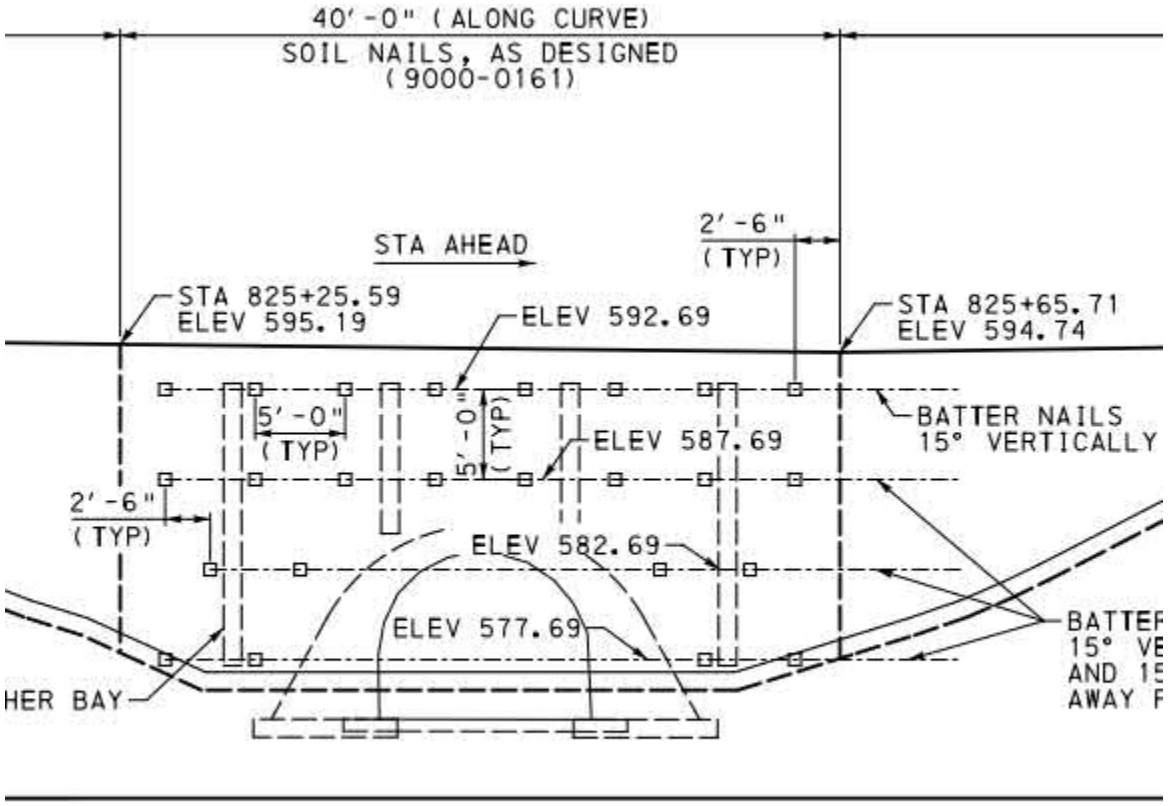
Temporary Arch Support



Adequate hydraulic opening is to be maintained in temporary arch centering system where constructed in waterway for duration of construction. Do not block more than 25% of the span's hydraulic opening with temporary arch centering system. Remove daily and satisfactorily dispose of all debris, logs, ice, etc. that blocks the channel opening while temporary arch support system is in place at no additional cost to the Department.

Temporary Arch Support

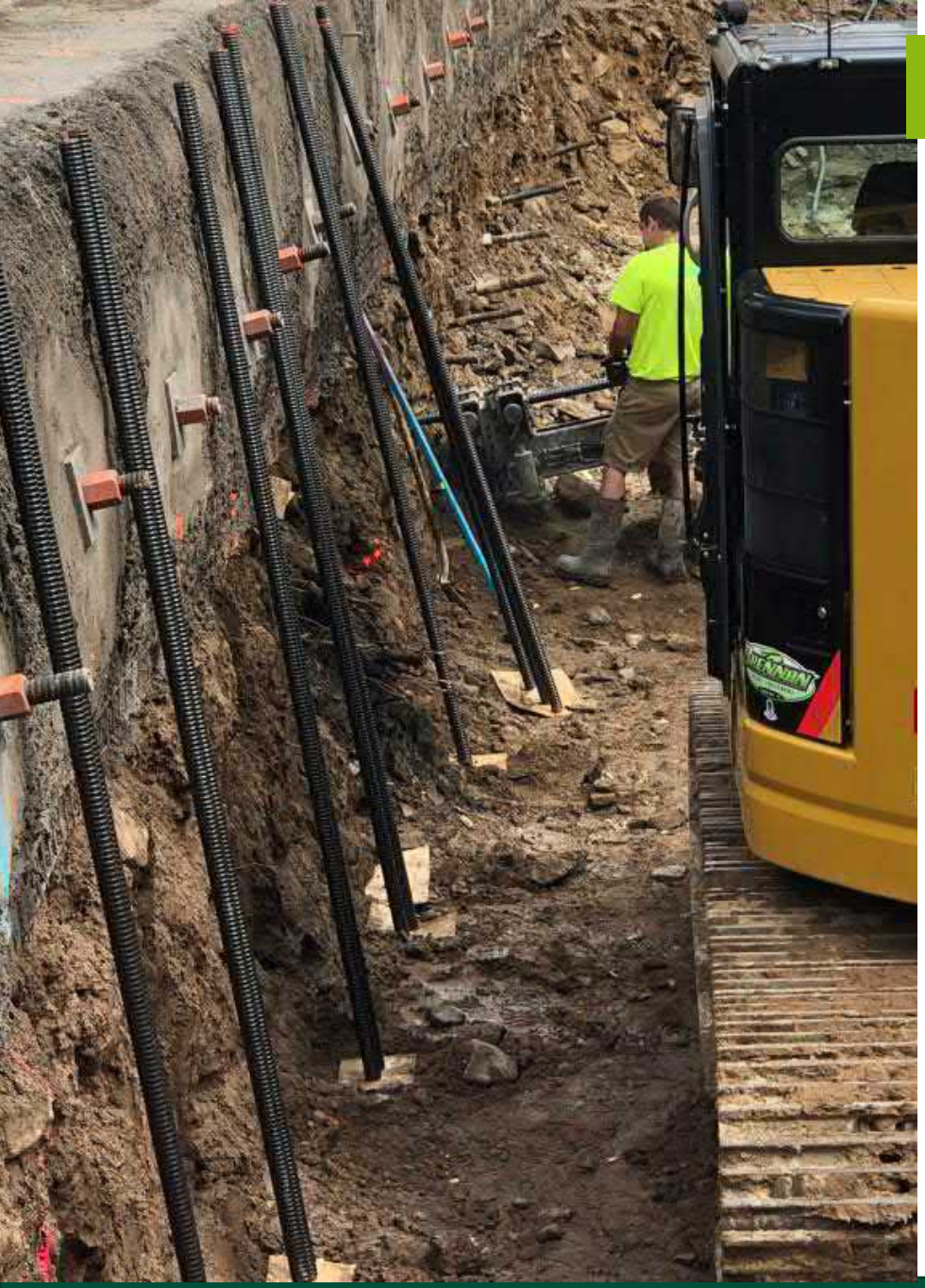
Soil Nail Wall



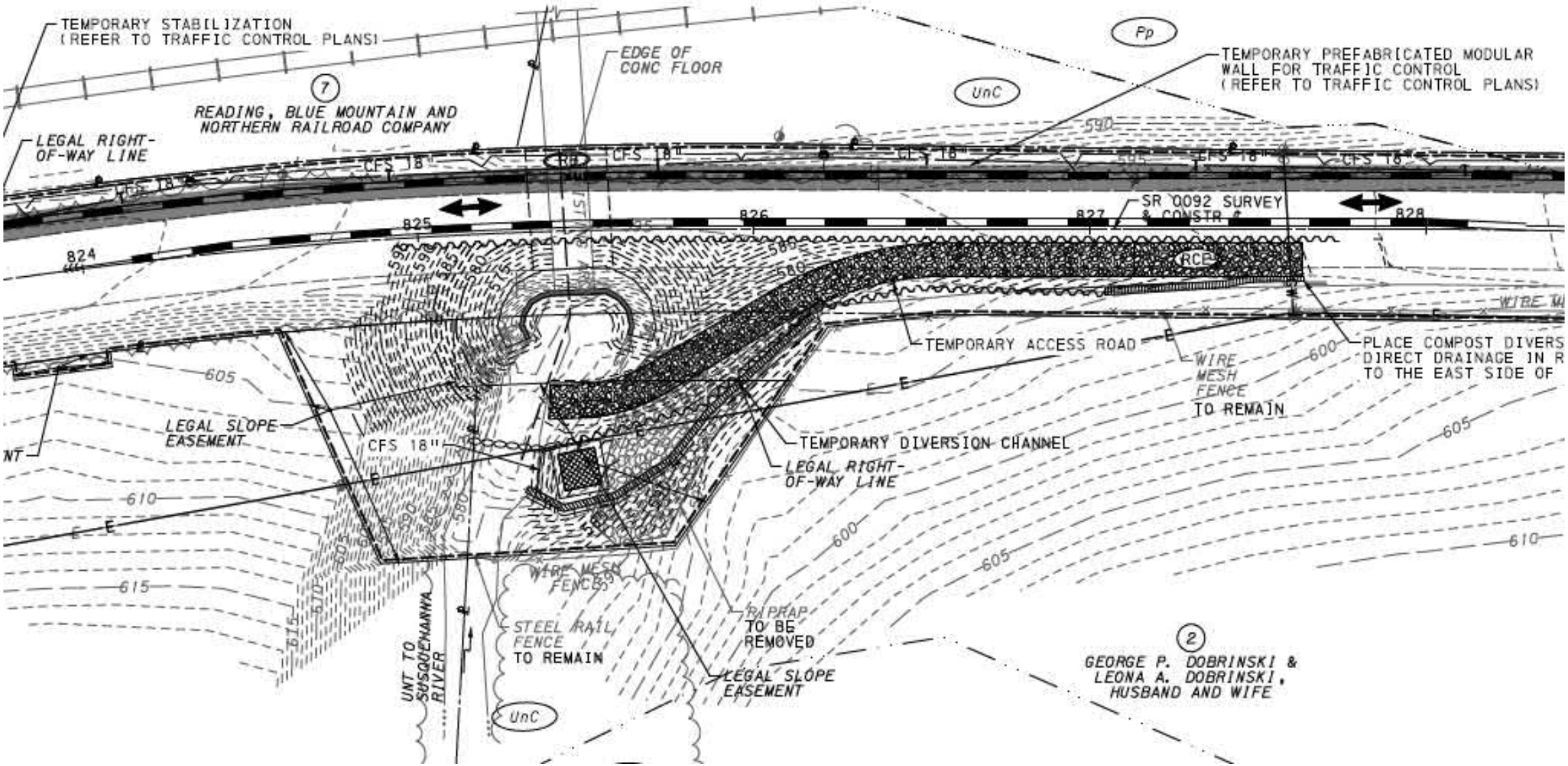
SOIL NAIL ELEVATION - 1

Soil Nail Wall

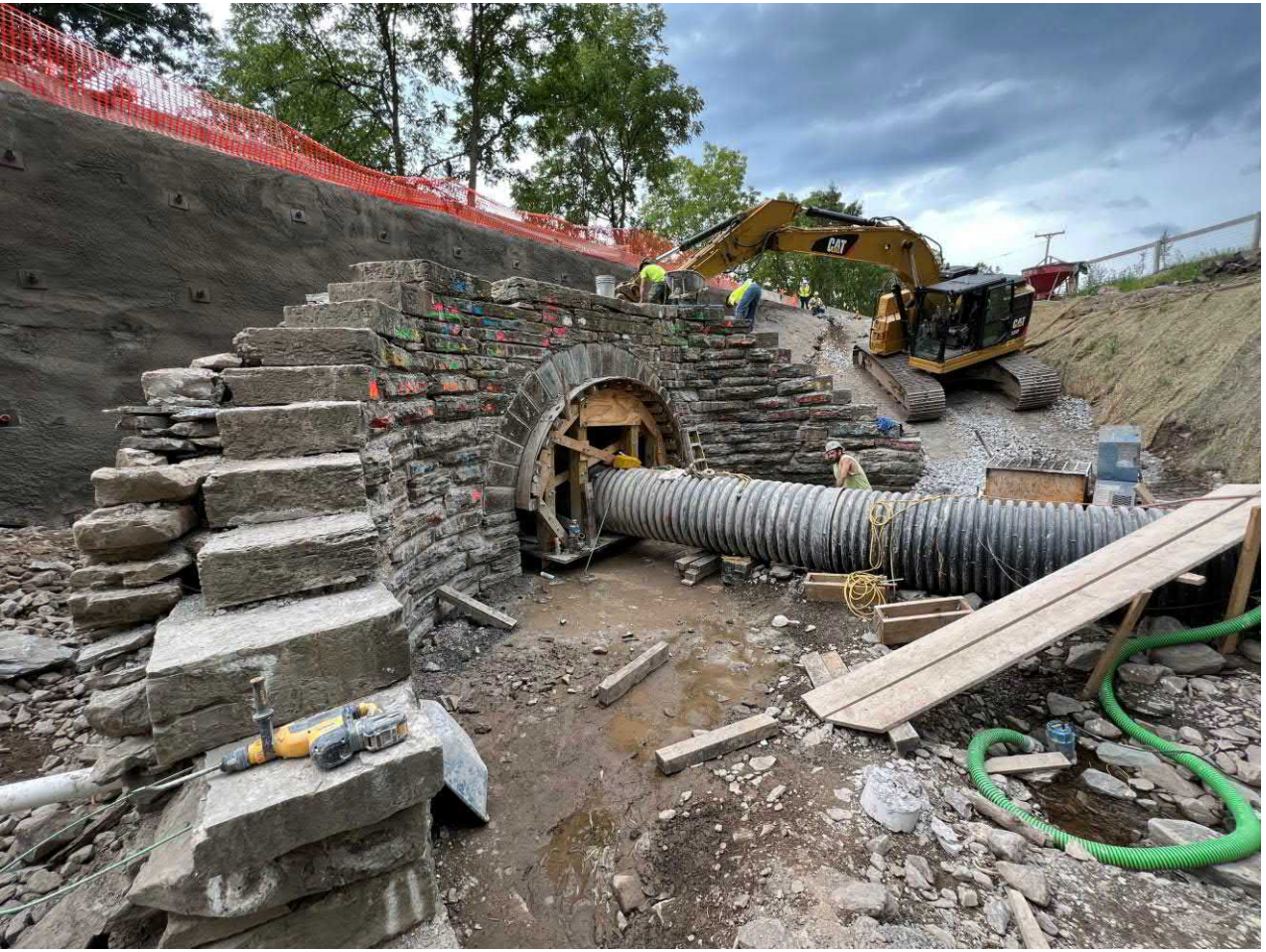
Soil Nail Wall



Access


TEMPORARY STABILIZATION
(REFER TO TRAFFIC CONTROL PLANS)
EDGE OF
CONC FLOOR
Pp
TEMPORARY PREFABRICATED MODULAR
WALL FOR TRAFFIC CONTROL
(REFER TO TRAFFIC CONTROL PLANS)
UnC
7
READING, BLUE MOUNTAIN AND
NORTHERN RAILROAD COMPANY
LEGAL RIGHT-
OF-WAY LINE
CFS 18"
SR 0092 SURVEY
& CONSTR
824
825
826
827
828
RCP
TEMPORARY ACCESS ROAD
WIRE
MESH
FENCE
TO REMAIN
PLACE COMPOST DIVERS
DIRECT DRAINAGE IN R
TO THE EAST SIDE OF
LEGAL SLOPE
EASEMENT
TEMPORARY DIVERSION CHANNEL
LEGAL RIGHT-
OF-WAY LINE
WIRE MESH
FENCE
RIPRAP
TO BE
REMOVED
STEEL RAIL
FENCE
TO REMAIN
UNT TO
SUSQUEHANNA
RIVER
LEGAL SLOPE
EASEMENT
2
GEORGE P. DOBRINSKI &
LEONA A. DOBRINSKI,
HUSBAND AND WIFE

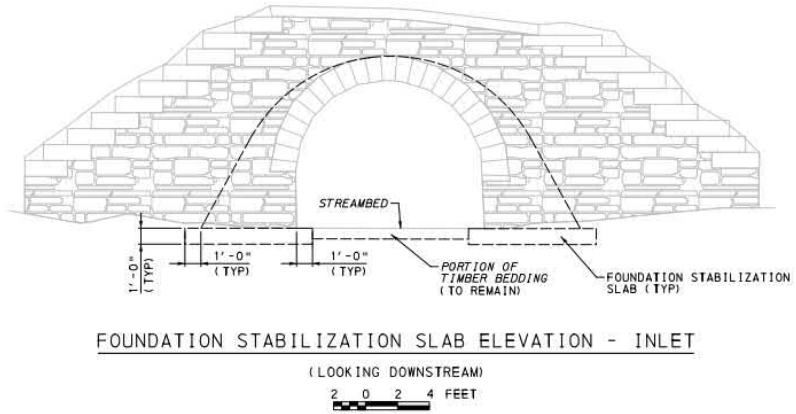
Access



Marking and Disassembly

Storage

Foundation Stabilization



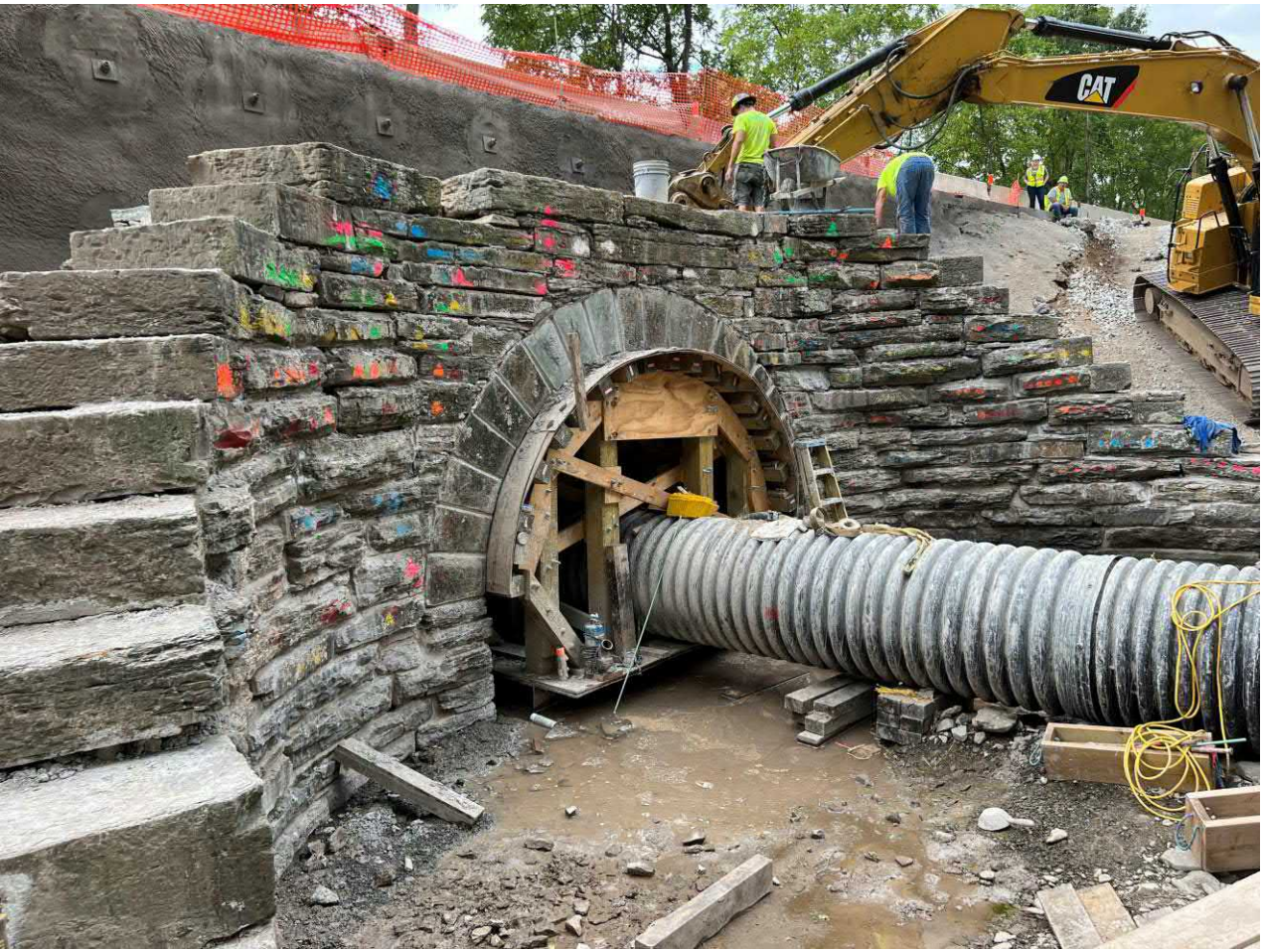
FOUNDATION STABILIZATION SLAB ELEVATION - INLET

(LOOKING DOWNSTREAM)

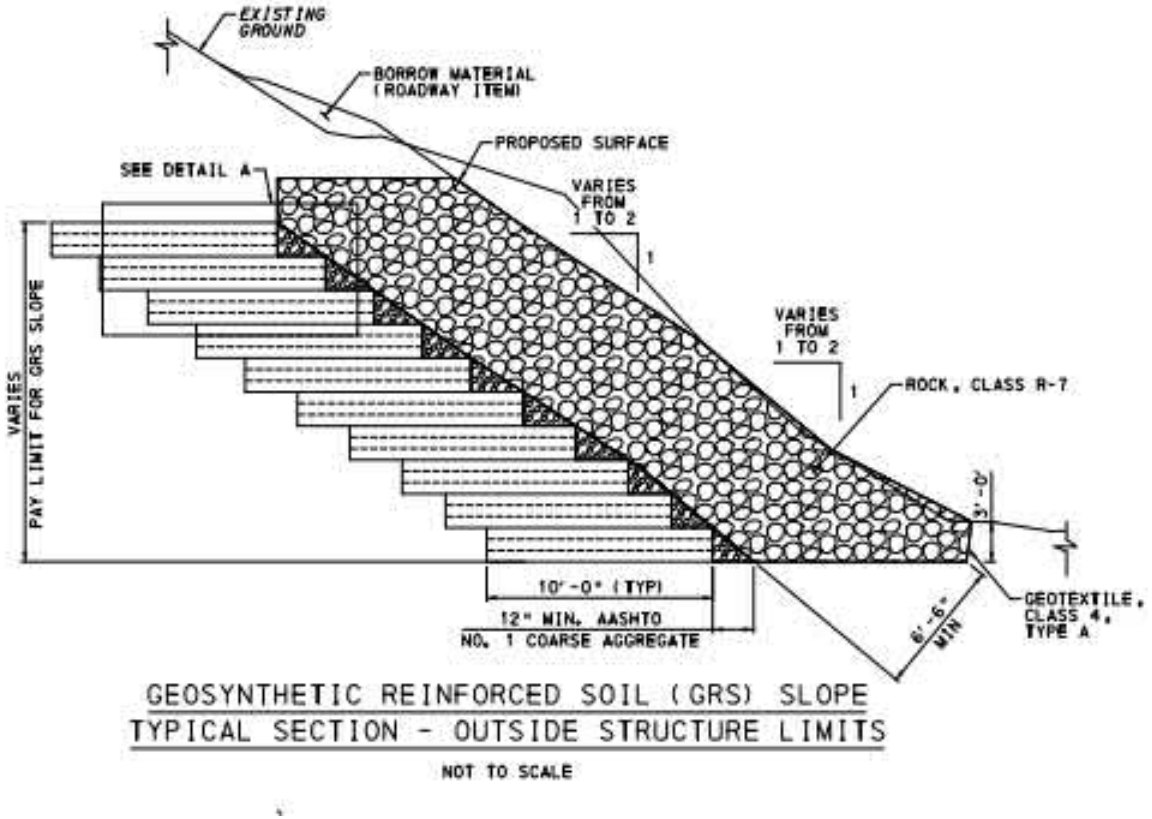
2 0 2 4 FEET

Rebuilding

Rebuilding



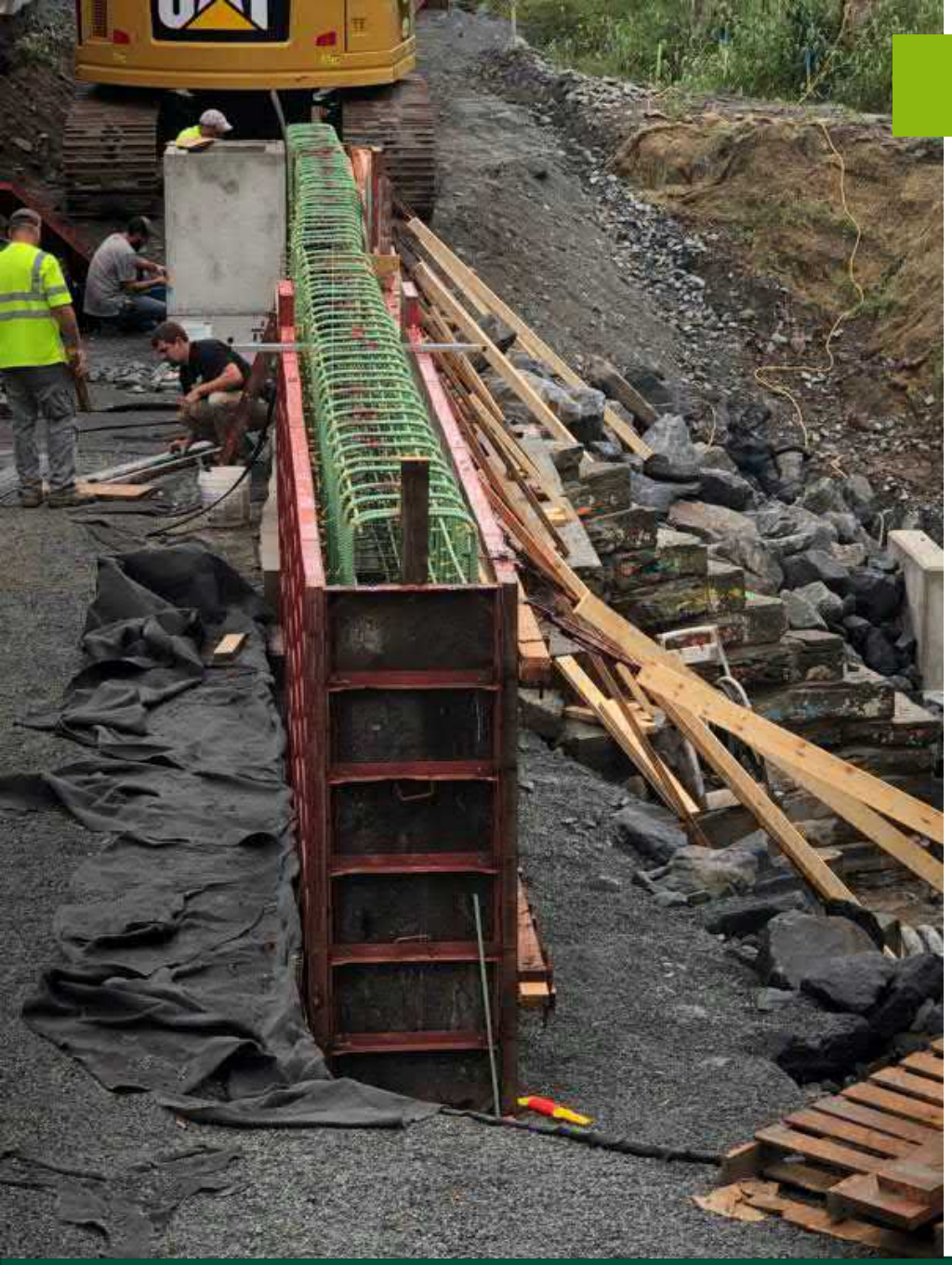
GRS / Toe Wall / Moment Slab

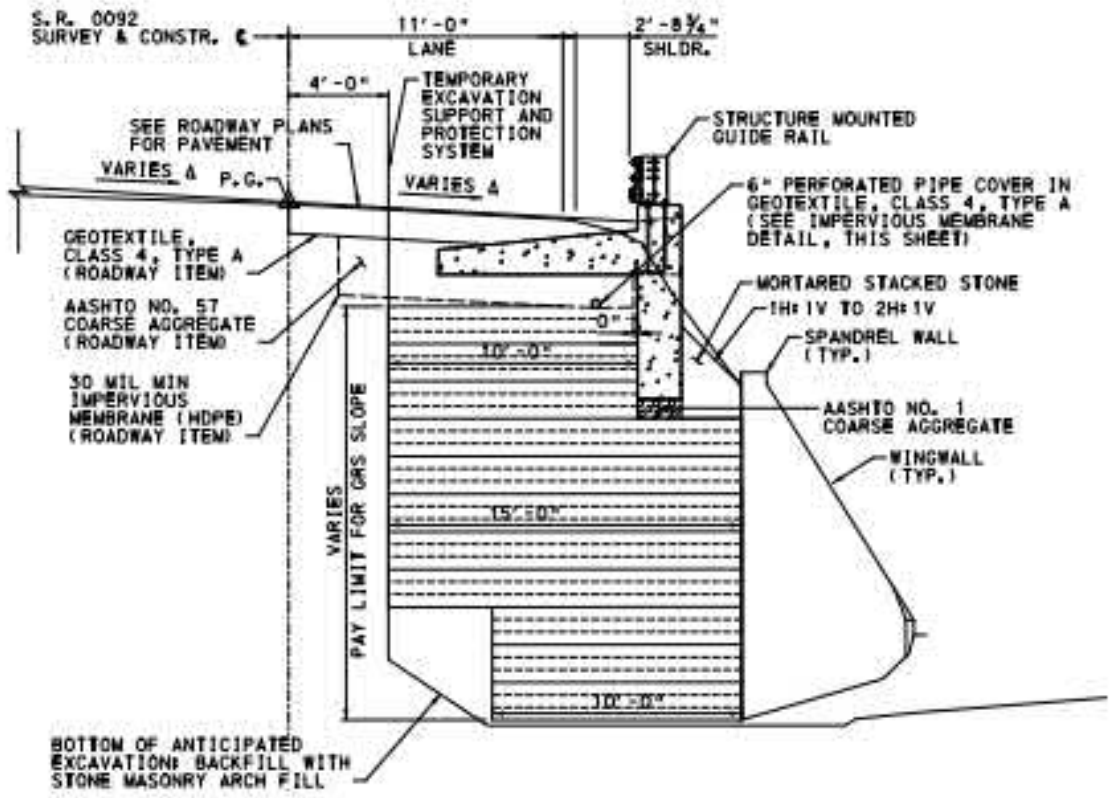


GEOSYNTHETIC REINFORCED SOIL (GRS) SLOPE
TYPICAL SECTION - OUTSIDE STRUCTURE LIMITS

NOT TO SCALE

GRS / Toe Wall / Moment Slab





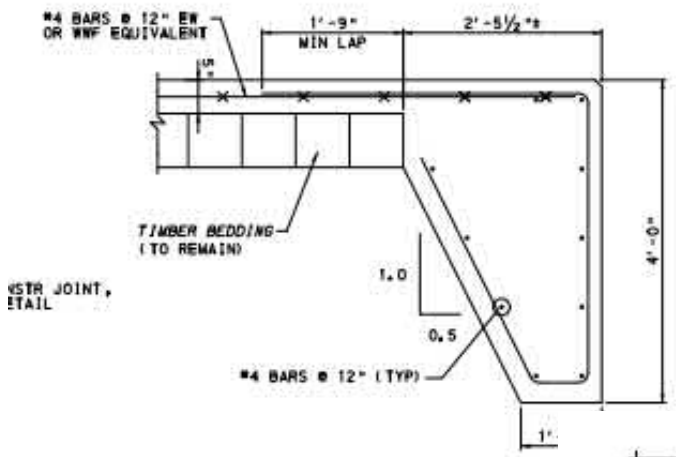
GEOSYNTHETIC REINFORCED SOIL (GRS) SLOPE
TYPICAL SECTION - WITHIN LIMITS OF WINGWALL

NOT TO SCALE

Δ SEE ROADWAY PLAN FOR VARYING CROSS SLOPES.

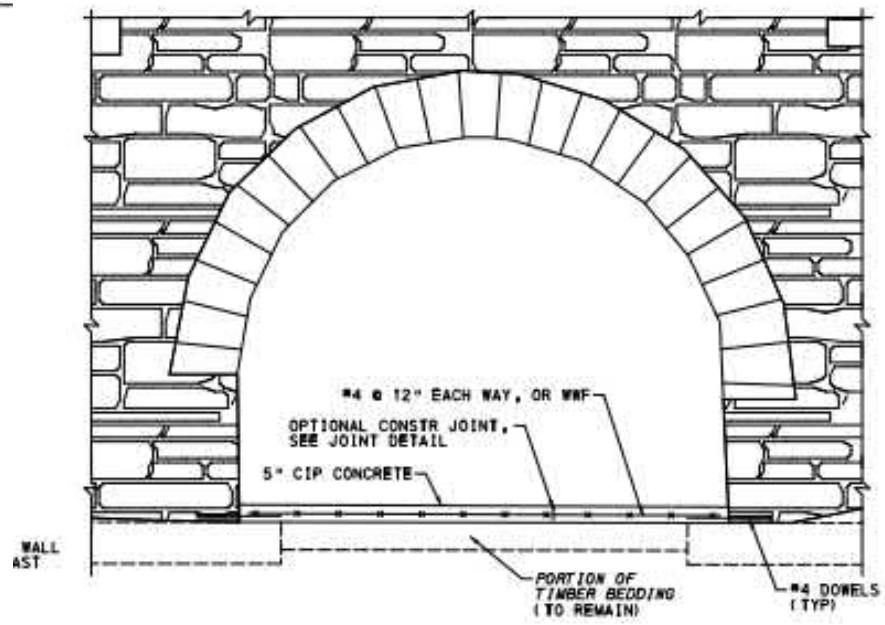
GRS / Toe Wall / Moment Slab

Concrete Floor



SECTION C-C

NOT TO SCALE



SECTION B-B

NOT TO SCALE

Existing Structure 2018 vs Final Construction

Construction Costs

Engineering Estimate: $2,086,610

vs bid $1,558,286 (low bid) successful contractor T. Brennan Heavy Equipment LLC

Highest Bid of 5 bidders - $2,422,222

Change Orders: $20,005

Total final cost: $1,578,291

2% Minority Participation

T. Brennan Heavy Equipment LLC performed 98% of the work


Q
A
Answer