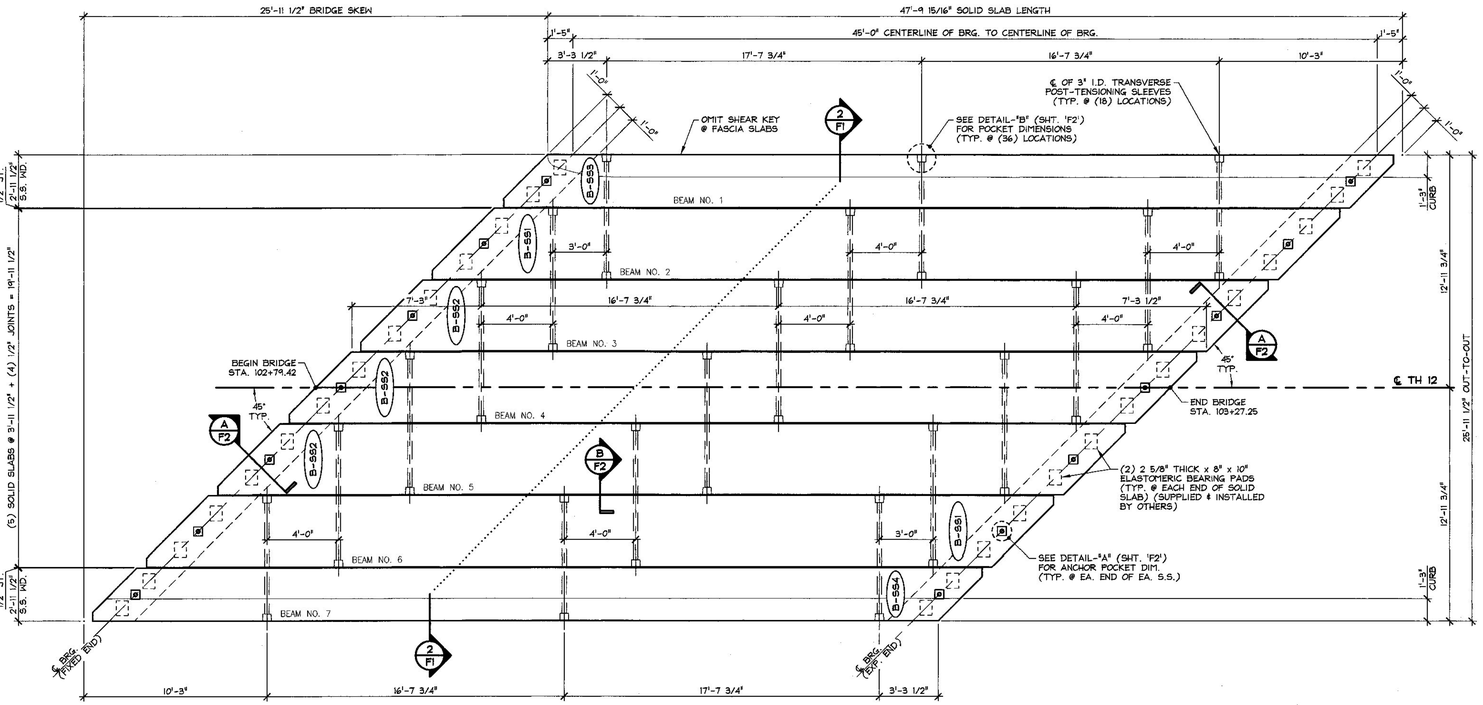
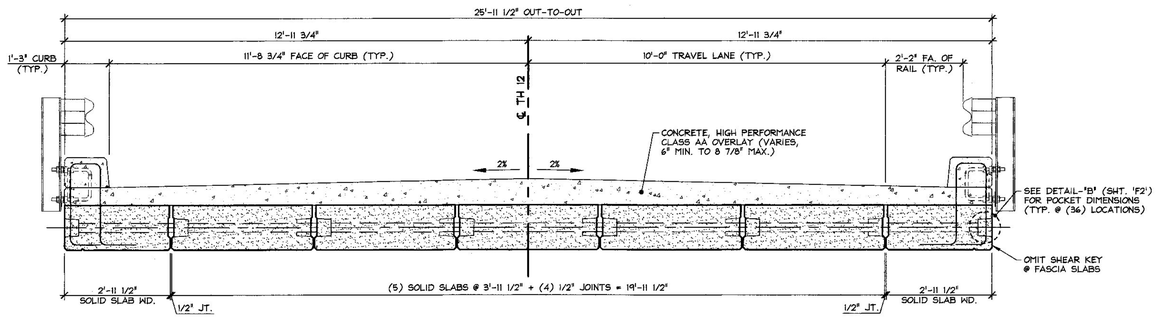
REVIEWED
By Jim Wild (jim.wild@state.vt.us) at 9:00 am, Apr 29, 2014



1/F1 PRECAST SOLID SLAB LAYOUT
1/4" = 1'-0"



2/F1 TRANSVERSE SECTION
1/2" = 1'-0"

CONSTRUCTION SEQUENCE

1. ERECT SLABS STARTING AT THE LOWER EXTERIOR SLAB, PLACING ONE SLAB AT A TIME:
   - A. PLACE SLABS TO FIT WITHIN THE WORKING LINES.
   - B. PRIOR TO INSTALLING INTERIOR SLABS IN EACH PHASE OF CONSTRUCTION, INSTALL ANCHORED END OF THREADED STEEL ROD WITH ENOUGH ROD TO PASS THROUGH THE NEXT SLAB TO BE PLACED IN THE FOLLOWING PHASE OF CONSTRUCTION.
   - C. AS WORK PROGRESSES, INSTALL HARDWOOD WEDGES BETWEEN ADJACENT SLABS TO MAINTAIN PROPER JOINT OPENING (A MINIMUM OF ONE WEDGE AT EACH POST-TENSIONING DUCT).
   - D. DRILL ANCHOR BOLT HOLES.
   - E. PLACE ANCHOR BOLTS.
2. INSTALL BACKER ROD: PLACE FILLER BELOW THE KEYWAY BOTTOM, AS SHOWN ON THE PLANS.
3. INSTALL THREADED STEEL RODS:
   - F. FEED THREADED STEEL RODS THROUGH DUCTS.
   - G. VERIFY THAT HARDWOOD WEDGES ARE IN PLACE AS REQUIRED TO PREVENT SLIPPAGE OF SLABS.
   - H. USING A CALIBRATED JACK, POST-TENSION THE THREADED STEEL RODS TO APPROXIMATELY 5 KIPS TO SEAT THE ANCHOR NUT.
6. GROUT SHEAR KEYS:
   - I. CLEAN JOINTS WITH AN OIL FREE AIR-BLAST IMMEDIATELY BEFORE GROUT PLACEMENT. VERIFY THAT THE BACKER ROD IS STILL IN PLACE.
   - J. FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR ADDITIONAL JOINT PREPARATION AND GROUT PLACEMENT.
   - K. CAREFULLY ROD JOINTS TO ELIMINATE ANY POSSIBILITY OF VOIDS.
7. POST-TENSION THREADED STEEL RODS:
   - L. GROUT SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 1,500 PSI, BASED ON THE MANUFACTURER'S RECOMMENDATIONS, PRIOR TO STRESSING. THE GROUT NEED NOT BE CURED FOR THREE DAYS PRIOR TO THE COMMENCING OF POST-TENSIONING.
   - M. PROVIDE APPROPRIATE CUBE MOLDS AS DESCRIBED IN AASHTO T106 FOR 3 SETS OF 3 DAY CUBES, 3 SETS OF 28 DAY CUBES AND AT A MINIMUM OF 3 MORE CUBES TO TEST FOR THE 1,500 PSI MINIMUM COMPRESSIVE STRENGTH (BY OTHERS).
   - N. POST-TENSION THREADED STEEL RODS TO 47 KIPS USING A CALIBRATED JACK OPERATED BY QUALIFIED PERSONNEL.
8. FOR EACH SOLID SLAB, REPEAT THE SEQUENCE SPECIFIED IN NOTES 1-7.

GENERAL NOTES

1. MIN. CONCRETE STRENGTH AT 28 DAYS SHALL BE 6,000 PSI.
2. MIN. CONCRETE STRENGTH AT STRESS TRANSFER SHALL BE 4,800 PSI.
3. REINFORCING STEEL SHALL BE GR-60, ASTM A-615 (AASHTO M31) AND SHALL BE LEVEL II, DUAL COATED.
4. PRESTRESSING STRANDS SHALL CONFORM TO ASTM A-416 (AASHTO M203) AND SHALL CONSIST OF 0.60"ϕ x 270 KSI 7-WIRE LOW RELAXATION STRANDS.
5. PRESTRESSING STRANDS SHALL EACH BE PULLED TO HAVE A NET TENSION OF 44.0 K AFTER ACCOUNTING FOR CHUCK SLIPPAGE. TENSION SHALL BE VERIFIED BY MEASURING STRAND ELONGATION. (SEE EXAMPLE ELONGATION CALCULATION AND TENSIONING PROCEDURE, THIS SHEET.)
6. ENDS OF PRESTRESSING STRANDS SHALL BE RECESSED & GROUTED.
7. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
8. THE TOP OF SLABS SHALL RECEIVE A TRANSVERSE RAKE FINISH ROUGHENED TO 1/4" AMPLITUDE.
9. SHEAR KEY SURFACES SHALL BE SAND BLASTED CLEAN.
10. SLABS SHALL BE HANDLED AND ERECTED USING THE LIFTING LOOPS ONLY. THE MINIMUM SLING ANGLE FROM THE HORIZONTAL SHALL BE 60°. **THE PINS OF THE SHACKLES SHALL BE PLACED THOUGH THE LIFTING LOOPS. SEE DETAIL, SHEET 'F2'.** SLABS SHALL BE STORED AND TRANSPORTED WITH TIMBER SUPPORTS WITHIN 2'-0" OF THE SLAB ENDS, UNLESS APPROVED BY J.P. CARRARA & SONS, INC.
11. MATERIAL SPECIFICATION AND MIX DESIGN SHALL CONFORM TO VERMONT SPEC. P510.02 AND P510.05 RESPECTIVELY.
    DESIGN MIX: J.P.C. BRIDGE MIX #425M
12. QUALITY CONTROL PROCEDURES ARE IN ACCORDANCE WITH PCI REQUIREMENTS. J.P. CARRARA & SONS, INC. IS A PCI CERTIFIED PLANT.
13. CURING METHOD: AS SOON AS THE TOP OF SLAB IS FINISHED, A COVER OF POLY AND A LAYER OF HOMOSOTE (OR BLUE BOARD) WILL BE PLACED OVER THE SLAB. THE DESIRED CURING TEMPERATURE RANGE SHALL NOT DROP BELOW 70°F. THE TEMPERATURE SHALL BE RECORDED BY AUTOMATIC SENSOR INSTRUMENTS ON GRAPH CHARTS, SPACED NOT MORE THAN 100' APART AND WILL CONTINUE UNTIL RELEASE STRENGTH IS ACHIEVED, (NATURAL CURE WITH NO EXTERNAL HEAT APPLIED). EACH CHART SHALL BE MARKED.
14. OWNER SHALL PROVIDE APPROPRIATE WATERPROOFING TO GROUTED SHEAR KEYS. J.P. CARRARA & SONS, INC. SHALL NOT BE HELD LIABLE FOR PROBLEMS ASSOCIATED WITH MOISTURE INFILTRATING GROUTED SHEAR KEYS.

EXAMPLE PRESTRESSING STRAND ELONGATION CALC. AND TENSIONING

(NOT TO BE USED FOR CONSTRUCTION)

SIZE & GRADE: 0.60"ϕ x 270 KSI
AREA: 0.217 IN^2
TENSION: 44,000 LB. EACH STRANDS
GRIP-TO-GRIP: 192'-9 3/4" = 192.813'
Es = 28,600,000 PSI (ASSUMED FOR THESE CALCULATIONS; VALUE TO BE OBTAINED FOR STRAND SPOOL ACTUALLY USED)

EXAMPLE:

$$\Delta = \frac{PL}{AE} = \frac{(44{,}000 - 3{,}000) \times 192.813 \times 12}{0.217 \times 28{,}600{,}000} = 15.29"$$

THEREFORE: (TOLERANCES ± 5%)
△ UPPER LIMIT = 1.05 x 15.29" = 16.05" = 16 1/16"
△ LOWER LIMIT = 0.95 x 15.29" = 14.53" = 14 1/2"

EXTRA FORCE REQUIRED TO COMPENSATE FOR 1/2" CHUCK SLIPPAGE:

$$\Delta P = \frac{0.5 \times 41{,}000}{15.29} = 1{,}340 \text{ LBS.}$$

TOTAL TENSIONING FORCE = 44,000 + 1,340 = 45,340 LBS.

STRAND TENSIONING PROCEDURE:

1. PULL EACH STRAND INITIALLY TO 3,000# LBS. AND MARK STRAND.
2. THEN PULL EACH STRAND TO A TOTAL TENSION OF 45,340# LBS. AND MEASURE ELONGATION AFTER SEATING. IT MUST BE BETWEEN 14 1/2" & 16 1/16".

NOTE: FORCES READ ON STRESSING JACK GAUGES MUST BE MADE TO CORRESPOND TO ABOVE VALUES BASED ON CALIBRATION DATA FOR SPECIFIC JACK USED.

Vermont Agency of Transportation
RECEIVED
Brattleboro/Work/Video/Bsam9-e Submittal.pdf
CK'D BY MJC OK'D BY TAS
April 24, 2014
RESUBMIT No Approved AsNoted
BY M. J. Chenette DATE 04/29/2014

SHOP DRAWING REVIEW
☐ REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.
☐ REJECTED ☐ REVISE AND RESUBMIT ☒ FURNISH AS CORRECTED
CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR REVIEW OF GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR, CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; SELECTING FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION; COORDINATING HIS WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING HIS WORK IN A SAFE AND SATISFACTORY MANNER.
VHB Vanasse Hangen Brustlin, Inc. 7056 US Route 7 North Ferrisburgh, VT 05473 802.425.7788
Job Number: 57528.00
Reviewed By: E.A. FIALA
Date: 04/29/2014

APPROVAL STAMP:

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Precast & Prestress Manufacturer
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RENAUD BRO., INC.
CONTRACTOR
VERNON, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF WINDHAM

DATE: MAR. 24, 2014
SCALE: NOTED
CHKD: M.D. DFTM: B.L.
JOB NO: 23424-014

TOWN OF BRATTLEBORO
TH 12, CLASS III (LOCAL ROAD) OVER HALLADAY BROOK
BRIDGE NO.: 7 PROJECT NO.: BRO 1442(35)

SUPERSTRUCTURE PLAN & SECTION

DWG. NO: F1

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