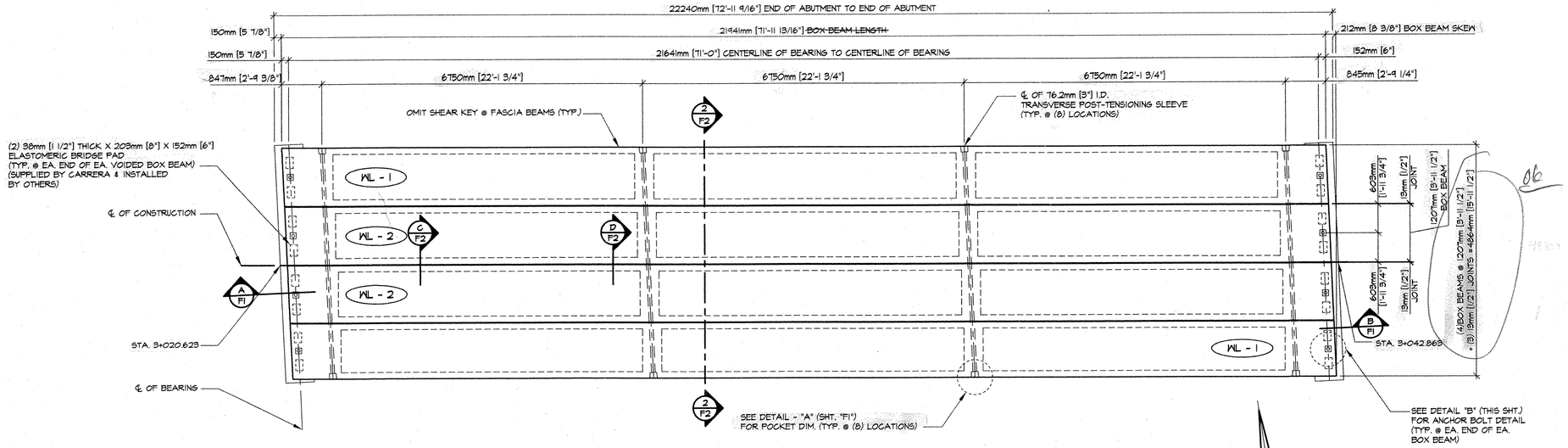
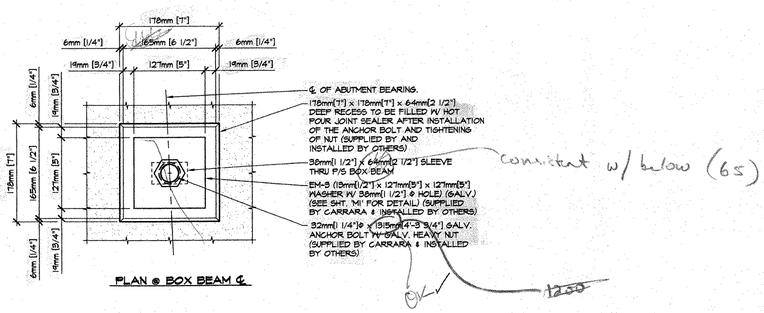


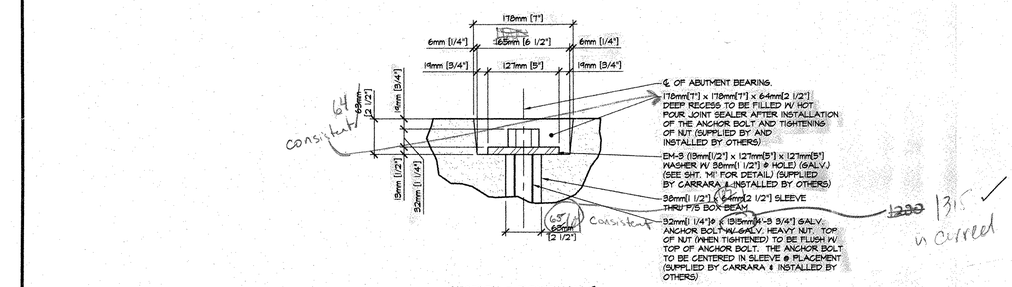

## 1 / F1 PRESTRESSED BOX BEAM LAYOUT

1:50

**DESIGN LOAD: AASHTO MS-22.5 LIVE LOAD**



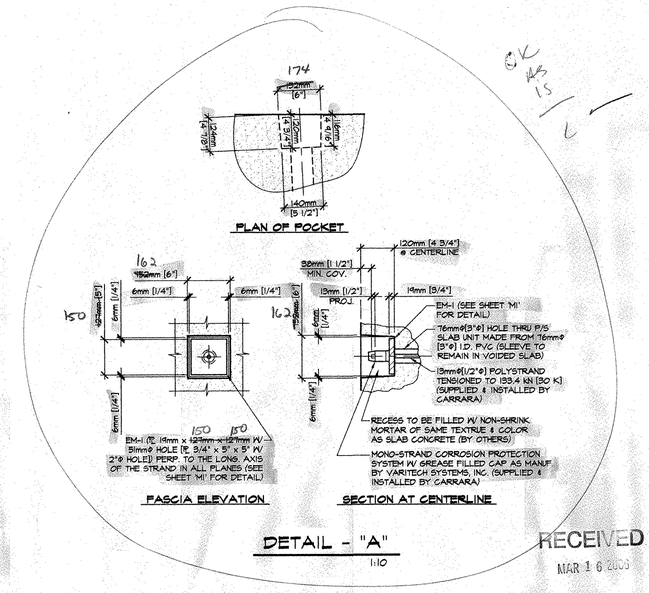

PLAN @ BOX BEAM ℄




SECTION @ BOX BEAM ℄

DETAIL - "B"

1:5




DETAIL - "A"

1:10

OK AB 15

690
110
1800
19
- 1281
+ 38
1319

## GENERAL NOTES

1. MIN. CONCRETE STRENGTH AT 28 DAYS: f'c = 42 MPa [6,100 PSI]
   MIN. CONCRETE STRENGTH AT STRESS TRANSFER: f'ci = 30 MPa [4,350 PSI]
2. REINFORCING STEEL SHALL BE GR-420 [GR-60], AASHTO M 31M ASTM A-615 AND SHALL BE EPOXY COATED.
3. PRESTRESSING STRANDS SHALL CONFORM TO ASTM A-416 (AASHTO M 203M) AND SHALL CONSIST OF:
   15mm[0.60"]ø x 1860 MPa [270 KSI]
   7-WIRE LOW RELAXATION STRANDS.
4. PRESTRESSING STRANDS SHALL EACH BE PULLED TO HAVE A NET TENSION OF 195.5 kN [44.0 K] (UNLESS NOTED OTHERWISE) AFTER ACCOUNTING FOR CHUCK SLIPPAGE. TENSION SHALL BE VERIFIED BY MEASURING STRAND ELONGATION.
   SEE EXAMPLE ELONGATION CALCULATION AND TENSIONING PROCEDURE, (THIS SHEET).
5. END OF PRESTRESSING STRANDS SHALL BE CUT W/ A TORCH, RECESSED AND PATCHED, WITH ASPHALTIC COATING.
6. TOP OF THE BEAMS SHALL RECEIVE A RAKE FINISH ROUGHNESS TO 6mm (1/4") AMPLITUDE.
7. BEAMS SHALL BE HANDLED AND ERECTED USING THE LIFTING LOOPS ONLY. THE MINIMUM SLING ANGLE FROM THE HORIZONTAL SHALL BE 60°. SHALL BE STORED AND TRANSPORTED WITH TIMBER SUPPORTS WITHIN 610mm[2'-0"] OF THE ENDS, UNLESS APPROVED BY J.P. CARRARA & SONS, INC.
8. SHEAR KEY SURFACES SHALL BE BLAST CLEAN.
9. DESIGN MIX: J.P.C. BRIDGE MIX #451MESCC
   106.8kg [180 LBS] FLY ASH - ISG RESOURCES
   427.2 kg [720 LBS.] TYPE III CEMENT - GLENS FALLS CEMENT
   742 kg [1250 LBS.] FINE AGGREGATE
   860 kg [1450 LBS.] COARSE AGGREGATE
   160.0 L [42.2 GAL.] WATER - 159.2 kg [352 LBS.]
   5% - 9.0% AIR CONTENT (251.42 mL [6.5 OZ.] DAREX II) ADJ. AS REQ.
   619.3 mL MB 3400 PER 100 kg CEMENT, SPREAD 559mm - 711mm [9.5 OZ. MB 3400 PER 100 LBS. CEMENT, SPREAD 22" - 28"]
   14.25 L [3 GAL.] DCI
   195.6 mL DARATARD PER 100 kg CEMENT
   [3.0 OZ. DARATARD PER 100 LBS. CEMENT, SPREAD 22" - 28"]
10. QUALITY CONTROL PROCEDURES ARE IN ACCORDANCE WITH PCI REQUIREMENTS. J.P. CARRARA & SONS, INC. IS A PCI CERTIFIED PLANT.
11. THE ENGINEER OF RECORD WILL BE NOTIFIED (7) WORKING DAYS SO THAT ALL PRECAST OPERATIONS MAY BE WITNESSED.
12. THE VOIDS MUST BE VENTED DURING THE CURING PERIOD.
    CURING METHOD:
13. NATURAL CURE. AS SOON AS THE TOP OF THE BEAM IS FINISHED, COVER WITH POLY UNTIL RELEASE STRENGTH IS ACHIEVED.
14. TRANSVERSE POST-TENSIONING SEQUENCE:
    A. ONCE BOX BEAMS & SOLID SLABS ARE ERECTED, POST-TENSION TENDONS TO APPROXIMATELY 22 kN [4,946 LBS].
    B. GROUT SHEAR KEYS. (BY OTHERS)
    C. ONCE SHEAR KEY GROUT HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 10.3 MPa [1,500 PSI], POST-TENSION TENDONS TO 133.5 kN [30,000 LBS].
15. POST-TENSIONING STRANDS SHALL CONFORM TO AASHTO M 203M [ASTM A-416] AND SHALL CONSIST OF 13mm[1/2"]ø x 1860 MPa [270 KSI] POLYSTRAND.
16. NO INSERTS SHALL BE FIELD INSTALLED IN SLABS WITHOUT APPROVAL OF J.P. CARRARA & SONS, INC.

### EXAMPLE PRESTRESSING STRAND ELONGATION CALCULATION AND TENSIONING

(NOT TO BE USED FOR CONSTRUCTION)

SIZE & GRADE: 0.60"ø x 270 KSI

AREA: 0.217 IN^2

TENSION: 44,000 LBS. EACH STRAND

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:

$\Delta P = \frac{0.5 \times 41{,}000}{15.29} = 1{,}341$ LBS.

TOTAL TENSIONING FORCE = 44,000 + 1,341 = 45,341 LBS. [201.7 kN]

### STRAND TENSIONING PROCEDURE

1. PULL EACH STRAND INITIALLY TO 13.34 kN* [3,000 LBS]* & MARK STRAND.
2. THE PULL EACH STRAND TO A TOTAL TENSION OF 201.7 kN* [45,341 LBS]* AND MEASURE ELONGATION AFTER SEATING. IT MUST BE BETWEEN 364mm[14 1/2"] AND 408mm[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.

RECEIVED
MAR 16 2006

APPROVAL STAMP:

RECEIVED
CK'D BY JMB OK'D BY CWC
MAR 17 2006
RESUBMIT ____ APPROVED AS NOTED
BY CWC DATE 4-6-06

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2464 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010

ALPINE CONSTRUCTION, LLC
CONTRACTOR
SCHUYLERVILLE, NY

STATE OF VERMONT A.O.T.
COUNTY OF RUTLAND

TOWN OF WALLINGFORD
PROJECTNUMBER: BRO 1443(31)
TH 60, CLASS 3 (LOCAL BRIDGE), BRIDGE NO.50

SUPERSTRUCTURE PLAN & DETAILS

| | |
|---|---|
| DATE: FEB. 14, 2006 | |
| SCALE: NOTED | |
| CHKD: B.L. | DFTM: B.J.B. |
| JOB NO: 23235-06 | |
| DWG. NO: F1 #039 PCL | |