NEXT BEAM GENERAL NOTES

1. MIN. CONCRETE STRENGTH AT 28 DAYS SHALL BE 8,000 PSI.
2. MIN. CONCRETE STRENGTH AT STRESS TRANSFER SHALL BE 6,000 PSI.
3. REINFORCING STEEL SHALL BE GR-60, ASTM A-615 (AASHTO M31) LEVEL II (DUAL COATED).
4. PRESTRESSING STRANDS SHALL CONFORM TO ASTM A-416 (AASHTO M203) AND SHALL CONSIST OF 0.60"ø 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 CUT FLUSH WITH END OF NEXT BEAM STEMS (UNLESS NOTED OTHERWISE) AND COATED WITH TWO PART EPOXY PAINT SYSTEM.
7. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
8. THE TOP OF BEAMS SHALL RECEIVE A SMOOTH FLOAT FINISH (UNLESS NOTED OTHERWISE).
9. SHEAR KEY SURFACES SHALL BE ROUGHENED.
10. BEAMS SHALL BE HANDLED AND ERECTED USING THE LIFTING LOOPS ONLY. RIGGING SHALL BE CONFIGURED SUCH THAT EQUAL AND VERTICAL FORCES ARE APPLIED TO EACH OF THE TWO LIFTING LOOPS AT EACH END OF THE BEAM. THE PINS OF THE SHACKLES SHALL BE PLACED THROUGH THE LIFTING LOOPS. SEE DETAIL, THIS SHEET. BEAMS SHALL BE STORED AND TRANSPORTED WITH TIMBER SUPPORTS WITHIN 2'-4" OF THE BEAM 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 #426M
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 BEAM IS FINISHED, A COVER OF INSULATED POLY. 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. EACH CHART SHALL BE MARKED WITH THE CASTING DATED AND LOCATION OF THE RECORDER. IF NECESSARY TO MAINTAIN CASTING BED TEMPERATURE PRIOR TO CONCRETE PLACEMENT OR TO ACCELERATE EARLY AGE STRENGTH GAIN, EXTERNAL RADIANT HEAT MAY BE EMPLOYED VIA HOT WATER DUCTS BENEATH AND WITHIN THE PERIPHERY OF THE CASTING BED. MAXIMUM CURING TEMPERATURE SHALL NOT EXCEED PCI SPECIFIED LIMITS.
14. OWNER SHALL PROVIDE APPROPRIATE WATERPROOFING TO GROUTED AND/OR EPOXIED SHEAR KEYS. J.P. CARRARA & SONS, INC. SHALL NOT BE HELD LIABLE FOR PROBLEMS ASSOCIATED WITH MOISTURE INFILTRATING GROUTED AND/OR EPOXIED SHEAR KEYS.

DRAWING INDEX

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NB2	PRESTRESSED NEXT BEAM DETAILS "CA-NB1"	1	01-22-15
NB3	PRESTRESSED NEXT BEAM DETAILS "CA-NB2"	1	01-22-15
NB4	PRESTRESSED NEXT BEAM DETAILS "CA-NB3"	1	01-22-15
M1	MATERIALS LIST FOR NEXT BEAMS	1	01-22-15

DESIGN LIVE LOAD: HL-93

EXAMPLE PRESTRESSING STRAND ELONGATION CALC. AND TENSIONING

(NOT TO BE USED FOR CONSTRUCTION)

SIZE & GRADE: 0.60"ø x 270 KSI
AREA: 0.217 IN^2
TENSION: 44,000 LB. EACH STRAND
GRIP-TO-GRIP: 252'-0" = 252.00'
Es = 28,500,000 PSI (ASSUMED FOR THESE CALCULATIONS; VALUE TO BE OBTAINED FOR STRAND SPOOL ACTUALLY USED)

EXAMPLE:

$$\Delta = \frac{PL}{AE} = \frac{(44{,}000 - 3{,}000) \times 252.00 \times 12}{0.217 \times 28{,}500{,}000} = 20.047"$$

THEREFORE: (TOLERANCES ± 5%)
Δ UPPER LIMIT = 1.05 x 20.047" = 21.05" = 21"
Δ LOWER LIMIT = 0.95 x 20.047" = 19.04" = 19"

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

$$\Delta P = \frac{0.5 \times 41{,}000}{20.047} = 1{,}023 \text{ LBS.}$$

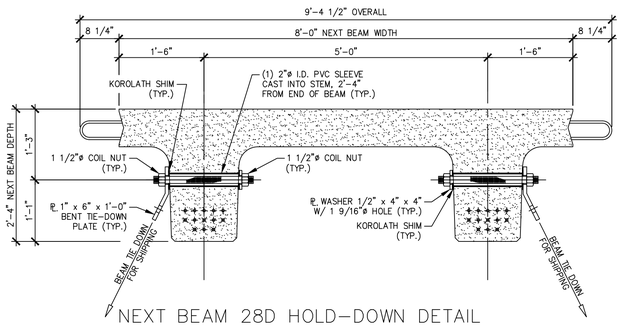
TOTAL TENSIONING FORCE = 44,000 + 1,023 = 45,023 LBS.

ADDITIONALLY, INCREASED ELONGATION AND THE CORRESPONDING FORCE DUE TO FORM SHORTENING SHALL BE ACCOUNTED FOR IN THE CALCULATIONS USED FOR CONSTRUCTION PER PROVISION PCI MNL 116 5.3.11.3.

STRAND TENSIONING PROCEDURE:

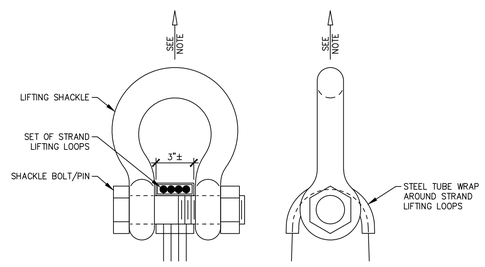
1. PULL EACH STRAND INITIALLY TO 3,000* LBS. AND MARK STRAND.
2. THEN PULL EACH STRAND TO A TOTAL TENSION OF 45,023* LBS. AND MEASURE ELONGATION AFTER SEATING. IT MUST BE BETWEEN 19"* AND 21"*.

   * NOTE: FORCES READ ON STRESSING JACK GAUGES MUST BE MADE TO CORRESPOND TO ABOVE VALUES BASED ON CALIBRATION DATA FOR SPECIFIC JACK USED.
3. STRANDS IN BOTTOM TWO ROWS SHALL BE RE-PULLED TO VERIFY SHORTENING EFFECT OF SELF STRESSING BED. RE-PULL FORCE SHALL NOT INCLUDE OVER-PULL FOR SHORTENING.



NEXT BEAM 28D HOLD-DOWN DETAIL FOR SHIPPING

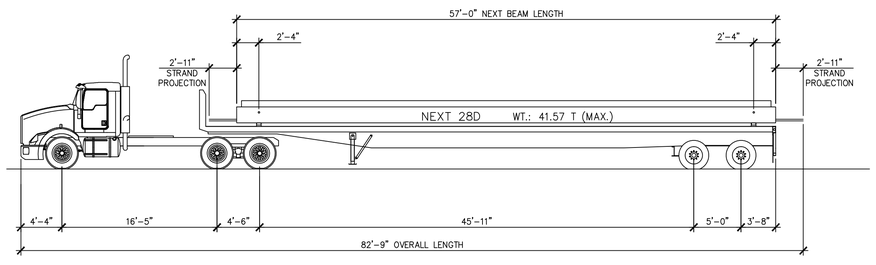
3/4" = 1'-0"



NOTE: BEAMS SHALL BE HANDLED AND ERECTED USING THE LIFTING LOOPS ONLY. RIGGING SHALL BE CONFIGURED SUCH THAT EQUAL AND VERTICAL FORCES ARE APPLIED TO EACH SET OF LIFTING LOOPS AT EACH END OF THE BEAM. SHACKLE BOLT/PIN SHALL BE PLACED UNDER LIFT LOOPS AS SHOWN. DESIGN AND CONFIGURATION OF RIGGING BY PURCHASER.

LIFTING SHACKLE DETAILS

N.T.S.



S H I P P I N G E L E V A T I O N

N.T.S.

△1 01-22-15 REVISED

APPROVAL STAMP:

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

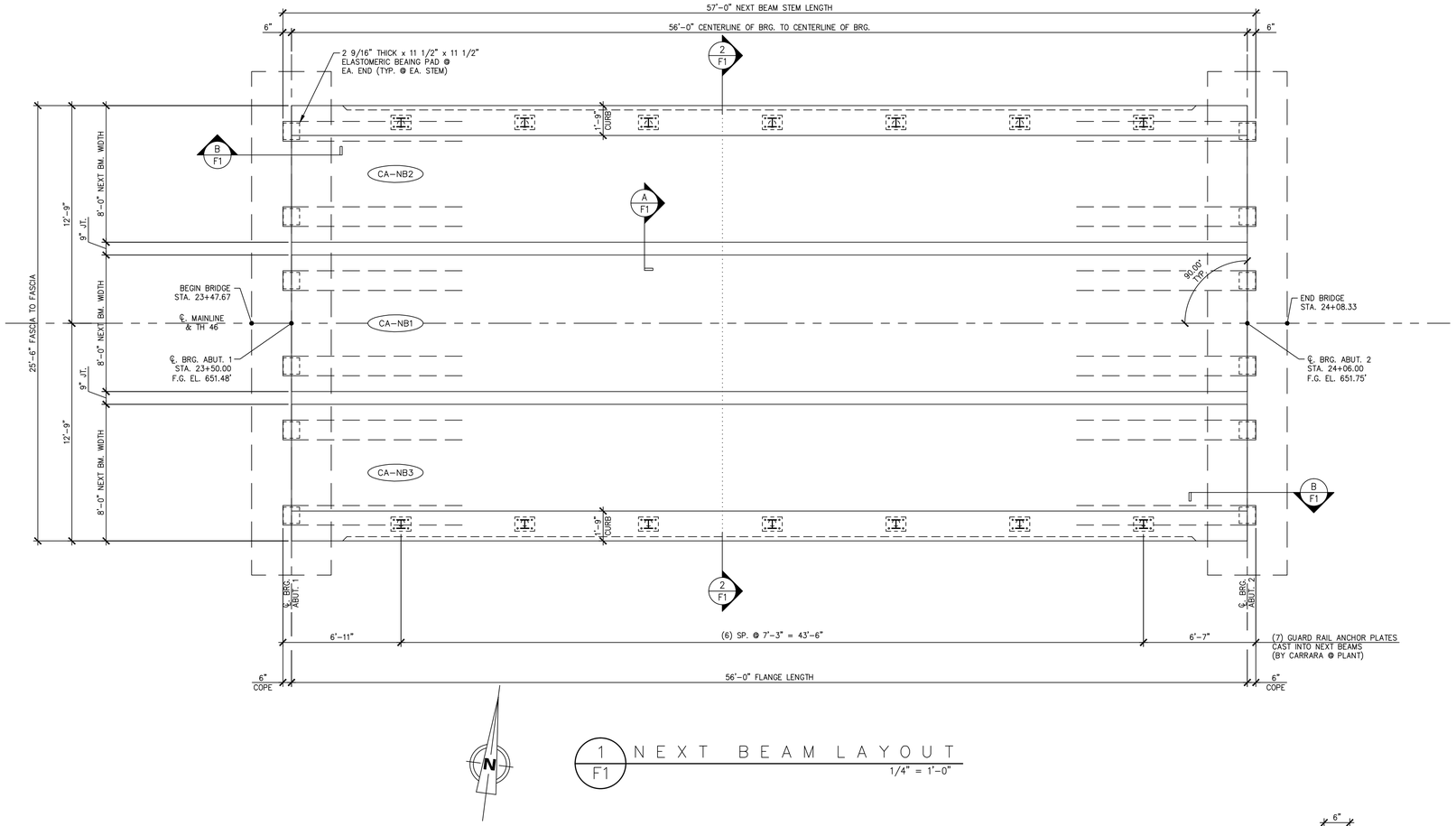
BLOW & COTE, INC.
CONTRACTOR
MORRISVILLE, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF LAMOILLE

TOWN OF CAMBRIDGE
IRISH SETTLEMENT ROAD T.H.46 CLASS 3
BRIDGE NO.: 28 PROJECT NO.: BRO 1448(39)

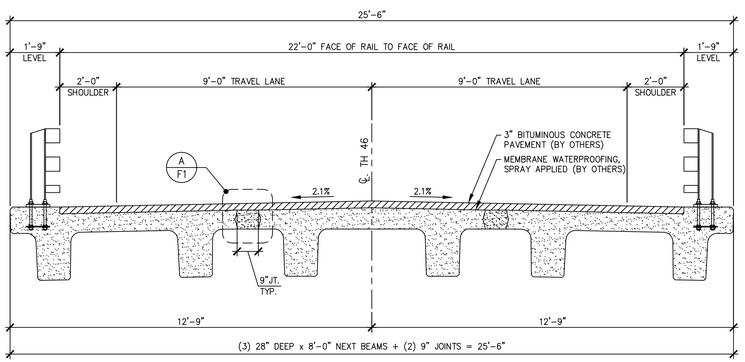
COVER SHEET

DATE: JAN. 22, 2015
SCALE: NOTED
CHKD: RM DFTM: PSS
JOB NO: 23447-014
DWG. NO: C1



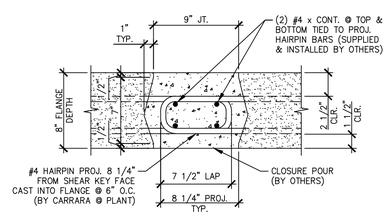
1 F1 NEXT BEAM LAYOUT

1/4" = 1'-0"



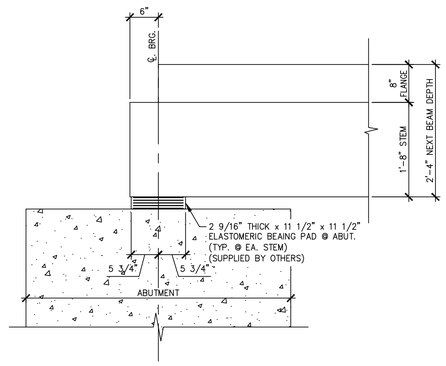
2 F1 TRANSVERSE NEXT BEAM SECTION

3/8" = 1'-0"



A F1 NEXT BEAM CLOSURE POUR

1 1/2" = 1'-0"



B F1 BEARING DETAIL

3/4" = 1'-0"

⚠1 01-22-15 REVISED

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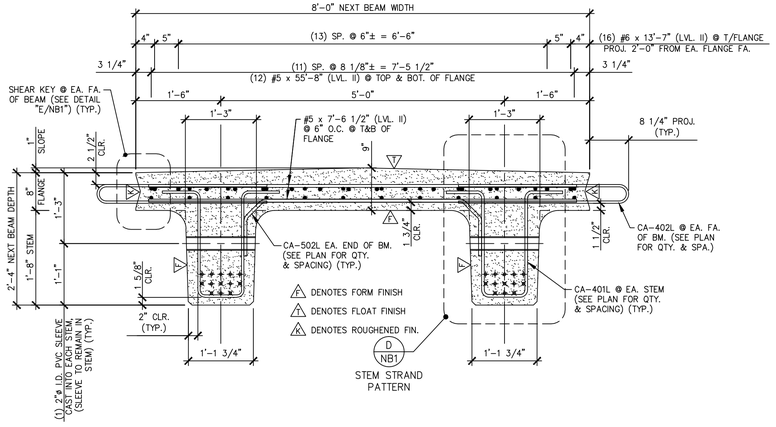
TOWN OF CAMBRIDGE
IRISH SETTLEMENT ROAD T.H.46 CLASS 3
BRIDGE NO.: 28 PROJECT NO.: BRO 1448(39)

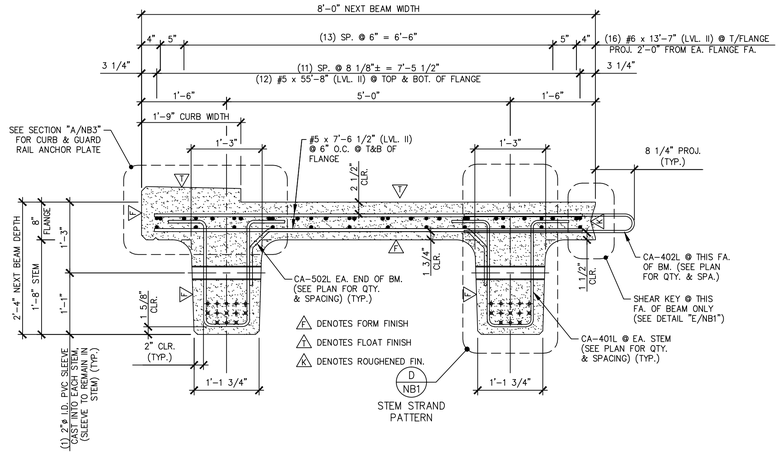
PRESTRESSED NEXT BEAM LAYOUT

DATE:	JAN. 22, 2015
SCALE:	NOTED
CHKD: RM	DFTM: PSS
JOB NO:	23447-014
DWG. NO:	F1



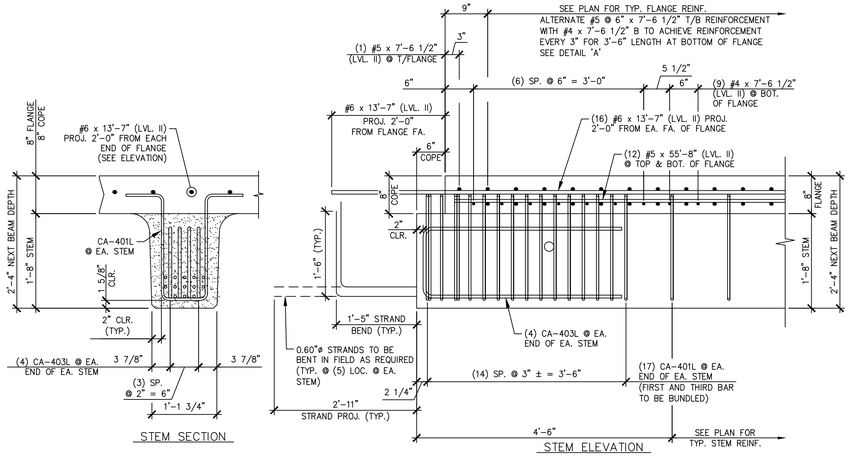
A NB1 DIMENSIONAL & REINFORCING SECTION

3/4" = 1'-0"



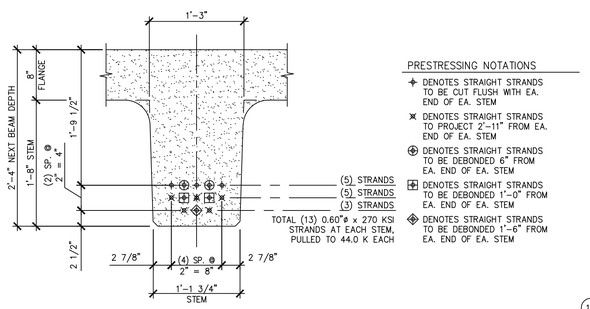
B NB1 DIMENSIONAL & REINFORCING SECTION

3/4" = 1'-0"



C NB1 END BLOCK STEM REINFORCING DETAILS

3/4" = 1'-0"



PRESTRESSING NOTATIONS

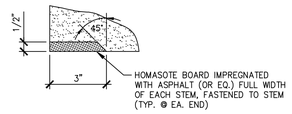
- DENOTES STRAIGHT STRANDS TO BE CUT FLUSH WITH EA. END OF EA. STEM
- DENOTES STRAIGHT STRANDS TO PROJECT 2"-11" FROM EA. END OF EA. STEM
- DENOTES STRAIGHT STRANDS TO BE DEBONDED 6" FROM EA. END OF EA. STEM
- DENOTES STRAIGHT STRANDS TO BE DEBONDED 1'-0" FROM EA. END OF EA. STEM
- DENOTES STRAIGHT STRANDS TO BE DEBONDED 1'-6" FROM EA. END OF EA. STEM

D NB1 STEM STRAND PATTERN

1" = 1'-0"

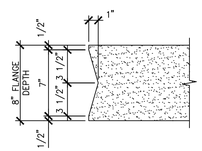
DETENSIONING SCHEDULE

N.T.S.



F NB1 HOMASOTE DETAIL

3" = 1'-0"



E NB1 SHEAR KEY DETAIL

1 1/2" = 1'-0"

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COUNTY OF LAMOILLE

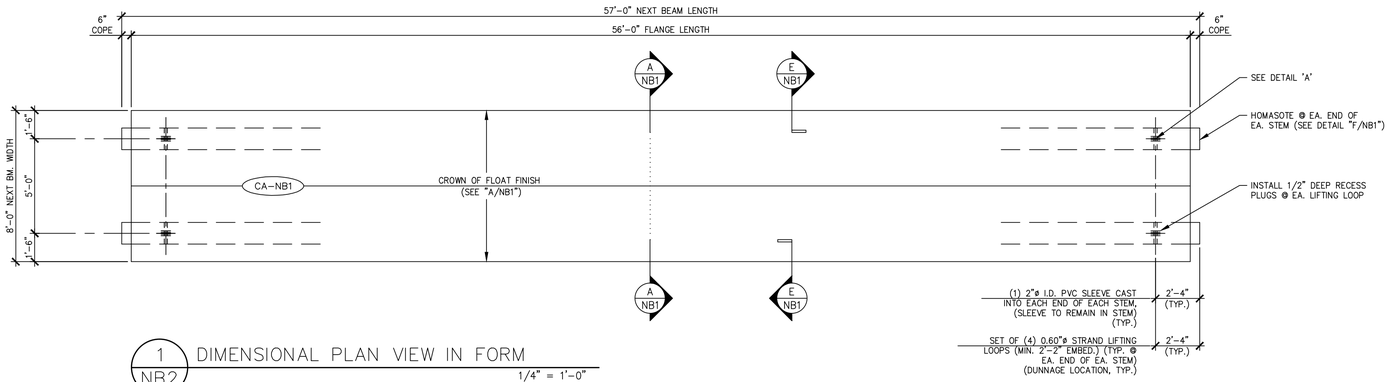
DATE: JAN. 22, 2015
SCALE: NOTED

TOWN OF CAMBRIDGE
IRISH SETTLEMENT ROAD T.H.46 CLASS 3
BRIDGE NO.: 28 PROJECT NO.: BRO 1448(39)

CHKD: RM DFTM: PSS
JOB NO: 23447-014

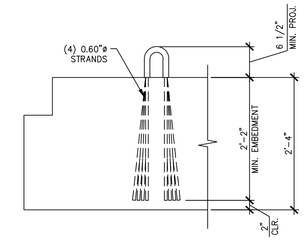
PRESTRESSED NEXT BEAM DETAILS

DWG. NO: NB1



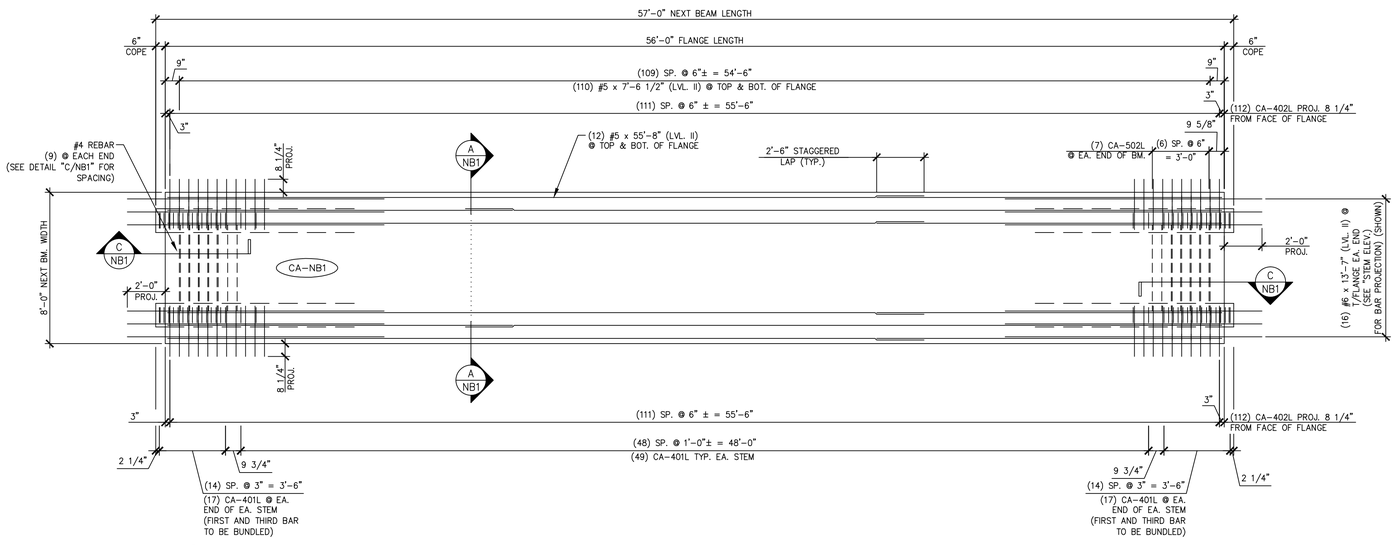
1 / NB2 DIMENSIONAL PLAN VIEW IN FORM

1/4" = 1'-0"



A / NB2 LIFT LOOP DETAIL

3/4" = 1'-0"



2 / NB2 REINFORCING PLAN VIEW IN FORM

1/4" = 1'-0"

MARK: CA-NB1	QTY.: 1	WT.: 41.01 T	VOL.: 20.25 cy

MATERIAL LIST / NEXT BEAM

ITEM	MARK	DESCRIPTION	QTY.
1	CA-401L	#4 BENT BAR (LEVEL II, DUAL COATED)	166
2	CA-402L	#4 BENT BAR (LEVEL II, DUAL COATED)	224
3	CA-403L	#4 BENT BAR (LEVEL II, DUAL COATED)	16
4	CA-502L	#5 BENT BAR (LEVEL II, DUAL COATED)	14
5		#4 x 7'-6 1/2" (LEVEL II, DUAL COATED)	18
6			
7		#5 x 7'-6 1/2" (LEVEL II, DUAL COATED)	222
8		#5 x 55'-8" (W/ (1) 2'-6" STAGGERED LAP) (LVL. II, DUAL COATED)	24
9			
10			
11		#6 x 13'-7" (LEVEL II, DUAL COATED)	32
12			
13		2"ø I.D. PVC SLEEVE	4
14		SET OF (4) 0.60"ø x 270 KSI STRAND LIFTING LOOPS	4
15			

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APPROVAL STAMP:

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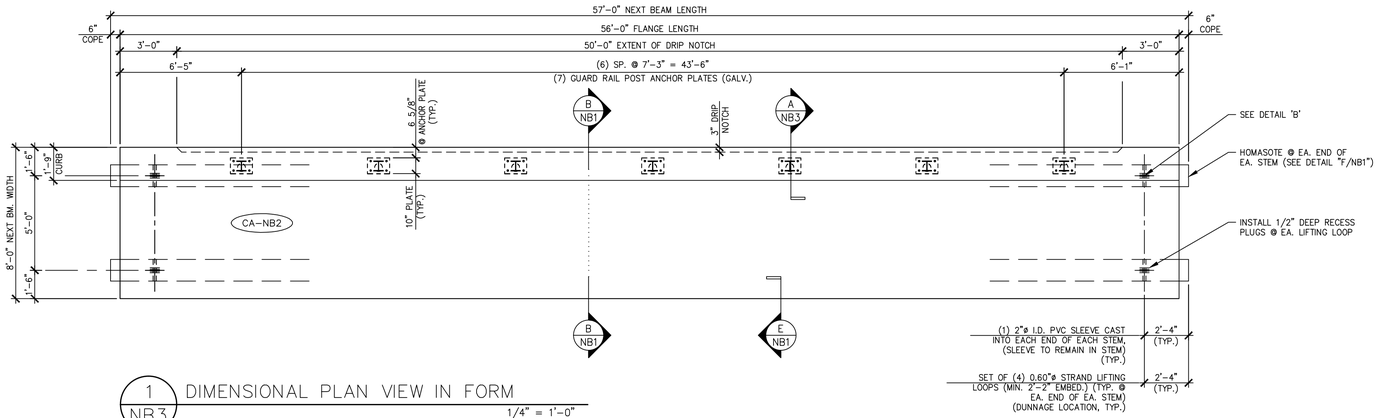
STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF LAMOILLE

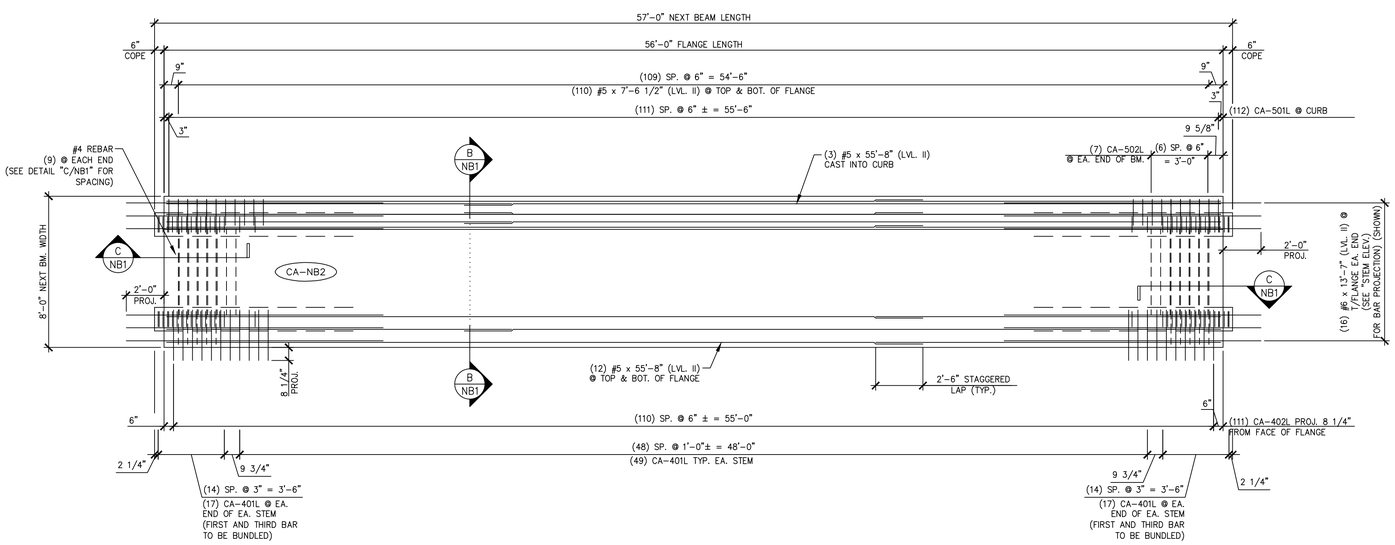
TOWN OF CAMBRIDGE
IRISH SETTLEMENT ROAD T.H.46 CLASS 3
BRIDGE NO.: 28 PROJECT NO.: BRO 1448(39)

PRESTRESSED NEXT BEAM DETAILS

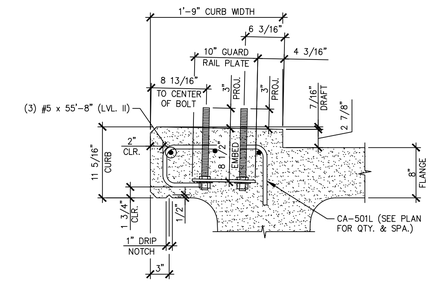
DATE: JAN. 22, 2015
SCALE: NOTED
CHKD: RM DFTM: PSS
JOB NO: 23447-014
DWG. NO: NB2



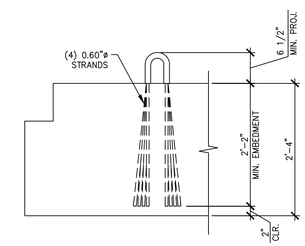
1 NB3 DIMENSIONAL PLAN VIEW IN FORM
1/4" = 1'-0"



2 NB3 REINFORCING PLAN VIEW IN FORM
1/4" = 1'-0"



A NB3 CURB & GUARD RAIL ANCHOR PLATE SECTION
TYP. BEAM REINF. NOT SHOWN FOR CLARITY
1" = 1'-0"



B NB3 LIFT LOOP DETAIL
3/4" = 1'-0"

MARK: CA-NB2	QTY.: 1	WT.: 41.57 T	VOL.: 20.53 cy

MATERIAL LIST / NEXT BEAM

ITEM	MARK	DESCRIPTION	QTY.
1	CA-401L	#4 BENT BAR (LEVEL II, DUAL COATED)	166
2	CA-402L	#4 BENT BAR (LEVEL II, DUAL COATED)	111
3	CA-403L	#4 BENT BAR (LEVEL II, DUAL COATED)	16
4	CA-501L	#5 BENT BAR (LEVEL II, DUAL COATED)	112
5	CA-502L	#5 BENT BAR (LEVEL II, DUAL COATED)	14
6		#4 x 7'-6 1/2" (LEVEL II, DUAL COATED)	18
7			
8		#5 x 7'-6 1/2" (LEVEL II, DUAL COATED)	222
9		#5 x 55'-8" (W/ (1) 2'-6" STAGGERED LAP) (LVL. II, DUAL COATED)	27
10			
11		#6 x 13'-7" (LEVEL II, DUAL COATED)	32
12			
13		2"ø I.D. PVC SLEEVE	4
14		SET OF (4) 0.60"ø x 270 KSI STRAND LIFTING LOOPS	4
15		GUARD RAIL ANCHOR PLATE (GALV.) (SUPPLIED BY OTHERS)	7

⚠ 01-22-15 REVISED

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

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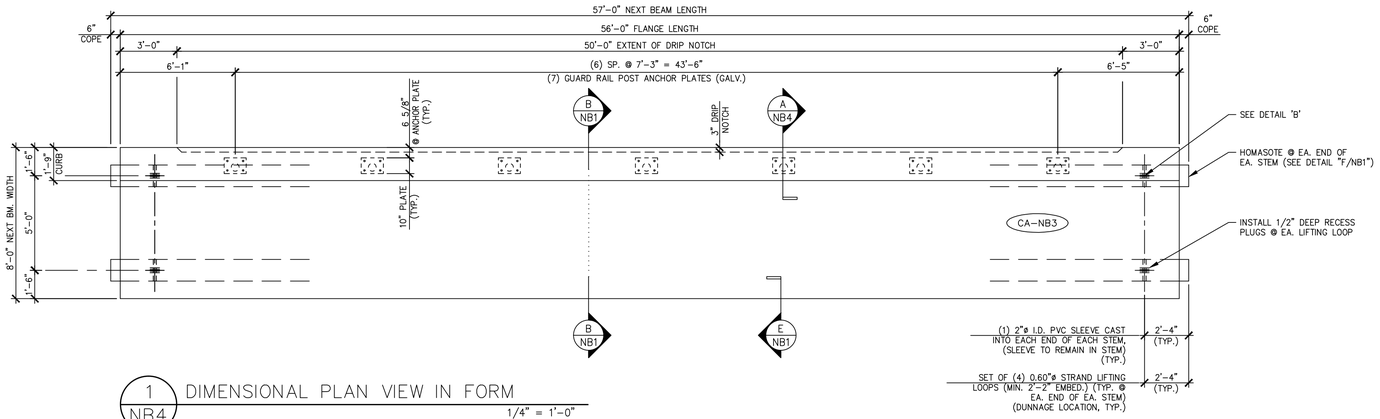
MORRISVILLE, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF LAMOILLE

TOWN OF CAMBRIDGE
IRISH SETTLEMENT ROAD T.H.46 CLASS 3
BRIDGE NO.: 28 PROJECT NO.: BRO 1448(39)

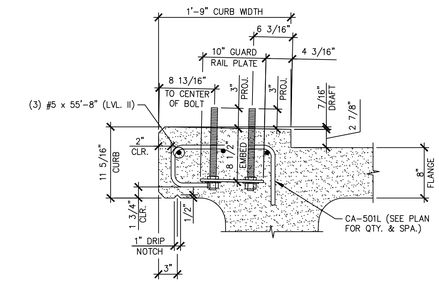
PRESTRESSED NEXT BEAM DETAILS

DATE: JAN. 22, 2015
SCALE: NOTED
CHKD: RM DFTM: PSS
JOB NO: 23447-014
DWG. NO: NB3



1 NB4 DIMENSIONAL PLAN VIEW IN FORM

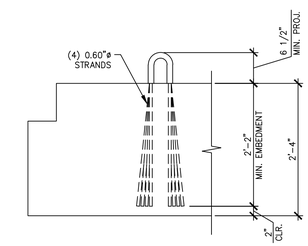
1/4" = 1'-0"



A NB4 CURB & GUARD RAIL ANCHOR PLATE SECTION

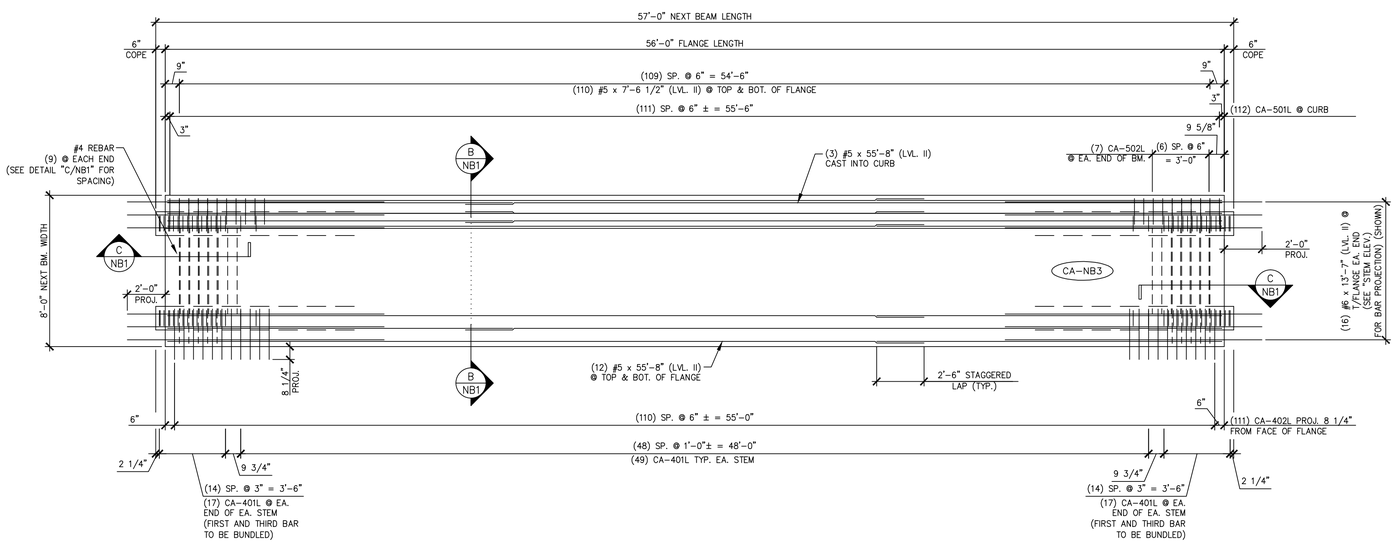
1" = 1'-0"

TYP. BEAM REINF. NOT SHOWN FOR CLARITY



B NB4 LIFT LOOP DETAIL

3/4" = 1'-0"



2 NB4 REINFORCING PLAN VIEW IN FORM

1/4" = 1'-0"

MARK: CA-NB3	QTY.: 1	WT.: 41.57 T	VOL.: 20.53 cy

MATERIAL LIST / NEXT BEAM

ITEM	MARK	DESCRIPTION	QTY.
1	CA-401L	#4 BENT BAR (LEVEL II, DUAL COATED)	166
2	CA-402L	#4 BENT BAR (LEVEL II, DUAL COATED)	111
3	CA-403L	#4 BENT BAR (LEVEL II, DUAL COATED)	16
4	CA-501L	#5 BENT BAR (LEVEL II, DUAL COATED)	112
5	CA-502L	#5 BENT BAR (LEVEL II, DUAL COATED)	14
6		#4 x 7'-6 1/2" (LEVEL II, DUAL COATED)	18
7			
8		#5 x 7'-6 1/2" (LEVEL II, DUAL COATED)	222
9		#5 x 55'-8" (W/ (1) 2'-6" STAGGERED LAP) (LVL. II, DUAL COATED)	27
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15		GUARD RAIL ANCHOR PLATE (GALV.) (SUPPLIED BY OTHERS)	7

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STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF LAMOILLE

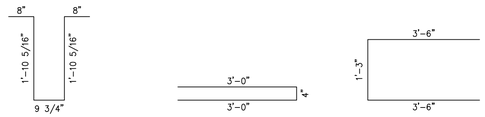
DATE: JAN. 22, 2015
SCALE: NOTED

TOWN OF CAMBRIDGE
IRISH SETTLEMENT ROAD T.H.46 CLASS 3
BRIDGE NO.: 28 PROJECT NO.: BRO 1448(39)

CHKD: RM DFTM: PSS
JOB NO: 23447-014

PRESTRESSED NEXT BEAM DETAILS

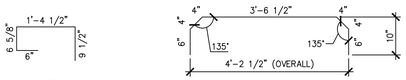
DWG. NO: NB4



CA-401L
#4 BENT BAR
LEVEL II (DUAL COATED)
USE 2"ø [50 mm] PIN
(498) REQ'D.

CA-402L
#4 BENT BAR
LEVEL II (DUAL COATED)
USE 2"ø [50 mm] PIN
(446) REQ'D.

CA-403L
#4 BENT BAR
LEVEL II (DUAL COATED)
USE 2"ø [50 mm] PIN
(48) REQ'D.



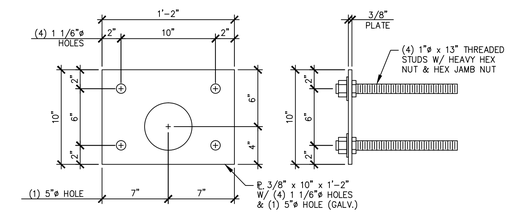
CA-501L
#5 BENT BAR
LEVEL II (DUAL COATED)
USE 2 3/4"ø [70 mm] PIN
(224) REQ'D.

CA-502L
#5 BENT BAR
LEVEL II (DUAL COATED)
USE 2 3/4"ø [70 mm] PIN
(42) REQ'D.

PRESTRESSED NEXT BEAMS

NEXT BEAM MISCELLANEOUS MATERIALS

ITEM	MARK	QTY.	DESCRIPTION	REMARKS
1		54	#4 x 7'-6 1/2" (LEVEL II, DUAL COATED)	
2				
3		666	#5 x 7'-6 1/2" (LEVEL II, DUAL COATED)	
4		78	#5 x 55'-8" (W/ (1) 2'-6" STAGGERED LAP) (LVL. II, DUAL COATED)	
5				
6		96	#6 x 13'-7" (LVL. II, DUAL COATED)	
7				
8				
9				
10				
11				
12				
13				
14				
15		14	GUARD RAIL ANCHOR PLATE (GALV.)	SUPPLIED BY OTHERS; SEE DETAIL THIS SHEET
16		12	SET OF (4) 0.60"ø x 270 KSI STRAND LIFTING LOOPS	
17		12	2"ø I.D. PVC SLEEVE	
18				
19				
20				



GUARD RAIL ANCHOR PLATE

SUPPLIED BY OTHERS 1 1/2" = 1'-0"

△1 01-22-15 REVISED

APPROVAL STAMP:

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

BLOW & COTE, INC.
CONTRACTOR
MORRISVILLE, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF LAMOILLE

TOWN OF CAMBRIDGE
IRISH SETTLEMENT ROAD T.H.46 CLASS 3
BRIDGE NO.: 28 PROJECT NO.: BRO 1448(39)

MATERIALS LIST

DATE: JAN. 22, 2015
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CHKD: RM DFTM: PSS
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DWG. NO: M1