Town of Exeter, New Hampshire
Court Street
Little River Bridge Replacement
Issued for Construction
June 2017

Contractor:

George R. Cairns & Sons, Inc.
8 Ledge Road
Windham, NH 03087

6-13-17
Signature of Corporate Officer — Date

President
Title

Exeter Board of Selectmen

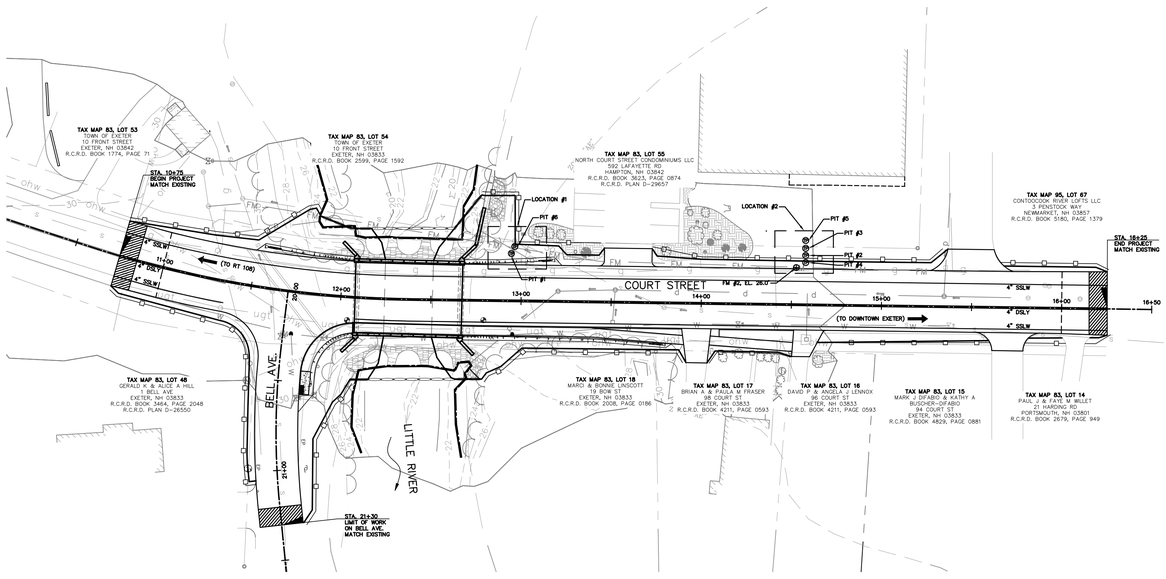
Don Clement, Chair
Anne Surman, Vice Chair
Kathy Corson, Clerk
Dan Chartrand
Julie Gilman

Exeter Town Manager

Russell Dean

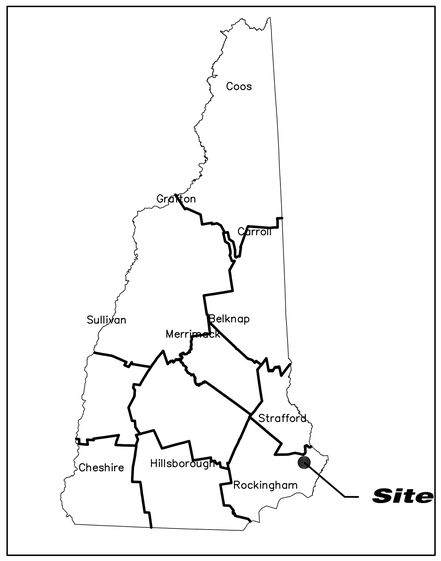
Exeter Department of Public Works

Jennifer Perry, PE, Director
Jay Perkins, Hwy. Supt.
Paul Vlasich, PE, Town Engineer
Jennifer Mates, PE, Asst. Town Engineer



SITE OVERVIEW
SCALE: 1" = 40'

SHEET INDEX	
Sheet Number	Sheet Title
1	Cover
2	General Plan and Elevation
3	Site Plan and Profile
4	Bridge Notes
5	Survey Layout and Channel Sections
6	Boring Logs (Sheet 1 of 2)
7	Boring Logs (Sheet 2 of 2)
8	Abutment A Plan and Elevation
9	Abutment B Plan and Elevation
10	Abutment Sections
11	Abutment and Wingwall Elevations and Details
12	Prestressed Box Beam Layout
13	Prestressed Box Beam Details (Sheet 1 of 3)
14	Prestressed Box Beam Details (Sheet 2 of 3)
15	Prestressed Box Beam Details (Sheet 3 of 3)
16	Typical Section and Rail Layout
17	Superstructure Details
18	Approach Slab Details (Sheet 1 of 2)
19	Approach Slab Details (Sheet 2 of 2)
20	Bearing and Joint Details
21	T101 Bridge & Approach Rail (Steel Posts)
22	Snow Screen With T101 Bridge Rail
23	General Notes and Summary of Quantities
24	Roadway Plan and Profile (Sheet 1 of 2)
25	Roadway Plan and Profile (Sheet 2 of 2)
26	Cross Sections (Sheet 1 of 4)
27	Cross Sections (Sheet 2 of 4)
28	Cross Sections (Sheet 3 of 4)
29	Cross Sections (Sheet 4 of 4)
30	Road and Utility Details
31	Thrust Block Details
32	Court Street Traffic Control Plan
33	Alternative Platform for Offset EAGRT
34	Sidewalk Curb Ramps With Detectable Warnings



Locus Plan

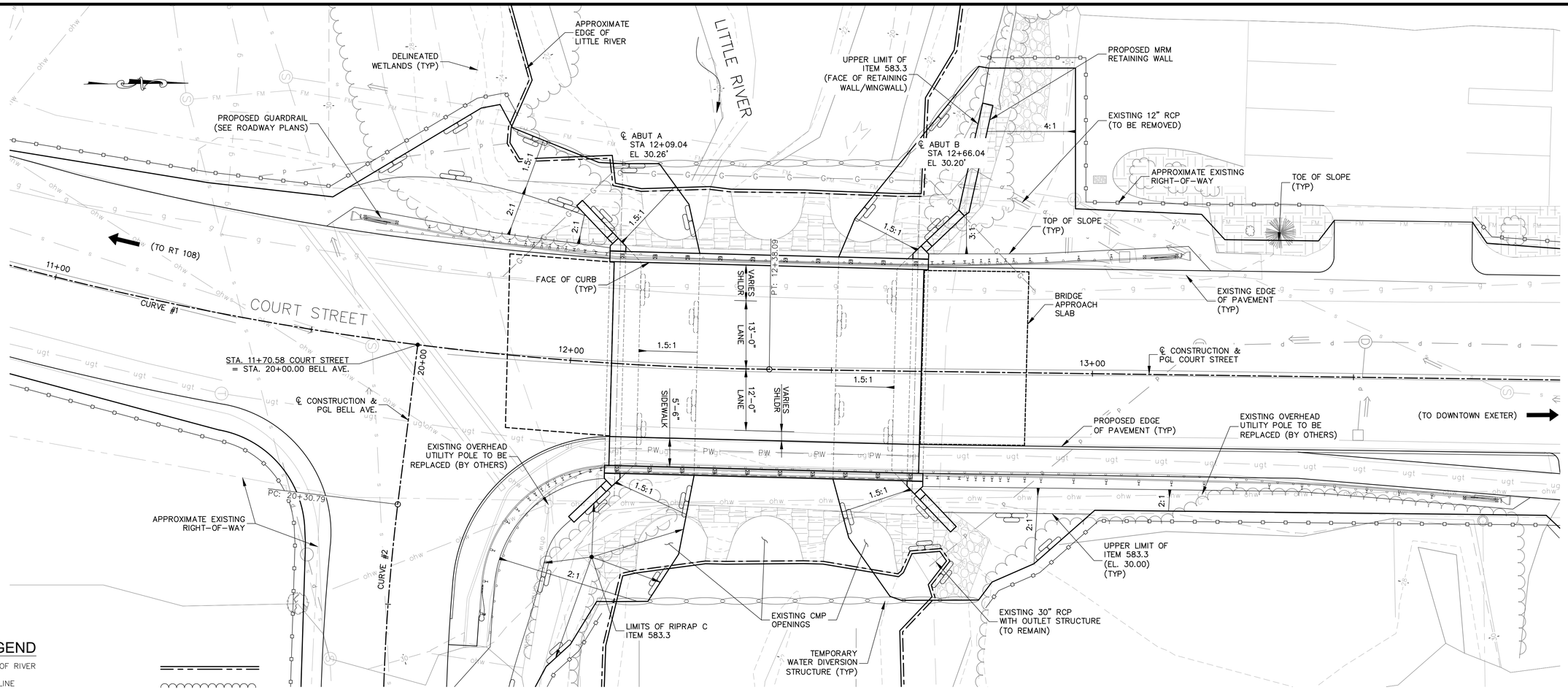
Prepared For:

Town of Exeter
Deptartment of Public Works
13 Newfields Road
Exeter, New Hampshire 03833

Prepared By:

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH 603/431-6196 • Manchester, NH 603/627-0708 • Portland, ME 207/541-4223
cmaengineers.com

Project Location



General Plan
Scale: 1"=10'-0"

LEGEND

- EDGE OF RIVER
- TREE LINE
- SILT FENCE
- PROPERTY LINE/ROW
- WATER DIVERSION STRUCTURE
- STONE FILL
- EXISTING OVERHEAD ELECTRIC
- PROPOSED OVERHEAD ELECTRIC
- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- EXISTING SEWER MAIN
- EXISTING UNDERGROUND TELECOM.
- PROPOSED UNDERGROUND TELECOM.
- EXISTING GAS MAIN
- PROPOSED GAS MAIN
- EXISTING DRAINAGE PIPE
- PROPOSED DRAINING PIPE
- EXISTING SEWER FORCE MAIN

HYDRAULIC DATA

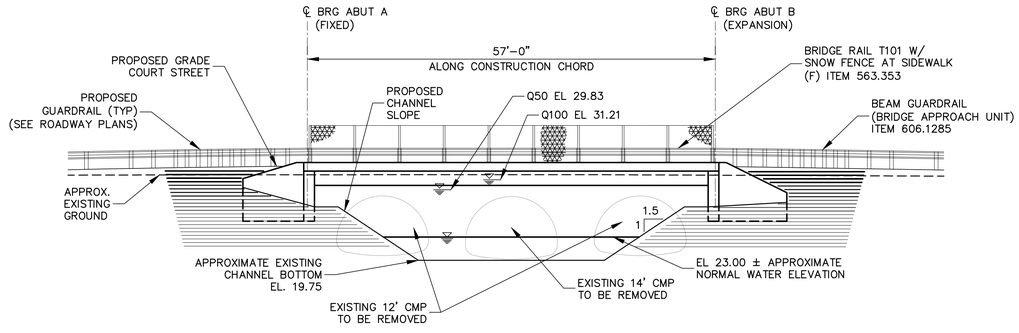
DESIGN FLOOD:	957 CFS (50 YEAR)
DESIGN VELOCITY:	2.41 FT/SEC
DESIGN FLOOD ELEVATION:	29.83 FT (50 YEAR)
100 YEAR FLOOD ELEVATION:	31.21 FT

CURVE #1 COURT STREET

PI STA = 11+46.88
N = 172946.66
E = 1175795.71
Δ = 17°25'19"
T = 91.93'
R = 600.00'
L = 182.44'
E = 7.00'

CURVE #1 BELL AVE.

PI STA = 20+73.91
N = 172962.03
E = 1175865.77
Δ = 13°04'13"
T = 45.86'
R = 400.00'
L = 91.31'
E = 2.62'



Elevation
Scale: 1"=10'-0"

INDEX OF BRIDGE SHEETS

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 603/627-0708 207/541-4223
cmaengineers.com

JASON GALLANT No. 10551 STATE OF NEW HAMPSHIRE - REGISTERED PROFESSIONAL ENGINEER

designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
scale:
date: June 2017
project no: ----
file name: S-1.dwg

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
General Plan and Elevation

drawing no. B-1
sheet: 2 of 34

F:\CADD\PROJECTS\923-Exeter Bridges\Production\Court St\Final Design\S-1.dwg Date Plotted: Jun 12, 2017 - 11:44am Plotted By: BPOMEROY

HEC-RAS Cross-Section 2676

TAX MAP 83, LOT 54
TOWN OF EXETER
10 FRONT STREET
EXETER, NH 03833
R.C.R.D. BOOK 2599, PAGE 1592

DELINEATED WETLANDS (TYP)

APPROXIMATE EDGE OF LITTLE RIVER

LITTLE RIVER

PROPOSED SILT FENCE (TYP)

℄ ABUT A
STA 12+09.04
EL 30.26'

℄ ABUT B
STA 12+66.04
EL 30.20'

53 ft

PROPOSED MRM RETAINING WALL

TAX MAP 83, PAGE 55
NORTH COURT STREET CONDOMINIUMS LLC
592 LAFAYETTE RD
HAMPTON, NH 03842
R.C.R.D. BOOK 3623, PAGE 0874
R.C.R.D. PLAN D-29657

EXISTING 12" RCP (ABANDON IN PLACE)

APPROXIMATE EXISTING RIGHT-OF-WAY

TOE OF SLOPE (TYP)

TOP OF SLOPE (TYP)

(TO RT 108)

11+00

CURVE #1

COURT STREET

P.I.: 12+38.09

BRIDGE APPROACH SLAB

EXISTING EDGE OF PAVEMENT (TYP)

12+00

13+00

℄ CONSTRUCTION & PGL COURT STREET

STA. 11+70.58 COURT STREET
= STA. 20+00.00 BELL AVE.

20+00

℄ CONSTRUCTION & PGL BELL AVE.

B1

B2

PROPOSED EDGE OF PAVEMENT (TYP)

EXISTING OVERHEAD UTILITY POLE TO BE REPLACED (BY OTHERS)

(TO DOWNTOWN EXETER)

PC: 20+30.79

APPROXIMATE EXISTING RIGHT-OF-WAY

EXISTING OVERHEAD UTILITY POLE TO BE REPLACED (BY OTHERS)

1-1/2" IRON PIPE FOUND, DOWN 1"

TAX MAP 83, PAGE 48
GERALD K & ALICE A HILL
1 BELL AVE
EXETER, NH 03833
R.C.R.D. BOOK 3464, PAGE 2048
R.C.R.D. PLAN D-26550

CURVE #2

EXISTING CMP OPENINGS

59.75 ft

EXISTING 30" RCP WITH OUTLET STRUCTURE (TO REMAIN)

TEMPORARY WATER DIVERSION STRUCTURE (TYP)

TAX MAP 83, PAGE 18
MARCI & BONNIE LINSCOTT
19 BOW ST
EXETER, NH 03833
R.C.R.D. BOOK 2008, PAGE 0186

Site Plan
Scale: 1"=10'-0"

HEC-RAS Cross-Section 2517

PVI STA = 12+25
ELEV = 33.82
LVC = 110
K = 27

℄ BRG ABUT A (FIXED)

℄ BRG ABUT B (EXPANSION)

Subtract (2)x1-ft setback from each abutment face to CL = 55.0' span (see sheet B-7)

57'-0" ALONG ℄ CONSTRUCTION

PVC = 11+70
ELEV = 32.50

PVC = 12+80
ELEV = 32.90

Q100 EL 31.21

HIGH POINT STA. = 12+34.7
HIGH POINT ELEV. =33.28

Q50 EL 29.83

20'-0" APPROACH SLAB (TYP)

PROFILE GRADE LINE COURT STREET

2.40%

-1.68%

PROPOSED PILE (TYP)

PROPOSED SLOPE

EXISTING 12' CMP TO BE REMOVED

EXISTING 14' CMP TO BE REMOVED

RIPRAP C ITEM 583.3

PROPOSED CONCRETE STUB ABUTMENT

APPROXIMATE EXISTING GROUND ALONG ℄ CONSTRUCTION

Top of curb is 0.32' higher than roadway centerline - add 0.32' to profile for high chord elevation (see sheet B-14)

	11+25	11+50	11+75	12+00	12+25	12+50	12+75	13+00	13+25	13+50	13+75
DATUM EL. 0.00	31.2 (EXIST) 31.47 (PROP)	31.4 32.02	31.7 32.62	31.7 33.06	31.7 33.26	31.7 33.23	31.6 32.98	31.5 32.56	31.3 32.14	31.2 31.86	31.2 31.85

Profile
Scale: 1"=10'-0"

LEGEND

PROPOSED CONTOUR	28
EXISTING CONTOUR	28
JULY 2014 SOIL BORING	
DELINEATED JURISDICTIONAL WETLANDS	

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

JASON GALLANT No. 10551 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE - USA

designed by:	drawn by:	approved by:	scale:
LBK/OGK	LBK/BGP	JLG	

date:	project no:	file name:
June 2017	----	S-2.dwg

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Site Plan and Profile

drawing no.
B-2

sheet: 3 of 34

F:\CADD\PROJECTS\923-Exeter Bridges\Production\Court St\Final Design\S-2.dwg Date Plotted: Jun 12, 2017 - 11:46am Plotted By: BPOMEROY

Structure Notes:

1) DESIGN LOADING: HL-93

2) DESIGN METHOD: LOAD AND RESISTANCE FACTOR DESIGN METHOD (LRFD).

3) SPECIFICATIONS: AASHTO LRFD 2015. NHDOT 2006 STANDARD SPECIFICATIONS AS AMENDED.

4) FOUNDATION DATA: STUB ABUTMENTS SUPPORTED ON END BEARING PILES HP12x53 WITH APPROVED PILE POINTS (AASHTO M270, ASTM A709 GRADE 50). NOMINAL AXIAL RESISTANCE OF 163 KIPS IN COMBINATION WITH A RESISTANCE FACTOR OF 0.5.

5) REINFORCING STEEL: AASHTO M31 (ASTM A615) GRADE 60. REINFORCING STEEL IN THE DECK OVERLAY, BOX BEAMS, APPROACH SLABS, AND BRUSH CURBS SHALL BE EPOXY COATED.

6) CONCRETE: BRIDGE DECK OVERLAY, CURBS, WINGWALL COPINGS AND APPROACH SLABS = 4 KSI STUB ABUTMENT AND WINGWALL = 4 KSI PRESTRESSED BUTTED BOX BEAMS = 6 KSI, RELEASE = 4.8 KSI

7) POST-TENSIONING STEEL: 0.6" ø SEVEN-WIRE STRAND CONFORMING TO AASHTO M203 (ASTM A416) GRADE 270, LOW RELAXATION.

8) PRESTRESSING STEEL: 0.6" ø SEVEN-WIRE STRAND CONFORMING TO AASHTO M203 (ASTM A416) GRADE 270, LOW RELAXATION.

9) SEISMIC PERFORMANCE ZONE 2: A = 0.17

10) ALL EXISTING BRONZE DISCS REPRESENTING STATE BENCHMARKS OR SURVEY TRIANGULATION POINTS MUST NOT BE DISTURBED. WHEN THE WORK CALLED FOR INVOLVES DISTURBING A BRONZE DISK, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SUFFICIENTLY IN ADVANCE OF THE WORK TO PERMIT THE TOWN, STATE OR AGENCY HAVING JURISDICTION TO TEMPORARILY RELOCATE THE AFFECTED MARKER.

11) MAINTENANCE OF TRAFFIC:: ROAD CLOSURE AND DETOUR; SEE TRAFFIC CONTROL PLAN.

12) FOR STRUCTURE LAYOUT SEE BRIDGE SHEET 4.

Bridge Removal Notes:

1) PLANS OF THE EXISTING BRIDGE ARE NOT AVAILABLE.

2) ITEM 502, REMOVAL OF EXISTING BRIDGE STRUCTURE, SHALL INCLUDE REMOVAL OF THE ENTIRE CORRUGATED METAL PIPE, FOOTINGS, AND EXISTING STONE MASONRY HEADWALLS AS DESCRIBED WITHIN THESE PLANS. SEE SPECIAL CONDITIONS FOR MATERIALS TO BE SALVAGED TO THE TOWN. ALL OTHER EXISTING BRIDGE MATERIALS SHALL BECOME PROPERTY OF THE CONTRACTOR.

3) EXCAVATION AND BACKFILL NOT INCLUDED IN OTHER PAY ITEMS, BUT REQUIRED FOR REMOVAL OF THE EXISTING STRUCTURE SHALL BE SUBSIDIARY TO ITEM 502.

Water Diversion Structure Notes:

1) ITEM 503.101, WATER DIVERSION STRUCTURES, MAY BE REQUIRED FOR REMOVAL OF THE EXISTING STRUCTURE AND THE CONSTRUCTION OF THE ABUTMENTS DURING HIGH FLOW CONDITIONS. THE CONTRACTOR SHALL SUBMIT THE DIVERSION STRUCTURE TYPE, DESIGN, AND PROPOSED METHOD OF CONSTRUCTION TO THE ENGINEER IN ACCORDANCE WITH SECTION 105.02 OF THE NHDOT STANDARD SPECIFICATIONS. WATER DIVERSION STRUCTURE SUBMITTALS SHALL BE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW HAMPSHIRE.

2) WATER DIVERSION STRUCTURE LIMITS SHOWN ON THE PLANS ARE APPROXIMATE. THE CONTRACTOR SHALL DETERMINE THE REQUIRED LIMITS, IN ACCORDANCE WITH THE ENVIRONMENTAL PERMIT, TO MAINTAIN A DEWATERED AND ADEQUATELY SUPPORTED EXCAVATION DURING THE CONSTRUCTION.

3) ALL COSTS FOR DESIGN, INSTALLATION AND REMOVAL OF WATER DIVERSION STRUCTURES SHALL BE INCLUDED IN ITEM 503.101.

Utility Notes:

1) ITEMS 611.05212 AND 611.052121 SHALL INCLUDE ALL NECESSARY MATERIALS, INCLUDING PIPE, INSULATION, STRAPS, PROTECTIVE JACKETING, EXPANSION JOINTS, SADDLES, ROLLER SUPPORTS, ASSOCIATED HARDWARE AND LABOR TO INSTALL THE UTILITY. FOR LIMITS, SEE BRIDGE SHEET B-1.

2) ALL THREADED RODS, NUTS, WASHERS, STRAPS, AND PIPE ROLL SUPPORTS SHALL BE GALVANIZED.

Boring Notes:

1) BORINGS INDICATED THUS ✪ WERE MADE BY GREAT WORKS PUMP & TEST BORING , INC. IN JULY 2014. BLOW COUNTS SHOWN ARE THE NUMBER OF BLOWS REQUIRED TO DRIVE A 2" O.D. STANDARD SPLIT SPOON SAMPLER 6", USING A 140LB WEIGHT FALLING 30".

2) BORINGS ARE FOR DESIGN PURPOSES ONLY, SHOWING CONDITIONS AT THE BORING POINTS ONLY, AND DO NOT NECESSARILY INDICATE MATERIAL TO BE ENCOUNTERED DURING CONSTRUCTION.

3) GROUNDWATER LEVELS NOTED, IF ANY, WERE MEASURED AT THE TIME OF EXPLORATION. THE WATER LEVELS ENCOUNTERED DURING CONSTRUCTION MAY VARY CONSIDERABLY DUE TO PREVAILING CLIMATE, RAINFALL, OR OTHER FACTORS.

Pile Notes:

1) MAXIMUM FACTORED PILE LOAD: 153.0 KIPS PER PILE

2) STEEL H-PILES SHALL CONFORM TO AASHTO M270 (ASTM A709), GRADE 50. ALL PILES SHALL BE HP12x53. PILE POINTS ARE REQUIRED, REFER TO THE QUALIFIED PRODUCTS LIST FOR STANDARD MANUFACTURED PILE POINTS.

3) THE PILES SHALL BE DRIVEN IN ACCORDANCE WITH SECTION 510 TO A NOMINAL GEOTECHNICAL RESISTANCE EQUAL TO THE MAXIMUM FACTORED LOAD DIVIDED BY A RESISTANCE FACTOR OF 0.65. ITEM 510.2, PILE LOADING TESTS, SHALL BE USED TO CONDUCT PILE DYNAMIC ANALYZER (PDA) TESTS IN ACCORDANCE WITH SECTION 510 TO VERIFY THE NOMINAL GEOTECHNICAL RESISTANCE AND THE ACCEPTABILITY OF THE CONTRACTOR'S DRIVING SYSTEM. SEE SPECIAL PROVISION FOR ADDITIONAL INFORMATION.

4) ONE SPLICE PER PILE WHEN THE ESTIMATED LENGTH IS OVER 60 FEET AND SPLICES REQUIRED FOR PILES THAT EXCEED THE ESTIMATED LENGTH WILL BE PAID. NO PAYMENT FOR ADDITIONAL PILE SPLICES WITHIN THE ESTIMATED LENGTH WILL BE PAID UNLESS ORDERED. APPROVED ADDITIONAL PILE SPLICES WILL BE PAID UNDER ITEM 510.9.

ESTIMATED PILE LENGTHS: ABUTMENT A: 39.0 FEET
ABUTMENT B: 37.0 FEET

5) PILE LOCATION AND ALIGNMENT TOLERANCES AT ABUTMENTS SHALL CONFORM TO SECTION 510.3.6.4 REQUIREMENTS FOR BENT CAPS SUPPORTED BY PILES.

6) PILE LAYOUT DIMENSIONS ARE GIVE AT THE BOTTOM OF THE STUB ABUTMENT.

7) PLACE REINFORCING STEEL TO CLEAR PILES.

8) PILES SHALL BE DRIVEN TO REFUSAL (BEDROCK).

Precast Box Beam Notes:

1) THE CONCRETE COMPRESSIVE STRENGTH OF THE PRECAST BOX BEAM UNITS SHALL BE 4800 PSI AT RELEASE AND 6000 PSI AT 28 DAYS.

2) PRESTRESSING STEEL SHALL BE 0.6" ø UNCOATED SEVEN-WIRE STRAND CONFORMING TO AASHTO M203 (ASTM A416) GRADE 270 LOW RELAXATION. ALL STRANDS SHALL BE PRE-TENSIONED TO 43.9 KIPS PER STRAND (75% INITIAL PULL).

3) POST-TENSIONING STRANDS SHALL BE COMPLETELY COATED WITH A CORROSION PREVENTATIVE COATING SUCH AS FLO-GUARD, AS MANUFACTURED BY INSTEEL INDUSTRIES, INC., SANDERSON, FL., OR POLYSTRAND, AS MANUFACTURED BY LANG TENDONS, INC., TOUGHKENAMON, PA., OR AN APPROVED EQUAL. IF THE FLO-GUARD COATING SYSTEM IS SUPPLIED, GROUT SHALL BE EXCLUDED FROM THE LATERAL POST-TENSIONING DUCTS DURING GROUTING OF THE SHEAR KEYS BETWEEN THE BEAMS. THE CONTRACTOR'S PROPOSED METHOD FOR EXCLUDING THE GROUT FROM THE POST-TENSIONING DUCTS SHALL BE SUBMITTED WITH THE SHOW DRAWINGS. POST-TENSIONING ANCHORAGE SYSTEM SHALL BE MONO-STRAND CORROSION PROTECTION SYSTEM AS MANUFACTURED BY HAYES INDUSTRIES, INC., HOUSTON TEXAS OR APPROVED EQUAL.

4) TRANSVERSE POST-TENSIONING OF THE PRECAST BOX BEAMS SHALL BE PERFORMED IN ACCORDANCE WITH SPECIAL PROVISION 528.3224.

5) ALL REINFORCING STEEL FOR THE SUPERSTRUCTURE SHALL CONFORM TO AASHTO M31 (ASTM A615) GRADE 60 AND SHALL BE EPOXY COATED.

6) THE PRECAST BOX BEAM REINFORCING STEEL SHALL HAVE A MINIMUM CLEAR COVER OF 1 $\frac{1}{4}$" UNLESS OTHERWISE NOTED.

7) THE COST OF PRESTRESSING STRANDS, POST-TENSIONING STRANDS AND ANCHORAGES, AND REINFORCING STEEL CAST INTO THE PRECAST BOX BEAM UNITS SHALL BE SUBSIDIARY TO ITEM 528.3224. ALL OTHER STEEL IN THE SUPERSTRUCTURE SHALL BE PAID UNDER ITEM 544.31.

8) LIFTING DEVICES SHALL BE WITHIN 24" OF EACH END OF THE PRECAST BOX BEAM UNITS. COST SHALL BE SUBSIDIARY TO ITEM 528.3224.

9) 1" ø DRAINS SHALL BE PROVIDE AT THE THE LOW END OF ALL BOX BEAM VOIDS.

10) THE BOX BEAM SHEAR KEYS SHALL BE BLAST CLEANED PRIOR TO SHIPPING.

11) THE TOP SURFACE OF THE BOX BEAMS SHALL BE RAKED TRANSVERSELY TO A $\frac{1}{4}$" AMPLITUDE.

12) DRILLING INTO THE BOX BEAMS SHALL NOT BE ALLOWED.

13) DIFFERENTIAL CAMBER (AT ERECTION) BETWEEN ADJACENT MEMBERS SHALL BE LIMITED TO 1". VALUES FOR MIDSPAN CAMBER AT TRANSFER SHALL BE DETAILED ON THE SHOP DRAWINGS.

14) PROVIDE INSERTS TO SUPPORT THE CONTRACTOR'S OVERHANG BRACKETS IN THE TOP SLAB ON EXTERIOR UNITS AT THE SPACING REQUESTED BY THE GENERAL CONTRACTOR. INSERTS SHALL BE SHOWN ON THE SHOP DRAWINGS. ALL COSTS SHALL BE SUBSIDIARY TO ITEM 528.3224.

Bridge Deck Notes:

1) ALL CONCRETE IN THE CAST-IN-PLACE OVERLAY AND BRUSH CURBS SHALL BE ITEM 520.01, CONCRETE CLASS AA.

2) CONCRETE OVERLAY FINISHING SHALL MEET THE REQUIREMENTS OF 520.3.9.2 UNLESS OTHERWISE APPROVED IN WRITING BY THE ENGINEER.

3) THE CONTRACTOR SHALL NOT DRILL INTO THE PRECAST BOX BEAMS UNLESS APPROVED IN WRITING BY THE ENGINEER.

4) ALL REINFORCEMENT IN THE BRIDGE DECK OVERLAY AND BRUSH CURBS SHALL BE EPOXY COATED AND SHALL BE PAID AS ITEM 544.31, REINFORCING STEEL, EPOXY COATED (CONTRACTOR DETAILED).

5) ALL REINFORCING SHALL BE 2 $\frac{1}{2}$" FROM CONCRETE SURFACES, UNLESS OTHERWISE NOTED.

Approach Slab Notes:

1) ALL CONCRETE FOR THE APPROACH SLABS SHALL BE ITEM 520.0302, CONCRETE CLASS AA, APPROACH SLABS (F).

2) ALL REINFORCEMENT IN THE APPROACH SLABS SHALL BE EPOXY COATED AND SHALL BE PAID AS ITEM 544.31, REINFORCING STEEL, EPOXY COATED (CONTRACTOR DETAILED).

3) ALL REINFORCING SHALL BE 2 $\frac{1}{2}$" FROM CONCRETE SURFACES, UNLESS OTHERWISE NOTED.

4) FILL SPACE BETWEEN APPROACH SLAB AND WINGWALL OR ROADWAY CURB WITH ITEM 520.01. CONCRETE FILL SHALL BE A MINIMUM DEPTH OF 6 INCHES.

5) APPROACH SLABS SHALL BE PLACED AFTER THE CONCRETE DECK OVERPOUR HAS BEEN CONSTRUCTED.

6) APPROACH SLABS FOR BOTH ABUTMENTS SHALL BE CAST 2 $^{0}_{-6}$" BELOW FINISHED GRADE AT THE APPROACH SLAB SEATS.

Elastomeric Bearing Notes:

1) ELASTOMERIC BEARING PADS SHALL BE VIRGIN NATURAL RUBBER, HARDNESS (SHORE "A" DUROMETER) OF 60, GRADE 4.

2) STEEL PLATE REINFORCEMENT SHALL CONFORM TO AASHTO M270 (ASTM A709, GRADE 35).

3) ELASTOMERIC BEARINGS, INCLUDING STEEL PLATES, SHALL BE PAID AS ITEM 548.11, ELASTOMERIC BEARING PADS (F).

4) DESIGN SERVICE LOADS PER BEARING: (DESIGN METHOD A)
MAX DEAD LOAD: 19.0 KIP
MAX LIVE LOAD: 28.6 KIP

5) FOLLOWING THE MANUFACTURE OF THE ELASTOMERIC BEARINGS AND VERIFICATION OF THE INTERNAL STEEL LAMINATES, THE PIN GROOVE OPENING SHALL BE COATED WITH AN APPROVED ASPHALTIC SEALER AND THE SPACE FILLED WITH SILICONE CAULKING.

Abutment and Wingwall Notes

1) THE CONTRACTOR SHALL BE REQUIRED TO PLACE ALL CONCRETE IN THE DRY. DEWATERING, AS REQUIRED, SHALL BE CONTINUOUS UNTIL THE ABUTMENT AND WINGWALLS ARE BACKFILLED TO THE ELEVATION OF THE SURROUNDING WATER TABLE, UNLESS DIRECTED OTHERWISE.

2) ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED $\frac{3}{4}$" EXCEPT AS NOTED.

3) ALL CONCRETE IN THE STUB ABUTMENTS AND WINGWALLS SHALL BE ITEM 520.01, CONCRETE CLASS AA.

4) ITEM 538.2, BARRIER MEMBRANE, VERTICAL SURFACES (F), SHALL BE PLACED OVER THE ABUTMENT-WINGWALL VERTICAL CONSTRUCTION JOINT, 1'-0" ON EACH SIDE OF THE JOINT.

5) ITEM 534.3, WATER REPELLENT (SILANE-SILOXANE), SHALL BE APPLIED TO THE ENTIRE BRIDGE SEAT, INCLUDING THE BEARING PEDESTAL SURFACES AND ALL EXPOSED SURFACES ON BOTH ABUTMENTS AND ALL WINGWALLS TO 1'-0" BELOW THE FILL LINE.

6) ALL REINFORCING IN THE ABUTMENTS AND WINGWALLS SHALL BE PAID AS ITEM 544.3, REINFORCING STEEL, (CONTRACTOR DETAILED).

7) ALL REINFORCING SHALL BE A MINIMUM OF 2 $\frac{1}{2}$" FROM CONCRETE SURFACES, UNLESS NOTED OTHERWISE.

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m

JASON GALLANT No. 10551 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE

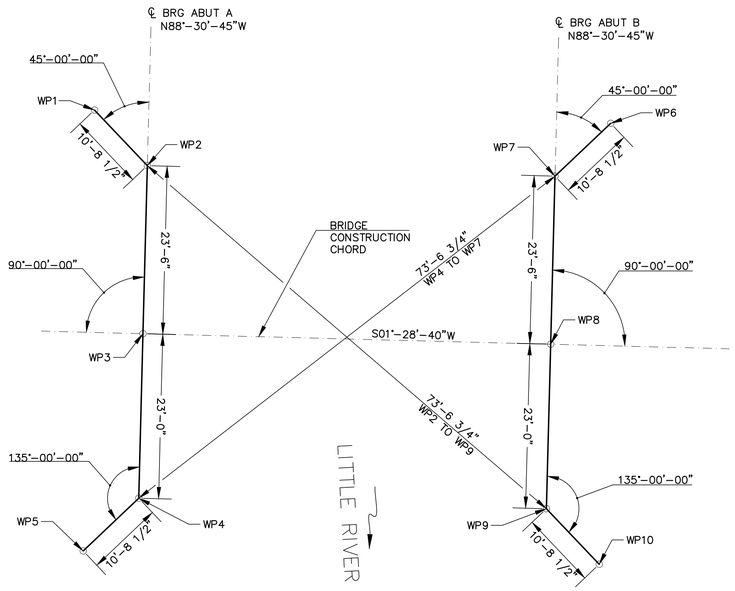
designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
scale:
date: June 2017
project no: ----
file name: S-3.dwg

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Bridge Notes

drawing no.
B-3

sheet: 4 of 34

F:\CADD\PROJECTS\923-Exeter Bridges\Production\Court St\Final Design\S-3.dwg Date Plotted: Jun 12, 2017 – 11:46am Plotted By: BPOMEROY



Survey Layout

Scale: 1"=10'

WORKING POINT COORDINATES		
WORKING POINT NO.	NORTHING	EASTING
WP1	173002.78	1175764.60
WP2	173010.15	1175772.36
WP3	173009.54	1175795.85
WP4	173008.95	1175818.85
WP5	173001.18	1175826.22
WP6	173074.90	1175766.46
WP7	173067.13	1175773.84
WP8	173066.52	1175798.33
WP9	173065.93	1175820.32
WP10	173073.30	1175828.08

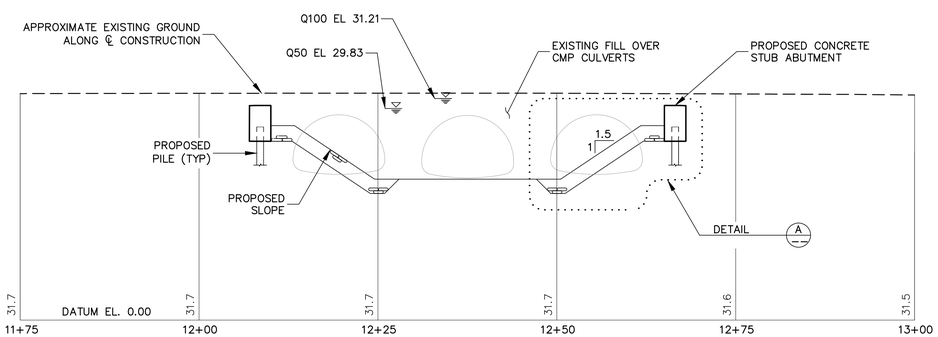
SUMMARY OF BRIDGE QUANTITIES			
ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT
207.1	COMMON CHANNEL EXCAVATION	1250	CY
209.201	GRANULAR BACKFILL (BRIDGE) (F)	130	CY
403.911	HOT BITUMINOUS BRIDGE PAVEMENT, 1 1/2" BASE COURSE	20	TON
502	REMOVAL OF EXISTING BRIDGE STRUCTURE	1	U
503.101	WATER DIVERSION STRUCTURE	1	U
504.1	COMMON BRIDGE EXCAVATION (F)	340	CY
504.2	ROCK BRIDGE EXCAVATION	5	CY
508	STRUCTURAL FILL	28	CY
510.1	PILE DRIVING EQUIPMENT	1	U
510.61	FURNISHING & DRIVING STEEL BEARING PILES	28200	LB
510.65	DRIVING–POINTS FOR STEEL BEARING PILES	14	EA
520.01	CONCRETE CLASS AA	140	CY
520.0302	CONCRETE CLASS AA APPROACH SLABS	71	CY
520.21	CONCRETE CLASS B, FOOTINGS (F)	7	CY
528.3224	PRESTRESSED CONCRETE BRIDGE DECK, 24" BUTTED BOX BEAMS (F)	2300	SF
534.3	WATER REPELLENT (SILANE/SILOXANE)	15	GAL
538.2	BARRIER MEMBRANE, PEEL AND STICK – VERTICAL SURFACES (F)	9	SY
538.5	BARRIER MEMBRANE, HEAT WELDED (F)	250	SY
544.3	REINFORCING STEEL (CONTRACTOR DETAILED)	7100	LB
544.31	REINFORCING STEEL, EPOXY COATED (CONTRACTOR DETAILED)	16700	LB
544.7	SYNTHETIC FIBER REINFORCING (F)	500	LB
548.11	ELASTOMERIC BEARING PADS (F)	44	EA
559.4	ASPHALTIC PLUG EXPANSION JOINT (F)	34	LF
559.41	ASPHALTIC PLUG FOR CRACK CONTROL (F)	34	LF
562.1	SILICONE JOINT SEALANT (F)	23	LF
563.3	BRIDGE RAIL T101	60	LF
563.353	BRIDGE RAIL T101 WITH SNOW SCREENING	60	LF
570.4	MORTAR RUBBLE MASONRY (F)	19	CY
583.3	RIPRAP CLASS III	280	CY
593.411	GEOTEXTILE; PERM CONTROL CL. 1, NON–WOVEN	650	SY
1008.9	ALTERATIONS AND ADDITIONS AS NEEDED – TESTING OF MATERIAL	6000	$

LOCATION AND DESCRIPTION OF BENCHMARKS				
BENCHMARK	LOCATION	NORTHING	EASTING	ELEVATION
TBM "C"	MAG NAIL SET, UP 6" IN POLE #45/24/2VZ/2/25VZ	173357.27	1175819.77	32.93'
TBM "D"	MAG NAIL SET, UP 6" IN POLE #1/8/3/7/29	172887.80	1175752.20	30.62

HORIZONTAL DATUM: NAD 1983, NEW HAMPSHIRE STATE PLANE COORDINATE SYSTEM
VERTICAL DATUM: NGVD 1929

NOTE: SEE ROADWAY PLANS FOR LOCATION OF TEMPORARY BENCH MARKS

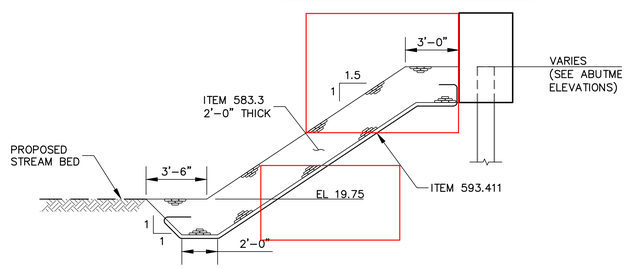
Vertical datum of bridge plans is NGVD29. Subtract 0.76 ft from all elevations on plans to convert to NAVD88 for HEC-RAS model.



Proposed Channel Section

Scale: 1"=10'–0"

Channel geometry: 3'-wide shelf at el 26.9 at each abutment, slope down at 1.5:1 to el 19.75 at channel bed



Detail A

Scale: 1/4"=1'–0"

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

NEW HAMPSHIRE – STATE OF – JASON GALLANT No. 10051 LICENSED PROFESSIONAL ENGINEER

designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
scale:
date: June 2017
project no: ----
file name: S-4.dwg

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Survey Layout and
Channel Sections

drawing no.
B-4

sheet: 5 of 34

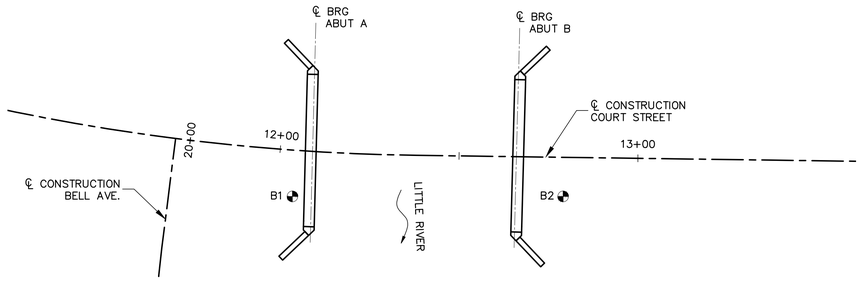
Boring No. B-1
Station 12+04, 12.9 Right

TEST BORING LOG

CMA Engineers, Inc.	PROJECT	Test Boring Number B-1
Civil/Environmental Engineers 35 Bow Street Portsmouth, NH 03801 Phone: 603.431.6196 Fax: 603.431.5376	Description: Court St. Bridge Location: Exeter, NH Notes:	Sheet 1 of 2
	Contractor: Great Works Pump & Test Boring, Inc.	Date: July 7, 2014
OBSERVED BY: CMA Engineer: Bob Grillo	Equipment: Acker Track Rig	Ground Elevation: 31.5' +/-
File Number: #923	Operator: Peter Michaud	Weather: Sun 80F

BOTTOM OF STUB ABUTMENT
ABUTMENT A (EL. 24.9) (TYP.)

Depth	Sample No. Depth (ft)	Blow Count	Sample Descriptions and Classifications	Remarks
1	S-1 0.5' - 2.5'	9 10 16 16	Brown Sand and Gravel, trace silt. Fill. Dry.	4" Asphalt Cobble at 1'
2				
3				
4				
5		7	Brown Sandy Clay. Roots and organics. Fill. Moist.	
6	S-2 5' - 7'	2 1		
7		1		
8				Groundwater Encountered at 8.0'
9				
10		8	Gray Medium Sand, trace silt. Wood fragments. Fill.	
11	S-3 5' - 7'	8 5		
12		4		
13				Change to Silty Clay at 12.5'
14	S-4 13' - 15'	WOH / 2'	Gray Silty Clay.	Solid stem augers to 10' 4" Casing to 13'. Drive and wash drilling.
15				
16	T-1 15' - 17'			
17	Vane Shear 17' - 17.75'		440 psf	
18	Vane Shear 17.75' - 18.5'		440 psf	
19				
20	Vane Shear 20' - 20.75'		450 psf	
21	Vane Shear 20.75' - 21.5'		450 psf	
22				
23				
24				Change to Sand at 23.7'
25		10	Gray Fine to Medium Sand, some silt, little gravel. Moist.	
	S-2	8		



Boring Layout
Scale: 1"=20'-0"

Boring No. B-1
(Continued)

TEST BORING LOG

CMA Engineers, Inc.	PROJECT	Test Boring Number B-1
Civil/Environmental Engineers 35 Bow Street Portsmouth, NH 03801 Phone: 603.431.6196 Fax: 603.431.5376	Description: Court St. Bridge Location: Exeter, NH Notes:	Sheet 2 of 2
	Contractor: Great Works Pump & Test Boring, Inc.	Date: July 7, 2014
OBSERVED BY: CMA Engineer: Bob Grillo	Equipment: Acker Track Rig	Ground Elevation: 31.5' +/-
File Number: #923	Operator: Peter Michaud	Weather: Sun 80F

Depth	Sample No. Depth (ft)	Blow Count	Sample Descriptions and Classifications	Remarks
26	25' - 27'	9 10		
27				
28				
29				
30		5	Gray Clayey Fine to Medium Sand, trace gravel and cobbles.	
31	S-6 30' - 32'	7 6		
32		6		
33				
34				
35		13		
36	S-7 35' - 37'	7 10	Same, some gravel.	
37		15		
38				Cobbles encountered 37.5' to 38.5'
39				
40		18		
41	S-8 40' - 42'	15 11	Same	
42		18		Refused to drilling tools at 42.5'. Roller bit drilled to 45' through rock.
43				
44				
45				
46				
47				
48				
49				
50				

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m

STATE OF NEW HAMPSHIRE – JASON GALANT No. 10551 LICENSED PROFESSIONAL ENGINEER

designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
scale:
date: June 2017
project no: -----
file name: S-5 & S-6.dwg

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Boring Logs
(Sheet 1 of 2)

drawing no. B-5
sheet: 6 of 34

Boring No. B-2
Station 12+79, 10.9 Right

TEST BORING LOG

CMA Engineers, Inc.
Civil/Environmental Engineers
35 Bow Street
Portsmouth, NH 03801
Phone: 603.431.6196
Fax: 603.431.5376

PROJECT
Description: Court St. Bridge
Location: Exeter, NH
Notes:

Test Boring Number B-2
Sheet 1 of 2

Contractor: Great Works Pump & Test Boring, Inc.
Date: July 7, 2014

OBSERVED BY:
CMA Engineer: Bob Grillo
Equipment: Acker Track Rig
Ground Elevation: 31.5' +/-

File Number: #923
Operator: Peter Michaud
Weather: Sun 80F

Depth	Sample No. Depth (ft)	Blow Count	Sample Descriptions and Classifications	Remarks
1	S-1 0.5' - 2.5'	8	Brown Sand and Gravel, trace silt. Dry. Fill	4" Asphalt
2		14		
		15		
3		13		
4				Solid Stem Augers to advance boring
5				
6	S-2 5' - 7'	5	Same	
7		6		
8		5		Groundwater at 8.0'
9				
10				
11	S-3 10' - 12'	2	Gray Silty Clay overlaying Gray Fine to Medium Sand, trace silt fill.	
12		2		
		9		
13	S-4 12' - 14'	7	12" Gray Sand, trace silt. Wood Fragments. Fill.	Change to Silty Clay at 12.5'
14		3	12" Gray Silty Clay	
		3		
15		4		
16	S-5 15' - 17'	2	Gray Silty Clay	Change to Soft Silty Clay at 15.2'
17		1		
18		1/12"		
19				Change to Sand at 19'
20	Rock Core-1 19' - 22.5'			Cored through boulder
21				
22				
23				
24		3		
25	S-6 24' - 26'	6	Gray Fine to Coarse Sand, little silt and gravel	
		15		
		12		

BOTTOM OF STUB ABUTMENT
ABUTMENT B (EL. 24.8) (TYP.)

Boring No. B-2
(Continued)

TEST BORING LOG

CMA Engineers, Inc.
Civil/Environmental Engineers
35 Bow Street
Portsmouth, NH 03801
Phone: 603.431.6196
Fax: 603.431.5376

PROJECT
Description: Court St. Bridge
Location: Exeter, NH
Notes:

Test Boring Number B-2
Sheet 2 of 2

Contractor: Great Works Pump & Test Boring, Inc.
Date: July 7, 2014

OBSERVED BY:
CMA Engineer: Bob Grillo
Equipment: Acker Track Rig
Ground Elevation: 31.5' +/-

File Number: #923
Operator: Peter Michaud
Weather: Sun 80F

Depth	Sample No. Depth (ft)	Blow Count	Sample Descriptions and Classifications	Remarks
26				
27				
28				
29				
30				Cobbles encountered from 29.5' - 30'
31	S-7 31' - 33'	11	Gray Clayey Sand, little gravel.	Could not advance casing through cored boulder. Borehole collapsed. Pushed s.s. sampler to 31'.
32		14		
33		24		
		30/5"		
34				
35				
36				
37				
38				
39				
40				Refusal to drilling tools at 40.5'. Roller bit drilled to 41.5' through rock.
41				
42				
43				
44				
45				
46				
47				
48				
49				
50				

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

NEW HAMPSHIRE - STATE OF - JASON GALLANT No. 10051 LICENSED PROFESSIONAL ENGINEER

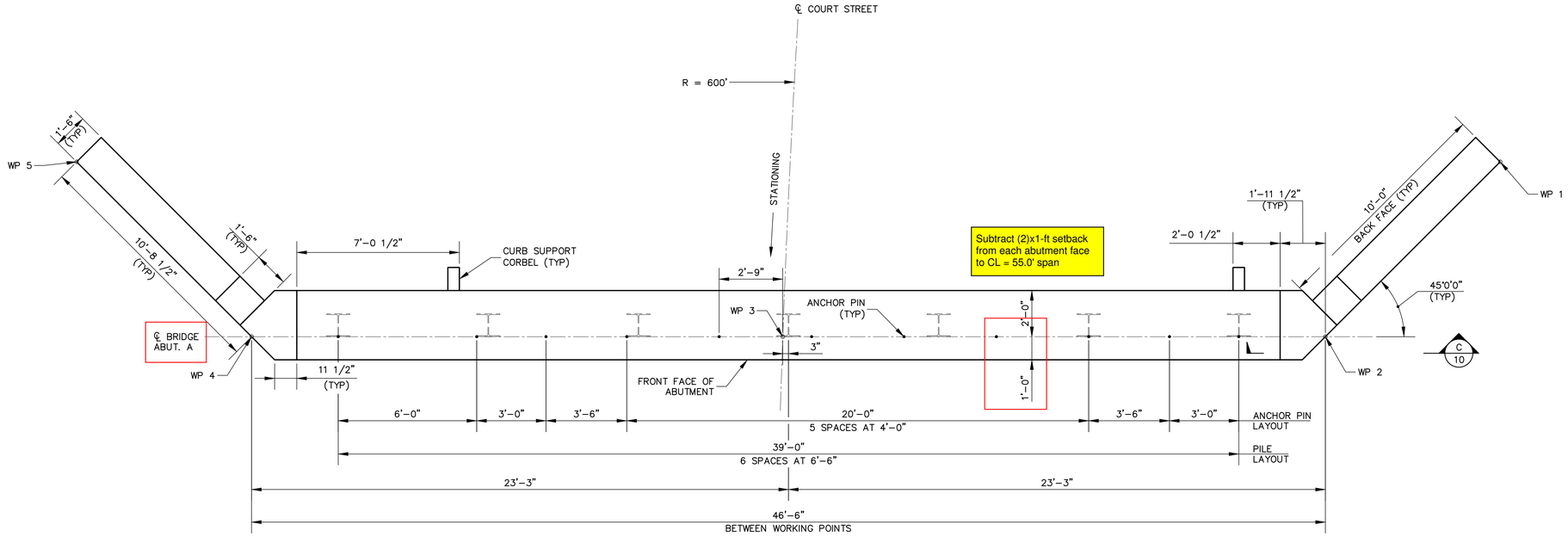
designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
scale:
date: June 2017
project no: ----
file name: S-5 & S-6.dwg

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Boring Logs
(Sheet 2 of 2)

drawing no.
B-6

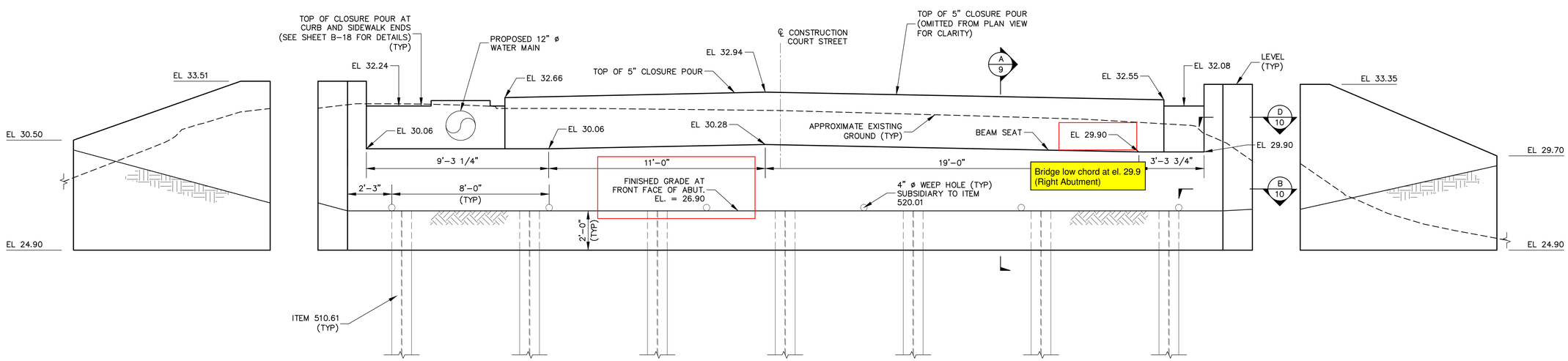
sheet: 7 of 34

F:\CADD\PROJECTS\923-Exeter Bridges\Production\Court St\Final Design\S-5 & S-6.dwg Date Plotted: Jun 12, 2017 - 11:48am Plotted By: BPOMEROY



Abutment A Plan

Scale: 3/8"=1'-0"



Abutment A Elevation

Scale: 3/8"=1'-0"

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • 603/431-6196
Manchester, NH • 603/627-0708
Portland, ME • 207/541-4223
c m a e n g i n e e r s . c o m

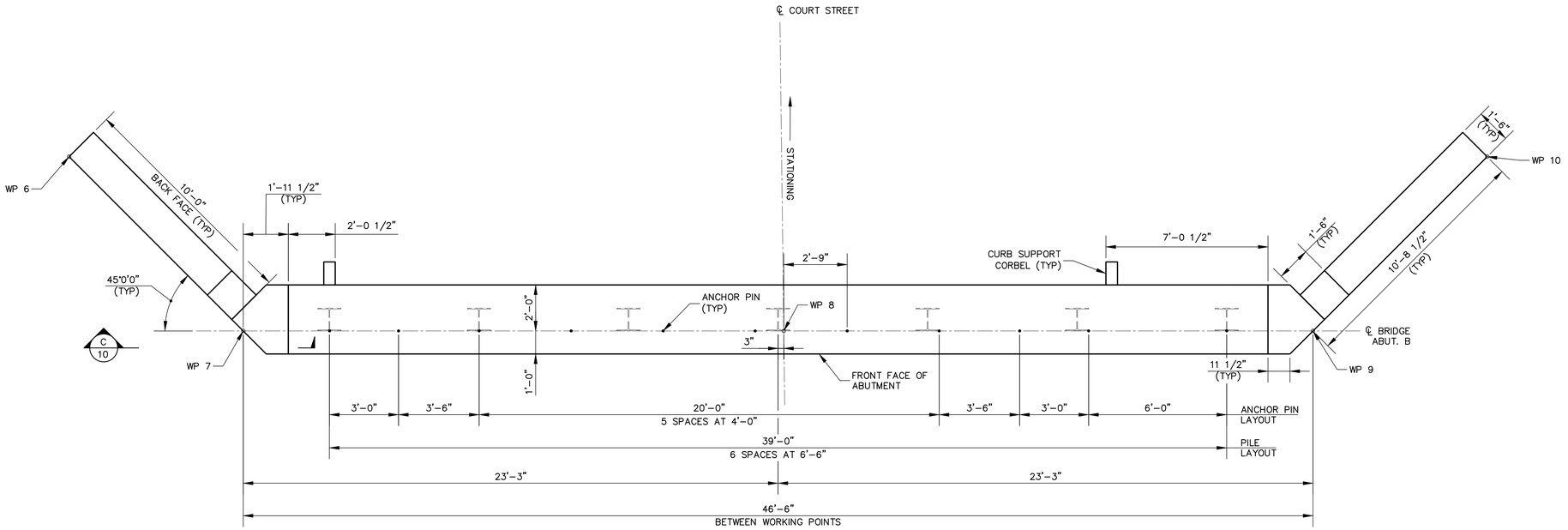
NEW HAMPSHIRE - STATE OF - PROFESSIONAL ENGINEER
JASON GALLANT No. 10551 LICENSED

designed by: LBK/DGK
drawn by: LBK/BGP
approved by: JLG
scale:
date: June 2017
project no: -----
file name: S-7 & S-9.dwg

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Abutment A Plan and Elevation

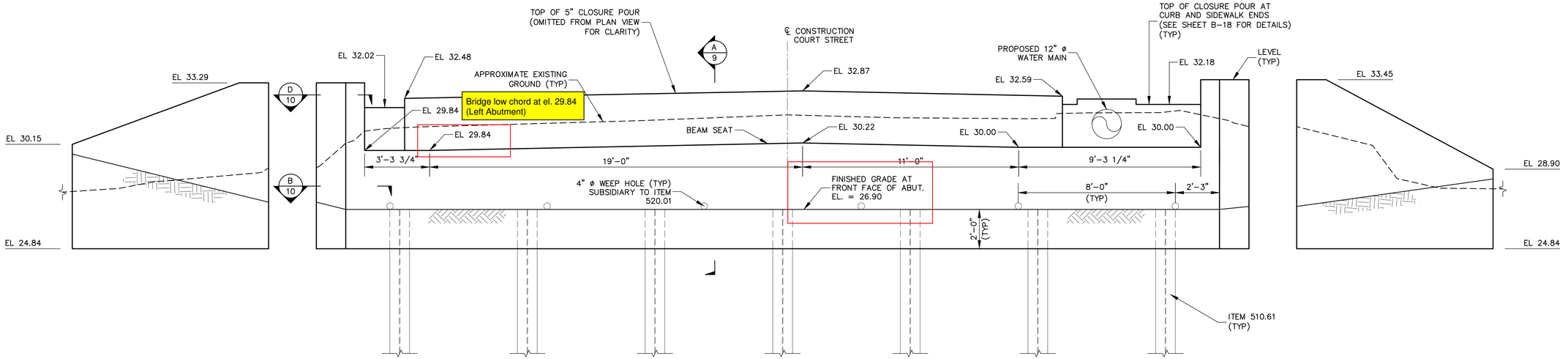
drawing no. B-7

sheet: 8 of 34



Abutment B Plan

Scale: 3/8"=1'-0"



Abutment B Elevation

Scale: 3/8"=1'-0"

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • 603/431-6196
Manchester, NH • 603/627-0708
Portland, ME • 207/541-4223
c m a e n g i n e e r s . c o m

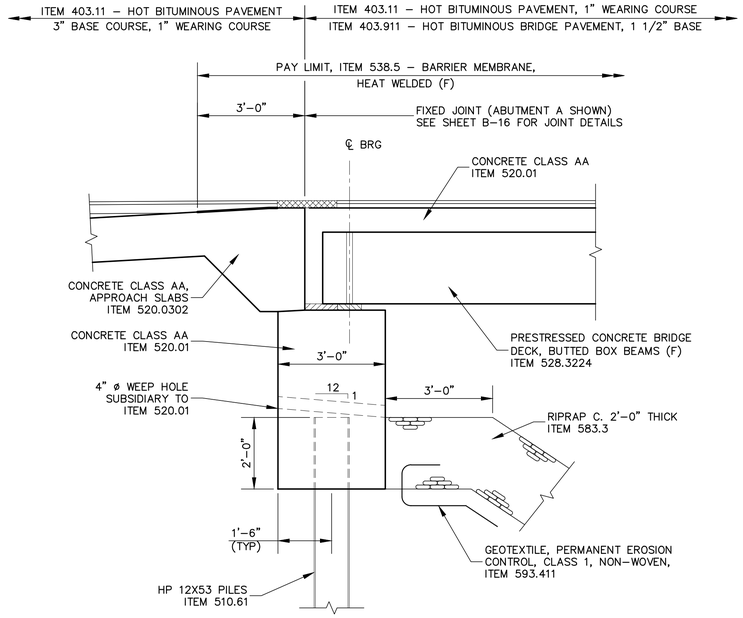
NEW HAMPSHIRE - STATE OF - PROFESSIONAL ENGINEER
JASON GALLANT No. 10551 LICENSED

designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
scale:
date: June 2017
project no: -----
file name: S-7 & S-9.dwg

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Abutment B Plan and Elevation

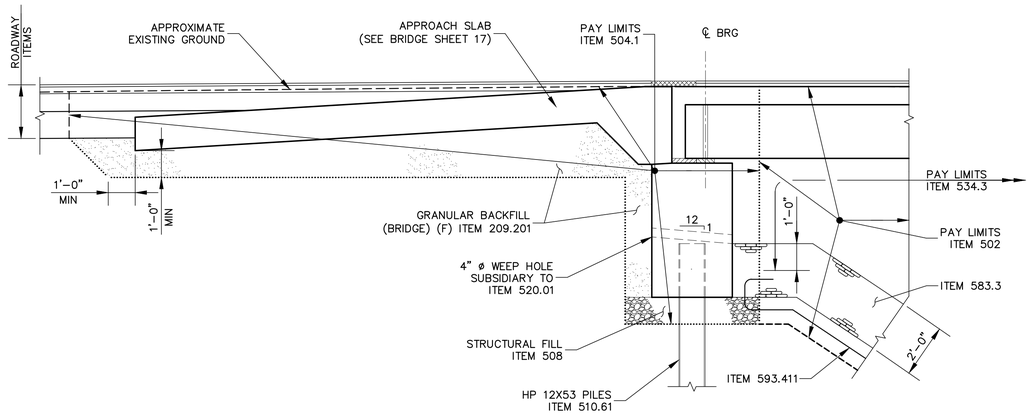
drawing no. B-8

sheet: 9 of 34



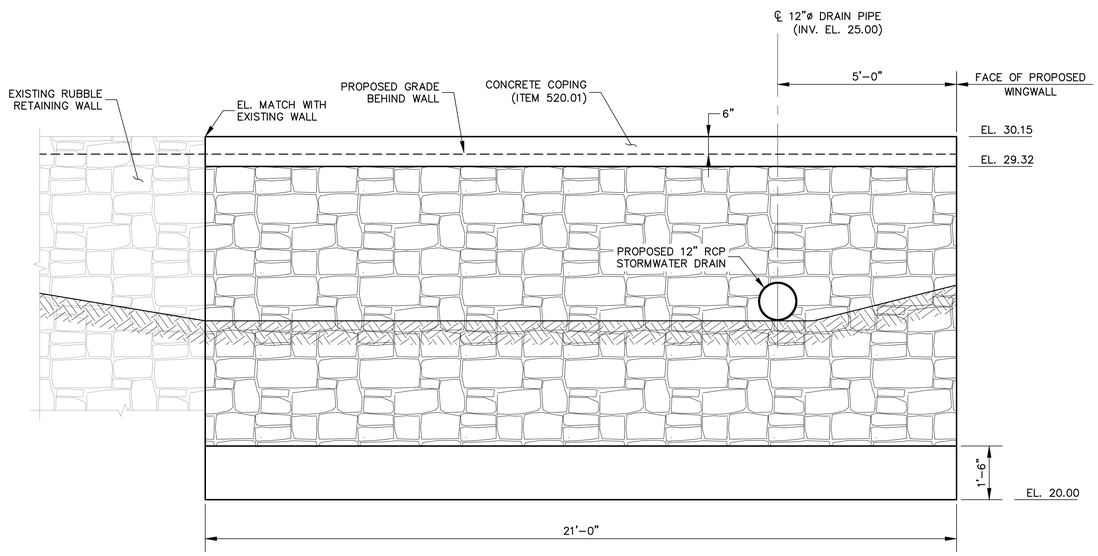
Section A7 A8

Scale: 1/2"=1'–0"



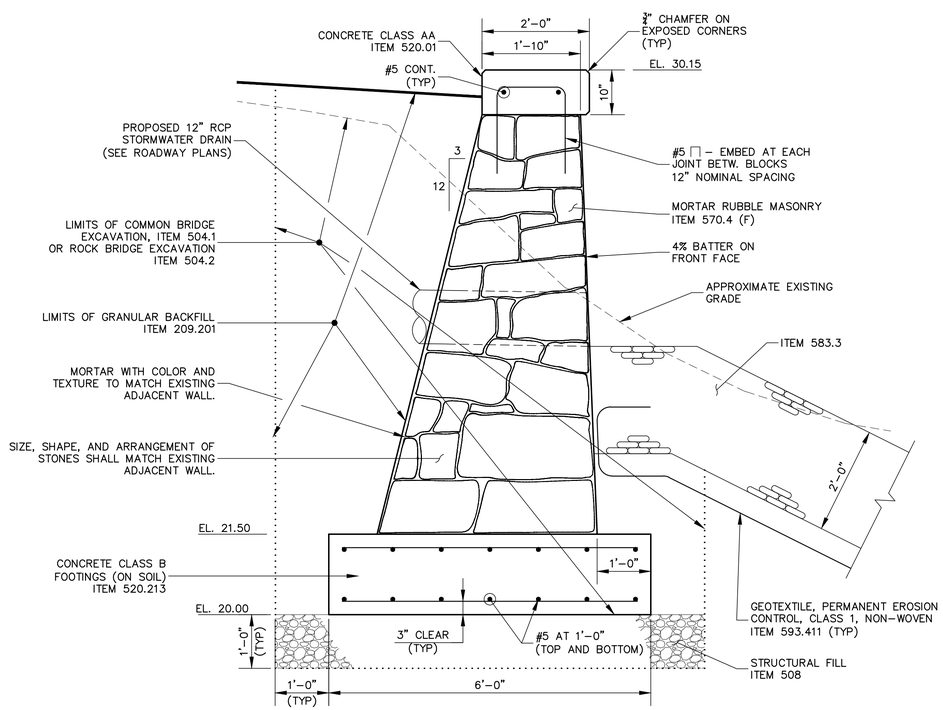
Typical Abutment Section

Scale: 3/8"=1'–0"



Mortar Rubble Masonry Wall Elevation

Scale: 1/2"=1'–0"



Mortar Rubble Masonry Wall Section

Scale: 3/4"=1'–0"

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

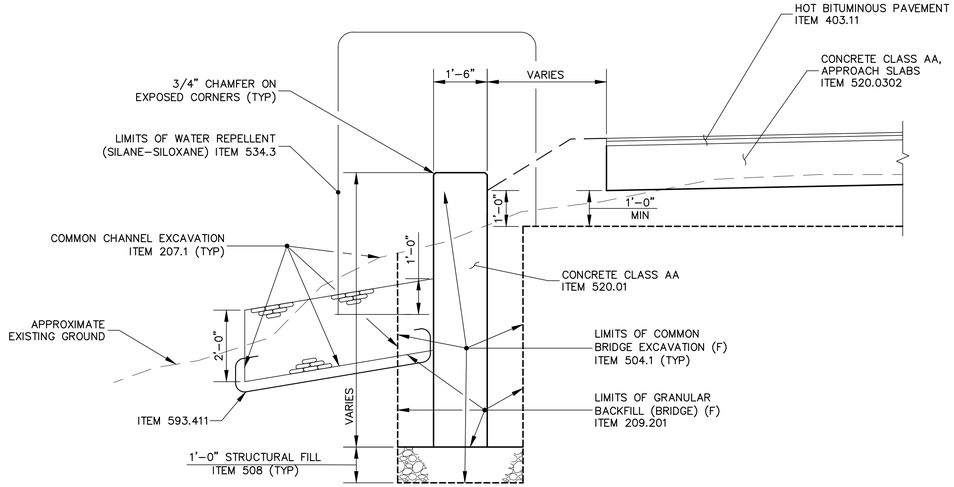
CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
scale:
date: June 2017
project no: ----
file name: S-7 & S-9.dwg

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Abutment Sections

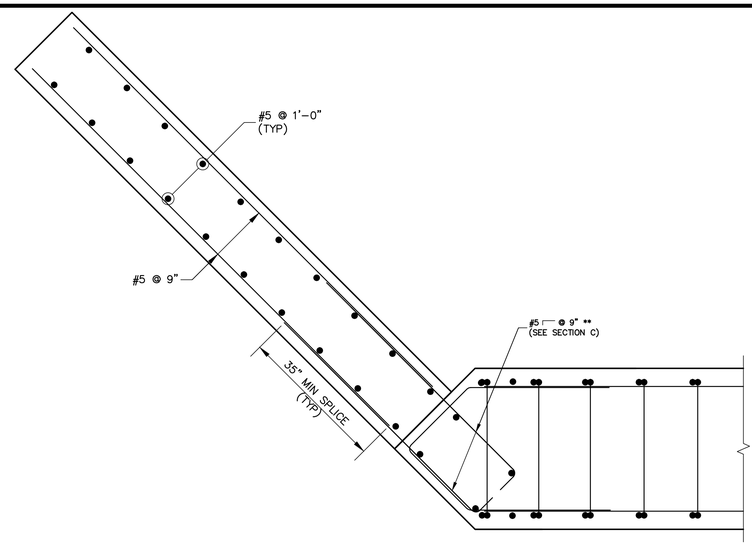
drawing no. B-9

sheet: 10 of 34



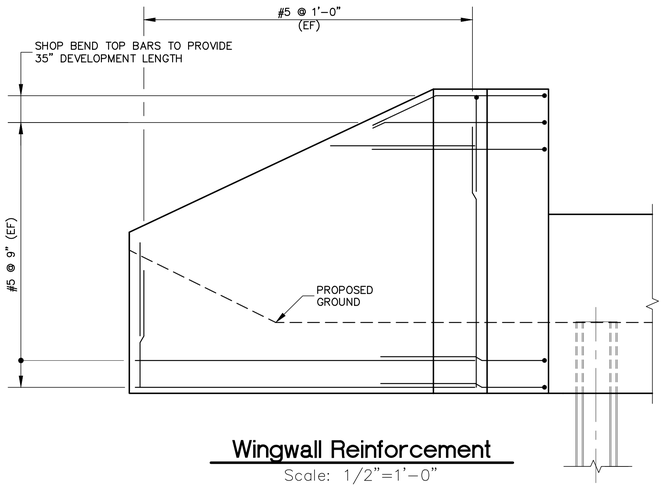
Typical Wingwall Section

Scale: 1/2"=1'-0"



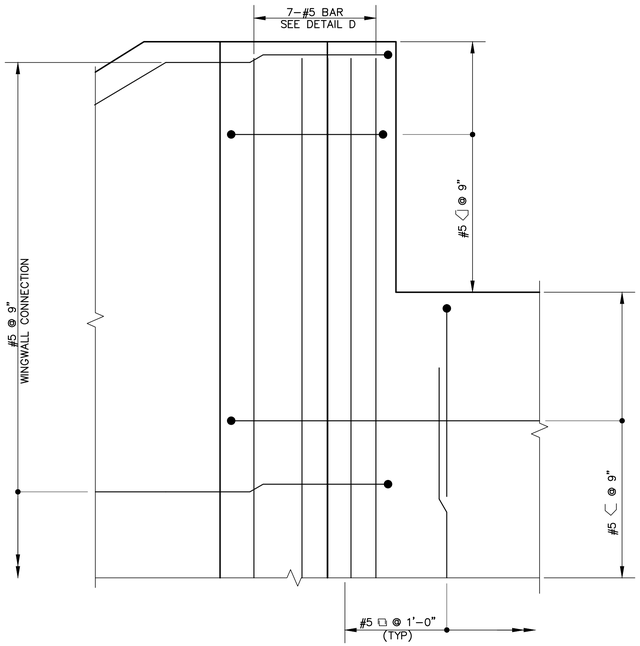
Wingwall Reinforcement Plan

Scale: 3/4"=1'-0"



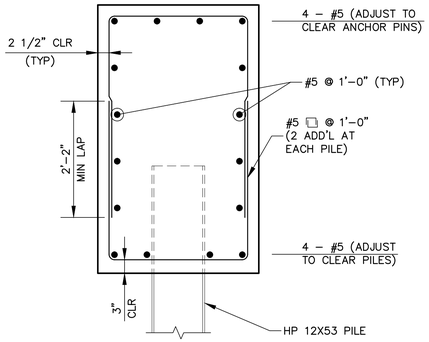
Wingwall Reinforcement

Scale: 1/2"=1'-0"



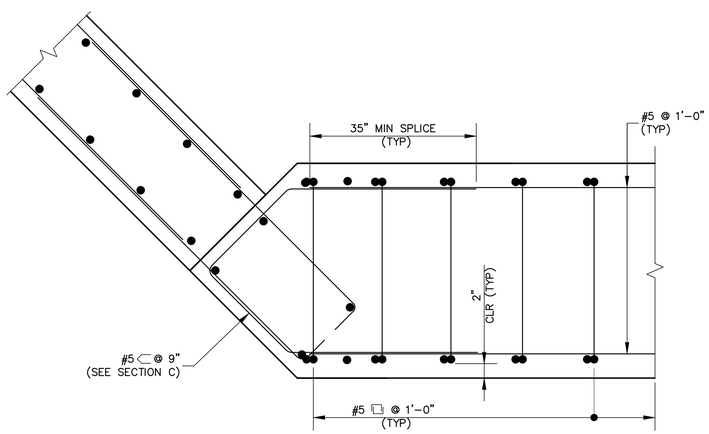
Reinforcing Section C 7 / C 8

Scale: 1"=1'-0"



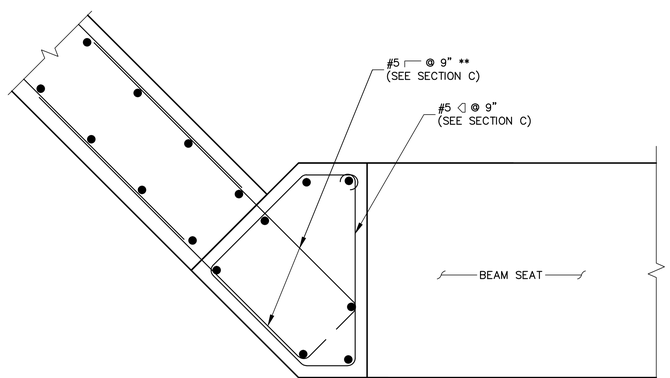
Typical Abutment Reinforcing

Scale: 3/4"=1'-0"



Reinforcing Detail B 7 / B 8

Scale: 1"=1'-0"



Reinforcing Detail D 7 / D 8

Scale: 1"=1'-0"

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 603/627-0708 207/541-4223
c m a e n g i n e e r s . c o m

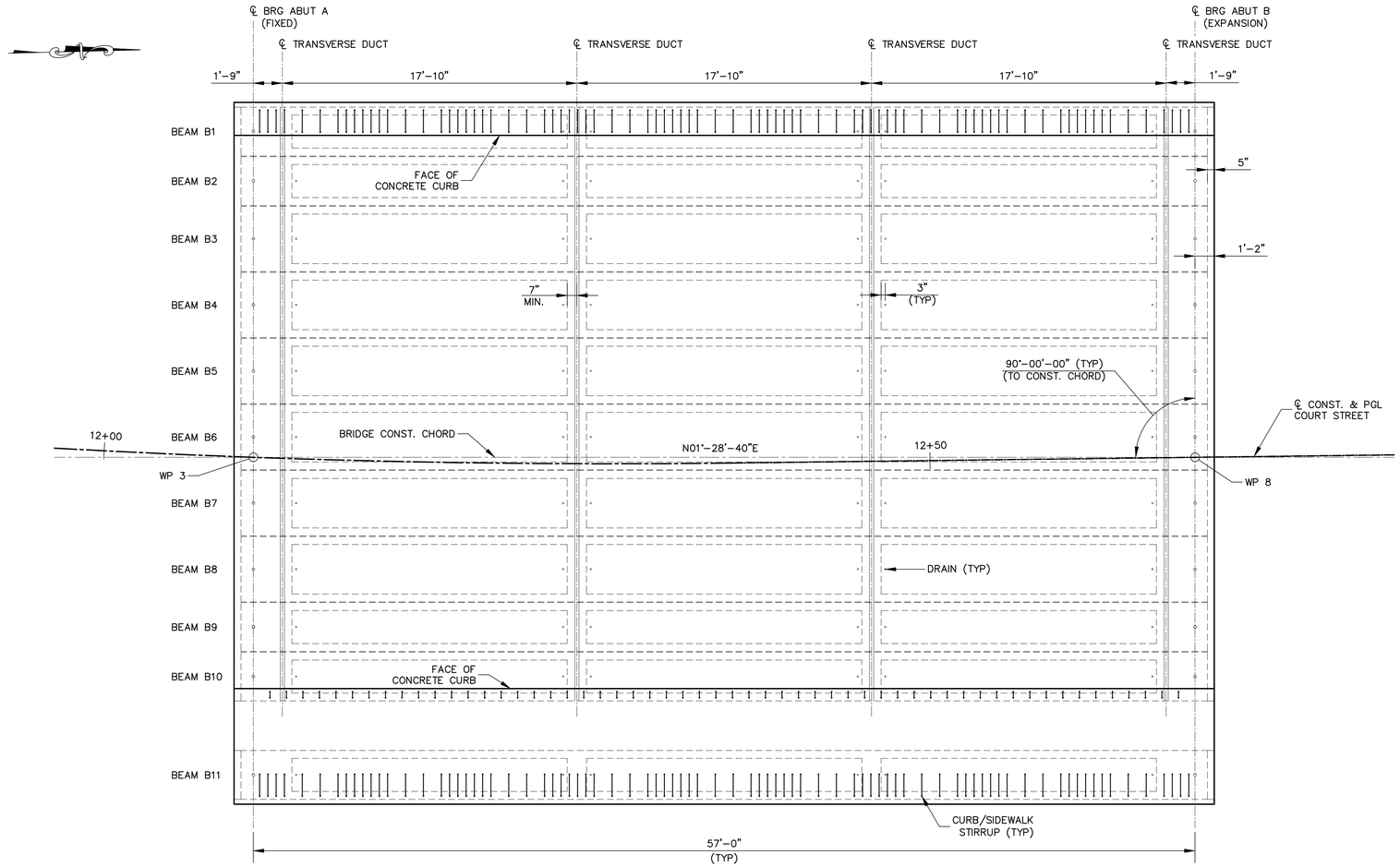
JASON GALLANT No. 10651 - STATE OF NEW HAMPSHIRE - LICENSED PROFESSIONAL ENGINEER

designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
scale:
date: June 2017
project no: ----
file name: S-10.dwg

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Abutment and Wingwall
Elevations and Details

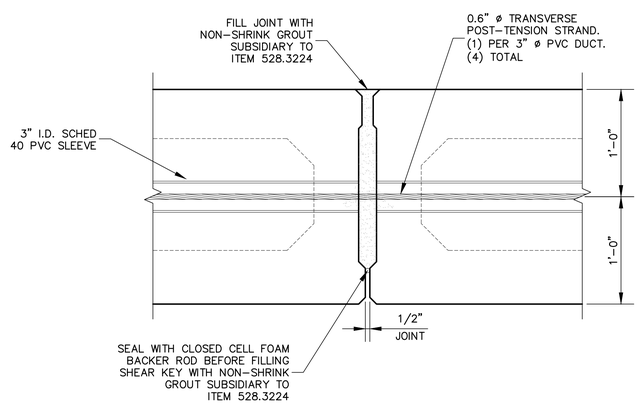
drawing no.
B-10

sheet: 11 of 34



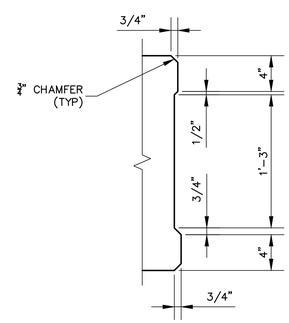
Prestressed Box Beam Layout

Scale: $\frac{1}{4}$" = 1'–0"



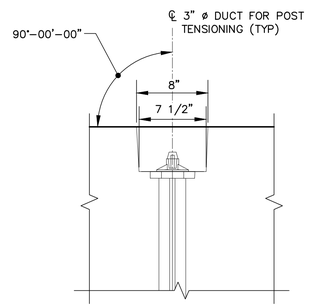
Post Tension/Grouted Shear Key Detail

Scale: $1\frac{1}{2}$" = 1'–0"

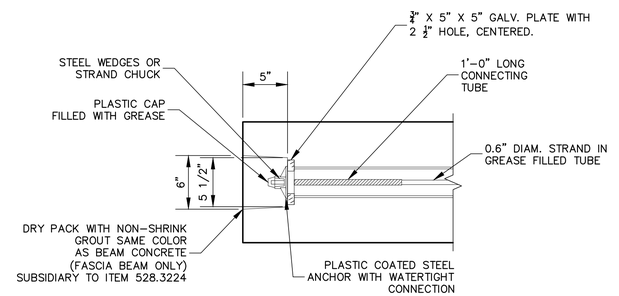


Typical Shear Key

Scale: $1\frac{1}{2}$" = 1'–0"



Plan



Elevation

Post Tension Detail

Scale: $1\frac{1}{2}$" = 1'–0"

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m

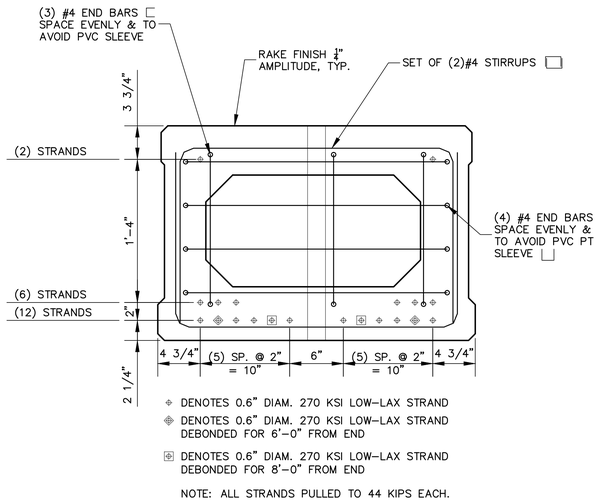
NEW HAMPSHIRE – STATE OF – JASON GALLANT No. 10051 LICENSED PROFESSIONAL ENGINEER

designed by: LBK/OGK	drawn by: LBK/BGP	approved by: JLG	scale:
date: June 2017	project no: ----	file name: S-11 to S-14.dwg	

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Prestressed Box Beam Layout

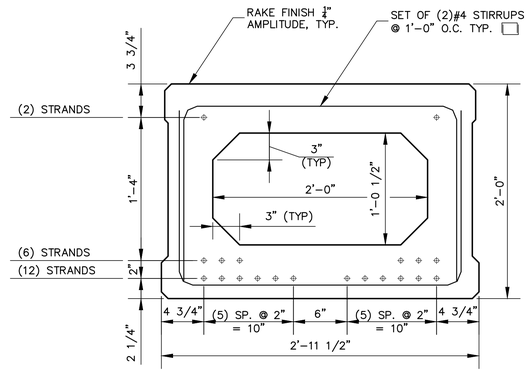
drawing no.
B-11

sheet: 12 of 34



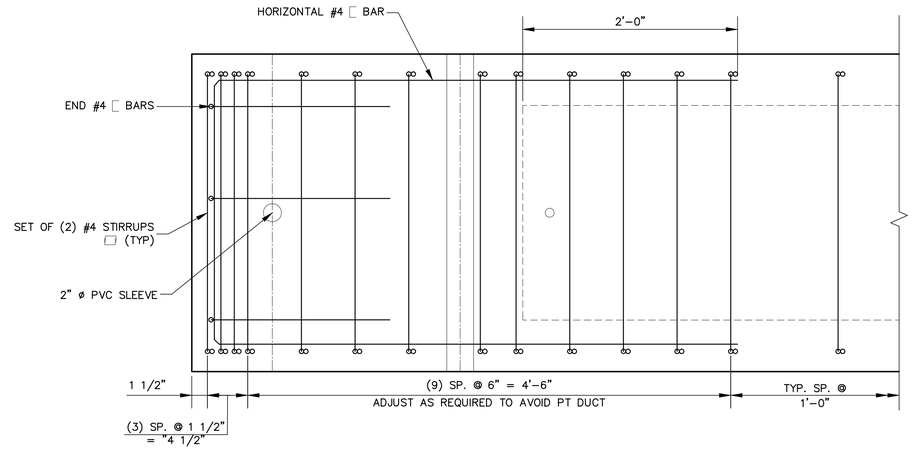
36" Box Beam Typical End Section

Scale: 1½" = 1'-0"



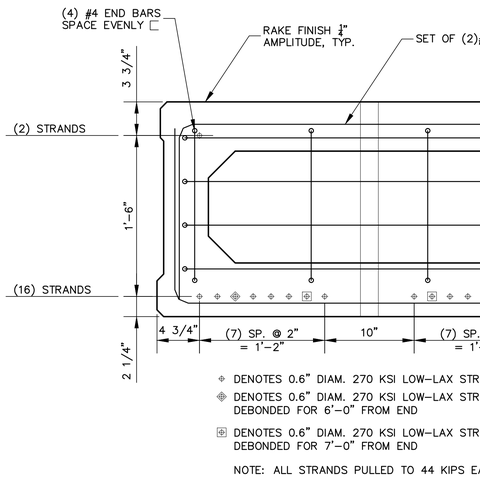
36" Box Beam Typical Mid Section

Scale: 1½" = 1'-0"



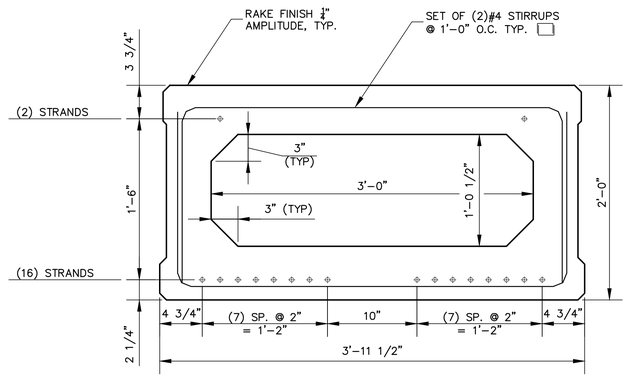
36" Box Beam Typical End Plan

Scale: 1½" = 1'-0"



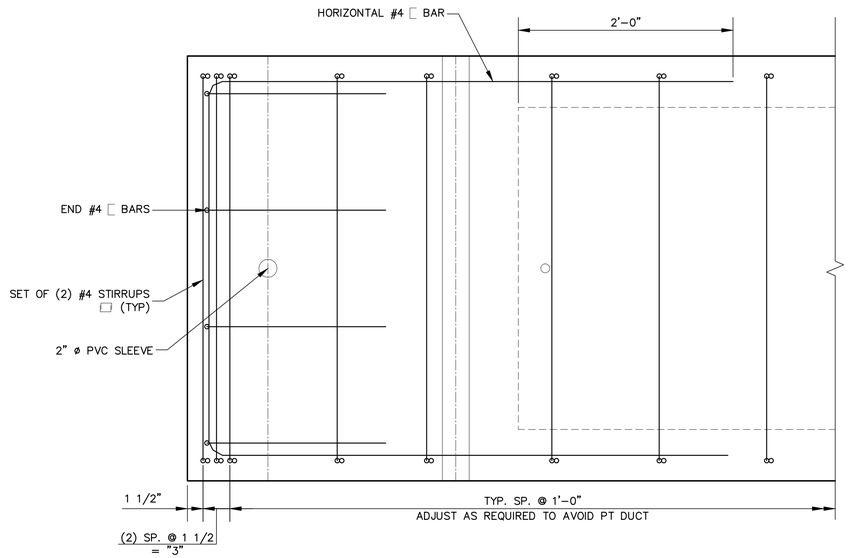
48" Box Beam Typical End Section

Scale: 1½" = 1'-0"



48" Box Beam Typical Mid Section

Scale: 1½" = 1'-0"



48" Box Beam Typical End Plan

Scale: 1½" = 1'-0"

CAMBER AT MID-SPAN (IN)					
	PRESTRESS	SELF WEIGHT	SUPERIMPOSED DL	TOTAL AT ERECTION	TOTAL AT FINAL
BEAM B1	2.35	-0.97	-048	2.43	1.39
BEAM B2 AND B9	2.35	-0.97	-0.43	2.43	1.54
BEAM B3-B8	1.72	-0.92	-0.42	1.40	0.31
BEAM B10	2.35	-0.97	-0.79	2.43	0.48
BEAM B11	2.35	-0.97	-1.05	2.43	-0.32

NOTE: NEGATIVE VALUES INDICATE DOWNWARD DEFLECTION.

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m

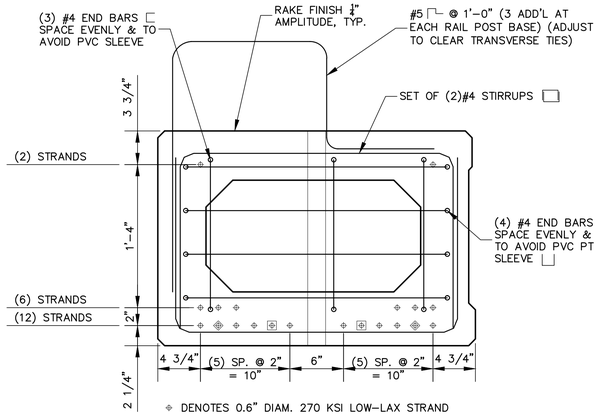
JASON GALLANT No. 10551 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE

designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
scale:
date: June 2017
project no: ----
file name: S-11 to S-14.dwg

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Prestressed Box Beam
Details (Sheet 1 of 3)

drawing no. B-12

sheet: 13 of 34



◆ DENOTES 0.6" DIAM. 270 KSI LOW-LAX STRAND

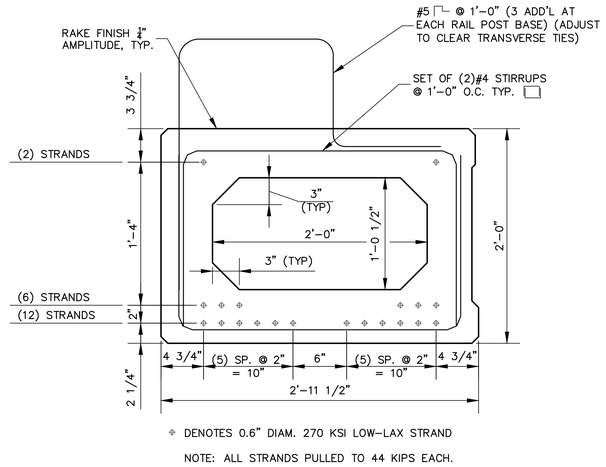
◈ DENOTES 0.6" DIAM. 270 KSI LOW-LAX STRAND DEBONDED FOR 6'-0" FROM END

⊡ DENOTES 0.6" DIAM. 270 KSI LOW-LAX STRAND DEBONDED FOR 8'-0" FROM END

NOTES:
1). ALL STRANDS PULLED TO 44 KIPS EACH.
2). BEAM B1 SHOWN WITH SINGLE SHEAR KEY. BEAM B11 OPPOSITE HAND WITH BOTH SHEAR KEYS OMITTED.

36" Box Beam (Beam B1/B11) End Section

Scale: $1\frac{1}{2}$" = 1'-0"

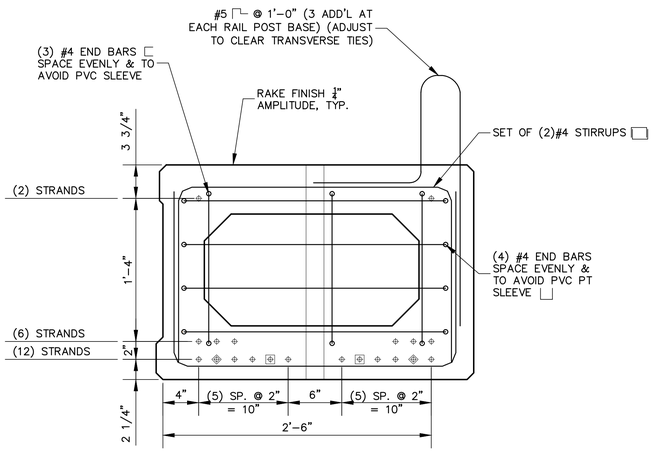


◆ DENOTES 0.6" DIAM. 270 KSI LOW-LAX STRAND

NOTE: ALL STRANDS PULLED TO 44 KIPS EACH.

36" Box Beam (Beam B1/B11) Typical Mid Section

Scale: $1\frac{1}{2}$" = 1'-0"



◆ DENOTES 0.6" DIAM. 270 KSI LOW-LAX STRAND

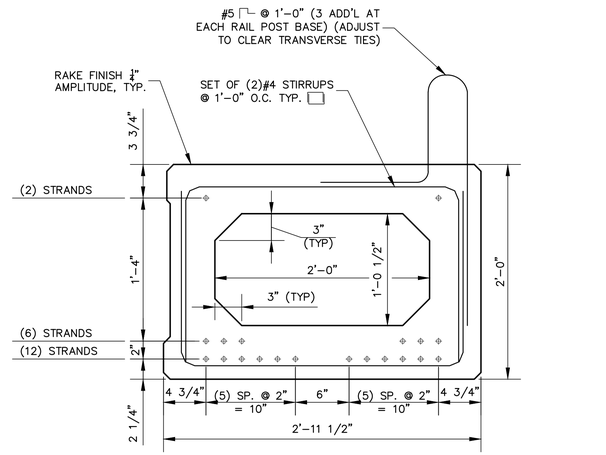
◈ DENOTES 0.6" DIAM. 270 KSI LOW-LAX STRAND DEBONDED FOR 6'-0" FROM END

⊡ DENOTES 0.6" DIAM. 270 KSI LOW-LAX STRAND DEBONDED FOR 8'-0" FROM END

NOTE: ALL STRANDS PULLED TO 44 KIPS EACH.

36" Box Beam (Beam B10) End Section

Scale: $1\frac{1}{2}$" = 1'-0"



◆ DENOTES 0.6" DIAM. 270 KSI LOW-LAX STRAND

NOTE: ALL STRANDS PULLED TO 44 KIPS EACH.

36" Box Beam (Beam B10) Typical Mid Section

Scale: $1\frac{1}{2}$" = 1'-0"

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • 603/431-6196
Manchester, NH • 603/627-0708
Portland, ME • 207/541-4223
c m a e n g i n e e r s . c o m

NEW HAMPSHIRE - STATE OF - JASON GALLANT No. 10551 LICENSED PROFESSIONAL ENGINEER

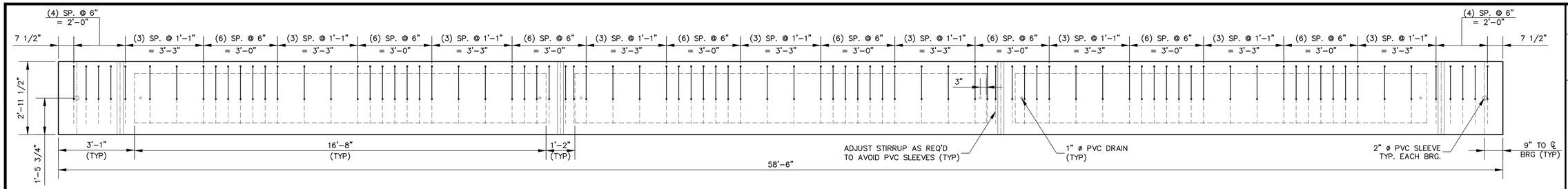
designed by:	drawn by:	approved by:	scale:
LBK/DGK	LBK/BGP	JLG	

date:	project no:	file name:
June 2017	-----	S-11 to S-14.dwg

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Prestressed Box Beam
Details (Sheet 2 of 3)

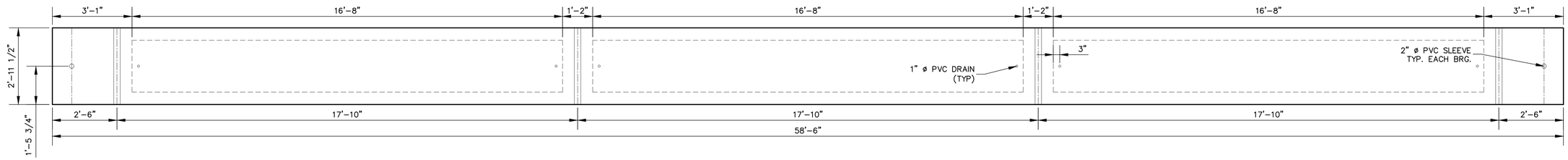
drawing no.
B-13

sheet: 14 of 34



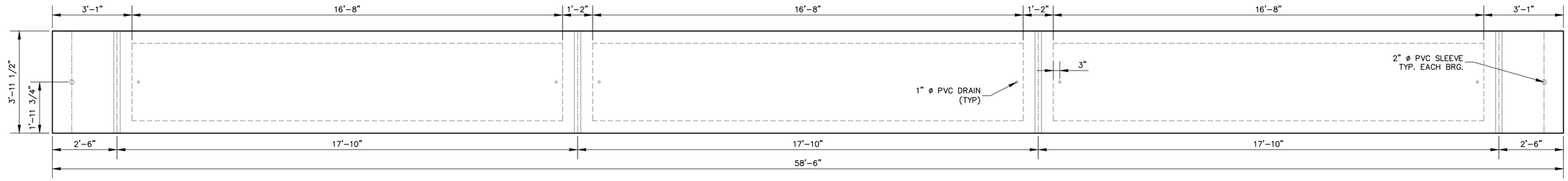
Beam B1 Plan

Scale: $\frac{1}{2}$" = 1'-0"



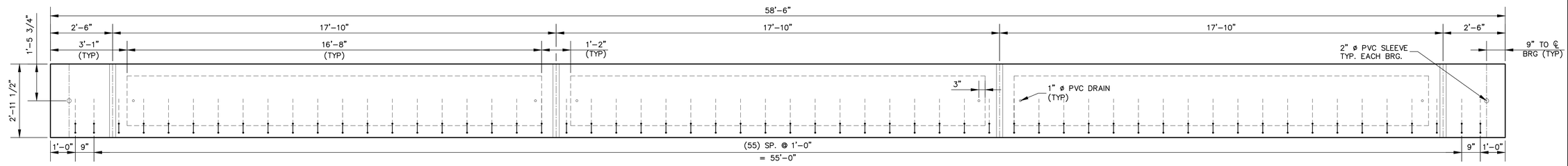
Beam B2 and B9 Plan

Scale: $\frac{1}{2}$" = 1'-0"



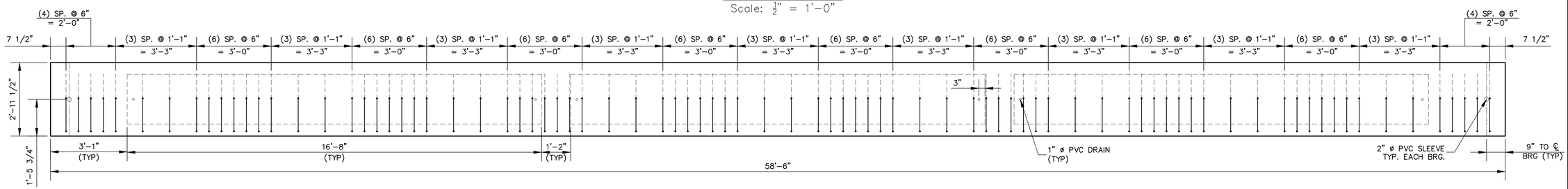
Beam B3 Through B8 Plan

Scale: $\frac{1}{2}$" = 1'-0"



Beam B10 Plan

Scale: $\frac{1}{2}$" = 1'-0"



Beam B11 Plan

Scale: $\frac{1}{2}$" = 1'-0"

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m

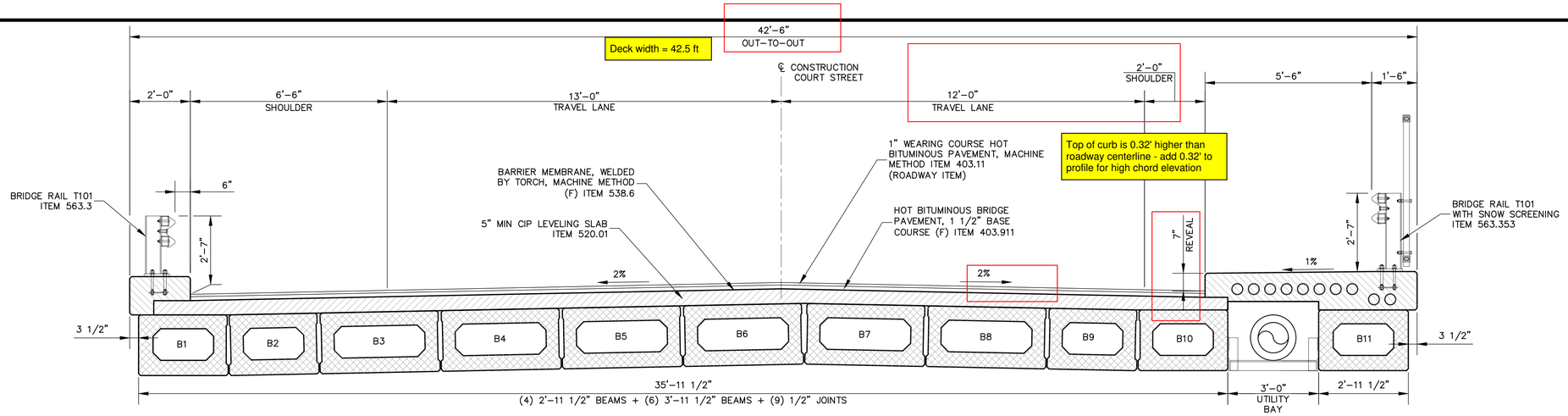
STATE OF NEW HAMPSHIRE - JASON GALLANT No. 10551 LICENSED PROFESSIONAL ENGINEER

designed by: LBK/OGK	drawn by: LBK/BGP	approved by: JLG	scale:
date: June 2017	project no: -----	file name: S-11 to S-14.dwg	

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Prestressed Box Beam
Details (Sheet 3 of 3)

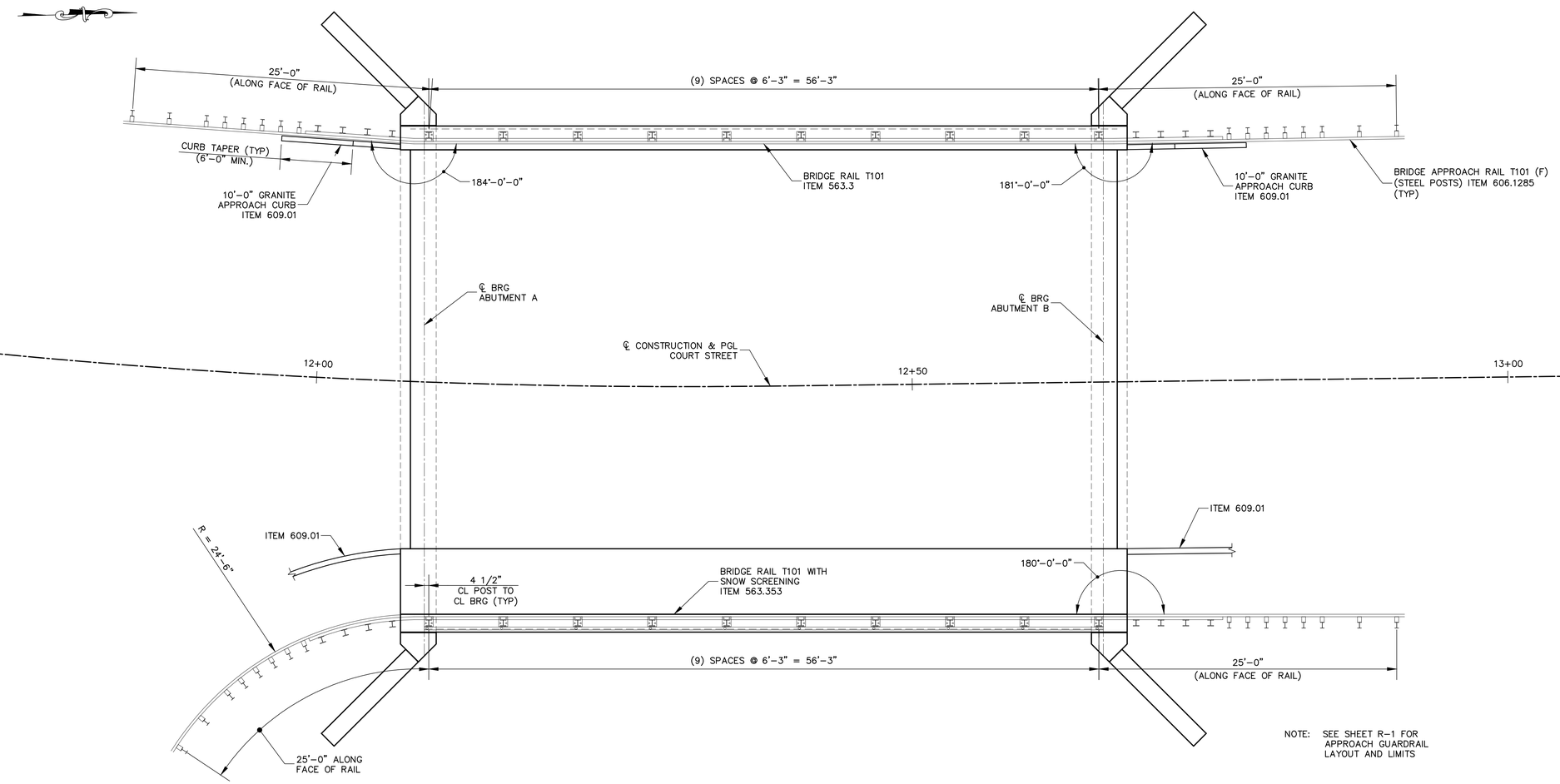
drawing no.
B-14

sheet: 15 of 34



Typical Deck Section

Scale: $\frac{1}{2}$" = 1'-0"



Rail Layout Plan

Scale: 1" = 5'-0"

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m

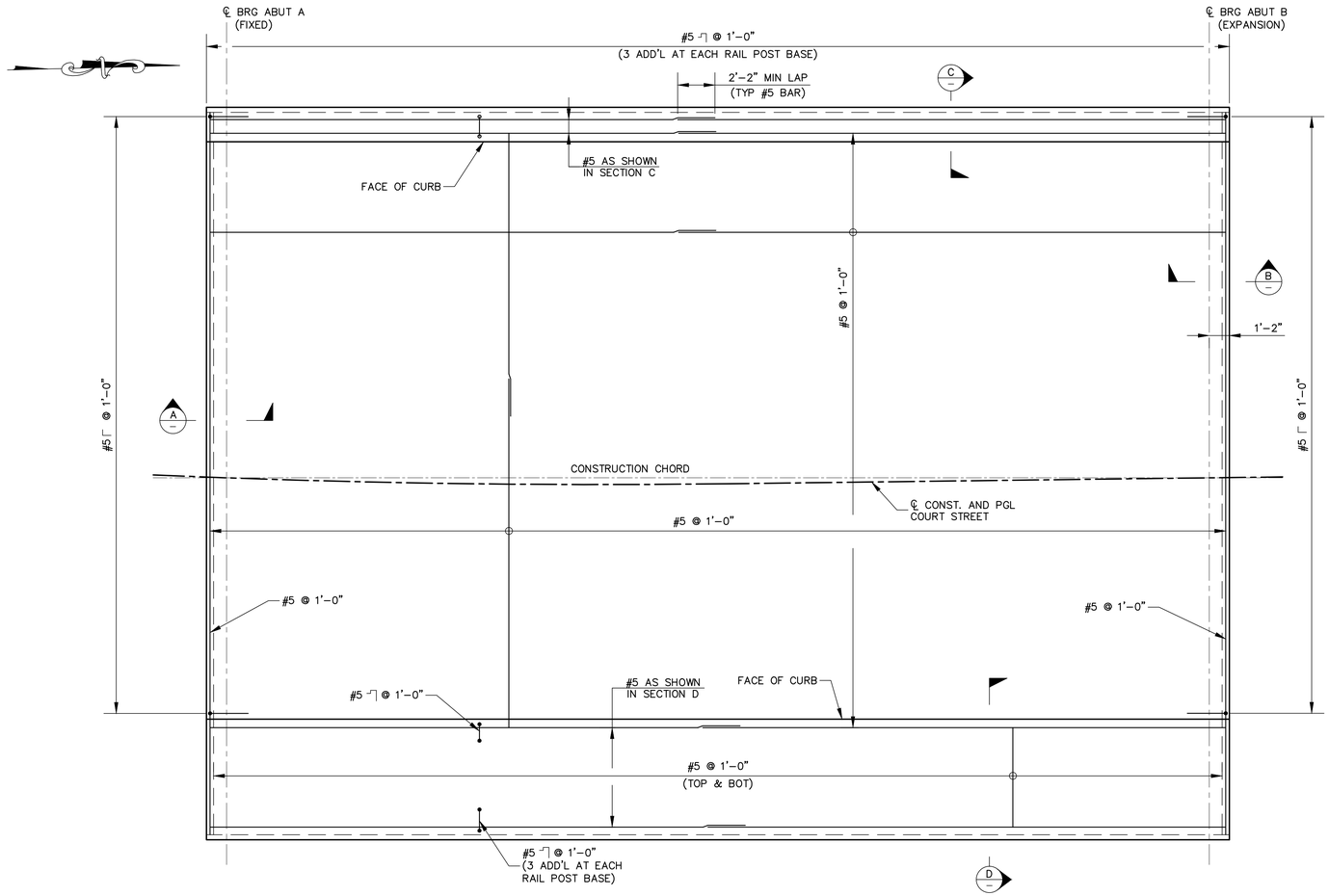
NEW HAMPSHIRE - STATE OF - PROFESSIONAL ENGINEER
JASON GALLANT No. 10551 LICENSED

designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
scale:
date: June 2017
project no: -----
file name: S-15.dwg

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Typical Section and Rail Layout

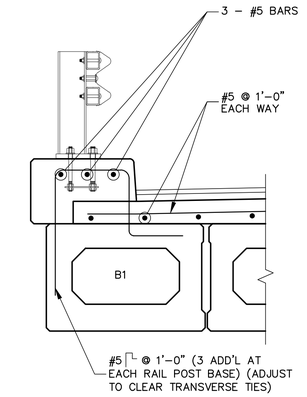
drawing no. B-15

sheet: 16 of 34



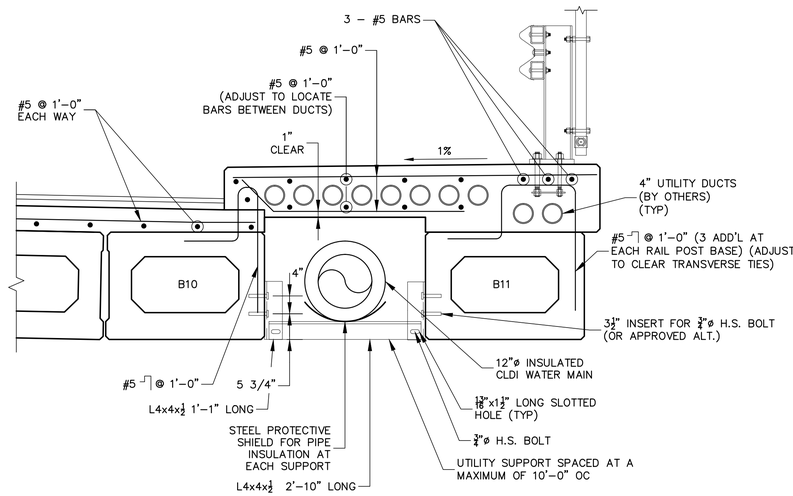
Overlay and Curb Reinforcing Plan

Scale: 1/4"=1'-0"



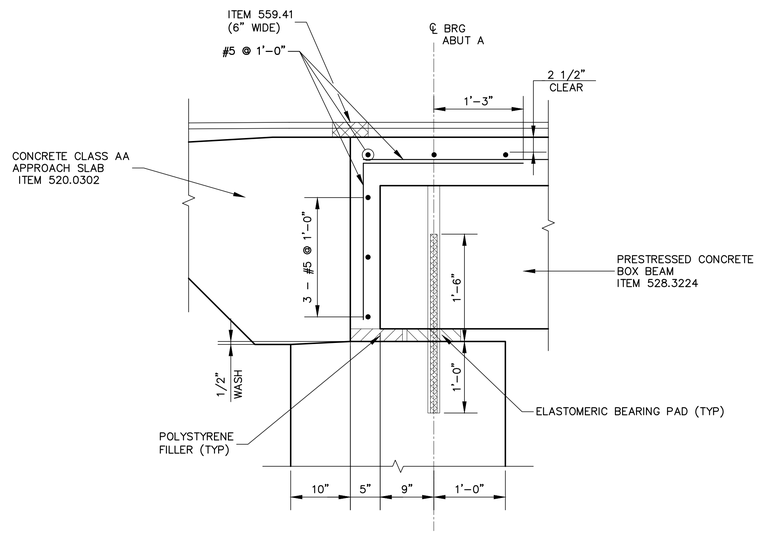
Section C

Scale: 3/4"=1'-0"



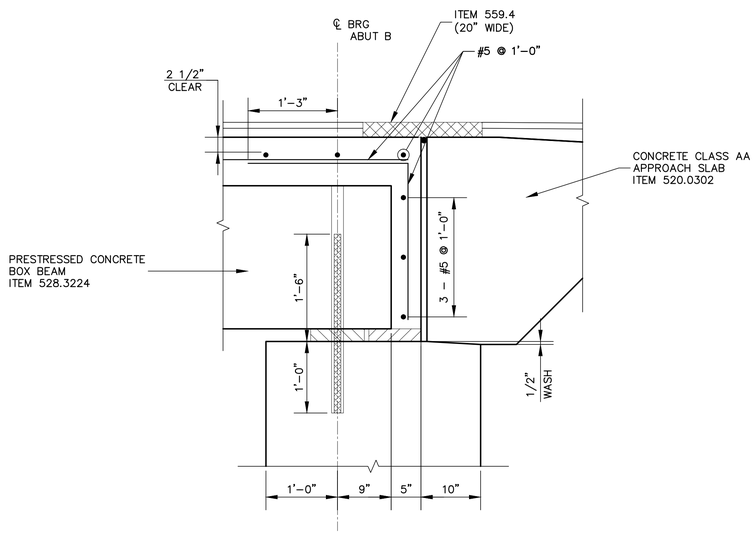
Section D

Scale: 3/4"=1'-0"



Section A

Scale: 1"=1'-0"



Section B

Scale: 1"=1'-0"

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

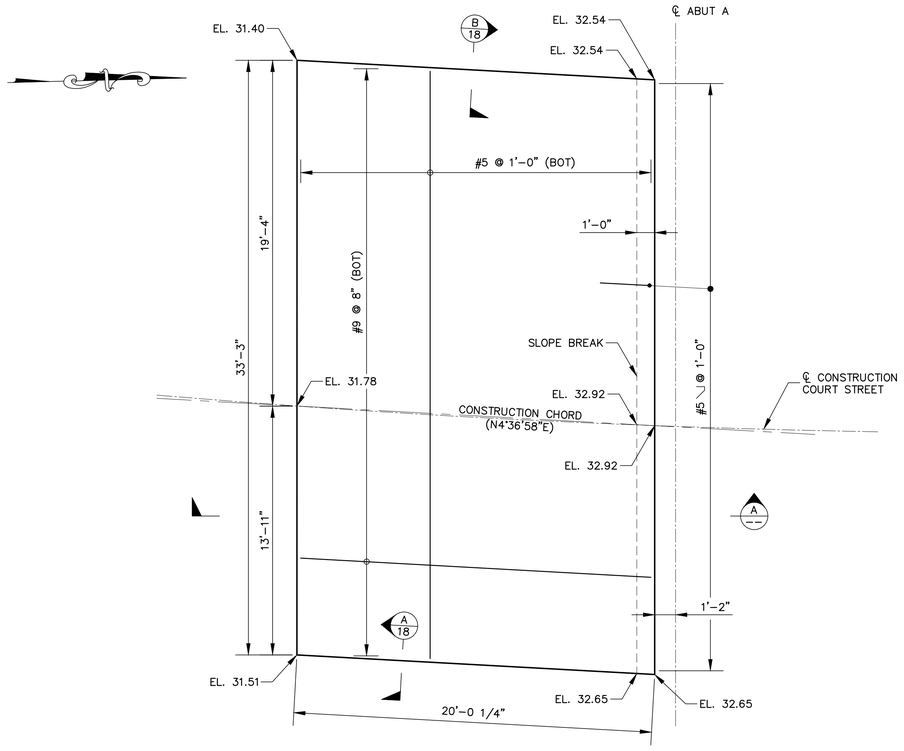
JASON GALANT No. 10551 LICENSED PROFESSIONAL ENGINEER - STATE OF NEW HAMPSHIRE

designed by: LBK/OGK	drawn by: LBK/BGP	approved by: JLG	scale:
date: June 2017	project no: ----	file name: S-16.dwg	

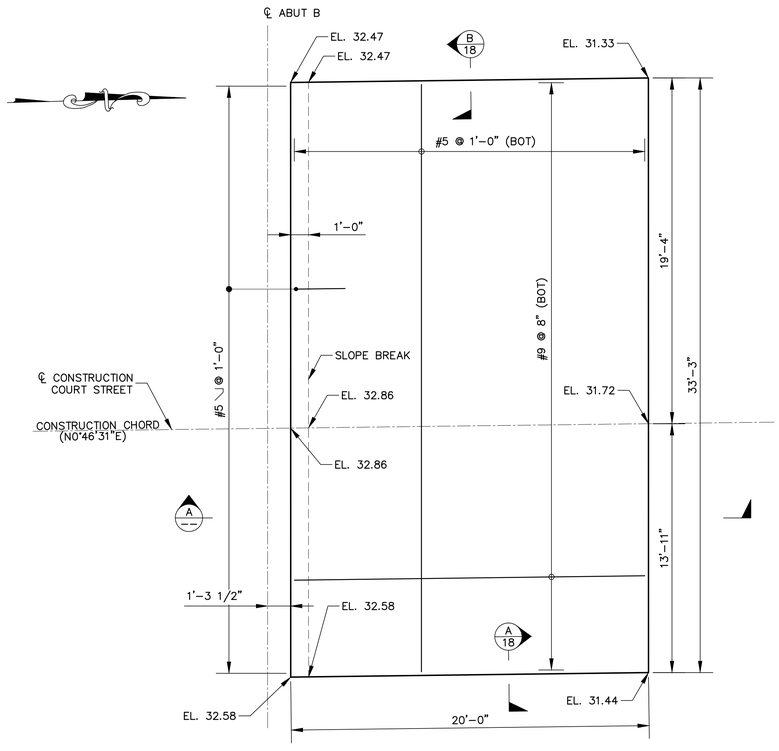
Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Superstructure Details

drawing no.
B-16

sheet: 17 of 34



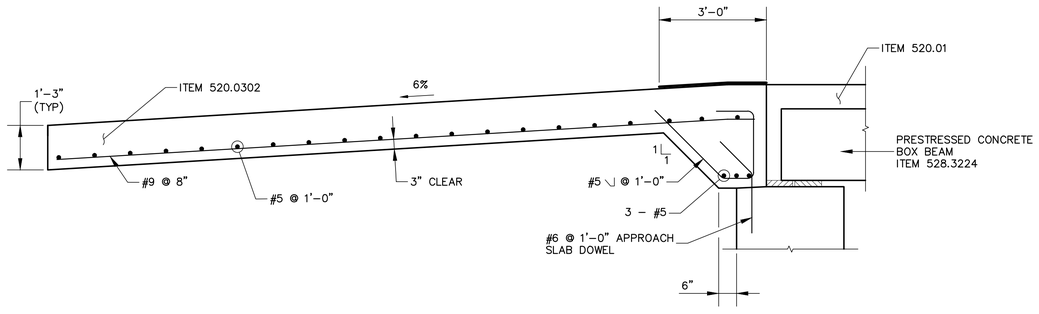
Abutment A



Abutment B

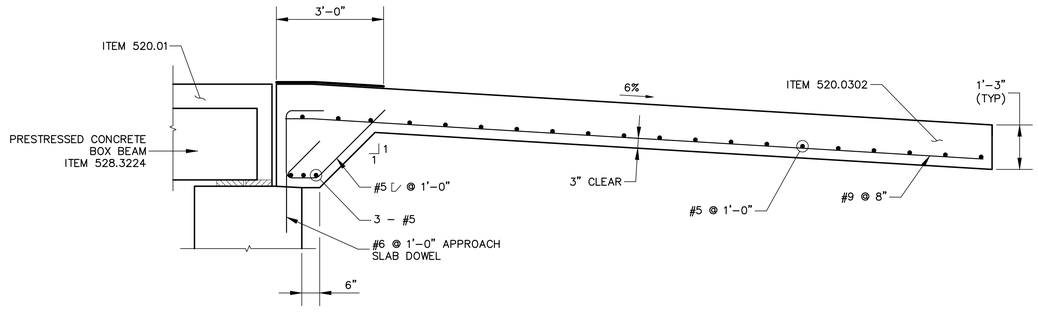
Approach Slab Plan

Scale: $\frac{1}{4}$" = 1'–0"



Section A

Scale: 1/2"=1'–0"



Section B

Scale: 1/2"=1'–0"

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • 603/431-6196
Manchester, NH • 603/627-0708
Portland, ME • 207/541-4223
c m a e n g i n e e r s . c o m

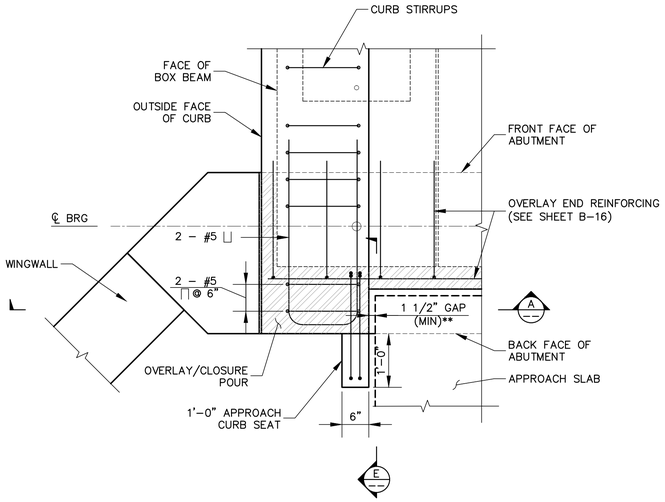
STATE OF NEW HAMPSHIRE – JASON GALLANT No. 10551 LICENSED PROFESSIONAL ENGINEER

designed by: LBK/DGK
drawn by: LBK/BGP
approved by: JLG
scale:
date: June 2017
project no: ----
file name: S-17.dwg

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Approach Slab Details
(Sheet 1 of 2)

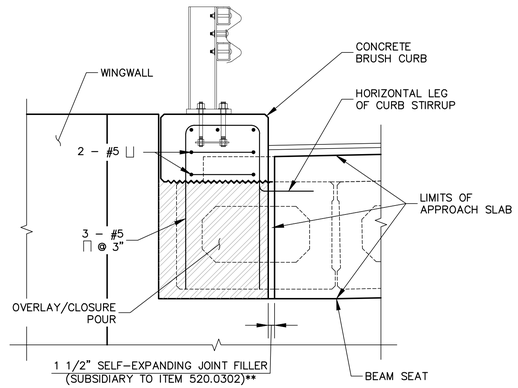
drawing no.
B-17

sheet: 18 of 34



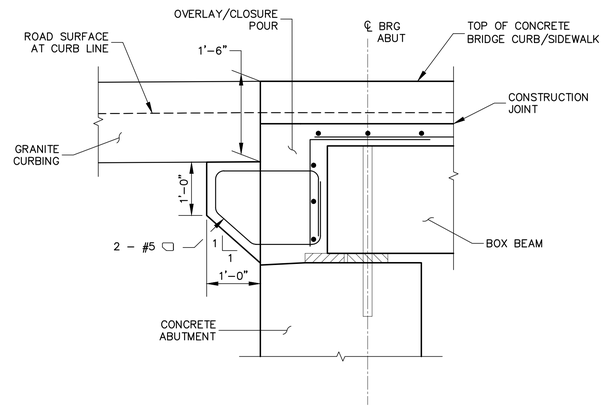
Closure Pour Detail 1

Scale: 3/4"=1'–0"



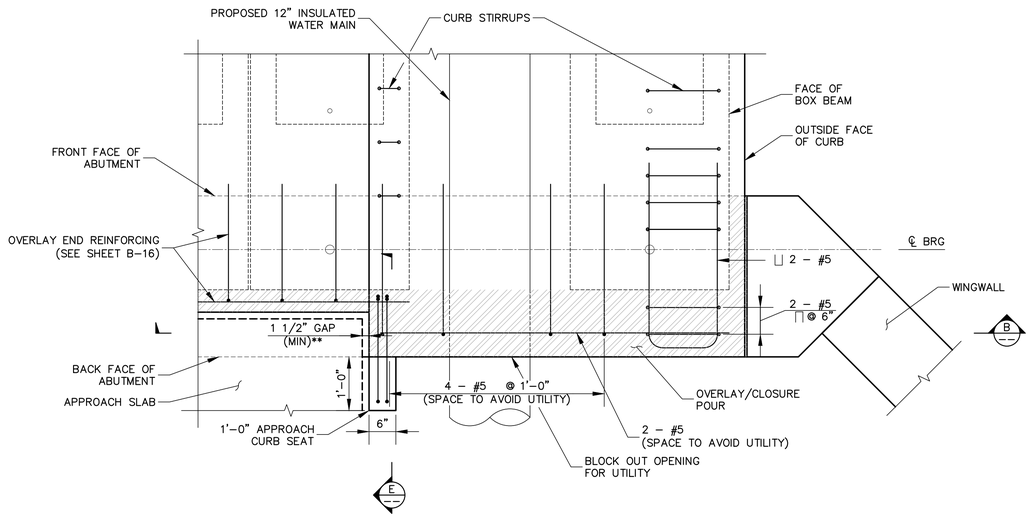
Section A

Scale: 3/4"=1'–0"



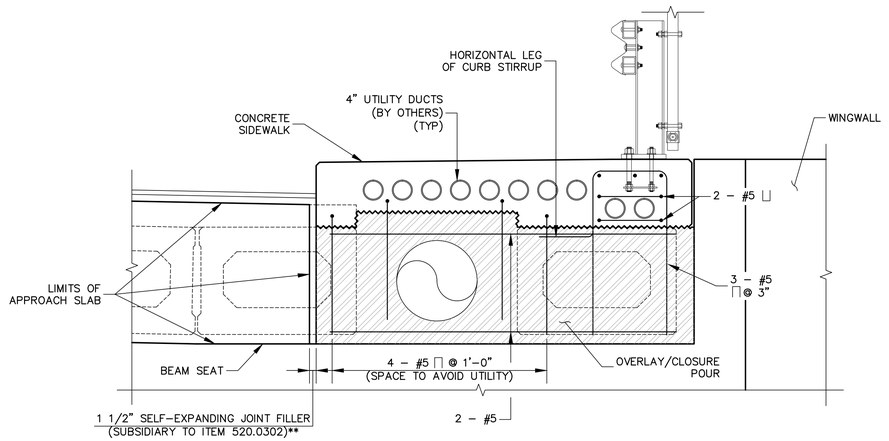
Section E

Scale: 3/4"=1'–0"



Closure Pour Detail 2

Scale: 3/4"=1'–0"



Section B

Scale: 3/4"=1'–0"

** GAP AT ABUTMENT B ONLY (EXPANSION).
OMIT GAP AT ABUTMENT A (FIXED)

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • 603/431-6196
Manchester, NH • 603/627-0708
Portland, ME • 207/541-4223
c m a e n g i n e e r s . c o m

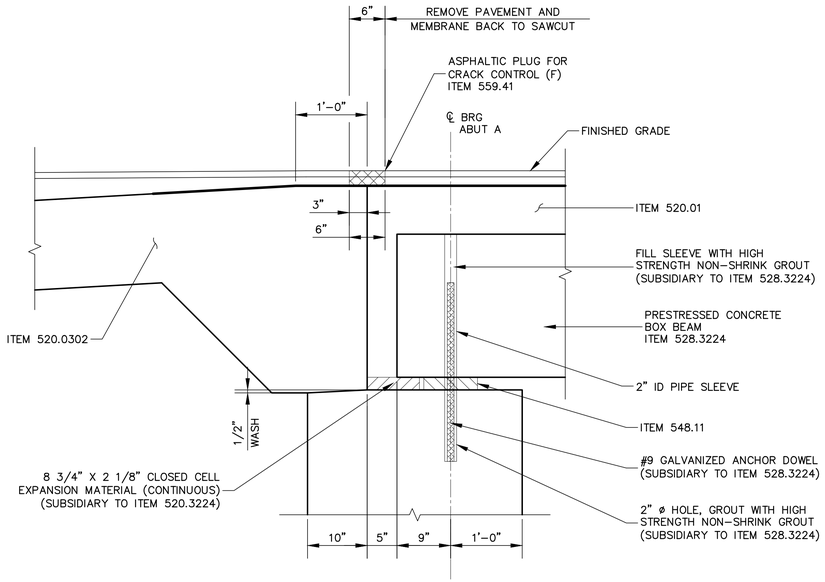
STATE OF NEW HAMPSHIRE – JASON GALLANT No. 10551 LICENSED PROFESSIONAL ENGINEER

designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
scale:
date: June 2017
project no: ----
file name: S-18.dwg

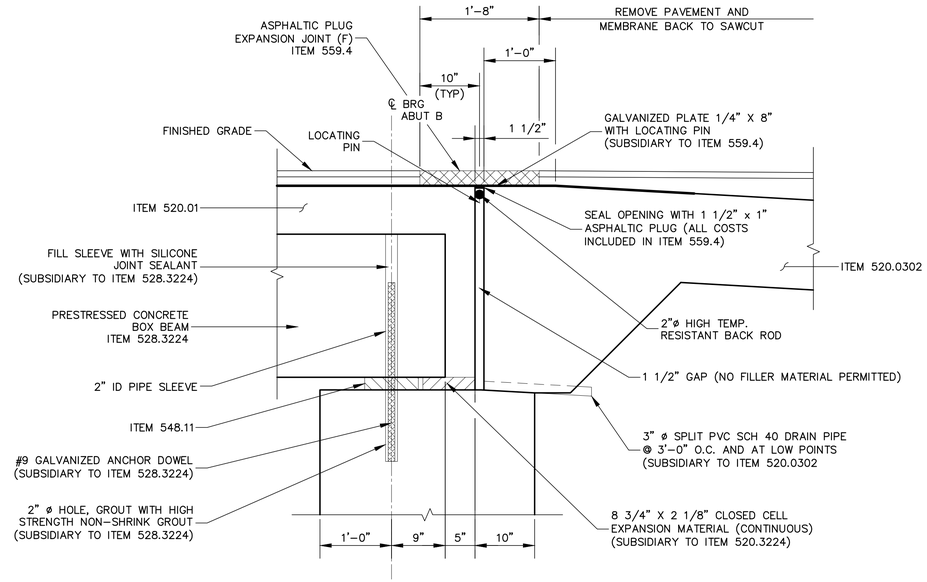
Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Approach Slab Details
(Sheet 2 of 2)

drawing no.
B-18

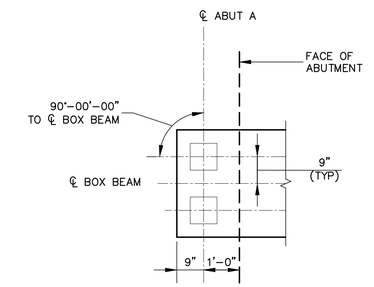
sheet: 19 of 34



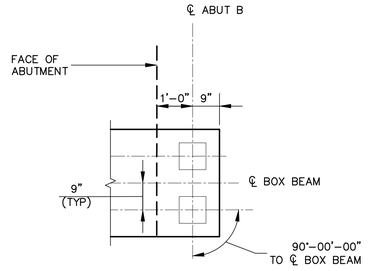
Abutment A
Scale: 1"=1'–0"



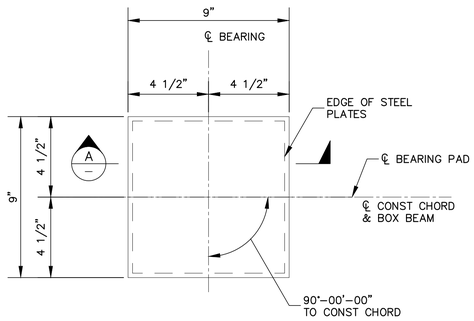
Abutment B
Scale: 1"=1'–0"



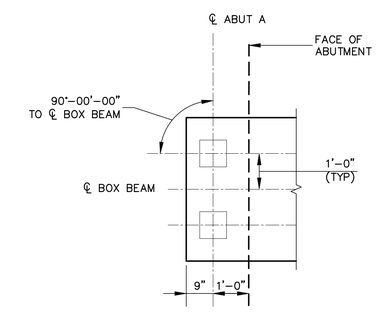
Bearing Layout (Abut A) (3 Ft Beam)
Scale: 1/2"=1'–0"



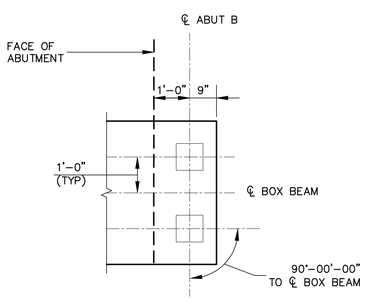
Bearing Layout (Abut B) (3 Ft Beam)
Scale: 1/2"=1'–0"



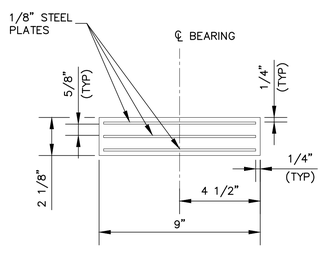
Bearing Plan
Scale: 3"=1'–0"



Bearing Layout (Abut A) (4 Ft Beam)
Scale: 1/2"=1'–0"



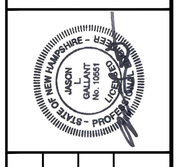
Bearing Layout (Abut B) (4 Ft Beam)
Scale: 1/2"=1'–0"



Section A–A
Scale: 3"=1'–0"

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m



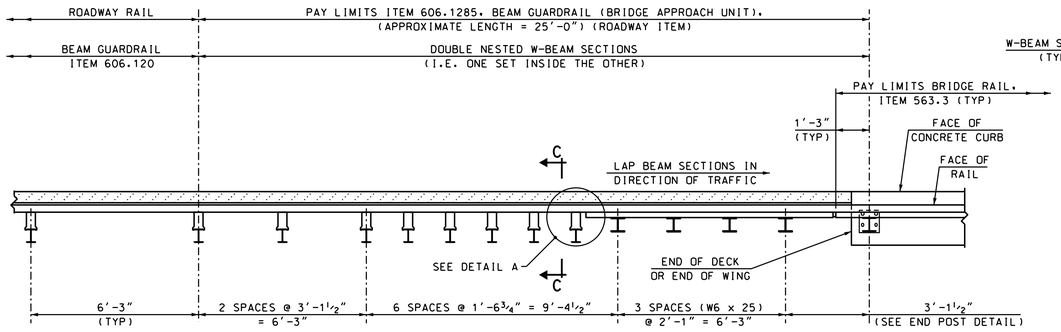
designed by:	drawn by:	approved by:	scale:
LBK/DGK	LBK/BGP	JLG	

date:	project no:	file name:
June 2017	----	S-19.dwg

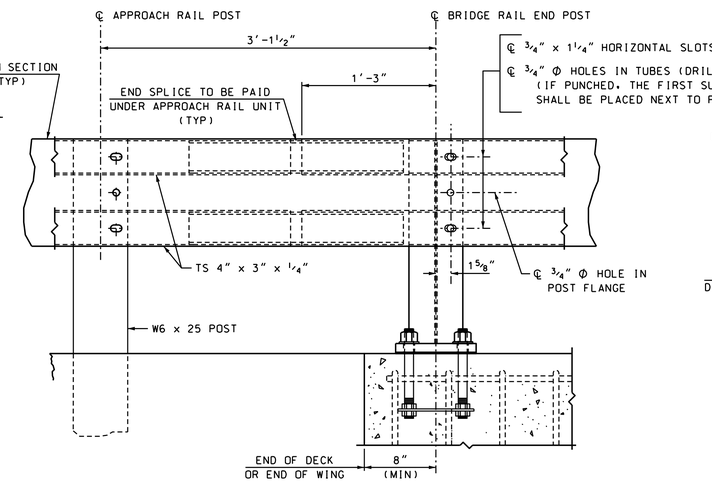
Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Bearing and Joint Details

drawing no.
B-19

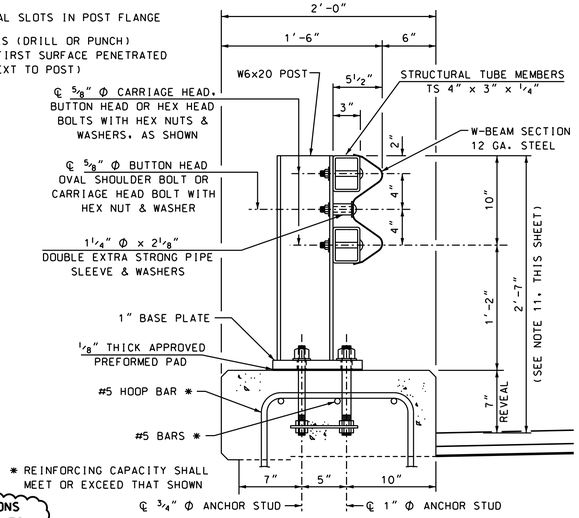
sheet: 20 of 34



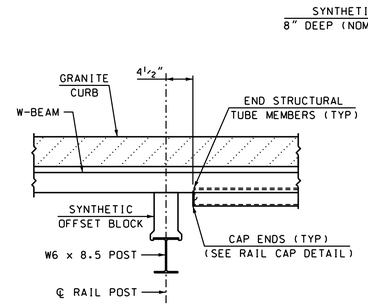
APPROACH RAIL LAYOUT
SCALE: 3/8" = 1'-0"



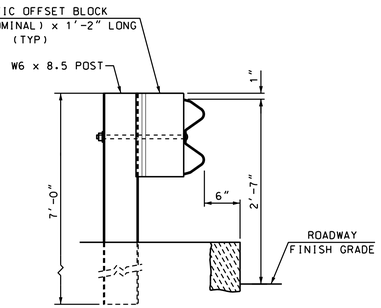
END POST DETAIL
SCALE: 1 1/2" = 1'-0"



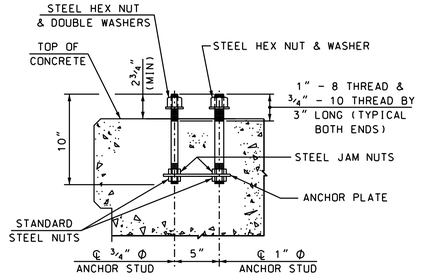
BRIDGE RAIL DETAIL
SCALE: 1 1/2" = 1'-0"



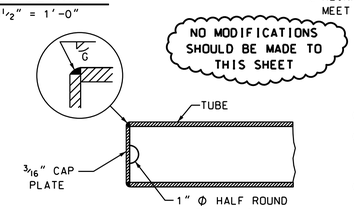
DETAIL A
SCALE: 1" = 1'-0"



SECTION C-C
SCALE: 1" = 1'-0"



POST ANCHOR ASSEMBLY
SCALE: 1 1/2" = 1'-0"



RAIL CAP DETAIL (BOTTOM VIEW)
SCALE: 3" = 1'-0"

GENERAL NOTES

(1) BRIDGE RAIL T101 SHALL NOT BE USED ON NATIONAL HIGHWAY SYSTEMS.

(2) BRIDGE RAIL T101 WAS SUCCESSFULLY CRASHED TESTED FOR NCHRP 350 (@ HEIGHT OF 2'-3"), TL-3 PER FHWA MAY 30, 1997 MEMORANDUM. USE OF THIS SYSTEM SHALL BE FOR POSTED SPEEDS ≤45 mph.

(3) ITEM 563.3, BRIDGE RAIL T101, SHALL INCLUDE POSTS, BASE PLATES, ANCHOR PLATES, ANCHOR STUDS, PREFORMED PADS, RAIL ASSEMBLY BOLTS, NUTS, WASHERS, STRUCTURAL TUBING, SPLICE BARS, PIPE SLEEVES AND W-BEAM SECTIONS.
- ASTM A572 GRADE 50 : POSTS AND BASE PLATES
- ASTM A500 GRADE B : STRUCTURAL TUBING
- ASTM A36 : PIPE SLEEVES, RAIL SPLICE BARS AND ANCHOR PLATES
- ASTM A449 : ANCHOR STUDS WITH STANDARD NUTS AND HARDENED STEEL COMMERCIAL TYPE A PLAIN WIDE WASHERS
- A307 : RAIL BOLTS, NUTS, AND WASHERS
- AASHTO M180 TYPE II : W-BEAM SECTIONS

(4) ALL STEEL COMPONENTS SHALL BE GALVANIZED AFTER FABRICATION IN CONFORMANCE WITH AASHTO M232 (ASTM A153) AND AASHTO M111 (ASTM A123). GALVANIZED SURFACES SHALL HAVE A UNIFORM APPEARANCE AND GALVANIZED MATERIAL SHALL BE PROPERLY STORED.

(5) STRUCTURAL TUBING SHALL BE SUPPLIED AS ONE PIECE FOR BRIDGE RAIL 40 FEET OR LESS IN LENGTH. IN OTHER CASES, TUBING SHALL BE SPLICED WITH A SPLICE BAR (SEE SPLICE BAR DETAILS). NO TRANSVERSE BUTT WELDS ARE PERMITTED ON RAIL TUBING WITHIN A CONTINUOUS LENGTH.

(6) EACH PIECE OF RAIL TUBING SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

(7) FOR BRIDGE RAIL POST SPACING, SEE BRIDGE RAIL LAYOUT. THE MAXIMUM BRIDGE RAIL POST SPACING SHALL BE 8'-4". POST SPACING OF 8'-4" OR 6'-3" IS RECOMMENDED WHENEVER POSSIBLE FOR USE WITH 25' SECTIONS OF STANDARD W-BEAM RAIL.

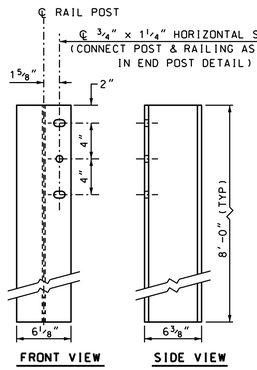
(8) PREFORMED BEARING PADS SHALL CONFORM TO AASHTO M251.

(9) NUTS FOR THREADED ANCHOR STUDS CONNECTING THE BASE PLATE TO THE CONCRETE SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL 1/8 TURN.

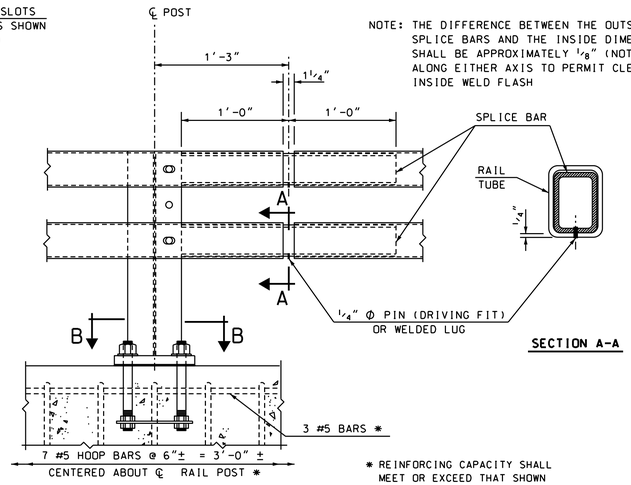
(10) OTHER TYPES OF OFFSET BLOCKS MAY BE SUBSTITUTED FOR THOSE SHOWN. SEE NOTES IN STANDARD PLAN GR-2 (BEAM GUARDRAIL STANDARD SECTION - STEEL POSTS & HARDWARE DETAILS) OF THE HIGHWAY DESIGN STANDARD PLANS FOR ROAD CONSTRUCTION.

(11) WHERE SIDEWALK IS PRESENT, 2'-7" SHALL BE MEASURED FROM THE TOP OF SIDEWALK ELEVATION AT THE BASE OF THE RAIL.

(GALVANIZED - 7" CURB REVEAL)



W6 x 25 STEEL POST (BRIDGE APPROACH RAIL)
SCALE: 1 1/2" = 1'-0"

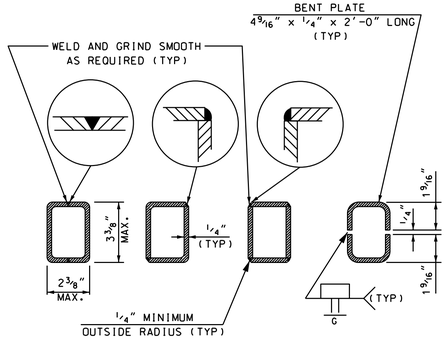


NOTE: THE DIFFERENCE BETWEEN THE OUTSIDE DIMENSIONS OF SPLICE BARS AND THE INSIDE DIMENSIONS OF THE RAIL SHALL BE APPROXIMATELY 1/8" (NOT TO EXCEED 3/16") ALONG EITHER AXIS TO PERMIT CLEARANCE FOR INSIDE WELD FLASH

* REINFORCING CAPACITY SHALL MEET OR EXCEED THAT SHOWN

TYPICAL SPLICE

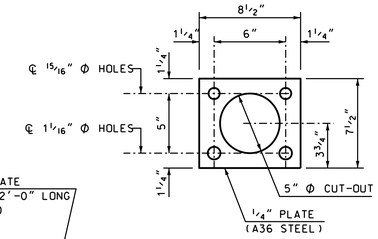
SECTION A-A



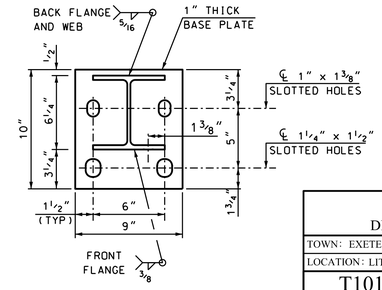
NOTE: OTHER SECTIONS OF EQUAL OR GREATER STRENGTH ARE ACCEPTABLE FOR SPLICE BARS

SPLICE BAR FABRICATION OPTIONS

SPLICE BAR DETAILS
NOT TO SCALE



ANCHOR PLATE DETAIL
SCALE: 2" = 1'-0"



BASE PLATE DETAIL (SECTION B-B)
SCALE: 2" = 1'-0"

CMA ENGINEERS

SUBDIRECTORY	.DGN LOCATOR	SHEET SCALE
		AS NOTED

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN

TOWN: EXETER BRIDGE NO.: 095/063 STATE PROJECT

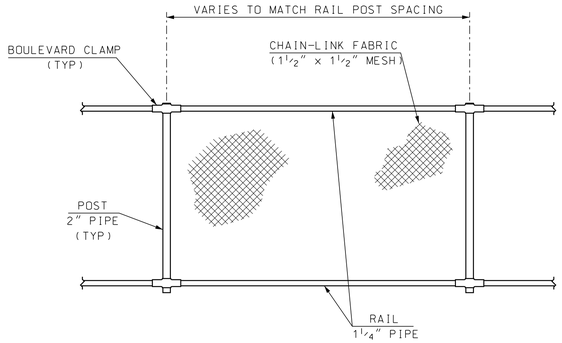
LOCATION: LITTLE RIVER CROSSING AT COURT STREET

T101 BRIDGE & APPROACH RAIL (STEEL POSTS)

BRIDGE SHEET: 20 OF 21

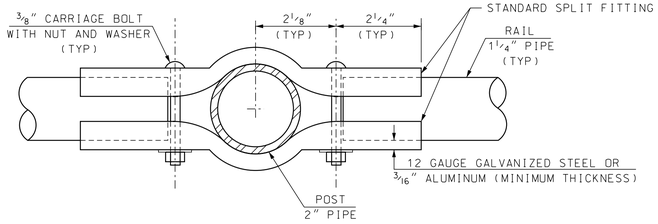
FILE NUMBER:

REVISIONS AFTER PROPOSAL			BY	DATE		BY	DATE
1	ADDED T3 RAIL DETAILS	1/30/13	DESIGNED	NHDOT	3/90	CHECKED	NHDOT
			DRAWN	NHDOT	1/10	CHECKED	NHDOT 1/10
			QUANTITIES	LBK	11/15	CHECKED	JLG 11/15
			ISSUE DATE	1/20/10	FEDERAL PROJECT NO.		SHEET NO. 21
			REV. DATE	3/30/14			TOTAL SHEETS 35



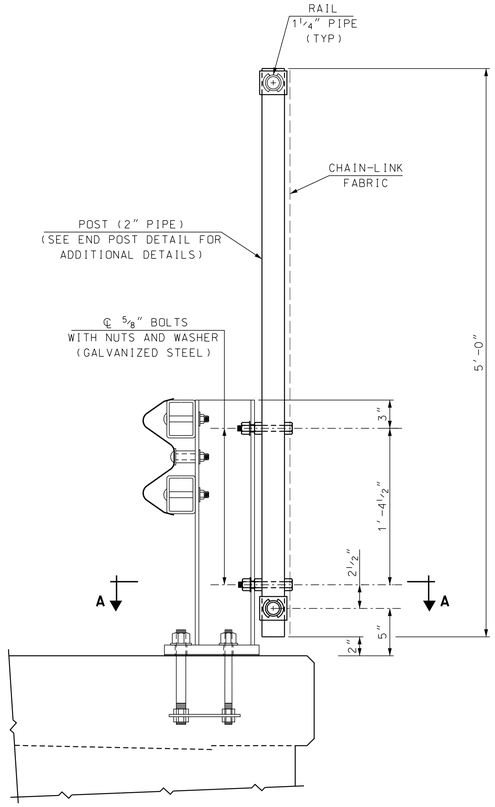
ELEVATION - SNOW SCREENING

SCALE: 1/2" = 1'-0"



BOULEVARD CLAMP DETAIL

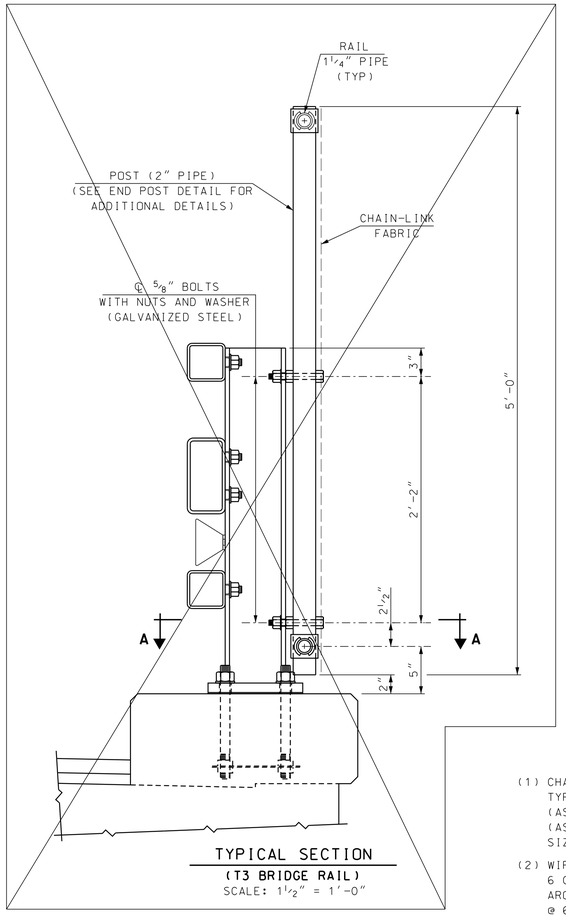
SCALE: 6" = 1'-0"



TYPICAL SECTION

(T101 BRIDGE RAIL)

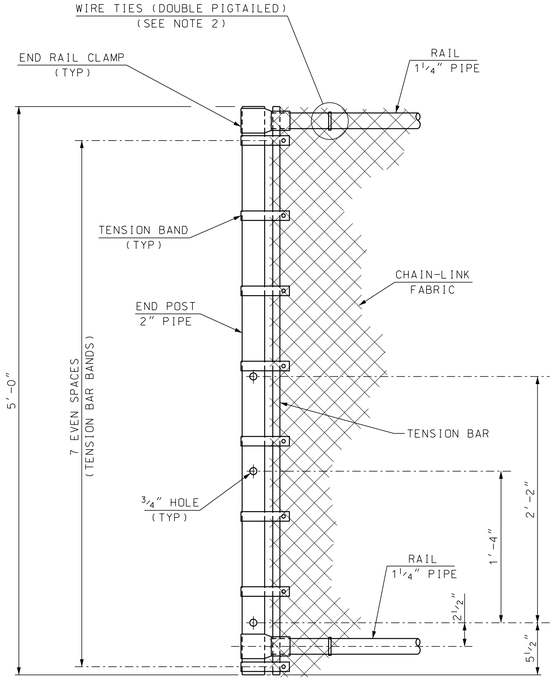
SCALE: 1 1/2" = 1'-0"



TYPICAL SECTION

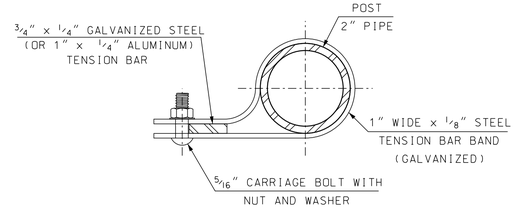
(T3 BRIDGE RAIL)

SCALE: 1 1/2" = 1'-0"



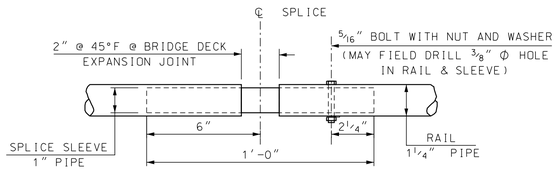
END POST DETAIL

SCALE: 1 1/2" = 1'-0"



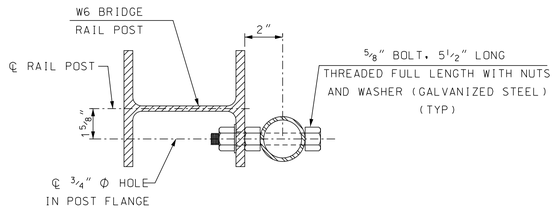
TENSION BAND DETAIL

SCALE: 6" = 1'-0"



RAIL SPLICE DETAIL

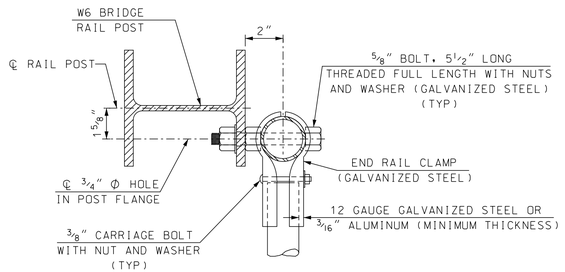
SCALE: 3" = 1'-0"



SECTION A-A

(AT INTERIOR POST)

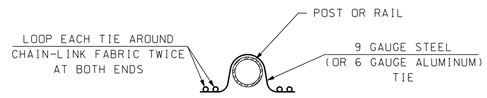
SCALE: 3" = 1'-0"



SECTION A-A

(AT END POST)

SCALE: 3" = 1'-0"



DOUBLE PIGTAILED TIE

NOT TO SCALE

GENERAL NOTES

(1) CHAIN-LINK FABRIC SHALL BE 9 GAUGE STEEL, ZINC-COATED CONFORMING TO AASHTO M 181, TYPE I, CLASS D (ASTM A 392), ALUMINUM-COATED CONFORMING TO AASHTO M 181, TYPE II (ASTM A 491) OR 6 GAUGE ALUMINUM ALLOY CONFORMING TO AASHTO M 181, TYPE III (ASTM F 1183). CHAIN-LINK FABRIC SHALL BE KNUCKLED ON TOP AND BOTTOM. THE SIZE OF WIRE MESH (FABRIC) SHALL BE 1 1/2".

(2) WIRE TIES SHALL BE STANDARD ROUND 9 GAUGE ZINC- OR ALUMINUM-COATED STEEL OR 6 GAUGE ALUMINUM ALLOY CONFORMING TO ASTM F 626. ALL TIES SHALL BE WRAPPED AROUND CHAIN-LINK FABRIC TWICE (DOUBLE PIGTAILED) AT BOTH ENDS. SPACE TIES @ 6" O.C. TO BOTTOM RAIL AND @ 12" O.C. TO ALL POSTS AND OTHER RAILS.

(3) POST AND RAIL PIPE SHALL BE HOT-DIP GALVANIZED STEEL CONFORMING TO AASHTO M 181, GRADE 1 (ASTM F 1083) OR ALUMINUM ALLOY CONFORMING TO AASHTO M 181 (ASTM B 429, ALLOY 6063-T6). ALL PIPE SHALL BE SCHEDULE 40, STANDARD WEIGHT. NOMINAL PIPE SIZES ARE SHOWN IN THE DRAWINGS.

(4) TENSION BARS, BAR BANDS, BOULEVARD AND END RAIL CLAMPS SHALL BE STEEL OR ALUMINUM ALLOY CONFORMING TO AASHTO M 181 (ASTM F 626). STEEL COMPONENTS SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M 111 (ASTM A 123) OR AASHTO M 232 (ASTM A 153) AS APPLICABLE.

(5) ALL BOLTS AND NUTS SHALL BE STEEL CONFORMING TO ASTM A 307 AND ASTM A 563 GRADE A RESPECTIVELY. WASHERS SHALL BE HARDENED STEEL COMMERCIAL TYPE A PLAIN AND SHALL MEET THE DIMENSIONAL REQUIREMENTS OF ANSI B18.22. ALL BOLTS, NUTS AND WASHERS SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M 111 (ASTM A 123) OR AASHTO M 232 (ASTM A 153) AS APPLICABLE.

(6) RAIL SPLICES SHALL BE PROVIDED AT BRIDGE DECK EXPANSION JOINT(S) AND BRIDGE RAIL SPLICES AS DIRECTED BY THE CONTRACT ADMINISTRATOR.

(7) RAIL MAY BE FIELD CUT (SAWN) TO FIT POST SPACING. GALVANIZED RAIL, CUT OR DRILLED AS ALLOWED, SHALL BE TOUCHED-UP IN ACCORDANCE WITH 563.3.2.2.3.

(8) ALL COSTS FOR CHAIN-LINK FABRIC, POSTS, RAILS AND APPURTENANCES SHALL BE INCLUDED IN ITEM 563.353, BRIDGE RAIL T101 WITH SNOW SCREENING.

(9) SEE BRIDGE RAIL SHEET FOR ADDITIONAL DETAILS.

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN

TOWN: EXETER | BRIDGE NO.: 095/063 | STATE PROJECT

LOCATION: LITTLE RIVER CROSSING AT COURT STREET

SNOW SCREEN WITH T101 BRIDGE RAIL

BRIDGE SHEET: 21 OF 21

	REVISIONS		BY	DATE		BY	DATE
1	ADDED T3 RAIL DETAILS	1/30/13	DESIGNED NHDOT	8/10	CHECKED NHDOT	8/10
			DRAWN NHDOT	8/10	CHECKED NHDOT	8/10
			QUANTITIES LBK	11/15	CHECKED JLG	11/15

FILE NUMBER

CMA ENGINEERS

SUBDIRECTORY	.DGN LOCATOR	SHEET SCALE
		AS NOTED

ISSUE DATE	2/98	FEDERAL PROJECT NO.	SHEET NO.	TOTAL SHEETS
REV. DATE	12/20/13		22	34

General Notes:

1) ALL WORK SHALL BE IN CONFORMANCE WITH CURRENT NHDOT STANDARD SPECIFICATIONS, DETAILS, AND THE TOWN OF EXETER REQUIREMENTS.

2) ENGINEER SHALL BE DEFINED AS THE RESIDENT ENGINEER / OWNER'S REPRESENTATIVE, WHO IS RESPONSIBLE FOR ENGINEERING OBSERVATION DURING CONSTRUCTION, ACTING DIRECTLY OR THROUGH HIS DULY AUTHORIZED REPRESENTATIVES.

3) THE CONTRACTOR SHALL VERIFY ALL EXISTING UTILITY LOCATIONS PUBLIC OR PRIVATE, SHOWN OR NOT SHOWN, PRIOR TO CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES FOUND INTERFERING WITH PROPOSED CONSTRUCTION AND THE APPROPRIATE REMEDIAL ACTION SHALL BE TAKEN BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL NOTIFY DIG-SAFE (1-800-DIG-SAFE) AT LEAST 72 HOURS PRIOR TO THE BEGINNING OF WORK TO CONFIRM THE LOCATION OF UNDERGROUND UTILITIES.

4) THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING THE HORIZONTAL AND VERTICAL CONTROL THROUGHOUT THE PROJECT.

5) THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING RESIDENTS OF ANY WORK RESTRICTING ACCESS TO ANY DRIVEWAY 24 HOURS IN ADVANCE.

6) SURVEY DATA FOR THIS PROJECT WAS COLLECTED BY DOUCET SURVEY, INC. IN JUNE 2014. HORIZONTAL DATUM BASED ON NHSPC (2800) NAD83 (US FEET). VERTICAL DATUM IS BASED ON NHDOT DISK B 13 1934 ELEV. = 60.47 (NGVD29).

7) ALL MAIL BOXES SHALL REMAIN AT THE SAME LOCATION AND BE RESET TO SAME HEIGHT IF TEMPORARY REMOVAL IS NECESSARY.

8) THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING OR RE-ESTABLISHING ALL PROPERTY MONUMENTATION (IRON PIPE, REBAR BOUNDS, ETC.). THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT.

9) FOR STANDARD PLANS, SEE THE NHDOT "STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION" DATED 2010 (A BOUND BOOK).

10) OVERHEAD UTILITY LINES ARE LOCATED THROUGHOUT THE PROJECT WITH CROSSINGS AT VARIOUS LOCATIONS AND RUNNING ALONG THE ROAD THROUGHOUT THE PROJECT. THE CONTRACTOR IS ADVISED THAT EXTREME CAUTION WILL BE REQUIRED IN THE OPERATION OF EQUIPMENT, ESPECIALLY CRANES.

11) REMOVE TOPSOIL FOR ITS TOTAL DEPTH WITHIN THE LIMITS OF THE SLOPE LINES, UNLESS OTHERWISE DIRECTED. STOCKPILE TOPSOIL AND USE IT ON THIS PROJECT AS NEEDED UNDER SECTION 646.51 - TURF ESTABLISHMENT WITH MULCH, TACKIFIERS AND LOAM. STOCKPILE LOCATION SHALL BE DETERMINED BY THE CONTRACTOR WITHIN THE RIGHT-OF-WAY OR OFF SITE. ALL COST FOR STOCKPILING OF TOPSOIL SHALL BE INCLUDED IN THE APPROPRIATE 646 ITEM OF THIS CONTRACT.

12) PERFORM ALL WORK WITHIN THE EXISTING RIGHT-OF-WAY OR ACQUIRED TEMPORARY RIGHT-OF-ENTRY LIMITS.

13) CONTRACTOR SHALL PLACE BARRICADES IN A MANNER THAT WILL PROVIDE CONTINUOUS AND UNRESTRICTED ACCESS FOR RESIDENTS WITHIN THE PROJECT LIMITS.

Survey Notes:

1) FIELD SURVEY AND RIGHT-OF-WAY DELINEATION PERFORMED BY DOUCET SURVEY INC. BY J.P.E. & P.J.S. DURING 06/14 USING A TRIMBLE 5603 DR 200 PLUS TOTAL STATION WITH A TDS RANGER DATA COLLECTOR AND A SOKKIA B21 AUTO/TRIMBLE DINI DIGITAL LEVEL. TRAVERSE ADJUSTMENT BASED ON LEAST SQUARE ANALYSIS.

2) JURISDICTIONAL WETLANDS DELINEATED BY NHSC, INC., A GZA COMPANY, DURING JUNE 2014 IN ACCORDANCE WITH 1987 CORPS OF ENGINEERS WETLANDS DELINEATIONS MANUAL, TECHNICAL REPORT Y-87-1.

3) HORIZONTAL DATUM BASED ON NEW HAMPSHIRE STATE PLANE(2800) NAD83(2011) DERIVED FROM STATIC GPS OBSERVATIONS PROCESSED BY THE NATIONAL GEODETIC SURVEY ON-LINE POSITIONING USER SERVICE (OPUS).

4) VERTICAL DATUM IS BASED ON NGVD29. LINDEN ST. DISK STAMPED B 13 1934 ELEV.=60.47 AND COURT ST. DISK STAMPED B 14 1934 ELEV.=37.67.

5) THE ACCURACY OF MEASURED UTILITY INVERTS AND PIPE SIZES/TYPES IS SUBJECT TO NUMEROUS FIELD CONDITIONS, INCLUDING; THE ABILITY TO MAKE VISUAL OBSERVATIONS, DIRECT ACCESS TO THE VARIOUS ELEMENTS, MANHOLE CONFIGURATION, ETC.

6) UNDERGROUND UTILITY DATA WAS MARKED BY DIGSMART OF MAINE TO ASCE QUALITY LEVEL B. THIS DATA IS FOR PLANNING PURPOSES ONLY AND DOUCET SURVEY DOES NOT GUARANTEE THE ACCURACY OR EXISTENCE OF THE DATA PROVIDED. ON-SITE INSPECTION SHOULD BE CONDUCTED PRIOR FINAL DESIGN AND/OR CONSTRUCTION

7) DUE TO THE COMPLEXITY OF RESEARCHING ROAD RECORDS AS A RESULT OF INCOMPLETE, UNORGANIZED, INCONCLUSIVE, OBLITERATED, OR LOST DOCUMENTS, THERE IS AN INHERENT UNCERTAINTY INVOLVED WHEN ATTEMPTING TO DETERMINE THE LOCATION AND WIDTH OF A ROADWAY RIGHT OF WAY. THE EXTENT OF THE ROADS AS DEPICTED HEREON ARE BASED ON PHYSICAL EVIDENCE FOUND AND RECORD PLANS OBTAINED THROUGH RESEARCH CONDUCTED AT THE ROCKINGHAM COUNTY REGISTRY OF DEEDS AND THE TOWN OF EXETER MUNICIPAL OFFICES.

8) FLOOD HAZARD ZONE:"AE", PER FIRM MAP #33015C0402E, DATED 5/17/05.

Roadway Notes:

1) THE PAVEMENT SHALL BE SUPERPAVE MIXTURE WITH PERFORMANCE GRADE 64-28 LIQUID ASPHALT. TOTAL REUSED BINDER LIMITED TO 1.0% MAXIMUM. THE VOLUMETRIC MIX DESIGN SHALL BE IN ACCORDANCE WITH NHDOT SPECIFICATIONS AND AASHTO STANDARD PRACTICE R35.

2) ALL PAVEMENT EDGES SHALL BE SAWCUT. THE CONTRACTOR SHALL TRIM, TACK, AND MATCH EXISTING PAVEMENT AT LOCATIONS WHERE NEW PAVEMENT MEETS EXISTING PAVEMENT.

3) A TACK COAT SHALL BE APPLIED TO PAVEMENT BETWEEN COURSES AND TO ALL ABUTTING PAVEMENT SURFACES IN ACCORDANCE WITH NHDOT STANDARD SPECIFICATIONS AND SUPPLEMENTAL SPECIFICATION SECTION 410. THE TACK COAT SHALL BE SUBSIDIARY TO THE PAVEMENT COST.

4) PAVEMENT JOINT ADHESIVE (ITEM 403.6) SHALL BE APPLIED ON ALL LONGITUDINAL PAVEMENT JOINTS FOR ALL COURSES AND AT TRANSVERSE JOINTS FOR DRIVEWAYS AND PROJECT LIMITS FOR ALL COURSES.

PAVEMENT COURSES

COURSE	MINIMUM LIFT THICKNESS	NOMINAL MAX. AGGREGATE SIZE	GYRATORY COMPACTION EFFORT	MINIMUM BINDER CONTENT*
WEARING	1"	3/8"	75	6.0%
ROAD-BINDER	3"	3/4"	50	5.1%
BRIDGE-BINDER	1 1/2"	1/2"	50	5.1%

*SEE ROADWAY NOTES

Erosion Control Notes:

1) THE CONTRACTOR IS RESPONSIBLE FOR THE DEVELOPMENT AND APPROVAL OF THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP).

2) PRIOR TO CONSTRUCTION AND THEREAFTER, EROSION CONTROL MEASURES ARE TO BE IMPLEMENTED AS NECESSARY. THE SMALLEST PRACTICAL AREA OF LAND SHOULD BE EXPOSED AT ANY ONE TIME DURING CONSTRUCTION. WHEN LAND IS EXPOSED DURING CONSTRUCTION, THE EXPOSURE SHOULD BE KEPT TO THE SHORTEST PRACTICAL PERIOD OF TIME. ANY DISTURBED AREAS THAT ARE TO BE LEFT UN-STABILIZED LONGER THAN TWO WEEKS SHALL BE TEMPORARILY SEEDED AND MULCHED AT THE RATE OF 2 TONS PER ACRE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL REMEDIAL WORK REQUIRED TO REPAIR AREAS WHICH ARE DAMAGED BY EROSION.

3) HAY BALE BARRIERS SHALL BE INSTALLED AND MAINTAINED AT DRAIN INLETS AND OUTLETS AND ALONG LIMITS OF WORK WHERE NECESSARY. HAY BALE BARRIERS SHALL NOT BE PLACED CLOSER THAN 25-FEET TO DRAIN INLETS AND OUTLETS. ADDITIONAL HAY BALES SHALL BE ADDED AS REQUIRED BY THE ENGINEER. HAY BALES WILL BE STAKED AND MAINTAINED PRIOR TO AND DURING CONSTRUCTION UNTIL DISTURBED AREAS HAVE A HEALTHY STAND OF GRASS.

4) ALL DISTURBED AREAS AND SIDE SLOPES THAT ARE AT ARE FINISH GRADED WITH NO FURTHER CONSTRUCTION TAKING PLACE SHALL BE TRACKED, SEEDED (IN ACCORDANCE WITH SECTION 644 OF THE STANDARD SPECIFICATIONS) AND MULCHED. ALL SEED, LIME AND FERTILIZER PROGRAMS SHALL CONFORM TO ALL APPLICABLE SECTIONS OF THE SPECIFICATIONS (SECTION 642 AND SECTION 643).

5) CONSTRUCTION TRAFFIC SHALL TRAVEL THE ROADBEDS OF EXISTING ROADS.

6) SILT FENCE SHALL BE INSTALLED AND MAINTAINED WHERE NECESSARY AND ADDITIONAL SILT FENCE ADDED AS REQUIRED BY THE ENGINEER PRIOR TO ANY ON-SITE GRADING OR DISTURBANCE OF EXISTING SURFACE MATERIAL. GENERALLY, SILT FENCE SHALL BE INSTALLED TO PREVENT MIGRATION OF THE SEDIMENT FROM THE WORK AREA. IT SHOULD BE MAINTAINED DURING AND AFTER CONSTRUCTION TO REMOVE SEDIMENT FROM NATURAL DRAINAGE WAYS. THE SILT FENCE IS TO BE MAINTAINED AND CLEANED UNTIL ALL SLOPES HAVE A HEALTHY STAND OF GRASS.

7) AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE TEMPORARY EROSION CONTROL MEASURES ARE TO BE REMOVED AND ACCUMULATED SEDIMENT DISPOSED OF IN A LOCATION DESIGNATED BY THE OWNER.

8) HAY BALES AND MULCH SHALL BE MOWINGS OF ACCEPTABLE HERBACEOUS GROWTH, FREE FROM NOXIOUS WEEDS OR WOODY STEMS AND SHALL BE DRY.

9) SILT FENCES SHALL BE A MINIMUM OF 36 INCHES HIGH WITH THE BOTTOM OF THE CLOTH KEYING INTO THE GROUND. POSTS SHALL BE OF WOOD OR STEEL.

10) THE EROSION CONTROL DEVICES DESCRIBED AND AS SPECIFIED IN THE SPECIFICATIONS REPRESENT THE MINIMUM REQUIRED MEASURES FOR EROSION CONTROL. THE CONTRACTOR SHALL ADD TO THESE DEVICES ANY OTHER MEASURES AS REQUIRED OR AS DIRECTED BY THE ENGINEER TO EFFECTIVELY PREVENT MIGRATION OF SEDIMENT FROM THE WORK AREA AND PROTECT WETLAND AREAS, WATERWAYS, EXISTING AND PROPOSED DRAINAGE FEATURES, SLOPES, LAWNS, AND PLANTS ADJACENT TO THE WORK AREA.

Guardrail Notes:

1) GUARDRAIL OFFSET BLOCKS SHALL BE SYNTHETIC.

2) ALL OFFSETS ARE TO FACE OF RAIL. EAGRT OFFSETS ARE TO THE FACE OF RAIL AT THE TERMINAL UNIT.

3) G4 IS LOCATED ON THE RADIUS BETWEEN COURT STREET AND BELL AVE. STATION OFFSETS ARE GIVEN FROM BOTH ALIGNMENTS. REFERENCED ALIGNMENT IS INDICATED WITH (C) FOR COURT STREET ALIGNMENT AND (B) FOR BELL AVE ALIGNMENT.

G1
STA 11+83.5 TO 12+08.5
LT 21.0' AT 11+83.5
LT 20.0' AT 12+08.5
CONST. T101 APPROACH RAIL
STA 11+58.5 TO 11+83.5
LT 22.3' AT 11+58.5
LT 21.0' AT 11+83.5
CONST. 25' EAGRT W/O PLATFORM

G2
STA 12+66 TO 12+91
LT 20.0' AT 12+66
LT 20.9' AT 12+91
CONST. T101 APPROACH RAIL
STA 12+91 TO 13+16
LT 20.9' AT 12+91
LT 22.3' AT 13+16
CONST. 25' EAGRT W/O PLATFORM

G3
STA 12+65.5 TO 12+90.5
RT 19.5' AT 12+65.5
RT 19.8' AT 12+90.5
CONST. T101 APPROACH RAIL
STA 12+90.5 TO 13+46.75
RT 19.8' AT 12+90.5
RT 20.5' AT 13+46.75
CONST. 56.25 LF W BEAM GUARDRAIL
STA 13+46.75 TO 13+71.75
RT 20.5' AT 13+46.75
RT 22.2' AT 13+71.75
CONST. 25' EAGRT W/O PLATFORM

G4
STA 12+10 (C) TO 20+31.5 (B)
RT 19.5' AT 12+10 (C)
LT 20.6' AT 20.31.5 (B)
RADIUS = 24.55'
CONST. T101 APPROACH RAIL
STA 20+31.5 (B) TO 20+37.5 (B)
LT 20.6' AT 20+31.5 (B)
LT 18.3' AT 20+37.5 (B)
RADIUS = 24.55'
CONST. 6.25' LF W BEAM GUARDRAIL
STA 20+37.5 (B) TO 20+50.5 (B)
LT 18.3' AT 20+37.5 (B)
LT 17.5 AT 20+50.5 (B)
CONST. 12.5' BEAM GUARDRAIL
TERMINAL UNIT TYPE G-2

Pavement Marking Notes:

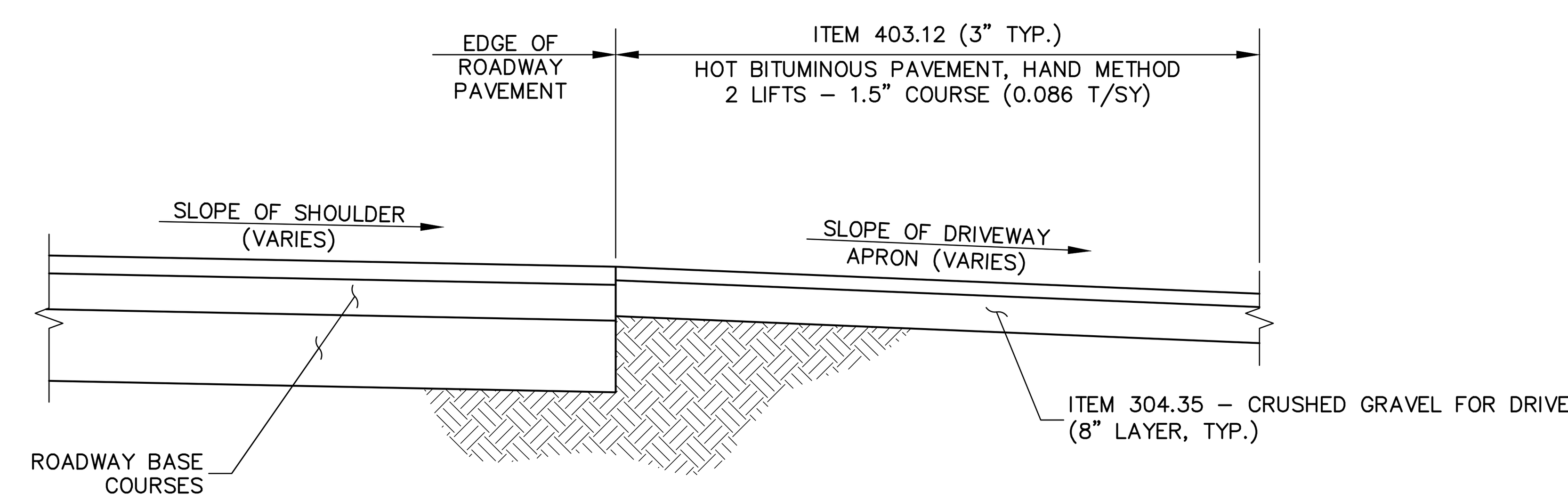
PLACEMENT AND COLOR OF PAVEMENT MARKING LINES, SYMBOLS AND WORDS SHALL CONFORM TO THE LATEST EDITION OF MUTCD, SECTION 632 OF NHDOT STANDARD SPECIFICATIONS, CONTRACT SUPPLEMENTAL SPECIFICATIONS, THE STATE OF NEW HAMPSHIRE PAVEMENT MARKING STANDARD DETAIL SHEETS, AND STANDARD PLAN SHEETS.

Retroreflective Paint Pavement Marking Key:

{}SSL()={SIZE IN INCHES} SINGLE SOLID LINE (COLOR)
{}DSL()={SIZE IN INCHES} DOUBLE SOLID LINE (COLOR)
{}SSBL()={SIZE IN INCHES} SINGLE SOLID W/BROKEN LINE (COLOR)
{}SBL()={SIZE IN INCHES} SINGLE BROKEN LINE (COLOR)
{}DBL()={SIZE IN INCHES} DOUBLE BROKEN LINE (COLOR)
(W) = WHITE
(Y) = YELLOW

SUMMARY OF ROADWAY QUANTITIES

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT
201.1	CLEARING AND GRUBBING (F)	1	LS
202.43	REMOVAL OF EXISTING ASBESTOS CEMENT PIPE 0-24" DIAMETER	110	LF
202.5	REMOVAL OF CATCH BASINS, DROP INLETS, AND MANHOLES	4	EA
202.7	REMOVAL OF GUARDRAIL	360	LF
203.1	COMMON EXCAVATION	1300	CY
203.2	ROCK EXCAVATION	15	CY
203.6	EMBANKMENT-IN-PLACE (F)	150	CY
206.19	COMMON STRUCTURE EXCAVATION EXPLORATORY	93	CY
214	FINE GRADING	1	U
304.2	GRAVEL (F)	980	CY
304.3	CRUSHED GRAVEL (F)	500	CY
403.11	HOT BITUMINOUS PAVEMENT, MACHINE METHOD	500	TON
403.12	HOT BITUMINOUS PAVEMENT, HAND METHOD	6	TON
403.6	PAVEMENT JOINT ADHESIVE	4100	LF
417	COLD PLANING BITUMINOUS SURFACES	81	SY
603.00212	12" R.C. PIPE, 2000D	250	LF
604.0007	POLYETHYLENE LINER	3	EA
604.124	CATCH BASINS TYPE B, 4-FOOT DIAMETER	4	U
604.242	DROP INLETS TYPE D-B	1	U
604.324	DRAINAGE MANHOLES, 4-FOOT DIAMETER	1	U
604.325	DRAINAGE MANHOLES, 5-FOOT DIAMETER	1	U
604.51	RECONSTRUCTING/ADJUSTING SEWER MANHOLES	3	LF
604.52	RECONSTRUCTING/ADJUSTING DRAINAGE MANHOLES	7	LF
604.54	RECONSTRUCTING/ADJUSTING TELEPHONE MANHOLES	1	LF
606.1255	BEAM GUARDRAIL (TERMINAL UNIT TYPE EAGRT 25 FT.) (STEEL POST)	3	U
606.1285	BEAM GUARDRAIL (BRIDGE APPROACH UNIT)	4	U
606.147	BEAM GUARDRAIL (TERMINAL UNIT TYPE G-2)	1	U
606.18001	31" W-BEAM GUARDRAIL WITH 8" OFFSET BLOCK (STEEL POST)	63	LF
608.125	2.5" BITUMINOUS SIDEWALK (F)	130	SY
608.36	6" REINFORCED CONCRETE SIDEWALK (F)	8	SY
608.54	DETECTABLE WARNING DEVICES, CAST IRON	3	SY
609.01	STRAIGHT GRANITE CURB	250	LF
611.05212	12" CEMENT LINED DUCTILE IRON WATER PIPE, CL 52	40	LF
611.052121	12" INSULATED CEMENT LINED DUCTILE IRON WATER PIPE, CL 52	120	LF
611.700121	12" FITTING (HYMAX TRANSITION COUPLING)	2	EA
611.700122	12" INSULATED FITTING	4	EA
611.71012	12" GATE VALVE WITH BOX	2	EA
618.61	UNIFORMED OFFICERS WITH VEHICLE	2500	$
619.1	MAINTENANCE OF TRAFFIC	1	U
619.25	PORTABLE CHANGEABLE MESSAGE SIGN	2	U
628.2	SAWED BITUMINOUS PAVEMENT	330	LF
632.0104	RETROREFLECTIVE PAINT PAVE. MARKING, 4" LINE	2700	LF
645.531	SILT FENCE	990	LF
645.7	STORM WATER POLLUTION PREVENTION PLAN	1	U
645.71	MONITORING SWPPP AND EROSION AND SEDIMENT CONTROLS	50	HR
646.51	TURF ESTABLISHMENT WITH MULCH, TACKIFIERS, AND LOAM	560	SY
692	MOBILIZATION	1	U
1008.11	ALTERATIONS AND ADDITIONS AS NEEDED - UNANTICIPATED WORK	15000	$



Typical Apron Section at Driveway

Scale: 3/8" = 1'-0"

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m

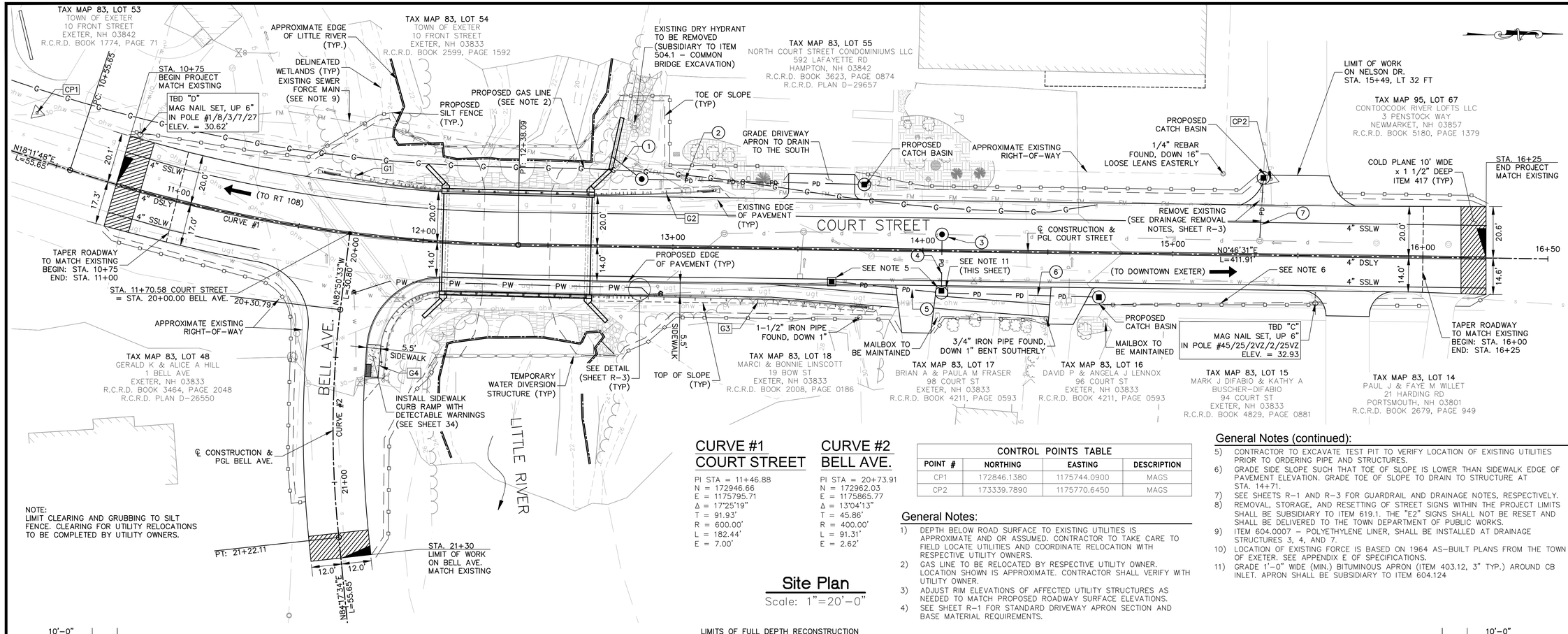
5/15/2017

designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
date: June 2017
project no: ----
file name: R-1.dwg
scale:

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
General Notes and
Summary of Quantities

drawing no. R-1

sheet: 23 of 34



CURVE #1 COURT STREET

PI STA = 11+46.88
N = 172946.66
E = 1175795.71
Δ = 17°25'19"
T = 91.93'
R = 600.00'
L = 182.44'
E = 7.00'

CURVE #2 BELL AVE.

PI STA = 20+73.91
N = 172962.03
E = 1175865.77
Δ = 13°04'13"
T = 45.86'
R = 400.00'
L = 91.31'
E = 2.62'

Site Plan

Scale: 1"=20'-0"

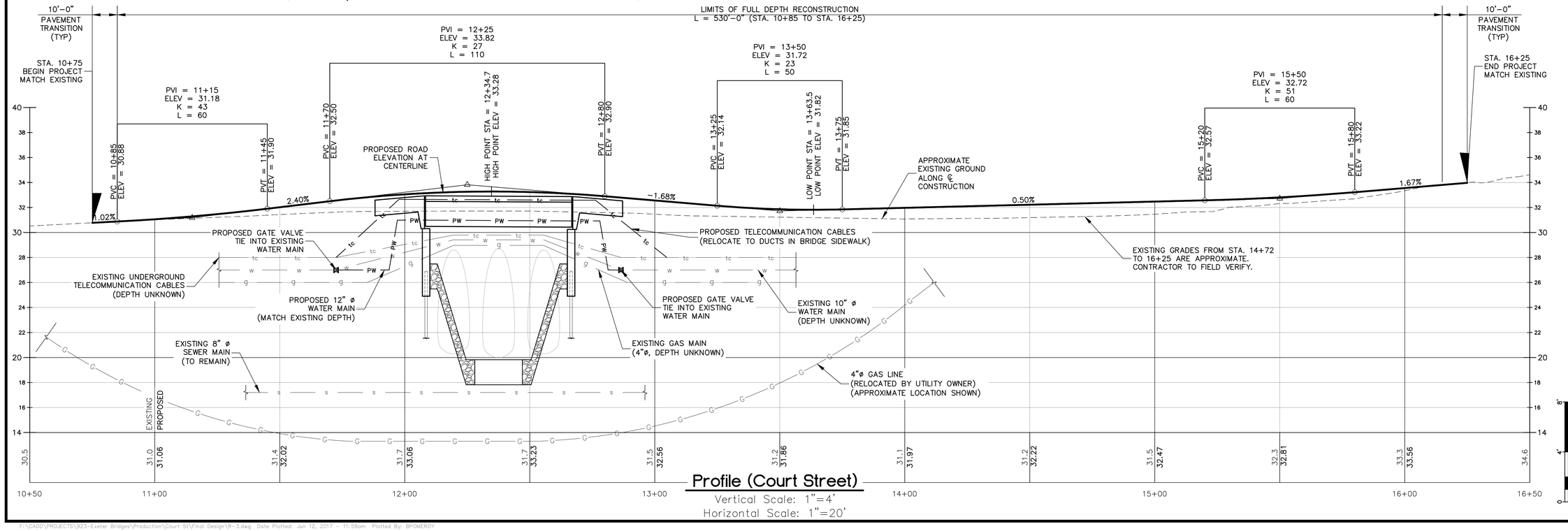
CONTROL POINTS TABLE			
POINT #	NORTHING	EASTING	DESCRIPTION
CP1	172846.1380	1175744.0900	MAGS
CP2	173339.7890	1175770.6450	MAGS

General Notes:

1) DEPTH BELOW ROAD SURFACE TO EXISTING UTILITIES IS APPROXIMATE AND OR ASSUMED. CONTRACTOR TO TAKE CARE TO FIELD LOCATE UTILITIES AND COORDINATE RELOCATION WITH RESPECTIVE UTILITY OWNERS.
2) GAS LINE TO BE RELOCATED BY RESPECTIVE UTILITY OWNER. LOCATION SHOWN IS APPROXIMATE. CONTRACTOR SHALL VERIFY WITH UTILITY OWNER.
3) ADJUST RIM ELEVATIONS OF AFFECTED UTILITY STRUCTURES AS NEEDED TO MATCH PROPOSED ROADWAY SURFACE ELEVATIONS.
4) SEE SHEET R-1 FOR STANDARD DRIVEWAY APRON SECTION AND BASE MATERIAL REQUIREMENTS.

General Notes (continued):

5) CONTRACTOR TO EXCAVATE TEST PIT TO VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO ORDERING PIPE AND STRUCTURES.
6) GRADE SIDE SLOPE SUCH THAT TOE OF SLOPE IS LOWER THAN SIDEWALK EDGE OF PAVEMENT ELEVATION. GRADE TOE OF SLOPE TO DRAIN TO STRUCTURE AT STA. 14+71.
7) SEE SHEETS R-1 AND R-3 FOR GUARDRAIL AND DRAINAGE NOTES, RESPECTIVELY.
8) REMOVAL, STORAGE, AND RESETTING OF STREET SIGNS WITHIN THE PROJECT LIMITS SHALL BE SUBSIDIARY TO ITEM 619.1. THE "E2" SIGNS SHALL NOT BE RESET AND SHALL BE DELIVERED TO THE TOWN DEPARTMENT OF PUBLIC WORKS.
9) ITEM 604.0007 – POLYETHYLENE LINER, SHALL BE INSTALLED AT DRAINAGE STRUCTURES 3, 4, AND 7.
10) LOCATION OF EXISTING FORCE IS BASED ON 1964 AS-BUILT PLANS FROM THE TOWN OF EXETER. SEE APPENDIX E OF SPECIFICATIONS.
11) GRADE 1'-0" WIDE (MIN.) BITUMINOUS APRON (ITEM 403.12, 3" TYP.) AROUND CB INLET. APRON SHALL BE SUBSIDIARY TO ITEM 604.124



Profile (Court Street)

Vertical Scale: 1"=4'
Horizontal Scale: 1"=20'

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

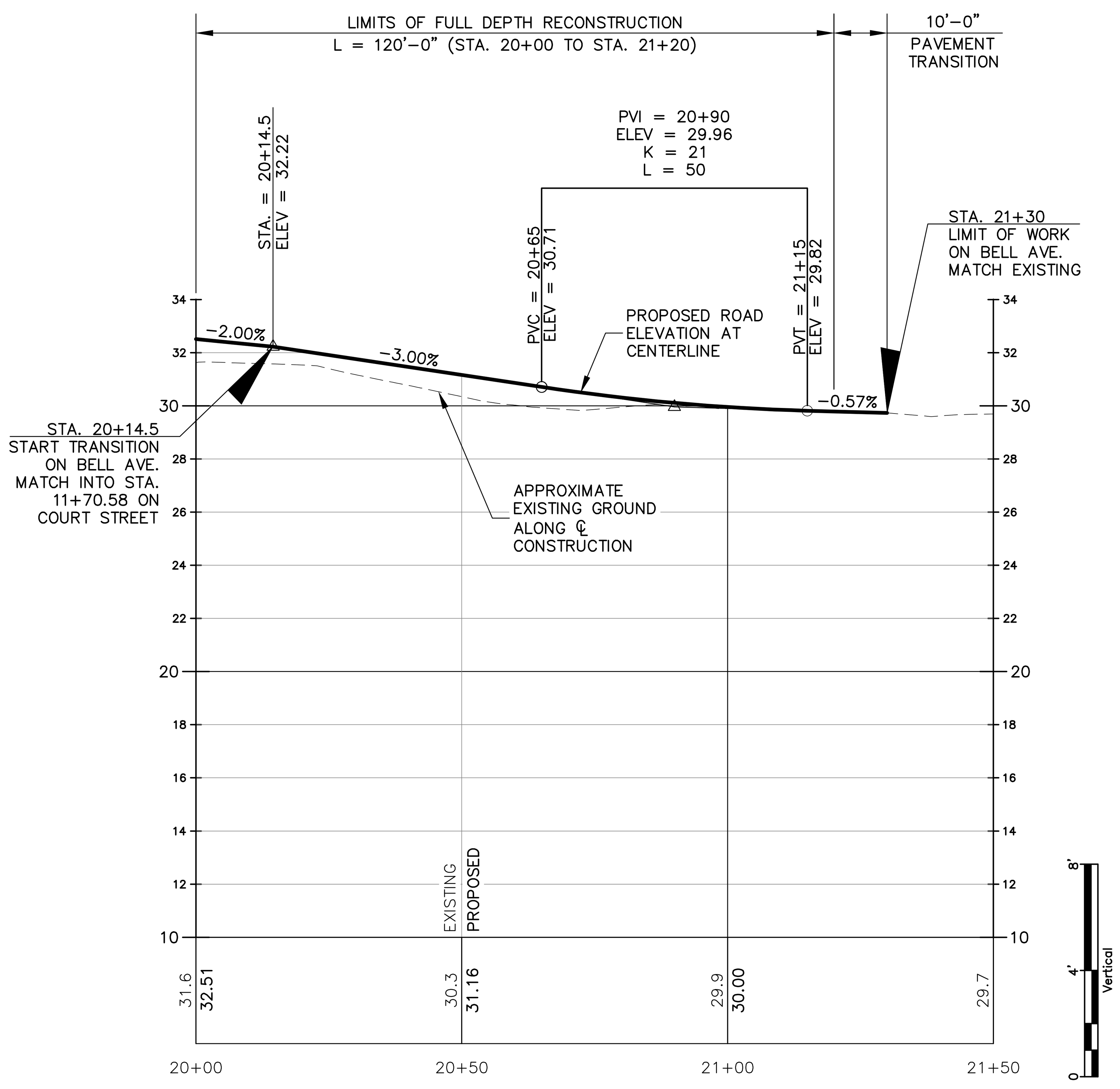
5/15/2017

designed by: LBK/DGK
drawn by: LBK/BGP
approved by: JLG
date: June 2017
project no: ----
file name: R-3.dwg
scale: 40' 20' 0 Horizontal

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Roadway Plan and Profile
(Sheet 1 of 2)

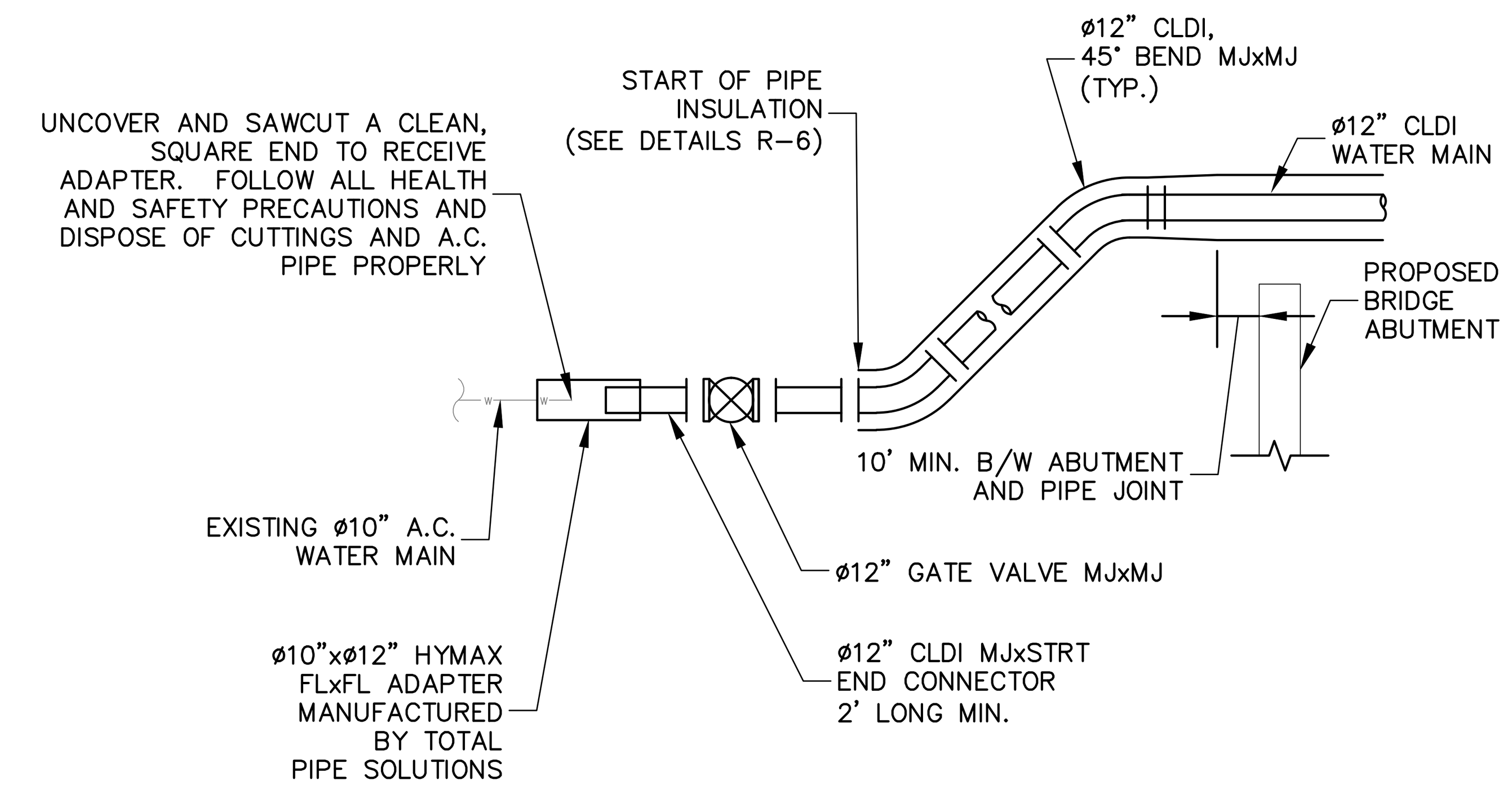
drawing no. R-2
sheet: 24 of 34

F:\CADD\PROJECTS\923-Exeter Bridges\Production\Court St\Final Design\R-3.dwg Date Plotted: Jun 12, 2017 – 11:59am Plotted By: BPOMEROY



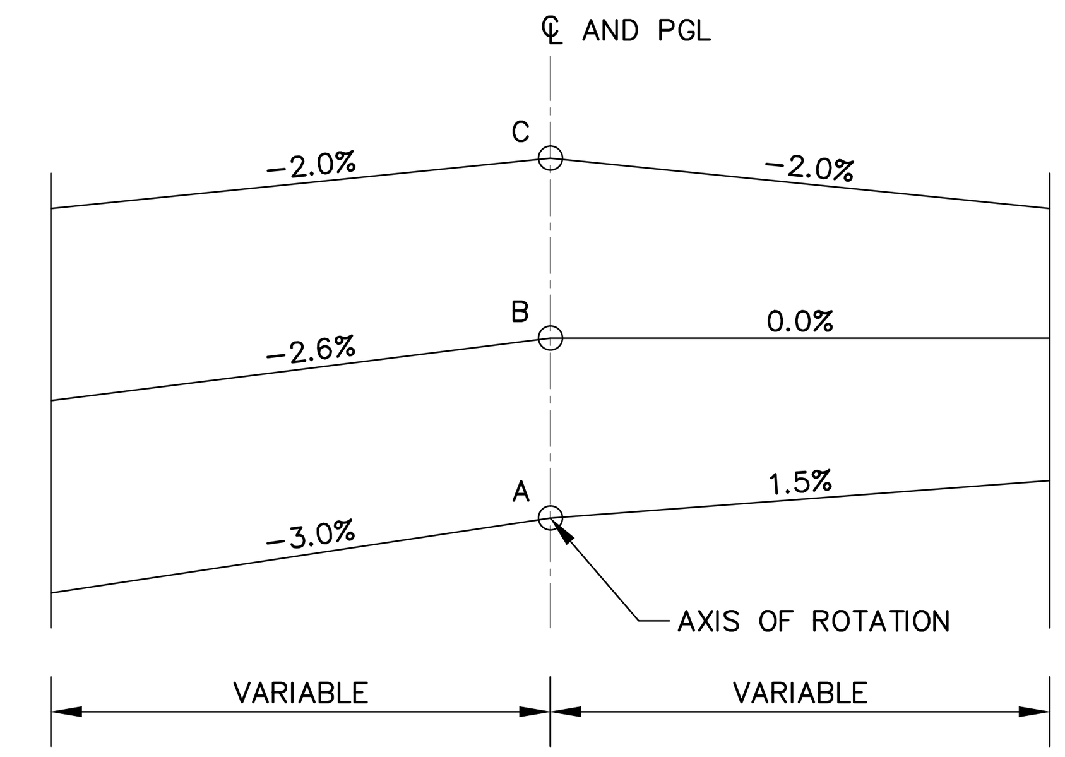
Profile (Bell Ave.)

Vertical Scale: 1"=4'
Horizontal Scale: 1"=20'



Detail A (2 Typ)

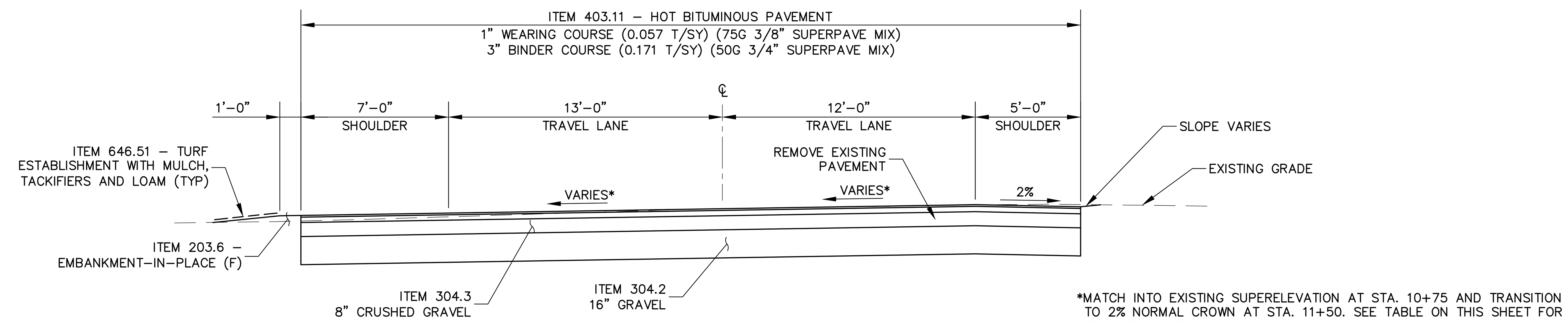
Not to Scale



Superelevation Break Points

Not to Scale

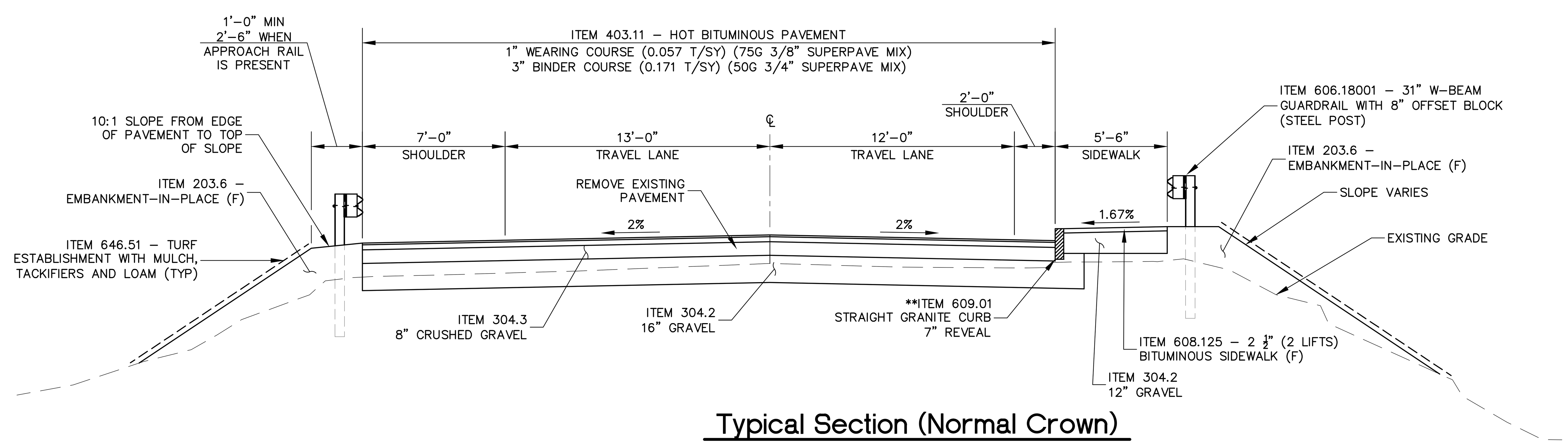
TABLE OF SUPERELEVATION BREAK POINT LOCATIONS			
CURVE NO.	A	B	C
1	10+75	11+07	11+50



*MATCH INTO EXISTING SUPERELEVATION AT STA. 10+75 AND TRANSITION TO 2% NORMAL CROWN AT STA. 11+50. SEE TABLE ON THIS SHEET FOR TRANSITION INFORMATION.

Typical Section (Superelevation)

Not to Scale



Typical Section (Normal Crown)

Not to Scale

**INSTALL GRANITE CURBING FROM:
STA. 11+96 TO STA. 12+06 LT
STA. 12+68 TO STA. 12+78 LT

STA. 12+67 TO STA. 13+89 RT TAPER REVEAL TO BE FLUSH WITH DRIVEWAY APRON AT STA. 13+89

STA. 14+10 TO STA. 14+51 RT TAPER REVEAL TO BE FLUSH WITH PAVEMENT AT BOTH ENDS

INSTALL 45 LF OF GRANITE CURB ALONG A 30'-0" RADIUS FROM: STA. 12+08 RT ON COURT STREET TO STA. 20+44 LT ON BELL AVE.

STA. 20+44 TO STA. 20+57 LT ON BELL AVE.

Drainage Notes:

1. STA 12+75, LT 35.8 FT TO STA 12+87, LT 27.0 FT
   INSTALL 14 FT OF 12" RC PIPE
   INSTALL 4' I.D. DMH, 12+87, RT 27.0 FT
   12" INV. IN: 25.40'
   12" INV. OUT: 25.15'
   RIM: 31.00'

2. STA 12+87, LT 27.0 FT TO STA 13+76, LT 26.0 FT
   INSTALL 86 FT OF 12" RC PIPE
   INSTALL 4' I.D. CB-B, 13+76, LT 26.0 FT
   12" INV. OUT: 26.25'
   RIM: 30.25'

3. INSTALL 5' D.I. DMH, 14+08, LT 6.5 FT
   12" INV. IN: 26.25' (SEE DRAINAGE NOTE 3)
   30" INV. IN: 23.65' ± (EX.) (SEE DRAINAGE NOTE 2)
   30" INV. OUT: 23.65' ± (EX.) (SEE DRAINAGE NOTE 2)
   RIM: 31.85'

4. STA 14+08, LT 6.5 FT TO STA 14+08, RT 16.9 FT
   INSTALL 20 FT OF 12" RC PIPE
   INSTALL 4' I.D. CB-B, 14+08, RT 16.9 FT
   (WITH ECCENTRIC TOP, ROTATE PER PLANS)
   12" INV. IN: 26.80' (SOUTH)
   12" INV. IN: 26.80' (NORTH)
   12" INV. OUT: 26.80'
   RIM: 31.40'

5. STA 13+64, RT 13.0 FT TO STA 14+08, RT 16.9 FT
   INSTALL 41 FT OF 12" RC PIPE
   INSTALL DROP INLET TYPE D-B, 13+64, RT 13.0 FT
   12" INV. OUT: 27.65'
   RIM: 31.50'

6. STA 14+08, RT 16.9 FT TO STA 14+71, RT 17.8 FT
   INSTALL 60 FT OF 12" RC PIPE
   INSTALL 4' I.D. CB-B, 14+71, RT 17.8 FT
   12" INV. OUT: 27.10'
   RIM: 30.80'

7. STA 15+35, LT 7.0 FT TO STA 15+36, LT 30.8 FT
   INSTALL 21 FT OF 12" RC PIPE
   (CONNECT TO EX. DMH (SUBSIDIARY))
   12" INV. = 25.45' (SEE DRAINAGE NOTE 3)
   INSTALL 4' I.D. CB-B, 15+36, LT 30.8 FT
   12" INV. IN: 25.95' ± (EX.) (SEE DRAINAGE NOTE 2)
   12" INV. OUT: 25.70' (SEE DRAINAGE NOTE 2)
   RIM: 31.45'

Drainage Removal Notes:

1) CONTRACTOR TO HAVE ENGINEER VERIFY ALL DRAINAGE STRUCTURES AND PIPING LISTED BELOW, PRIOR TO REMOVAL.

2) DRAINAGE STRUCTURES TO BE REMOVED:

   STA. 13+06 LT 22.4'
   STA. 13+51 RT 11.0'
   STA. 14+59 RT 19.2'
   STA. 15+35 LT 21.8'

3) ALL PIPING CONNECTED TO STRUCTURES BEING REMOVED SHALL ALSO BE REMOVED UNLESS PIPING WILL BE RECONNECTED TO A NEW STRUCTURE.

Drainage Notes:

1) CONTRACTOR TO FIELD VERIFY ELEVATIONS OF EXISTING 30" RCP DRAINAGE LINE WHERE IT IS BEING TIED INTO. ADJUST PROPOSED PIPE INVERTS AND DRAINAGE STRUCTURES AS NEEDED BASED ON ANY DIFFERENCE BETWEEN ACTUAL AND ASSUMED ELEVATIONS.

2) INV. IN AND INV. OUT ELEVATIONS SHALL BE SET BASED ON EXISTING PIPE INV. ELEVATIONS WHERE THE PROPOSED STRUCTURE INTERSECTS THE EXISTING PIPE.

3) INV. OF PROPOSED 12" RC PIPE SHALL BE SET SUCH THAT THE CROWN EL. IS ABOVE OR MATCHES THE HIGHEST CROWN EL. OF THE 30" RC PIPES PRESENT AT THE SAME MANHOLE.

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 603/627-0708 207/541-4223
c m a e n g i n e e r s . c o m

5/15/2017

designed by: LBK/OCK
drawn by: LBK/BGP
approved by: JLG
date: June 2017
project no: ----
file name: R-3.dwg
scale: 20' 40' Horizontal

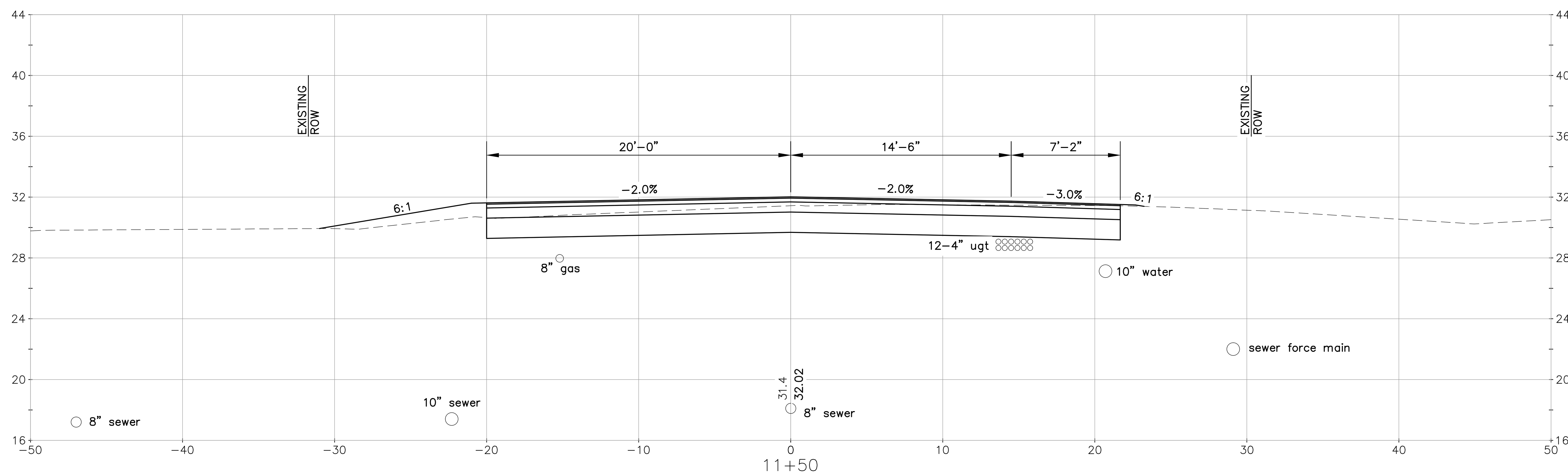
Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Roadway Plan and Profile
(Sheet 2 of 2)

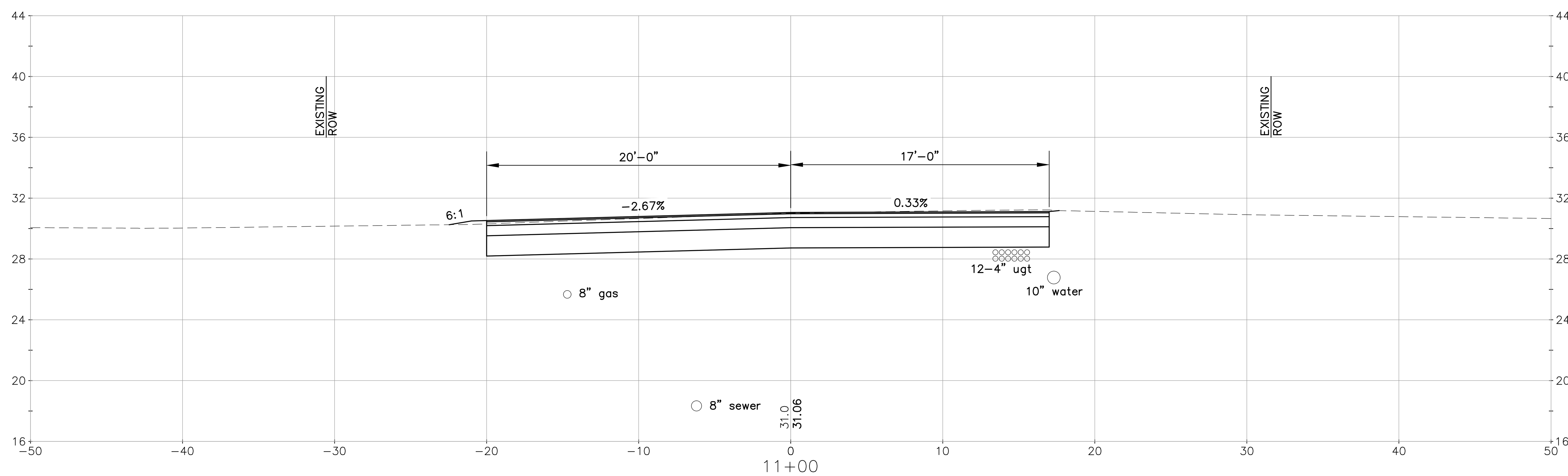
drawing no. R-3

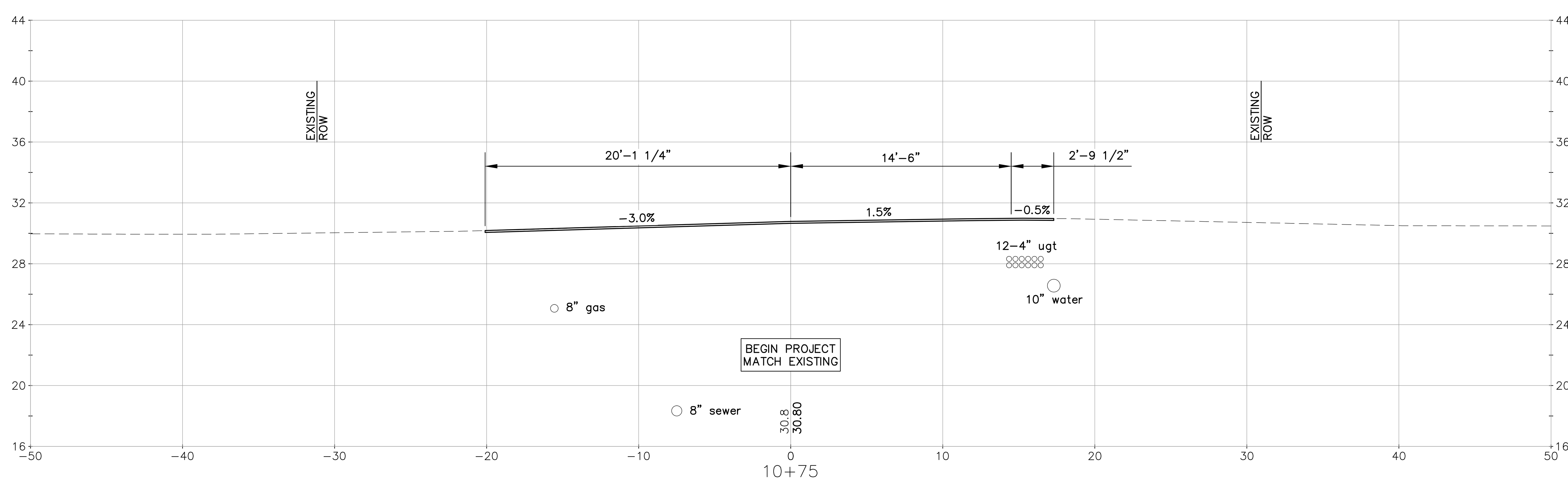
sheet: 25 of 34

F:\CADD\PROJECTS\823-Exeter Bridges\Production\Court St\Final Design\R-3.dwg Date Plotted: Jun 12, 2017 – 11:59am Plotted By: BPOMEROY

NOTE:
DEPTH BELOW ROAD SURFACE TO EXISTING UTILITIES IS APPROXIMATE AND OR ASSUMED. CONTRACTOR TO TAKE CARE TO FIELD LOCATE UTILITIES AND COORDINATE RELOCATION WITH RESPECTIVE UTILITY OWNERS.







no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 603/627-0708 207/541-4223
cmaengineers.com

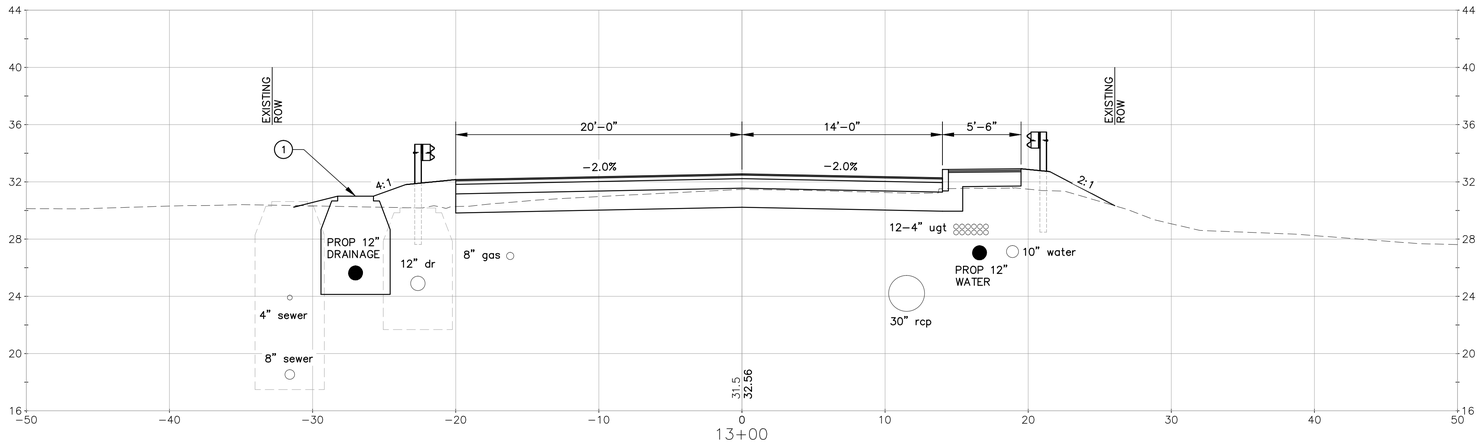
designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
scale:
date: June 2017
project no: ----
file name: R-5.dwg

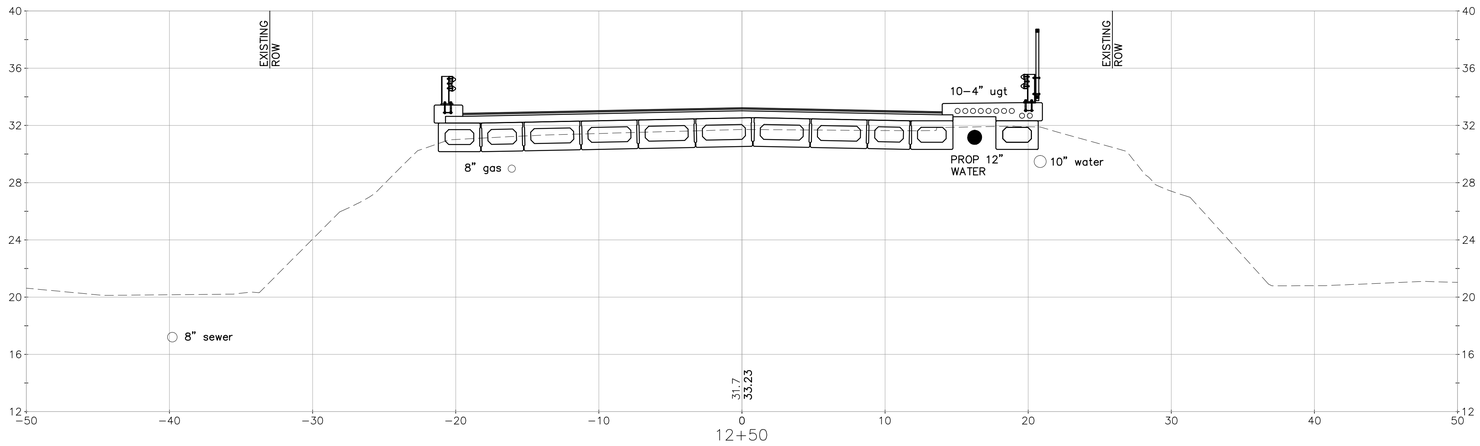
Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Cross Sections
(Sheet 1 of 4)

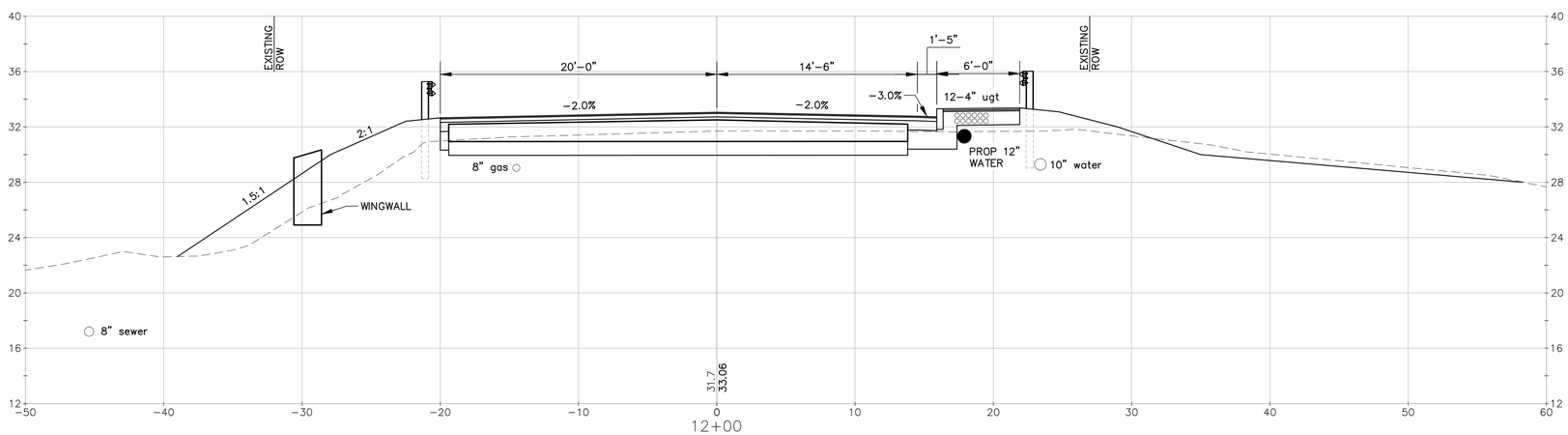
drawing no.
R-4

sheet: 26 of 34

NOTE:
DEPTH BELOW ROAD SURFACE TO EXISTING UTILITIES IS APPROXIMATE AND OR ASSUMED. CONTRACTOR TO TAKE CARE TO FIELD LOCATE UTILITIES AND COORDINATE RELOCATION WITH RESPECTIVE UTILITY OWNERS.







no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH 603/431-6196 • Manchester, NH 603/627-0708 • Portland, ME 207/541-4223
c m a e n g i n e e r s . c o m

STATE OF NEW HAMPSHIRE – PROFESSIONAL ENGINEER – JASON L. GILBERT – 9741 – 4/4/2017

designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
scale:
date: June 2017
project no: ----
file name: R-5.dwg

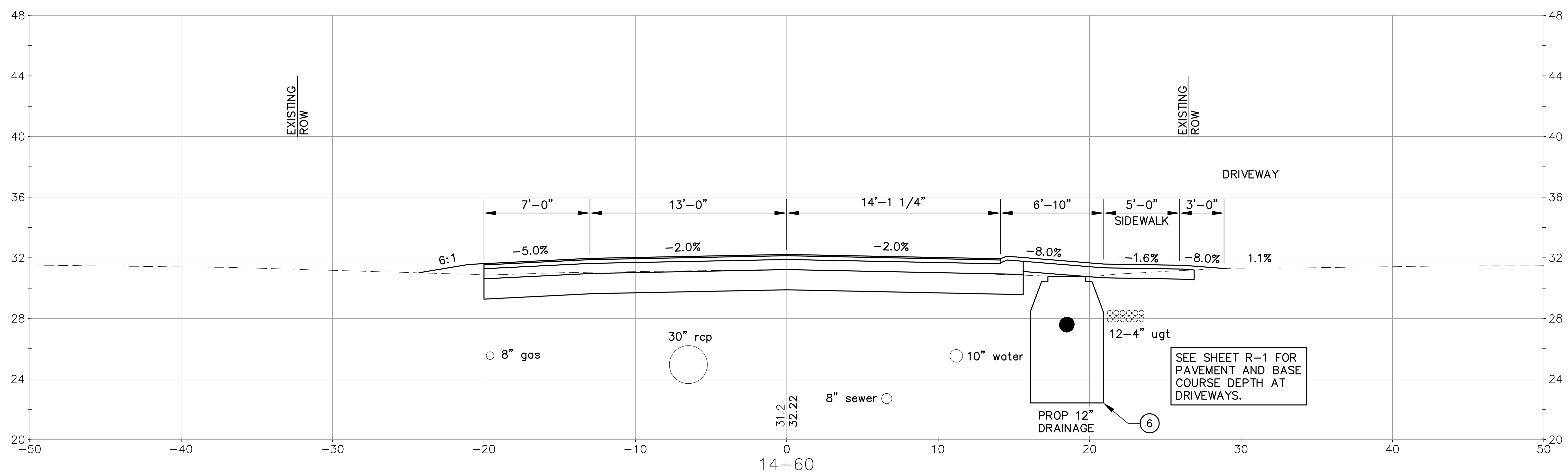
Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Cross Sections
(Sheet 2 of 4)

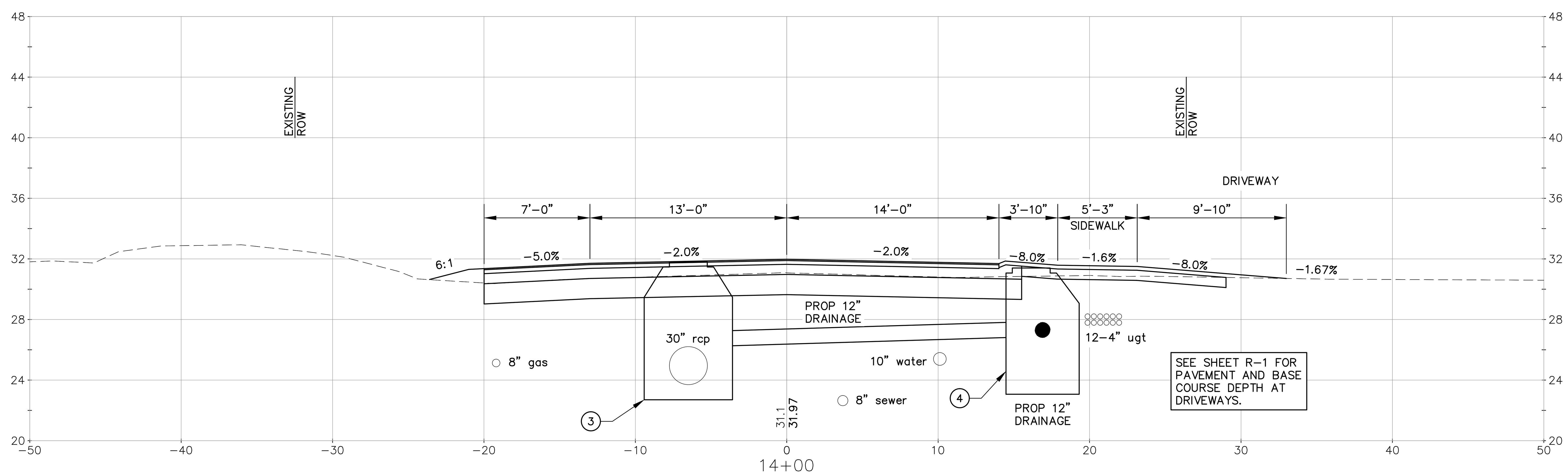
drawing no.
R-5

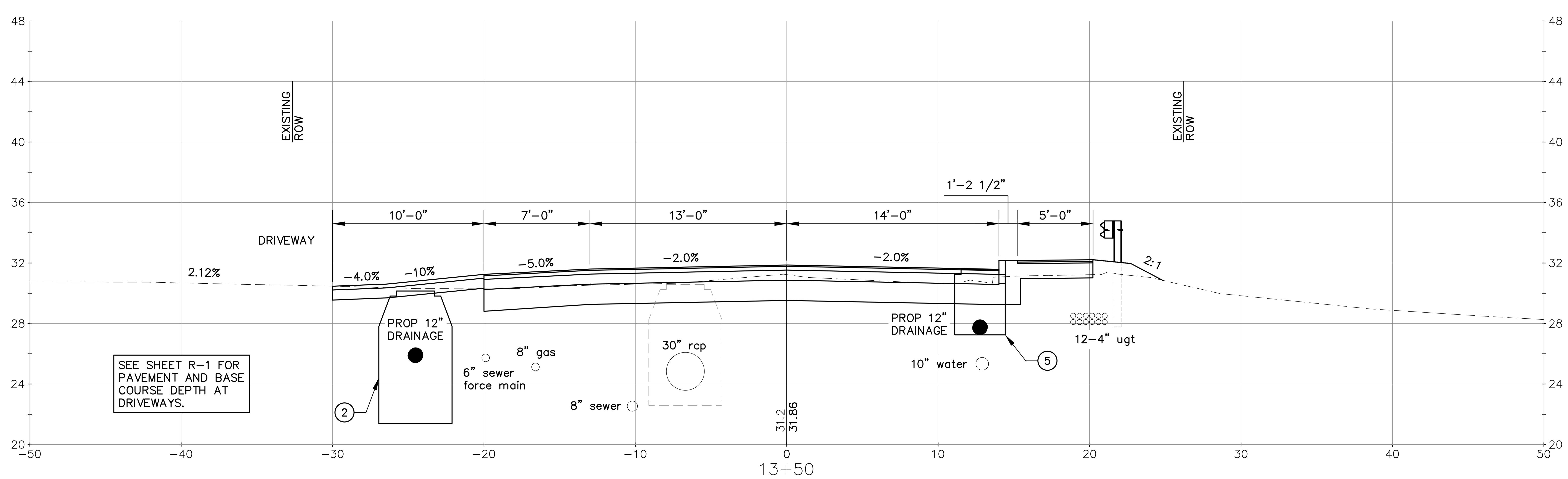
sheet: 27 of 34

F:\CADD\PROJECTS\923-Exeter Bridges\Production\Court St\Final Design\R-5.dwg Date Plotted: Jun 12, 2017 – 12:01pm Plotted By: BPOMEROY

NOTE:
DEPTH BELOW ROAD SURFACE TO EXISTING UTILITIES IS APPROXIMATE AND OR ASSUMED. CONTRACTOR TO TAKE CARE TO FIELD LOCATE UTILITIES AND COORDINATE RELOCATION WITH RESPECTIVE UTILITY OWNERS.







no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH 603/431-6196 • Manchester, NH 603/627-0708 • Portland, ME 207/541-4223
c m a e n g i n e e r s . c o m

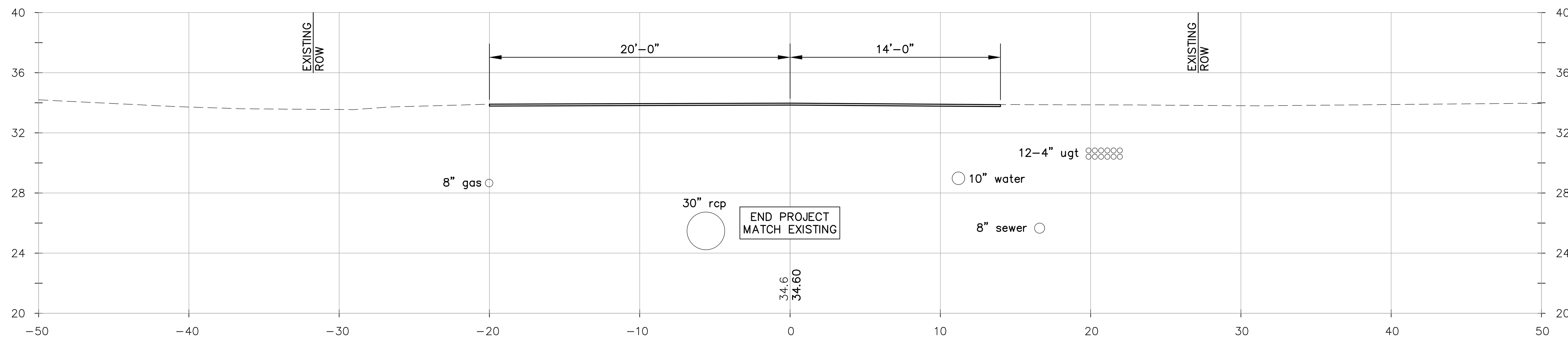
designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
date: June 2017
project no: ----
file name: R-5.dwg
scale:

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Cross Sections
(Sheet 3 of 4)

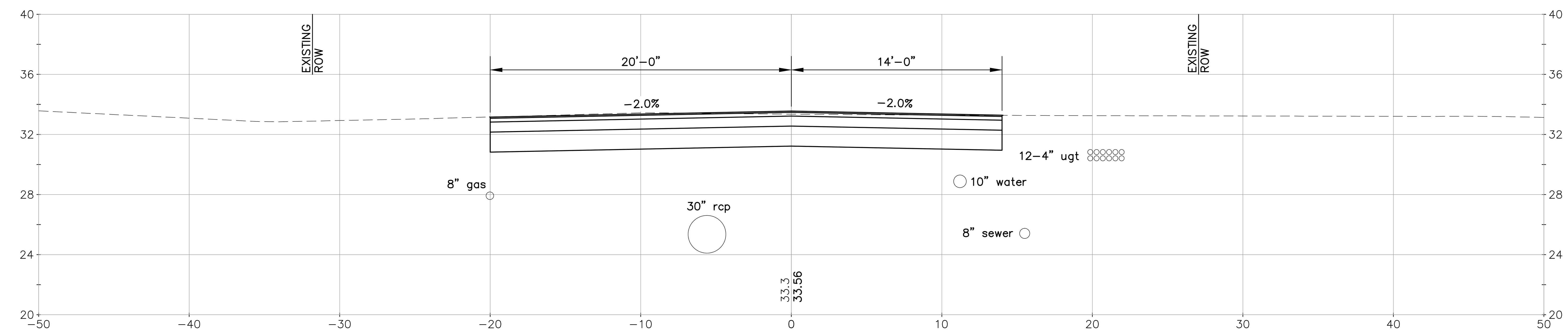
drawing no.
R-6

sheet: 28 of 34

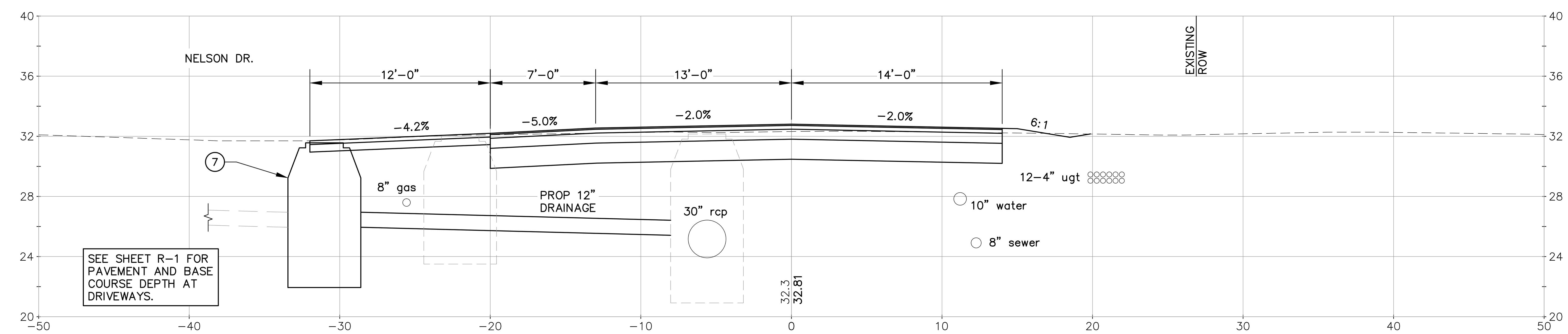
NOTE:
DEPTH BELOW ROAD SURFACE TO EXISTING UTILITIES IS APPROXIMATE AND OR ASSUMED. CONTRACTOR TO TAKE CARE TO FIELD LOCATE UTILITIES AND COORDINATE RELOCATION WITH RESPECTIVE UTILITY OWNERS.



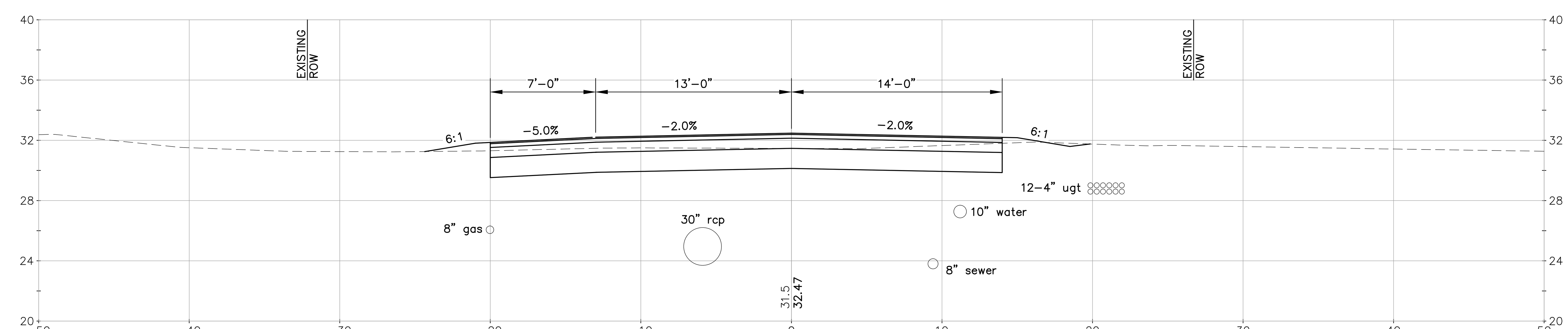
16+25



16+00



15+50



15+00

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 603/627-0708 207/541-4223
c m a e n g i n e e r s . c o m

designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
date: June 2017
project no: ----
file name: R-5.dwg
scale:

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Cross Sections
(Sheet 4 of 4)

drawing no.
R-7

sheet: 29 of 34

F:\CADD\PROJECTS\923-Exeter Bridges\Production\Court St\Final Design\R-5.dwg Date Plotted: Jun 12, 2017 – 12:01pm Plotted By: BPOMEROY

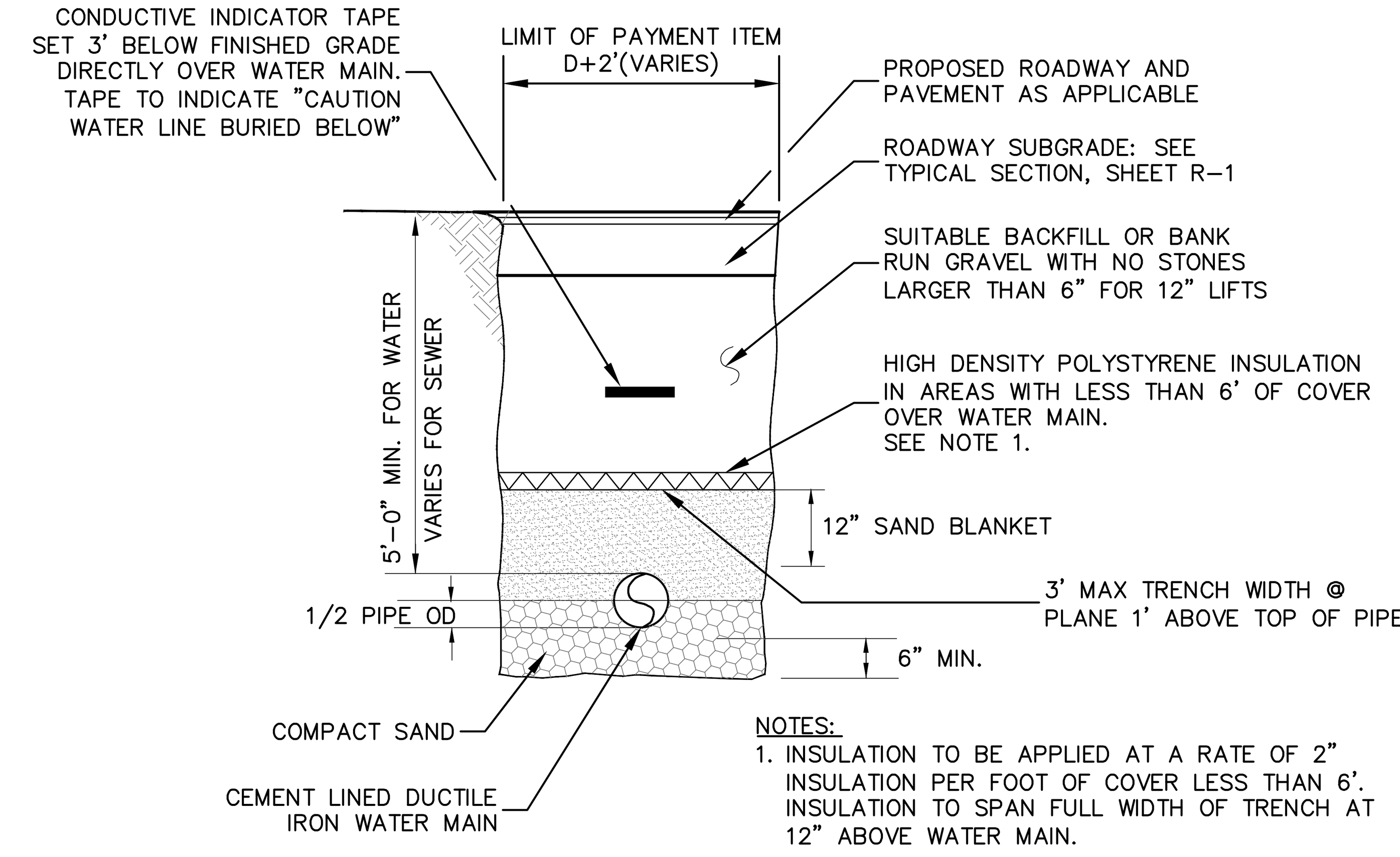
Water Main Notes:

1) WATER MAIN PIPE AND APPURTENANCES SHALL BE NEWLY MANUFACTURED MATERIALS FREE FROM DEFECTS AND BLEMISHES AND SHALL MEET THE LATEST STANDARDS OF THE AMERICAN WATER WORKS ASSOCIATION (AWWA), AS OUTLINED IN THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES CERTIFIED RULES, ENV-WS 307, TABLE 307-1. APPLICABLE AWWA STANDARDS INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   - C600 (1999 OR LATEST) INSTALLATION OF DUCTILE-IRON MAINS AND THEIR APPURTENANCES
   - C104/A21.4 (2003 OR LATEST) AMERICAN NATIONAL STANDARD FOR CEMENT-MORTAR LINING FOR DUCTILE-IRON PIPE AND FITTINGS FOR WATER
   - C110/A21.10 (2003 OR LATEST) AMERICAN NATIONAL STANDARD FOR DUCTILE-IRON AND GRAY-IRON FITTINGS, 3 IN. THROUGH 48 IN., FOR WATER AND OTHER LIQUIDS
   - C111/A21.11 (2000 OR LATEST) AMERICAN NATIONAL STANDARD FOR RUBBER-GASKET JOINTS FOR DUCTILE-IRON AND GRAY-IRON PRESSURE PIPE AND FITTINGS
   - C116/A21.16 (2003 OR LATEST) AMERICAN NATIONAL STANDARD FOR PROTECTIVE FUSION-BONDED EPOXY COATINGS INTERNAL & EXTERNAL IRON/GRAY-IRON FITTINGS
   - C150/A21.50 (2002 OR LATEST) AMERICAN NATIONAL STANDARD FOR THE THICKNESS DESIGN OF DUCTILE-IRON PIPE
   - C153/A21.53 (2000 OR LATEST) AMERICAN NATIONAL STANDARD FOR DUCTILE-IRON COMPACT FITTINGS, 2 IN. THROUGH 16 IN., FOR WATER AND OTHER LIQUIDS
   - C500 (2002 OR LATEST) GATE VALVES FOR WATER AND SEWERAGE SYSTEMS
   - C502 (1994 OR LATEST) DRY-BARREL FIRE HYDRANTS
   - C503 (1997 OR LATEST) WET-BARREL FIRE HYDRANTS
   - C509 (2001 OR LATEST) RESILIENT-SEATED GATE VALVES FOR WATER AND SEWERAGE SYSTEMS
   - C651-86 (1999 OR LATEST) DISINFECTING WATER MAINS
   - AWWA C600, SECTION 4, OR EQUIVALENT, FOR PRESSURE TESTING WATER MAINS.
2) THE EXISTING WATER MAIN IS 10-INCH CEMENT LINED DUCTILE IRON (C.L.D.I.) PIPE. ADJACENT PIPE SECTIONS INCLUDE ASBESTOS CONCRETE (A.C.) PIPE. THE CONTRACTOR SHALL FOLLOW ALL PREVAILING HEALTH AND SAFETY STANDARDS FOR CUTTING, REMOVAL AND DISPOSAL OF PORTIONS OF THE AC PIPE THAT ARE TO BE PERMANENTLY REMOVED.
3) NEW WATER MAIN SHALL BE BURIED A MINIMUM OF 6'-0" TO TOP OF PIPE AND LAID AT A CONSTANT GRADE. WHERE TOP OF WATER MAIN IS LESS THAN 6'-0" BELOW FINISHED GRADE, THE CONTRACTOR SHALL INSTALL RIGID INSULATION IN CONFORMANCE WITH WATER MAIN TRENCH DETAIL ON SHEET R-8 UNTIL THE WATER MAIN DEPTH IS AT, OR EXCEEDS, 6'-0".
4) CONTRACTOR SHALL USE RESTRAINT SYSTEMS ON ALL VALVES AND FITTINGS UNLESS OTHERWISE NOTED ON THE PLANS.
5) ALL GATE VALVES SHALL HAVE RESTRAINED MECHANICAL JOINTS AND SHALL OPEN LEFT.
6) EXISTING CURB BOXES AND/OR OTHER CASTINGS DISTURBED OR RELOCATED BY CONSTRUCTION ACTIVITIES SHALL BE ADJUSTED TO MATCH FINAL GRADE, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
7) WHERE WATER MAIN IS LESS THAN 6'-0" HORIZONTALLY FROM A STRUCTURE, THE CONTRACTOR SHALL INSTALL 2 INCHES OF RIGID INSULATION ALONG THE SIDE WALL OF THE WATER MAIN TRENCH A MINIMUM OF 10'-0" HORIZONTALLY BEYOND THE CENTERLINE OF THE STRUCTURE IN BOTH DIRECTIONS TO PROTECT THE WATER MAIN FROM FREEZING.
8) THE CONTRACTOR SHALL MAINTAIN WATER SERVICE TO RESIDENTS AT ALL TIMES. DISRUPTION OF WATER SERVICE TO RESIDENTS REQUIRES COORDINATION BY THE CONTRACTOR WITH THE TOWN'S PUBLIC WORKS DIRECTOR AND THE ENGINEER AT LEAST 72 HOURS PRIOR TO THE PLANNED INTERRUPTION OF SERVICE.
9) THE CONTRACTOR IS RESPONSIBLE FOR TAKING DETAILED MEASUREMENTS OF THE EXACT LOCATION OF ALL BURIED WATER DISTRIBUTION PIPING AND APPURTENANCES INSTALLED BY THE CONTRACTOR INCLUDING PIPE, GATE VALVES, TRANSITION FITTINGS, BENDS, AND SHALL RECORD THE MEASUREMENTS ON AS-BUILT PLANS OR RECORD DRAWINGS. THE AS BUILT PLANS OR RECORD DRAWINGS OF THE WATER DISTRIBUTION PIPING AND APPURTENANCES SHALL INCLUDE THE FOLLOWING INFORMATION:
   A. PRECISELY-MEASURED DIMENSIONS TO ALL TRANSITION FITTINGS;
   B. PRECISELY-MEASURED DIMENSIONS TO ALL "ON-LINE" GATE VALVES;
   C. PRECISELY-MEASURED DIMENSIONS TO ALL BENDS AND/OR PRINCIPAL CHANGES IN PIPE DIRECTION;

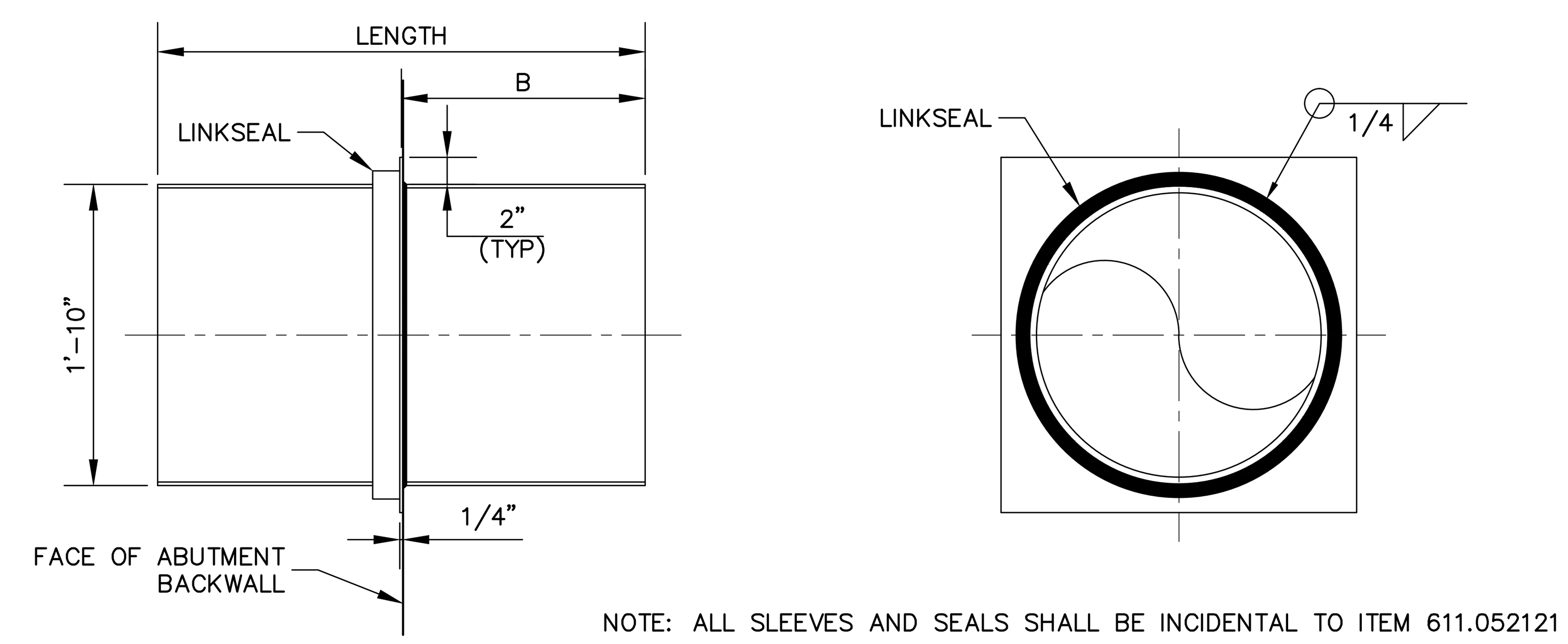
   NOTE: "PRECISELY-MEASURED" MEANS OF SUFFICIENT ACCURACY TO LOCATE THE PIPING OR APPURTENANCE TO WITHIN 1 FOOT ACCURACY, RECORDED TO THE NEAREST 0.5 FOOT.
10) THE CONTRACTOR SHALL SUPPLY THE TOWN OF EXETER WITH ONE ORIGINAL AND ONE COPY OF THE AS-BUILT PLAN OR RECORD DRAWING OF THE NEW WATER DISTRIBUTION PIPING INSTALLATION.
11) CONTRACTOR SHALL FLUSH AND CHLORINATE THE NEW WATER DISTRIBUTION PIPING SYSTEM BEFORE ACTIVATING INTO SERVICE. THE NEW WATER DISTRIBUTION PIPES AND APPURTENANCES SHALL BE FLUSHED TO REMOVE ANY DIRT OR OTHER CONTAMINANTS, AND TESTED PER THE TOWN OF EXETER REQUIREMENTS AS SPECIFIED IN SPECIAL PROVISION 611.3.12 - PRESSURE AND LEAKAGE TESTING OF THE TECHNICAL SPECIFICATIONS.
12) THE CONTRACTOR SHALL PERFORM A LEAKAGE TEST OF THE NEW PIPING SYSTEM BEFORE SYSTEM USE. THE DISTRIBUTION SYSTEM SHALL BE CHECKED FOR LEAKAGE BY CONDUCTING A SUSTAINED PRESSURE TEST PER THE TOWN OF EXETER REQUIREMENTS AS SPECIFIED IN SPECIAL PROVISION 611.3.13 - DISINFECTION OF THE TECHNICAL SPECIFICATIONS.

Insulated Pipe Notes:

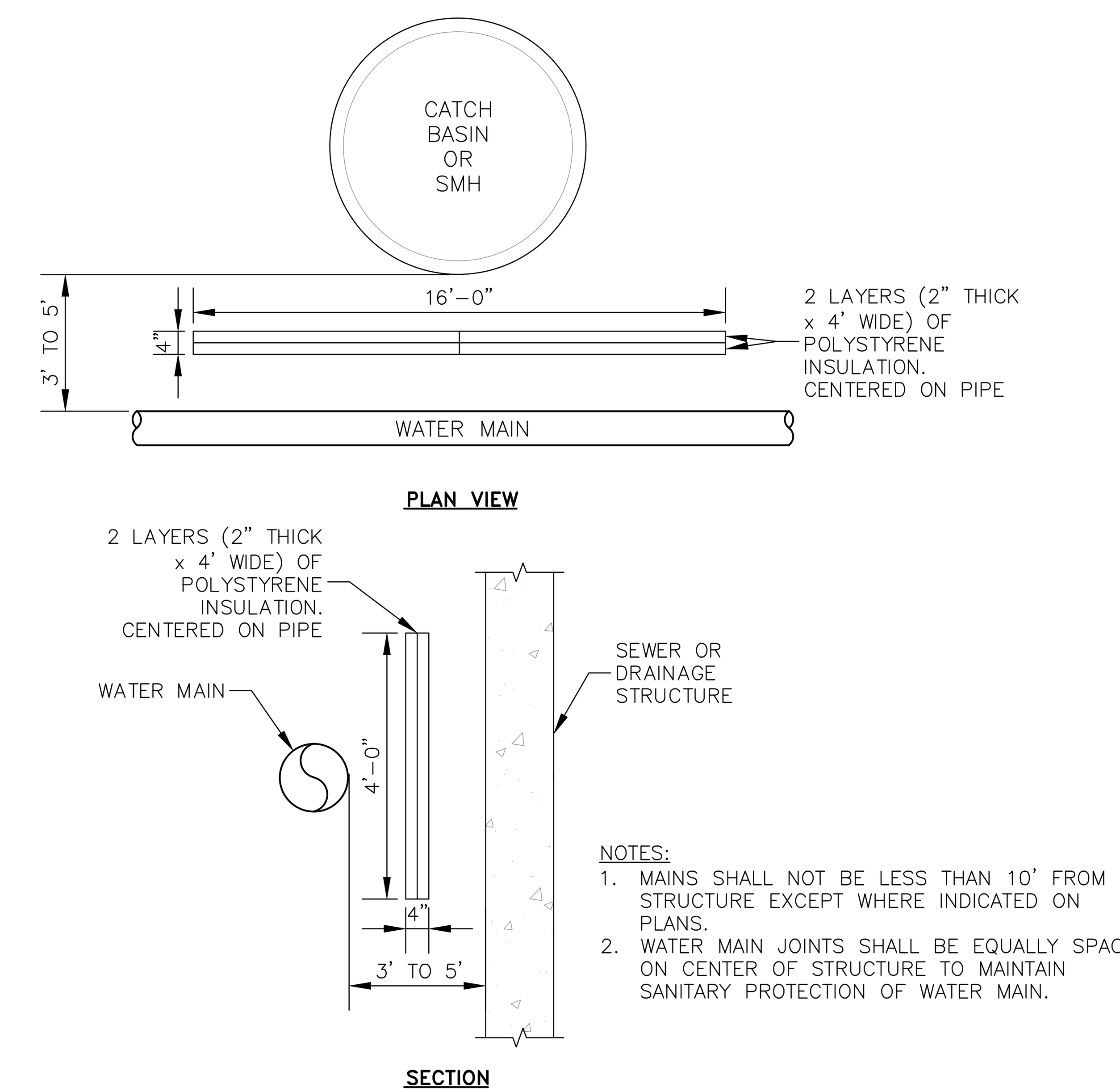
1) DUCTILE IRON PIPE SHALL BE TR FLEX, RESTRAINED JOINT PIPE WITH 2.16" OF CLOSED CELL POLYURETHANE INSULATION WRAPPED IN A SEAMLESS, HDPE JACKET. NO TAPE CASINGS WILL BE ALLOWED
2) PIPING AND INSULATION SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS.
3) ALL FITTINGS SHALL HAVE RESTRAINED, MECHANICAL JOINTS AND INSULATED WITH FIELD APPLIED INSULATION COVERS.
4) NO PIPING SHALL BE INSTALLED IN STANDING WATER. TRENCHES SHALL BE MAINTAINED DRY UNTIL FINAL FIELD CLOSURE IS COMPLETE.



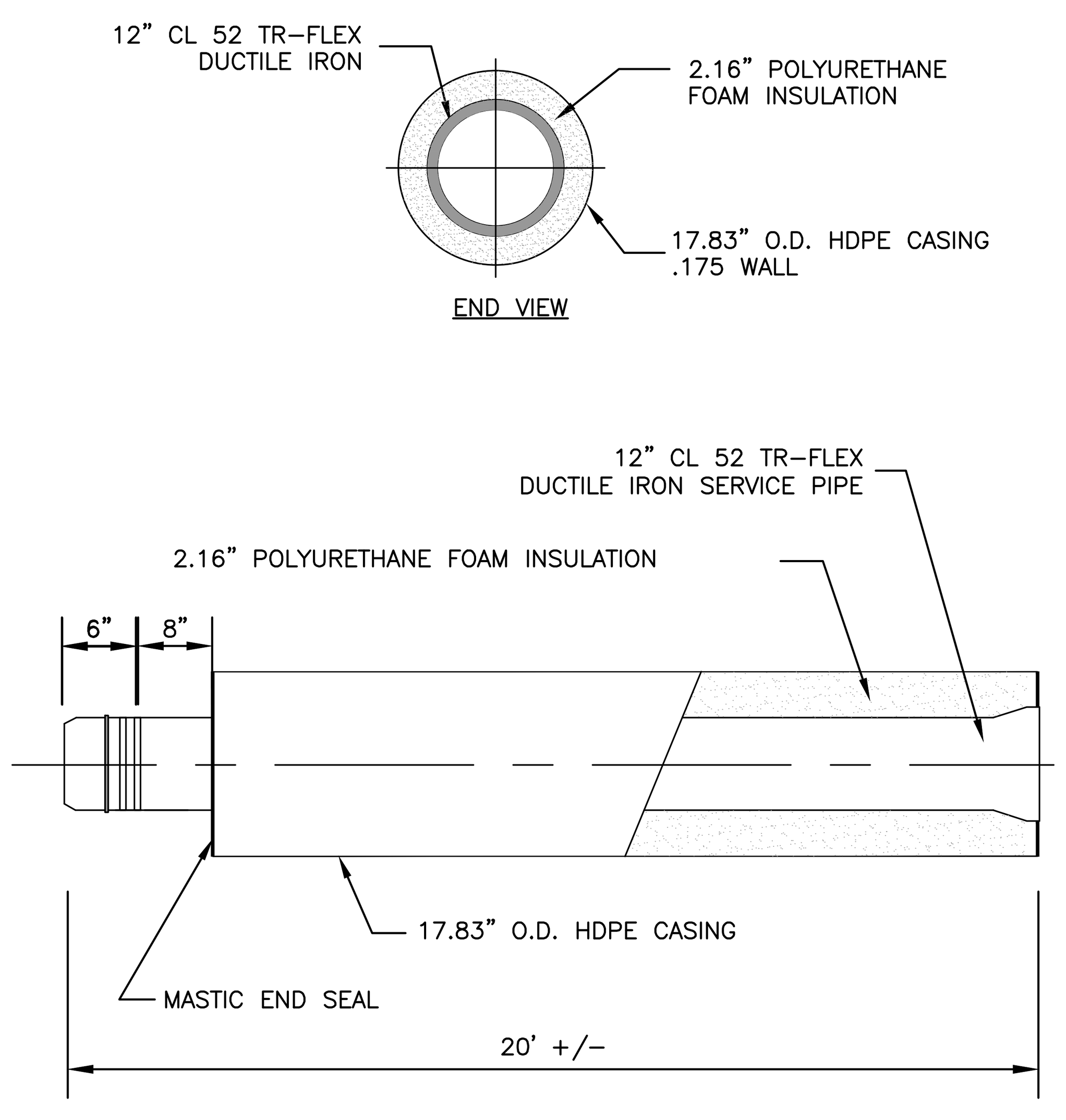
Water Main Trench Detail
Not to Scale



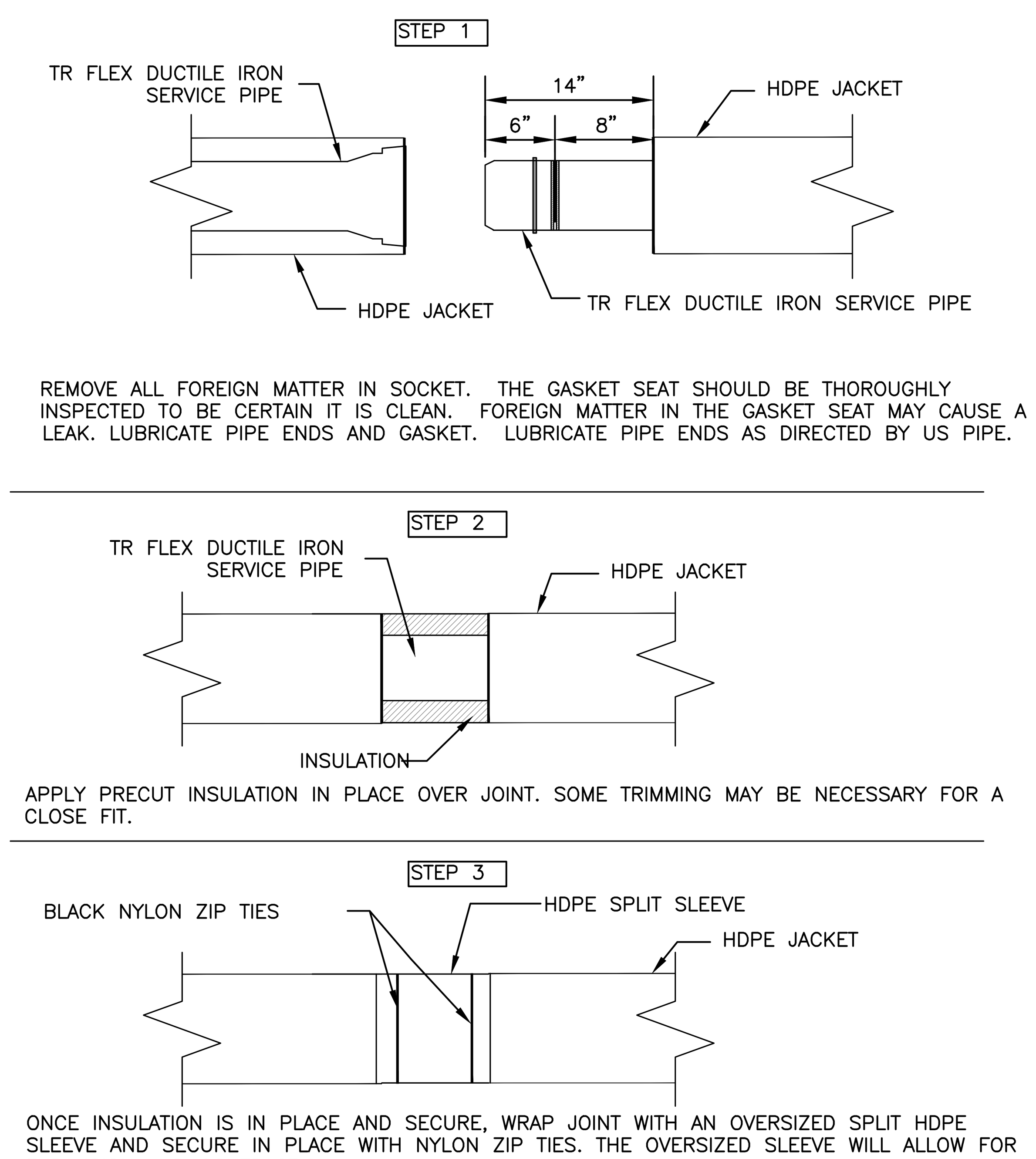
Waterproof Sleeve Details
Not to Scale



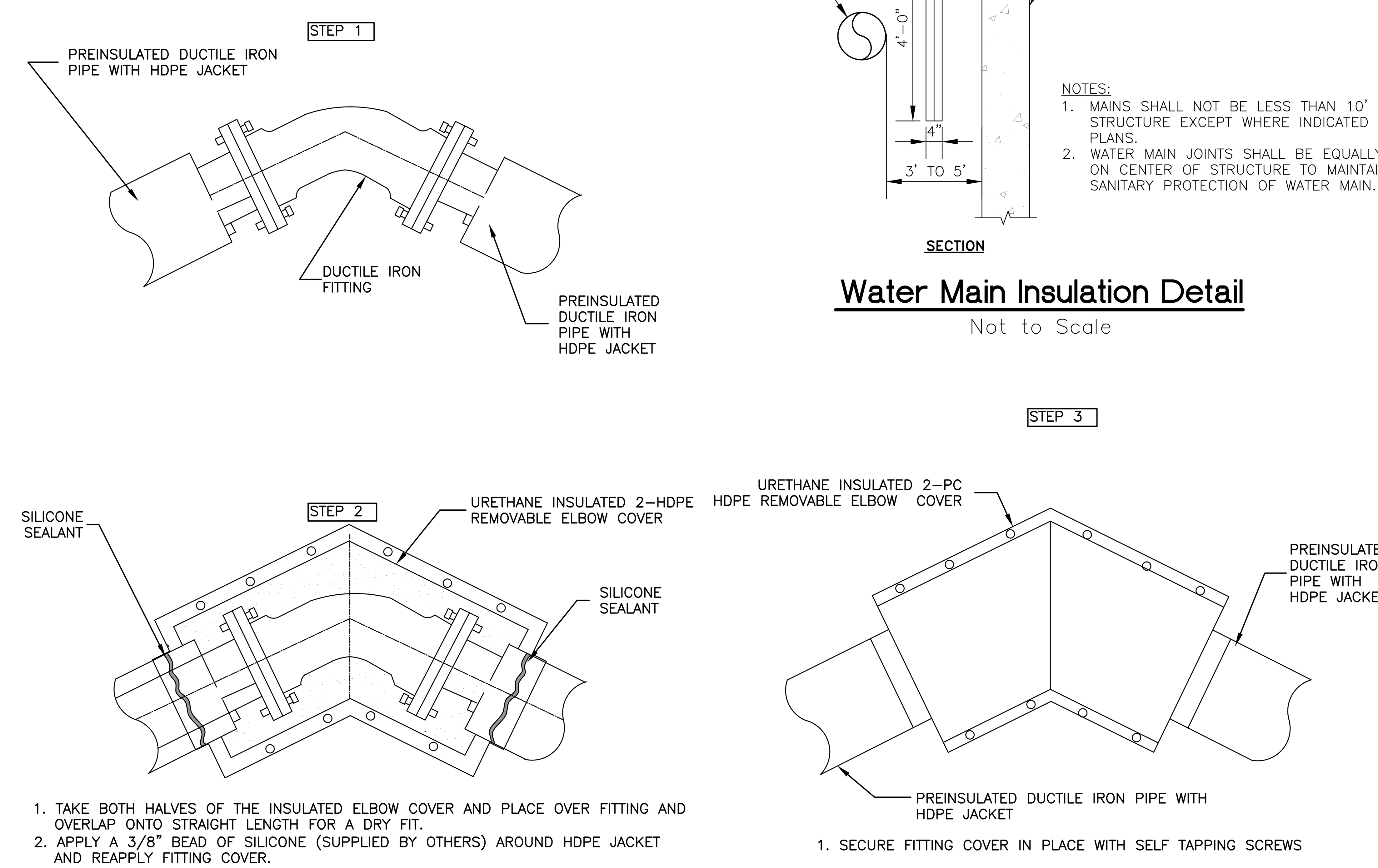
Water Main Insulation Detail
Not to Scale



PIPE INSULATION DETAIL



FIELD JOINT DETAIL



FIELD APPLIED FITTING COVER DETAIL

Water Main Pipe Insulation Details
Not to Scale

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m

4/21/2017

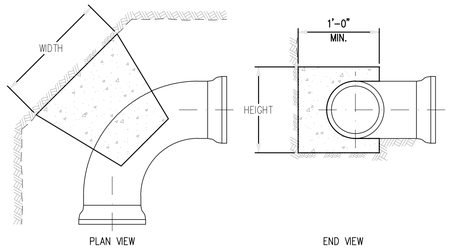
designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
date: June 2017
project no: ---
file name: R-10.dwg
scale:

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Road and Utility Details

drawing no. R-8

sheet: 30 of 34

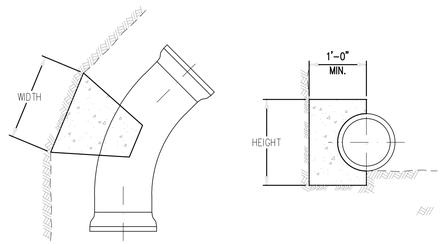
F:\CADD\PROJECTS\923-Exeter Bridges\Production\Court St\Final Design\R-10.dwg Date Plotted: Jun 12, 2017 - 12:01pm Plotted By: BPOMEROY



PLAN VIEW END VIEW

90° BEND THRUST BLOCK DIMENSIONING

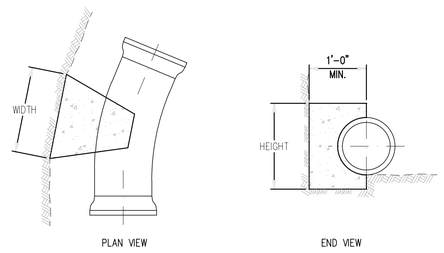
PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)	PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)
4 NPS	2'-3"	1'-3"	14 NPS	7'-3"	3'-6"
6 NPS	3'-3"	1'-9"	16 NPS	8'-3"	4'-0"
8 NPS	4'-3"	2'-3"	18 NPS	9'-3"	4'-6"
10 NPS	5'-3"	2'-6"	20 NPS	10'-6"	5'-0"
12 NPS	6'-0"	3'-3"	24 NPS	12'-6"	6'-0"



PLAN VIEW END VIEW

45° BEND THRUST BLOCK DIMENSIONING

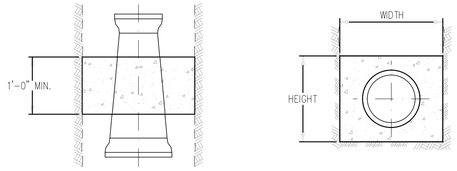
PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)	PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)
4 NPS	2'-0"	0'-9"	14 NPS	5'-3"	2'-6"
6 NPS	2'-6"	1'-3"	16 NPS	5'-6"	3'-3"
8 NPS	3'-3"	1'-9"	18 NPS	7'-3"	3'-3"
10 NPS	4'-0"	2'-0"	20 NPS	7'-3"	4'-0"
12 NPS	4'-6"	2'-3"	24 NPS	8'-9"	4'-6"



PLAN VIEW END VIEW

22½° BEND THRUST BLOCK DIMENSIONING

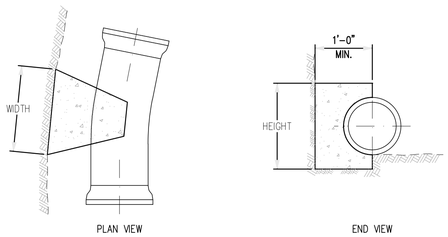
PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)	PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)
4 NPS	1'-3"	0'-9"	14 NPS	3'-6"	2'-0"
6 NPS	2'-0"	0'-9"	16 NPS	4'-6"	2'-3"
8 NPS	2'-3"	1'-3"	18 NPS	5'-0"	2'-6"
10 NPS	3'-0"	1'-3"	20 NPS	5'-0"	3'-0"
12 NPS	3'-3"	1'-9"	24 NPS	6'-3"	3'-3"



PLAN VIEW END VIEW

REDUCER THRUST BLOCK DIMENSIONING

SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)	SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)
6x4 NPS	1'-6"	1'-6"	16x8 NPS	4'-6"	4'-6"
8x4 NPS	2'-3"	2'-3"	16x10 NPS	4'-0"	4'-0"
8x6 NPS	1'-9"	1'-9"	16x12 NPS	3'-6"	3'-6"
10x6 NPS	2'-6"	2'-6"	20x12 NPS	5'-0"	5'-0"
10x8 NPS	2'-0"	2'-0"	20x16 NPS	4'-0"	4'-0"
12x6 NPS	3'-3"	3'-3"	24x12 NPS	6'-6"	6'-6"
12x8 NPS	3'-0"	3'-0"	24x16 NPS	5'-9"	5'-9"
12x10 NPS	2'-3"	2'-3"	24x20 NPS	4'-6"	4'-6"



PLAN VIEW END VIEW

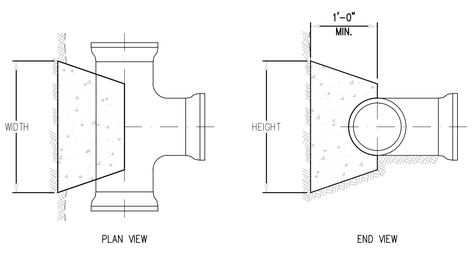
11¼° BEND THRUST BLOCK DIMENSIONING

PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)	PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)
4 NPS	1'-0"	0'-6"	14 NPS	3'-0"	1'-3"
6 NPS	1'-3"	0'-9"	16 NPS	3'-3"	1'-9"
8 NPS	1'-9"	0'-9"	18 NPS	3'-6"	1'-9"
10 NPS	2'-0"	1'-0"	20 NPS	3'-6"	2'-0"
12 NPS	2'-3"	1'-3"	24 NPS	4'-6"	2'-3"

PLAN VIEW END VIEW

22½° BEND THRUST BLOCK DIMENSIONING

PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)	PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)
4 NPS	1'-3"	0'-9"	14 NPS	3'-6"	2'-0"
6 NPS	2'-0"	0'-9"	16 NPS	4'-6"	2'-3"
8 NPS	2'-3"	1'-3"	18 NPS	5'-0"	2'-6"
10 NPS	3'-0"	1'-3"	20 NPS	5'-0"	3'-0"
12 NPS	3'-3"	1'-9"	24 NPS	6'-3"	3'-3"



PLAN VIEW END VIEW

TEE/DEAD END THRUST BLOCK DIMENSIONING

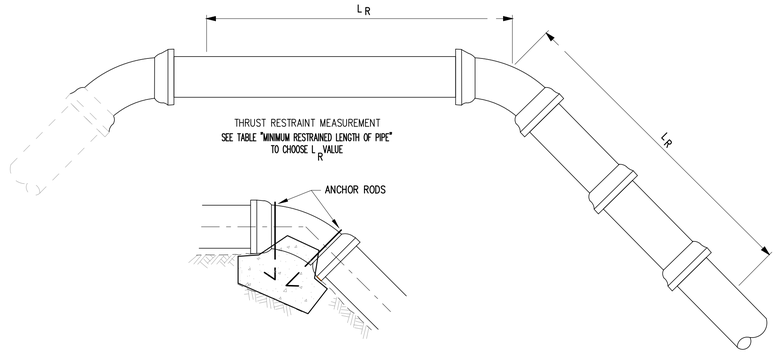
PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)	PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)
4 NPS	2'-0"	1'-0"	14 NPS	5'-6"	3'-3"
6 NPS	3'-0"	1'-3"	16 NPS	6'-6"	3'-6"
8 NPS	3'-3"	2'-0"	18 NPS	7'-6"	4'-0"
10 NPS	4'-3"	2'-3"	20 NPS	8'-6"	4'-3"
12 NPS	5'-3"	2'-6"	24 NPS	10'-3"	5'-3"

HORIZONTAL THRUST BLOCKS–MINIMUM RESTRAINED LENGTH OF PIPE (FT–IN) L_R

FITTING	4 NPS	6 NPS	8 NPS	10 NPS	12 NPS	14 NPS	16 NPS	18 NPS	20 NPS	24 NPS
11 .n BEND	1'–3"	2'–0"	2'–6"	3'–0"	3'–6"	4'–0"	4'–6"	5'–0"	5'–6"	6'–3"
22 .n BEND	1'–3"	2'–0"	2'–6"	3'–0"	3'–6"	4'–0"	4'–6"	5'–0"	5'–6"	6'–6"
45n BEND	3'–0"	4'–0"	5'–3"	6'–3"	7'–6"	8'–6"	9'–6"	10'–6"	11'–6"	13'–6"
90n BEND	7'–0"	9'–9"	12'–6"	15'–6"	18'–0"	20'–0"	23'–0"	25'–6"	28'–0"	32'–6"
DEAD END	8'–6"	12'–6"	16'–0"	19'–3"	23'–0"	26'–0"	29'–6"	33'–0"	36'–0"	42'–0"

NOTE: PVC PIPE WILL TYPICALLY HAVE SLIGHTLY GREATER RESTRAINED LENGTH

NOTE: FOR POLYETHYLENE WRAPPED PIPE, MULTIPLY VALUES IN TABLE BY 1.45



VERTICAL BEND GRAVITY BLOCK – ELEVATION

MINIMUM RESTRAINED LENGTH OF PIPE (L) FOR VERTICAL BENDS

VERTICAL UPWARD BENDS – NPS (FT.)										
FITTING	4 NPS	6 NPS	8 NPS	10 NPS	12 NPS	14 NPS	16 NPS	18 NPS	20 NPS	24 NPS
11 1/4°	1.5	2.0	3.0	3.0	4.0	4.0	5.0	5.0	6.0	6.5
22 1/2°	1.5	2.0	3.0	3.0	4.0	4.0	5.0	5.0	6.0	7.0
45°	3.0	4.0	5.5	6.5	8.0	9.0	10.0	10.5	11.5	13.5
90°	7.0	10.0	12.5	15.5	18.5	20.5	23.0	26.0	28.0	32.5
VERTICAL DOWNWARD BENDS – NPS (FT.)										
FITTING	4 NPS	6 NPS	8 NPS	10 NPS	12 NPS	14 NPS	16 NPS	18 NPS	20 NPS	24 NPS
11 1/4°	3.5	5.0	6.5	8.0	9.5	10.5	12.0	13.0	14.5	17.0
22 1/2°	7.0	10.0	13.0	15.5	18.5	21.0	24.0	26.5	29.0	34.0
45°	14.5	20.5	27.0	32.5	38.5	44.0	49.0	54.5	60.0	70.0
90°	35.0	49.5	64.0	78.0	92.0	105.0	118.5	131.5	144.5	169.0

NOTE: FOR POLYETHYLENE WRAPPED PIPE, MULTIPLY VALUES IN TABLE BY 1.45

NOTE: FOR PVC PIPE MULTIPLY VALUES IN TABLE BY 1.15

ANCHOR ROD SCHEDULE FOR GRAVITY BLOCKS

PIPE SIZE	RODS	MIN. EMBEDMENT LENGTH
4 NPS	1 – (3)	6"
6 NPS	1 – (3)	6"
8 NPS	2 – (4)	6"
10 NPS	2 – (4)	6"
12 NPS	2 – (5)	7"
14 NPS	2 – (6)	8"
16 NPS	2 – (6)	8"
18 NPS	2 – (7)	10"
20 NPS	2 – (8)	11"
24 NPS	2 – (9)	12"

NUMBERS IN PARENTHESIS ARE BAR SIZES MARKED IN EIGHTHS OF INCHES

MINIMUM GRAVITY BLOCK VOLUMES FOR VERTICAL BENDS (CU.FT.)

FITTING	4 NPS	6 NPS	8 NPS	10 NPS	12 NPS	14 NPS	16 NPS	18 NPS	20 NPS	24 NPS
11 1/4°	4	11	18	25	35	46	60	74	92	131
22 1/2°	11	18	32	49	67	92	120	148	184	261
45°	18	35	64	95	134	180	233	293	360	512
90°	32	67	117	177	247	332	431	540	664	950

THRUST BLOCK NOTES:

1. SEE SPECIAL PROVISION 611 – WATER MAIN INSTALLATION FOR ADDITIONAL INFORMATION ON THRUST RESTRAINT REQUIREMENTS.
2. THRUST RESTRAINT USING THRUST BLOCKS OR RESTRAINED LENGTHS ARE SHOWN ON THESE SHEETS. THRUST BLOCKS, RESTRAINED JOINTS USING TIE RODS OR RETAINER GLANDS ARE ALL ACCEPTABLE METHODS; HOWEVER, THE THRUST RESTRAINT METHOD SELECTED SHALL BE APPROVED BY THE ENGINEER.
3. IF THE OWNER OF THE WATER SYSTEM ALLOWS A METHOD THAT RESTRAINS INDIVIDUAL JOINTS, EACH JOINT THAT FALLS WITHIN THE MINIMUM RESTRAINED LENGTH, MEASURED FROM THE CENTER OF THE FITTING, AS SHOWN ON THESE SHEETS SHALL BE RESTRAINED, AND SHALL WITHSTAND THE MAXIMUM PRESSURE APPLIED TO THE SYSTEM.
4. CLASS B CONCRETE SHALL NOT BE PLACED UNDERWATER. THE CONTRACTOR SHALL DEWATER THE EXCAVATION TO INSTALL THE THRUST BLOCKS IN THE DRY.
5. CONCRETE FOR THRUST BLOCKS SHALL NOT BE ALLOWED TO COVER OR INTERFERE WITH JOINT OR RESTRAINT HARDWARE. PLASTIC SHEETING OR BUILDING FELT MAY BE PLACED OVER PIPE OR FITTINGS TO PREVENT CONCRETE FROM ADHERING TO SURFACES.
6. FOR BENDS, BEARING AREA SHALL BE PARALLEL TO THE EDGE OF THE FITTING AT THE FITTING MIDPOINT.
7. FOR TEES, BEARING AREA SHALL BE PERPENDICULAR TO THE BRANCH (SINGLE LEG) AXIS.
8. FOR REDUCERS, BEARING AREA SHALL BE PERPENDICULAR TO THE FITTING AXIS. THE MINIMUM THICKNESS ALONG THE FITTING AXIS SHALL BE 1'–0" OR THE LENGTH BETWEEN THE BELLS, WHICHEVER IS SMALLER.
9. THRUST BLOCK ANCHOR RODS SHALL MEET THE REQUIREMENTS OF SECTION 530.2.5 OF THE NHDOT STANDARD SPECIFICATIONS. ALL EMBEDDED RODS SHALL HAVE STANDARD ACI HOOKS ON EACH END, AND SHALL HAVE A MINIMUM OF 3" CONCRETE COVER IN ALL DIRECTIONS.
10. THRUST RESTRAINT FOR SIZES OVER 24 NPS AND/OR FOR OTHER FITTINGS NOT SHOWN ON THESE SHEETS WILL BE AS SHOWN IN THE CONTRACT DOCUMENTS.
11. THRUST BLOCK SIZES AND MINIMUM RESTRAINED LENGTHS SHOWN ON THESE SHEETS ARE BASED UPON THE FOLLOWING ASSUMED CONDITIONS:

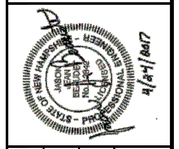
    1.5 SAFETY FACTOR
    5 FT DEPTH OF COVER
    200 PSI WATER SYSTEM TEST PRESSURE
    30n SOIL FRICTION ANGLE
    90 LBS\FTr SOIL UNIT WEIGHT
    IF SOILS ARE POORER THEN REFER TO REFERENCES

12. FOR INSTALLATIONS NOT MEETING THE CONDITIONS OF NOTE 8, THE CONTRACTOR SHALL SUBMIT CALCULATIONS TO THE ENGINEER FOR APPROVAL OF RESTRAINT LENGTH CHOSEN.
13. TO DETERMINE REQUIRED SIZES FOR DIFFERENT TEST PRESSURES, MULTIPLY THE DIMENSION BY A FACTOR OF THE SPECIFIC VALUE DIVIDED BY THE STANDARD VALUE.

EXAMPLE: GRAVITY BLOCK VOLUME FOR 12 NPS 45° BEND WITH 100 PSI TEST PRESSURE:
WIDTH = 3'–3"
HEIGHT = 1'–7"
VOLUME REQUIRED 134 FTr X (100/200) = 67 FTr

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com



designed by:	drawn by:	approved by:	scale:
LBK/OGK	LBK/BGP	JLG	

date:	project no:	file name:
June 2017	----	R-11.dwg

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Thrust Block Details

drawing no.
R-9

sheet: 31 of 34

F:\CADD\PROJECTS\923-Exeter Bridges\Production\Court St\Final Design\R-11.dwg Date Plotted: Jun 12, 2017 – 12:02pm Plotted By: BPOMEROY

1
48" X 48"

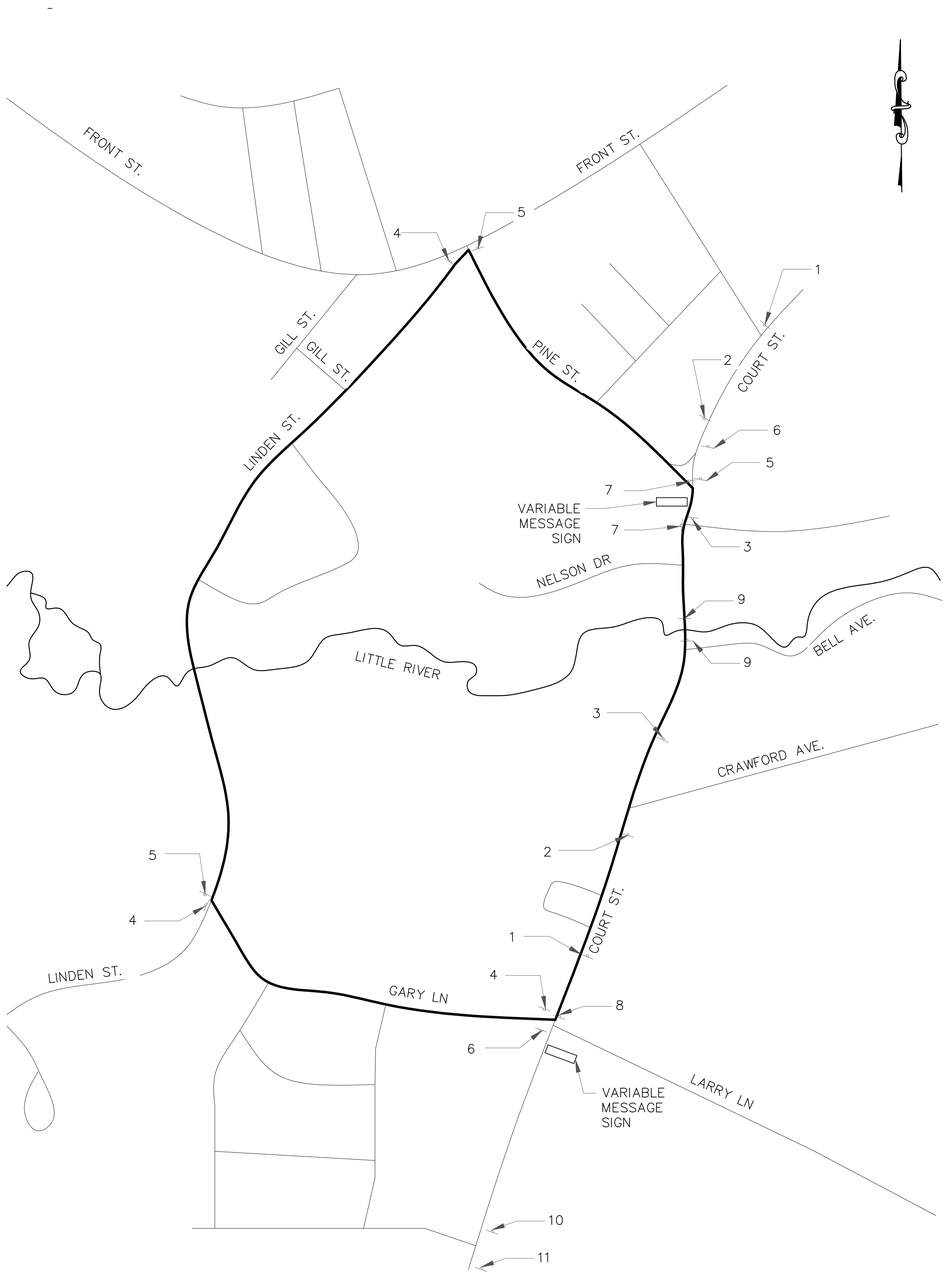
2
48" X 48"

3
48" X 48"

4
30" X 24"

5
30" X 24"

6
24" X 18"



NOTES:

1. DETOUR SHALL BE SET IN COMPLIANCE WITH THE MUTCD 2009 EDITION AND THE NHDOT STANDARD SPECIFICATIONS, SECTION 619.

2. 30 LINEAR FT OF TEMPORARY CONCRETE BARRIER SHALL BE PLACED TO BLOCK THE ROADWAY DIRECTLY BEHIND THE TYPE III BARRICADES (#9).

3. CONTRACTOR IS RESPONSIBLE FOR SUPPLYING AND MAINTAINING ALL SIGNS REQUIRED FOR DETOUR.

4. SIGNS SHALL BE REMOVED OR COVERED DURING PERIODS IN WHICH THEY ARE NOT REQUIRED.

5. LAYOUT SHOWN IS NOT TO SCALE AND IS A SUGGESTED LAYOUT.

6. CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN FOR APPROVAL PRIOR TO ANY WORK.

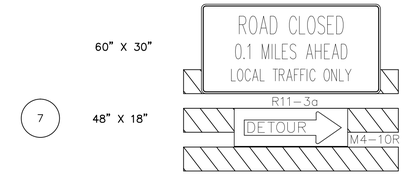
7. TOTAL ESTIMATED SIGN AREA: 239.5 SF

8. ALL COST FOR TRAFFIC CONTROL DEVICES INCLUDING PLACEMENT, RELOCATION, AND REMOVAL OF SIGNS SHALL BE INCLUDED IN ITEM 619.1 – MAINTENANCE OF TRAFFIC.

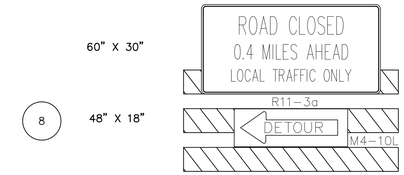
9. THE CONTRACTOR SHALL COORDINATE ALL WORK WITH THE TOWN OF EXETER PUBLIC WORKS, FIRE AND POLICE DEPARTMENTS, AND ENGINEER AT LEAST 14 DAYS PRIOR TO IMPLEMENTING AND ROAD CLOSURES OR DETOURS.

10. THE CONTRACTOR SHALL PLACE PORTABLE MESSAGE BOARDS (PMB'S) AS INDICATED ON THE PLANS AT LEAST 7 DAYS IN ADVANCE OF ROAD CLOSURES AND DETOURS.

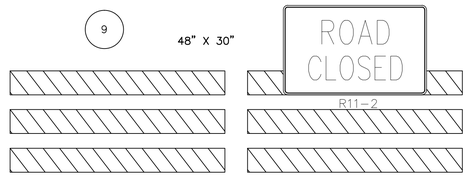
11. ACCESS TO EXISTING DRIVES SHALL BE MAINTAINED AT ALL TIMES. IN THE EVENT THAT MAJOR WORK MUST BE DONE AT DRIVES THAT PRECLUDES FULL ACCESS, THE CONTRACTOR IS TO COORDINATE THE WORK WITH THE OWNER TO MINIMIZE INCONVENIENCED.



7
60" X 30"
48" X 18"



8
60" X 30"
48" X 18"



9
48" X 30"

10
48" X 48"

11
48" X 48"

no.	revision	date	by
A	ISSUED FOR CONSTRUCTION	6/13/17	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 603/627-0708 207/541-4223
c m a e n g i n e e r s . c o m

4/24/2017

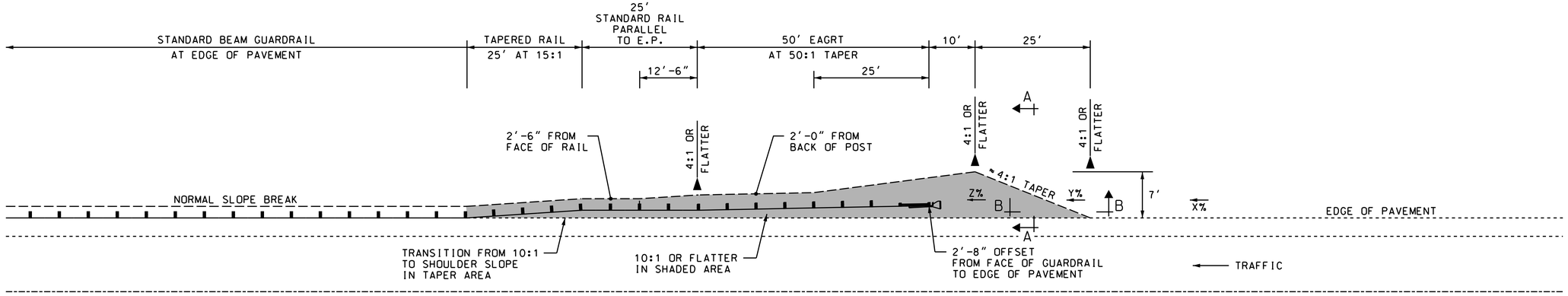
designed by: LBK/OGK
drawn by: LBK/BGP
approved by: JLG
scale:
date: June 2017
project no: ----
file name: 923 - Traffic Plan.dwg

Town of Exeter
Department of Public Works
Court Street
Little River Bridge Replacement
Court Street
Traffic Control Plan

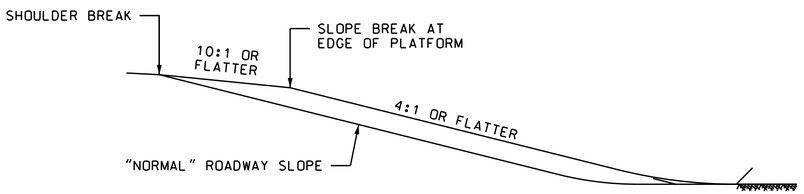
drawing no.
R-10

sheet: 32 of 34

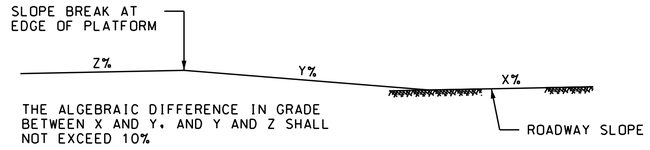
F:\CADD\PROJECTS\923-Exeter Bridges\Production\923 - Traffic Plan.dwg Date Plotted: Jun 12, 2017 – 12:03pm Plotted By: BPOMEROY



50' EAGRT UNIT



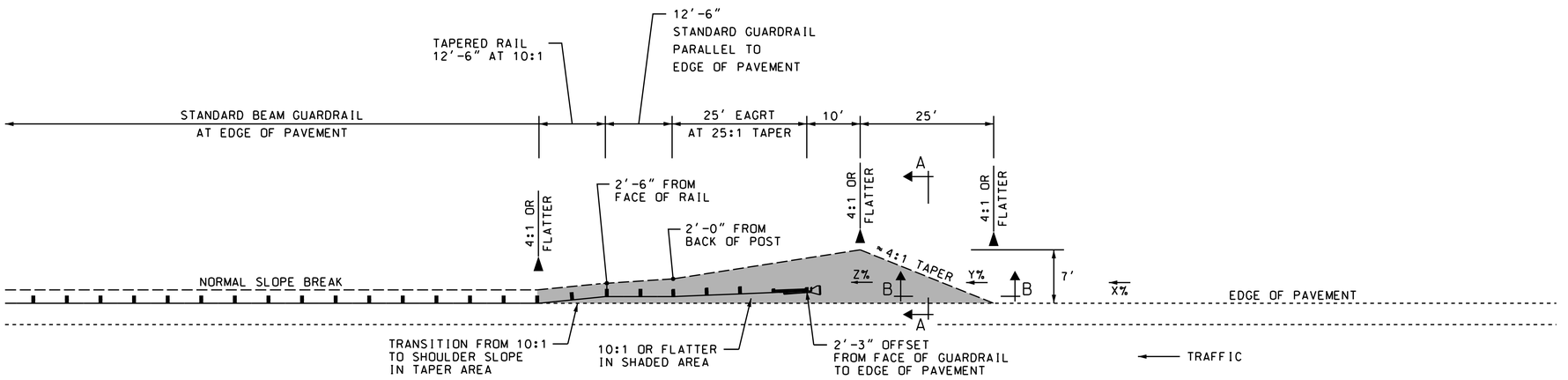
SECTION A-A
PLATFORM SLOPE GRADING



THE ALGEBRAIC DIFFERENCE IN GRADE BETWEEN X AND Y. AND Y AND Z SHALL NOT EXCEED 10%

X: LONGITUDINAL GRADE OF ROADWAY SLOPE IN ADVANCE OF PLATFORM
Y: LONGITUDINAL GRADE OF PLATFORM APPROACH
Z: LONGITUDINAL GRADE OF PLATFORM

SECTION B-B
PLATFORM APPROACH GRADING



25' EAGRT UNIT

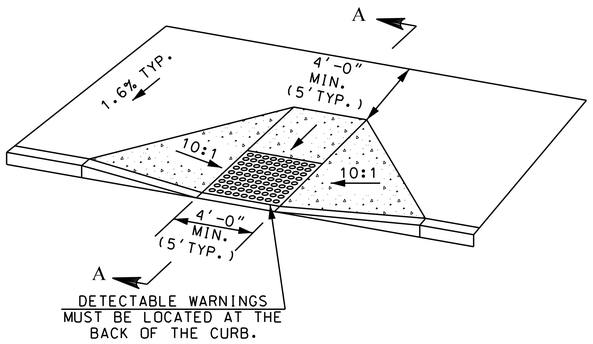
CMA ENGINEERS

STATE OF NEW HAMPSHIRE

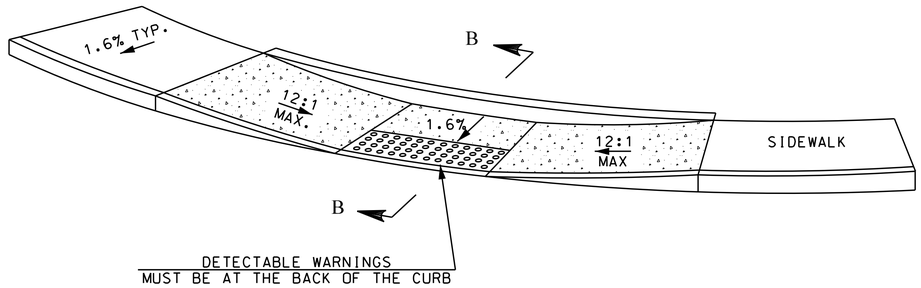
DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF HIGHWAY DESIGN

ALTERNATIVE PLATFORM FOR OFFSET ENERGY ABSORBING GUARDRAIL TERMINAL (EAGRT)

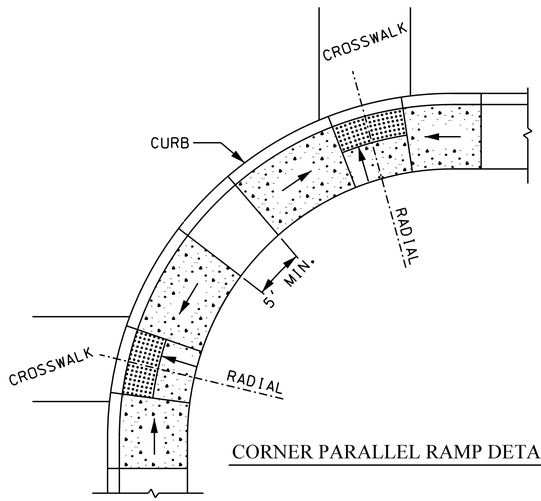
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11/24/14			33	34



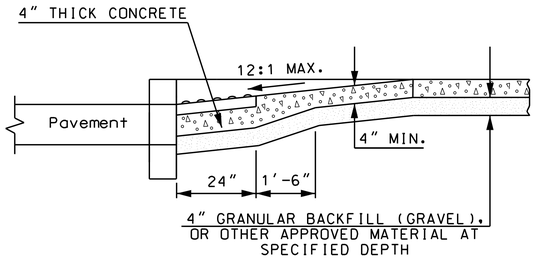
PERPENDICULAR CURB RAMP DETAIL



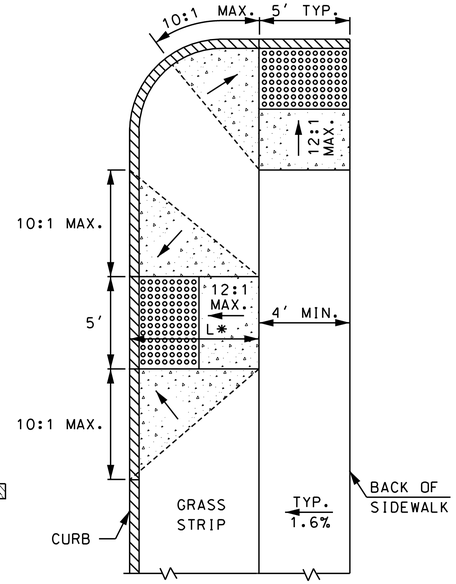
PARALLEL CURB RAMP DETAIL



CORNER PARALLEL RAMP DETAIL

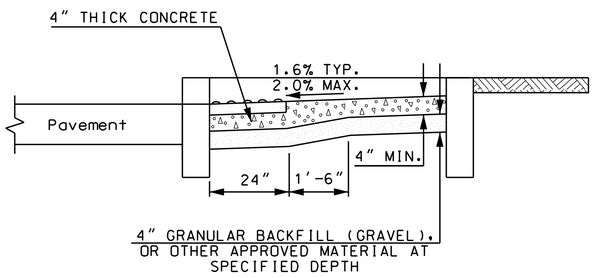


SECTION A-A



PERPENDICULAR RAMP WITH GRASS PANEL

* LENGTH OF RAMP VARIES WITH SLOPE & WIDTH OF GRASS PANEL



SECTION B-B

TRANSITION RAMPS:

BLENDED TRANSITIONS HAVE A RUNNING SLOPE GREATER THAN 2% BUT LESS THAN 5%. CURB RAMPS HAVE A RUNNING SLOPE OF 5% MIN. TO 8.33% MAX. SIDEWALK, BLENDED TRANSITIONS, AND CURB RAMPS HAVE A MAX. CROSS SLOPE OF 2%.

ALL GRADE BREAKS BETWEEN LANDINGS, RAMPS, AND BLENDED TRANSITIONS SHALL BE PERPENDICULAR TO THE DIRECTION OF TRAVEL.

IF IT IS NECESSARY TO USE SIDEWALK WIDTHS 5'-0" OR LESS, PROVIDE A WIDENED AREA A MINIMUM OF 5'-0" WIDE BY 5'-0" LONG SPACED AT INTERVALS OF 200' MAXIMUM TO ALLOW FOR USERS TO PASS EACH OTHER.

PROVIDE DETECTABLE WARNING SURFACES ANYTIME THAT A CURB RAMP, BLENDED TRANSITION, OR LANDING CONNECTS TO A STREET. PLACEMENT FOR DETECTABLE WARNING SURFACES ARE AS FOLLOWS:

PERPENDICULAR CURB RAMPS:

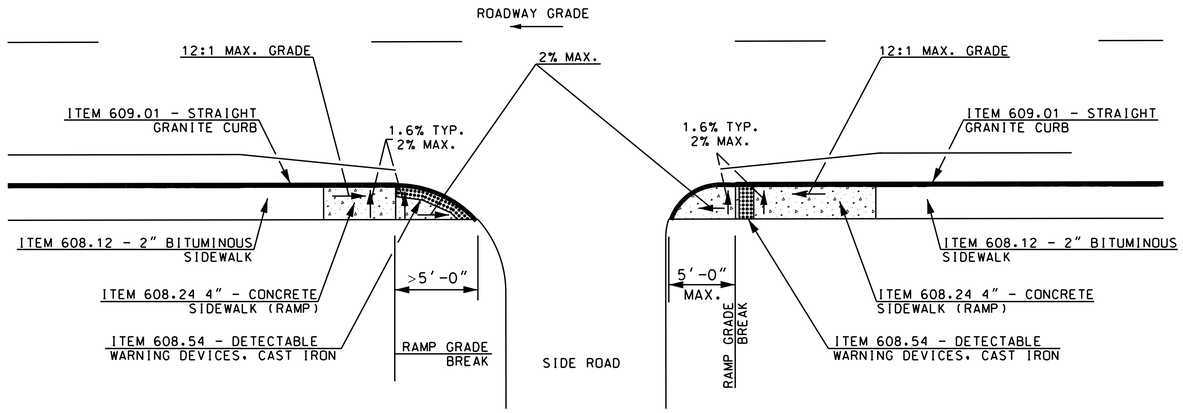
WHERE BOTH ENDS OF THE BOTTOM GRADE ARE LESS THAN 5'- 0" FROM THE BACK OF THE CURB, LOCATE THE DETECTABLE WARNING PANELS ON THE RAMP SURFACE AT THE BOTTOM OF THE RAMP. WHERE EITHER END OF THE BOTTOM GRADE IS GREATER THAN 5'-0" FROM THE BACK OF THE CURB, LOCATE THE DETECTABLE WARNINGS AT THE BOTTOM OF THE LANDING.

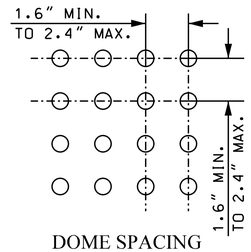
PARALLEL CURB RAMPS:

LOCATE THE DETECTABLE WARNING SURFACES AT THE BACK OF THE CURB ALONG THE EDGE OF THE LANDING.

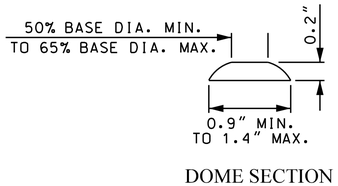
FOR BLENDED TRANSITIONS AND LANDINGS:

LOCATE THE DETECTABLE WARNING SURFACES AT THE BACK OF THE CURB.





DOME SPACING



DOME SECTION

THE ORDER OF PREFERENCE FOR LOCATION OF CORNER RAMPS:

1. TWO SEPARATE RAMPS LOCATED ON TANGENT SIDEWALK AREA IMMEDIATELY OUTSIDE OF CORNER RADIUS.
2. TWO SEPARATE RAMPS SEPARATED BY 5' MINIMUM AS SHOWN ABOVE.
3. SINGLE RAMP SERVING TWO CROSSWALKS.

GENERAL NOTES

1. THE MAXIMUM RUNNING SLOPE OF ANY SIDEWALK CURB RAMP IS 12:1. THE MAXIMUM CROSS SLOPE IS 2%. THE SLOPE OF THE LANDING SHALL NOT EXCEED 2% IN ANY DIRECTION.

   RAMP RUNNING SLOPE EXCEPTION: A GREATER THAN 8.33% RAMP RUNNING GRADE IS ALLOWED WHERE THE THE ROADWAY AND THE SIDEWALK(S) ARE PARALLEL AND VERY CLOSE TOGETHER, WITH THE SAME GRADE, AND USING A GRADE OF 8.33% WOULD RESULT IN A RAMP LENGTH LONGER THAN 15'. IN THOSE CIRCUMSTANCES USE A MAXIMUM RAMP LENGTH OF 15'AND THE ALLOWABLE RUNNING SLOPE OF THE RAMP(S) IS GREATER THAN 8.33%.
2. TRANSITIONS SHALL BE FLUSH AND FREE OF ABRUPT CHANGES. ROADWAY SHOULDER SLOPES ADJOINING SIDEWALK CURB RAMPS SHALL BE A MAXIMUM OF 5% (FULL WIDTH) FOR A DISTANCE OF 2 FT. FROM THE ROADWAY CURBLINE.
3. INTERCEPT DRAINAGE ALONG THE CURB IN ADVANCE OF SIDEWALK CURB RAMPS OR LANDINGS. CATCH BASINS, MANHOLES, ETC. SHALL NOT BE LOCATED IN, OR AT THE BASE OF, SIDEWALK CURB RAMPS OR LANDINGS.
4. THE BOTTOM OF THE SIDEWALK CURB RAMP OR LANDING, EXCLUSIVE OF THE FLARED SIDES, SHALL BE WHOLLY CONTAINED WITHIN THE CROSSWALK MARKINGS.
5. THE SURFACE OF A PERPENDICULAR SIDEWALK CURB RAMP OR THE LANDING OF A PARALLEL SIDEWALK CURB RAMP SHALL CONTRAST VISUALLY WITH THE ADJOINING SIDEWALK SURFACE, EITHER ASPHALT/LIGHT-COLORED CONCRETE OR LIGHT-COLORED CONCRETE/DARK-STAINED CONCRETE. THE CONCRETE SURFACE SHALL BE SLIP RESISTANT.
6. DETECTABLE WARNING PANELS SHALL BE THE FULL WIDTH OF THE LANDING, BLENDED TRANSITION, OR CURB RAMP THEY ARE A PART OF AND SHALL BE A MINIMUM OF 2 FEET IN DEPTH. THE ROWS OF TRUNCATED DOMES SHALL BE ALIGNED PERPENDICULAR TO THE GRADE BREAK BETWEEN THE RAMP, BLENDED TRANSITION, OR LANDING AND THE STREET.

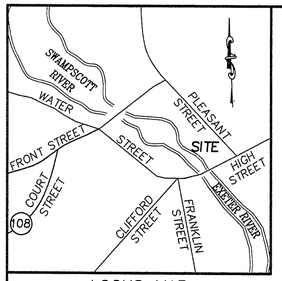
CMA ENGINEERS

STATE OF NEW HAMPSHIRE

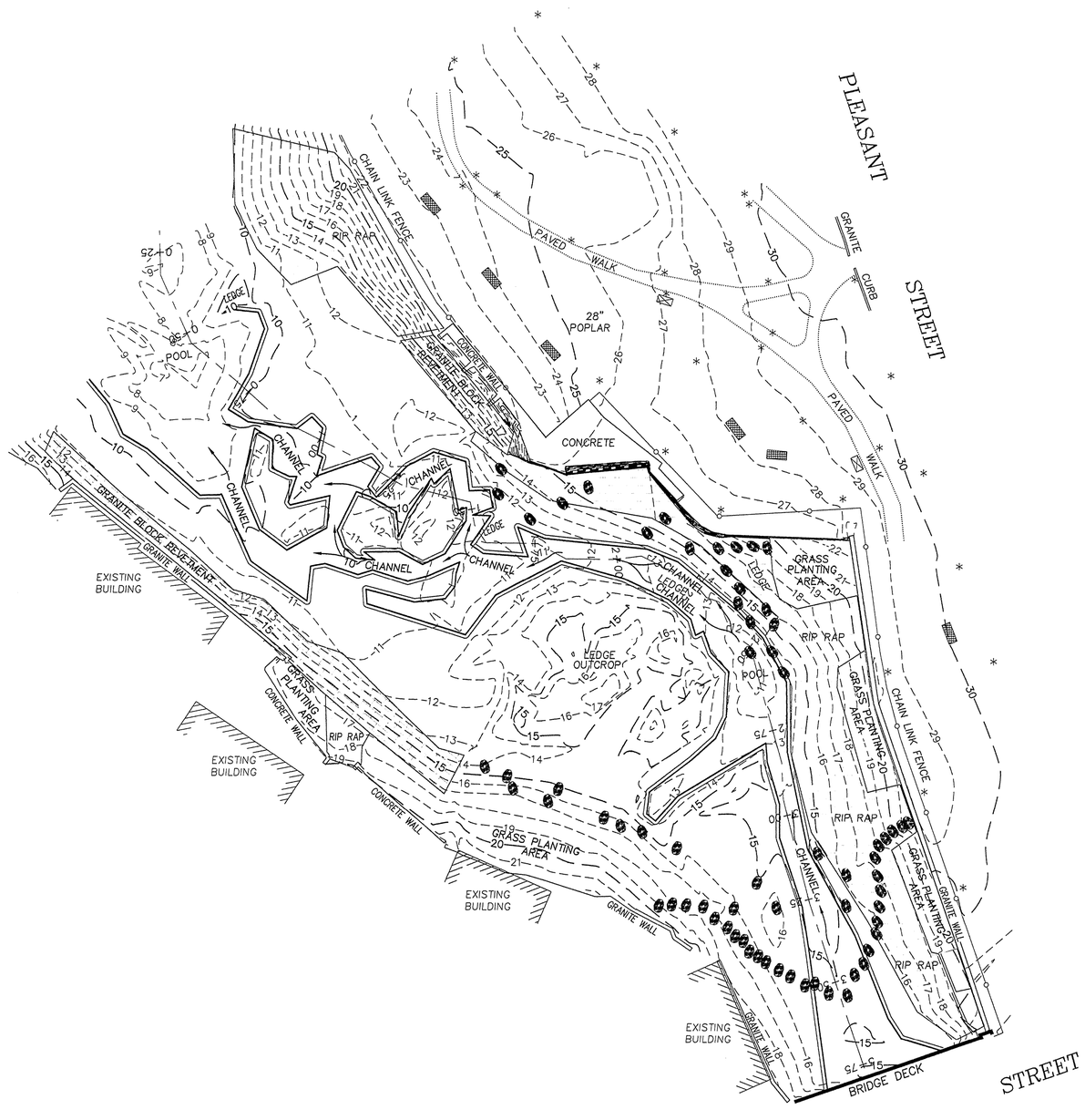
DEPARTMENT OF TRANSPORTATION ◦ BUREAU OF HIGHWAY DESIGN

SIDEWALK CURB RAMPS WITH DETECTABLE WARNINGS

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
		34	34



LOCUS MAP
NOT TO SCALE



NOTES:

1) THE ELEVATIONS SHOWN HEREON ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.

NEW HAMPSHIRE GEODETIC GRID

LEGEND

- PARK BENCH
- IRRIGATION CONTROL BOX
- SPRINKLER HEAD
- BOULDER
- CHAIN LINK FENCE

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20'

I CERTIFY:

THAT THIS ACTUAL SURVEY WAS MADE ON THE GROUND ON SEPTEMBER 28, 2016.

THAT THIS SURVEY CONFORMS TO THE REQUIREMENTS FOR ACCURACY FOR N.H. URBAN SURVEY.

STATE OF NEW HAMPSHIRE LAND SURVEYOR 970 HENRY H. BOYD, JR. ACTIVE

LICENSED LAND SURVEYOR — DATE 10-11-2016

AS BUILT PLAN

IN

EXETER, N.H.

SHOWING

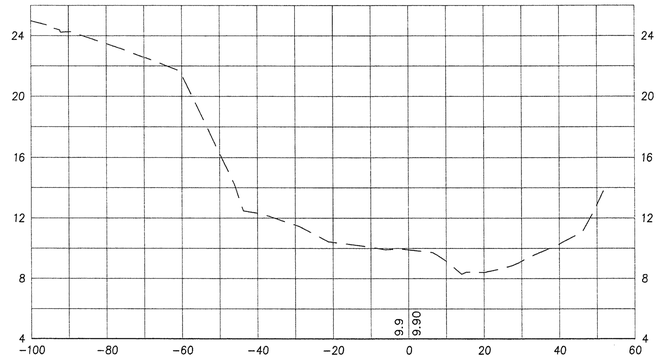
EXISTING CONDITIONS
OFF OF PLEASANT STREET & HIGH STREET

PREPARED FOR

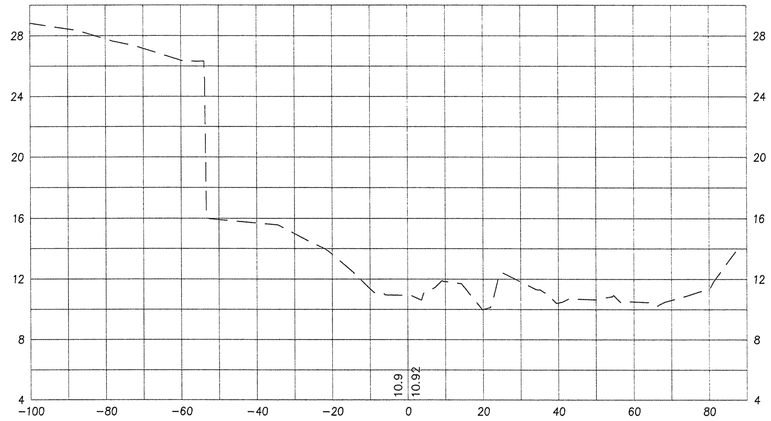
SUMCO ECO CONTRACTING
16 FRONT STREET, SUITE 209, SALEM, MA 01970

MILLENNIUM ENGINEERING INC.
ENGINEERS AND LAND SURVEYORS
P.O. BOX 745 13 HAMPTON ROAD EXETER, NH 03833
PHONE:(603)778-0528 FAX:(603)772-0689 WWW.MEI-NH.COM

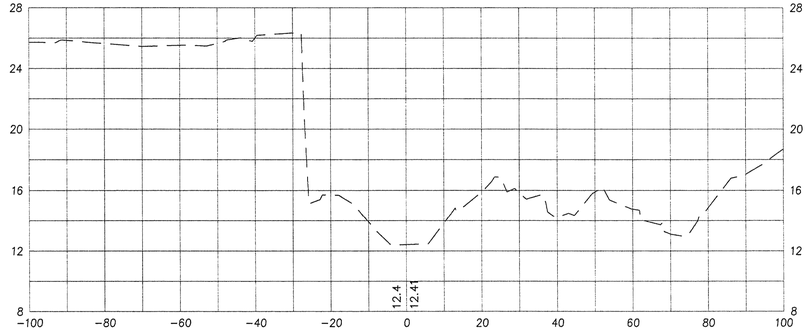
SCALE: 1"=20'	DRWN. BY: P.D.B.	PROJECT: E161877
DATE: OCT. 05, 2016	CHKD. BY: H.H.B.	SHEET: 1 OF 3



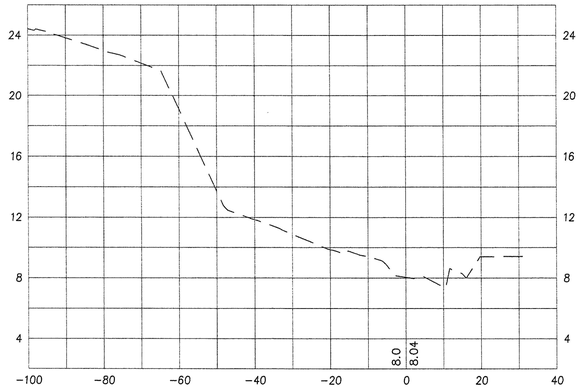
0+75



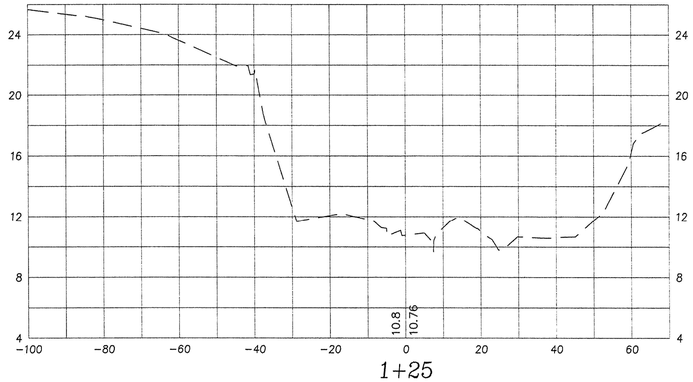
1+50



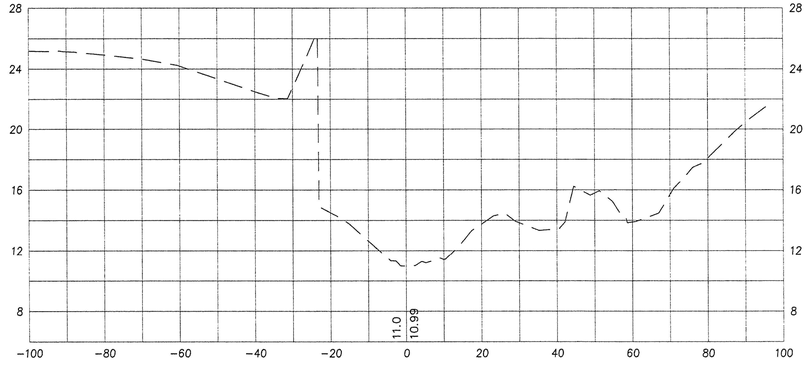
2+00



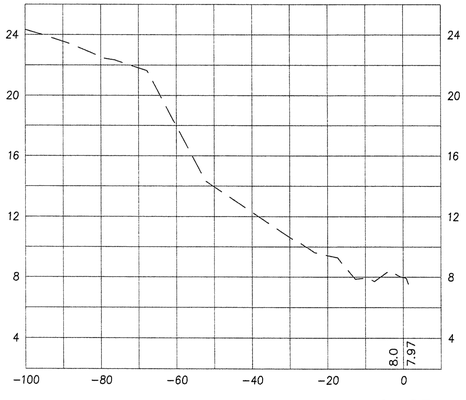
0+50



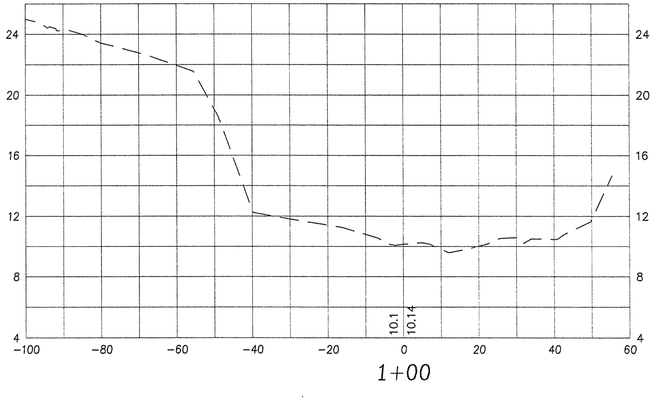
1+25



1+75



0+25



1+00

GRAPHIC SCALE

20 0 10 20 40 80
5 0 2.5 5 10 20

(IN FEET)
Horiz.: 1 inch = 20'
Vert.: 1 inch = 5'

I CERTIFY:

THAT THIS ACTUAL SURVEY WAS MADE ON THE GROUND ON SEPTEMBER 28, 2016.

THAT THIS SURVEY CONFORMS TO THE REQUIREMENTS FOR ACCURACY FOR N.H. URBAN SURVEY.

STATE OF NEW HAMPSHIRE — No. 904 HENRY H. BOYD, JR. — LICENSED LAND SURVEYOR

10-14-2016

LICENSED LAND SURVEYOR — DATE

AS BUILT PLAN

IN

EXETER, N.H.

SHOWING

EXISTING CONDITIONS

OFF OF PLEASANT STREET & HIGH STREET

PREPARED FOR

SUMCO ECO CONTRACTING

16 FRONT STREET, SUITE 209, SALEM, MA 01970

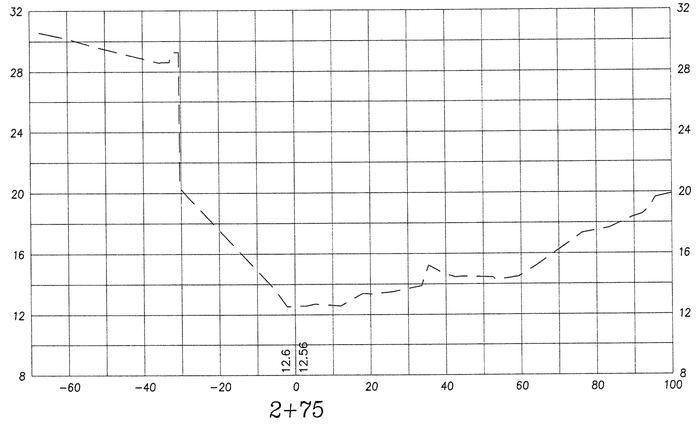
MILLENNIUM ENGINEERING INC.

ENGINEERS AND LAND SURVEYORS

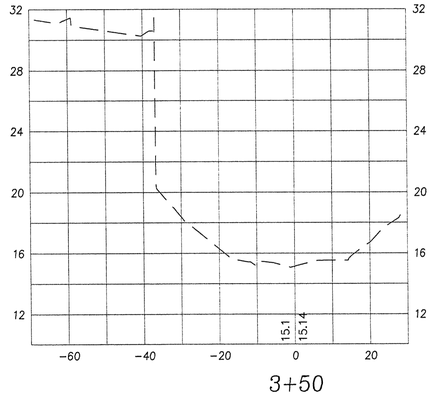
P.O. BOX 745 13 HAMPTON ROAD EXETER, NH 03833

PHONE:(603)778-0528 FAX:(603)772-0689 WWW.MEI-NH.COM

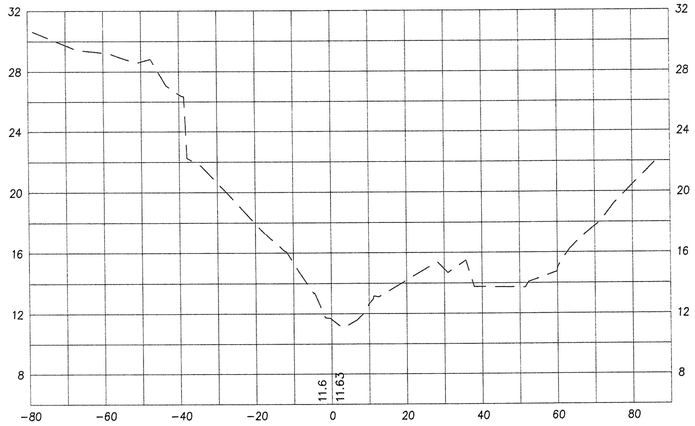
SCALE: AS NOTED	DRWN. BY: P.D.B.	PROJECT: E161877
DATE: OCT. 05, 2016	CHKD. BY: H.H.B.	SHEET: 2 OF 3



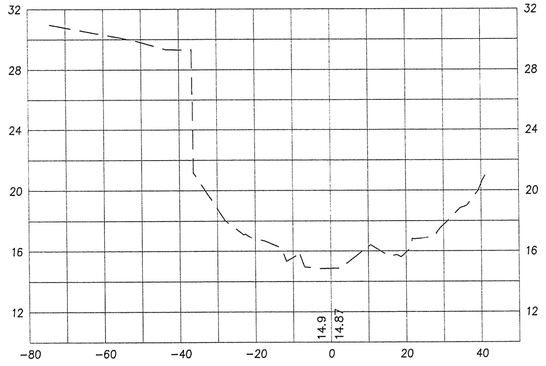
2+75



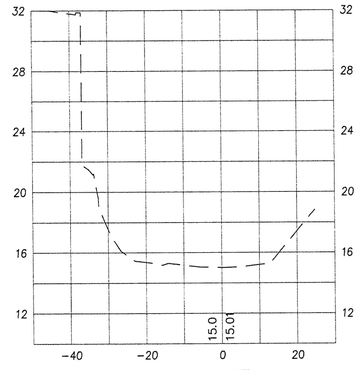
3+50



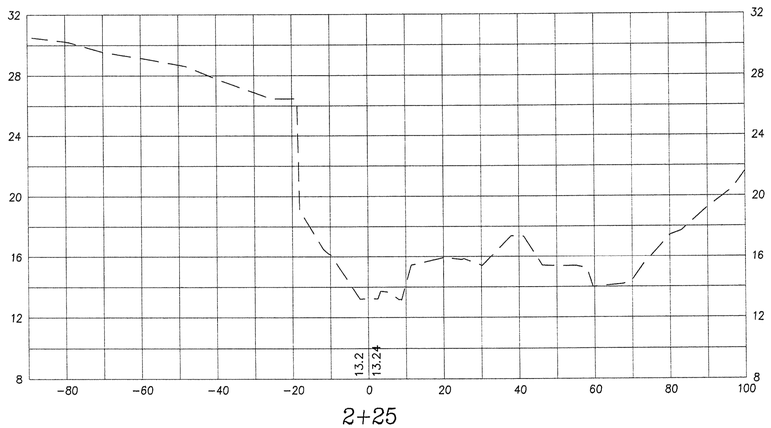
2+50



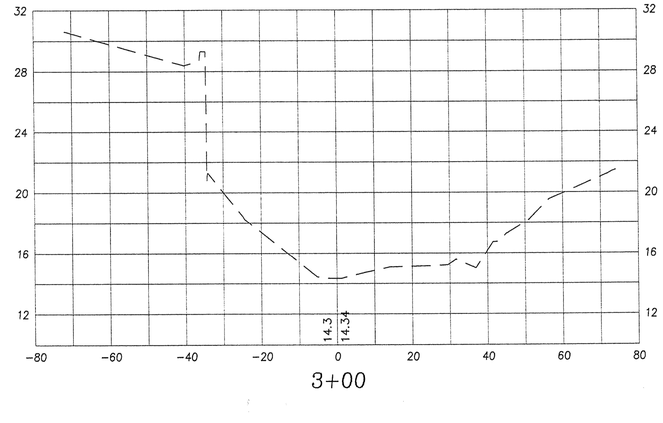
3+25



3+75



2+25



3+00

GRAPHIC SCALE

20 0 10 20 40 80
5 0 2.5 5 10 20

(IN FEET)
Horiz.: 1 inch = 20'
Vert.: 1 inch = 5'

I CERTIFY:

THAT THIS ACTUAL SURVEY WAS MADE ON THE GROUND ON SEPTEMBER 28, 2016.

THAT THIS SURVEY CONFORMS TO THE REQUIREMENTS FOR ACCURACY FOR N.H. URBAN SURVEY.

STATE OF NEW HAMPSHIRE — NO. 994 HENRY H. BOYD, JR. — LICENSED LAND SURVEYOR

SIGNATURE 10-14-2016

LICENSED LAND SURVEYOR DATE

AS BUILT PLAN

IN

EXETER, N.H.

SHOWING

EXISTING CONDITIONS

OFF OF PLEASANT STREET & HIGH STREET

PREPARED FOR

SUMCO ECO CONTRACTING

16 FRONT STREET, SUITE 209, SALEM, MA 01970

MILLENNIUM ENGINEERING INC.

ENGINEERS AND LAND SURVEYORS

P.O. BOX 745 13 HAMPTON ROAD EXETER, NH 03833

PHONE:(603)778-0528 FAX:(603)772-0689 WWW.MEI-NH.COM

SCALE: AS NOTED	DRWN. BY: P.D.B.	PROJECT: E161877
DATE: OCT. 05, 2016	CHKD. BY: H.H.B.	SHEET: 3 OF 3

Town of Exeter, New Hampshire

Linden Street

Little River Bridge Replacement

Record Drawings

Issued January 2016

Exeter Board of Selectmen

Julie Gilman, Chair
Dan Chartrand
Donald Clement, Vice Chair
Nancy Belanger, Clerk
Anne Surman

Exeter Town Manager

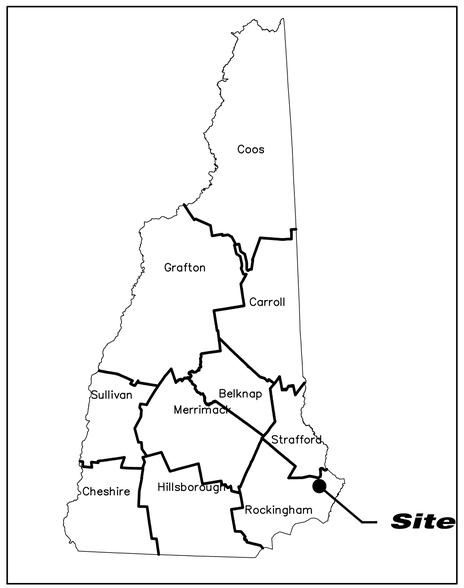
Russell Dean

Exeter Department of Public Works

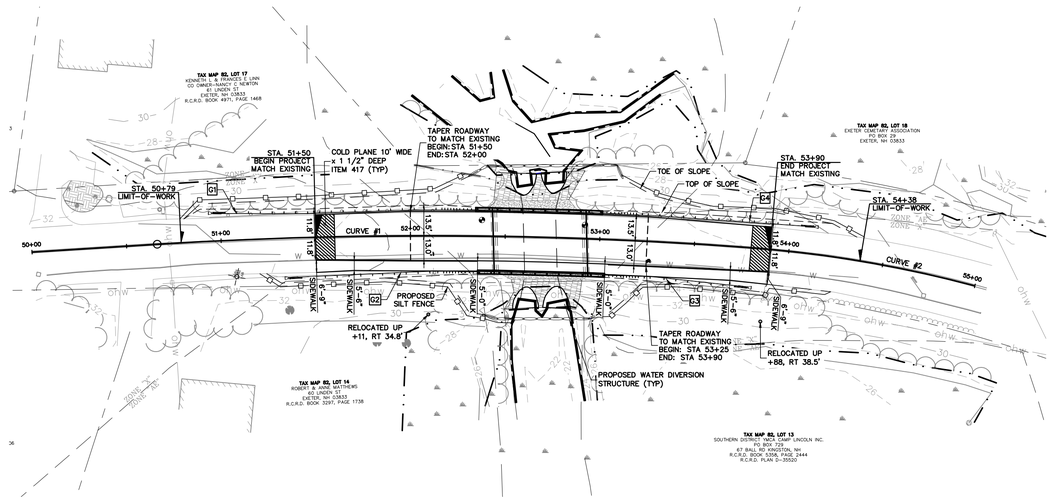
Jennifer Perry, PE, Director
Jay Perkins, Hwy. Supt.

Exeter Engineering

Paul Vlasich, PE, Town Engineer
Jennifer Mates, PE, Asst. Town Engineer



Locus Plan



SITE OVERVIEW
SCALE: 1" = 40'

Index of Sheets	
Sheet Number	*Sheet Title*
1	Cover
2	General Plan and Elevation
3	Site Plan and Profile
4	Bridge Notes
5	Survey Layout
6	Boring Logs (1 of 2)
7	Boring Logs (2 of 2)
8	Abutment A Plan and Elevation
9	Abutment B Plan and Elevation
10	Abutment and Wingwall Elevations and Details
11	Prestressed Box Beam Layout
12	Box Beam Details (1 of 3)
13	Box Beam Details (2 of 3)
14	Box Beam Details (3 of 3)
15	Typical Section
16	Superstructure Details
17	Approach Slab Details (1 of 2)
18	Approach Slab Details (2 of 2)
19	Bearing and Joint Details
20	T101 Bridge Rail & Approach Rail (Steel Posts)
21	Alternative Platform for Offset EAGRT
22	Snow Screen with T101 Bridge Rail
23	General Notes and Summary of Quantities
24	Roadway Plan and Profile
25	Cross Sections (1 of 2)
26	Cross Sections (2 of 2)
27	Road and Utility Details
28	Thurst Block Details
29	Linden Street Traffic Control Plan

Prepared For:

Town of Exeter
Deptartment of Public Works
13 Newfields Road
Exeter, New Hampshire 03833

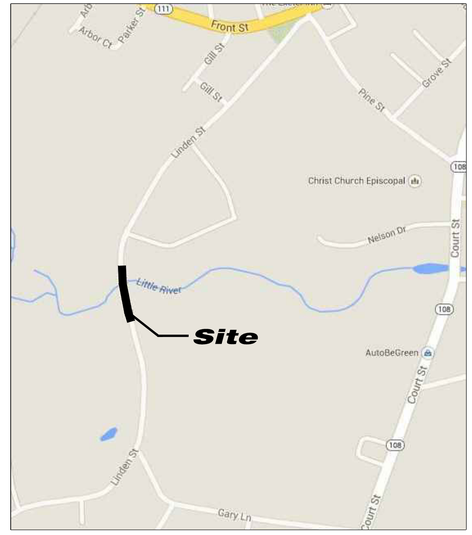
Prepared By:

CMA
ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS

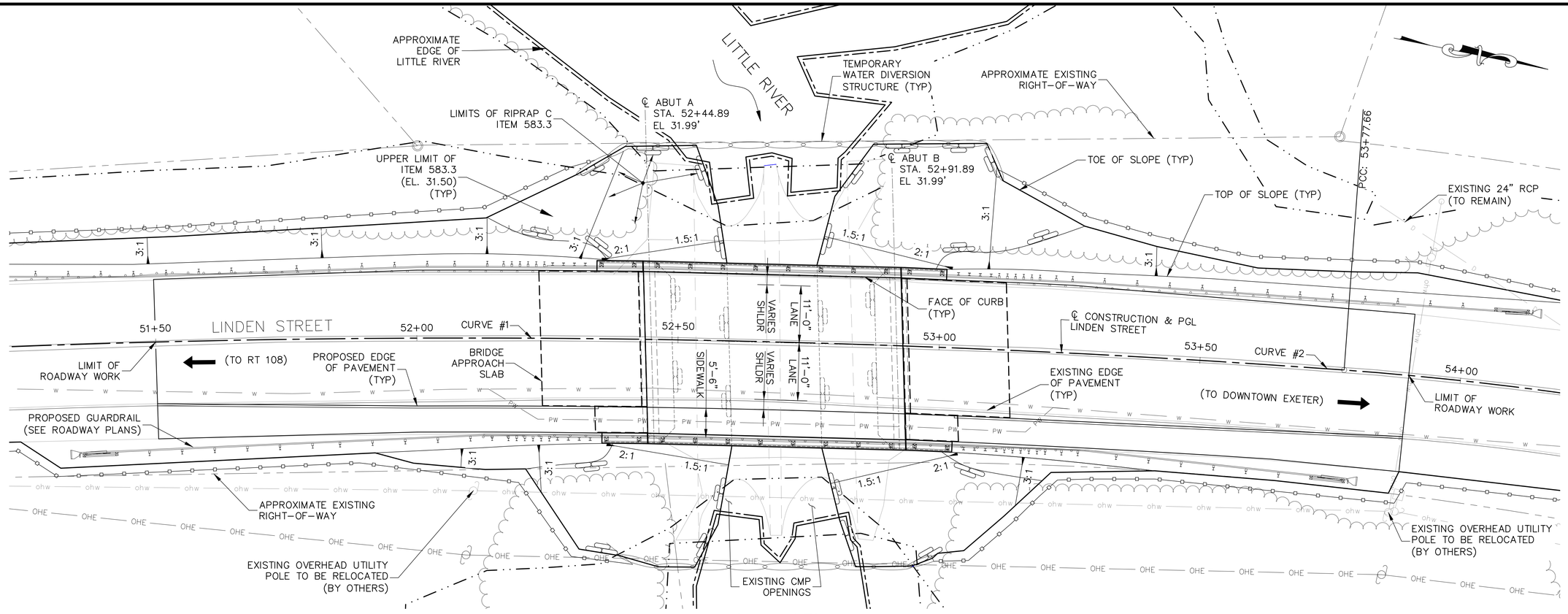
35 Bow Street
Portsmouth, New Hampshire 03801
Phone: 603/431-6196
Fax: 603/431-5376

Langer Place
55 South Commercial Street
Manchester, New Hampshire 03101
Phone: 603/627-0708
Fax: 603/627-0746

10 Free Street
Portland, Maine 04101
Phone: 207/541-4223
Fax: 207/541-4225



Project Location



General Plan

Scale: 1"=10'-0"

HYDRAULIC DATA

DRAINAGE AREA:	
DESIGN FLOOD:	957 CFS (50 YEAR)
DESIGN VELOCITY:	3.9 FT/SEC
DESIGN FLOOD ELEVATION:	30.12 FT (50 YEAR)
100 YEAR FLOOD ELEVATION:	31.40 FT

LEGEND

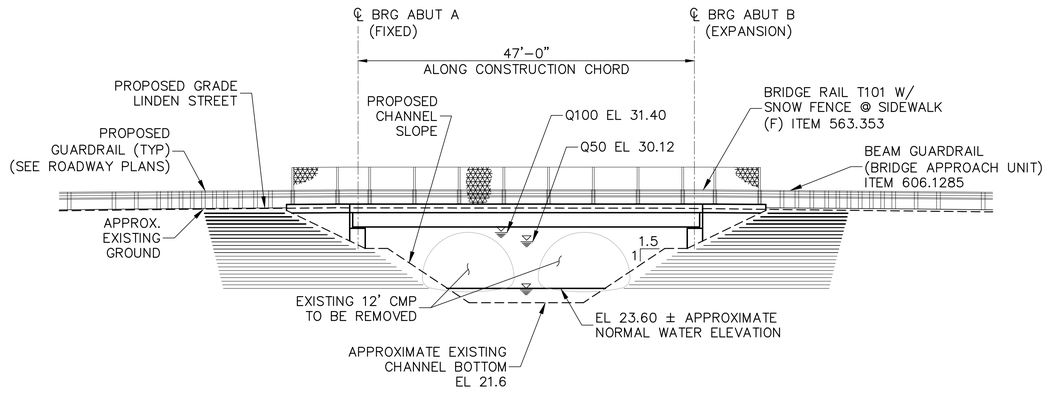
- EDGE OF RIVER
- TREE LINE
- SILT FENCE
- PROPERTY LINE/ROW
- WATER DIVERSION STRUCTURE
- STONE FILL
- EXISTING OVERHEAD ELECTRIC
- PROPOSED OVERHEAD ELECTRIC
- EXISTING WATER MAIN
- PROPOSED WATER MAIN

CURVE #1 LINDEN STREET

PI STA = 52+22.18
N = 172812.7558
E = 1173490.2571
Δ = 07°45'30"
T = 155.96'
R = 2300.00'
L = 311.44'
E = 5.28'

CURVE #2 LINDEN STREET

PI STA = 54+38.80
N = 173028.0313
E = 1173460.7123
Δ = 10°46'52"
T = 61.34'
R = 650.00'
L = 122.31'
E = 2.89'



Elevation

Scale: 1"=10'-0"

INDEX OF BRIDGE SHEETS

BRIDGE SHEET NO.	SHEET TITLE
B-1	GENERAL PLAN AND ELEVATION
B-2	SITE PLAN AND PROFILE
B-3	BRIDGE NOTES
B-4	SURVEY LAYOUT AND CHANNEL SECTIONS
B-5	BORING LOGS (SHEET 1 OF 2)
B-6	BORING LOGS (SHEET 2 OF 2)
B-7	ABUTMENT A PLAN AND ELEVATION
B-8	ABUTMENT B PLAN AND ELEVATION
B-9	ABUTMENT AND WINGWALL ELEVATIONS AND DETAILS
B-10	PRESTRESSED BOX BEAM LAYOUT
B-11	BOX BEAM DETAILS (SHEET 1 OF 3)
B-12	BOX BEAM DETAILS (SHEET 2 OF 3)
B-13	BOX BEAM DETAILS (SHEET 3 OF 3)
B-14	TYPICAL SECTION AND RAIL LAYOUT
B-15	SUPERSTRUCTURE DETAILS
B-16	APPROACH SLAB DETAILS (SHEET 1 OF 2)
B-17	APPROACH SLAB DETAILS (SHEET 2 OF 2)
B-18	BEARING AND JOINT DETAILS
B-19	T101 BRIDGE AND APPROACH RAIL
B-20	ALTERNATIVE PLATFORM FOR OFFSET EAGRT
B-21	SNOW SCREEN WITH T101 BRIDGE RAIL

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com
www.cmaengineers.com

NEW HAMPSHIRE - U.S.A. JASON L. GALLANT No. 10565 LICENSED PROFESSIONAL ENGINEER

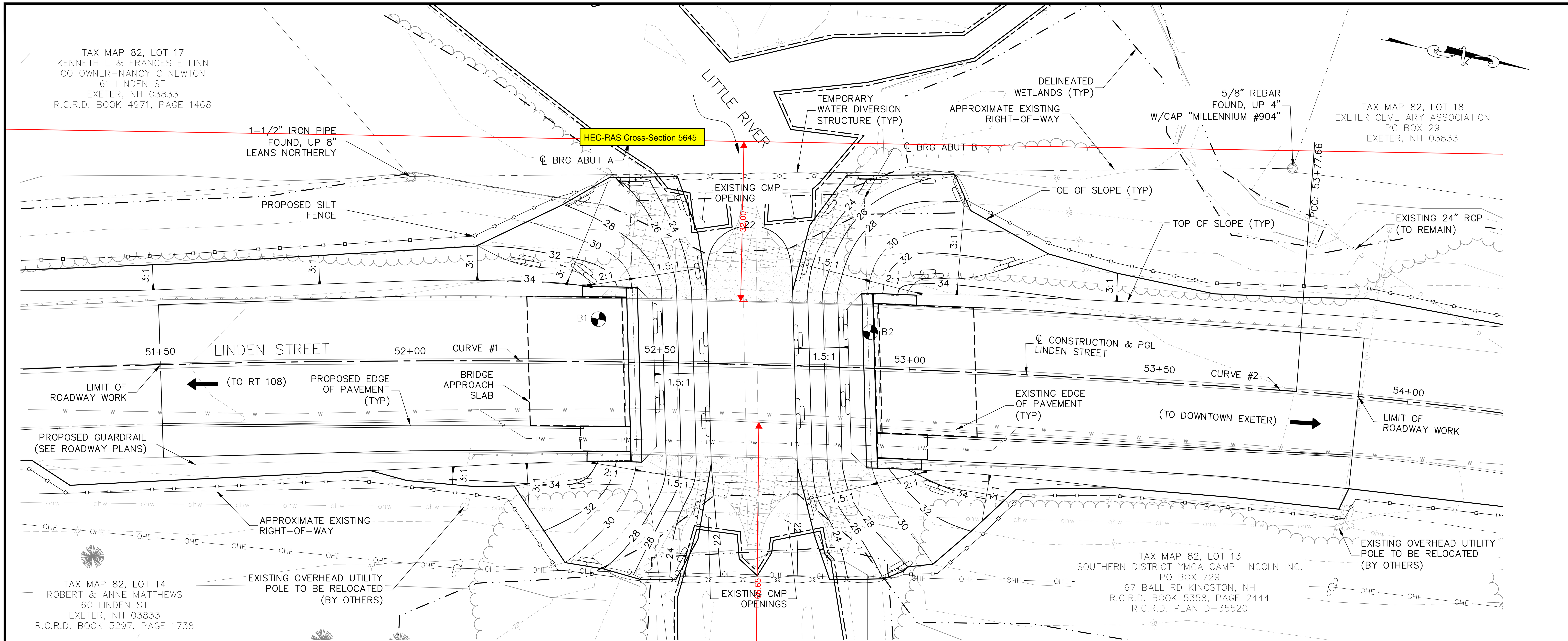
designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
date: July 2015
project no: 923
file name: 923 - Structural Plans.dwg
scale: As Shown

Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
General Plan and Elevation

drawing no. B-1

sheet: 2 of 29

F:\CADD\PROJECTS\923-Exeter Bridges\Production\Linden St\As-Builts\923 - Structural Plans.dwg Date Plotted: Jan 06, 2016 - 1:56pm Plotted By: LKALLOCH



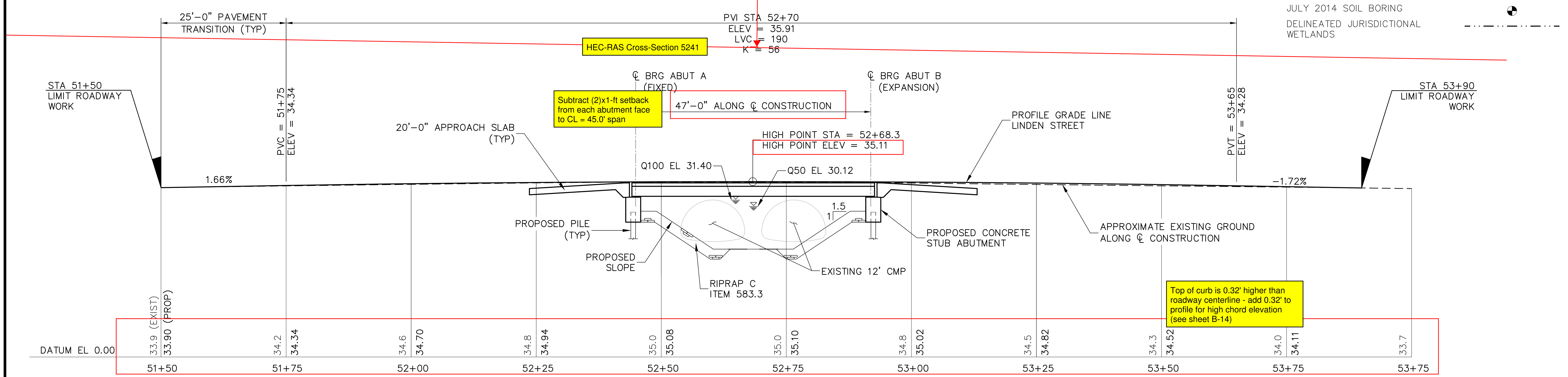
TAX MAP 82, LOT 17
KENNETH L & FRANCES E LINN
CO OWNER–NANCY C NEWTON
61 LINDEN ST
EXETER, NH 03833
R.C.R.D. BOOK 4971, PAGE 1468
1–1/2" IRON PIPE FOUND, UP 8" LEANS NORTHERLY
HEC-RAS Cross-Section 5645
℄ BRG ABUT A
LITTLE RIVER
TEMPORARY WATER DIVERSION STRUCTURE (TYP)
APPROXIMATE EXISTING RIGHT–OF–WAY
DELINEATED WETLANDS (TYP)
5/8" REBAR FOUND, UP 4" W/CAP "MILLENNIUM #904"
TAX MAP 82, LOT 18
EXETER CEMETARY ASSOCIATION
PO BOX 29
EXETER, NH 03833
℄ BRG ABUT B
PCC: 53+77.86
PROPOSED SILT FENCE
EXISTING CMP OPENING
TOE OF SLOPE (TYP)
TOP OF SLOPE (TYP)
EXISTING 24" RCP (TO REMAIN)
B1
B2
51+50
LINDEN STREET
52+00
CURVE #1
52+50
53+00
℄ CONSTRUCTION & PGL LINDEN STREET
53+50
CURVE #2
54+00
LIMIT OF ROADWAY WORK
(TO RT 108)
PROPOSED EDGE OF PAVEMENT (TYP)
BRIDGE APPROACH SLAB
EXISTING EDGE OF PAVEMENT (TYP)
(TO DOWNTOWN EXETER)
LIMIT OF ROADWAY WORK
PROPOSED GUARDRAIL (SEE ROADWAY PLANS)
APPROXIMATE EXISTING RIGHT–OF–WAY
EXISTING OVERHEAD UTILITY POLE TO BE RELOCATED (BY OTHERS)
EXISTING CMP OPENINGS
TAX MAP 82, LOT 13
SOUTHERN DISTRICT YMCA CAMP LINCOLN INC.
PO BOX 729
67 BALL RD KINGSTON, NH
R.C.R.D. BOOK 5358, PAGE 2444
R.C.R.D. PLAN D–35520
EXISTING OVERHEAD UTILITY POLE TO BE RELOCATED (BY OTHERS)
TAX MAP 82, LOT 14
ROBERT & ANNE MATTHEWS
60 LINDEN ST
EXETER, NH 03833
R.C.R.D. BOOK 3297, PAGE 1738

Site Plan

Scale: 1"=10'–0"

LEGEND

PROPOSED CONTOUR	28
EXISTING CONTOUR	28
JULY 2014 SOIL BORING	
DELINEATED JURISDICTIONAL WETLANDS	



25'–0" PAVEMENT TRANSITION (TYP)
PVI STA 52+70
ELEV = 35.91
LVC = 190
K = 56
HEC-RAS Cross-Section 5241
STA 51+50 LIMIT ROADWAY WORK
PVC = 51+75
ELEV = 34.34
℄ BRG ABUT A (FIXED)
℄ BRG ABUT B (EXPANSION)
Subtract (2)x1-ft setback from each abutment face to CL = 45.0' span
47'–0" ALONG ℄ CONSTRUCTION
20'–0" APPROACH SLAB (TYP)
HIGH POINT STA = 52+68.3
HIGH POINT ELEV = 35.11
PROFILE GRADE LINE LINDEN STREET
PVT = 53+65
ELEV = 34.28
STA 53+90 LIMIT ROADWAY WORK
1.66%
Q100 EL 31.40
Q50 EL 30.12
–1.72%
PROPOSED PILE (TYP)
PROPOSED SLOPE
RIPRAP C ITEM 583.3
EXISTING 12' CMP
PROPOSED CONCRETE STUB ABUTMENT
APPROXIMATE EXISTING GROUND ALONG ℄ CONSTRUCTION
Top of curb is 0.32' higher than roadway centerline - add 0.32' to profile for high chord elevation (see sheet B-14)
DATUM EL 0.00
33.9 (EXIST)
33.90 (PROP)
34.2
34.34
34.6
34.70
34.8
34.94
35.0
35.08
35.0
35.10
34.8
35.02
34.5
34.82
34.3
34.52
34.0
34.11
33.7
51+50
51+75
52+00
52+25
52+50
52+75
53+00
53+25
53+50
53+75
53+75

Profile

Scale: 1"=10'–0"

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com
www.cmaengineers.com

STATE OF NEW HAMPSHIRE – JASON L GALLANT No. 10651 – LICENSED PROFESSIONAL ENGINEER

designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
date: July 2015
project no: 923
file name: 923 - Structural Plans.dwg
scale: As Shown

Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Site Plan and Profile

drawing no. B-2

sheet: 3 of 29

F:\CADD\PROJECTS\923–Exeter Bridges\Production\Linden St\As–Builts\923 – Structural Plans.dwg Date Plotted: Jan 06, 2016 – 1:57pm Plotted By: LKALLOCH

Structure Notes:

1) DESIGN LOADING: HL-93

2) DESIGN METHOD: LOAD AND RESISTANCE FACTOR DESIGN METHOD (LRFD).

3) SPECIFICATIONS: AASHTO LRFD 2015. NHDOT 2006 STANDARD SPECIFICATIONS AS AMENDED.

4) FOUNDATION DATA: STUB ABUTMENTS SUPPORTED ON END BEARING PILES HP12x53 WITH APPROVED PILE POINTS (AASHTO M270, ASTM A709 GRADE 50). NOMINAL AXIAL RESISTANCE OF 388 TONS IN COMBINATION WITH A RESISTANCE FACTOR OF 0.5.

5) REINFORCING STEEL: AASHTO M31 (ASTM A615) GRADE 60. REINFORCING STEEL IN THE DECK OVERLAY, BOX BEAMS, APPROACH SLABS, AND BRUSH CURBS SHALL BE EPOXY COATED.

6) CONCRETE: BRIDGE DECK OVERLAY, CURBS, WINGWALL COPINGS AND APPROACH SLABS = 4 KSI. STUB ABUTMENT AND WINGWALL = 4 KSI. PRESTRESSED BUTTED BOX BEAMS = 6 KSI, RELEASE = 4.8 KSI

7) POST-TENSIONING STEEL: 0.6" ø SEVEN-WIRE STRAND CONFORMING TO AASHTO M203 (ASTM A416) GRADE 270, LOW RELAXATION.

8) PRESTRESSING STEEL: 0.5" ø SEVEN-WIRE STRAND CONFORMING TO AASHTO M203 (ASTM A416) GRADE 270, LOW RELAXATION.

9) SEISMIC PERFORMANCE ZONE 2: A = 0.17

10) ALL EXISTING BRONZE DISCS REPRESENTING STATE BENCHMARKS OR SURVEY TRIANGULATION POINTS MUST NOT BE DISTURBED. WHEN THE WORK CALLED FOR INVOLVES DISTURBING A BRONZE DISK, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SUFFICIENTLY IN ADVANCE OF THE WORK TO PERMIT THE TOWN, STATE OR AGENCY HAVING JURISDICTION TO TEMPORARILY RELOCATE THE AFFECTED MARKER.

11) MAINTENANCE OF TRAFFIC:: ROAD CLOSURE AND DETOUR; SEE TRAFFIC CONTROL PLAN.

12) FOR STRUCTURE LAYOUT SEE BRIDGE SHEET 4.

Bridge Removal Notes:

1) PLANS OF THE EXISTING BRIDGE ARE NOT AVAILABLE.

2) ITEM 502, REMOVAL OF EXISTING BRIDGE STRUCTURE, SHALL INCLUDE REMOVAL OF THE ENTIRE CORRUGATED METAL PIPE, FOOTINGS, AND EXISTING STONE MASONRY HEADWALLS AS DESCRIBED WITHIN THESE PLANS. SEE SPECIAL CONDITIONS FOR MATERIALS TO BE SALVAGED TO THE TOWN. ALL OTHER EXISTING BRIDGE MATERIALS SHALL BECOME PROPERTY OF THE CONTRACTOR.

3) EXCAVATION AND BACKFILL NOT INCLUDED IN OTHER PAY ITEMS, BUT REQUIRED FOR REMOVAL OF THE EXISTING STRUCTURE SHALL BE SUBSIDIARY TO ITEM 502.

Water Diversion Structure Notes:

1) ITEM 503.101, WATER DIVERSION STRUCTURES, MAY BE REQUIRED FOR REMOVAL OF THE EXISTING STRUCTURE AND THE CONSTRUCTION OF THE ABUTMENTS DURING HIGH FLOW CONDITIONS. THE CONTRACTOR SHALL SUBMIT THE DIVERSION STRUCTURE TYPE, DESIGN, AND PROPOSED METHOD OF CONSTRUCTION TO THE ENGINEER IN ACCORDANCE WITH SECTION 105.02 OF THE NHDOT STANDARD SPECIFICATIONS. WATER DIVERSION STRUCTURE SUBMITTALS SHALL BE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW HAMPSHIRE.

2) WATER DIVERSION STRUCTURE LIMITS SHOWN ON THE PLANS ARE APPROXIMATE. THE CONTRACTOR SHALL DETERMINE THE REQUIRED LIMITS, IN ACCORDANCE WITH THE ENVIRONMENTAL PERMIT, TO MAINTAIN A DEWATERED AND ADEQUATELY SUPPORTED EXCAVATION DURING THE CONSTRUCTION.

3) ALL COSTS FOR DESIGN, INSTALLATION AND REMOVAL OF WATER DIVERSION STRUCTURES SHALL BE INCLUDED IN ITEM 503.101.

Utility Notes:

1) ITEMS 611.05212 AND 611.052121 SHALL INCLUDE ALL NECESSARY MATERIALS, INCLUDING PIPE, INSULATION, STRAPS, PROTECTIVE JACKETING, EXPANSION JOINTS, SADDLES, ROLLER SUPPORTS, ASSOCIATED HARDWARE AND LABOR TO INSTALL THE UTILITY. FOR LIMITS, SEE BRIDGE SHEET B-1.

2) ALL THREADED RODS, NUTS, WASHERS, STRAPS, AND PIPE ROLL SUPPORTS SHALL BE GALVANIZED.

Boring Notes:

1) BORINGS INDICATED THUS ⊕ WERE MADE BY GREAT WORKS PUMP & TEST BORING , INC. IN JULY 2014. BLOW COUNTS SHOWN ARE THE NUMBER OF BLOWS REQUIRED TO DRIVE A 2" O.D. STANDARD SPLIT SPOON SAMPLER 6", USING A 140LB WEIGHT FALLING 30".

2) BORINGS ARE FOR DESIGN PURPOSES ONLY, SHOWING CONDITIONS AT THE BORING POINTS ONLY, AND DO NOT NECESSARILY INDICATE MATERIAL TO BE ENCOUNTERED DURING CONSTRUCTION.

3) GROUNDWATER LEVELS NOTED, IF ANY, WERE MEASURED AT THE TIME OF EXPLORATION. THE WATER LEVELS ENCOUNTERED DURING CONSTRUCTION MAY VARY CONSIDERABLY DUE TO PREVAILING CLIMATE, RAINFALL, OR OTHER FACTORS.

Pile Notes:

1) MAXIMUM FACTORED PILE LOAD: 143.0 KIPS PER PILE

2) STEEL H-PILES SHALL CONFORM TO AASHTO M270 (ASTM A709), GRADE 50. ALL PILES SHALL BE HP12x53. PILE POINTS ARE REQUIRED, REFER TO THE QUALIFIED PRODUCTS LIST FOR STANDARD MANUFACTURED PILE POINTS.

3) THE PILES SHALL BE DRIVEN IN ACCORDANCE WITH SECTION 510 TO A NOMINAL GEOTECHNICAL RESISTANCE EQUAL TO THE MAXIMUM FACTORED LOAD DIVIDED BY A RESISTANCE FACTOR OF 0.65. ITEM 510.2, PILE LOADING TESTS, SHALL BE USED TO CONDUCT PILE DYNAMIC ANALYZER (PDA) TESTS IN ACCORDANCE WITH SECTION 510 TO VERIFY THE NOMINAL GEOTECHNICAL RESISTANCE AND THE ACCEPTABILITY OF THE CONTRACTOR'S DRIVING SYSTEM. SEE SPECIAL PROVISION FOR ADDITIONAL INFORMATION.

4) ONE SPLICE PER PILE WHEN THE ESTIMATED LENGTH IS OVER 60 FEET AND SPLICES REQUIRED FOR PILES THAT EXCEED THE ESTIMATED LENGTH WILL BE PAID. NO PAYMENT FOR ADDITIONAL PILE SPLICES WITHIN THE ESTIMATED LENGTH WILL BE PAID UNLESS ORDERED. APPROVED ADDITIONAL PILE SPLICES WILL BE PAID UNDER ITEM 510.9.

   ESTIMATED PILE LENGTHS: ABUTMENT A: 26.0 FEET
   ABUTMENT B: 26.0 FEET

5) PILE LOCATION AND ALIGNMENT TOLERANCES AT ABUTMENTS SHALL CONFORM TO SECTION 510.3.6.4 REQUIREMENTS FOR BENT CAPS SUPPORTED BY PILES.

6) PILE LAYOUT DIMENSIONS ARE GIVE AT THE BOTTOM OF THE STUB ABUTMENT.

7) PLACE REINFORCING STEEL TO CLEAR PILES.

8) PILES SHALL BE DRIVEN TO REFUSAL (BEDROCK).

Precast Box Beam Notes:

1) THE CONCRETE COMPRESSIVE STRENGTH OF THE PRECAST BOX BEAM UNITS SHALL BE 4800 PSI AT RELEASE AND 6000 PSI AT 28 DAYS.

2) PRESTRESSING STEEL SHALL BE 0.5" ø UNCOATED SEVEN-WIRE STRAND CONFORMING TO AASHTO M203 (ASTM A416) GRADE 270 LOW RELAXATION. ALL STRANDS SHALL BE PRE-TENSIONED TO 43.9 KIPS PER STRAND (75% INITIAL PULL).

3) POST-TENSIONING STRANDS SHALL BE COMPLETELY COATED WITH A CORROSION PREVENTATIVE COATING SUCH AS FLO-GUARD, AS MANUFACTURED BY INSTEEL INDUSTRIES, INC., SANDERSON, FL., OR POLYSTRAND, AS MANUFACTURED BY LANG TENDONS, INC., TOUGHKENAMON, PA., OR AN APPROVED EQUAL. IF THE FLO-GUARD COATING SYSTEM IS SUPPLIED, GROUT SHALL BE EXCLUDED FROM THE LATERAL POST-TENSIONING DUCTS DURING GROUTING OF THE SHEAR KEYS BETWEEN THE BEAMS. THE CONTRACTOR'S PROPOSED METHOD FOR EXCLUDING THE GROUT FROM THE POST-TENSIONING DUCTS SHALL BE SUBMITTED WITH THE SHOW DRAWINGS. POST-TENSIONING ANCHORAGE SYSTEM SHALL BE MONO-STRAND CORROSION PROTECTION SYSTEM AS MANUFACTURED BY HAYES INDUSTRIES, INC., HOUSTON TEXAS OR APPROVED EQUAL.

4) TRANSVERSE POST-TENSIONING OF THE PRECAST BOX BEAMS SHALL BE PERFORMED IN ACCORDANCE WITH SPECIAL PROVISION 528.3224.

5) ALL REINFORCING STEEL FOR THE SUPERSTRUCTURE SHALL CONFORM TO AASHTO M31 (ASTM A615) GRADE 60 AND SHALL BE EPOXY COATED.

6) THE PRECAST BOX BEAM REINFORCING STEEL SHALL HAVE A MINIMUM CLEAR COVER OF $1\frac{1}{4}$" UNLESS OTHERWISE NOTED.

7) THE COST OF PRESTRESSING STRANDS, POST-TENSIONING STRANDS AND ANCHORAGES, AND REINFORCING STEEL CAST INTO THE PRECAST BOX BEAM UNITS SHALL BE SUBSIDIARY TO ITEM 528.3224. ALL OTHER STEEL IN THE SUPERSTRUCTURE SHALL BE PAID UNDER ITEM 544.31.

8) LIFTING DEVICES SHALL BE WITHIN 24" OF EACH END OF THE PRECAST BOX BEAM UNITS. COST SHALL BE SUBSIDIARY TO ITEM 528.3224.

9) 1" ø DRAINS SHALL BE PROVIDE AT THE THE LOW END OF ALL BOX BEAM VOIDS.

10) THE BOX BEAM SHEAR KEYS SHALL BE BLAST CLEANED PRIOR TO SHIPPING.

11) THE TOP SURFACE OF THE BOX BEAMS SHALL BE RAKED TRANSVERSELY TO A $\frac{1}{4}$" AMPLITUDE.

12) DRILLING INTO THE BOX BEAMS SHALL NOT BE ALLOWED.

13) DIFFERENTIAL CAMBER (AT ERECTION) BETWEEN ADJACENT MEMBERS SHALL BE LIMITED TO 1". VALUES FOR MIDSPAN CAMBER AT TRANSFER SHALL BE DETAILED ON THE SHOP DRAWINGS.

14) PROVIDE INSERTS TO SUPPORT THE CONTRACTOR'S OVERHANG BRACKETS IN THE TOP SLAB ON EXTERIOR UNITS AT THE SPACING REQUESTED BY THE GENERAL CONTRACTOR. INSERTS SHALL BE SHOWN ON THE SHOP DRAWINGS. ALL COSTS SHALL BE SUBSIDIARY TO ITEM 528.3224.

Bridge Deck Notes:

1) ALL CONCRETE IN THE CAST-IN-PLACE OVERLAY AND BRUSH CURBS SHALL BE ITEM 520.01, CONCRETE CLASS AA.

2) CONCRETE OVERLAY FINISHING SHALL MEET THE REQUIREMENTS OF 520.3.9.2 UNLESS OTHERWISE APPROVED IN WRITING BY THE ENGINEER.

3) THE CONTRACTOR SHALL NOT DRILL INTO THE PRECAST BOX BEAMS UNLESS APPROVED IN WRITING BY THE ENGINEER.

4) ALL REINFORCEMENT IN THE BRIDGE DECK OVERLAY AND BRUSH CURBS SHALL BE EPOXY COATED AND SHALL BE PAID AS ITEM 544.31, REINFORCING STEEL, EPOXY COATED (CONTRACTOR DETAILED).

5) ALL REINFORCING SHALL BE $2\frac{1}{2}$" FROM CONCRETE SURFACES, UNLESS OTHERWISE NOTED.

Approach Slab Notes:

1) ALL CONCRETE FOR THE APPROACH SLABS SHALL BE ITEM 520.0302, CONCRETE CLASS AA, APPROACH SLABS (F).

2) ALL REINFORCEMENT IN THE APPROACH SLABS SHALL BE EPOXY COATED AND SHALL BE PAID AS ITEM 544.31, REINFORCING STEEL, EPOXY COATED (CONTRACTOR DETAILED).

3) ALL REINFORCING SHALL BE $2\frac{1}{2}$" FROM CONCRETE SURFACES, UNLESS OTHERWISE NOTED.

4) FILL SPACE BETWEEN APPROACH SLAB AND WINGWALL OR ROADWAY CURB WITH ITEM 520.01. CONCRETE FILL SHALL BE A MINIMUM DEPTH OF 6 INCHES.

5) APPROACH SLABS SHALL BE PLACED AFTER THE CONCRETE DECK OVERPOUR HAS BEEN CONSTRUCTED.

6) APPROACH SLABS FOR BOTH ABUTMENTS SHALL BE CAST $2\frac{5}{8}$" BELOW FINISHED GRADE AT THE APPROACH SLAB SEATS.

Elastomeric Bearing Notes:

1) ELASTOMERIC BEARING PADS SHALL BE VIRGIN NATURAL RUBBER, HARDNESS (SHORE "A" DUROMETER) OF 60, GRADE 4.

2) STEEL PLATE REINFORCEMENT SHALL CONFORM TO AASHTO M270 (ASTM A709, GRADE 35).

3) ELASTOMERIC BEARINGS, INCLUDING STEEL PLATES, SHALL BE PAID AS ITEM 548.11, ELASTOMERIC BEARING PADS (F).

4) DESIGN SERVICE LOADS PER BEARING: (DESIGN METHOD A)
   MAX DEAD LOAD: 14.9 KIP
   MAX LIVE LOAD: 26.7 KIP

5) FOLLOWING THE MANUFACTURE OF THE ELASTOMERIC BEARINGS AND VERIFICATION OF THE INTERNAL STEEL LAMINATES, THE PIN GROOVE OPENING SHALL BE COATED WITH AN APPROVED ASPHALTIC SEALER AND THE SPACE FILLED WITH SILICONE CAULKING.

Abutment and Wingwall Notes

1) THE CONTRACTOR SHALL BE REQUIRED TO PLACE ALL CONCRETE IN THE DRY. DEWATERING, AS REQUIRED, SHALL BE CONTINUOUS UNTIL THE ABUTMENT AND WINGWALLS ARE BACKFILLED TO THE ELEVATION OF THE SURROUNDING WATER TABLE, UNLESS DIRECTED OTHERWISE.

2) ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED $\frac{3}{4}$" EXCEPT AS NOTED.

3) ALL CONCRETE IN THE STUB ABUTMENTS, WINGWALLS, AND WINGWALL COPING SHALL BE ITEM 520.01, CONCRETE CLASS AA.

4) ITEM 538.2, BARRIER MEMBRANE, VERTICAL SURFACES (F), SHALL BE PLACED OVER THE ABUTMENT-WINGWALL VERTICAL CONSTRUCTION JOINT, 1'-0" ON EACH SIDE OF THE JOINT.

5) ITEM 534.3, WATER REPELLENT (SILANE-SILOXANE), SHALL BE APPLIED TO THE ENTIRE BRIDGE SEAT, INCLUDING THE BEARING PEDESTAL SURFACES AND ALL EXPOSED SURFACES ON BOTH ABUTMENTS AND ALL WINGWALLS TO 1'-0" BELOW THE FILL LINE.

6) ALL REINFORCING IN THE ABUTMENTS AND WINGWALLS SHALL BE PAID AS ITEM 544.3, REINFORCING STEEL, (CONTRACTOR DETAILED) EXCEPT REINFORCING IN WINGWALL COPINGS WHICH SHALL BE EPOXY COATED AND PAID AS ITEM 544.31, REINFORCING STEEL, EPOXY COATED (CONTRACTOR DETAILED).

7) ALL REINFORCING SHALL BE A MINIMUM OF $2\frac{1}{2}$" FROM CONCRETE SURFACES, UNLESS NOTED OTHERWISE.

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com www.cmaengineers.com

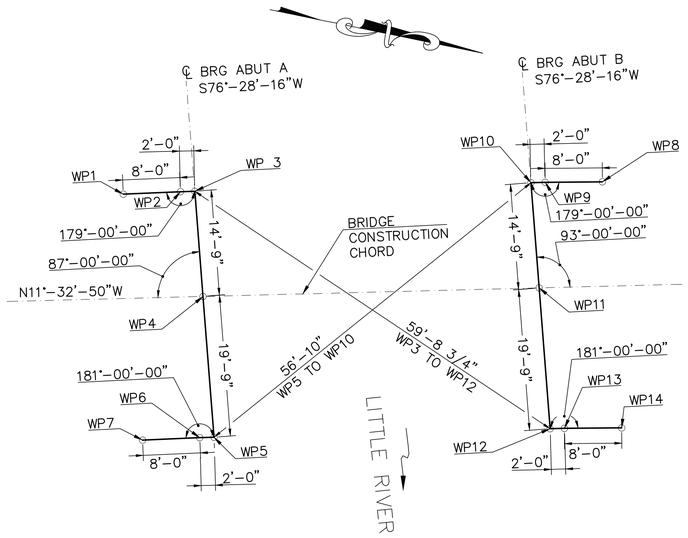
STATE OF NEW HAMPSHIRE – JASON L. GALLANT No. 10551 – LICENSED PROFESSIONAL ENGINEER

designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
date: July 2015
project no: 923
file name: 923 - Structural Plans.dwg
scale: As Shown

Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Bridge Notes

drawing no. B-3

sheet: 4 of 29



Survey Layout

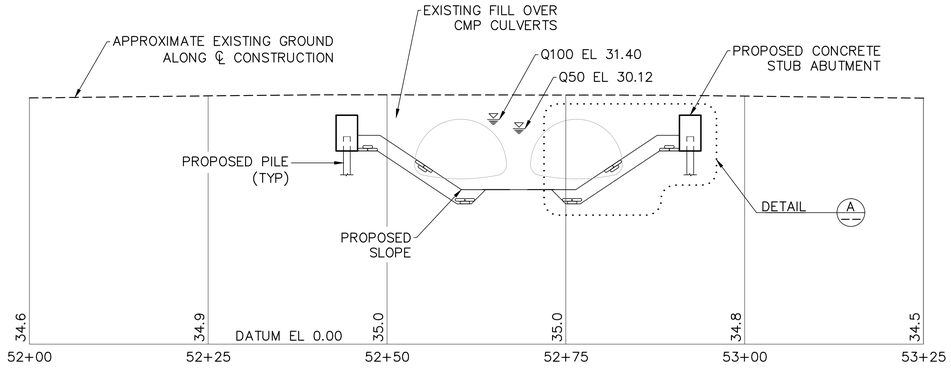
Scale: 1"=10'

WORKING POINT COORDINATES		
WORKING POINT NO.	NORTHING	EASTING
WP1	172823.06	1173478.52
WP2	172830.90	1173476.92
WP3	172832.87	1173476.55
WP4	172836.32	1173490.89
WP5	172840.94	1173510.09
WP6	172838.98	1173510.46
WP7	172831.14	1173512.06
WP8	172888.93	1173466.26
WP9	172881.04	1173467.59
WP10	172879.08	1173467.96
WP11	172882.53	1173482.30
WP12	172887.15	1173501.50
WP13	172889.12	1173501.13
WP14	172897.01	1173499.81

LOCATION AND DESCRIPTION OF BENCHMARKS				
BENCH MARK	LOCATION	NORTHING	EASTING	ELEVATION
TBM "A"	MAG NAIL SET, UP 6" IN POLE #18/51	173147.9749	1173435.3853	31.64'
TBM "B"	"X" MARK CHISELED IN BOLT OVER MAIN OUTLET OF HYDRANT AT 60 LINDEN STREET	172707.7694	1173540.6009	35.53'

HORIZONTAL DATUM: NAD1983, NEW HAMPSHIRE STATE PLANE COORDINATE SYSTEM
VERTICAL DATUM: NGVD 1929

Vertical datum of bridge plans is NGVD29.
Subtract 0.76 ft from all elevations on plans to convert to NAVD88 for HEC-RAS model.

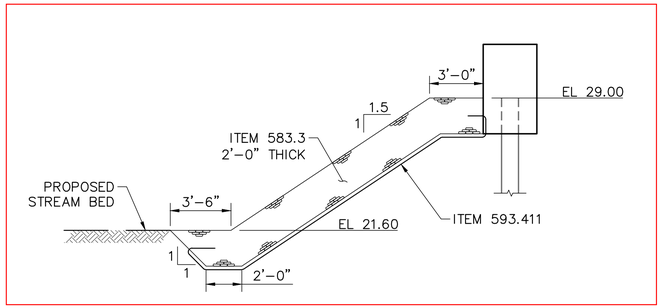


Proposed Channel Section

Scale: 1"=10'-0"

SUMMARY OF BRIDGE QUANTITIES			
ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT
207.1	COMMON CHANNEL EXCAVATION	770	CY
209.201	GRANULAR BACKFILL BRIDGE (F)	100	CY
403.911	HOT BITUMINOUS BRIDGE PAVEMENT, 1.5" BASE COURSE (F)	13	TON
502	REMOVAL OF EXISTING BRIDGE STRUCTURE	1	U
503.101	WATER DIVERSION STRUCTURE	1	U
504.1	COMMON BRIDGE EXCAVATION (F)	310	CY
504.2	ROCK BRIDGE EXCAVATION	20	CY
508	STRUCTURAL FILL	20	CY
510.1	PILE DRIVING EQUIPMENT	1	U
510.61	FURNISHING AND DRIVING STEEL BEARING PILES	13800	LB
510.65	DRIVING-POINTS FOR STEEL BEARING PILES	10	EA
520.01	CONCRETE CLASS AA	105	CY
520.0302	CONCRETE CLASS AA APPROACH SLABS	60	CY
528.3224	PRESTRESSED CONCRETE BRIDGE DECK, 24" BUTTED BOX BEAMS (F)	1600	SF
534.3	WATER REPELLENT (SILANE-SILOXANE)	10	GAL
538.2	BARRIER MEMBRANE, PEEL AND STICK - VERTICAL SURFACES (F)	5	SY
538.5	BARRIER MEMBRANE, HEAT WELDED (F)	25	SY
538.6	BARRIER MEMBRANE, HEAT WELDED - MACHINE METHOD (F)	170	SY
544.3	REINFORCING STEEL, (CONTRACTOR DETAILED)	4900	LB
544.31	REINFORCING STEEL, EPOXY COATED (CONTRACTOR DETAILED)	14300	LB
544.7	SYNTHETIC FIBER REINFORCEMENT (F)	380	LB
548.11	ELASTOMERIC BEARING PADS (F)	36	EA
559.4	ASPHALTIC PLUG EXPANSION JOINT (F)	35	LF
559.41	MODIFIED ELASTOMERIC PLUG TYPE FLEXIBLE JOINT, 6" WIDE (F)	35	LF
562.1	SILICONE JOINT SEALANT (F)	40	LF
563.3	BRIDGE RAIL T101	68	LF
563.353	BRIDGE RAIL T101 WITH SNOW SCREENING	68	LF
583.3	RIPRAP C	240	CY
593.411	GEOTEXTILE, PERMANENT EROSION CONTROL, CLASS 1, NON-WOVEN	475	SY
1008.9	ALTERATIONS AND ADDITIONS AS NEEDED - TESTING OF MATERIAL	6000	$

Channel geometry: 3'-wide shelf at el 29.0 at each abutment, slope down at 1.5:1 to el 21.60 at channel bed



Detail

Scale: 1/4"=1'-0"

A

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com www.cmaengineers.com

JASON GALLANT No. 7004 LICENSED PROFESSIONAL ENGINEER - STATE OF NEW HAMPSHIRE - 1/6/16

designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
scale: As Shown
date: July 2015
project no: 923
file name: 923 - Structural Plans.dwg

Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Survey Layout and Channel Sections

drawing no. B-4

sheet: 5 of 29

Boring No. B-1

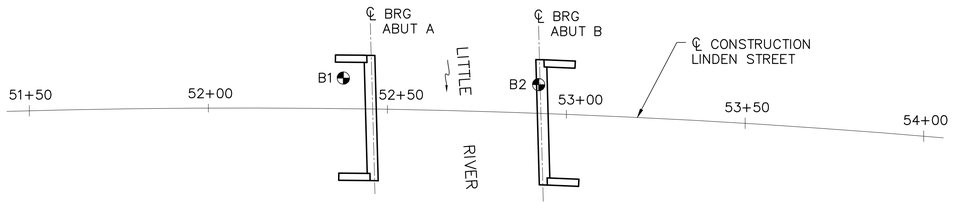
Station 52+37.6, 8.5 Left

TEST BORING LOG

CMA Engineers, Inc.	PROJECT	Test Boring Number B-1
Civil/Environmental Engineers **35 Bow Street** **Portsmouth, NH 03801** **Phone: 603.431.6196** **Fax: 603.431.5376**	Description: Linden Street Bridge Location: Exeter, NH Notes:	Sheet 1 of 2
	Contractor: Great Works Pump & Test Boring, Inc.	Date: July 8, 2014
CMA Engineer: Bob Grillo	Equipment: Acker Track Rig	Ground Elevation: 35' +/-
File Number: #923	Operator: Peter Michaud	Weather: Sun 80F

BOTTOM OF STUB ABUTMENT
ABUTMENT A (EL. 27.0)

Depth	Sample No. Depth (ft)	Blow Count	Sample Descriptions and Classifications	Remarks
1	S-1 0.5' - 2.5'	16 17 14 14	Brown Sand and Gravel, trace Silt. Dry. Fill.	4" Asphalt Solid stem augers to advance boring.
2				
3				
4				
5				
6	S-2 5' - 7'	5 3 5 4	Same. Moist.	Obstruction at 9'. Bridge Abutment? Move 2' south.
7				
8				
9				
10		2		
11	S-3 10' - 12'	2 5 8	Brown-Gray Silty Clay with brick fragments. Fill.	
12		7		
13	S-4 12' - 14'	7 9 9	Brown-Gray Silty Clay with organics. Fill.	
14				
15		6		
16	S-5 15' - 17'	6 9 10	Brown-Gray Silty Clay. Fill.	
17		8		Rock in Spoon tip.
18	S-6 17' - 19'	5 5 5	No Recovery	
19				
20				Change to Silty Clay at 19.5'
21	T-1 20' - 22'		Gray Silty Clay	Drove 4" Casing to 20', wash boring.
22	Vane Shear 22' - 22.75'		730 psf	
23	Vane Shear 22.75' - 23.5'		650 psf	
24				
25	Vane Shear 25' - 25.75'		530 psf	



Proposed Channel Section

Scale: 1"=20'-0"

Boring No. B-1

(Continued)

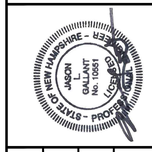
TEST BORING LOG

CMA Engineers, Inc.	PROJECT	Test Boring Number B-1
Civil/Environmental Engineers **35 Bow Street** **Portsmouth, NH 03801** **Phone: 603.431.6196** **Fax: 603.431.5376**	Description: Linden Street Bridge Location: Exeter, NH Notes:	Sheet 2 of 2
	Contractor: Great Works Pump & Test Boring, Inc.	Date: July 8, 2014
CMA Engineer: Bob Grillo	Equipment: Acker Track Rig	Ground Elevation: 35' +/-
File Number: #923	Operator: Peter Michaud	Weather: Sun 80F

Depth	Sample No. Depth (ft)	Blow Count	Sample Descriptions and Classifications	Remarks
26	Vane Shear 25.75' - 26.5'		530 psf	
27				
28				
29				Changed to Granular Soil at 28.8'
30	S-7 30' - 30.1'	50/.5"		Refused at 30.1'
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				
46				
47				
48				
49				
50				

by	date	revision	no.
JLG	1/6/16	AS-BUILT	0

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com
www.cmaengineers.com



designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
date: July 2015
project no: 923
file name: 923 - Structural Plans.dwg
scale: As Shown

Town of Exeter
Department of Public Works

Linden Street
Little River Bridge Replacment

Boring Logs
(Sheet 1 of 2)

drawing no.
B-5

sheet: 6 of 29

Boring No. B-2

Station 52+92.0, 7.2 Left

TEST BORING LOG

CMA Engineers, Inc.	PROJECT	Test Boring Number B-2
Civil/Environmental Engineers **35 Bow Street** **Portsmouth, NH 03801** **Phone: 603.431.6196** **Fax: 603.431.5376**	Description: Linden Street Bridge Location: Exeter, NH Notes:	Sheet 1 of 2
	Contractor: Great Works Pump & Test Boring, Inc.	Date: July 8, 2014
CMA Engineer: Bob Grillo	Equipment: Acker Track Rig	Ground Elevation: 35' +/-
File Number: #923	Operator: Peter Michaud	Weather: Sun 80F

BOTTOM OF STUB ABUTMENT
ABUTMENT B (EL. 27.00)

Depth	Sample No. Depth (ft)	Blow Count	Sample Descriptions and Classifications	Remarks
				4" Asphalt
1	S-1	15	Brown Sand and Gravel, trace Silt.	
2	0.5' - 2.5'	15	Dry. Fill.	Solid stem augers to advance boring.
		14		
3		15		
4				
5				
		9		
6	S-2	8	Same.	
7	5' - 7'	5		
		5		
8				
9				
10				
		8		
11	S-3	10	Gray Sand and Gravel, some silt, organics.	
	10' - 12'	13	Moist. Fill.	
12		11		
		10		
13	S-4	15	Gray-Brown mottled Silty Clay with	Clay Fill encountered at 13'.
	12' - 14'	13	fine sand lenses. Fill.	
14		11	Moist	Groundwater at 14'.
15				
		4		
16	S-5	2	Dark Brown to Gray Silty Clay with organics.	Drove 4" Casing to 15', wash boring.
	15' - 17'	2	Fill.	
17		4		
		4	Same to 18.5'	
18	S-6	4		
	17' - 19'	6		
19		4	Gray Fine to Medium Sand, trace silt. Fill.	
20				Change to Silty Clay at 19.5'
21	S-7	WOH	Gray Silty Clay.	
	20' - 22'	24"		
22				
23				
24				
25				
	Vane Shear 25' - 25.75'		560 psf	

Boring No. B-2

(Continued)

TEST BORING LOG

CMA Engineers, Inc.	PROJECT	Test Boring Number B-2
Civil/Environmental Engineers **35 Bow Street** **Portsmouth, NH 03801** **Phone: 603.431.6196** **Fax: 603.431.5376**	Description: Linden Street Bridge Location: Exeter, NH Notes:	Sheet 2 of 2
	Contractor: Great Works Pump & Test Boring, Inc.	Date: July 8, 2014
CMA Engineer: Bob Grillo	Equipment: Acker Track Rig	Ground Elevation: 35' +/-
File Number: #923	Operator: Peter Michaud	Weather: Sun 80F

Depth	Sample No. Depth (ft)	Blow Count	Sample Descriptions and Classifications	Remarks
26	Vane Shear		540 psf	
27	25.75' - 26.5'			
28				
29				
30		14		End of Clay Layer at 31.8'
31	S-8	9	Rock fragments mixed with gray silty clay.	
	30' - 31.9'	8		Changed to Weathered Rock at 31.8'
32		50/5"		
33				
34				
35				Roller bit drill to 33.5' through weathered rock. Lost all drilling fluids in rock.
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				
46				
47				
48				
49				
50				

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com www.cmaengineers.com

JACOB GALLANT No. 13061 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE

designed by:	drawn by:	approved by:	scale:
LBK/OGK	LBK/OGK	JLG	As Shown

date:	project no:	file name:
July 2015	923	923 - Structural Plans.dwg

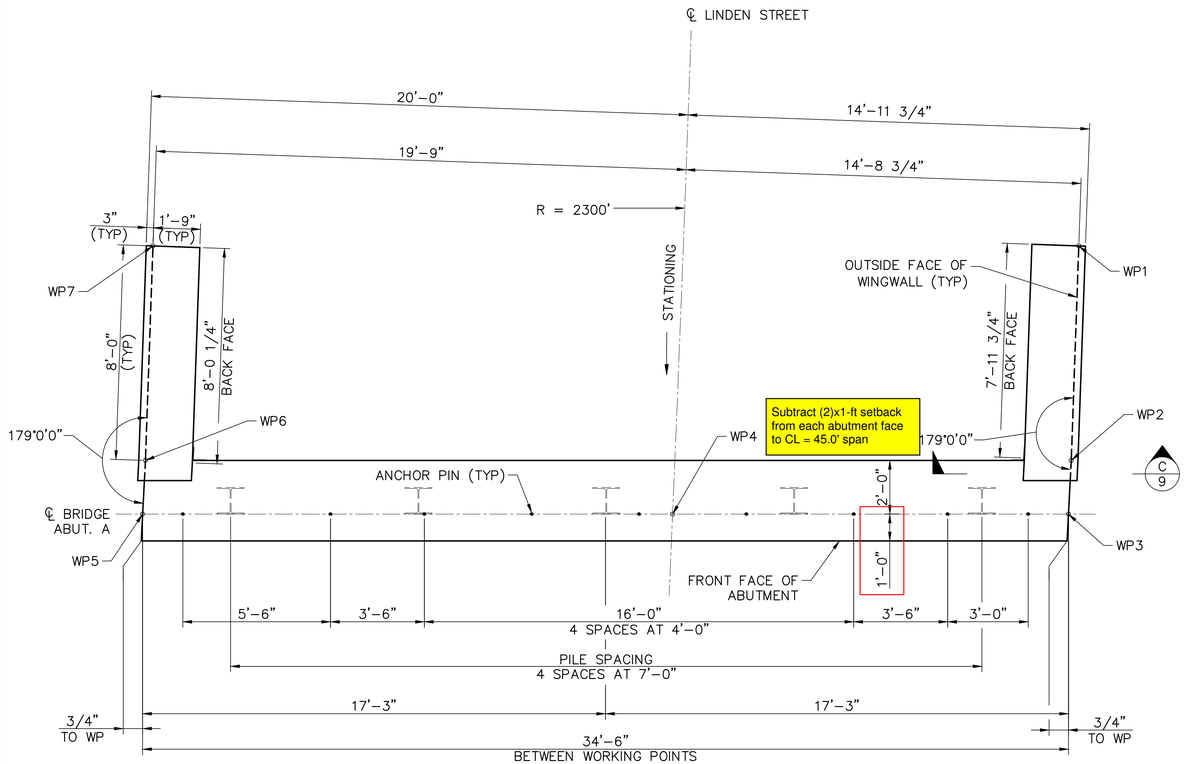
Town of Exeter
Department of Public Works

Linden Street
Little River Bridge Replacment

Boring Logs
(Sheet 2 of 2)

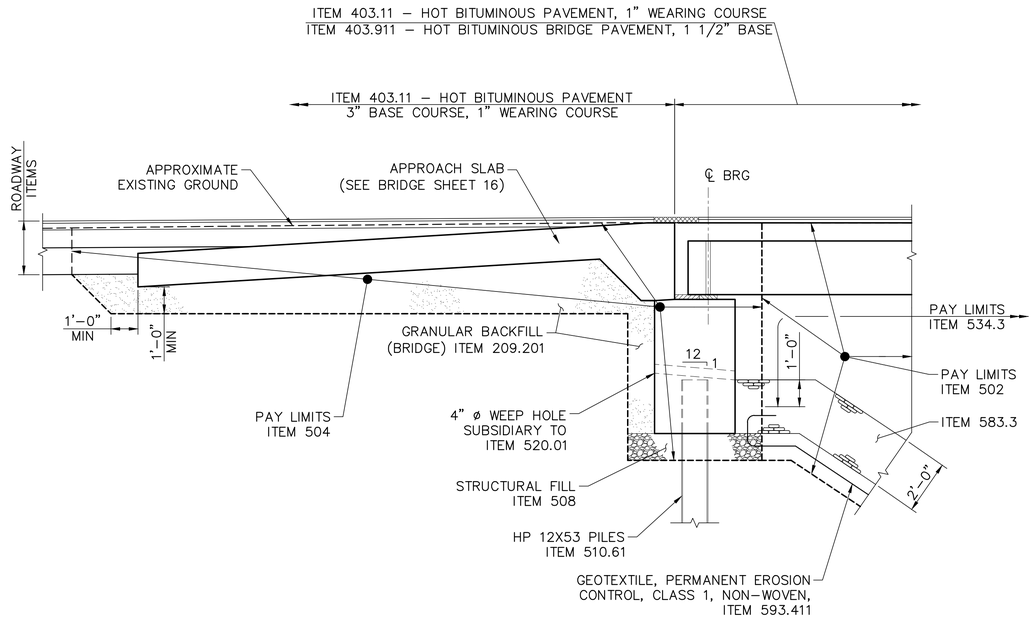
drawing no.
B-6

sheet: 7 of 29



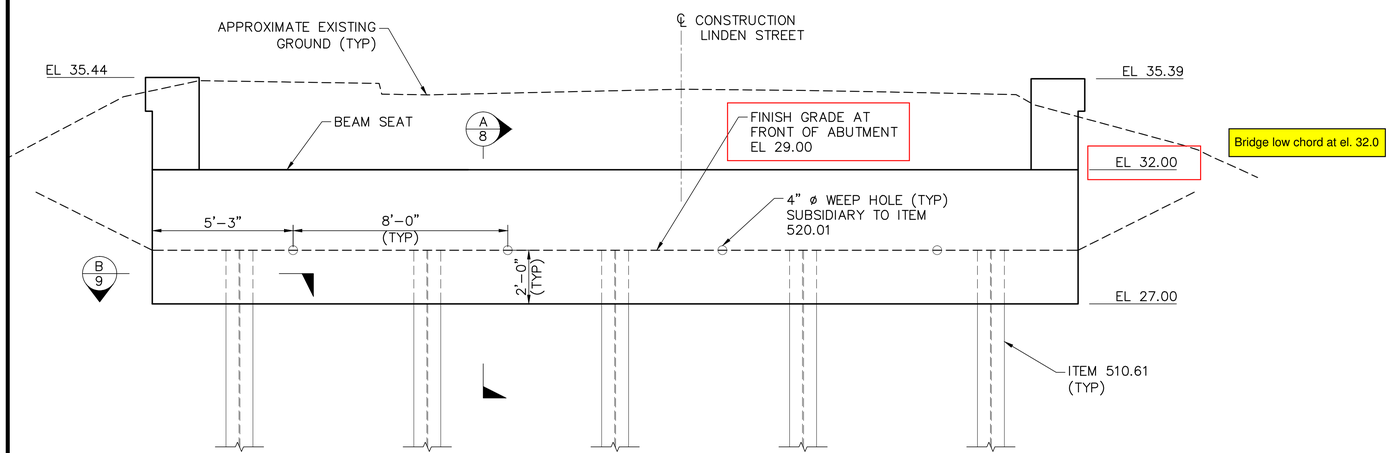
Abutment A Plan

Scale: 3/8"=1'–0"



Typical Abutment Section

Scale: 3/8"=1'–0"



Abutment A Elevation

Scale: 3/8"=1'–0"

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com
www.cmaengineers.com

STATE OF NEW HAMPSHIRE – JASON L. GALLANT No. 10801 – REGISTERED PROFESSIONAL ENGINEER

designed by: LBK/OGK	drawn by: LBK/OGK	approved by: JLG	scale: As Shown
date: July 2015	project no: 923	file name: 923 - Structural Plans.dwg	

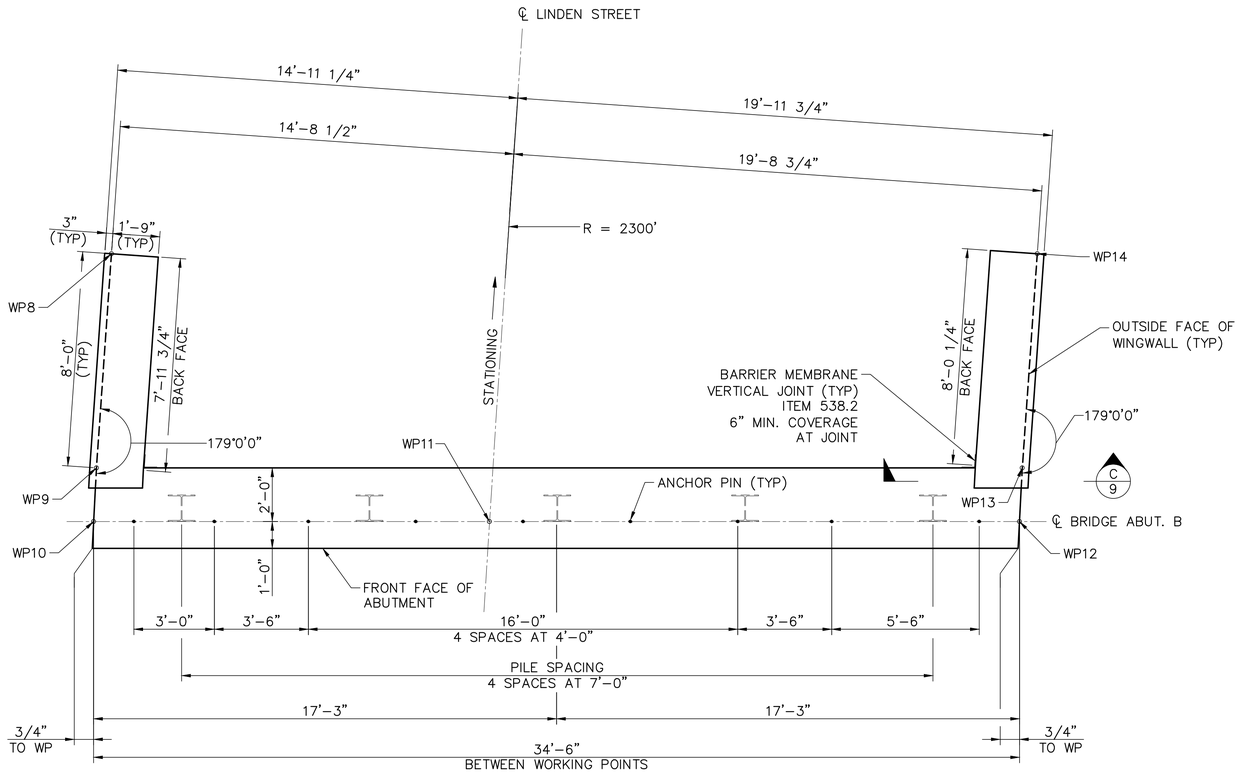
Town of Exeter
Department of Public Works

Linden Street
Little River Bridge Replacment

Abutment A Plan and Elevation

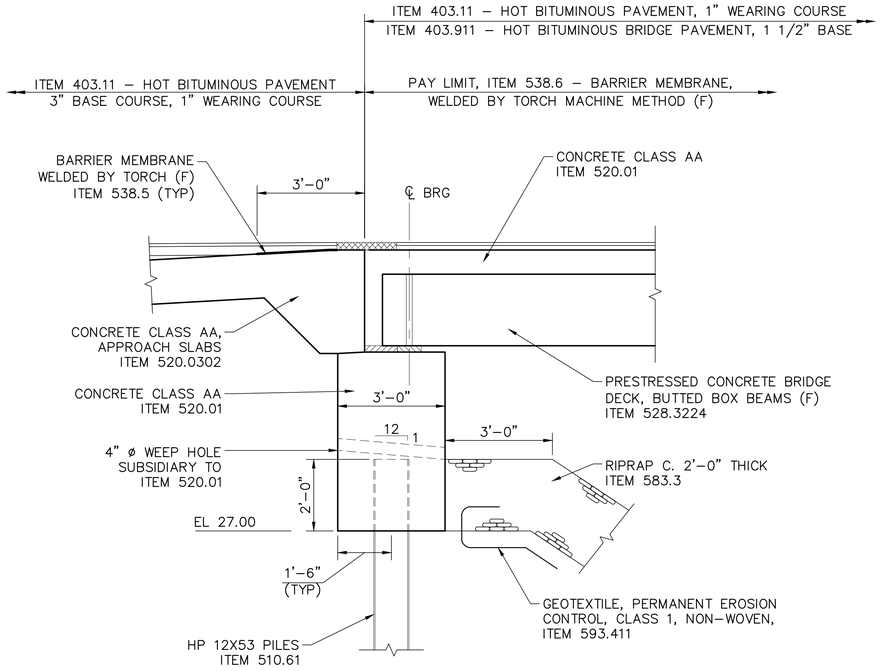
drawing no.
B-7

sheet: 8 of 29



Abutment B Plan

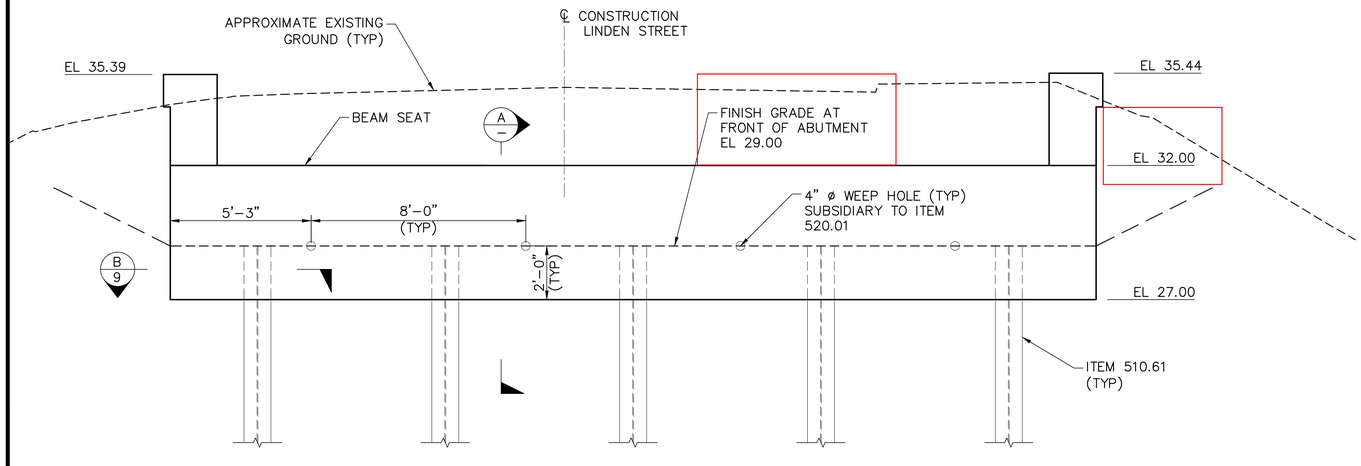
Scale: 3/8"=1'–0"



Section

Scale: 1/2"=1'–0"

A -- A 7



Abutment B Elevation

Scale: 3/8"=1'–0"

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com
www.cmaengineers.com

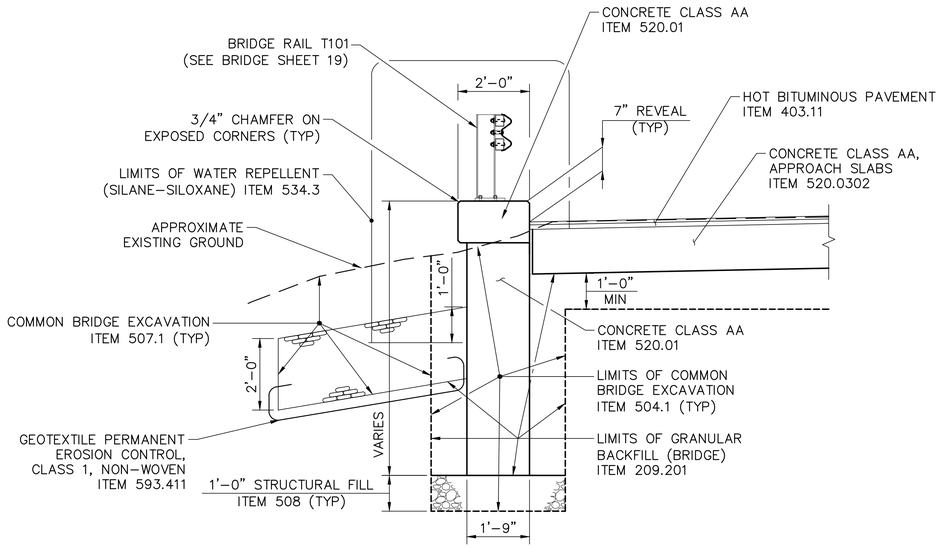
STATE OF NEW HAMPSHIRE – JASON L. GALANT No. 13061 LICENSED PROFESSIONAL ENGINEER

designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
date: July 2015
project no: 923
file name: 923 - Structural Plans.dwg
scale: As Shown

Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Abutment B Plan and Elevation

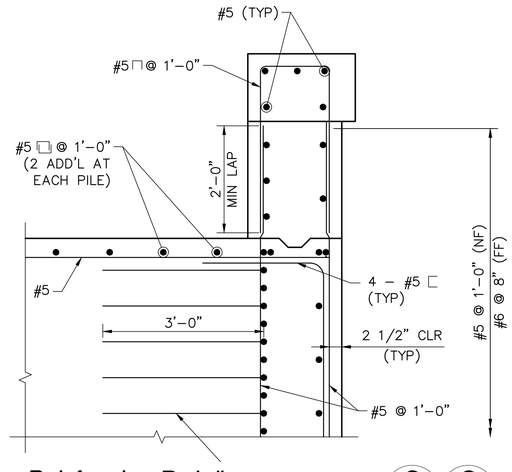
drawing no. B-8

sheet: 9 of 29



Typical Wingwall Section

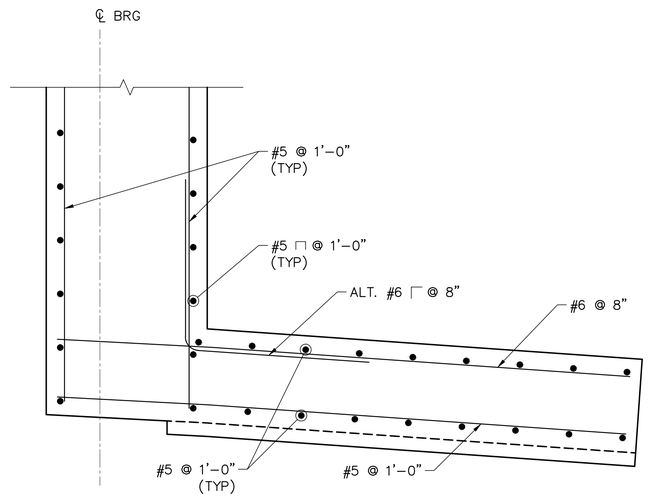
Scale: 1/2"=1'-0"



Reinforcing Detail

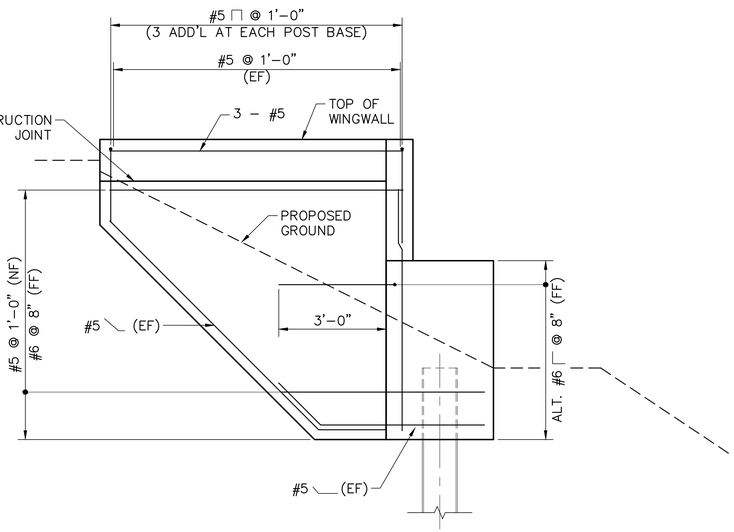
Scale: 1"=1'-0"

C 7 / C 8



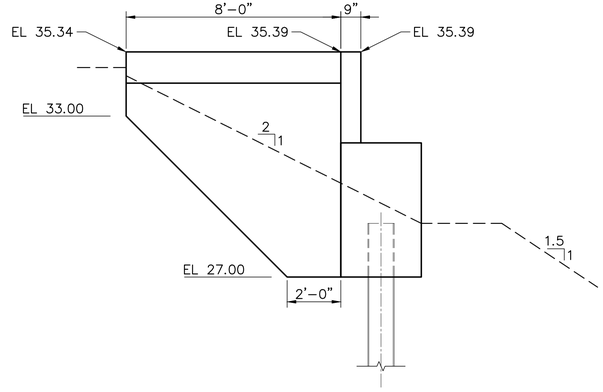
Wingwall Reinforcement Plan

Scale: 3/4"=1'-0"



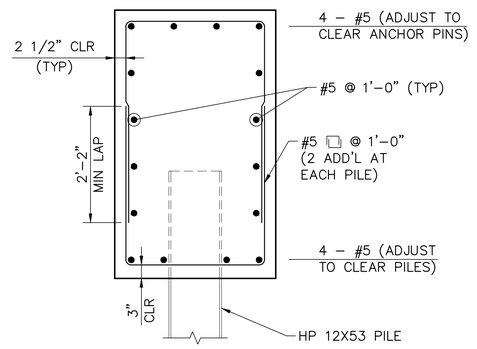
Wingwall Reinforcement

Scale: 1/2"=1'-0"



NW and SW Wingwalls

Scale: 3/8"=1'-0"

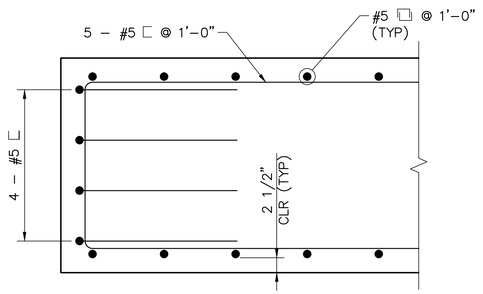


Typical Abutment Reinforcing

Scale: 3/4"=1'-0"

Wingwall Reinforcement

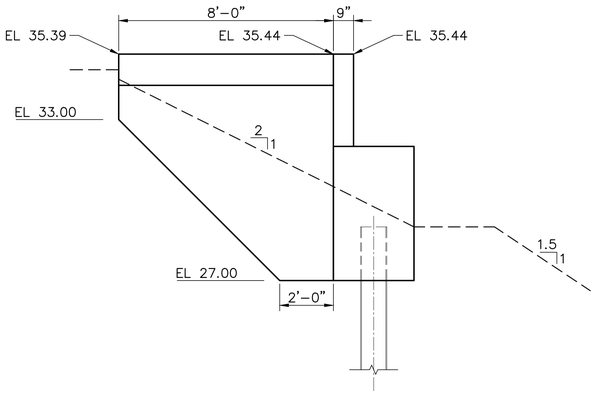
Scale: 1/2"=1'-0"



Reinforcing Detail

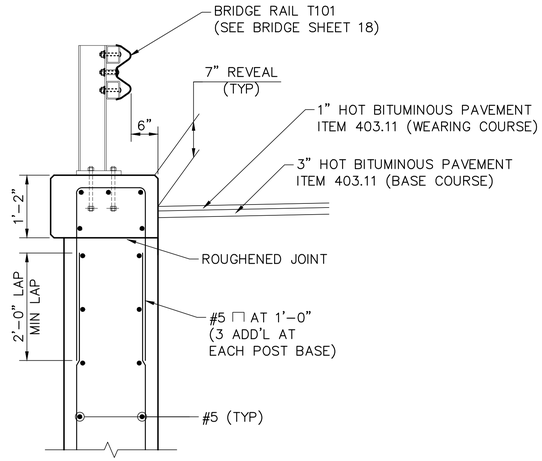
Scale: 1"=1'-0"

B 7 / B 8



NE and SE Wingwalls

Scale: 3/8"=1'-0"



Typical Section At Wingwall Coping

Scale: 3/4"=1'-0"

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

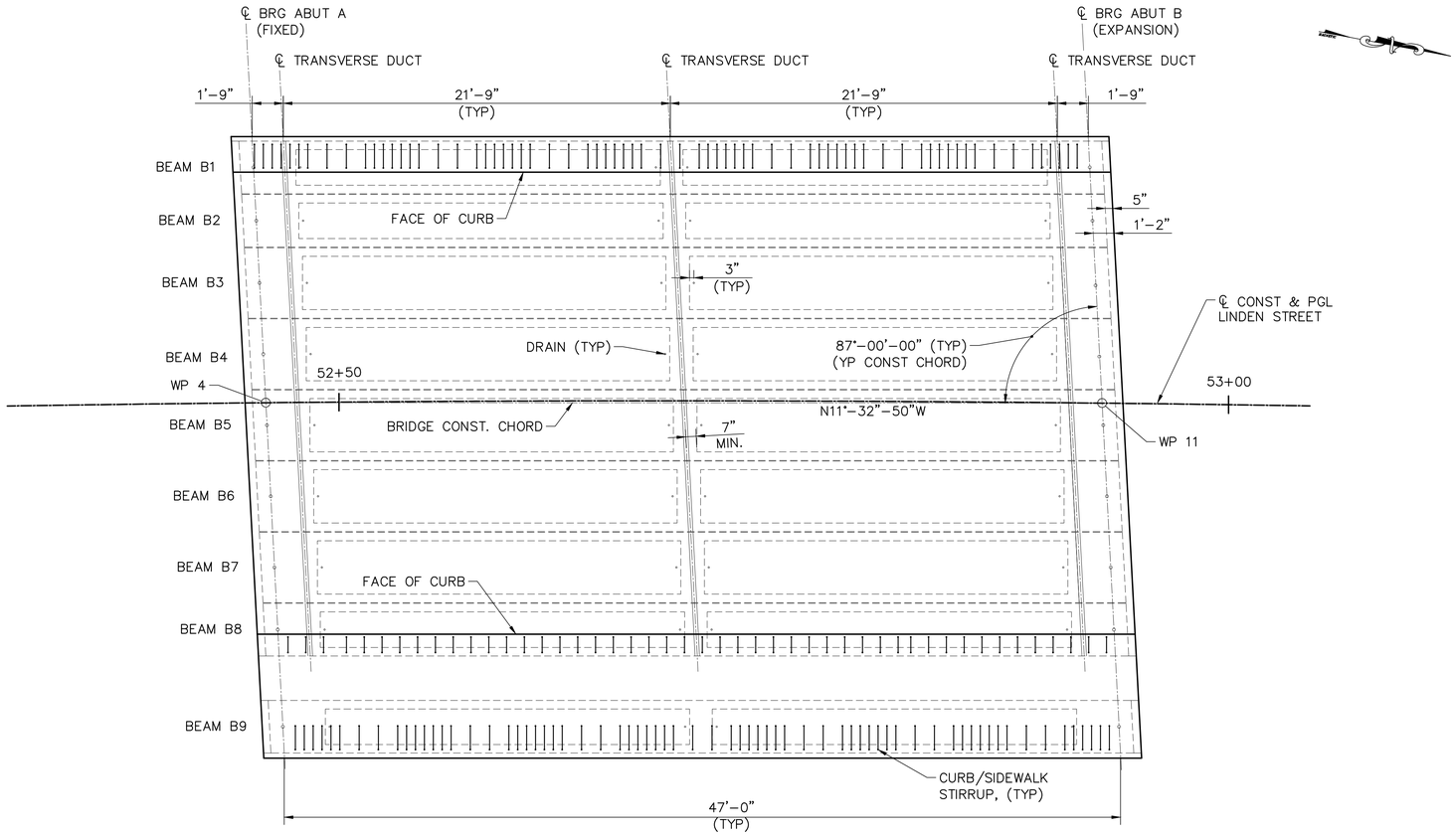
CMA ENGINEERS
Civil/Environmental Engineers
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com www.cmaengineers.com

JASON L. GALLANT No. 10653 LICENSED PROFESSIONAL ENGINEER - STATE OF NEW HAMPSHIRE

designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
date: July 2015
project no: 923
file name: 923 - Structural Plans.dwg
scale: As Shown

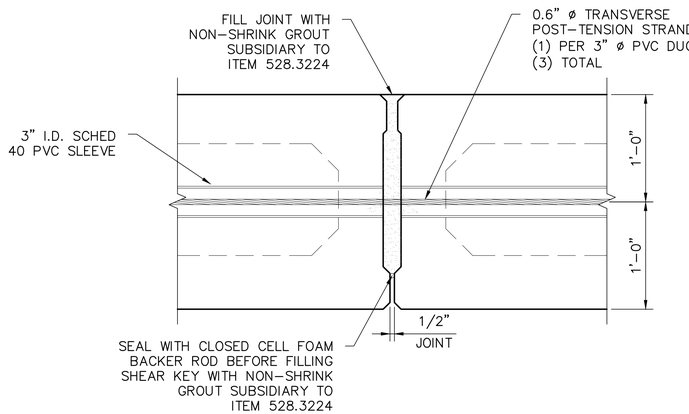
Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Abutment and Wingwall
Elevations and Details

drawing no. B-9
sheet: 10 of 29



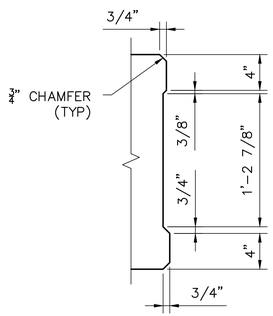
Prestressed Box Beam Layout

Scale: $\frac{1}{4}$" = 1'–0"



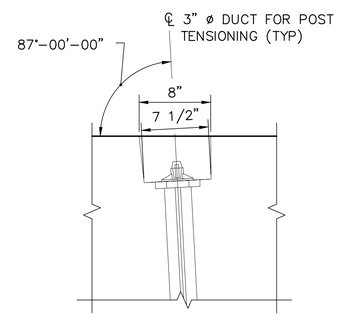
Post Tension/Grouted Shear Key Detail

Scale: $1\frac{1}{2}$" = 1'–0"

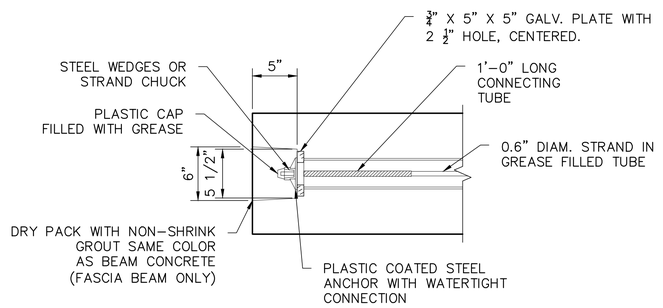


Typical Shear Key

Scale: $1\frac{1}{2}$" = 1'–0"



Plan



Elevation

Post Tension Detail

Scale: $1\frac{1}{2}$" = 1'–0"

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com www.cmaengineers.com

JASON L. GALLANT No. 10551 STATE OF NEW HAMPSHIRE - REGISTERED PROFESSIONAL ENGINEER

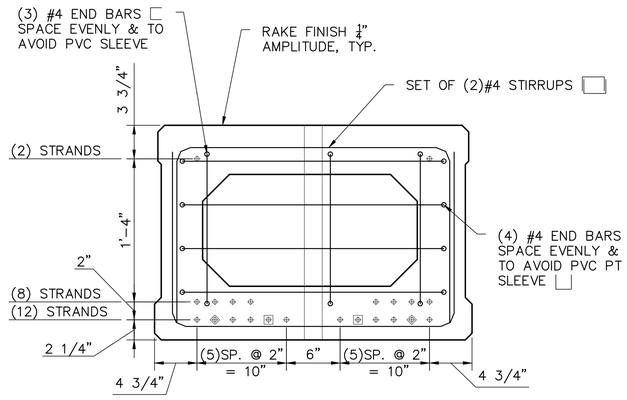
designed by:	drawn by:	approved by:	scale:
LBK/OGK	LBK/OGK	JLG	As Shown

date:	project no:	file name:
July 2015	923	923 - Structural Plans.dwg

Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Prestressed Box Beam Layout

drawing no.
B-10

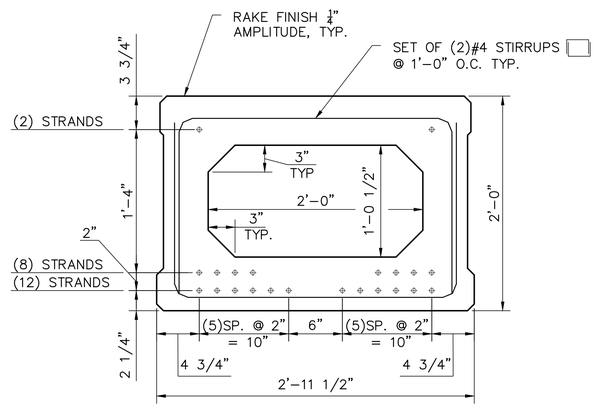
sheet: 11 of 29



◆ DENOTES ½"ø 270 KSI LOW-LAX STRAND
◈ DENOTES ½"ø 270 KSI LOW-LAX STRAND DEBONDED FOR 5'-0" FROM END
⊕ DENOTES ½"ø 270 KSI LOW-LAX STRAND DEBONDED FOR 6'-0" FROM END
NOTE: ALL STRANDS PULLED TO 31 KIPS EACH.

36" Box Beam Typical End Section

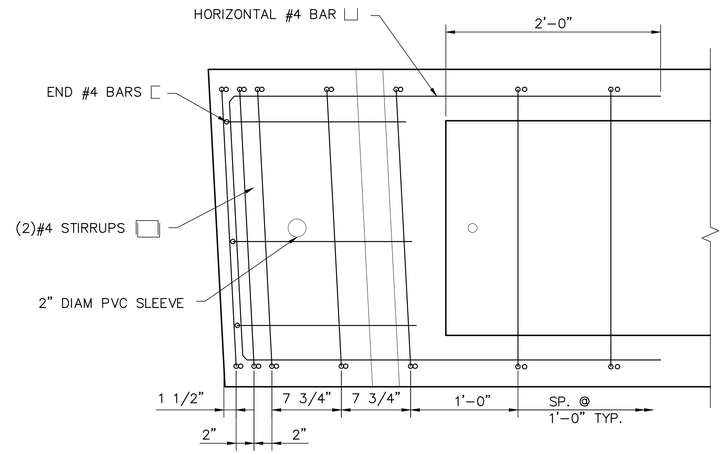
Scale: 1½" = 1'-0"



◆ DENOTES ½"ø 270 KSI LOW-LAX STRAND
NOTE: ALL STRANDS PULLED TO 31 KIPS EACH.

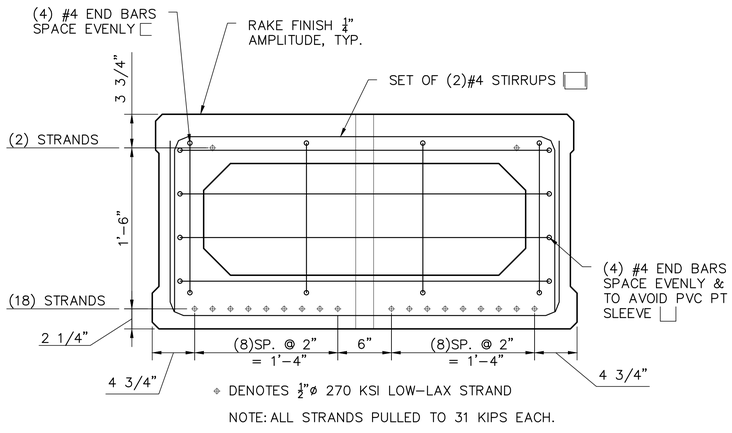
36" Box Beam Typical Mid Section

Scale: 1½" = 1'-0"



36" Box Beam Typical End Plan

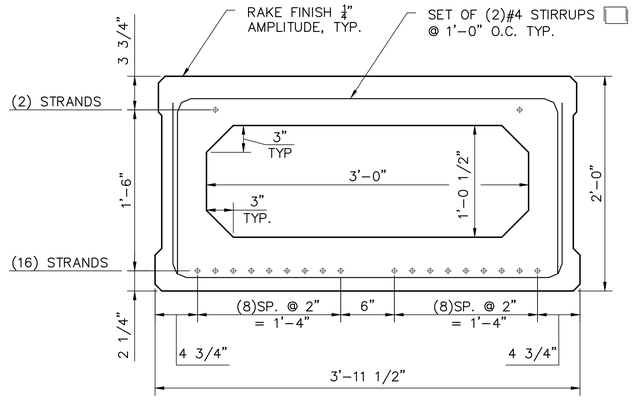
Scale: 1½" = 1'-0"



◆ DENOTES ½"ø 270 KSI LOW-LAX STRAND
NOTE: ALL STRANDS PULLED TO 31 KIPS EACH.

48" Box Beam Typical End Section

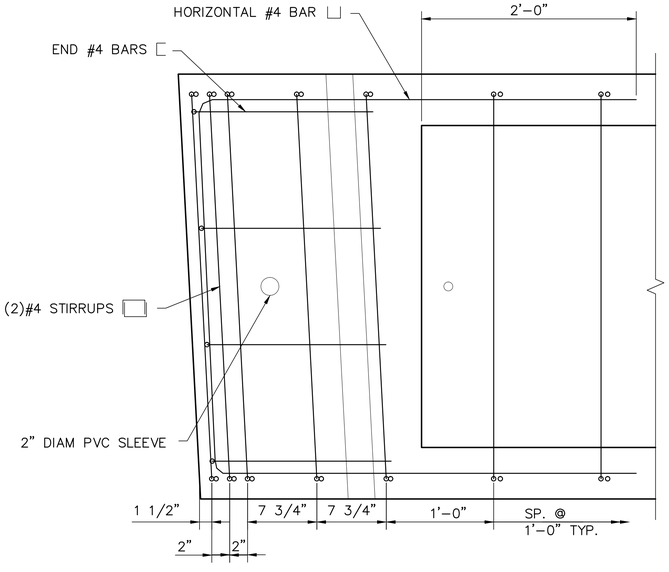
Scale: 1½" = 1'-0"



◆ DENOTES ½"ø 270 KSI LOW-LAX STRAND
NOTE: ALL STRANDS PULLED TO 31 KIPS EACH.

48" Box Beam Typical Mid Section

Scale: 1½" = 1'-0"



48" Box Beam Typical End Plan

Scale: 1½" = 1'-0"

CAMBER AT MID-SPAN (IN)					
	PRESTRESS	SELF WEIGHT	SUPERIMPOSED DL	TOTAL AT ERECTION	TOTAL AT FINAL
BEAM B1	1.28	0.46	0.222	1.45	1.04
BEAM B2	1.28	0.46	0.224	1.45	1.03
BEAM B3-B7	0.96	0.43	0.268	0.92	0.26
BEAM B8	1.28	0.46	0.445	1.45	0.37
BEAM B9	1.28	0.46	0.558	1.45	0.03

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

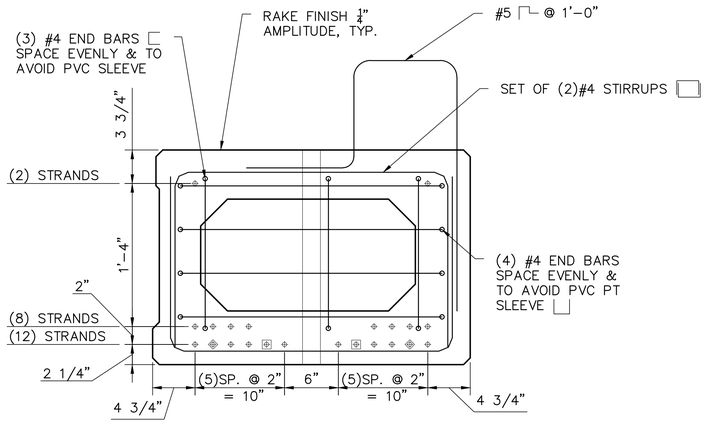
CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com www.cmaengineers.com

JASON GALLANT No. 13961 STATE OF NEW HAMPSHIRE - REGISTERED PROFESSIONAL ENGINEER

designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
date: July 2015
project no: 923
file name: 923 - Structural Plans.dwg
scale: As Shown

Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Prestressed Box Beam
Details (Sheet 1 of 2)

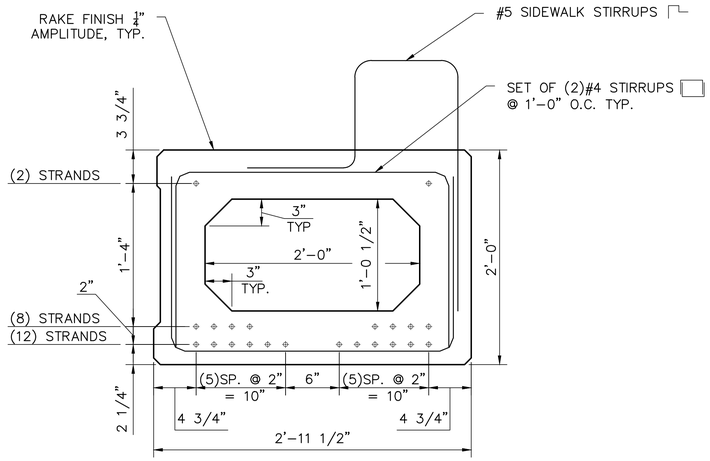
drawing no. B-11
sheet: 12 of 29



⌖ DENOTES $\frac{1}{2}$"ø 270 KSI LOW-LAX STRAND
⌖ DENOTES $\frac{1}{2}$"ø 270 KSI LOW-LAX STRAND DEBONDED FOR 5'-0" FROM END
⌖ DENOTES $\frac{1}{2}$"ø 270 KSI LOW-LAX STRAND DEBONDED FOR 6'-0" FROM END
NOTE: ALL STRANDS PULLED TO 31 KIPS EACH.

36" Box Beam (Beam B8) End Section

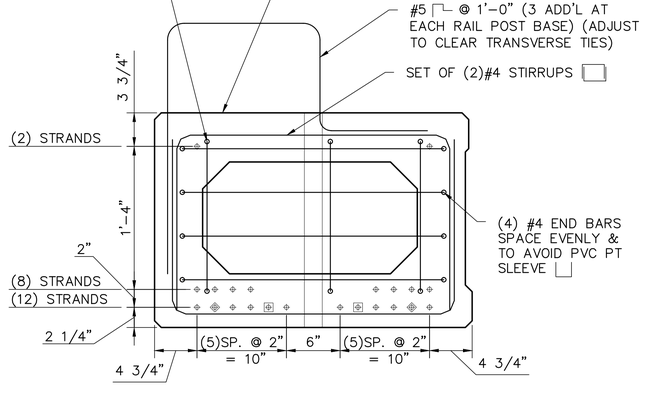
Scale: $1\frac{1}{2}$" = 1'-0"



⌖ DENOTES $\frac{1}{2}$"ø 270 KSI LOW-LAX STRAND
NOTE: ALL STRANDS PULLED TO 31 KIPS EACH.

36" Box Beam (Beam B8) Typical Mid Section

Scale: $1\frac{1}{2}$" = 1'-0"

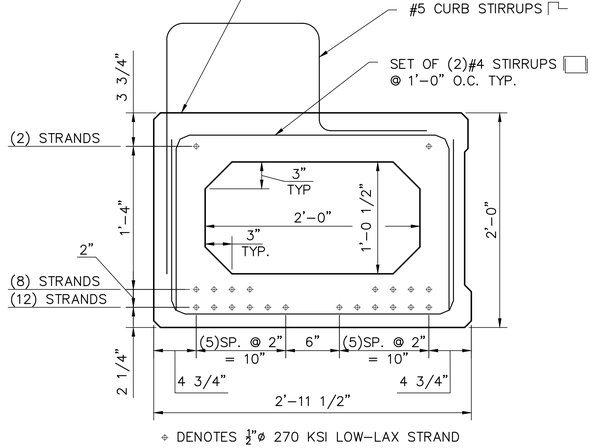


⌖ DENOTES $\frac{1}{2}$"ø 270 KSI LOW-LAX STRAND
⌖ DENOTES $\frac{1}{2}$"ø 270 KSI LOW-LAX STRAND DEBONDED FOR 5'-0" FROM END
⌖ DENOTES $\frac{1}{2}$"ø 270 KSI LOW-LAX STRAND DEBONDED FOR 6'-0" FROM END

NOTES:
1). ALL STRANDS PULLED TO 31 KIPS EACH.
2). BEAM B1 SHOWN WITH SINGLE SHEAR KEY. BEAM B9 OPPOSITE HAND WITH BOTH SHEAR KEYS OMITTED.

36" Box Beam (Beam B1/B9) End Section

Scale: $1\frac{1}{2}$" = 1'-0"



⌖ DENOTES $\frac{1}{2}$"ø 270 KSI LOW-LAX STRAND
NOTE: ALL STRANDS PULLED TO 31 KIPS EACH.

36" Box Beam (Beam B1/B9) Typical Mid Section

Scale: $1\frac{1}{2}$" = 1'-0"

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com www.cmaengineers.com

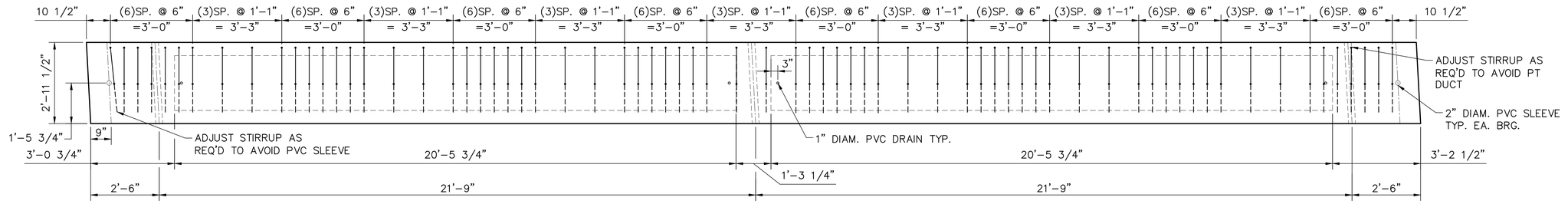
NEW HAMPSHIRE - STATE OF - JASON GALLANT No. 15061 LICENSED PROFESSIONAL ENGINEER

designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
date: July 2015
project no: 923
file name: 923 - Structural Plans.dwg
scale: As Shown

Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Prestressed Box Beam
Details (Sheet 2 of 3)

drawing no.
B-12

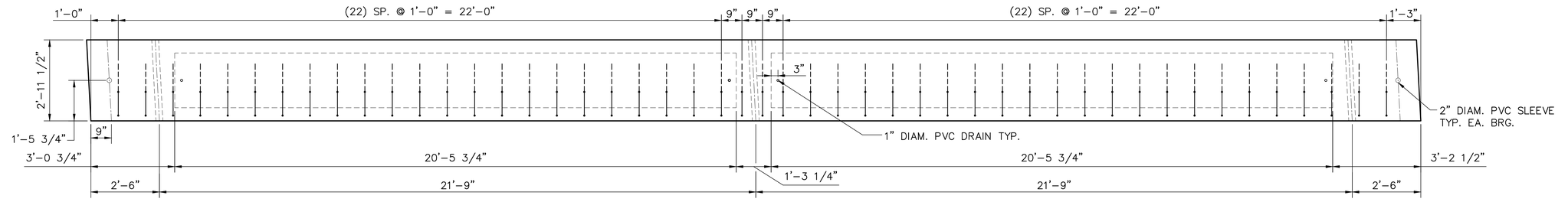
sheet: 13 of 29



Beam B1 Plan

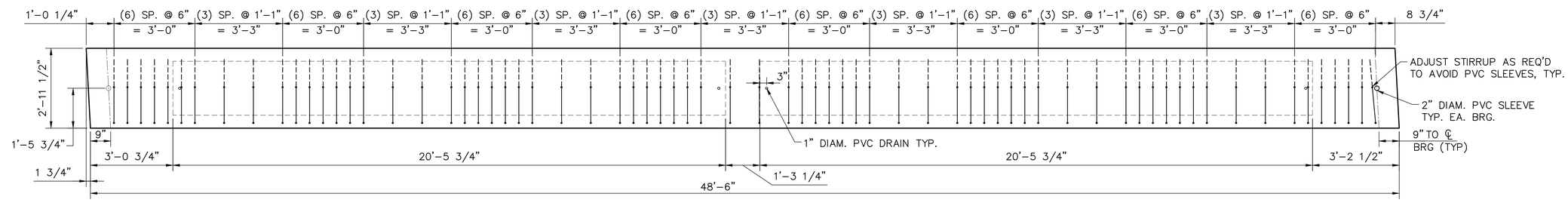
Scale: $\frac{1}{2}$" = 1'-0"

Beam B2 Similar but w/ out curb stirrups



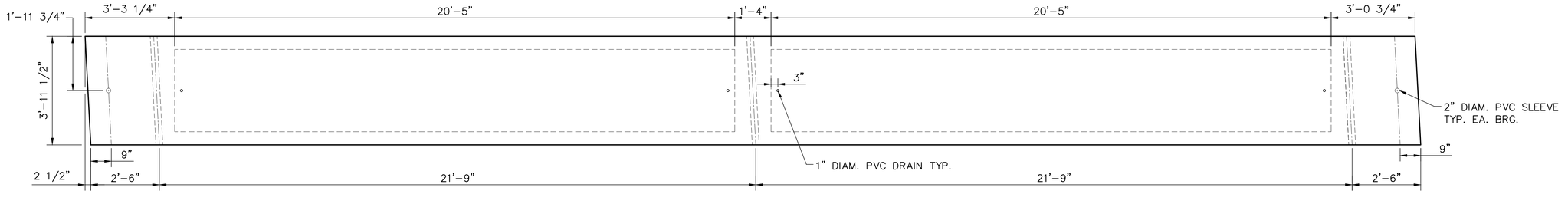
Beam B8 Plan

Scale: $\frac{1}{2}$" = 1'-0"



Beam B9 Plan

Scale: $\frac{1}{2}$" = 1'-0"



Beam B3 Thru B7 Plan

Scale: $\frac{1}{2}$" = 1'-0"

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com
www.cmaengineers.com

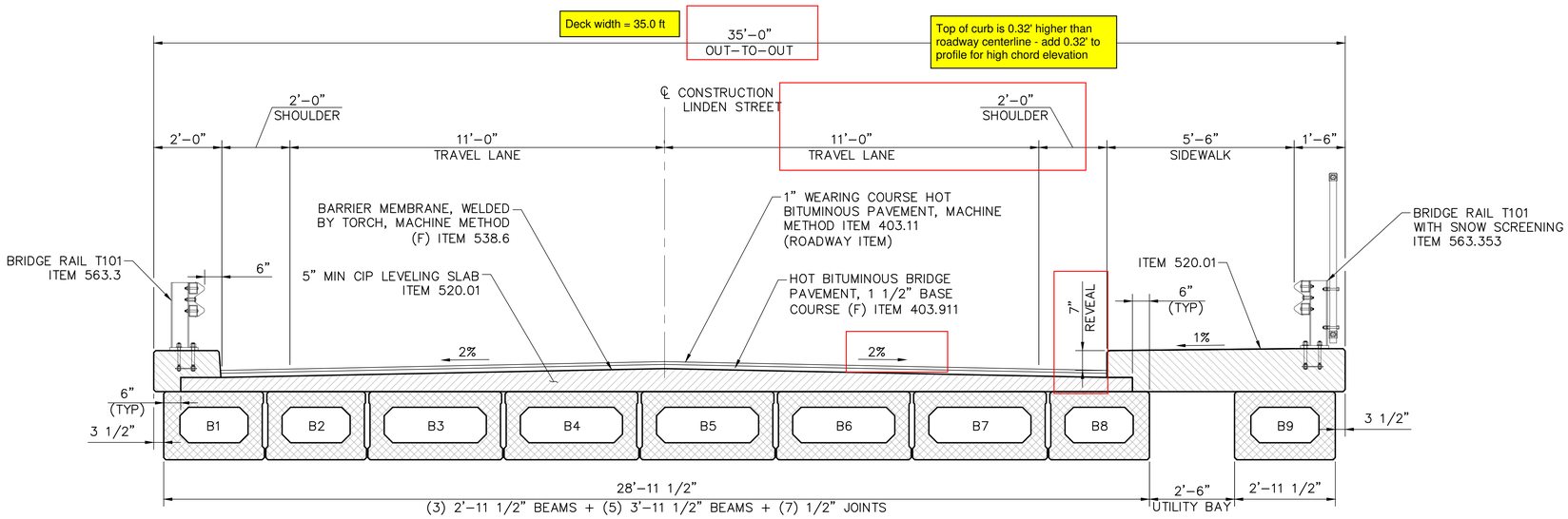
NEW HAMPSHIRE - 837 - JASON L. GALANT No. 7955 - LICENSED PROFESSIONAL ENGINEER - STATE OF

designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
date: July 2015
project no: 923
file name: 923 - Structural Plans.dwg
scale: As Shown

Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Prestressed Box Beam
Details (Sheet 2 of 2)

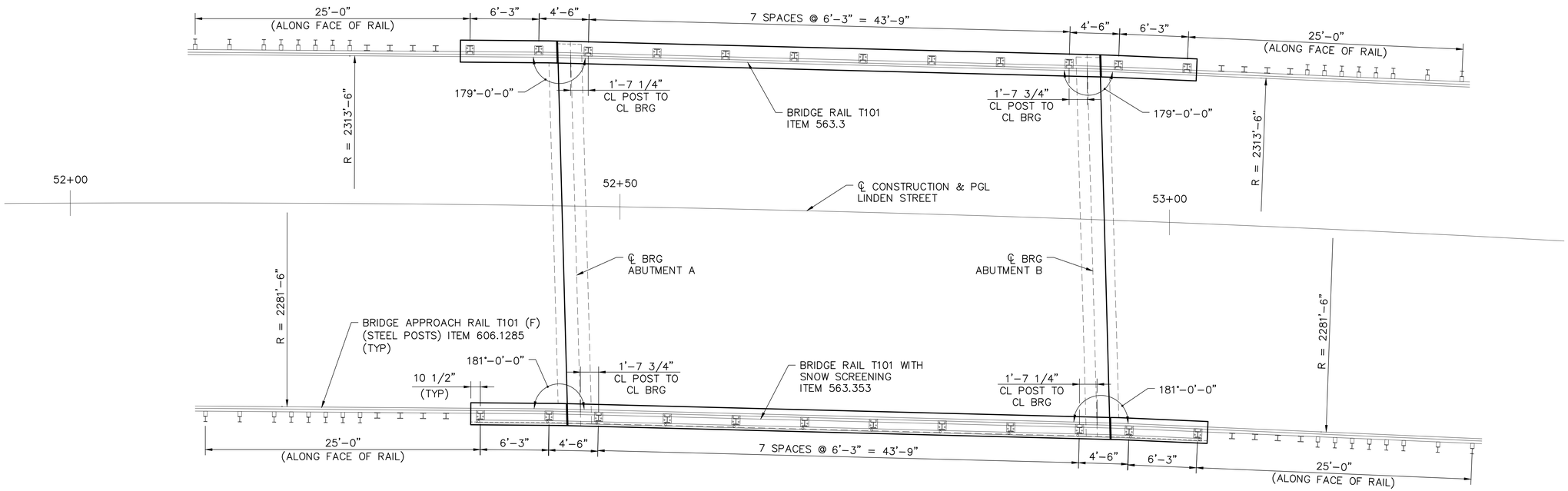
drawing no.
B-13

sheet: 14 of 29



Typical Deck Section

Scale: 1/2"=1'–0"



Rail Layout Plan

Scale: 1"=5'–0"

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196, info@cmaengineers.com
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
www.cmaengineers.com

STATE OF NEW HAMPSHIRE - 8333 - JASON GALLANT No. 13581 LICENSED PROFESSIONAL ENGINEER

designed by: LBK/OGK	drawn by: LBK/OGK	approved by: JLG	scale: As Shown
date: July 2015	project no: 923	file name: 923 - Structural Plans.dwg	

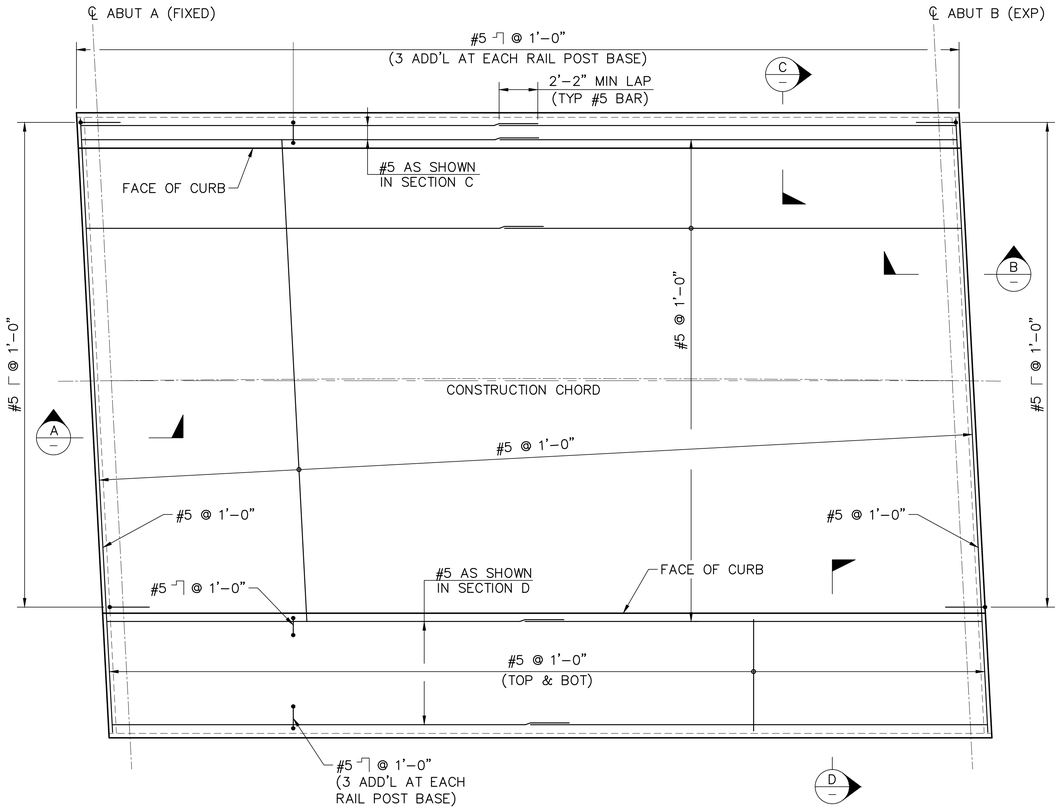
Town of Exeter
Department of Public Works

Linden Street
Little River Bridge Replacment

Typical Section
and Rail Layout

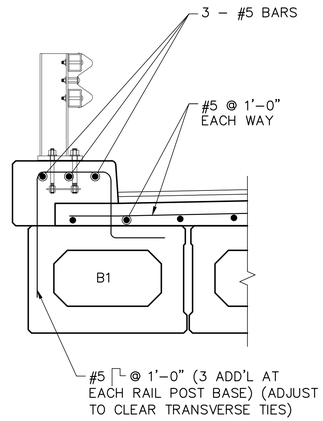
drawing no.
B-14

sheet: 15 of 29



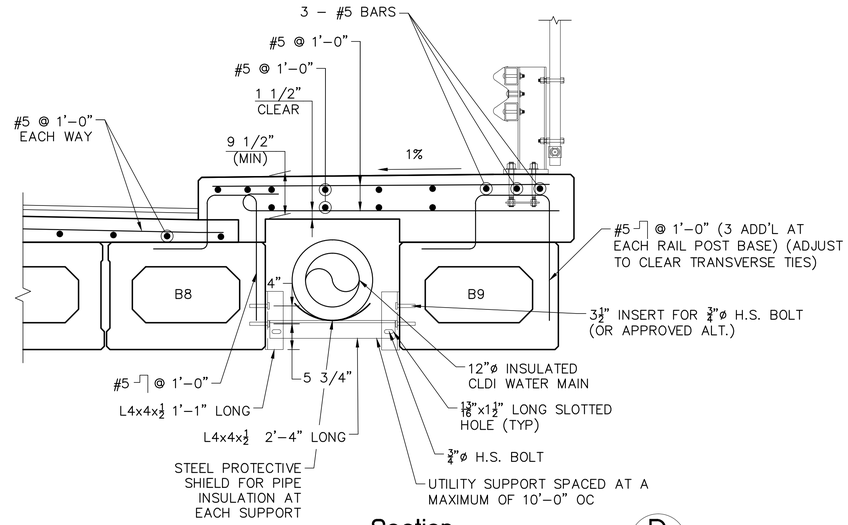
Overlay and Curb Reinforcing Plan

Scale: 1/4"=1'–0"



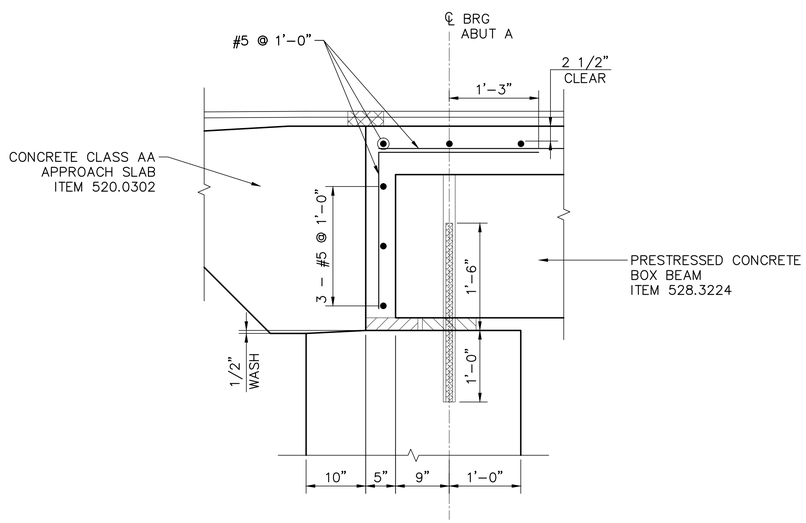
Section C

Scale: 3/4"=1'–0"



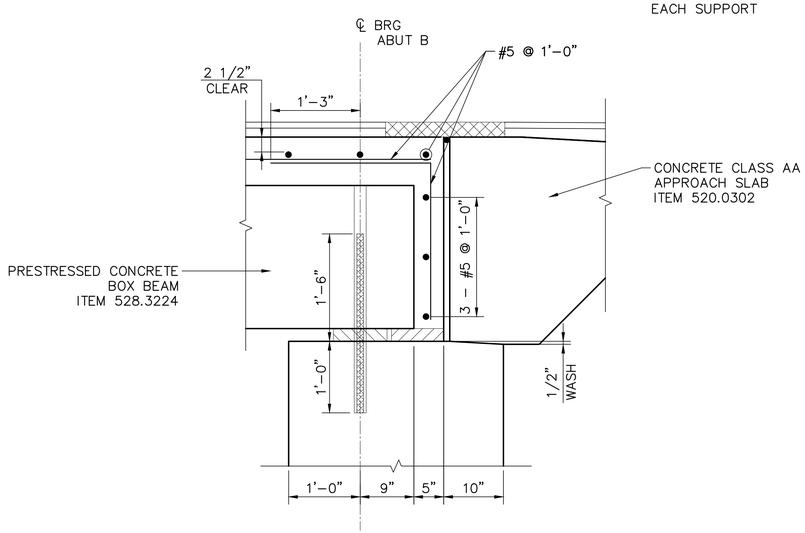
Section D

Scale: 3/4"=1'–0"



Section A

Scale: 1"=1'–0"



Section B

Scale: 1"=1'–0"

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com www.cmaengineers.com

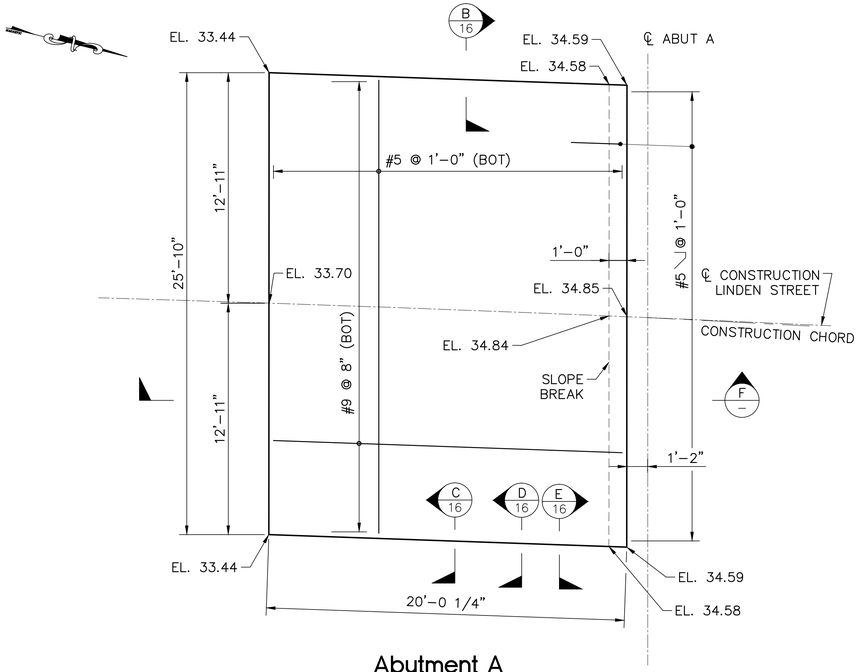
JASON L. GALLANT No. 10561 STATE OF NEW HAMPSHIRE - REGISTERED PROFESSIONAL ENGINEER

designed by: LBK/OGK	drawn by: LBK/OGK
approved by: JLG	scale: As Shown
date: July 2015	project no: 923
file name: 923 - Structural Plans.dwg	

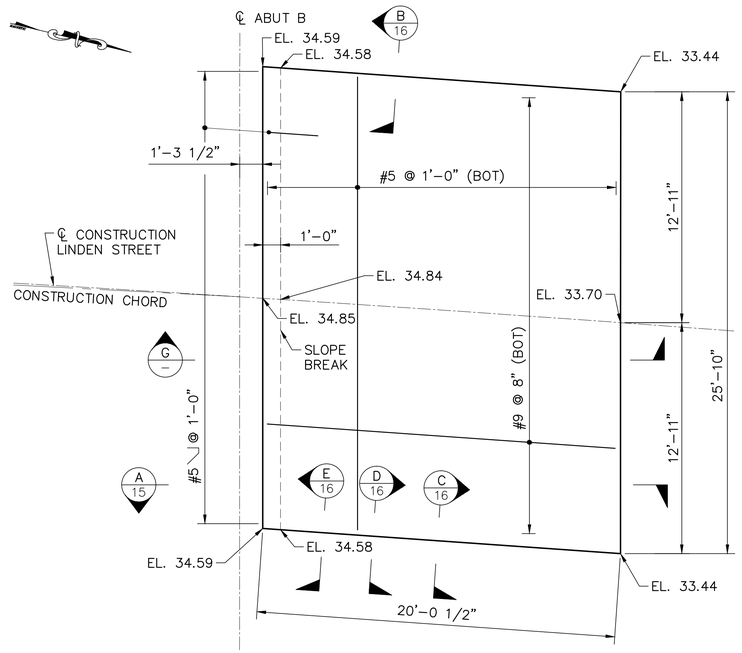
Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Superstructure Details

drawing no.
B-15

sheet: 16 of 29



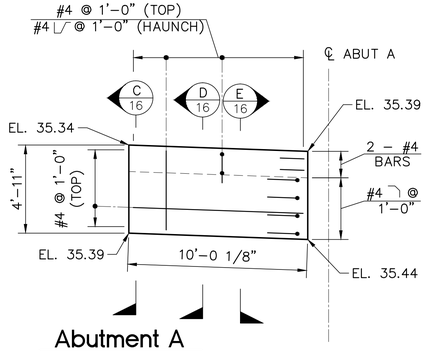
Abutment A



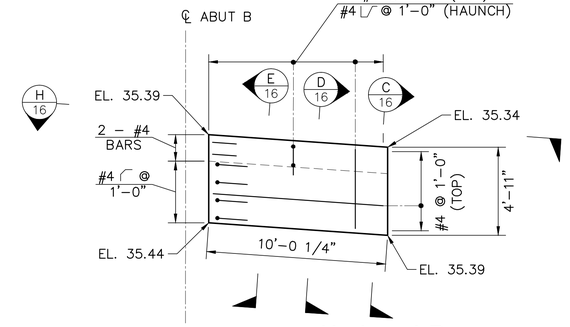
Abutment B

Approach Slab Plan

Scale: 1/4"=1'–0"



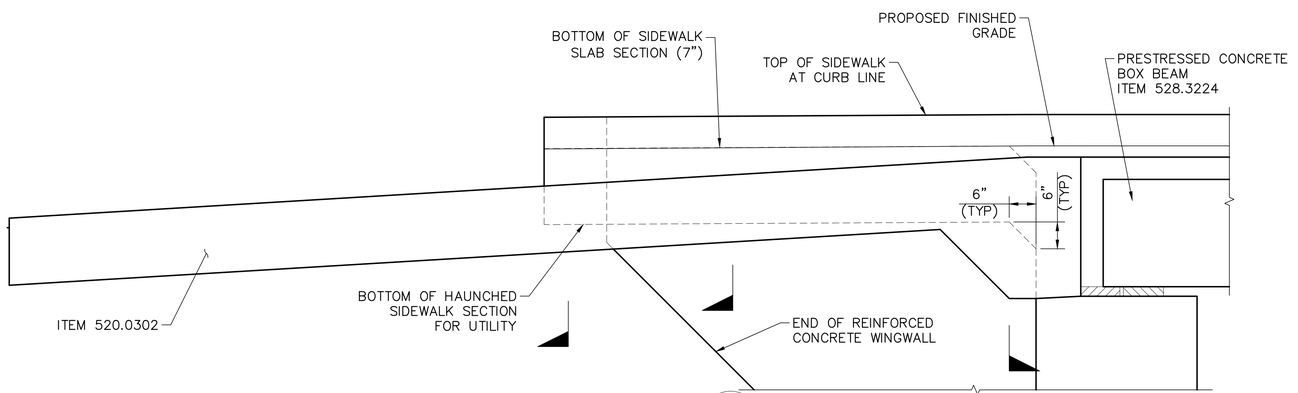
Abutment A



Abutment B

Sidewalk Approach Slab Plan

Scale: 1/4"=1'–0"



Section A

Scale: 3/4"=1'–0"

no.	revision	date	by
0	AS-BUILT	1/8/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-5196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com
www.cmaengineers.com

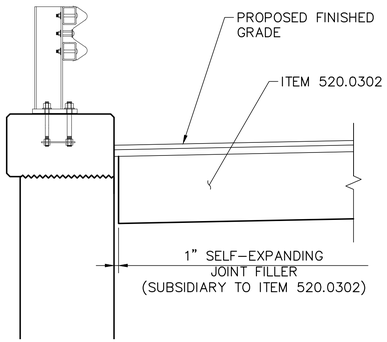
JASON L. GALLANT No. 10581 STATE OF NEW HAMPSHIRE - REGISTERED PROFESSIONAL ENGINEER

designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
scale: As Shown
date: July 2015
project no: 923
file name: 923 – Structural Plans.dwg

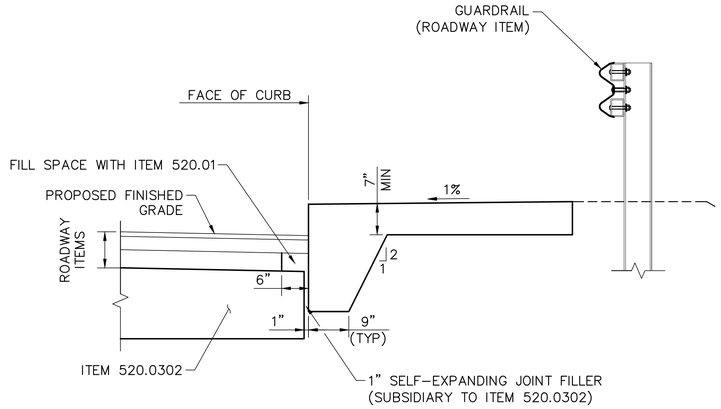
Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Approach Slab Details
(Sheet 1 of 2)

drawing no. B-16

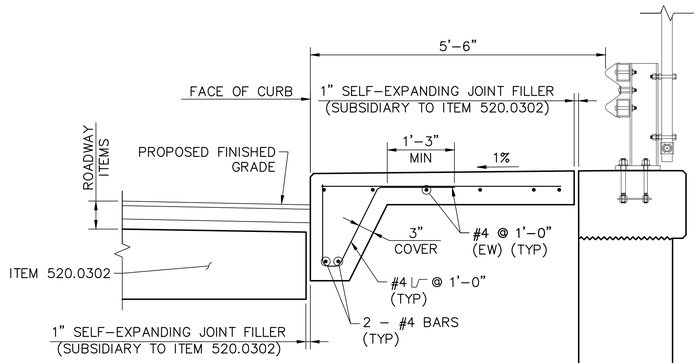
sheet: 17 of 29



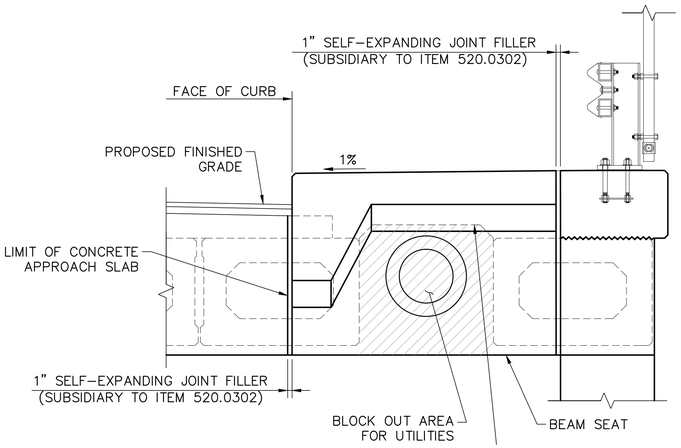
Section B 15
Scale: 3/4"=1'–0"



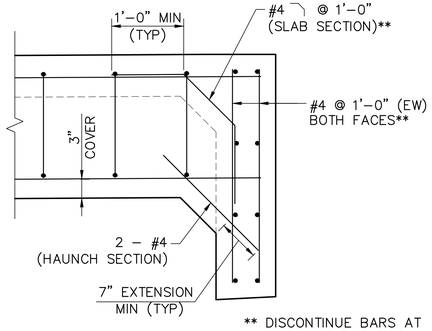
Section C 15
Scale: 3/4"=1'–0"



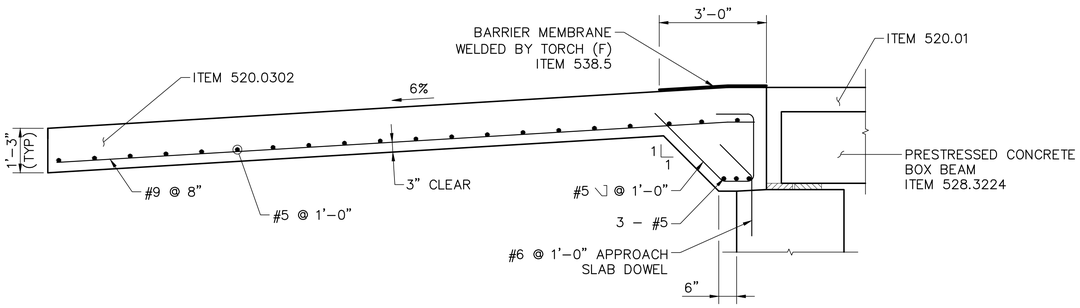
Section D 15
Scale: 3/4"=1'–0"



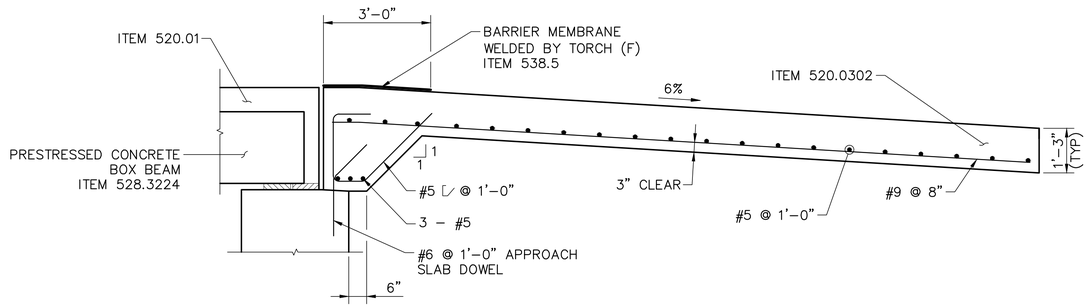
Section E 15
Scale: 3/4"=1'–0"



Section H 15
Scale: 3/4"=1'–0"



Section F 15
Scale: 1/2"=1'–0"



Section G 15
Scale: 1/2"=1'–0"

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

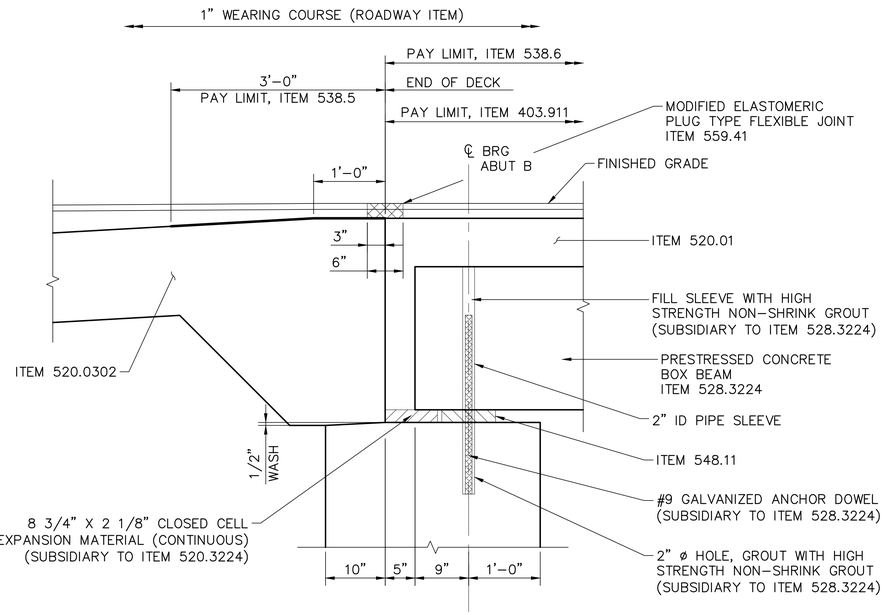
CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com
www.cmaengineers.com

JASON GALLANT No. 10641 STATE OF NEW HAMPSHIRE - REGISTERED PROFESSIONAL ENGINEER

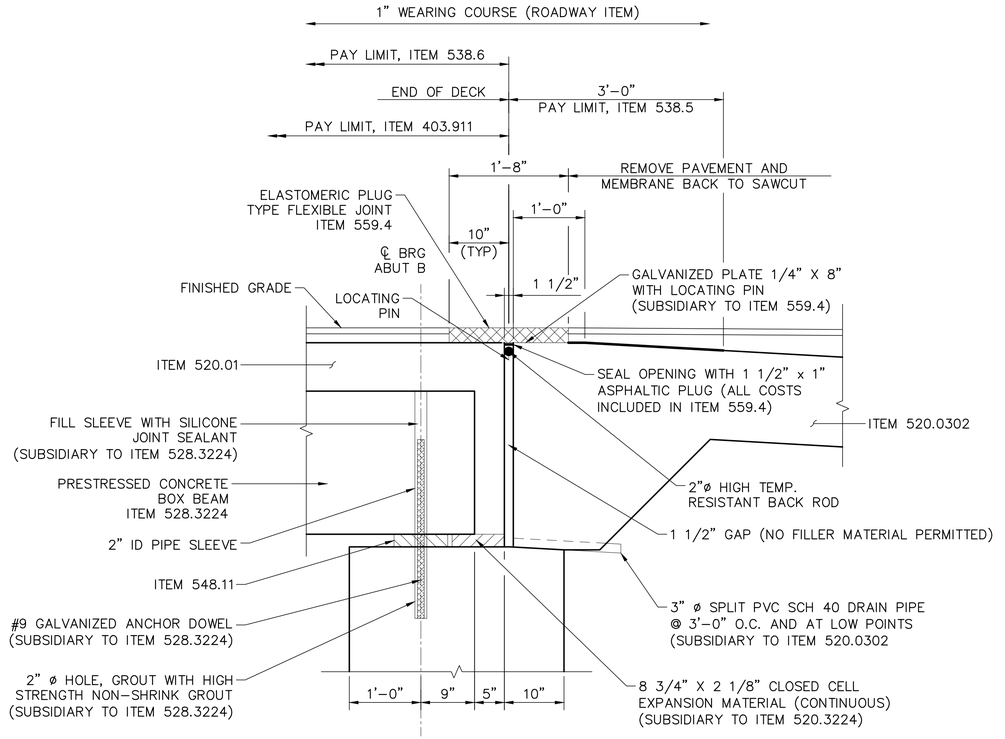
designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
scale: As Shown
date: July 2015
project no: 923
file name: 923 - Structural Plans.dwg

Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Approach Slab Details
(Sheet 2 of 2)

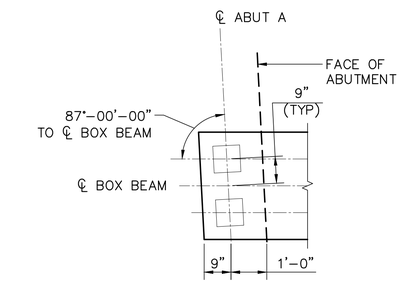
drawing no. B-17
sheet: 18 of 29



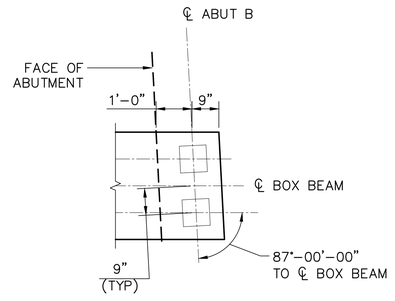
Abutment A
Scale: 1"=1'–0"



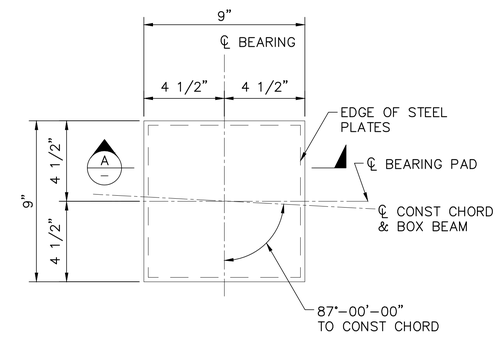
Abutment B
Scale: 1"=1'–0"



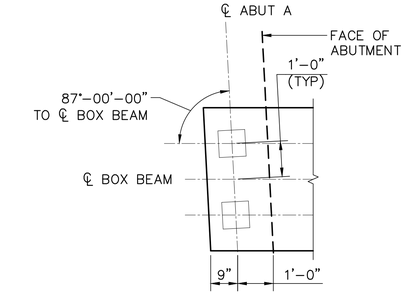
Bearing Layout (Abut A) (3 Ft Beam)
Scale: 1/2"=1'–0"



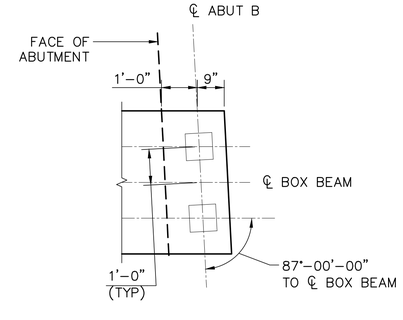
Bearing Layout (Abut B) (3 Ft Beam)
Scale: 1/2"=1'–0"



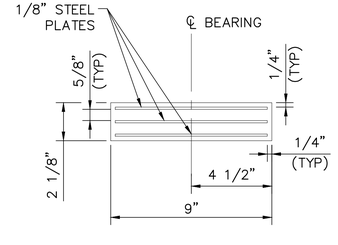
Bearing Plan
Scale: 3"=1'–0"



Bearing Layout (Abut A) (4 Ft Beam)
Scale: 1/2"=1'–0"



Bearing Layout (Abut B) (4 Ft Beam)
Scale: 1/2"=1'–0"



Section A
Scale: 3"=1'–0"

CMA ENGINEERS
Civil/Environmental Engineers
35 Bow Street, Portsmouth, NH 03801, 603/431-8196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com
www.cmaengineers.com

no.	revision	date	by
0	AS-BUILT	1/8/16	JLG

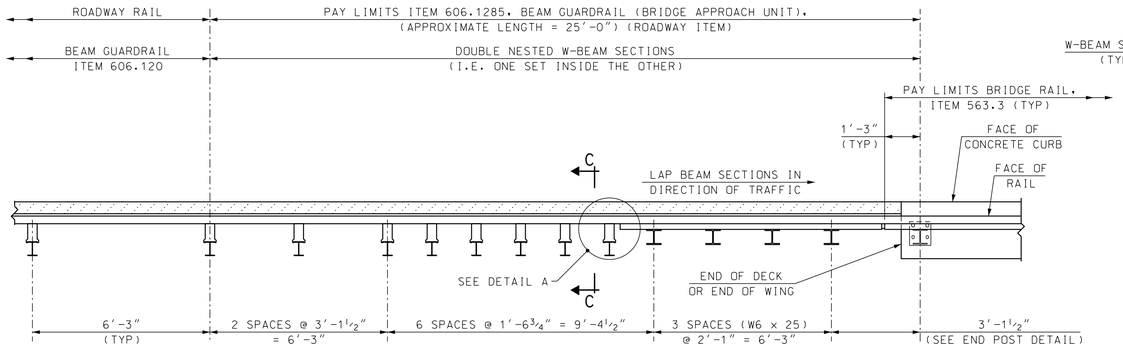
JASON L. GALANT No. 10561 LICENSED PROFESSIONAL ENGINEER – STATE OF NEW HAMPSHIRE

designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
date: July 2015
project no: 923
file name: 923 - Structural Plans.dwg
scale: As Shown

Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Bearing and Joint Details

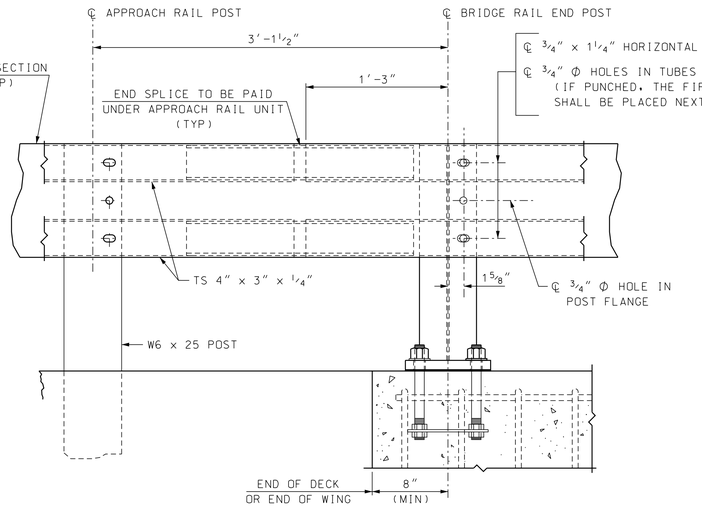
drawing no. B-18

sheet: 19 of 29



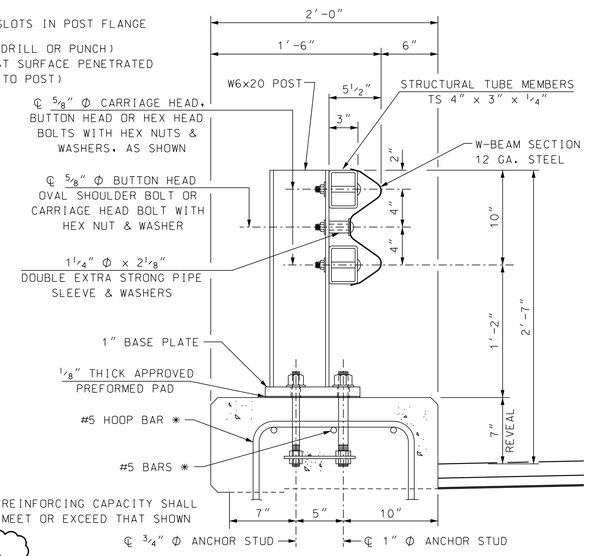
APPROACH RAIL LAYOUT

SCALE: 3/8" = 1'-0"



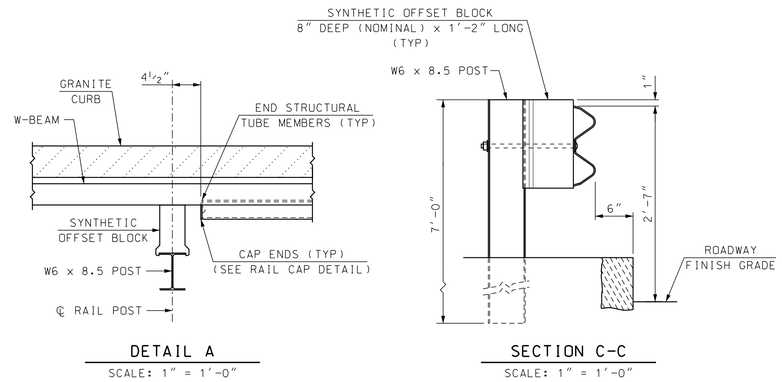
END POST DETAIL

SCALE: 1 1/2" = 1'-0"



BRIDGE RAIL DETAIL

SCALE: 1 1/2" = 1'-0"

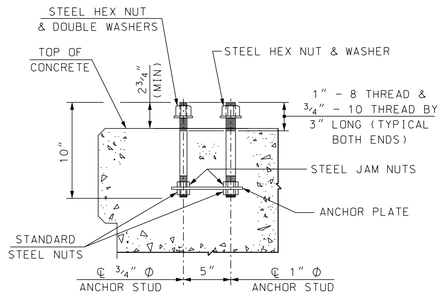


DETAIL A

SCALE: 1" = 1'-0"

SECTION C-C

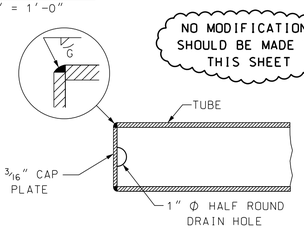
SCALE: 1" = 1'-0"



POST ANCHOR ASSEMBLY

SCALE: 1 1/2" = 1'-0"

NO MODIFICATIONS SHOULD BE MADE TO THIS SHEET



RAIL CAP DETAIL (BOTTOM VIEW)

SCALE: 3" = 1'-0"

GENERAL NOTES

(1) BRIDGE RAIL T101 SHALL NOT BE USED ON NATIONAL HIGHWAY SYSTEMS.

(2) BRIDGE RAIL T101 WAS SUCCESSFULLY CRASHED TESTED FOR NCHRP 350 (@ HEIGHT OF 2'-3"), TL-3 PER FHWA MAY 30, 1997 MEMORANDUM. USE OF THIS SYSTEM SHALL BE FOR POSTED SPEEDS ≤45 mph.

(3) ITEM 563.3, BRIDGE RAIL T101, SHALL INCLUDE POSTS, BASE PLATES, ANCHOR PLATES, ANCHOR STUDS, PREFORMED PADS, RAIL ASSEMBLY BOLTS, NUTS, WASHERS, STRUCTURAL TUBING, SPLICE BARS, PIPE SLEEVES AND W-BEAM SECTIONS.
- ASTM A572 GRADE 50 : POSTS AND BASE PLATES
- ASTM A500 GRADE B : STRUCTURAL TUBING
- ASTM A36 : PIPE SLEEVES, RAIL SPLICE BARS AND ANCHOR PLATES
- ASTM A449 : ANCHOR STUDS WITH STANDARD NUTS AND HARDENED STEEL COMMERCIAL TYPE A PLAIN WIDE WASHERS
- A307 : RAIL BOLTS, NUTS, AND WASHERS
- AASHTO M180 TYPE II : W-BEAM SECTIONS

(4) ALL STEEL COMPONENTS SHALL BE GALVANIZED AFTER FABRICATION IN CONFORMANCE WITH AASHTO M232 (ASTM A153) AND AASHTO M111 (ASTM A123). GALVANIZED SURFACES SHALL HAVE A UNIFORM APPEARANCE AND GALVANIZED MATERIAL SHALL BE PROPERLY STORED.

(5) STRUCTURAL TUBING SHALL BE SUPPLIED AS ONE PIECE FOR BRIDGE RAIL 40 FEET OR LESS IN LENGTH. IN OTHER CASES, TUBING SHALL BE SPLICED WITH A SPLICE BAR (SEE SPLICE BAR DETAILS). NO TRANSVERSE BUTT WELDS ARE PERMITTED ON RAIL TUBING WITHIN A CONTINUOUS LENGTH.

(6) EACH PIECE OF RAIL TUBING SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

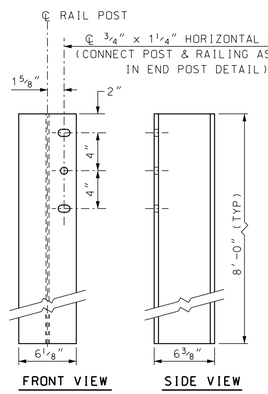
(7) FOR BRIDGE RAIL POST SPACING, SEE BRIDGE RAIL LAYOUT. THE MAXIMUM BRIDGE RAIL POST SPACING SHALL BE 8'-4". POST SPACING OF 8'-4" OR 6'-3" IS RECOMMENDED WHENEVER POSSIBLE FOR USE WITH 25' SECTIONS OF STANDARD W-BEAM RAIL.

(8) PREFORMED BEARING PADS SHALL CONFORM TO AASHTO M251.

(9) NUTS FOR THREADED ANCHOR STUDS CONNECTING THE BASE PLATE TO THE CONCRETE SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL 1/8 TURN.

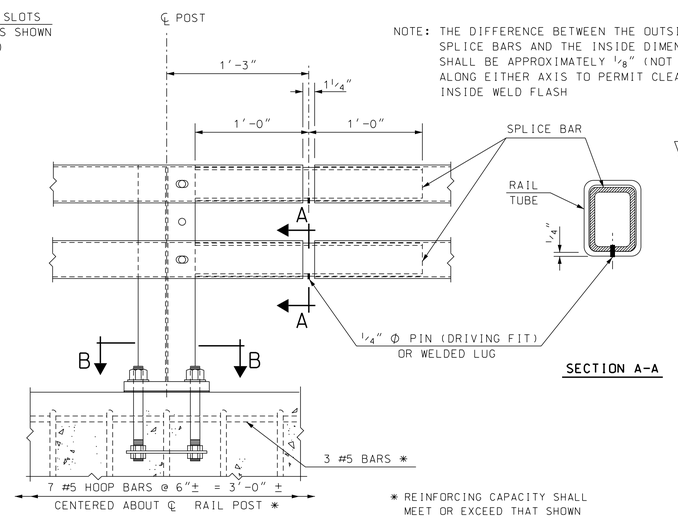
(10) OTHER TYPES OF OFFSET BLOCKS MAY BE SUBSTITUTED FOR THOSE SHOWN. SEE NOTES IN STANDARD PLAN GR-2 (BEAM GUARDRAIL STANDARD SECTION - STEEL POSTS & HARDWARE DETAILS) OF THE HIGHWAY DESIGN STANDARD PLANS FOR ROAD CONSTRUCTION.

(GALVANIZED - 7" CURB REVEAL)



W6 x 25 STEEL POST (BRIDGE APPROACH RAIL)

SCALE: 1 1/2" = 1'-0"

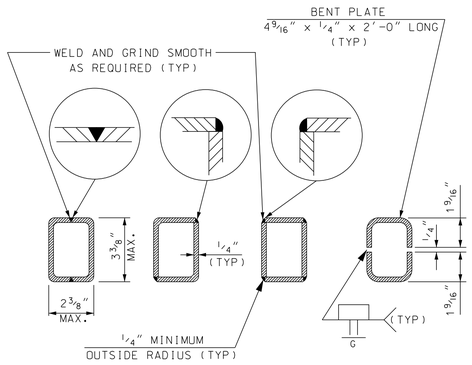


NOTE: THE DIFFERENCE BETWEEN THE OUTSIDE DIMENSIONS OF SPLICE BARS AND THE INSIDE DIMENSIONS OF THE RAIL SHALL BE APPROXIMATELY 1/8" (NOT TO EXCEED 3/16") ALONG EITHER AXIS TO PERMIT CLEARANCE FOR INSIDE WELD FLASH

* REINFORCING CAPACITY SHALL MEET OR EXCEED THAT SHOWN

TYPICAL SPLICE

SECTION A-A

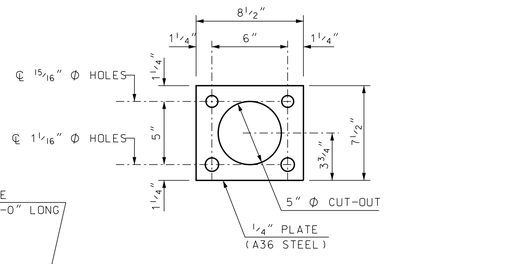


NOTE: OTHER SECTIONS OF EQUAL OR GREATER STRENGTH ARE ACCEPTABLE FOR SPLICE BARS

SPLICE BAR FABRICATION OPTIONS

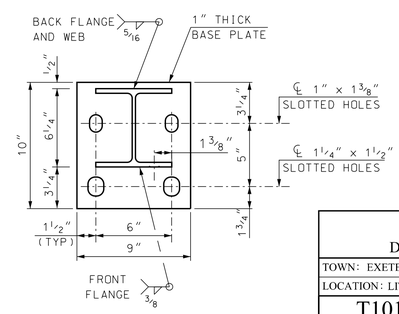
SPLICE BAR DETAILS

NOT TO SCALE



ANCHOR PLATE DETAIL

SCALE: 2" = 1'-0"



BASE PLATE DETAIL (SECTION B-B)

SCALE: 2" = 1'-0"

CMA ENGINEERS

SUBDIRECTORY	.DGN LOCATOR	SHEET SCALE
		AS NOTED

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN

TOWN: EXETER BRIDGE NO.: 087/062 STATE PROJECT

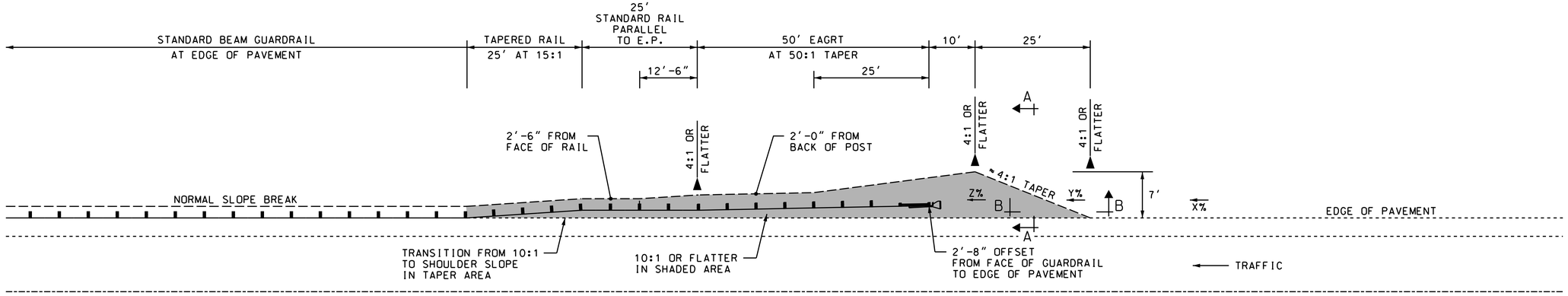
LOCATION: LITTLE RIVER CROSSING AT LINDEN STREET

T101 BRIDGE & APPROACH RAIL (STEEL POSTS)

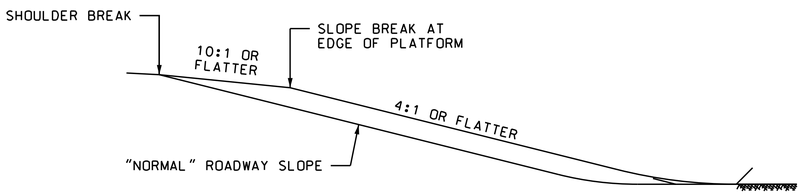
BRIDGE SHEET 19 OF 21

FILE NUMBER

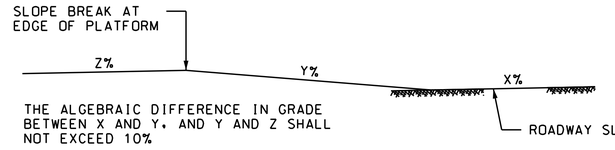
	REVISIONS AFTER PROPOSAL		BY	DATE	BY	DATE
1	ADDED T3 RAIL DETAILS	1/30/13	DESIGNED NHDOT	3/90	CHECKED NHDOT	
			DRAWN NHDOT	1/10	CHECKED NHDOT	1/10
			QUANTITIES LBK	3/15	CHECKED SCK	5/15
			ISSUE DATE 1/20/10		FEDERAL PROJECT NO.	SHEET NO. 20
			REV. DATE 3/30/14			TOTAL SHEETS 29



50' EAGRT UNIT



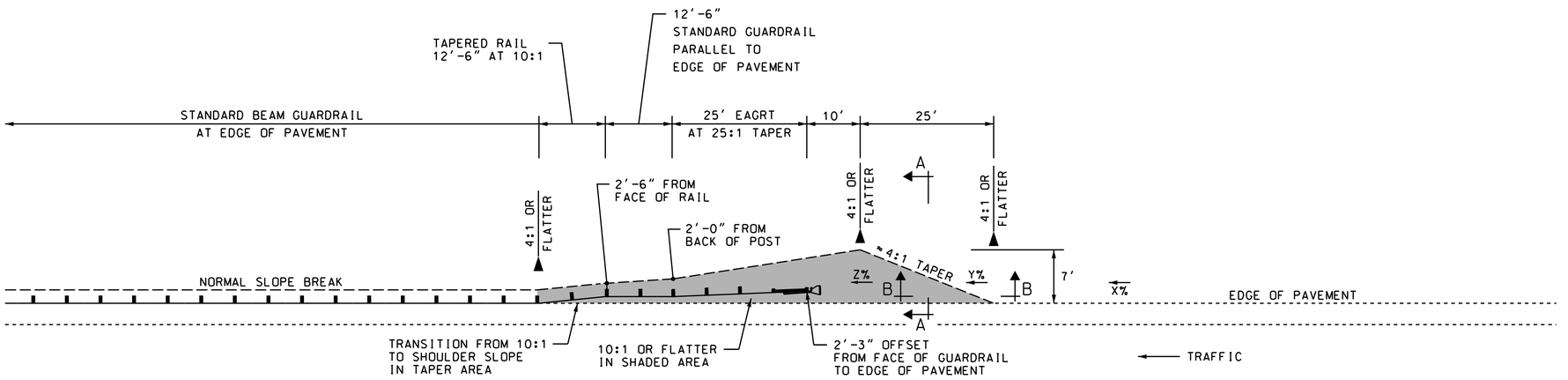
SECTION A-A
PLATFORM SLOPE GRADING



THE ALGEBRAIC DIFFERENCE IN GRADE BETWEEN X AND Y. AND Y AND Z SHALL NOT EXCEED 10%

X: LONGITUDINAL GRADE OF ROADWAY SLOPE IN ADVANCE OF PLATFORM
Y: LONGITUDINAL GRADE OF PLATFORM APPROACH
Z: LONGITUDINAL GRADE OF PLATFORM

SECTION B-B
PLATFORM APPROACH GRADING



25' EAGRT UNIT

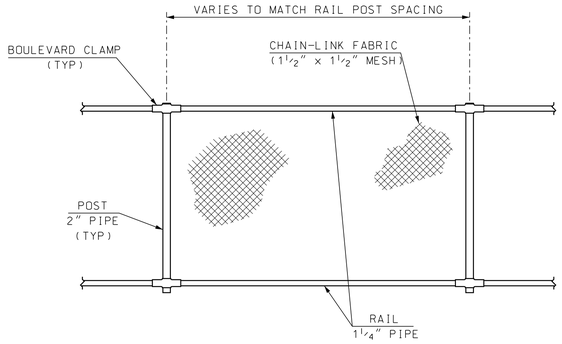
CMA ENGINEERS

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION ◦ BUREAU OF HIGHWAY DESIGN

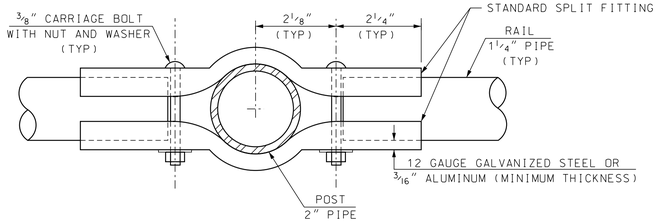
ALTERNATIVE PLATFORM FOR OFFSET ENERGY ABSORBING GUARDRAIL TERMINAL (EAGRT)

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11/24/14			21	29



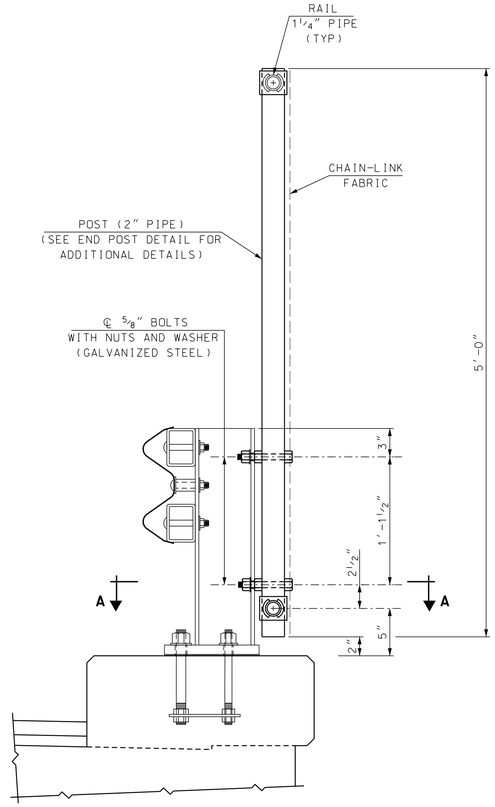
ELEVATION - SNOW SCREENING

SCALE: 1/2" = 1'-0"



BOULEVARD CLAMP DETAIL

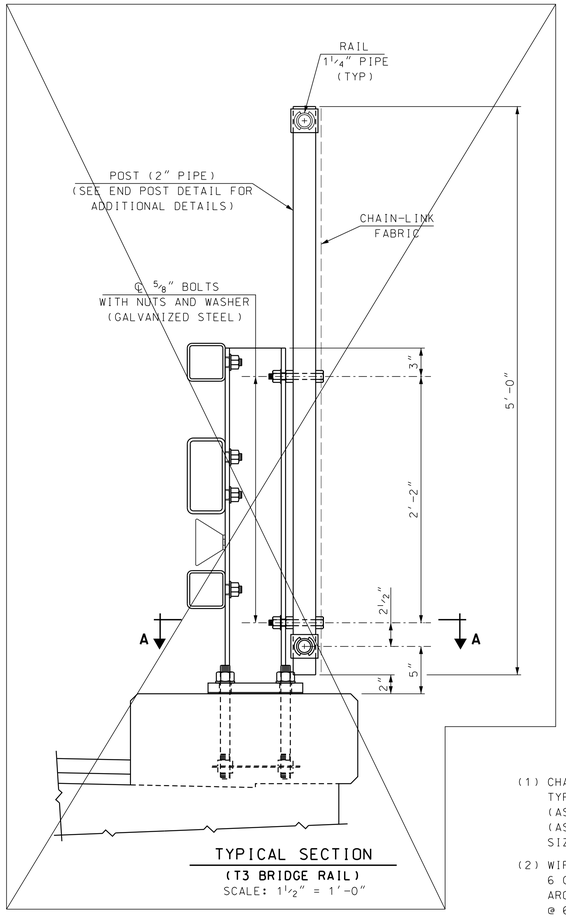
SCALE: 6" = 1'-0"



TYPICAL SECTION

(T101 BRIDGE RAIL)

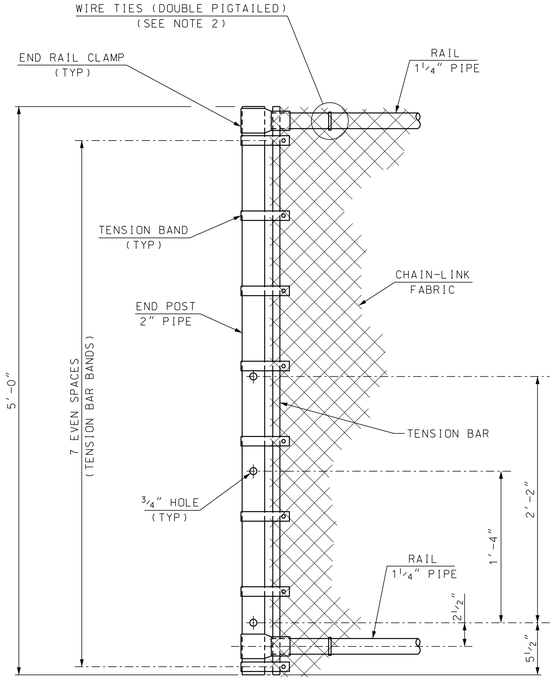
SCALE: 1 1/2" = 1'-0"



TYPICAL SECTION

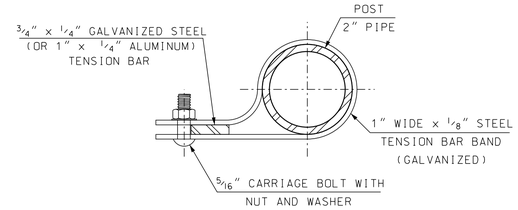
(T3 BRIDGE RAIL)

SCALE: 1 1/2" = 1'-0"



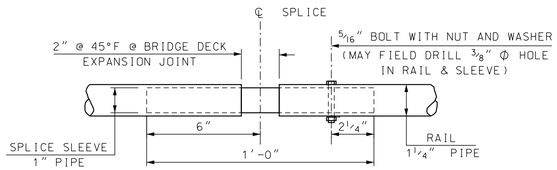
END POST DETAIL

SCALE: 1 1/2" = 1'-0"



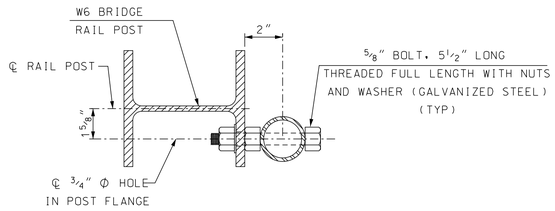
TENSION BAND DETAIL

SCALE: 6" = 1'-0"



RAIL SPLICE DETAIL

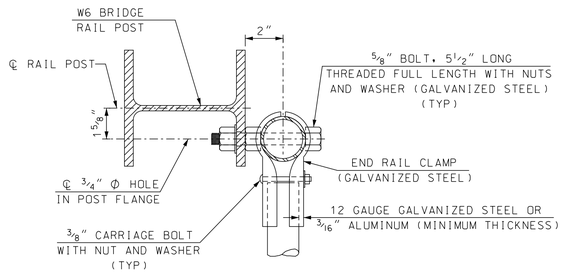
SCALE: 3" = 1'-0"



SECTION A-A

(AT INTERIOR POST)

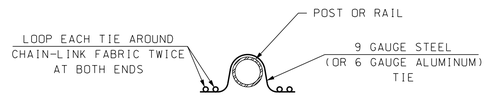
SCALE: 3" = 1'-0"



SECTION A-A

(AT END POST)

SCALE: 3" = 1'-0"



DOUBLE PIGTAILED TIE

NOT TO SCALE

GENERAL NOTES

(1) CHAIN-LINK FABRIC SHALL BE 9 GAUGE STEEL, ZINC-COATED CONFORMING TO AASHTO M 181, TYPE I, CLASS D (ASTM A 392), ALUMINUM-COATED CONFORMING TO AASHTO M 181, TYPE II (ASTM A 491) OR 6 GAUGE ALUMINUM ALLOY CONFORMING TO AASHTO M 181, TYPE III (ASTM F 1183). CHAIN-LINK FABRIC SHALL BE KNUCKLED ON TOP AND BOTTOM. THE SIZE OF WIRE MESH (FABRIC) SHALL BE 1 1/2".

(2) WIRE TIES SHALL BE STANDARD ROUND 9 GAUGE ZINC- OR ALUMINUM-COATED STEEL OR 6 GAUGE ALUMINUM ALLOY CONFORMING TO ASTM F 626. ALL TIES SHALL BE WRAPPED AROUND CHAIN-LINK FABRIC TWICE (DOUBLE PIGTAILED) AT BOTH ENDS. SPACE TIES @ 6" O.C. TO BOTTOM RAIL AND @ 12" O.C. TO ALL POSTS AND OTHER RAILS.

(3) POST AND RAIL PIPE SHALL BE HOT-DIP GALVANIZED STEEL CONFORMING TO AASHTO M 181, GRADE 1 (ASTM F 1083) OR ALUMINUM ALLOY CONFORMING TO AASHTO M 181 (ASTM B 429, ALLOY 6063-T6). ALL PIPE SHALL BE SCHEDULE 40, STANDARD WEIGHT. NOMINAL PIPE SIZES ARE SHOWN IN THE DRAWINGS.

(4) TENSION BARS, BAR BANDS, BOULEVARD AND END RAIL CLAMPS SHALL BE STEEL OR ALUMINUM ALLOY CONFORMING TO AASHTO M 181 (ASTM F 626). STEEL COMPONENTS SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M 111 (ASTM A 123) OR AASHTO M 232 (ASTM A 153) AS APPLICABLE.

(5) ALL BOLTS AND NUTS SHALL BE STEEL CONFORMING TO ASTM A 307 AND ASTM A 563 GRADE A RESPECTIVELY. WASHERS SHALL BE HARDENED STEEL COMMERCIAL TYPE A PLAIN AND SHALL MEET THE DIMENSIONAL REQUIREMENTS OF ANSI B18.22. ALL BOLTS, NUTS AND WASHERS SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M 111 (ASTM A 123) OR AASHTO M 232 (ASTM A 153) AS APPLICABLE.

(6) RAIL SPLICES SHALL BE PROVIDED AT BRIDGE DECK EXPANSION JOINT(S) AND BRIDGE RAIL SPLICES AS DIRECTED BY THE CONTRACT ADMINISTRATOR.

(7) RAIL MAY BE FIELD CUT (SAWN) TO FIT POST SPACING. GALVANIZED RAIL, CUT OR DRILLED AS ALLOWED, SHALL BE TOUCHED-UP IN ACCORDANCE WITH 563.3.2.2.3.

(8) ALL COSTS FOR CHAIN-LINK FABRIC, POSTS, RAILS AND APPURTENANCES SHALL BE INCLUDED IN ITEM 563.353, BRIDGE RAIL T101 WITH SNOW SCREENING.

(9) SEE BRIDGE RAIL SHEET FOR ADDITIONAL DETAILS.

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE DESIGN

TOWN: EXETER | BRIDGE NO.: 087/062 | STATE PROJECT

LOCATION: LITTLE RIVER CROSSING AT LINDEN STREET

SNOW SCREEN WITH T101 BRIDGE RAIL

BRIDGE SHEET: 21 OF 21

	REVISIONS		BY	DATE		BY	DATE
1	ADDED T3 RAIL DETAILS	1/30/13	DESIGNED NHDOT	8/10	CHECKED NHDOT	8/10
			DRAWN NHDOT	8/10	CHECKED NHDOT	8/10
			QUANTITIES LBK	3/15	CHECKED SCK	5/15
			ISSUE DATE 2/98		FEDERAL PROJECT NO.	SHEET NO. 22	TOTAL SHEETS 29
			REV. DATE 12/20/13				

FILE NUMBER

CMA ENGINEERS

SUBDIRECTORY	.DGN LOCATOR	SHEET SCALE
		AS NOTED

General Notes:

1) ALL WORK SHALL BE IN CONFORMANCE WITH CURRENT NHDOT STANDARD SPECIFICATIONS, DETAILS, AND THE TOWN OF EXETER REQUIREMENTS.

2) ENGINEER SHALL BE DEFINED AS THE RESIDENT ENGINEER / OWNER'S REPRESENTATIVE, WHO IS RESPONSIBLE FOR ENGINEERING OBSERVATION DURING CONSTRUCTION, ACTING DIRECTLY OR THROUGH HIS DULY AUTHORIZED REPRESENTATIVES.

3) THE CONTRACTOR SHALL VERIFY ALL EXISTING UTILITY LOCATIONS PUBLIC OR PRIVATE, SHOWN OR NOT SHOWN, PRIOR TO CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES FOUND INTERFERING WITH PROPOSED CONSTRUCTION AND THE APPROPRIATE REMEDIAL ACTION SHALL BE TAKEN BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL NOTIFY DIG-SAFE (1-800-DIG-SAFE) AT LEAST 72 HOURS PRIOR TO THE BEGINNING OF WORK TO CONFIRM THE LOCATION OF UNDERGROUND UTILITIES.

4) THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING THE HORIZONTAL AND VERTICAL CONTROL THROUGHOUT THE PROJECT.

5) THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING RESIDENTS OF ANY WORK RESTRICTING ACCESS TO ANY DRIVEWAY 24 HOURS IN ADVANCE.

6) SURVEY DATA FOR THIS PROJECT WAS COLLECTED BY DOUCET SURVEY, INC. IN JUNE 2014. HORIZONTAL DATUM BASED ON NHSPC (2800) NAD83 (US FEET). VERTICAL DATUM IS BASED ON NHDOT DISK B 13 1934 ELEV. = 60.47 (NGVD29).

7) ALL MAIL BOXES SHALL REMAIN AT THE SAME LOCATION AND BE RESET TO SAME HEIGHT IF TEMPORARY REMOVAL IS NECESSARY.

8) THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING OR RE-ESTABLISHING ALL PROPERTY MONUMENTATION (IRON PIPE, REBAR BOUNDS, ETC.). THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT.

9) FOR STANDARD PLANS, SEE THE NHDOT "STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION" DATED 2010 (A BOUND BOOK).

10) OVERHEAD UTILITY LINES ARE LOCATED THROUGHOUT THE PROJECT WITH CROSSINGS AT VARIOUS LOCATIONS AND RUNNING ALONG THE ROAD THROUGHOUT THE PROJECT. THE CONTRACTOR IS ADVISED THAT EXTREME CAUTION WILL BE REQUIRED IN THE OPERATION OF EQUIPMENT, ESPECIALLY CRANES.

11) REMOVE TOPSOIL FOR ITS TOTAL DEPTH WITHIN THE LIMITS OF THE SLOPE LINES, UNLESS OTHERWISE DIRECTED. STOCKPILE TOPSOIL AND USE IT ON THIS PROJECT AS NEEDED UNDER SECTION 646.51 – TURF ESTABLISHMENT WITH MULCH, TACKIFIERS AND LOAM. STOCKPILE LOCATION SHALL BE DETERMINED BY THE CONTRACTOR WITHIN THE RIGHT-OF-WAY OR OFF SITE. ALL COST FOR STOCKPILING OF TOPSOIL SHALL BE INCLUDED IN THE APPROPRIATE 646 ITEM OF THIS CONTRACT.

12) PERFORM ALL WORK WITHIN THE EXISTING RIGHT-OF-WAY OR ACQUIRED TEMPORARY RIGHT-OF-ENTRY LIMITS.

13) CONTRACTOR SHALL PLACE BARRICADES IN A MANNER THAT WILL PROVIDE CONTINUOUS AND UNRESTRICTED ACCESS FOR RESIDENTS WITHIN THE PROJECT LIMITS.

Survey Notes:

1) FIELD SURVEY AND RIGHT-OF-WAY DELINEATION PERFORMED BY DOUCET SURVEY INC. BY J.P.E. & P.J.S. DURING 06/14 USING A TRIMBLE 5603 DR 200 PLUS TOTAL STATION WITH A TDS RANGER DATA COLLECTOR AND A SOKKIA B21 AUTO/TRIMBLE DINI DIGITAL LEVEL. TRAVERSE ADJUSTMENT BASED ON LEAST SQUARE ANALYSIS.

2) JURISDICTIONAL WETLANDS DELINEATED BY NHSC, INC., A GZA COMPANY, DURING JUNE 2014 IN ACCORDANCE WITH 1987 CORPS OF ENGINEERS WETLANDS DELINEATIONS MANUAL, TECHNICAL REPORT Y-87-1.

3) HORIZONTAL DATUM BASED ON NEW HAMPSHIRE STATE PLANE(2800) NAD83(2011) DERIVED FROM STATIC GPS OBSERVATIONS PROCESSED BY THE NATIONAL GEODETIC SURVEY ON-LINE POSITIONING USER SERVICE (OPUS).

4) VERTICAL DATUM IS BASED ON NGVD29. LINDEN ST. DISK STAMPED B 13 1934 ELEV.=60.47 AND COURT ST. DISK STAMPED B 14 1934 ELEV.=37.67.

5) THE ACCURACY OF MEASURED UTILITY INVERTS AND PIPE SIZES/TYPES IS SUBJECT TO NUMEROUS FIELD CONDITIONS, INCLUDING; THE ABILITY TO MAKE VISUAL OBSERVATIONS, DIRECT ACCESS TO THE VARIOUS ELEMENTS, MANHOLE CONFIGURATION, ETC.

6) UNDERGROUND UTILITY DATA WAS MARKED BY DIGSMART OF MAINE TO ASCE QUALITY LEVEL B. THIS DATA IS FOR PLANNING PURPOSES ONLY AND DOUCET SURVEY DOES NOT GUARANTEE THE ACCURACY OR EXISTENCE OF THE DATA PROVIDED. ON-SITE INSPECTION SHOULD BE CONDUCTED PRIOR FINAL DESIGN AND/OR CONSTRUCTION

7) DUE TO THE COMPLEXITY OF RESEARCHING ROAD RECORDS AS A RESULT OF INCOMPLETE, UNORGANIZED, INCONCLUSIVE, OBLITERATED, OR LOST DOCUMENTS, THERE IS AN INHERENT UNCERTAINTY INVOLVED WHEN ATTEMPTING TO DETERMINE THE LOCATION AND WIDTH OF A ROADWAY RIGHT OF WAY. THE EXTENT OF THE ROADS AS DEPICTED HEREON ARE BASED ON PHYSICAL EVIDENCE FOUND AND RECORD PLANS OBTAINED THROUGH RESEARCH CONDUCTED AT THE ROCKINGHAM COUNTY REGISTRY OF DEEDS AND THE TOWN OF EXETER MUNICIPAL OFFICES.

8) FLOOD HAZARD ZONE: "AE", PER FIRM MAP #33015C0402E, DATED 5/17/05.

PAVEMENT COURSES				
COURSE	MINIMUM LIFT THICKNESS	NOMINAL MAX. AGGREGATE SIZE	GYRATORY COMPACTION EFFORT	MINIMUM BINDER CONTENT*
WEARING	1"	3/8"	75	6.0%
BINDER	3"	3/4"	50	4.9%
BRIDGE-BINDER	1 1/2"	3/4"	50	4.9%

*SEE ROADWAY NOTES

Erosion Control Notes:

1) THE CONTRACTOR IS RESPONSIBLE FOR THE DEVELOPMENT AND APPROVAL OF THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP).

2) PRIOR TO CONSTRUCTION AND THEREAFTER, EROSION CONTROL MEASURES ARE TO BE IMPLEMENTED AS NECESSARY. THE SMALLEST PRACTICAL AREA OF LAND SHOULD BE EXPOSED AT ANY ONE TIME DURING CONSTRUCTION. WHEN LAND IS EXPOSED DURING CONSTRUCTION, THE EXPOSURE SHOULD BE KEPT TO THE SHORTEST PRACTICAL PERIOD OF TIME. ANY DISTURBED AREAS THAT ARE TO BE LEFT UN-STABILIZED LONGER THAN TWO WEEKS SHALL BE TEMPORARILY SEEDED AND MULCHED AT THE RATE OF 2 TONS PER ACRE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL REMEDIAL WORK REQUIRED TO REPAIR AREAS WHICH ARE DAMAGED BY EROSION.

3) HAY BALE BARRIERS SHALL BE INSTALLED AND MAINTAINED AT DRAIN INLETS AND OUTLETS AND ALONG LIMITS OF WORK WHERE NECESSARY. HAY BALE BARRIERS SHALL NOT BE PLACED CLOSER THAN 25-FEET TO DRAIN INLETS AND OUTLETS. ADDITIONAL HAY BALES SHALL BE ADDED AS REQUIRED BY THE ENGINEER. HAY BALES WILL BE STAKED AND MAINTAINED PRIOR TO AND DURING CONSTRUCTION UNTIL DISTURBED AREAS HAVE A HEALTHY STAND OF GRASS.

4) ALL DISTURBED AREAS AND SIDE SLOPES THAT ARE AT ARE FINISH GRADED WITH NO FURTHER CONSTRUCTION TAKING PLACE SHALL BE TRACKED, SEEDED (IN ACCORDANCE WITH SECTION 644 OF THE STANDARD SPECIFICATIONS) AND MULCHED. ALL SEED, LIME AND FERTILIZER PROGRAMS SHALL CONFORM TO ALL APPLICABLE SECTIONS OF THE SPECIFICATIONS (SECTION 642 AND SECTION 643).

5) CONSTRUCTION TRAFFIC SHALL TRAVEL THE ROADBEDS OF EXISTING ROADS.

6) SILT FENCE SHALL BE INSTALLED AND MAINTAINED WHERE NECESSARY AND ADDITIONAL SILT FENCE ADDED AS REQUIRED BY THE ENGINEER PRIOR TO ANY ON-SITE GRADING OR DISTURBANCE OF EXISTING SURFACE MATERIAL. GENERALLY, SILT FENCE SHALL BE INSTALLED TO PREVENT MIGRATION OF THE SEDIMENT FROM THE WORK AREA. IT SHOULD BE MAINTAINED DURING AND AFTER CONSTRUCTION TO REMOVE SEDIMENT FROM NATURAL DRAINAGE WAYS. THE SILT FENCE IS TO BE MAINTAINED AND CLEANED UNTIL ALL SLOPES HAVE A HEALTHY STAND OF GRASS.

7) AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE TEMPORARY EROSION CONTROL MEASURES ARE TO BE REMOVED AND ACCUMULATED SEDIMENT DISPOSED OF IN A LOCATION DESIGNATED BY THE OWNER.

8) HAY BALES AND MULCH SHALL BE MOWINGS OF ACCEPTABLE HERBACEOUS GROWTH, FREE FROM NOXIOUS WEEDS OR WOODY STEMS AND SHALL BE DRY.

9) SILT FENCES SHALL BE A MINIMUM OF 36 INCHES HIGH WITH THE BOTTOM OF THE CLOTH KEYING INTO THE GROUND. POSTS SHALL BE OF WOOD OR STEEL.

10) THE EROSION CONTROL DEVICES DESCRIBED AND AS SPECIFIED IN THE SPECIFICATIONS REPRESENT THE MINIMUM REQUIRED MEASURES FOR EROSION CONTROL. THE CONTRACTOR SHALL ADD TO THESE DEVICES ANY OTHER MEASURES AS REQUIRED OR AS DIRECTED BY THE ENGINEER TO EFFECTIVELY PREVENT MIGRATION OF SEDIMENT FROM THE WORK AREA AND PROTECT WETLAND AREAS, WATERWAYS, EXISTING AND PROPOSED DRAINAGE FEATURES, SLOPES, LAWNS, AND PLANTS ADJACENT TO THE WORK AREA.

Roadway Notes:

1) THE PAVEMENT SHALL BE SUPERPAVE MIXTURE WITH PERFORMANCE GRADE 64-28 LIQUID ASPHALT. TOTAL REUSED BINDER LIMITED TO 1.0% MAXIMUM. THE VOLUMETRIC MIX DESIGN SHALL BE IN ACCORDANCE WITH NHDOT SPECIFICATIONS AND AASHTO STANDARD PRACTICE R35.

2) ALL PAVEMENT EDGES SHALL BE SAWCUT. THE CONTRACTOR SHALL TRIM, TACK, AND MATCH EXISTING PAVEMENT AT LOCATIONS WHERE NEW PAVEMENT MEETS EXISTING PAVEMENT.

3) A TACK COAT SHALL BE APPLIED TO BETWEEN PAVEMENT COURSES AND TO ALL ABUTTING PAVEMENT SURFACES IN ACCORDANCE WITH NHDOT STANDARD SPECIFICATIONS AND SUPPLEMENTAL SPECIFICATION SECTION 410. THE TACK COAT SHALL BE SUBSIDIARY TO THE PAVEMENT COST.

4) PAVEMENT JOINT ADHESIVE (ITEM 403.6) SHALL BE APPLIED ON ALL LONGITUDINAL PAVEMENT JOINTS FOR ALL COURSES.

SUMMARY OF BRIDGE QUANTITIES			
ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT
201.1	CLEARING AND GRUBBING (F)	1	LS
202.43	REMOVAL OF EXIST. ASBEST. CEMENT PIPE, 0-24" DIAM	130	LF
202.7	REMOVAL OF GUARDRAIL	415	LF
203.1	COMMON EXCAVATION	235	CY
203.2	ROCK EXCAVATION	15	CY
203.6	EMBANKMENT-IN-PLACE (F)	20	CY
206.19	COMMON STRUCTURE EXCAVATION EXPLORATORY	40	CY
214	FINE GRADING	1	U
304.2	GRAVEL (F)	135	CY
304.3	CRUSHED GRAVEL (F)	165	CY
403.11	HOT BITUMINOUS PAVEMENT, MACHINE METHOD	130	TON
403.12	HOT BITUMINOUS PAVEMENT, HAND METHOD	5	TON
403.6	PAVEMENT JOINT ADHESIVE	500	LF
417	COLD PLANING BITUMINOUS SURFACES	55	SY
606.12	BEAM GUARDRAIL (STANDARD SECTION) (STEEL POST)	225	LF
606.1255	BEAM GUARDRAIL (TERMINAL UNIT TYPE EAGRT 25 FT.) (STEEL POST)	4	U
606.1285	BEAM GUARDRAIL (BRIDGE APPROACH UNIT)	4	U
608.125	2.5" BITUMINOUS SIDEWALK (F)	110	SY
~~609.01~~	~~STRAIGHT GRANITE CURB~~	~~180~~	~~LF~~
611.05212	12" CEMENT LINED DUCTILE IRON WATER PIPE, CL 52	40	LF
611.052121	12" INSULATED CEMENT LINED DUCTILE IRON WATER PIPE, CL 52	90	LF
611.70012	12" FITTING (HYMAX TRANSITION COUPLING)	2	EA
611.70012	12" INSULATED FITTING	2	EA
611.71012	12" GATE VALVE	4	EA
618.6	UNIFORMED OFFICERS	2500	$
619.1	MAINTENANCE OF TRAFFIC	1	LS
628.2	SAWED BITUMINOUS PAVEMENT	110	LF
632.0104	RETROREFLECTIVE PAINT PAVE. MARKING, 4" LINE	1000	LF
645.531	SILT FENCE	600	LF
645.7	STORM WATER POLLUTION PREVENTION PLAN	1	U
645.71	MONITORING SWPPP AND EROSION AND SEDIMENT CONTROLS	50	HR
646.51	TURF ESTABLISHMENT WITH MULCH, TACKIFIERS, AND LOAM	450	SY
692	MOBILIZATION	1	U
609.812	BITUMINOUS CURB, TYPE A	180	LF

Guardrail Notes:

1) GUARDRAIL BLOCKOUTS SHALL BE SYNTHETIC BLOCKOUTS.

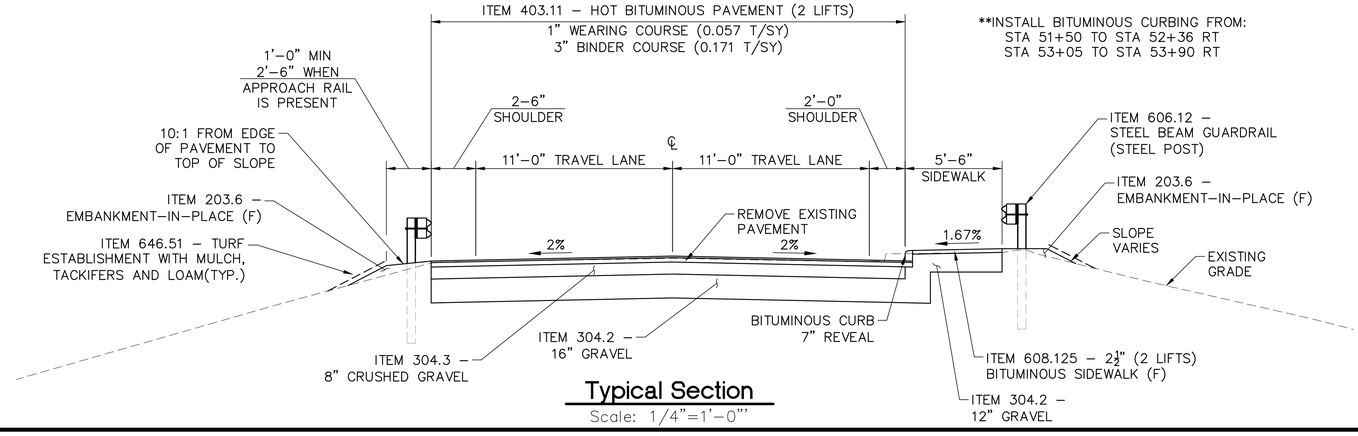
2) ALL OFFSETS ARE TO FACE OF RAIL. EAGRT OFFSETS ARE TO THE FACE OF RAIL AT THE TERMINAL UNIT.

G1 STA 52+10 TO 52+35 LT 13.5'
CONST. T101 APPROACH RAIL
STA 51+22.5 TO 52+10
LT 13' AT 51+21
LT 11.8' AT 51+46
LT 13.5' AT 52+00
CONST. 87.5 LF W BEAM GUARDRAIL
STA 50+97.5 TO 51+22.5 LT 14'
CONST. 25' EAGRT W/O PLATFORM

G2 STA 52+11 TO 52+36 RT 18.5'
CONST. T101 APPROACH RAIL
STA 51+61 TO 52+11
RT 19.7' AT 51+87
RT 18.5' AT 52+11
CONST. 50 LF W BEAM GUARDRAIL
STA 51+36 TO 51+61 RT 21.0'
CONST. 25' EAGRT W/O PLATFORM

G3 STA 53+03 TO 53+28 RT 18.5'
CONST. T101 APPROACH RAIL
STA 53+28 TO 53+53
RT 18.5' AT 53+29
RT 19.7' AT 53+54
CONST. 25 LF W BEAM GUARDRAIL
STA 53+53 TO 53+78 RT 20.6'
CONST. 25' EAGRT W/O PLATFORM

G4 STA 53+00 TO 53+25 LT 13.5'
CONST. T101 APPROACH RAIL
STA 53+25 TO 53+87.5
LT 13.5' AT 53+25
LT 13.3' AT 53+87.5
CONST. 62.5 LF W BEAM GUARDRAIL
STA 53+87.5 TO 54+12.5 LT 14.2'
CONST. 25' EAGRT W/O PLATFORM



Typical Section
Scale: 1/4"=1'-0"

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-8196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com www.cmaengineers.com

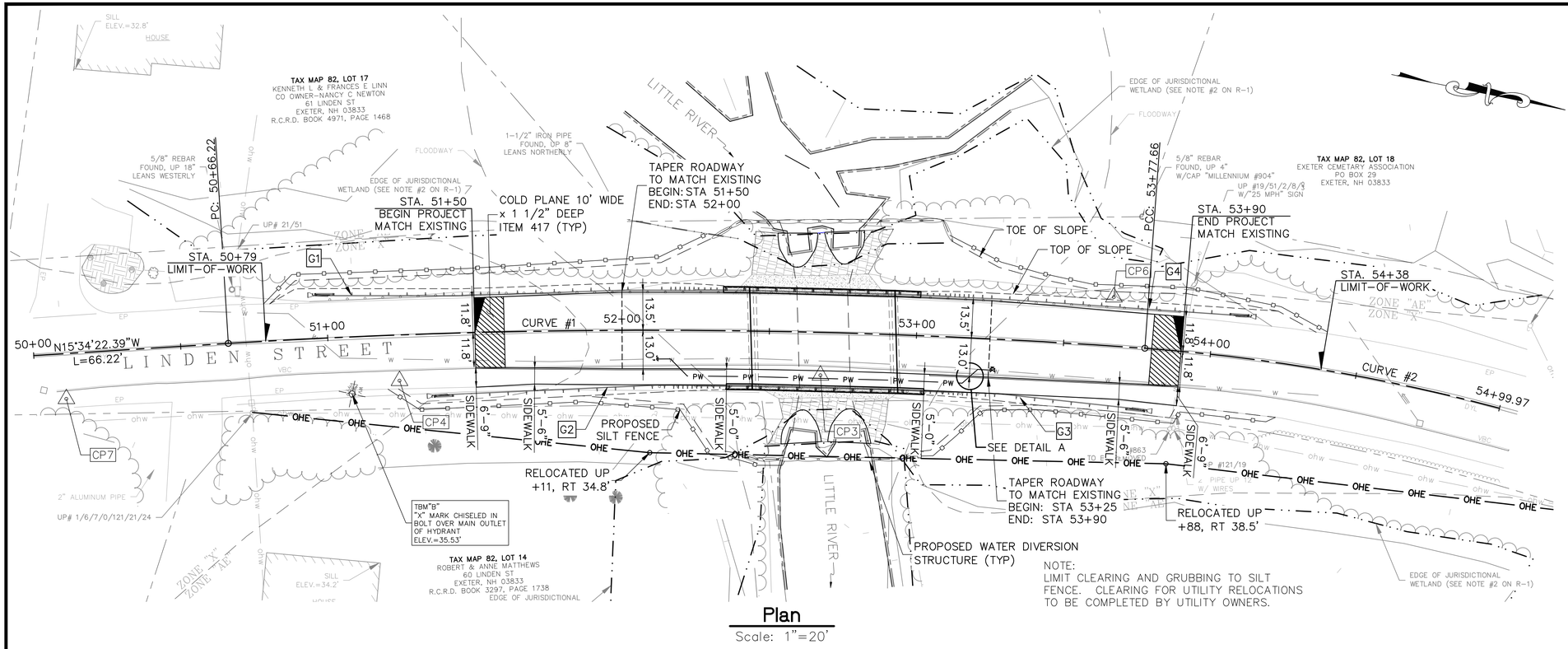
F:\CADD\PROJECTS\923-Exeter Bridges\Production\Linden St\As-Builts\923-R-Notes.dwg

designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
scale: As Shown
date: May 2015
project no: 923
file name: 923-R-Notes.dwg

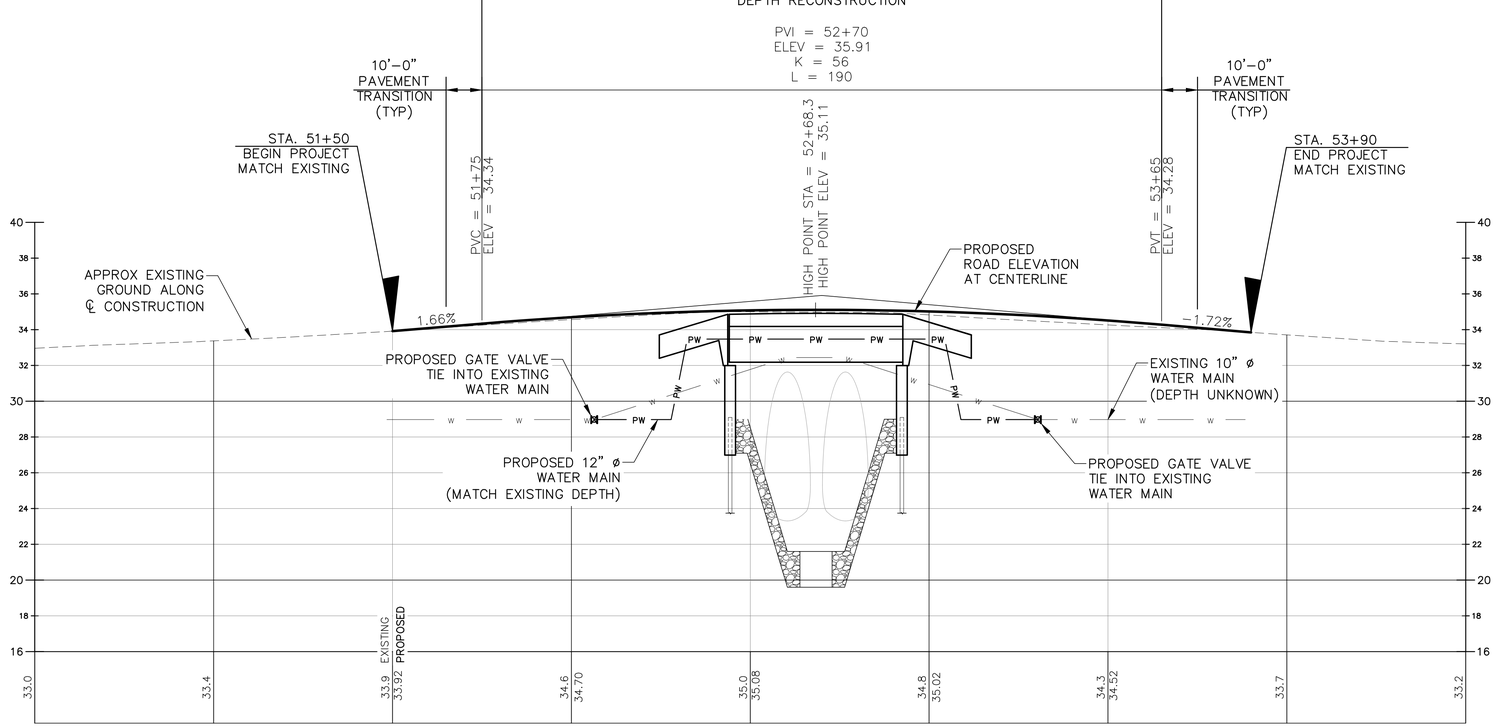
Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
General Notes, Summary, and Typical

drawing no. R-1
sheet: 23 of 29

F:\CADD\PROJECTS\923-Exeter Bridges\Production\Linden St\As-Builts\923-R-Notes.dwg Date Plotted: Jan 06, 2016 – 2:24pm Plotted By: LKALLOCH



Plan
Scale: 1"=20'



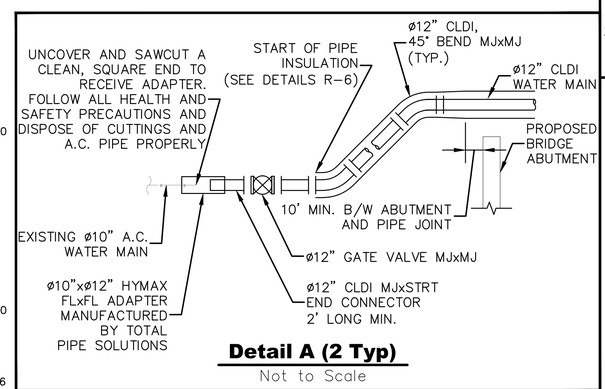
Profile
Vertical Scale: 1"=4'
Horizontal Scale: 1"=20'

CURVE # 1
LINDEN STREET
PI STA = 52+22.18
N = 172812.7558
E = 1173490.2571
Δ = 07°45'30"
T = 155.96'
R = 2300.00'
L = 311.44'
E = 5.28'

CURVE # 2
LINDEN STREET
PI STA = 54+38.80
N = 173028.0313
E = 1173460.7123
Δ = 10°46'52"
T = 61.34'
R = 650'
L = 122.31'
E = 2.89'

CONTROL POINTS TABLE

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP1	173689.0717	1173709.7186	46.52	HUBS
CP2	173200.0030	1173458.2140	33.84	HUBS
CP3	172861.4239	1173500.9164	35.26	MAGS
CP4	172721.9956	1173532.4221	34.07	MAGS
CP5	172317.5397	1173637.7321	33.65	MAGS
CP6	172953.3795	1173454.2495	32.75	HUBS
CP7	172612.6377	1173561.9500	32.56	MAGS



Detail A (2 Typ)
Not to Scale

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

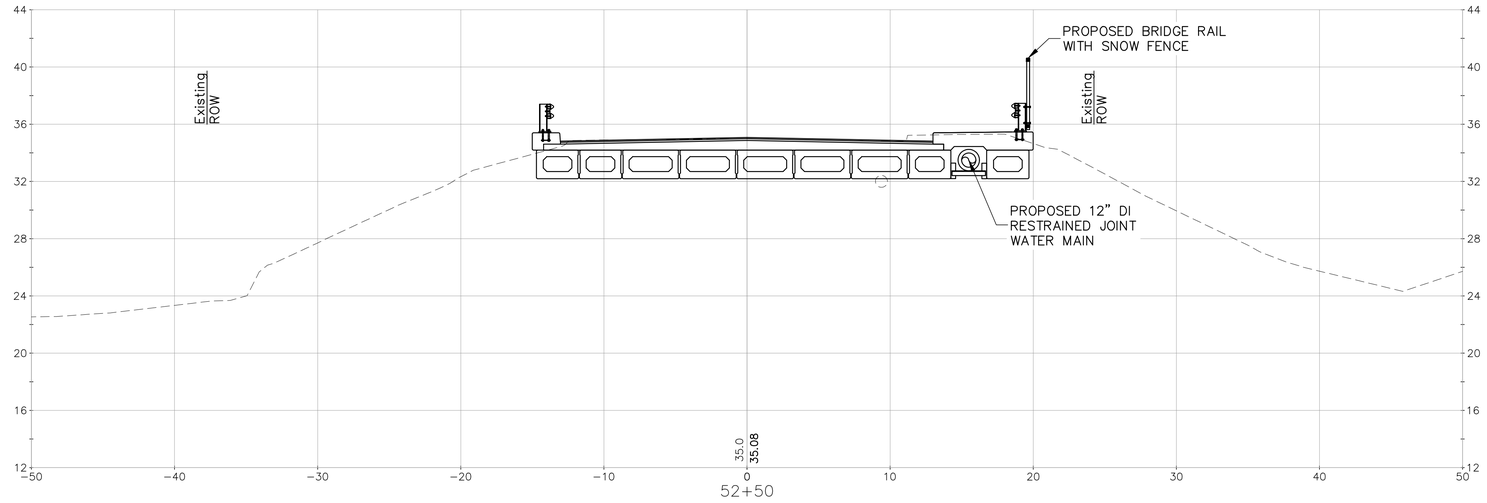
CMA ENGINEERS
Civil/Environmental Engineers
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Unit 101, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com www.cmaengineers.com

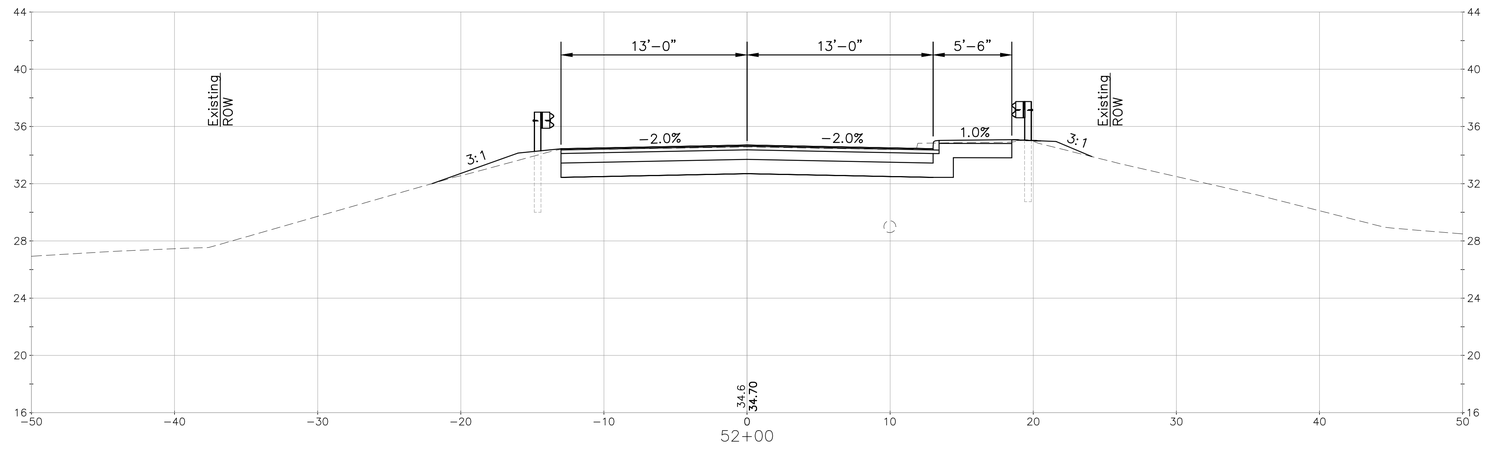
designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
date: May 2015
project no: 923
file name: 923 - Roadway Plans.dwg
scale: (in feet) 1" = 20'

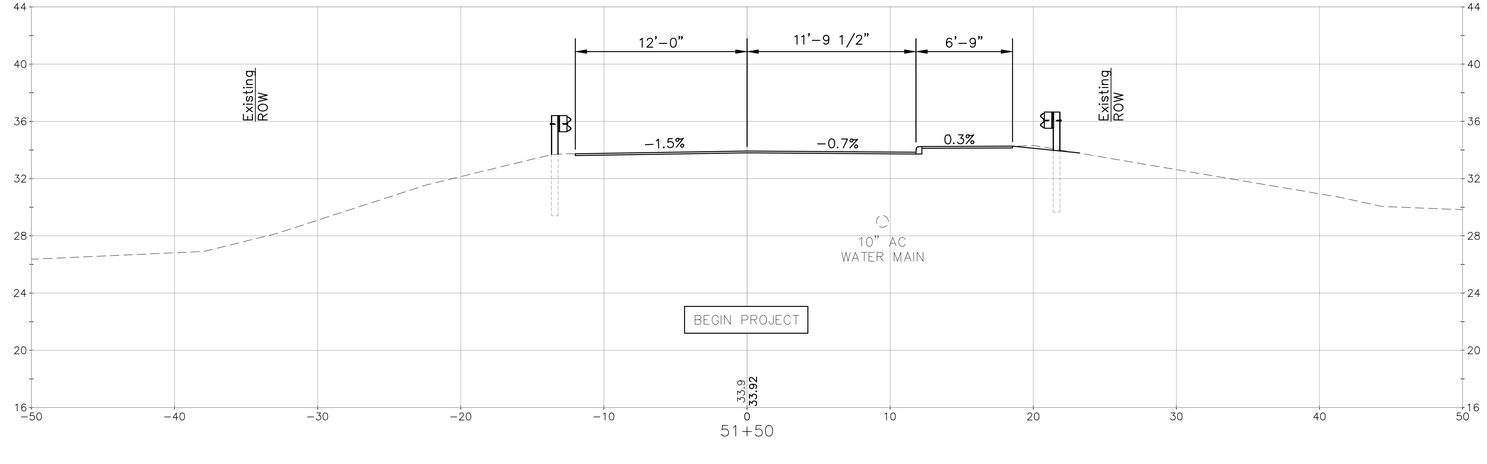
Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Roadway Plan and Profile

drawing no.
R-2
sheet: 24 of 29

F:\CADD\PROJECTS\923-Exeter Bridges\Production\Linden St\As-Builts\923 - Roadway Plans.dwg Date Plotted: Jan 06, 2016 - 2:31pm Plotted By: LKALLOCH







no.	revision	date	by
0	AS-BUILT	1/8/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com www.cmaengineers.com

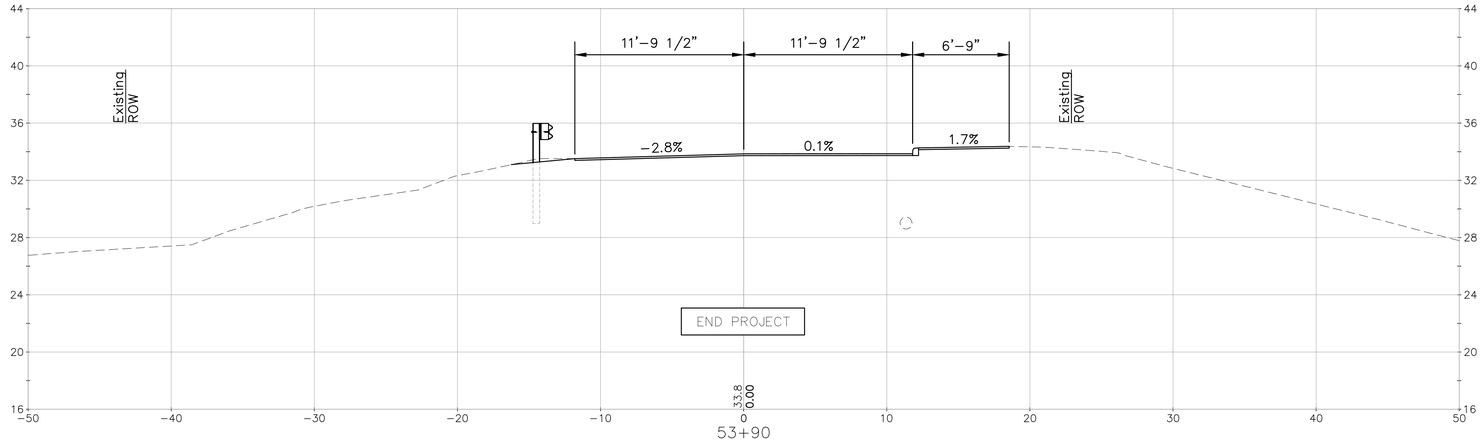
STATE OF NEW HAMPSHIRE - JASON L GALLANT No. 10561 LICENSED PROFESSIONAL ENGINEER

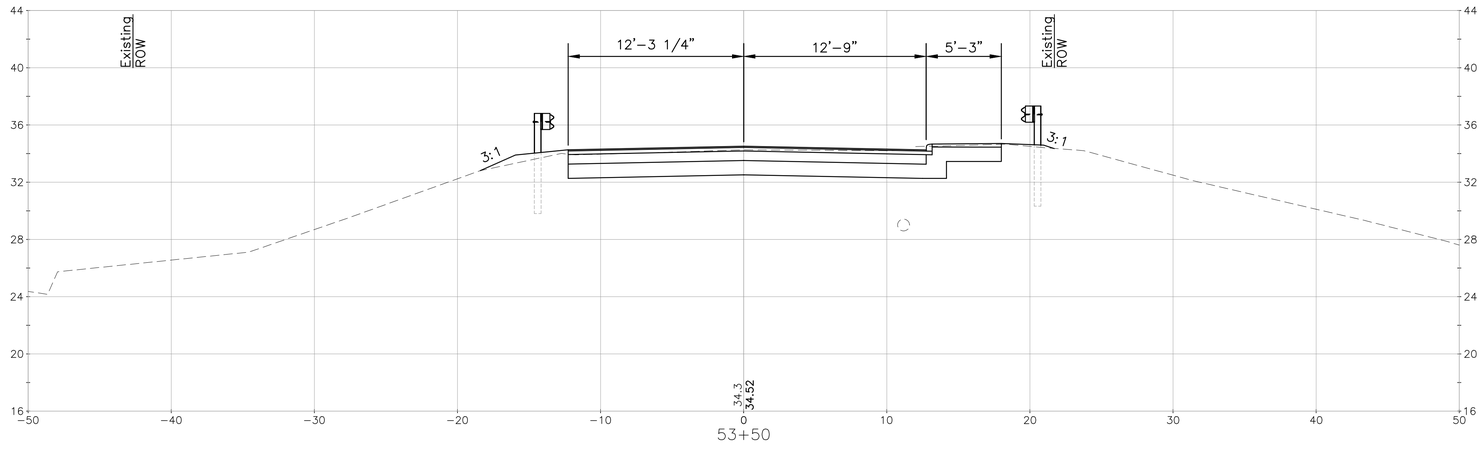
designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
date: May 2015
project no: 923
file name: 923 - Roadway Plans.dwg
scale: 0 2.5 5 (in feet) 1" = 5'

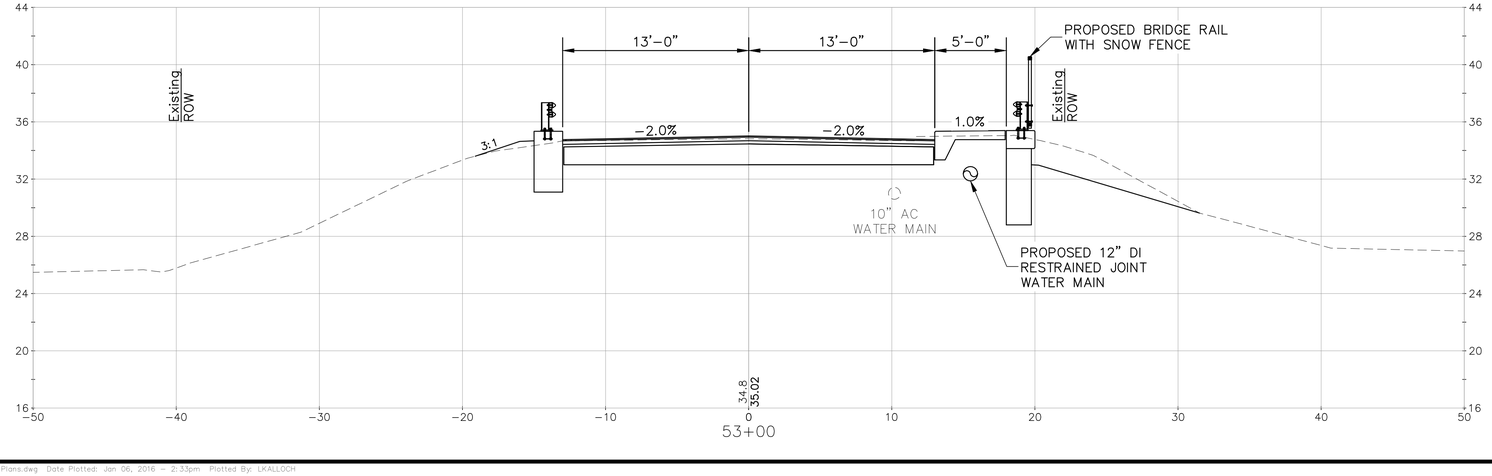
Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Cross Sections
(1 of 2)

drawing no.
R-3

sheet: 25 of 29







no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com www.cmaengineers.com

STATE OF NEW HAMPSHIRE - 15324 - JASON GALLANT - No. 15324 - LICENSED PROFESSIONAL ENGINEER

designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
scale: 0 2.5 5 (in feet) 1" = 5'
date: May 2015
project no: 923
file name: 923 - Roadway Plans.dwg

Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Cross Sections
(2 of 2)

drawing no.
R-4

sheet: 26 of 29

Water Main Notes:

1) WATER MAIN PIPE AND APPURTENANCES SHALL BE NEWLY MANUFACTURED MATERIALS FREE FROM DEFECTS AND BLEMISHES AND SHALL MEET THE LATEST STANDARDS OF THE AMERICAN WATER WORKS ASSOCIATION (AWWA), AS OUTLINED IN THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES CERTIFIED RULES, ENV-WS 307, TABLE 307-1. APPLICABLE AWWA STANDARDS INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

   - C600 (1999 OR LATEST) INSTALLATION OF DUCTILE-IRON MAINS AND THEIR APPURTENANCES
   - C104/A21.4 (2003 OR LATEST) AMERICAN NATIONAL STANDARD FOR CEMENT-MORTAR LINING FOR DUCTILE-IRON PIPE AND FITTINGS FOR WATER
   - C110/A21.10 (2003 OR LATEST) AMERICAN NATIONAL STANDARD FOR DUCTILE-IRON AND GRAY-IRON FITTINGS, 3 IN. THROUGH 48 IN., FOR WATER AND OTHER LIQUIDS
   - C111/A21.11 (2000 OR LATEST) AMERICAN NATIONAL STANDARD FOR RUBBER-GASKET JOINTS FOR DUCTILE-IRON AND GRAY-IRON PRESSURE PIPE AND FITTINGS
   - C116/A21.16 (2003 OR LATEST) AMERICAN NATIONAL STANDARD FOR PROTECTIVE FUSION-BONDED EPOXY COATINGS INTERNAL & EXTERNAL IRON/GRAY-IRON FITTINGS
   - C150/A21.50 (2002 OR LATEST) AMERICAN NATIONAL STANDARD FOR THE THICKNESS DESIGN OF DUCTILE-IRON PIPE
   - C153/A21.53 (2000 OR LATEST) AMERICAN NATIONAL STANDARD FOR DUCTILE-IRON COMPACT FITTINGS, 2 IN. THROUGH 16 IN., FOR WATER AND OTHER LIQUIDS
   - C500 (2002 OR LATEST) GATE VALVES FOR WATER AND SEWERAGE SYSTEMS
   - C502 (1994 OR LATEST) DRY-BARREL FIRE HYDRANTS
   - C503 (1997 OR LATEST) WET-BARREL FIRE HYDRANTS
   - C509 (2001 OR LATEST) RESILIENT-SEATED GATE VALVES FOR WATER AND SEWERAGE SYSTEMS
   - C651-86 (1999 OR LATEST) DISINFECTING WATER MAINS
   - AWWA C600, SECTION 4, OR EQUIVALENT, FOR PRESSURE TESTING WATER MAINS.

2) THE EXISTING WATER MAIN IS 10-INCH DIAMETER ASBESTOS CEMENT (A.C.) PIPE. THE CONTRACTOR SHALL FOLLOW ALL PREVAILING HEALTH AND SAFETY STANDARDS FOR CUTTING, REMOVAL AND DISPOSAL OF PORTIONS OF THE AC PIPE THAT ARE TO BE PERMANENTLY REMOVED.

3) NEW WATER MAIN SHALL BE BURIED A MINIMUM OF 6'-0" TO TOP OF PIPE AND LAID AT A CONSTANT GRADE. WHERE TOP OF WATER MAIN IS LESS THAN 6'-0" BELOW FINISHED GRADE, THE CONTRACTOR SHALL INSTALL RIGID INSULATION IN CONFORMANCE WITH WATER MAIN TRENCH DETAIL ON SHEET R-6 UNTIL THE WATER MAIN DEPTH IS AT, OR EXCEEDS, 6'-0".

4) CONTRACTOR SHALL USE RESTRAINT SYSTEMS ON ALL VALVES AND FITTINGS UNLESS OTHERWISE NOTED ON THE PLANS.

5) ALL GATE VALVES SHALL HAVE RESTRAINED MECHANICAL JOINTS AND SHALL OPEN LEFT.

6) EXISTING CURB BOXES AND/OR OTHER CASTINGS DISTURBED OR RELOCATED BY CONSTRUCTION ACTIVITIES SHALL BE ADJUSTED TO MATCH FINAL GRADE, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

7) WHERE WATER MAIN IS LESS THAN 6'-0" HORIZONTALLY FROM A STRUCTURE, THE CONTRACTOR SHALL INSTALL 2 INCHES OF RIGID INSULATION ALONG THE SIDE WALL OF THE WATER MAIN TRENCH A MINIMUM OF 10'-0" HORIZONTALLY BEYOND THE CENTERLINE OF THE STRUCTURE IN BOTH DIRECTIONS TO PROTECT THE WATER MAIN FROM FREEZING.

8) THE CONTRACTOR SHALL MAINTAIN WATER SERVICE TO RESIDENTS AT ALL TIMES. DISRUPTION OF WATER SERVICE TO RESIDENTS REQUIRES COORDINATION BY THE CONTRACTOR WITH THE TOWN'S PUBLIC WORKS DIRECTOR AND THE ENGINEER AT LEAST 72 HOURS PRIOR TO THE PLANNED INTERRUPTION OF SERVICE.

9) THE CONTRACTOR IS RESPONSIBLE FOR TAKING DETAILED MEASUREMENTS OF THE EXACT LOCATION OF ALL BURIED WATER DISTRIBUTION PIPING AND APPURTENANCES INSTALLED BY THE CONTRACTOR INCLUDING PIPE, GATE VALVES, TRANSITION FITTINGS, BENDS, AND SHALL RECORD THE MEASUREMENTS ON AS-BUILT PLANS OR RECORD DRAWINGS. THE AS BUILT PLANS OR RECORD DRAWINGS OF THE WATER DISTRIBUTION PIPING AND APPURTENANCES SHALL INCLUDE THE FOLLOWING INFORMATION:

   A. PRECISELY-MEASURED DIMENSIONS TO ALL TRANSITION FITTINGS;

   B. PRECISELY-MEASURED DIMENSIONS TO ALL "ON-LINE" GATE VALVES;

   C. PRECISELY-MEASURED DIMENSIONS TO ALL BENDS AND/OR PRINCIPAL CHANGES IN PIPE DIRECTION;

   NOTE: "PRECISELY-MEASURED" MEANS OF SUFFICIENT ACCURACY TO LOCATE THE PIPING OR APPURTENANCE TO WITHIN 1 FOOT ACCURACY, RECORDED TO THE NEAREST 0.5 FOOT.

10) THE CONTRACTOR SHALL SUPPLY THE TOWN OF EXETER WITH ONE ORIGINAL AND ONE COPY OF THE AS-BUILT PLAN OR RECORD DRAWING OF THE NEW WATER DISTRIBUTION PIPING INSTALLATION.

11) CONTRACTOR SHALL FLUSH AND CHLORINATE THE NEW WATER DISTRIBUTION PIPING SYSTEM BEFORE ACTIVATING INTO SERVICE. THE NEW WATER DISTRIBUTION PIPES AND APPURTENANCES SHALL BE FLUSHED TO REMOVE ANY DIRT OR OTHER CONTAMINANTS, AND TESTED PER THE TOWN OF EXETER REQUIREMENTS AS SPECIFIED IN SPECIAL PROVISION 611.3.12 – PRESSURE AND LEAKAGE TESTING OF THE TECHNICAL SPECIFICATIONS.

12) THE CONTRACTOR SHALL PERFORM A LEAKAGE TEST OF THE NEW PIPING SYSTEM BEFORE SYSTEM USE. THE DISTRIBUTION SYSTEM SHALL BE CHECKED FOR LEAKAGE BY CONDUCTING A SUSTAINED PRESSURE TEST PER THE TOWN OF EXETER REQUIREMENTS AS SPECIFIED IN SPECIAL PROVISION 611.3.13 – DISINFECTION OF THE TECHNICAL SPECIFICATIONS.

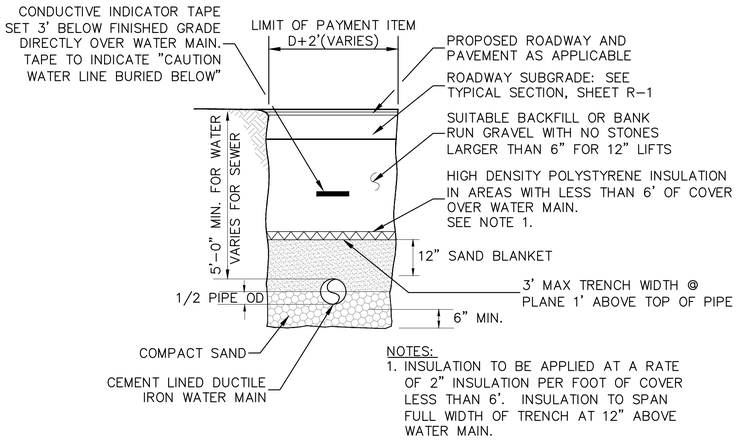
Insulated Pipe Notes:

1) DUCTILE IRON PIPE SHALL BE TR FLEX, RESTRAINED JOINT PIPE WITH 2.16" OF CLOSED CELL POLYURETHANE INSULATION WRAPPED IN A SEAMLESS, HDPE JACKET. NO TAPE CASINGS WILL BE ALLOWED

2) PIPING AND INSULATION SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS.

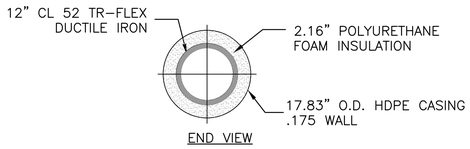
3) ALL FITTINGS SHALL HAVE RESTRAINED, MECHANICAL JOINTS AND INSULATED WITH FIELD APPLIED INSULATION COVERS.

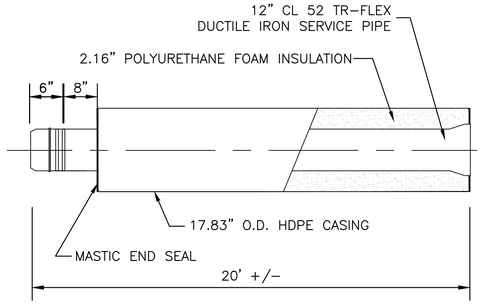
4) NO PIPING SHALL BE INSTALLED IN STANDING WATER. TRENCHES SHALL BE MAINTAINED DRY UNTIL FINAL FIELD CLOSURE IS COMPLETE.



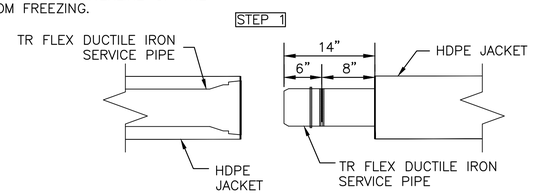
Water Main Trench Detail

Not to Scale

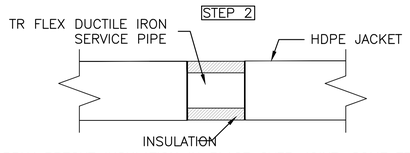




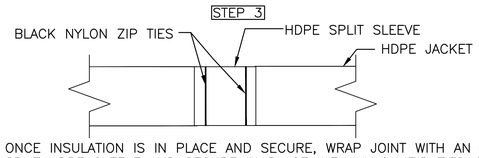
PIPE INSULATION DETAIL



REMOVE ALL FOREIGN MATTER IN SOCKET. THE GASKET SEAT SHOULD BE THOROUGHLY INSPECTED TO BE CERTAIN IT IS CLEAN. FOREIGN MATTER IN THE GASKET SEAT MAY CAUSE A LEAK. LUBRICATE PIPE ENDS AND GASKET. LUBRICATE PIPE ENDS AS DIRECTED BY US PIPE.

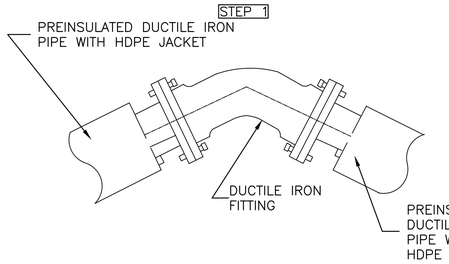


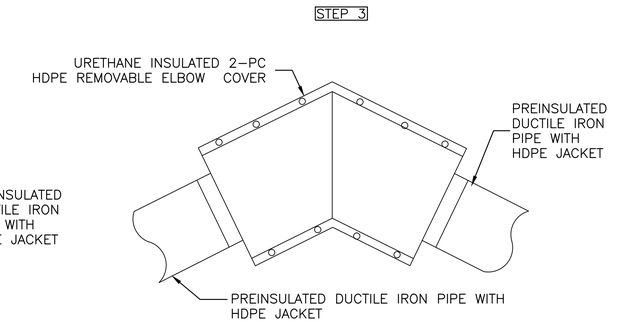
APPLY PRECUT INSULATION IN PLACE OVER JOINT. SOME TRIMMING MAY BE NECESSARY FOR A CLOSE FIT.

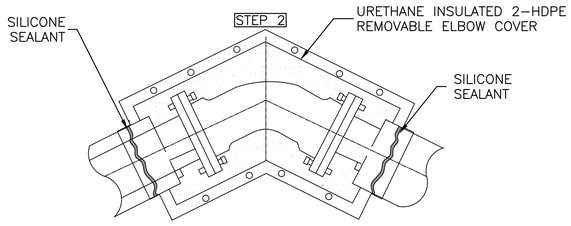


ONCE INSULATION IS IN PLACE AND SECURE, WRAP JOINT WITH AN OVERSIZED SPLIT HDPE SLEEVE AND SECURE IN PLACE WITH NYLON ZIP TIES. THE OVERSIZED SLEEVE WILL ALLOW FOR EXPANSION AND CONTRACTION.

FIELD JOINT DETAIL







1. TAKE BOTH HALVES OF THE INSULATED ELBOW COVER AND PLACE OVER FITTING AND OVERLAP ONTO STRAIGHT LENGTH FOR A DRY FIT.
2. APPLY A 3/8" BEAD OF SILICONE (SUPPLIED BY OTHERS) AROUND HDPE JACKET AND REAPPLY FITTING COVER.

1. SECURE FITTING COVER IN PLACE WITH SELF TAPPING SCREWS

FIELD APPLIED FITTING COVER DETAIL

Water Main Pipe Insulation Details

Not to Scale

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com www.cmaengineers.com

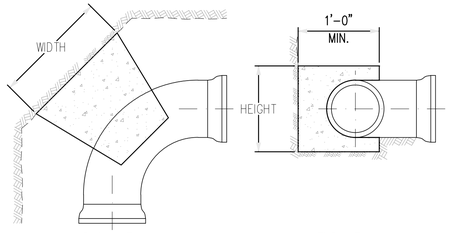
STATE OF NEW HAMPSHIRE - JASON L. GALLANT No. 10561 - LICENSED PROFESSIONAL ENGINEER

designed by: LBK/OGK
drawn by: LBK/OGK
approved by: JLG
date: May 2015
project no: 923
file name: 923-R-Details.dwg
scale: 0 10 20 (in feet) 1" = 20'

Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Road and Utility Details

drawing no. R-5

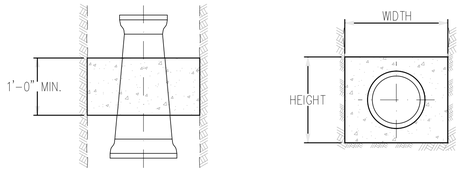
sheet: 27 of 29



PLAN VIEW END VIEW

90° BEND THRUST BLOCK DIMENSIONING

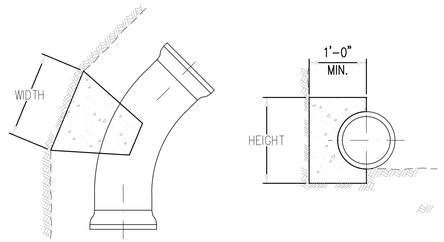
PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)	PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)
4 NPS	2'-3"	1'-3"	14 NPS	7'-3"	3'-6"
6 NPS	3'-3"	1'-9"	16 NPS	8'-3"	4'-0"
8 NPS	4'-3"	2'-3"	18 NPS	9'-3"	4'-6"
10 NPS	5'-3"	2'-6"	20 NPS	10'-6"	5'-0"
12 NPS	6'-0"	3'-3"	24 NPS	12'-6"	6'-0"



PLAN VIEW END VIEW

REDUCER THRUST BLOCK DIMENSIONING

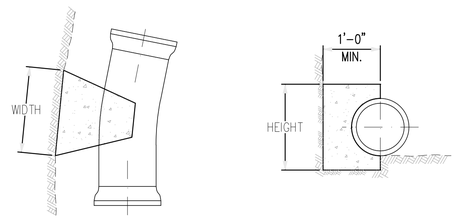
SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)	SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)
6x4 NPS	1'-6"	1'-6"	16x8 NPS	4'-6"	4'-6"
8x4 NPS	2'-3"	2'-3"	16x10 NPS	4'-0"	4'-0"
8x6 NPS	1'-9"	1'-9"	16x12 NPS	3'-6"	3'-6"
10x6 NPS	2'-6"	2'-6"	20x12 NPS	5'-0"	5'-0"
10x8 NPS	2'-0"	2'-0"	20x16 NPS	4'-0"	4'-0"
12x6 NPS	3'-3"	3'-3"	24x12 NPS	6'-6"	6'-6"
12x8 NPS	3'-0"	3'-0"	24x16 NPS	5'-9"	5'-9"
12x10 NPS	2'-3"	2'-3"	24x20 NPS	4'-6"	4'-6"



PLAN VIEW END VIEW

45° BEND THRUST BLOCK DIMENSIONING

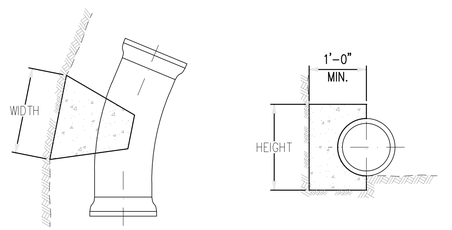
PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)	PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)
4 NPS	2'-0"	0'-9"	14 NPS	5'-3"	2'-6"
6 NPS	2'-6"	1'-3"	16 NPS	5'-6"	3'-3"
8 NPS	3'-3"	1'-9"	18 NPS	7'-3"	3'-3"
10 NPS	4'-0"	2'-0"	20 NPS	7'-3"	4'-0"
12 NPS	4'-6"	2'-3"	24 NPS	8'-9"	4'-6"



PLAN VIEW END VIEW

11¼° BEND THRUST BLOCK DIMENSIONING

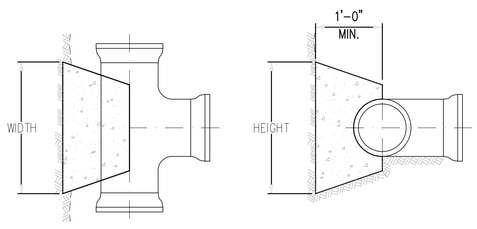
PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)	PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)
4 NPS	1'-0"	0'-6"	14 NPS	3'-0"	1'-3"
6 NPS	1'-3"	0'-9"	16 NPS	3'-3"	1'-9"
8 NPS	1'-9"	0'-9"	18 NPS	3'-6"	1'-9"
10 NPS	2'-0"	1'-0"	20 NPS	3'-6"	2'-0"
12 NPS	2'-3"	1'-3"	24 NPS	4'-6"	2'-3"



PLAN VIEW END VIEW

22½° BEND THRUST BLOCK DIMENSIONING

PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)	PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)
4 NPS	1'-3"	0'-9"	14 NPS	3'-6"	2'-0"
6 NPS	2'-0"	0'-9"	16 NPS	4'-6"	2'-3"
8 NPS	2'-3"	1'-3"	18 NPS	5'-0"	2'-6"
10 NPS	3'-0"	1'-3"	20 NPS	5'-0"	3'-0"
12 NPS	3'-3"	1'-9"	24 NPS	6'-3"	3'-3"



PLAN VIEW END VIEW

TEE/DEAD END THRUST BLOCK DIMENSIONING

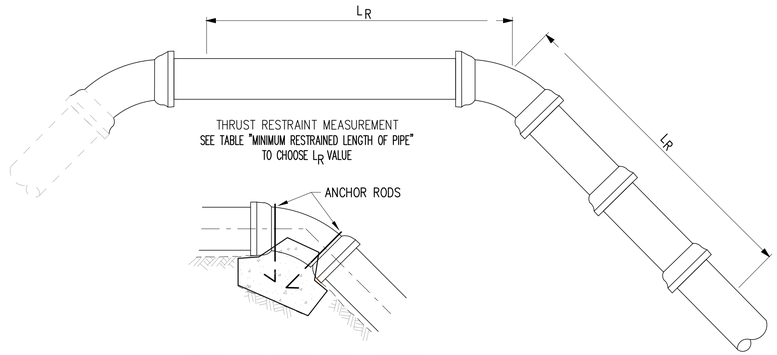
PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)	PIPE SIZE	WIDTH (FT-IN)	HEIGHT (FT-IN)
4 NPS	2'-0"	1'-0"	14 NPS	5'-6"	3'-3"
6 NPS	3'-0"	1'-3"	16 NPS	6'-6"	3'-6"
8 NPS	3'-3"	2'-0"	18 NPS	7'-6"	4'-0"
10 NPS	4'-3"	2'-3"	20 NPS	8'-6"	4'-3"
12 NPS	5'-3"	2'-6"	24 NPS	10'-3"	5'-3"

HORIZONTAL THRUST BLOCKS–MINIMUM RESTRAINED LENGTH OF PIPE (FT–IN) L_R

FITTING	4 NPS	6 NPS	8 NPS	10 NPS	12 NPS	14 NPS	16 NPS	18 NPS	20 NPS	24 NPS
11 ¼ BEND	1'–3"	2'–0"	2'–6"	3'–0"	3'–6"	4'–0"	4'–6"	5'–0"	5'–6"	6'–3"
22 ¼ BEND	1'–3"	2'–0"	2'–6"	3'–0"	3'–6"	4'–0"	4'–6"	5'–0"	5'–6"	6'–6"
45n BEND	3'–0"	4'–0"	5'–3"	6'–3"	7'–6"	8'–6"	9'–6"	10'–6"	11'–6"	13'–6"
90n BEND	7'–0"	9'–9"	12'–6"	15'–6"	18'–0"	20'–0"	23'–0"	25'–6"	28'–0"	32'–6"
DEAD END	8'–6"	12'–6"	16'–0"	19'–3"	23'–0"	26'–0"	29'–6"	33'–0"	36'–0"	42'–0"
NOTE: PVC PIPE WILL TYPICALLY HAVE SLIGHTLY GREATER RESTRAINED LENGTH										
NOTE: FOR POLYETHYLENE WRAPPED PIPE, MULTIPLY VALUES IN TABLE BY 1.45										

MINIMUM GRAVITY BLOCK VOLUMES FOR VERTICAL BENDS (CU.FT.)

FITTING	4 NPS	6 NPS	8 NPS	10 NPS	12 NPS	14 NPS	16 NPS	18 NPS	20 NPS	24 NPS
11 1/4°	4	11	18	25	35	46	60	74	92	131
22 1/2°	11	18	32	49	67	92	120	148	184	261
45°	18	35	64	95	134	180	233	293	360	512
90°	32	67	117	177	247	332	431	540	664	950



VERTICAL BEND GRAVITY BLOCK – ELEVATION

MINIMUM RESTRAINED LENGTH OF PIPE (L) FOR VERTICAL BENDS

VERTICAL UPWARD BENDS – NPS (FT.)										
FITTING	4 NPS	6 NPS	8 NPS	10 NPS	12 NPS	14 NPS	16 NPS	18 NPS	20 NPS	24 NPS
11 1/4°	1.5	2.0	3.0	3.0	4.0	4.0	5.0	5.0	6.0	6.5
22 1/2°	1.5	2.0	3.0	3.0	4.0	4.0	5.0	5.0	6.0	7.0
45°	3.0	4.0	5.5	6.5	8.0	9.0	10.0	10.5	11.5	13.5
90°	7.0	10.0	12.5	15.5	18.5	20.5	23.0	26.0	28.0	32.5
VERTICAL DOWNWARD BENDS – NPS (FT.)										
FITTING	4 NPS	6 NPS	8 NPS	10 NPS	12 NPS	14 NPS	16 NPS	18 NPS	20 NPS	24 NPS
11 1/4°	3.5	5.0	6.5	8.0	9.5	10.5	12.0	13.0	14.5	17.0
22 1/2°	7.0	10.0	13.0	15.5	18.5	21.0	24.0	26.5	29.0	34.0
45°	14.5	20.5	27.0	32.5	38.5	44.0	49.0	54.5	60.0	70.0
90°	35.0	49.5	64.0	78.0	92.0	105.0	118.5	131.5	144.5	169.0

NOTE: FOR POLYETHYLENE WRAPPED PIPE, MULTIPLY VALUES IN TABLE BY 1.45

NOTE: FOR PVC PIPE MULTIPLY VALUES IN TABLE BY 1.15

ANCHOR ROD SCHEDULE FOR GRAVITY BLOCKS

PIPE SIZE	RODS	MIN. EMBEDMENT LENGTH
4 NPS	1 – (3)	6"
6 NPS	1 – (3)	6"
8 NPS	2 – (4)	6"
10 NPS	2 – (4)	6"
12 NPS	2 – (5)	7"
14 NPS	2 – (6)	8"
16 NPS	2 – (6)	8"
18 NPS	2 – (7)	10"
20 NPS	2 – (8)	11"
24 NPS	2 – (9)	12"

NUMBERS IN PARENTHESIS ARE BAR SIZES MARKED IN EIGHTHS OF INCHES

THRUST BLOCK NOTES:

1. SEE SPECIAL PROVISION 611 – WATER MAIN INSTALLATION FOR ADDITIONAL INFORMATION ON THRUST RESTRAINT REQUIREMENTS.
2. THRUST RESTRAINT USING THRUST BLOCKS OR RESTRAINED LENGTHS ARE SHOWN ON THESE SHEETS. THRUST BLOCKS, RESTRAINED JOINTS USING TIE RODS OR RETAINER GLANDS ARE ALL ACCEPTABLE METHODS; HOWEVER, THE THRUST RESTRAINT METHOD SELECTED SHALL BE APPROVED BY THE ENGINEER.
3. IF THE OWNER OF THE WATER SYSTEM ALLOWS A METHOD THAT RESTRAINS INDIVIDUAL JOINTS, EACH JOINT THAT FALLS WITHIN THE MINIMUM RESTRAINED LENGTH, MEASURED FROM THE CENTER OF THE FITTING, AS SHOWN ON THESE SHEETS SHALL BE RESTRAINED, AND SHALL WITHSTAND THE MAXIMUM PRESSURE APPLIED TO THE SYSTEM.
4. CLASS B CONCRETE SHALL NOT BE PLACED UNDERWATER. THE CONTRACTOR SHALL DEWATER THE EXCAVATION TO INSTALL THE THRUST BLOCKS IN THE DRY.
5. CONCRETE FOR THRUST BLOCKS SHALL NOT BE ALLOWED TO COVER OR INTERFERE WITH JOINT OR RESTRAINT HARDWARE. PLASTIC SHEETING OR BUILDING FELT MAY BE PLACED OVER PIPE OR FITTINGS TO PREVENT CONCRETE FROM ADHERING TO SURFACES.
6. FOR BENDS, BEARING AREA SHALL BE PARALLEL TO THE EDGE OF THE FITTING AT THE FITTING MIDPOINT.
7. FOR TEES, BEARING AREA SHALL BE PERPENDICULAR TO THE BRANCH (SINGLE LEG) AXIS.
8. FOR REDUCERS, BEARING AREA SHALL BE PERPENDICULAR TO THE FITTING AXIS. THE MINIMUM THICKNESS ALONG THE FITTING AXIS SHALL BE 1'-0" OR THE LENGTH BETWEEN THE BELLS, WHICHEVER IS SMALLER.
9. THRUST BLOCK ANCHOR RODS SHALL MEET THE REQUIREMENTS OF SECTION 530.2.5 OF THE NHDOT STANDARD SPECIFICATIONS. ALL EMBEDDED RODS SHALL HAVE STANDARD ACI HOOKS ON EACH END, AND SHALL HAVE A MINIMUM OF 3" CONCRETE COVER IN ALL DIRECTIONS.
10. THRUST RESTRAINT FOR SIZES OVER 24 NPS AND/OR FOR OTHER FITTINGS NOT SHOWN ON THESE SHEETS WILL BE AS SHOWN IN THE CONTRACT DOCUMENTS.
11. THRUST BLOCK SIZES AND MINIMUM RESTRAINED LENGTHS SHOWN ON THESE SHEETS ARE BASED UPON THE FOLLOWING ASSUMED CONDITIONS:

    1.5 SAFETY FACTOR
    5 FT DEPTH OF COVER
    200 PSI WATER SYSTEM TEST PRESSURE
    30n SOIL FRICTION ANGLE
    90 LBS\FTr SOIL UNIT WEIGHT
    IF SOILS ARE POORER THEN REFER TO REFERENCES

12. FOR INSTALLATIONS NOT MEETING THE CONDITIONS OF NOTE 8, THE CONTRACTOR SHALL SUBMIT CALCULATIONS TO THE ENGINEER FOR APPROVAL OF RESTRAINT LENGTH CHOSEN.
13. TO DETERMINE REQUIRED SIZES FOR DIFFERENT TEST PRESSURES, MULTIPLY THE DIMENSION BY A FACTOR OF THE SPECIFIC VALUE DIVIDED BY THE STANDARD VALUE.

EXAMPLE: GRAVITY BLOCK VOLUME FOR 12 NPS 45° BEND WITH 100 PSI TEST PRESSURE:
WIDTH = 3'–3"
HEIGHT = 1'–7"
VOLUME REQUIRED 134 FTr X (100/200) = 67 FTr

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
15 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com www.cmaengineers.com

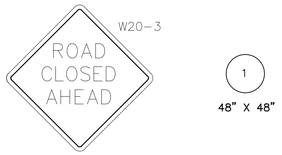
JASON GALLANT No. 10951 STATE OF NEW HAMPSHIRE – REGISTERED PROFESSIONAL ENGINEER

designed by: LBK/OGK | drawn by: LBK/OGK | approved by: JLG | scale: As Shown
date: May 2015 | project no: 923 | file name: 923-Thrust Block.dwg

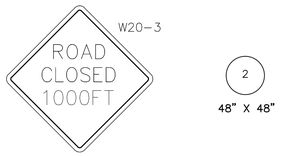
Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacment
Thurst Block Details

drawing no. R-6

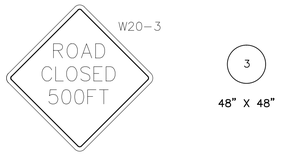
sheet: 28 of 29



1
48" X 48"



2
48" X 48"

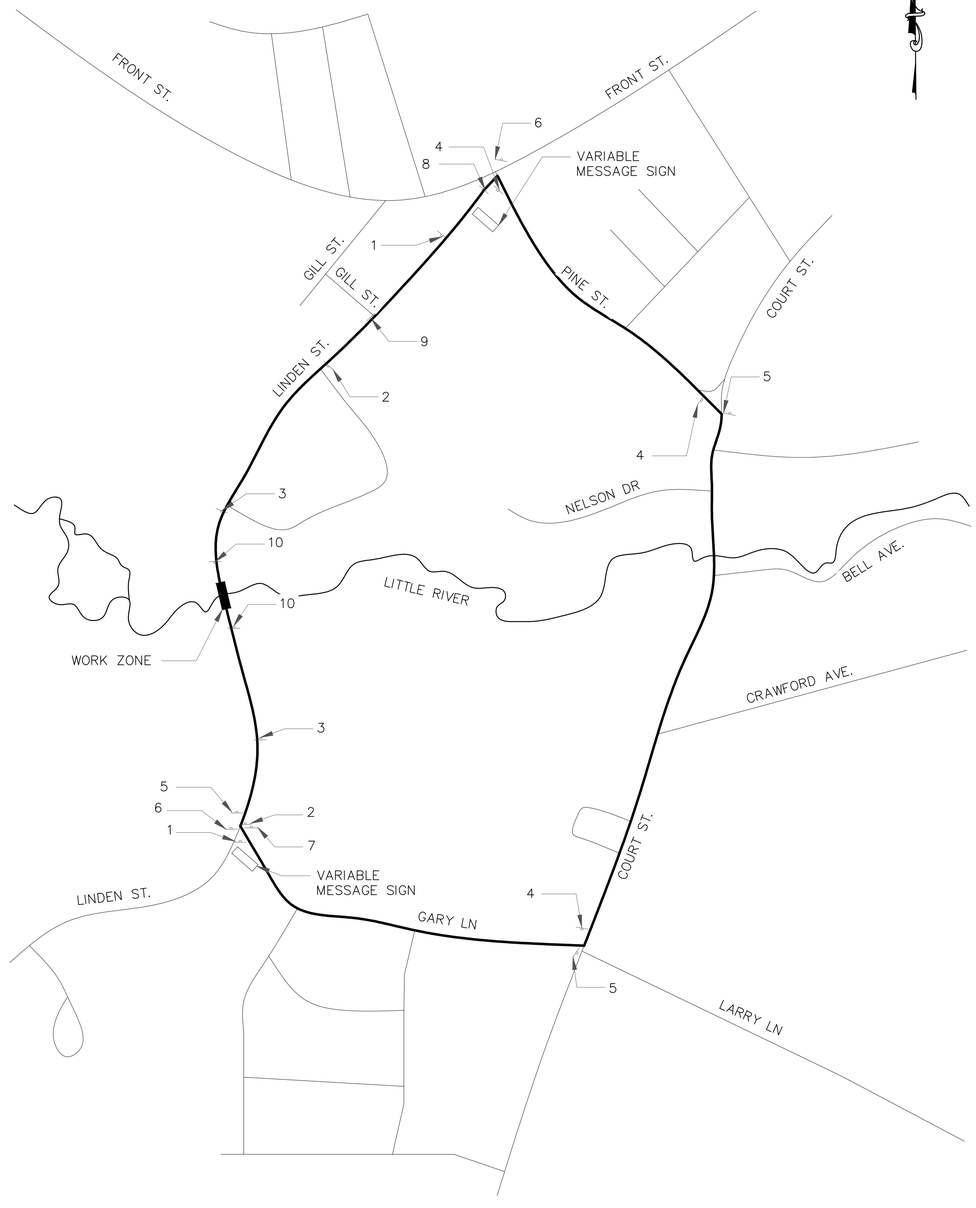


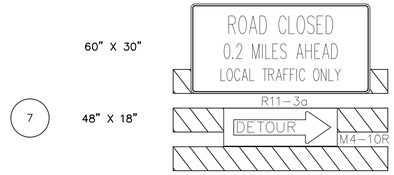
3
48" X 48"

4
30" X 24"

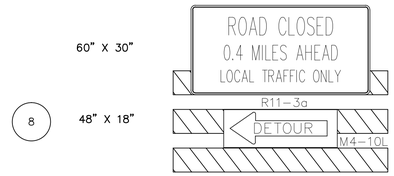
5
30" X 24"

6
24" X 18"

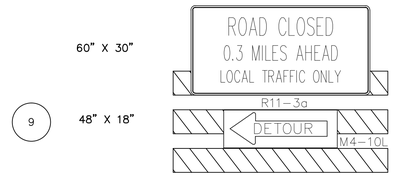




7
48" X 18"

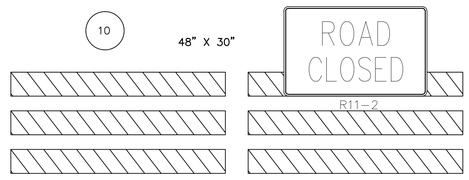


8
48" X 18"



9
48" X 18"

10
48" X 30"



NOTES:

1. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM WITH SECTIONS 618 AND 619 OF THE STANDARD SPECIFICATIONS, THESE TRAFFIC CONTROL PLANS, THE CURRENT EDITION OF THE MUTCD, INCLUDING ALL REVISIONS, AND THE STATE OF NEW HAMPSHIRE DOT TRAFFIC CONTROL HANDBOOK.

2. 30 LINEAR FT OF TEMPORARY CONCRETE BARRIER SHALL BE PLACED TO BLOCK THE ROADWAY DIRECTLY BEHIND THE TYPE III BARRICADES (#10).

3. CONTRACTOR IS RESPONSIBLE FOR SUPPLYING AND MAINTAINING ALL SIGNS REQUIRED FOR DETOUR.

4. SIGNS SHALL BE REMOVED OR COVERED DURING PERIODS IN WHICH THEY ARE NOT REQUIRED.

5. LAYOUT SHOWN IS NOT TO SCALE AND IS A SUGGESTED LAYOUT.

6. CONTRACTOR SHALL SUBMIT A SIGNAGE PLAN FOR APPROVAL PRIOR TO ANY WORK.

7. TOTAL ESTIMATED SIGN AREA: 207.5 SF

8. ALL COST FOR TRAFFIC CONTROL DEVISES INCLUDING PLACEMENT, RELOCATION, AND REMOVAL OF SIGNS SHALL BE INCLUDED IN ITEM 619.1 – MAINTENANCE OF TRAFFIC.

9. THE CONTRACTOR SHALL COORDINATE ALL WORK WITH THE TOWN OF EXETER PUBLIC WORKS, FIRE AND POLICE DEPARTMENTS, AND ENGINEER AT LEAST 14 DAYS PRIOR TO IMPLEMENTING AND ROAD CLOSURES OR DETOURS.

10. THE CONTRACTOR SHALL PLACE PORTABLE MESSAGE BOARDS (PMB'S) AS INDICATED ON THE PLANS AT LEAST 7 DAYS IN ADVANCE OF ROAD CLOSURES AND DETOURS.

11. ACCESS TO EXISTING DRIVES SHALL BE MAINTAINED AT ALL TIMES. IN THE EVENT THAT MAJOR WORK MUST BE DONE AT DRIVES THAT PRECLUDES FULL ACCESS, THE CONTRACTOR IS TOO COORDINATE THE WORK WITH THE OWNER TO MINIMIZE INCONVENIENCED.

no.	revision	date	by
0	AS-BUILT	1/6/16	JLG

CMA ENGINEERS
CIVIL/ENVIRONMENTAL ENGINEERS
35 Bow Street, Portsmouth, NH 03801, 603/431-6196
Langer Place, 55 So. Commercial Street, Manchester, NH 03101, 603/627-0708
10 Free Street, Portland, Maine 04101, 207/541-4223
info@cmaengineers.com
www.cmaengineers.com

JASON L. GALLANT No. 10551 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE

designed by: OGK
drawn by: OGK
approved by: JLG
scale: N.T.S.
date: May 2015
project no: 923
file name: 923 - Traffic Plan.dwg

Town of Exeter
Department of Public Works
Linden Street
Little River Bridge Replacement
Linden Street
Traffic Control Plan

drawing no.
R-7
sheet: 29 of 29

F:\CADD\PROJECTS\923-Exeter Bridges\Production\Linden St\As-Builts\923 - Traffic Plan.dwg Date Plotted: Jan 06, 2016 - 2:40pm Plotted By: LKALLOCH