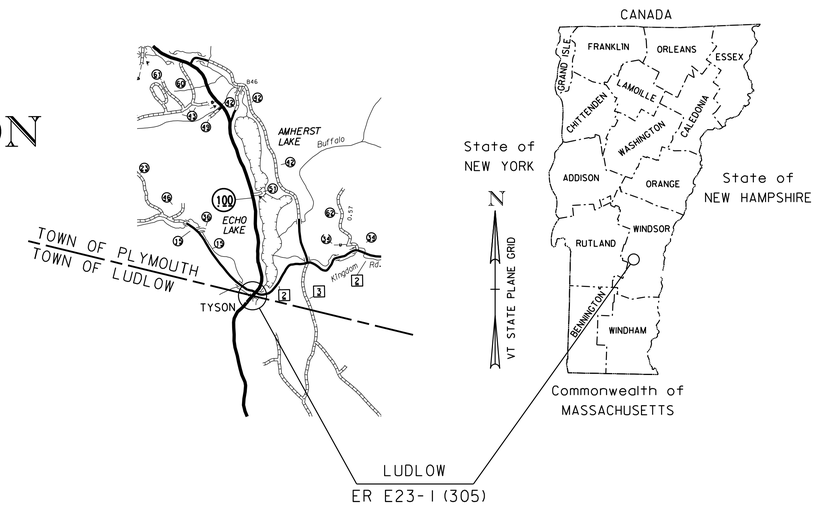
STATE OF VERMONT
AGENCY OF TRANSPORTATION



PROPOSED IMPROVEMENT
BRIDGE PROJECT

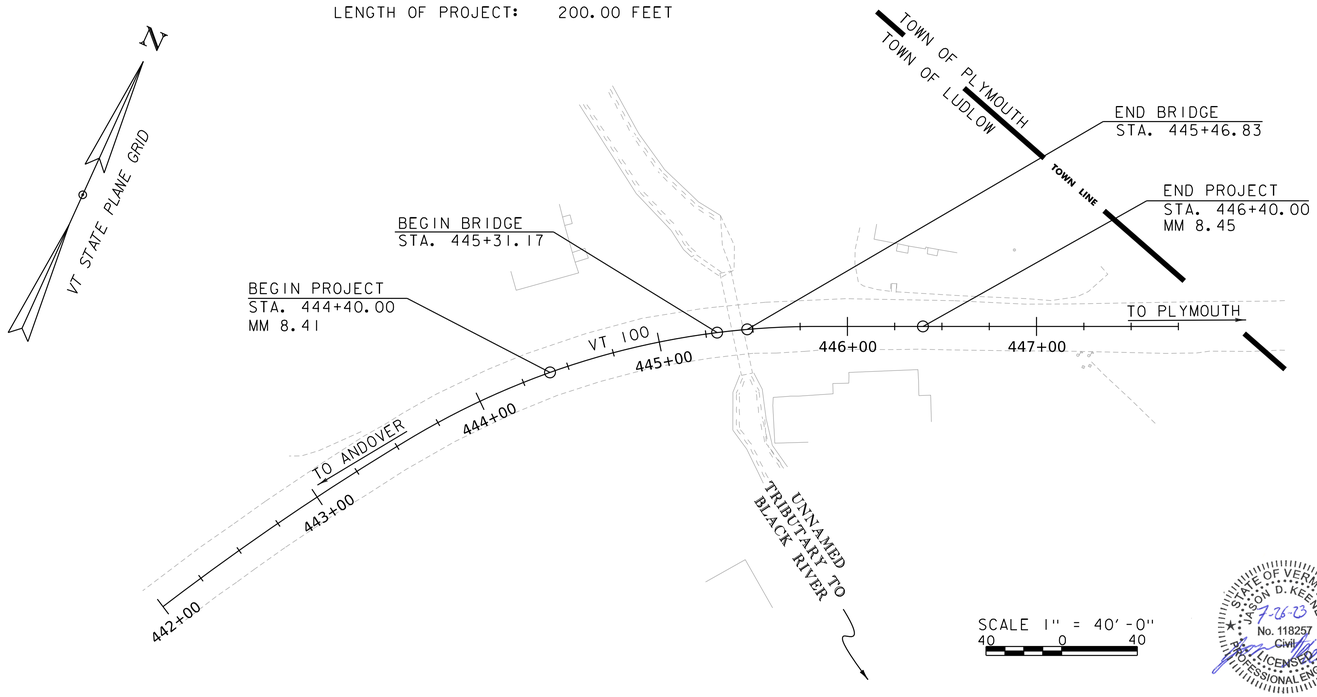
TOWN OF LUDLOW
COUNTY OF WINDSOR

VERMONT ROUTE 100 (RURAL MINOR ARTERIAL), BRIDGE NO. 102

PROJECT LOCATION: LOCATED IN THE TOWN OF LUDLOW, ON VERMONT ROUTE 100; BRIDGE NO. 102 OVER AN UNNAMED TRIBUTARY TO THE BLACK RIVER; APPROXIMATELY 0.20 MILES SOUTH OF THE INTERSECTION OF VERMONT ROUTE 100 AND KINGDOM ROAD IN THE TOWN OF PLYMOUTH.

PROJECT DESCRIPTION: WORK TO BE PERFORMED UNDER THIS PROJECT INCLUDES THE REMOVAL AND REPLACEMENT OF BRIDGE NO. 102 WITH ASSOCIATED ROADWAY AND CHANNEL WORK.

LENGTH OF STRUCTURE: 15.67 FEET
LENGTH OF ROADWAY: 184.33 FEET
LENGTH OF PROJECT: 200.00 FEET



SCALE 1" = 40'-0"
40 0 40

CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE WITH THESE PLANS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2018, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION ON APRIL 13, 2018 FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT REVISIONS AND SUCH REVISED SPECIFICATIONS AND SPECIAL PROVISIONS AS ARE INCORPORATED IN THESE PLANS.

QUALITY ASSURANCE PROGRAM : LEVEL 2	
SURVEYED BY :	VTRANS
SURVEYED DATE :	9/25/2019
DATUM	
VERTICAL	NAVD88
HORIZONTAL	NAD 83 (2011)

STATE OF VERMONT
JASON D. KEENER
No. 118257
Civil
LICENSED PROFESSIONAL ENGINEER
7-26-23

vhb

HIGHWAY DIVISION, CHIEF ENGINEER
APPROVED Erin Sisson, P.E. DATE July 25, 2023

PROJECT MANAGER : BRIAN SANDERSON, PE

PROJECT NAME : LUDLOW
PROJECT NUMBER : ER E23-1(305)

SHEET 1 OF 45 SHEETS

STATE OF VERMONT
AGENCY OF TRANSPORTATION

PRELIMINARY INFORMATION SHEET (CULVERT)

Version 2020.09.23.12
LRFD

INDEX OF SHEETS

PLAN SHEETS

STANDARDS LIST

DETAIL SHEETS

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA

Date: 11/12/21

DRAINAGE AREA : 1.42 sq. mi.
CHARACTER OF TERRAIN : Hilly to Moutainous
STREAM CHARACTERISTICS : Sinuous with narrow floodplain
NATURE OF STREAMBED : Gravel & Cobble

PEAK FLOW DATA - ANNUAL EXCEEDANCE PROBABILITY (AEP)

43% =	64 cfs	2% =	200 cfs
10% =	120 cfs	1% =	240 cfs
4% =	160 cfs	0.2% =	350 cfs

DATE OF FLOOD OF RECORD : Unknown
ESTIMATED DISCHARGE: Unknown
WATER SURFACE ELEV.: Unknown
NATURAL STREAM VELOCITY : @ 2% AEP = 6.7 fps
ICE CONDITIONS : Low to Moderate
DEBRIS: Low to Moderate
DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? Unknown
IS ORDINARY RISE RAPID? Unknown
IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? No
IF YES, DESCRIBE:

WATERSHED STORAGE: 6% HEADWATERS:
UNIFORM: X
IMMEDIATELY ABOVE SITE:

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: Round ACCGMPP
YEAR BUILT: 1919
CLEAR SPAN(NORMAL TO STREAM): 6.0 ft.
VERTICAL CLEARANCE ABOVE STREAMBED: 6.0 ft.
WATERWAY OF FULL OPENING: 28.26 sq. ft.
DISPOSITION OF STRUCTURE: Replacement
TYPE OF MATERIAL UNDER SUBSTRUCTURE: See Borings

WATER SURFACE ELEVATIONS AT:

43% AEP =	1076.4 ft.	VELOCITY =	7.1 fps
10% AEP =	1077.8 ft.	"	8.6 fps
4% AEP =	1078.6 ft.	"	9.5 fps
2% AEP =	1079.4 ft.	"	10.4 fps
1% AEP =	1080.2 ft.	"	11.2 fps

LONG TERM STREAMBED CHANGES: Unknown

IS THE ROADWAY OVERTOPPED BELOW 1% AEP: N/A
FREQUENCY: N/A
RELIEF ELEVATION: N/A
DISCHARGE OVER ROAD @ 1% AEP: N/A

UPSTREAM STRUCTURE

TOWN: N/A — DISTANCE: N/A
HIGHWAY # : N/A — STRUCTURE #: N/A
CLEAR SPAN: N/A — CLEAR HEIGHT: N/A
YEAR BUILT: N/A — FULL WATERWAY: N/A
STRUCTURE TYPE: N/A

DOWNSTREAM STRUCTURE

TOWN: Ludlow — DISTANCE: N/A
HIGHWAY # : Rescue Lake — STRUCTURE #: N/A
CLEAR SPAN: N/A — CLEAR HEIGHT: N/A
YEAR BUILT: N/A — FULL WATERWAY: N/A
STRUCTURE TYPE: N/A

PROPOSED STRUCTURE

STRUCTURE TYPE: Concrete Box Culvert

CLEAR SPAN(NORMAL TO STREAM): 14.0 ft.
VERTICAL CLEARANCE ABOVE STREAMBED: 6.5 ft.
WATERWAY OF FULL OPENING: 91.0 sq. ft.

WATER SURFACE ELEVATIONS AT:

43% AEP =	1077.9 ft.	VELOCITY=	3.3 fps
10% AEP =	1078.6 ft.	"	4.2 fps
4% AEP =	1079.0 ft.	"	4.6 fps
2% AEP =	1079.5 ft.	"	5.0 fps
1% AEP =	1079.8 ft.	"	5.4 fps

IS THE ROADWAY OVERTOPPED BELOW 1% AEP: N/A
FREQUENCY: N/A
RELIEF ELEVATION: N/A
DISCHARGE OVER ROAD @ 1% AEP: N/A

BRIDGE LOW CHORD ELEVATION:
FREEBOARD: @ 2% AEP = 1.46 ft.

SCOUR: N/A

REQUIRED CHANNEL PROTECTION: *Stone Fill Type III

PERMIT INFORMATION

AVERAGE DAILY FLOW:	-	DEPTH OR ELEVATION:
ORDINARY LOW WATER:	-	-
ORDINARY HIGH WATER:	-	-

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: N/A
CLEAR SPAN (NORMAL TO STREAM): N/A
VERTICAL CLEARANCE ABOVE STREAMBED: N/A
WATERWAY AREA OF FULL OPENING: N/A

ADDITIONAL INFORMATION

*E-Stone Type III to be used for In-channel work

TRAFFIC MAINTENANCE NOTES

1. MAINTAIN TRAFFIC ON OFFSITE DETOUR DURING EXTENDED WEEKEND CLOSURE.
2. TRAFFIC SIGNALS ARE NOT NECESSARY.
3. SIDEWALKS ARE NOT NECESSARY

DESIGN VALUES

1. DESIGN LIVE LOAD		HL-93
2. FUTURE PAVEMENT	d_P:	N/A
3. CULVERT OPENING	D:	14.00 FT
4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS)	Δ:	---
5. PRESTRESSING STRAND	f_y:	---
6. PRESTRESSED CONCRETE STRENGTH	f'_c:	---
7. PRESTRESSED CONCRETE RELEASE STRENGTH	f'_{ci}:	---
8. HIGH PERFORMANCE CONCRETE, CLASS AA	f'_c:	---
9. HIGH PERFORMANCE CONCRETE, CLASS A	f'_c:	---
10. CONCRETE HIGH PERFORMANCE, CLASS B	f'_c:	---
11. CONCRETE, CLASS C	f'_c:	---
12. REINFORCING STEEL	f_y:	60 KSI
13. STRUCTURAL STEEL AASHTO M270	f_y:	---
14. NOMINAL BEARING RESISTANCE OF SOIL	q_n:	---
15. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	---
16. NOMINAL BEARING RESISTANCE OF ROCK	q_n:	---
17. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	---
18. PILE RESISTANCE FACTOR	ϕ:	---
19. LATERAL PILE DEFLECTION	Δ:	---
20. BASIC WIND SPEED	$V3s$:	---
21. MINIMUM GROUND SNOW LOAD	pg:	---
22. SEISMIC DATA PGA: ---	Ss:	---
	$S1$:	---
23.		
24.		---
25.		---
26.		---

LRFR LOAD RATING FACTORS

LOADING LEVELS	TRUCK						
	H-20	HL-93	3S2	6 AXLE	3A. STR.	4A. STR.	5A. SEMI
TONNAGE	20	36	36	66	30	34.5	38
INVENTORY							
POSTING							
OPERATING							
COMMENTS:							

CULVERT DESIGN CRITERIA

1. PROPOSED CULVERT IS A PRECAST CONCRETE STRUCTURE (14'-0" X 10'-0" X 56'-0" BOX).
2. CULVERT ENDS ARE NOT SKEWED.
3. CULVERT WILL BE SET AT A SLOPE OF 0.71 IN. PER 1 FT.
4. CULVERT WILL REQUIRE FISH PASSAGE ACCOMMODATIONS

TRAFFIC

YEAR	ADT	DHV	%D	%T	ADTT
2024	2300	370	54	7.8	140
2044	2600	420	54	12.2	240

20 year ESAL for flexible pavement from 2024 to 2044 : 674000
40 year ESAL for flexible pavement from 2024 to 2064 : 1605000
Design Speed : 35 mph

AS BUILT "REBAR" DETAIL

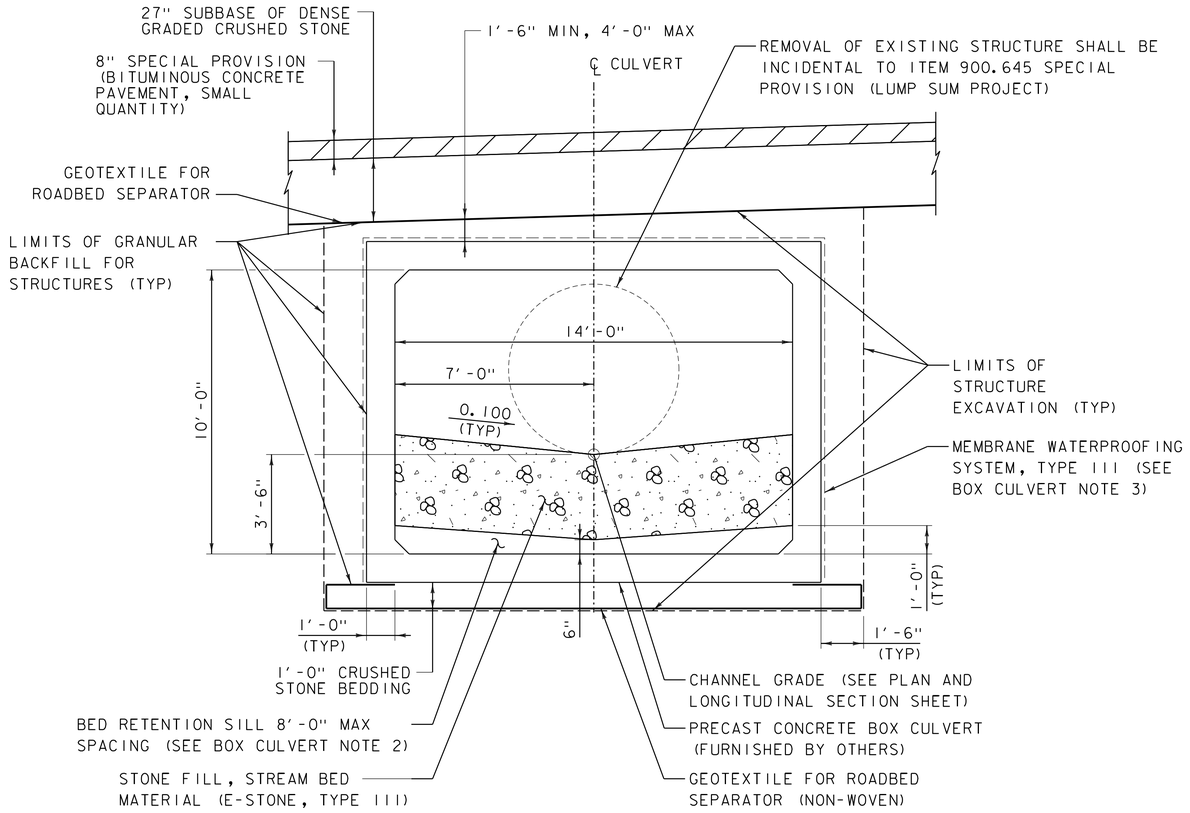
LEVEL I	LEVEL II	LEVEL III
TYPE:	TYPE:	TYPE:
GRADE:	GRADE:	GRADE:

vhb

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-I(305)

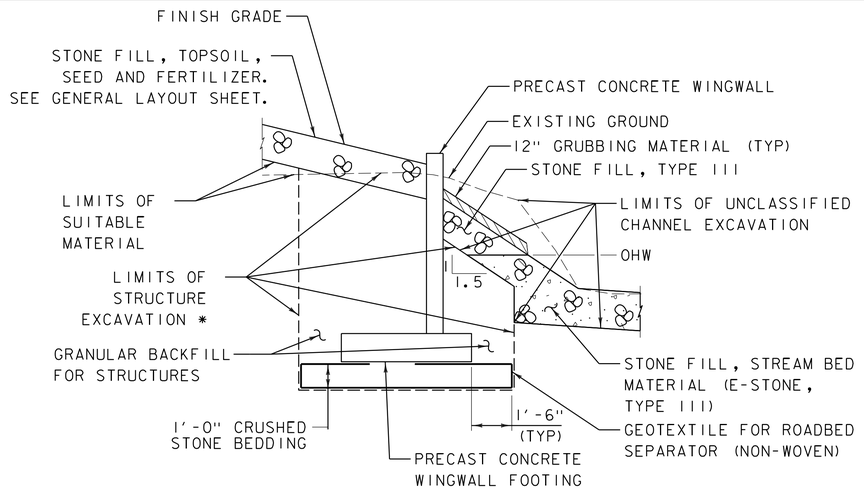
FILE NAME: z19b215pi.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: N.A. TRUSLOW
PRELIMINARY INFORMATION SHEET

PLOT DATE: 7/26/2023
DRAWN BY: N.A. TRUSLOW
CHECKED BY: J.D. KEENER



CULVERT TYPICAL SECTION

SCALE 3/8" = 1'-0"



WINGWALL EARTHWORK TYPICAL SECTION

NOT TO SCALE

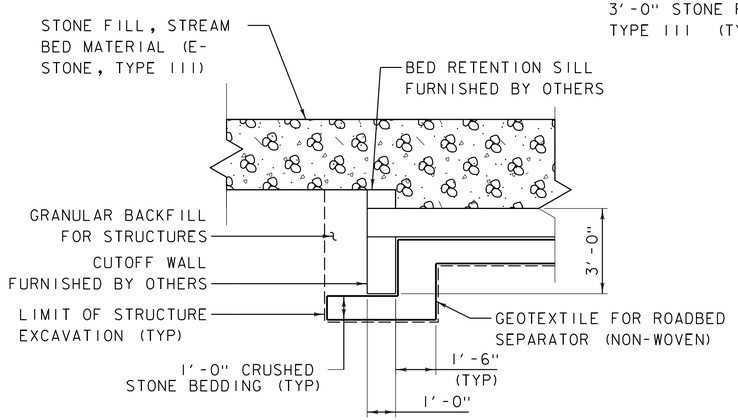
* - STRUCTURE EXCAVATION LIMITS VARY AT WINGWALL 3. SEE STONE TOE WALL DETAIL SHEET FOR LIMITS.

BOX CULVERT NOTES:

1. PRECAST CONCRETE BOX CULVERT TO BE FURNISHED BY OTHERS AND SHALL BE INSTALLED IN ACCORDANCE WITH CONTRACT PLANS, SECTION 540, AND MANUFACTURERS SPECIFICATIONS.

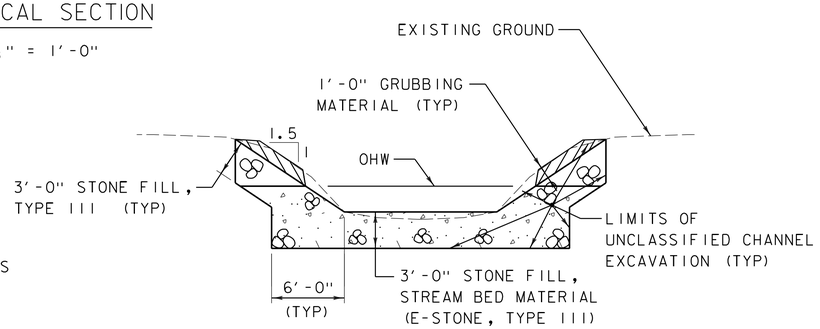
2. BED RETENTION SILLS SHALL BE 12" HIGH AT THE EDGES OF THE BOX AND 6" HIGH IN THE CENTER. SILLS SHALL HAVE A POSITIVE CONNECTION TO THE PRECAST BOX. SILLS SHALL BE PLACED NO MORE THAN 8'-0" APART THROUGHOUT THE STRUCTURE WITH ONE SILL PLACED AT BOTH THE INLET AND OUTLET AS SHOWN IN CUTOFF WALL TYPICAL SECTION.

3. SEE PROJECT NOTES FOR REQUIREMENTS FOR SHEET MEMBRANE WATERPROOFING SYSTEM, TYPE III AND WATER REPELLENT, SILANE.



CUTOFF WALL TYPICAL SECTION

NOT TO SCALE



TYPICAL CHANNEL SECTION

NOT TO SCALE

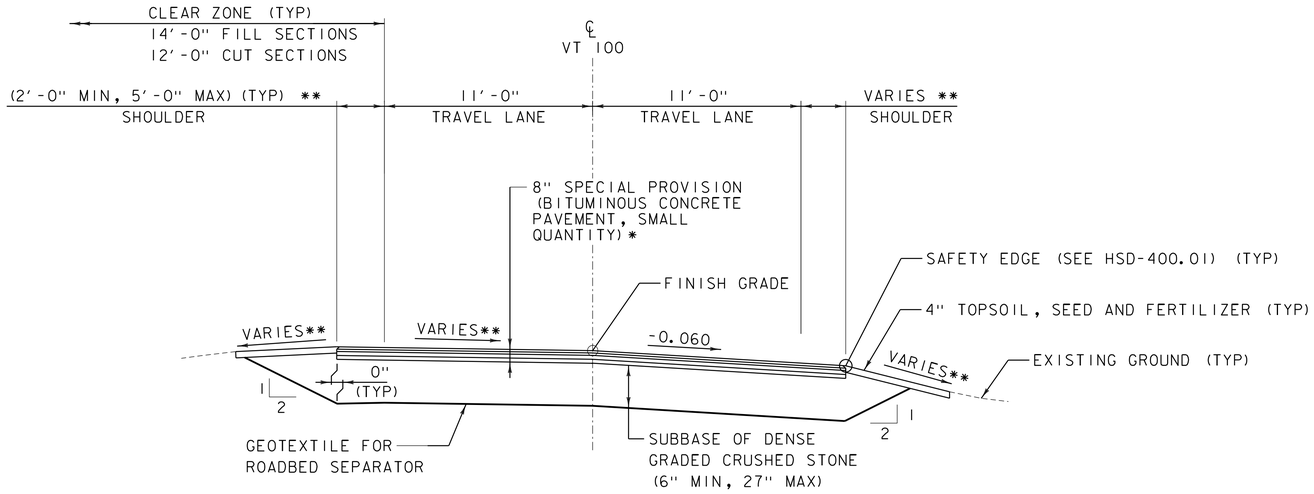
NOTES:

1. WHENEVER CHANNEL SLOPE INTERSECTS ROADWAY SUBBASE, GRUBBING MATERIAL SHALL BEGIN AT THE BOTTOM OF SUBBASE.

2. AT THE DISCRETION OF THE RESIDENT, THE CHANNEL SHOULD BE CONSTRUCTED TO GRADE SIMILARLY TO A NATURAL LOW FLOW CHANNEL.

vhb

PROJECT NAME: LUDLOW	
PROJECT NUMBER: ER E23-1(305)	
FILE NAME: z19b215typ.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: J.D. KEENER
TYPICAL CULVERT SECTIONS	SHEET 3 OF 45

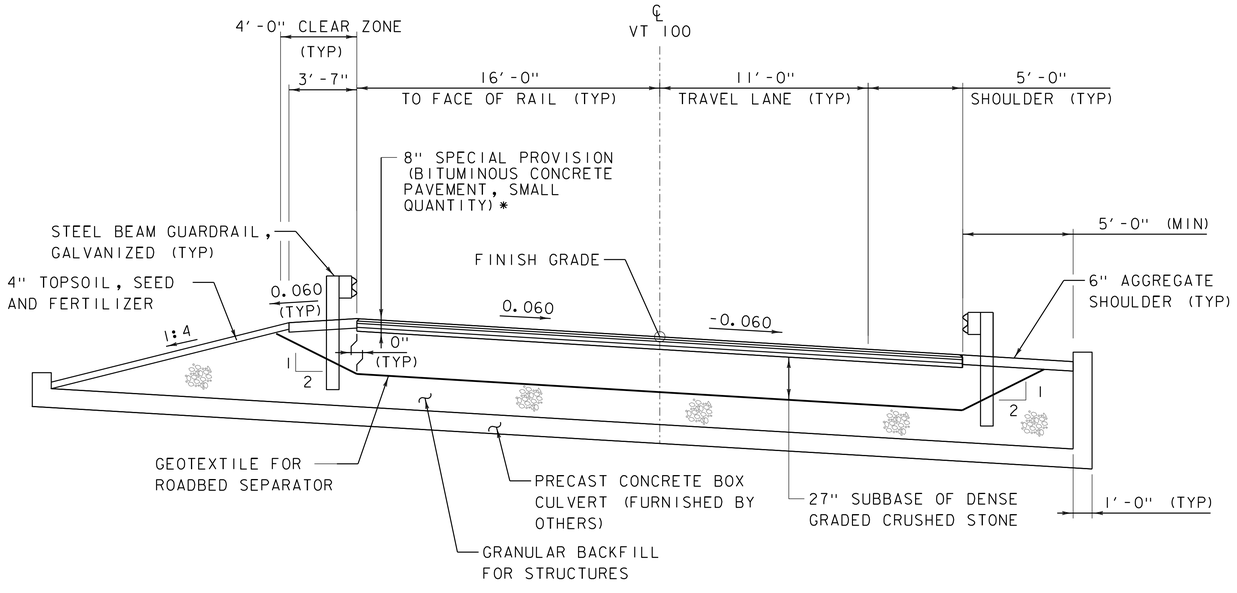


VT ROUTE 100 TYPICAL SECTION

SCALE 1/4" = 1'-0"

* - (2) 1½" LIFTS OF TYPE IVS OVER
(2) 2½" LIFTS OF TYPE IIS

** - SEE CROSS SECTIONS OR BANKING
DIAGRAM AS APPLICABLE



VT ROUTE 100 PROPOSED BOX CULVERT TYPICAL SECTION

SCALE 1/4" = 1'-0"

* - (2) 1½" LIFTS OF TYPE IVS OVER
(2) 2½" LIFTS OF TYPE IIS

SUPERPAVE BITUMINOUS CONCRETE PAVEMENT MIXTURE DESIGN CRITERIA	
DESIGN LIFE ESAL (DESIGN LANE)	363,960
DESIGN NUMBER OF GYRATIONS	65
PERFORMANCE GRADED ASHPALT BINDER	70-28

MATERIAL TOLERANCES

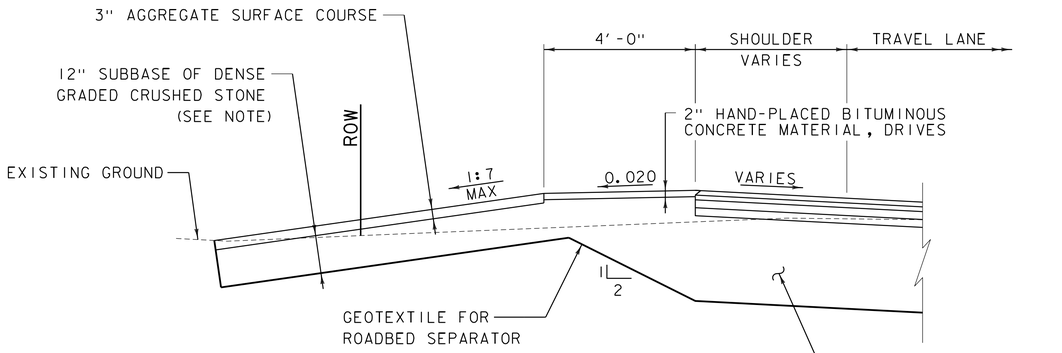
(IF USED ON PROJECT)

SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215typ.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: N.A. TRUSLOW
TYPICAL ROADWAY SECTIONS (1 OF 2)

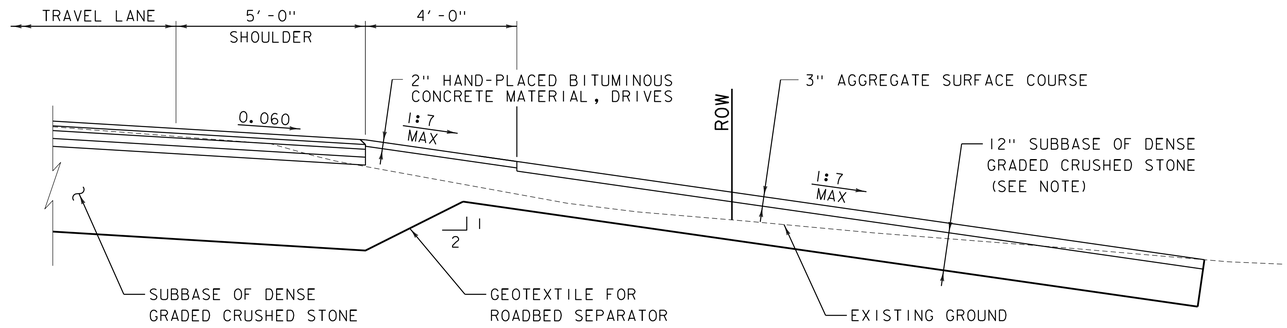
PLOT DATE: 7/26/2023
DRAWN BY: N.A. TRUSLOW
CHECKED BY: J.D. KEENER
SHEET 4 OF 45



DRIVE LEFT DETAIL

SCALE ½" = 1'-0"

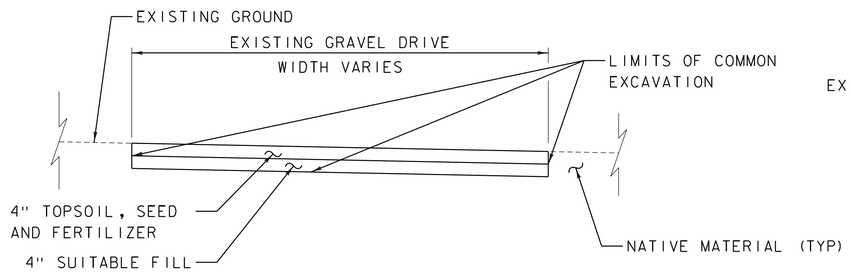
NOTE: CONTRACTOR TO ENSURE ALL 4'-0" PAVED APRONS, PAVED DRIVES AND GRAVEL DRIVES ARE INSTALLED WITH A MINIMUM OF 12" SUBBASE OF DENSE GRADED CRUSHED STONE BENEATH THEM.



DRIVE RIGHT DETAIL

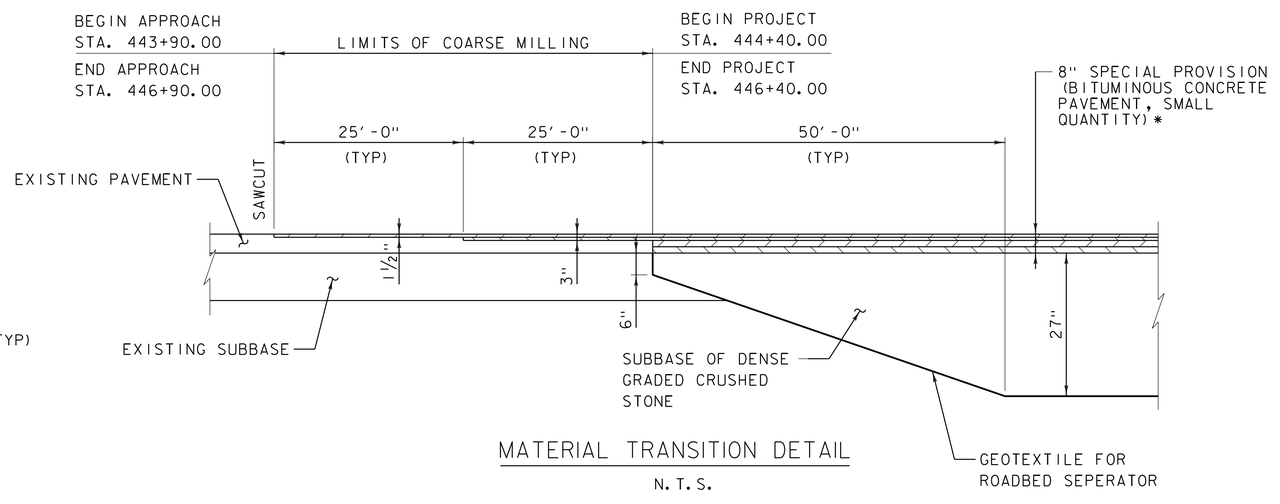
SCALE ½" = 1'-0"

NOTE: CONTRACTOR TO ENSURE ALL 4'-0" PAVED APRONS, PAVED DRIVES AND GRAVEL DRIVES ARE INSTALLED WITH A MINIMUM OF 12" SUBBASE OF DENSE GRADED CRUSHED STONE BENEATH THEM.



GRAVEL DRIVE REMOVAL DETAIL

SCALE ½" = 1'-0"



MATERIAL TRANSITION DETAIL

N.T.S.

* - (2) 1½" LIFTS OF TYPE IVS OVER (2) 2½" LIFTS OF TYPE IIS

PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)
FILE NAME: z19b215typ.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: J.D. KEENER
TYPICAL ROADWAY SECTIONS (2 OF 2)	SHEET 5 OF 45

PROJECT NOTES

GENERAL

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE STATE OF VERMONT AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION, DATED 2018, AND ITS LATEST REVISIONS, AND THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, AND ITS LATEST REVISIONS.

2. UNLESS OTHERWISE NOTED ALL COST ASSOCIATED WITH THE COMPLETION OF THIS PROJECT WILL BE PAID FOR UNDER ITEM 900.645, "SPECIAL PROVISION (LUMP SUM PROJECT)".

3. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL AERIAL UTILITIES AND POLES PRIOR TO STARTING WORK. SOME UTILITIES MAY HAVE BEEN RELOCATED DURING THE PREPARATION OF THE CONTRACT DOCUMENTS AND THE CONTRACTOR SHALL COORDINATE WITH ALL UTILITY OWNERS TO CONFIRM ACTUAL LOCATION PRIOR TO CONSTRUCTION.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF THE EXISTING CULVERT, THE PREVIOUS SLAB BRIDGE, AND CONCRETE ABUTMENTS IN THEIR ENTIRETY. WORK FOR REMOVAL OF THESE STRUCTURES SHALL BE IN ACCORDANCE WITH SECTION 240 OF THE STANDARD SPECIFICATIONS AND PAYMENT WILL BE CONSIDERED INCIDENTAL TO ITEM 900.645, "SPECIAL PROVISION (LUMP SUM PROJECT)". THIS WORK WILL INCLUDE THE COMPLETE REMOVAL AND DISPOSAL OF THE EXISTING CULVERT, INCLUDING ANY INLETS, OUTLETS, CUTOFF WALLS, HEADWALLS, AND WINGWALLS, THE CONCRETE SLAB BRIDGE SUPERSTRUCTURE AND THE CONCRETE SLAB BRIDGE ABUTMENTS, HEADWALLS, AND WINGWALLS.

5. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONTROL AND MAINTAIN FLOWS OF THE UNNAMED TRIBUTARY OF THE BLACK RIVER THROUGHOUT CONSTRUCTION. ALL COSTS ASSOCIATED WITH THE CONTROL OF THE UNNAMED TRIBUTARY OF THE BLACK RIVER SHALL BE CONSIDERED INCIDENTAL TO ITEM 900.645, "SPECIAL PROVISION (LUMP SUM PROJECT)".

TRAFFIC CONTROL

6. TRAFFIC CONROL WILL BE PAID FOR UNDER ITEM 641.11, "TRAFFIC CONTROL, ALL-INCLUSIVE". CONTRACTOR SHALL DESIGN AND SUBMIT THEIR OWN SITE-SPECIFIC TRAFFIC CONTROL PLAN FOR REVIEW AND APPROVAL.

7. THE CONTRACTOR SHALL NOTIFY THE TOWN AND RESIDENTS WITHIN THE PROJECT LIMITS REGARDING THE ROAD CLOSURE IN ACCORDANCE WITH THE PROJECT SPECIAL PROVISIONS.

8. WITH THE EXCEPTION OF THE DRIVE FROM STA. 444+91 TO 445+20 LT, FULL ACCESS TO ALL OTHER SIDE ROADS AND DRIVES WITHIN THE PROJECT LIMITS SHALL BE MAINTAINED AT ALL TIMES. CONSTRUCTION ACCESS THROUGH THE DRIVE FROM STA. 444+91 TO 445+20 LT IS PERMITTED WITHIN THE LIMITS SHOWN IN THE CONTRACT PLANS. COORDINATION WITH THE PROPERTY OWNER AND/OR TENANT TO DISCUSS CONSTRUCTION SCHEDULE AND ACCESS SHALL OCCUR PRIOR TO COMMENCEMENT OF CONSTRUCTION AND UPDATES SHALL BE PROVIDED AS NEEDED THROUGHOUT THE CONSTRUCTION DURATION. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO ITEM 641.11, "TRAFFIC CONTROL, ALL-INCLUSIVE".

EARTHWORK

9. THE CONTRACTOR SHALL FOLLOW VTRANS STATE HIGHWAY SYSTEM ROADSIDE TERRESTRIAL INVASIVE PLANTS BEST MANAGEMENT PRACTICES (BMPS), EFFECTIVE DATE 9/10/12, BMP #18 THROUGH #21 FOR STOCKPILING, HANDLING, REUSING, AND DISPOSING OF SOILS FROM THE AREA DELINEATED ON THE EPSC EXISTING SITE PLAN SHEET.

10. THE CONTRACTOR SHALL STOCKPILE THE SOILS REMOVED FROM THE AREA DELINEATED ON THE EPSC SHEETS AS CONTAINING JAPANESE KNOTWEED IN A DIFFERENT LOCATION FROM THE OTHER SOIL STOCKPILE AREAS. A BARRIER SHALL BE PLACED IN THE STOCKPILE AREA FOR THE DELINEATED SOILS PRIOR TO EXCAVATION OF THE SOILS. THE EQUIPMENT USED FOR EXCAVATION SHALL BE CLEANED OF ALL DELINEATED SOIL BEFORE BEING USED TO EXCAVATE IN OTHER AREAS. IF THERE IS AN EXCESS OF MATERIAL, IT SHALL BE WASTED PER THE GUIDANCE IN THE VTRANS STATE HIGHWAY SYSTEM ROADSIDE TERRESTRIAL INVASIVE PLANTS BEST MANAGEMENT PRACTICES (BMPS), EFFECTIVE DATE 9/10/12. THE COST FOR HANDLING MATERIAL, CLEANING EQUIPMENT AND WASTING EXCESS DELINEATED SOIL SHALL BE CONSIDERED INCIDENTAL TO ITEM 900.645, "SPECIAL PROVISION (LUMP SUM PROJECT)".

11. STONE FILL MATERIAL MEETING THE REQUIREMENTS OF ITEM 613.06, "STONE FILL, STREAMBED MATERIAL (E-STONE, TYPE III)" IS PERMITTED TO BE USED IN PLACE OF STONE FILL, TYPE III.

12. EXCAVATION FOR THE REMOVAL OF THE EXISTING SLAB BRIDGE AND CONCRETE ABUTMENTS THAT ARE OUTSIDE THE LIMITS OF GRANULAR BACKFILL FOR STRUCTURES SHALL BE BACKFILLED WITH MATERIAL MEETING THE REQUIREMENTS OF ITEM 203.32, "GRANULAR BORROW".

PRECAST CONCRETE CULVERT

13. THE PRECAST CONCRETE BOX CULVERT IS TO BE FURNISHED BY VTRANS AND WILL BE FABRICATED AND DELIVERED TO THE PROJECT SITE BY THE FORT MILLER CO. LLC. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF DELIVERY, UNLOADING, AND ERECTING THE PRECAST CONCRETE BOX IN ACCORDANCE WITH THE CONTRACT PLANS, SECTION 540 OF THE STANDARD SPECIFICATIONS, AND THE MANUFACTURERS SPECIFICATIONS. PER SECTION 540 OF THE STANDARD SPECIFICATIONS, THE CONTRACTOR SHALL DEVELOP AND SUBMIT AN ERECTION PLAN FOR THE ERECTION OF THE PRECAST CONCRETE BOX AND WINGWALLS. PAYMENT FOR ALL COSTS ASSOCIATED WITH THE HANDLING, REPAIRING, AND ERECTING THE PRECAST CONCRETE BOX AND MATERIALS SPECIFIED, FOR FURNISHING AND IMPLEMENTING THE ERECTION PLAN, AND FOR FURNISHING ALL LABOR, TOOLS, EQUIPMENT, AND INCIDENTALS NECESSARY TO COMPLETE THE WORK SHALL BE MADE UNDER ITEM 900.645, "SPECIAL PROVISION (LUMP SUM PROJECT)".

14. ALL LIFTING ATTACHMENTS IN THE PRECAST CONCRETE CULVERT UNITS SHALL BE REMOVABLE TO THE MINIMUM CLEAR COVER FOR REINFORCING STEEL AS SPECIFIED IN THE PLANS. THE LIFTING POINTS SHALL BE DETAILED IN THE APPROPRIATE FABRICATION DRAWINGS.

15. ALL STEEL PERMANENTLY LEFT IN PLACE SHALL BE COATED TO THE SAME LEVEL OF THE REINFORCING STEEL IN THE BOX CULVERT. COST ASSOCIATED WITH STEEL COATING SHALL BE CONSIDERED INCIDENTAL TO ITEM 900.645, "SPECIAL PROVISION (LUMP SUM PROJECT)".

16. CLOSURE POURS SHALL BE COMPLETED WITH MATERIAL MEETING THE REQUIREMENTS OF SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, RAPID SET).

17. ALL RECESSED LIFTING POINTS AND BLOCK OUTS SHALL BE FILLED WITH MORTAR TYPE IV PER SUBSECTION 540.11. ALL RELATED COSTS SHALL BE CONSIDERED INCIDENTAL TO ITEM 900.645, "SPECIAL PROVISION (LUMP SUM PROJECT)".

18. THE FABRICATOR SHALL USE THE FOLLOWING DESIGN CRITERIA:

    A. SOIL UNIT WEIGHT = 140 PCF
    B. DESIGN LIVE LOAD = HL-93
    C. DESIGN FILL OVER BOX = 0.5 - 5 FEET
    D. AT-REST EARTH PRESSURE (K_O) = 0.38
    E. CONCRETE COMPRESSIVE STRENGTH = 5.0 KSI (MINIMUM)
    F. DESIGN LIFE = 100 YEAR

19. PRECAST CONCRETE BOX CULVERT LAYOUT AND DIMENSIONS ARE INCLUDED FOR REFERENCE ONLY. THE ACTUAL DIMENSIONS AND CONFIGURATION SHALL BE THOSE SHOWN IN THE PRECAST CONCRETE BOX CULVERT FABRICATION DRAWINGS AND IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THESE PRIOR TO ERECTION OF THE STRUCTURE.

20. BOTH INLET AND OUTLET FACES OF THE PRECAST CONCRETE BOX SHALL BE VERTICAL IN THEIR FINAL POSITION.

21. PAYMENT FOR REINFORCING STEEL, HIGH PERFORMANCE CONCRETE, EXPANSION MATERIAL, PREFORMED JOINT FILLER, JOINT GASKETS, MECHANICAL BAR CONNECTORS, MORTAR AND ALL OTHER CONNECTION HARDWARE AND MATERIAL SHALL NOT BE MADE SEPARATELY BUT SHALL BE CONSIDERED INCIDENTAL TO ITEM 900.645, "SPECIAL PROVISION (LUMP SUM PROJECT)".

22. PRIOR TO THE START OF THE BRIDGE CLOSURE PERIOD THE CONTRACTOR SHALL SUBMIT AN ERECTION PLAN IN ACCORDANCE WITH SECTION 105. UNDER NO CIRCUMSTANCES SHALL A BRIDGE CLOSURE BEGIN PRIOR TO HAVING AN ACCEPTED ERECTION PLAN.

23. BACKFILL SHALL NOT BE PLACED AGAINST WINGWALLS UNTIL THE HIGH PERFORMANCE CONCRETE, RAPID SET MATERIAL HAS REACHED A MINIMUM STRENGTH OF 3,000 PSI.

24. MEMBRANE WATERPROOFING SYSTEM, TYPE III SHALL BE APPLIED TO THE TOP AND SIDES OF THE PRECAST BOX CULVERT AS SHOWN ON THE PLANS AND IN ACCORDANCE WITH SUBSECTION 726.11(C). MEMBRANE SHALL EXTEND PAST PRECAST JOINTS A MINIMUM OF ONE FOOT. MEMBRANE SHALL BE APPLIED TO THE SIDES OF THE PRECAST CONCRETE BOX PRIOR TO THE TOPS. ANY OVERLAPPING OF MEMBRANE SHALL BE DONE IN A SHINGLED STYLE WITH A MINIMUM OVERLAP OF ONE FOOT. ALL OF THE CONCRETE JOINTS SHALL BE GROUTED PRIOR TO MEMBRANE APPLICATION. A 1" THICK POLYSTYRENE INSULATION BOARD IN ACCORDANCE WITH SUBSECTION 732.01 SHALL BE PLACED OVER THE MEMBRANE PRIOR TO BACKFILL. PAYMENT FOR MEMBRANE WATERPROOFING SYSTEM, TYPE III AND POLYSTYRENE INSULATION BOARD FOR THIS WORK SHALL BE CONSIDERED INCIDENTAL TO ITEM 900.645, "SPECIAL PROVISION (LUMP SUM PROJECT)".

25. THE BRIDGE PLAQUE FURNISHED BY THE AGENCY SHALL BE CAST INTO WINGWALL 2. SEE STANDARD DRAWING S-501 FOR FURTHER DETAILS.

26. RETENTION SILLS MEETING THE REQUIREMENTS WITHIN THE PLANS SHALL BE DESIGNED BY THE FABRICATOR AND SHALL BE SPACED AT A MAXIMUM OF 8'-0"

27. E-STONE PLACED INSIDE OF THE PRECAST CONCRETE CULVERT SHALL BE PLACED SUCH THAT THE CULVERT IS NOT DAMAGED.

CONCRETE

28. ITEM 514.10, "WATER REPELLENT, SILANE" SHALL BE APPLIED TO ALL CONCRETE SURFACES EXPOSED IN THE FINAL CONDITION, WITH THE EXCEPTION OF THE INSIDE OF THE PRECAST BOX, AS SHOWN IN THE PLANS. WATER REPELLENT, SILANE MAY BE SHOP APPLIED FOR THE PRECAST COMPONENTS, IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

REINFORCING STEEL

29. ALL REINFORCING STEEL SHALL BE LEVEL I REINFORCING STEEL IN ACCORDANCE WITH SECTION 507.

30. ALL REINFORCING STEEL SHALL HAVE A CLEAR COVER OF 2".

31. REINFORCING STEEL PLACEMENT TOLERANCES SHALL BE AS FOLLOWS:

    A. SPACING +/- 1"
    B. CLEARANCE +/- ¼"

32. ALL REINFORCING STEEL SHALL BE DETAILED AND FABRICATED USING PROCEDURES AND TOLERANCES IN ACCORDANCE WITH APPLICABLE PUBLICATIONS OF THE CONCRETE REINFORCING STEEL INSTITUTE (CRSI).

ITEMS TO BE PAID FOR UNDER LUMP SUM PROJECT

ESTIMATED QUANTITY	UNIT	ITEM	ITEM NUMBER
1	LS	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	201.10
640	CY	COMMON EXCAVATION	203.15
680	CY	UNCLASSIFIED CHANNEL EXCAVATION	203.27
25	CY	GRANULAR BORROW	203.32
1020	CY	STRUCTURE EXCAVATION	204.25
570	CY	GRANULAR BACKFILL FOR STRUCTURES	204.30
300	SY	COARSE-MILLING, BITUMINOUS PAVEMENT	210.10
550	CY	SUBBASE OF DENSE GRADED CRUSHED STONE	301.35
25	CY	AGGREGATE SURFACE COURSE	401.10
23	TON	AGGREGATE SHOULDERS	402.12
9	CWT	EMULSIFIED ASPHALT	404.65
160	SY	HAND-PLACED BITUMINOUS CONCRETE PAVEMENT, DRIVES	406.38
305	LB	REINFORCING STEEL, LEVEL I (EPOXY COATED)	507.11
20	GAL	WATER REPELLENT, SILANE	514.10
1	LS	PRECAST CONCRETE STRUCTURE (14'-0" x 10'-0" x 56'-0")	540.10
390	CY	STONE FILL, STREAM BED MATERIAL (E-STONE, TYPE III)	613.06
130	CY	STONE FILL, TYPE III	613.12
165	LF	STEEL BEAM GUARDRAIL, GALVANIZED	621.20
4	EACH	ANCHOR FOR STEEL BEAM RAIL	621.60
80	LF	REMOVAL AND DISPOSAL OF GUARDRAIL	621.80
70	TON	CRUSHED STONE BEDDING	629.54
1	LS	TESTING EQUIPMENT, BITUMINOUS	631.17
3	EACH	CPM SCHEDULE	633.10
610	LF	DURABLE 4 INCH WHITE LINE, POLYUREA	646.404
610	LF	DURABLE 4 INCH YELLOW LINE, POLYUREA	646.414
2060	SY	GEOTEXTILE FOR ROADBED SEPARATOR	649.11
25	LB	SEED	651.15
110	LB	FERTILIZER	651.18
0.5	TON	AGRICULTURAL LIMESTONE	651.20
120	CY	TOPSOIL	651.35
230	SY	GRUBBING MATERIAL (12 INCH)	651.40
1	LS	EPSC PLAN	653.01
80	HR	MONITORING EPSC PLAN	653.02
1	LU	MAINTENANCE OF EPSC PLAN (N.A.B.I.)	653.03
0.5	TON	HAY MULCH	653.10
280	SY	ROLLED EROSION CONTROL PRODUCT, TYPE I	653.20
40	CY	STABILIZED CONSTRUCTION ENTRANCE	653.35
2	EACH	FILTER BAG	653.45
350	LF	BARRIER FENCE	653.50
220	LF	PROJECT DEMARCATION FENCE	653.55
210	LF	EROSION LOG	653.60
2	EACH	DECIDUOUS TREES (ACER RUBRUM)(B&B)(2.5"-3" CAL.)	656.30
11	EACH	DECIDUOUS SHRUBS (CORNUS SERICEA 'ARCTIC FIRE')(B&B)(18" - 24" SPD.)	656.35
12	EACH	DECIDUOUS SHRUBS (SALIX DISCOLOR)(B&B)(24" - 30" SPD.)	656.35
6	EACH	DECIDUOUS SHRUBS (SPIRAEA LATIFOLIA)(B&B)(18" - 24" SP)	656.35
140	CY	LANDSCAPE BACKFILL, TRUCK MEASUREMENT	656.80
1	LS	TREE PROTECTION	656.85
1	SF	TRAFFIC SIGN, TYPE A	675.20
30	LF	SQUARE TUBE SIGN POST AND ANCHOR	675.341
1	EACH	REMOVING SIGNS	675.50
3	CY	SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, RAPID SET)	900.608
5	EACH	SPECIAL PROVISION (LANDSCAPE BOULDER)	900.620
1	LS	SPECIAL PROVISION (REMOVE AND RESET SHED)	900.645
1	LS	SPECIAL PROVISION (TEMPORARY RELOCATION OF STREAM)	900.645
40	SF	SPECIAL PROVISION (STONE TOE WALL)	900.670
330	TON	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)	900.680

ITEMS TO BE PAID FOR UNDER TRAFFIC CONTROL, ALL INCLUSIVE

ESTIMATED QUANTITY	UNIT	ITEM	ITEM NUMBER
160	LF	TEMPORARY TRAFFIC BARRIER	621.90
150	HR	UNIFORMED TRAFFIC OFFICERS	630.10
200	HR	FLAGGERS	630.15
1	LS	TRAFFIC CONTROL, ALL-INCLUSIVE	641.11
8	EACH	PORTABLE CHANGEABLE MESSAGE SIGN	641.15

ITEMS TO BE PAID SEPARATELY

ESTIMATED QUANTITY	UNIT	ITEM	ITEM NUMBER
1	CY	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	204.22
1	LS	MOBILIZATION/DEMOBILIZATION	635.11

DETAILED SUMMARY OF QUANTITIES

QUANTITIES	UNIT	ITEMS
		BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY
		(TYPE IIS)
90.55	TON	BASE COURSE
90.55	TON	BASE COURSE
90.55	TON	BASE COURSE
3.89	TON	ROUNDING
185	**TON**	**TOTAL PAVEMENT (TYPE IIS) REQUIRED**
		BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY
		(TYPE IVS)
62.64	TON	INTERMEDIATE COURSE
80.39	TON	WEARING COURSE
1.98	TON	ROUNDING
145	**TON**	**TOTAL PAVEMENT (TYPE IVS) REQUIRED**
		N.A.B.I = NOT A BID ITEM

vhb

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215qty.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: M.F. NEMETH
QUANTITY SHEET

PLOT DATE: 7/26/2023
DRAWN BY: M.F. NEMETH
CHECKED BY: J.D. KEENER
SHEET 7 OF 45

GENERAL INFORMATION

SYMBOLOGY LEGEND NOTE

THE SYMBOLOGY ON THIS SHEET IS INTENDED TO COVER STANDARD CONVENTIONAL SYMBOLOGY. THE SYMBOLOGY IS USED FOR EXISTING & PROPOSED FEATURES WITH HEAVIER LINEWEIGHT, IN COMBINATION WITH PROJECT ANNOTATION, AS NOTED ON PROJECT PLAN SHEETS. THIS LEGEND SHEET COVERS THE BASICS. SYMBOLOGY ON PLANS MAY VARY, PLAN ANNOTATIONS AND NOTES SHOULD BE USED TO CLARIFY AS NEEDED.

R.O.W. ABBREVIATIONS (CODES) & SYMBOLS

POINT	CODE	DESCRIPTION
	BF	BARRIER FENCE
	CH	CHANNEL EASEMENT
	CONST	CONSTRUCTION EASEMENT
	CUL	CULVERT EASEMENT
	D&C	DISCONNECT & CONNECT
	DIT	DITCH EASEMENT
	DR	DRAINAGE EASEMENT
	DRIVE	DRIVEWAY EASEMENT
	EC	EROSION CONTROL
	HWY	HIGHWAY EASEMENT
	I&M	INSTALL & MAINTAIN EASEMENT
	LAND	LANDSCAPE EASEMENT
	PDF	PROJECT DEMARCATION FENCE
	R&RES	REMOVE & RESET
	R&REP	REMOVE & REPLACE
	R.T.& I.	RIGHT, TITLE, AND INTEREST
	SR	SLOPE RIGHT
	UE	UTILITY EASEMENT
	(P)	PERMANENT EASEMENT
	(T)	TEMPORARY EASEMENT
■	BNDNS	BOUND SET
⧈	BNDNS	BOUND TO BE SET
◎	IPNF	IRON PIN FOUND
●	IPNS	IRON PIN TO BE SET
⊠	CALC	EXISTING ROW POINT
○	PROW	PROPOSED ROW POINT
[LENGTH]		LENGTH CARRIED ON NEXT SHEET

COMMON TOPOGRAPHIC POINT SYMBOLS

POINT	CODE	DESCRIPTION
	APL	BOUND APPARENT LOCATION
	BM	BENCHMARK
	BND	BOUND
	CB	CATCH BASIN
	COMB	COMBINATION POLE
	DITHR	DROP INLET THROATED DNC
	EL	ELECTRIC POWER POLE
	FPOLE	FLAGPOLE
	GASFIL	GAS FILLER
	GP	GUIDE POST
	GSO	GAS SHUT OFF
	GUY	GUY POLE
	GUYW	GUY WIRE
	GV	GATE VALVE
	H	TREE HARDWOOD
	HCTRL	CONTROL HORIZONTAL
	HVCTRL	CONTROL HORIZ. & VERTICAL
	HYD	HYDRANT
	IP	IRON PIN
	IPIPE	IRON PIPE
	LI	LIGHT - STREET OR YARD
	MB	MAILBOX
	MH	MANHOLE (MH)
	MM	MILE MARKER
	PM	PARKING METER
	PMK	PROJECT MARKER
	POST	POST STONE/WOOD
	RRSIG	RAILROAD SIGNAL
	RRSL	RAILROAD SWITCH LEVER
	S	TREE SOFTWOOD
	SAT	SATELLITE DISH
	SHRUB	SHRUB
	SIGN	SIGN
	STUMP	STUMP
	TEL	TELEPHONE POLE
	TIE	TIE
	TSIGN	SIGN W/DOUBLE POST
	VCTRL	CONTROL VERTICAL
	WELL	WELL
	WSO	WATER SHUT OFF

THESE ARE COMMON VAOT SURVEY POINT SYMBOLS FOR EXISTING FEATURES, ALSO USED FOR PROPOSED FEATURES WITH HEAVIER LINEWEIGHT, IN COMBINATION WITH PROPOSED ANNOTATION.

PROPOSED GEOMETRY CODES

CODE	DESCRIPTION
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
CC	CENTER OF CURVE
PT	POINT OF TANGENCY
PCC	POINT OF COMPOUND CURVE
PRC	POINT OF REVERSE CURVE
POB	POINT OF BEGINNING
POE	POINT OF ENDING
STA	STATION PREFIX
AH	AHEAD STATION SUFFIX
BK	BACK STATION SUFFIX
D	CURVE DEGREE OF (100FT)
R	CURVE RADIUS OF
T	CURVE TANGENT LENGTH
L	CURVE LENGTH OF
E	CURVE EXTERNAL DISTANCE
CB	CHORD BEARING

UTILITY SYMBOLOGY

UNDERGROUND UTILITIES

- UGU — UTILITY (GENERIC-UNKNOWN)
- UT — TELEPHONE
- UE — ELECTRIC
- UC — CABLE (TV)
- UEC — ELECTRIC+CABLE
- UET — ELECTRIC+TELEPHONE
- UCT — CABLE+TELEPHONE
- UECT — ELECTRIC+CABLE+TELEPHONE
- G — GAS LINE
- W — WATER LINE
- S — SANITARY SEWER (SEPTIC)

ABOVE GROUND UTILITIES (AERIAL)

- AGU — UTILITY (GENERIC-UNKNOWN)
- T — TELEPHONE
- E — ELECTRIC
- C — CABLE (TV)
- EC — ELECTRIC+CABLE
- ET — ELECTRIC+TELEPHONE
- AER E&T — ELECTRIC+TELEPHONE
- CT — CABLE+TELEPHONE
- ECT — ELECTRIC+CABLE+TELEPHONE
- UTILITY POLE GUY WIRE

PROJECT CONSTRUCTION SYMBOLOGY

PROJECT DESIGN & LAYOUT SYMBOLOGY

- CZ — CLEAR ZONE
- PLAN LAYOUT MATCHLINE

PROJECT CONSTRUCTION FEATURES

- TOP OF CUT SLOPE
- TOE OF FILL SLOPE
- STONE FILL
- BOTTOM OF DITCH ℄
- CULVERT PROPOSED
- STRUCTURE SUBSURFACE
- PROJECT DEMARCATION FENCE
- BARRIER FENCE
- TREE PROTECTION ZONE (TPZ)
- STRIPING LINE REMOVAL
- SHEET PILES

CONVENTIONAL BOUNDARY SYMBOLOGY

BOUNDARY LINES

- TOWN LINE — TOWN BOUNDARY LINE
- COUNTY LINE — COUNTY BOUNDARY LINE
- STATE LINE — STATE BOUNDARY LINE
- PROPOSED STATE R.O.W. (LIMITED ACCESS)
- PROPOSED STATE R.O.W.
- STATE ROW (LIMITED ACCESS)
- STATE ROW
- TOWN ROW
- PERMANENT EASEMENT LINE (P)
- TEMPORARY EASEMENT LINE (T)
- SURVEY LINE
- P/L — PROPERTY LINE (P/L)
- SR SR SR — SLOPE RIGHTS
- 6f — 6F PROPERTY BOUNDARY
- 4f — 4F PROPERTY BOUNDARY
- HAZ — HAZARDOUS WASTE

EPSC LAYOUT PLAN SYMBOLOGY

EPSC MEASURES

- FILTER CURTAIN
- SILT FENCE
- SILT FENCE WOVEN WIRE
- CHECK DAM
- DISTURBED AREAS REQUIRING RE-VEGETATION
- EROSION MATTING

SEE EPSC DETAIL SHEETS FOR ADDITIONAL SYMBOLOGY

ENVIRONMENTAL RESOURCES

- WETLAND BOUNDARY
- RIPARIAN BUFFER ZONE
- WETLAND BUFFER ZONE
- SOIL TYPE BOUNDARY
- T&E — THREATENED & ENDANGERED SPECIES
- HAZ — HAZ — HAZARDOUS WASTE AREA
- AG — AGRICULTURAL LAND
- HABITAT — FISH & WILDLIFE HABITAT
- FLOOD PLAIN — FLOOD PLAIN
- OHW — ORDINARY HIGH WATER (OHW)
- STORM WATER
- USDA FOREST SERVICE LANDS
- WILDLIFE HABITAT SUIT/CONN

ARCHEOLOGICAL & HISTORIC

- ARCH — ARCHEOLOGICAL BOUNDARY
- HISTORIC DIST — HISTORIC DISTRICT BOUNDARY
- HISTORIC — HISTORIC AREA
- (H) HISTORIC STRUCTURE

CONVENTIONAL TOPOGRAPHIC SYMBOLOGY

EXISTING FEATURES

- ROAD EDGE PAVEMENT
- ROAD EDGE GRAVEL
- DRIVEWAY EDGE
- DITCH
- FOUNDATION
- FENCE (EXISTING)
- FENCE WOOD POST
- FENCE STEEL POST
- GARDEN
- ROAD GUARDRAIL
- RAILROAD TRACKS
- CULVERT (EXISTING)
- STONE WALL
- WALL
- WOOD LINE
- BRUSH LINE
- HEDGE
- BODY OF WATER EDGE
- LEDGE EXPOSED

vhb

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215legend.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: N.A. TRUSLOW
CONVENTIONAL SYMBOLOGY LEGEND

PLOT DATE: 7/26/2023
DRAWN BY: N.A. TRUSLOW
CHECKED BY: J.D. KEENER
SHEET 8 OF 45

PRIMARY CONTROL

HVCTRL #1
ECHO LAKE
NORTH =355857.0760
EAST =1586477.0940
ELEV. =1070.0400

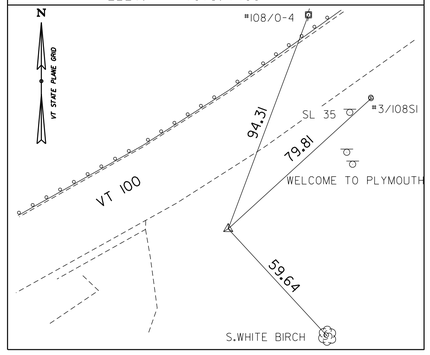
GENERAL LOCATION, PLYMOUTH, VT. TO REACH FROM THE MOST NORTHERLY INTERSECTION OF VT ROUTES 100 AND 103 IN GRAHAMVILLE, NORTH OF LUDLOW VILLAGE, GO NORTH ALONG VT ROUTE 100 FOR 3.6 MI (5.8 KM) TO THE INTERSECTION OF KINGDOM ROAD RIGHT AND DUBLIN ROAD LEFT, IN TYSON. CONTINUE STRAIGHT AHEAD AND GO NORTH ALONG VT ROUTE 100 FOR 0.8 MI (1.3 KM) TO THE ECHO LAKE FISHING ACCESS ON THE RIGHT AND THE SITE OF THE MARK ON THE RIGHT, JUST NORTH OF THE ACCESS RAMP, BEHIND A STEEL BEAM GUARD RAIL. THE MARK IS SET FLUSH WITH GROUND SURFACE IN THE TOP OF A 30 CM DIAMETER CONCRETE MONUMENT POURED 1.2 M (3.9 FT) DEEP. IT IS 4.9 M (16.1 FT) EAST OF AND ABOUT 0.1 M (0.3 FT) LOWER THAN THE CENTERLINE OF VT ROUTE 100, 34.0 M (111.5 FT) NORTH OF THE NORTH EDGE OF THE FISHING ACCESS DRIVE, 11.8 M (38.7 FT) EAST OF AN UNNUMBERED POLE, 8.8 M (28.9 FT) NORTH NORTHWEST OF THE CENTER OF THE EAST (OUTLET) END OF A 40 CM DIAMETER METAL CULVERT, AND 0.5 M (1.6 FT) SOUTH OF A FIBERGLASS WITNESS POST.

HVCTRL #2
ECHO LAKE AZ MK
NORTH =356006.8440
EAST =1587863.9010
ELEV. =1071.0900

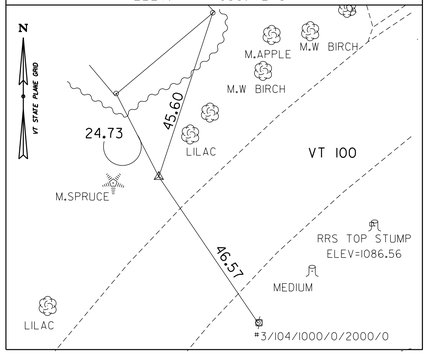
GENERAL LOCATION, PLYMOUTH, VT LOCATED AT CAMP PLYMOUTH STATE PARK AT ECHO LAKE. CONTACT CHUCK EDDY (802-773-2657), VT PARKS AND RECREATION.
THE MARK IS SET IN THE TOP OF THE SOUTH SIDE OF THE MOST WESTERLY OF TWO CONCRETE SEWER PUMP STRUCTURES.
IT IS 10.7 M SOUTH OF THE SOUTHEAST CORNER OF THE MOST SOUTHERLY OF TWO BATHHOUSES, 21.5 M WEST OF THE CENTER OF ELECTRIC BOX NO 17-09, 25.4 M NNW OF A 70 CM PINE, 36.8 M EAST OF A 40 CM ASH AND 10 CM NORTH OF THE SOUTH EDGE OF THE PUMP STRUCTURE.

SECONDARY CONTROL

HVCTRL 7
NORTH = 351473.8300
EAST = 1585974.5900
ELEV. = 1078.1400



HVCTRL 8
NORTH = 351274.4279
EAST = 1585490.0692
ELEV. = 1089.7279



TRAVERSE COMPLETED BY R.GILMAN AND H.MCGOWAN ON 9/25/2019

DATUM
VERTICAL NAVD88
HORIZONTAL NAD83(2011)
ADJUSTMENT COMPASS

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215ti.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: VTRANS
TIE SHEET

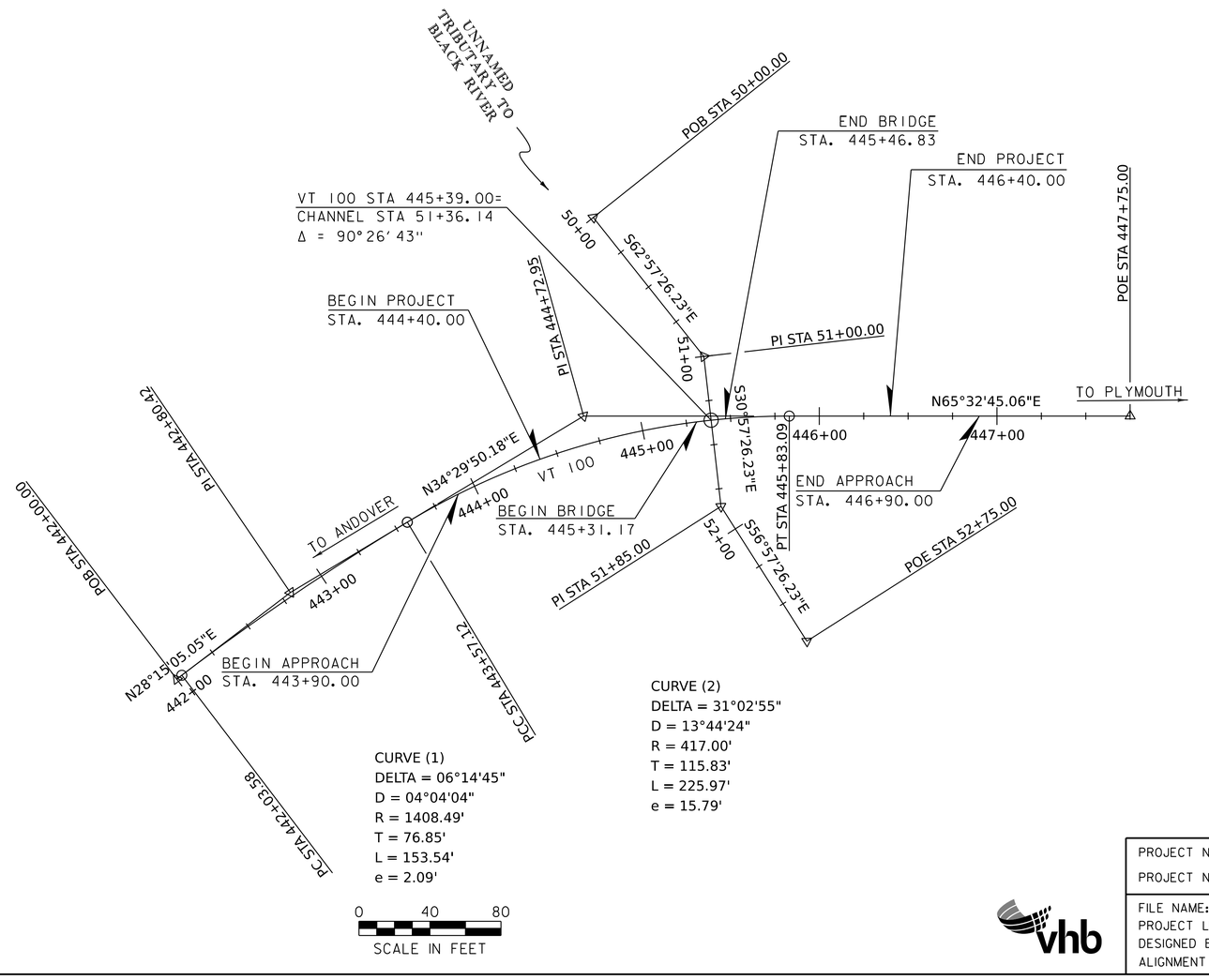
PLOT DATE: 7/26/2023
DRAWN BY: H. MCGOWAN
CHECKED BY: L. MACCORMACK

VT ROUTE 100 ALIGNMENT

	Station	Northing	Easting
Element: Linear			
POB	442+00.00	351066.5122	1585377.5855
PC	442+03.58	351069.6640	1585379.2791
Tangential Direction:	N28°15'05.05"E		
Tangential Length:	3.58		
Element: Circular			
PC	442+03.58	351069.6640	1585379.2791
PI	442+80.42	351137.3564	1585415.6537
CC		350402.9684	1586619.9872
PCC	443+57.12	351200.6897	1585459.1771
Radius:	1408.49		
Delta:	06°14'45.13" Right		
Degree of Curvature (Arc):	04°04'04.41"		
Length:	153.54		
Tangent:	76.85		
Chord:	153.46		
Middle Ordinate:	2.09		
External:	2.09		
Back Tangent Direction:	N28°15'05.05"E		
Back Radial Direction:	S61°44'54.95"E		
Chord Direction:	N31°22'27.61"E		
Ahead Radial Direction:	S55°30'09.82"E		
Ahead Tangent Direction:	N34°29'50.18"E		
Element: Circular			
PCC	443+57.12	351200.6897	1585459.1771
PI	444+72.95	351296.1553	1585524.7820
CC		350964.5147	1585802.8489
PT	445+83.09	351344.1068	1585630.2255
Radius:	417.00		
Delta:	31°02'54.88"	Right	
Degree of Curvature (Arc):	13°44'23.98"		
Length:	225.97		
Tangent:	115.83		
Chord:	223.22		
Middle Ordinate:	15.21		
External:	15.79		
Back Tangent Direction:	N34°29'50.18"E		
Back Radial Direction:	S55°30'09.82"E		
Chord Direction:	N50°01'17.62"E		
Ahead Radial Direction:	S24°27'14.94"E		
Ahead Tangent Direction:	N65°32'45.06"E		
Element: Linear			
PT	445+83.09	351344.1068	1585630.2255
POE	447+75.00	351423.5513	1585804.9210
Tangential Direction:	N65°32'45.06"E		
Tangential Length:	191.91		

UNNAMED TRIBUTARY TO BLACK RIVER ALIGNMENT

	Station	Northing	Easting
Element: Linear			
POB	50+00.00	351400.2280	1585483.4730
PI	51+00.00	351354.7625	1585572.5400
Tangential Direction:	S62°57'26.23"E		
Tangential Length:	100.00		
Element: Linear			
PI	51+00.00	351354.7625	1585572.5400
PI	51+85.00	351281.8707	1585616.2640
Tangential Direction:	S30°57'26.23"E		
Tangential Length:	85.00		
Element: Linear			
PI	51+85.00	351281.8707	1585616.2639
POE	52+75.00	351232.7969	1585691.7077
Tangential Direction:	S56°57'26.23"E		
Tangential Length:	90.00		



PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)
FILE NAME: z19b215bdr_ali.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: D.M. PECK
ALIGNMENT LAYOUT SHEET	SHEET 10 OF 45

COARSE MILLING, BITUMINOUS PAVEMENT

STA 443+90 - 444+40, LT & RT
STA 446+40 - 446+90, LT & RT

SPECIAL PROVISION (STONE TOE WALL)

STA 445+52 - 445+55, RT

SPECIAL PROVISION (REMOVE AND RESET SHED)

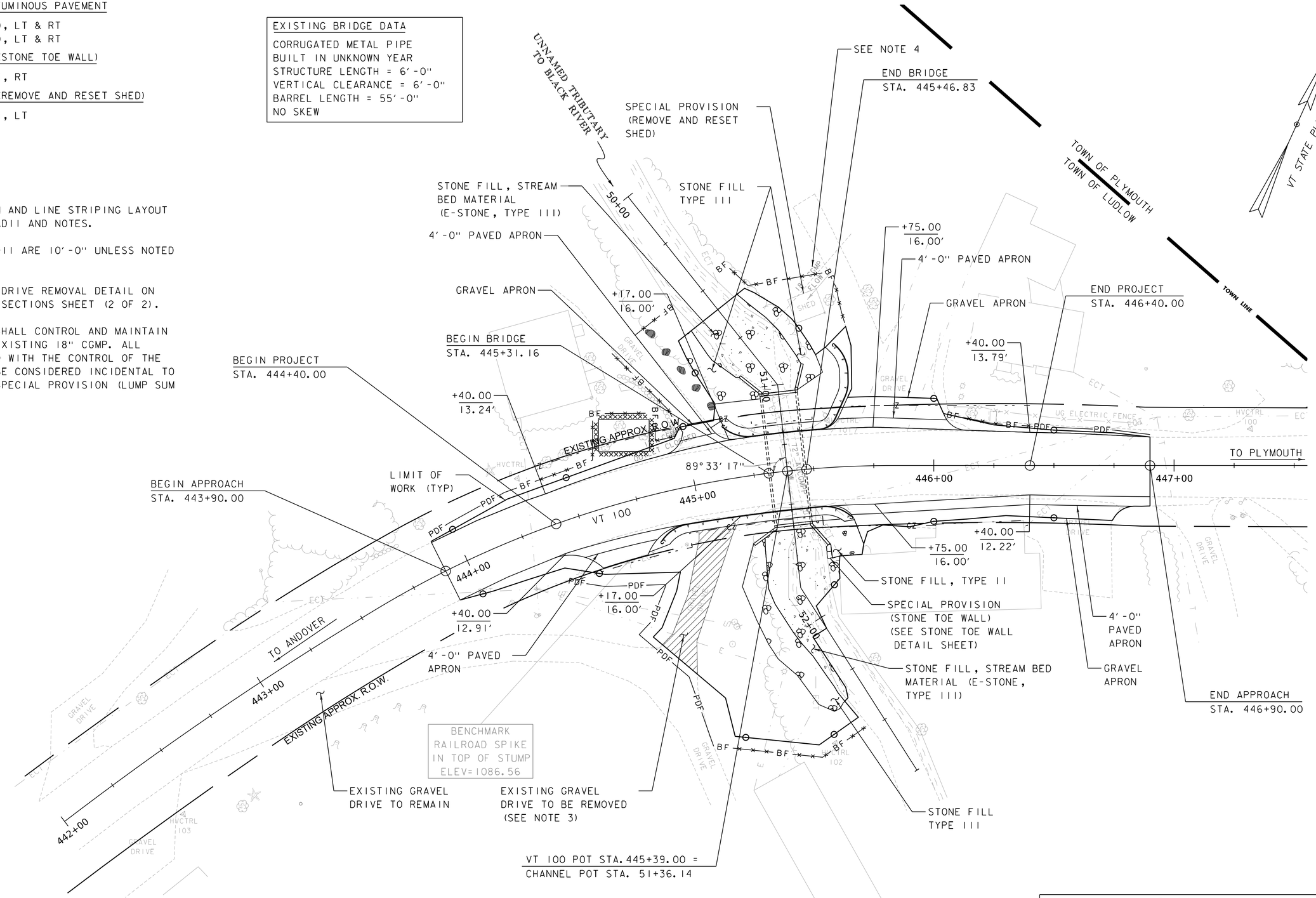
STA 445+45 - 445+58, LT

NOTES:

1. SEE TRAFFIC SIGN AND LINE STRIPING LAYOUT FOR GUARDRAIL RADII AND NOTES.
2. ALL DRIVEWAY RADII ARE 10'-0" UNLESS NOTED OTHERWISE.
3. REFER TO GRAVEL DRIVE REMOVAL DETAIL ON TYPICAL ROADWAY SECTIONS SHEET (2 OF 2).
4. THE CONTRACTOR SHALL CONTROL AND MAINTAIN FLOWS FROM THE EXISTING 18" CGMP. ALL COSTS ASSOCIATED WITH THE CONTROL OF THE 18" CGMP SHALL BE CONSIDERED INCIDENTAL TO ITEM 900.645, "SPECIAL PROVISION (LUMP SUM PROJECT)".

EXISTING BRIDGE DATA

CORRUGATED METAL PIPE
BUILT IN UNKNOWN YEAR
STRUCTURE LENGTH = 6'-0"
VERTICAL CLEARANCE = 6'-0"
BARREL LENGTH = 55'-0"
NO SKEW



STATION AND OFFSET LEGEND

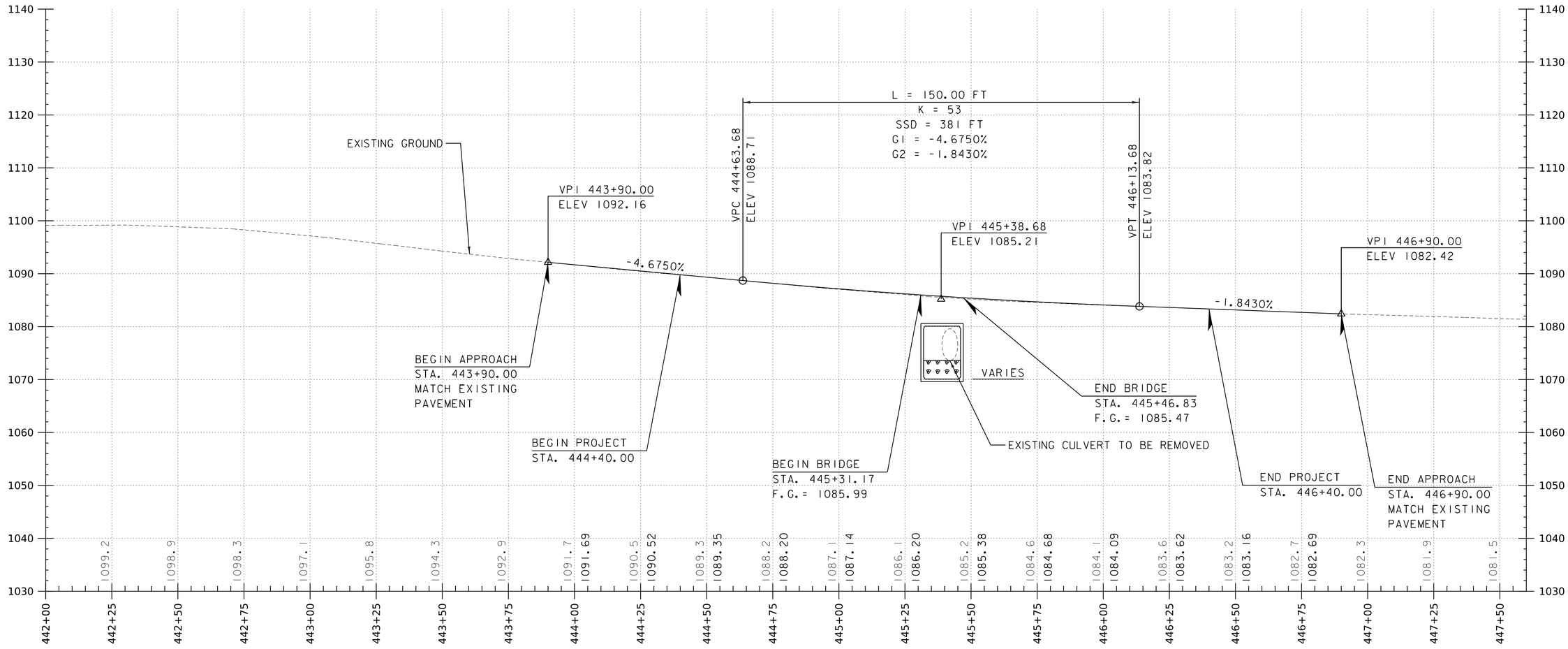
DISTANCE FROM PREVIOUS 100TH STATION → +40.00
OFFSET LT OR RT FROM STATION → 12.90'

ALL STATIONS AND OFFSETS ARE FROM THE VT ROUTE 100 ALIGNMENT

0 20 40
SCALE IN FEET

vhb

PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)
FILE NAME: z19b215bdr_nul.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: A.P. GUYETTE
GENERAL LAYOUT SHEET	SHEET 11 OF 45



VT 100 PROFILE

SCALE 1" = 20'-0" HORIZONTAL
1" = 10'-0" VERTICAL

NOTE: SEE PLAN AND ELEVATION SHEET FOR PROPOSED CULVERT ELEVATIONS.

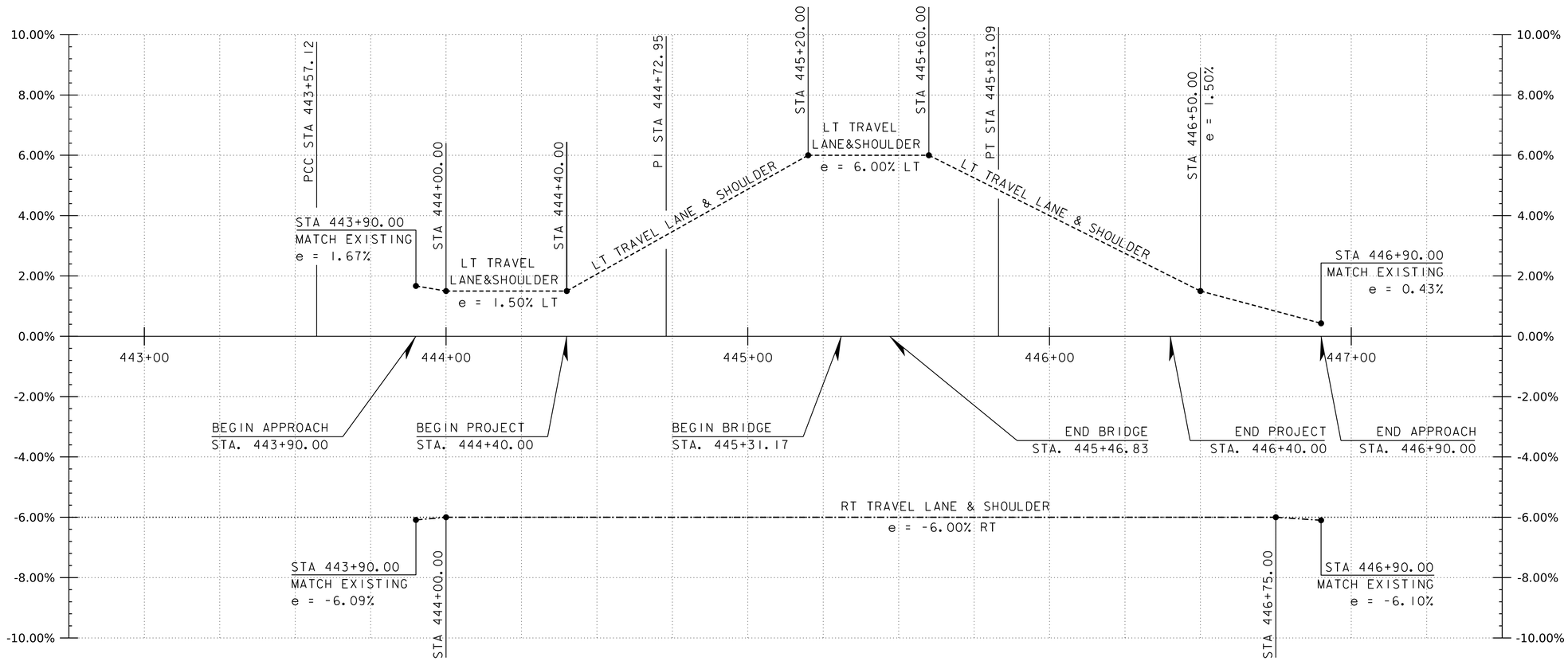
THE GRADES SHOWN TO THE NEAREST TENTH ARE THE ORIGINAL GROUND ELEVATIONS ALONG THE PROPOSED ALIGNMENT.

THE GRADES SHOWN TO THE NEAREST HUNDREDTH ARE THE FINISH GRADES ALONG THE PROPOSED ALIGNMENT.

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215bdr_ali.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: N.A. TRUSLOW
VT 100 PROFILE

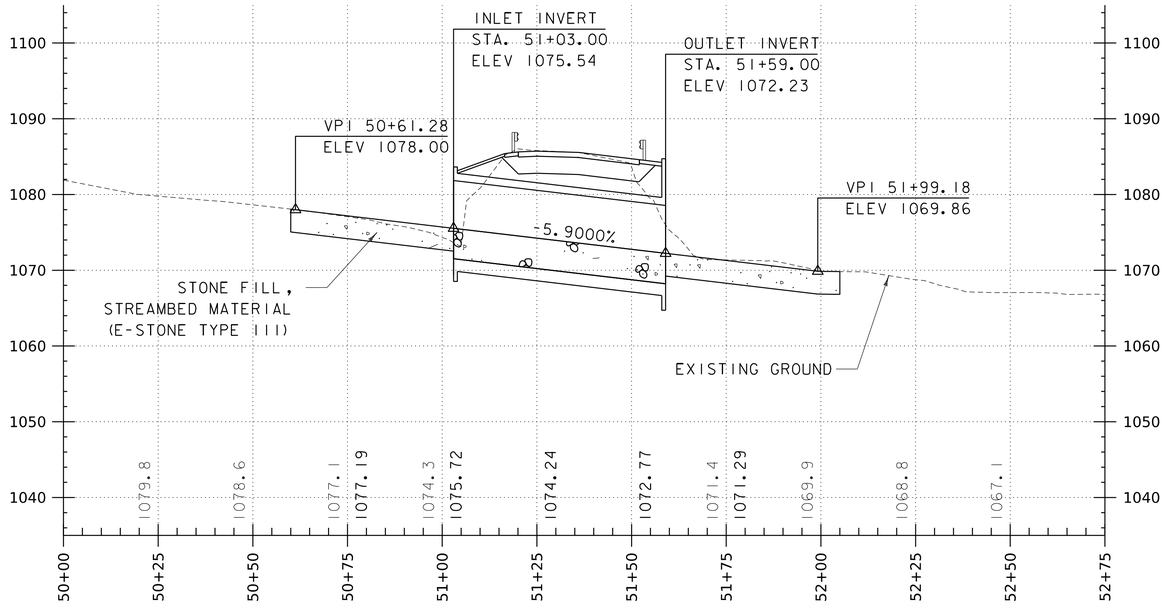
PLOT DATE: 7/26/2023
DRAWN BY: N.A. TRUSLOW
CHECKED BY: D.M. PECK



VT ROUTE 100 BANKING DIAGRAM

SCALE 1" = 20'-0" HORIZONTAL
1" = 0.020 FT/FT VERTICAL

PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)
FILE NAME: z19b215bdr_ali.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: D.M. PECK
VT 100 BANKING DIAGRAM	SHEET 13 OF 45



UNNAMED TRIBUTARY TO BLACK RIVER PROFILE

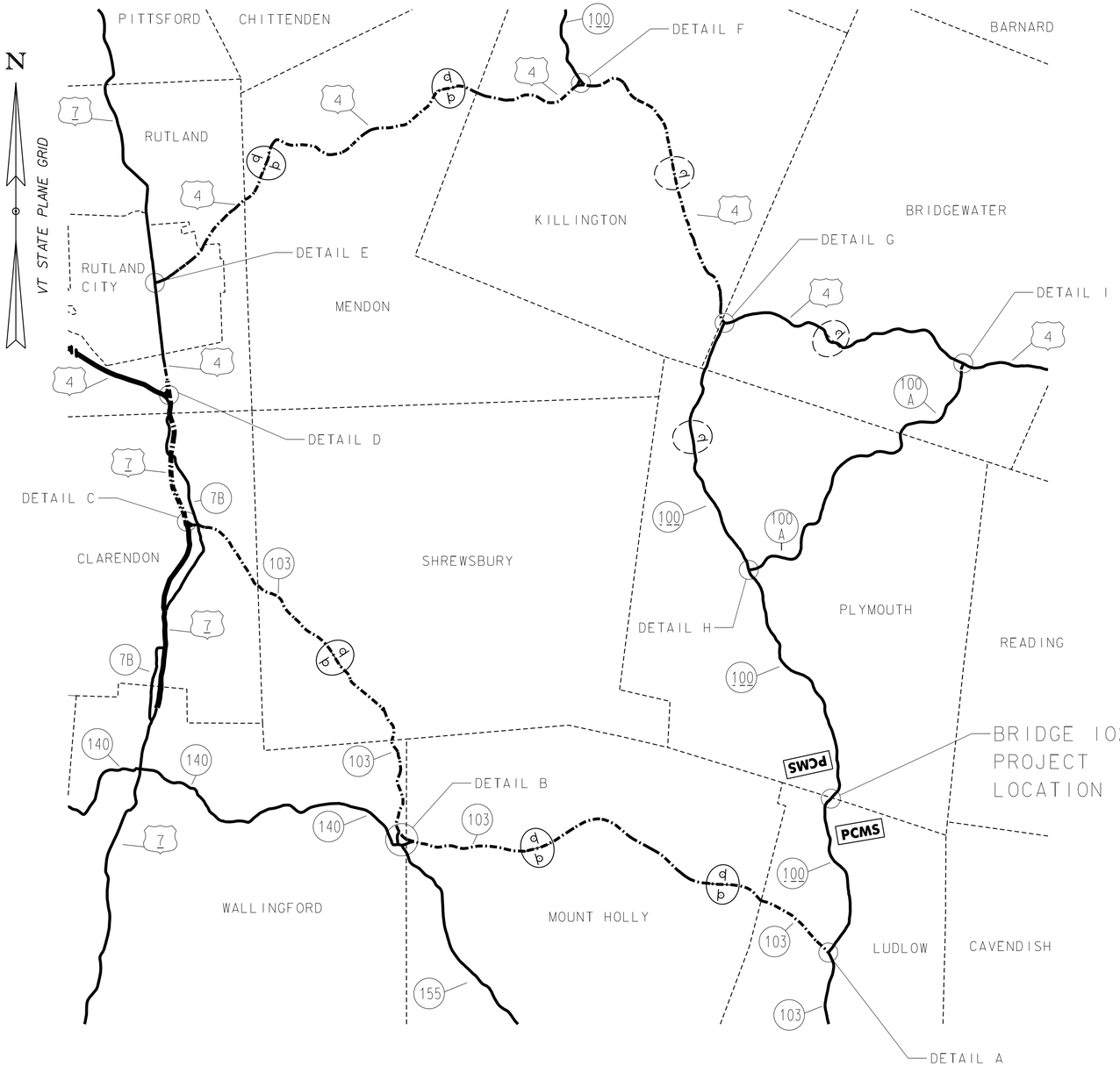
SCALE 1" = 20'-0" HORIZONTAL
1" = 10'-0" VERTICAL

THE GRADES SHOWN TO THE NEAREST TENTH ARE THE ORIGINAL GROUND ELEVATIONS ALONG THE PROPOSED ALIGNMENT.

THE GRADES SHOWN TO THE NEAREST HUNDREDTH ARE THE FINISH GRADES ALONG THE PROPOSED ALIGNMENT.

vhb

PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)
FILE NAME: z19b215bdr_ali.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: D.M. PECK
UNNAMED TRIB. TO BLACK RIVER PROFILE	SHEET 14 OF 45



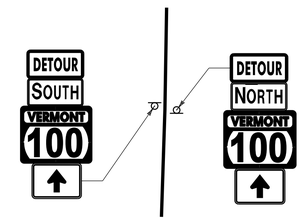
REGIONAL TRAFFIC DETOUR

LEGEND

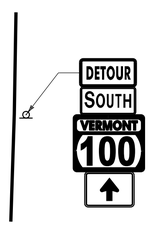
- CONFIRMATORY ROUTE MARKER ASSEMBLY A (SEE NOTE 2 AND 3)
- CONFIRMATORY ROUTE MARKER ASSEMBLY B (SEE NOTE 2 AND 3)
- PCMS — PORTABLE CHANGEABLE MESSAGE SIGN (SEE TRAFFIC CONTROL PLAN (5 OF 5) FOR MESSAGES)

TRAFFIC CONTROL NOTES:

1. SEE TRAFFIC CONTROL PLAN (5 OF 5) FOR ADDITIONAL NOTES.
2. INSTALL CONFIRMATORY ROUTE MARKERS ALONG THE DETOUR AT LOCATIONS INDICATED ON THIS PLAN.
3. WHEN EXISTING ROUTE MARKER ASSEMBLIES ARE LOCATED AT THE INTERSECTIONS OR ALONG THE DETOUR ROUTE, THE DETOUR MARKER ASSEMBLIES SHALL BE INSTALLED ADJACENT TO THE EXISTING ROUTE MARKER ASSEMBLIES AND THE ROUTE MARKER SHALL BE COVERED IF ASSEMBLY CONFLICTS WITH DETOUR ROUTE MARKER ASSEMBLY. SIGN COVERING SHALL NOT DAMAGE THE RETRO-REFLECTIVITY OF THE SIGN FACE. ALSO, THE SIGN COVER SHALL NOT DETERIORATE FOR THE DURATION THAT THE SIGN IS COVERED.
4. WHERE SIGN INSTALLATIONS ARE NOT PROTECTED BY GUARDRAIL OR OTHER APPROVED TRAFFIC BARRIERS, ALL SIGN STANDS AND POST INSTALLATIONS SHALL BE "NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM" (NCHRP) REPORT 350 COMPLIANT OR "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH) COMPLIANT. NO SIGN POSTS SHALL EXTEND OVER THE TOP OF THE SIGN INSTALLED ON SAID POST(S). WHEN ANCHORS ARE INSTALLED STUB SHALL NOT BE GREATER THAN FOUR INCHES ABOVE EXISTING GROUND.
5. PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) SHALL BE PLACED OFF THE EDGE OF ROADWAY, OUTSIDE CLEAR ZONE, BUT SHALL BE VISIBLE FROM THE ROADWAY. ANY VEGETATION THAT INTERFERES WITH VISIBILITY OF THE PCMS SHALL BE REMOVED. REMOVAL OF THE VEGETATION SHALL BE INCIDENTAL TO ITEM 641.11, "TRAFFIC CONTROL, ALL-INCLUSIVE". WHEN PLACED BEHIND THE GUARDRAIL, THE BOTTOM OF THE SIGN FACE SHALL BE ABOVE THE TOP OF THE GUARDRAIL.
6. THE PCMS SHALL BE USED IN ACCORDANCE WITH SECTION 6F.60 OF THE MUTCD.
7. SEE TRAFFIC CONTROL PLANS 2-4 FOR A-I DETAILS.
8. DETOUR SIGNING IS THE RESPONSIBILITY OF THE CONTRACTOR. PAYMENT FOR ALL TEMPORARY TRAFFIC CONTROL DEVICES FOR IMPLEMENTING THE DETOUR, INCLUDING BUT NOT LIMITED TO SIGNS AND BARRICADES, WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 641.11 "TRAFFIC CONTROL, ALL-INCLUSIVE".
9. THIS DETOUR PLAN IS A CONCEPTUAL OUTLINE ONLY AND CONTRACTOR SHALL SUBMIT A DETAILED PLAN OF EACH INTERSECTION SHOWING DETOUR SIGN LOCATIONS IN RELATION TO EXISTING SIGNS.
10. THE CONTRACTOR SHALL ENSURE THAT THE SUBMITTED TRAFFIC CONTROL PLAN REFLECTS CURRENT ROADWAY CLOSURE CONDITIONS ALONG THE DETOUR ROUTE.



CONFIRMATORY ROUTE MARKER ASSEMBLY A
NOT TO SCALE

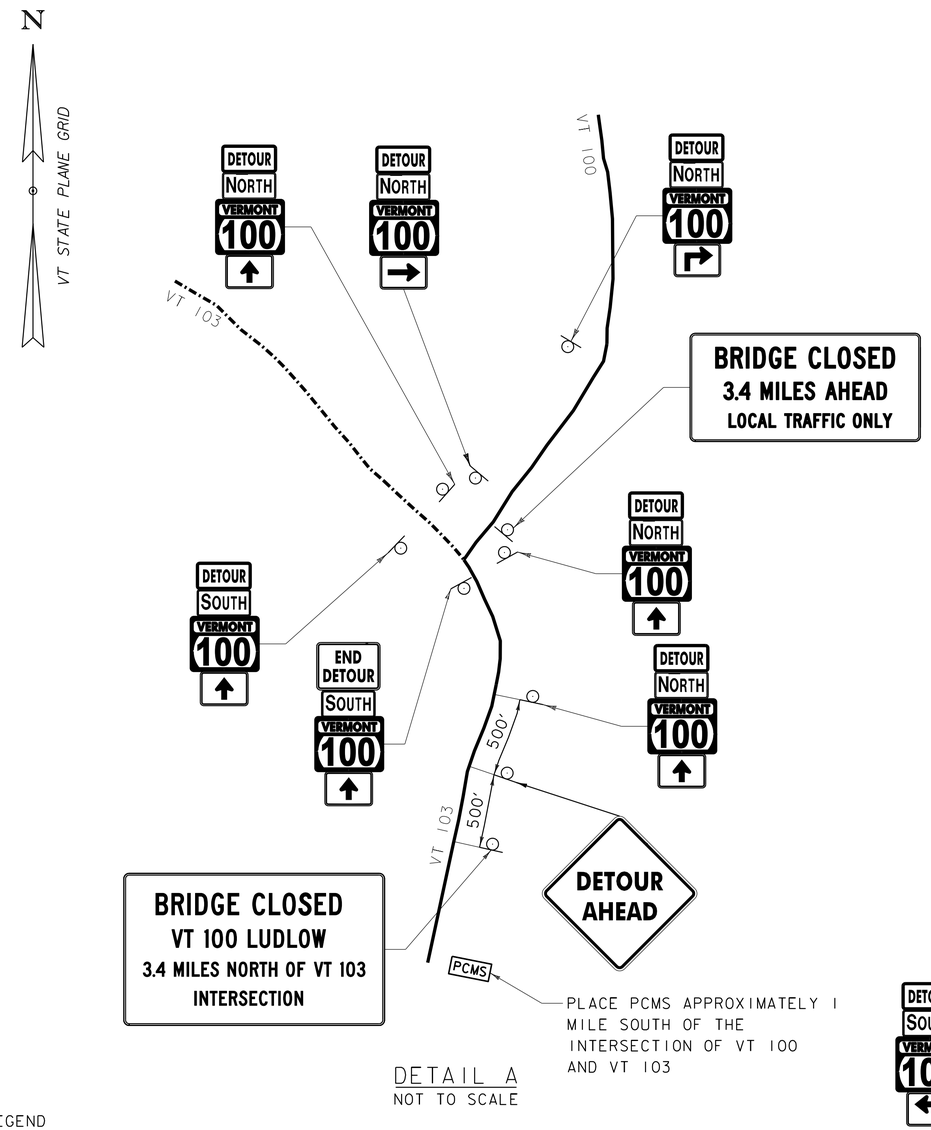


CONFIRMATORY ROUTE MARKER ASSEMBLY B
NOT TO SCALE

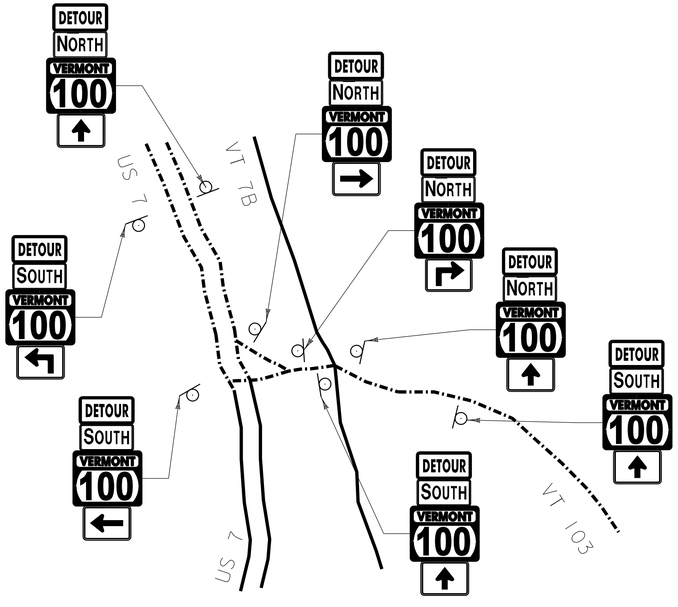
PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215detour.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: D.E. MORRISSETTE
TRAFFIC CONTROL PLAN (1 OF 5)

PLOT DATE: 7/26/2023
DRAWN BY: D.E. MORRISSETTE
CHECKED BY: K.M. SENTOFF
SHEET 15 OF 45



DETAIL A
NOT TO SCALE



DETAIL B
NOT TO SCALE

DETAIL C
NOT TO SCALE

LEGEND

PCMS PORTABLE CHANGEABLE MESSAGE SIGN

NOTE:

1. SEE TRAFFIC CONTROL PLAN (5 OF 5) FOR PCMS MESSAGES.
2. WHEN EXISTING ROUTE MARKER ASSEMBLIES ARE LOCATED AT THE INTERSECTIONS OR ALONG THE DETOUR ROUTE, THE DETOUR ROUTE MARKER ASSEMBLIES SHALL BE INSTALLED ADJACENT TO THE EXISTING ROUTE MARKER ASSEMBLIES.
3. ALL DISTANCES ARE APPROXIMATE AND MAY VARY IN THE FIELD.
4. CONFIRMATORY ROUTE MARKER ASSEMBLY TO BE MORE THAN 25 FT AND LESS THAN 200 FT FROM INTERSECTION, UNLESS OTHERWISE NOTED.

vhb

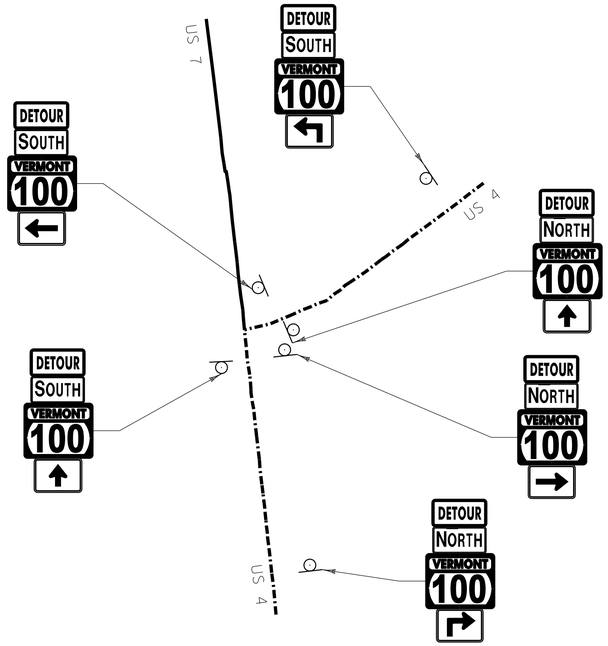
PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215detour_dts.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: D.E. MORRISSETTE
TRAFFIC CONTROL PLAN (2 OF 5)

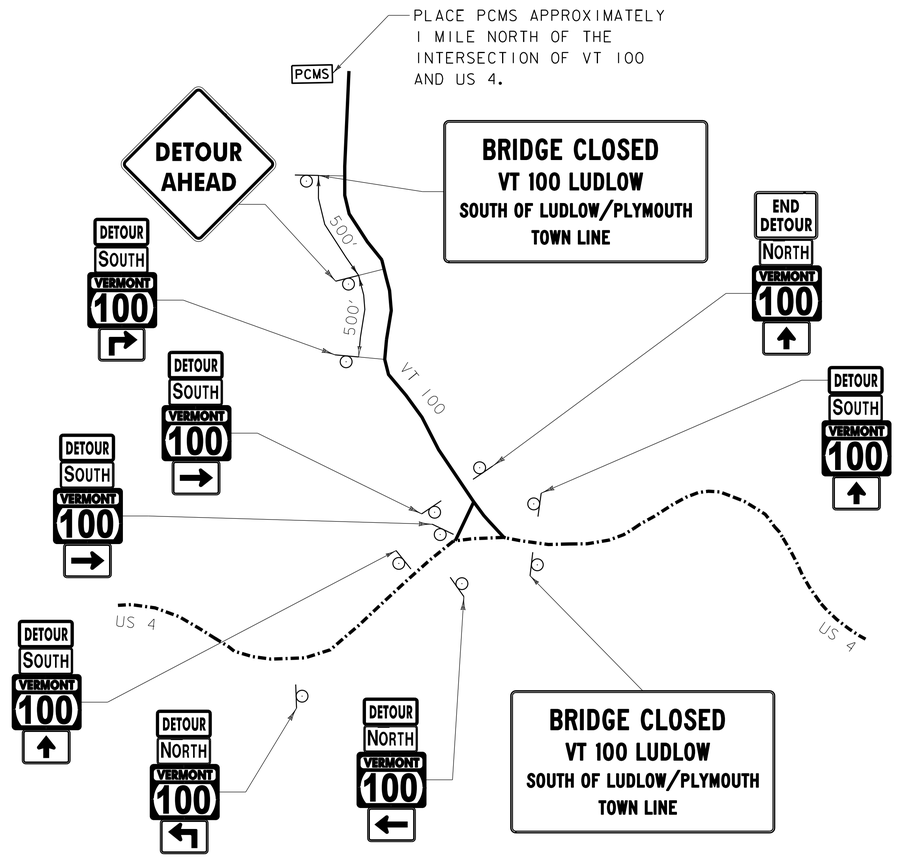
PLOT DATE: 7/26/2023
DRAWN BY: D.E. MORRISSETTE
CHECKED BY: K.M. SENTOFF
SHEET 16 OF 45

N

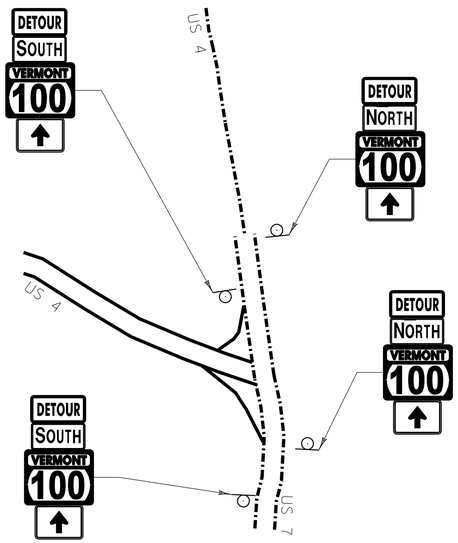
VT STATE PLANE GRID



DETAIL E
NOT TO SCALE



DETAIL F
NOT TO SCALE



DETAIL D
NOT TO SCALE

LEGEND

PCMS PORTABLE CHANGEABLE MESSAGE SIGN

NOTE:

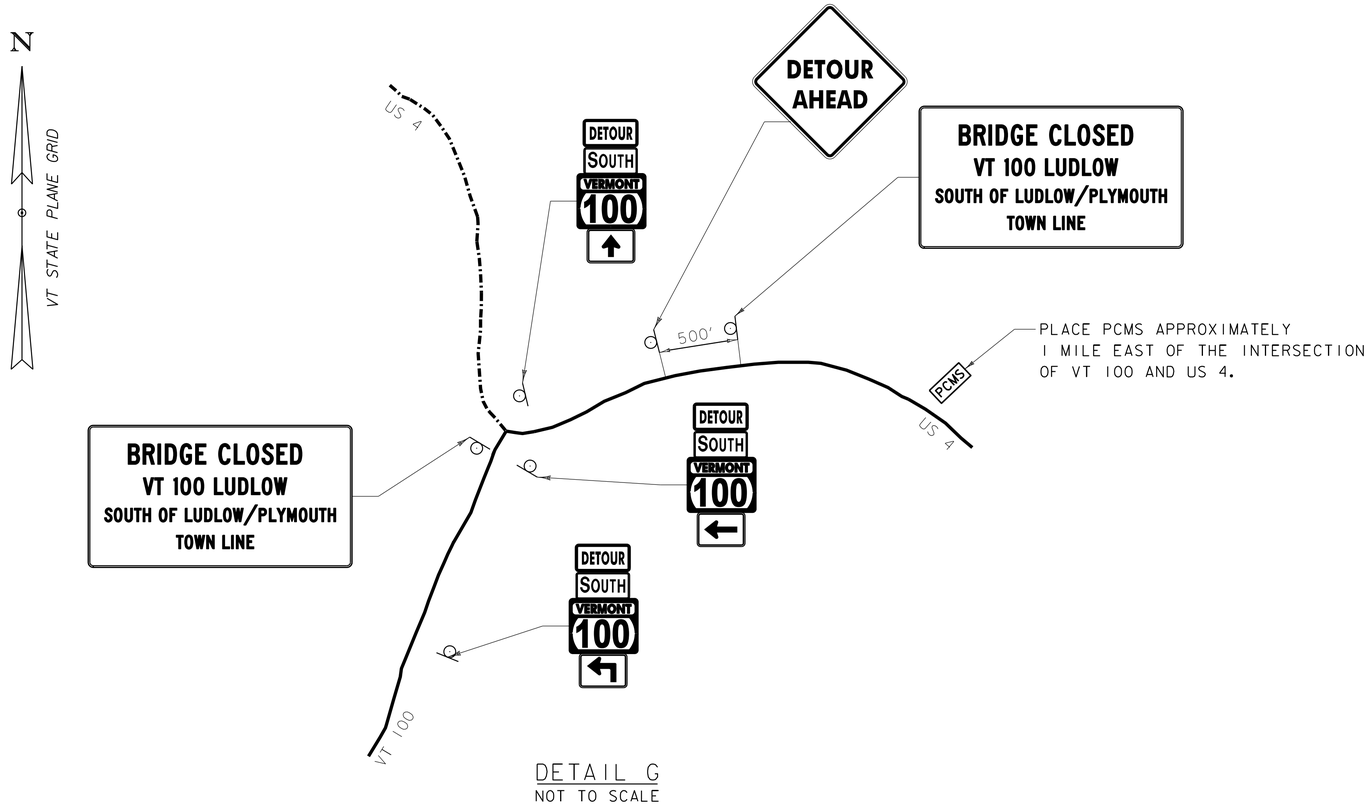
1. SEE TRAFFIC CONTROL PLAN (5 OF 5) FOR PCMS MESSAGES.
2. WHEN EXISTING ROUTE MARKER ASSEMBLIES ARE LOCATED AT THE INTERSECTIONS OR ALONG THE DETOUR ROUTE, THE DETOUR ROUTE MARKER ASSEMBLIES SHALL BE INSTALLED ADJACENT TO THE EXISTING ROUTE MARKER ASSEMBLIES.
3. ALL DISTANCES ARE APPROXIMATE AND MAY VARY IN THE FIELD.
4. CONFIRMATORY ROUTE MARKER ASSEMBLY TO BE MORE THAN 25 FT AND LESS THAN 200 FT FROM INTERSECTION, UNLESS OTHERWISE NOTED.

vhb

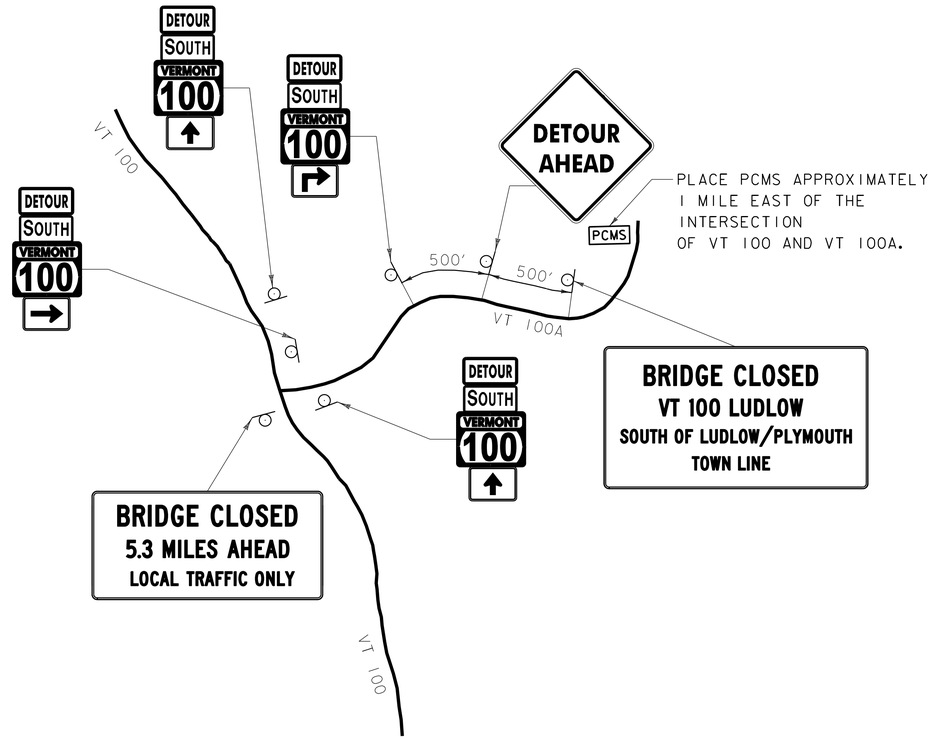
PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215detour_dts.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: D.E. MORRISSETTE
TRAFFIC CONTROL PLAN (3 OF 5)

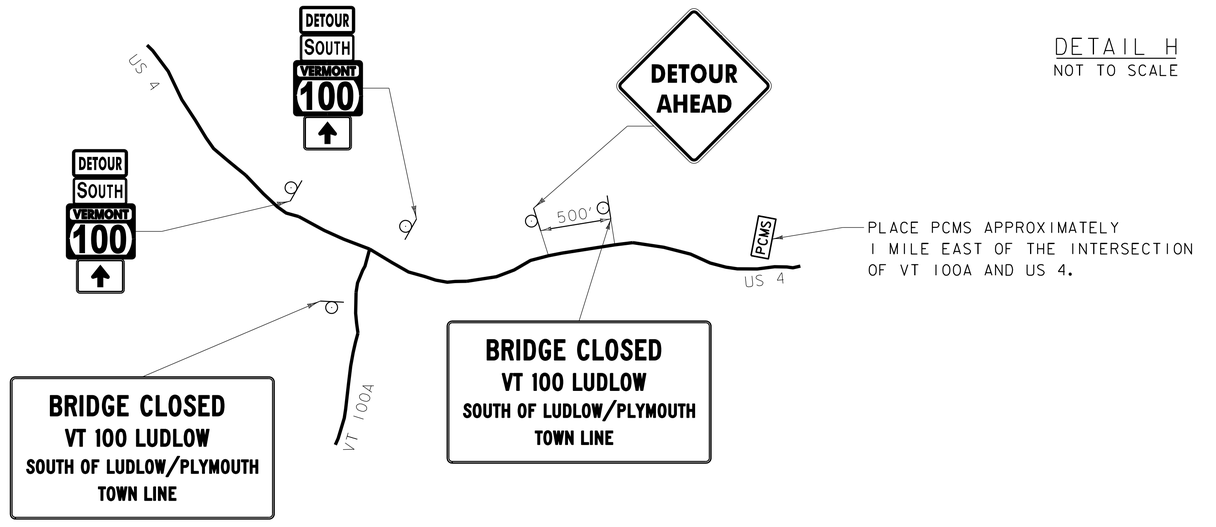
PLOT DATE: 7/26/2023
DRAWN BY: D.E. MORRISSETTE
CHECKED BY: K.M. SENTOFF
SHEET 17 OF 45



DETAIL G
NOT TO SCALE



DETAIL H
NOT TO SCALE



DETAIL I
NOT TO SCALE

LEGEND

PCMS PORTABLE CHANGEABLE MESSAGE SIGN

NOTE:

1. SEE TRAFFIC CONTROL PLAN (5 OF 5) FOR PCMS MESSAGES.
2. WHEN EXISTING ROUTE MARKER ASSEMBLIES ARE LOCATED AT THE INTERSECTIONS OR ALONG THE DETOUR ROUTE, THE DETOUR ROUTE MARKER ASSEMBLIES SHALL BE INSTALLED ADJACENT TO THE EXISTING ROUTE MARKER ASSEMBLIES.
3. ALL DISTANCES ARE APPROXIMATE AND MAY VARY IN THE FIELD.
4. CONFIRMATORY ROUTE MARKER ASSEMBLY TO BE MORE THAN 25 FT AND LESS THAN 200 FT FROM INTERSECTION, UNLESS OTHERWISE NOTED.

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215detour_dts.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: D.E. MORRISSETTE
TRAFFIC CONTROL PLAN (4 OF 5)

PLOT DATE: 7/26/2023
DRAWN BY: D.E. MORRISSETTE
CHECKED BY: K.M. SENTOFF
SHEET 18 OF 45

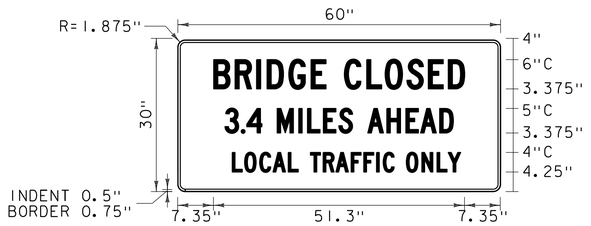
IDENTIFICATION NUMBER	SIZE OF SIGN WIDTH (IN)	SIZE OF SIGN HEIGHT (IN)	TEXT	NUMBER OF SIGNS REQ'D	REMARKS	COLOR
MI-5	30	24	VERMONT 100	72*	MOUNT ON ONE POST	VTRANS STD E-I36B
M3-I	24	I2	NORTH	3I*	MOUNT ABOVE THE MI-5	VTRANS STD E-I36B
M3-3	24	I2	SOUTH	4I*	MOUNT ABOVE THE MI-5	VTRANS STD E-I36B
G20-2	36	I8	END ROAD WORK	2	MOUNT ON ONE POST	LEGEND BLACK BACKGROUND ORANGE **
M4-8	24	I2	DETOUR	72*	MOUNT ABOVE THE M3-I OR M3-3	LEGEND BLACK BACKGROUND ORANGE **
M4-8A	24	I8	END DETOUR	2	MOUNT ON ONE POST	LEGEND BLACK BACKGROUND ORANGE **
M5-IL	2I	I5	←	5	MOUNT BELOW THE MI-5	LEGEND BLACK BACKGROUND ORANGE***
M5-IR	2I	I5	→	6	MOUNT BELOW THE MI-5	LEGEND BLACK BACKGROUND ORANGE***
M5-2R	2I	I5	←	5	MOUNT BELOW THE MI-5	LEGEND BLACK BACKGROUND ORANGE***
M6-IL	2I	I5	→	7	MOUNT BELOW THE MI-5	LEGEND BLACK BACKGROUND ORANGE***
M6-3	2I	I5	↑	49*	MOUNT BELOW THE MI-5	LEGEND BLACK BACKGROUND ORANGE***

* = NUMBER OF SIGNS REQ'D ASSUMING APPROXIMATELY 5 NORTH AND 8 SOUTH CONFIRMATORY ROUTE MARKER ASSEMBLY DETAILS

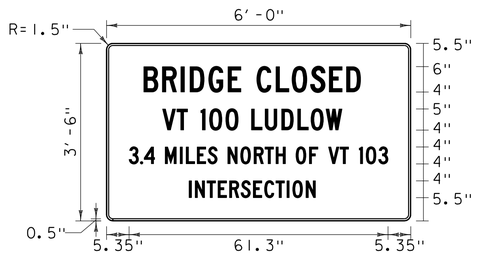
** = SIGN BACKGROUND SHALL BE RETROREFLECTIVE FLUORESCENT

*** = SIGN BACKGROUNDS SHALL BE RETOREFLECTIVE

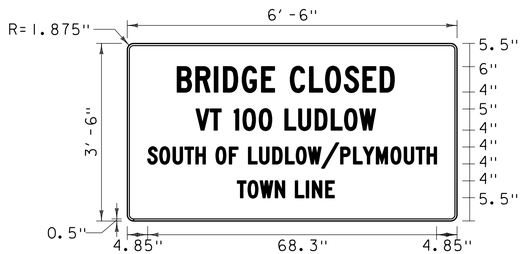
IDENTIFICATION NUMBER	SIZE OF SIGN WIDTH (IN)	SIZE OF SIGN HEIGHT (IN)	TEXT	NUMBER OF SIGNS REQ'D	REMARKS	COLOR
RII-2	48	30	ROAD CLOSED	2	MOUNT ON TYPE III BARRICADE (MOD.)	LEGEND BLACK BACKGROUND WHITE ***
RII-3B	60	30	BRIDGE CLOSED 3.4 MILES AHEAD LOCAL TRAFFIC ONLY	I	MOUNT ON TWO POSTS	LEGEND BLACK BACKGROUND WHITE ***
RII-3B	60	30	BRIDGE CLOSED 5.3 MILES AHEAD LOCAL TRAFFIC ONLY	I	MOUNT ON TWO POSTS	LEGEND BLACK BACKGROUND WHITE ***
W20-2	48	48	DETOUR AHEAD	7	MOUNT ON TWO POSTS	LEGEND BLACK BACKGROUND ORANGE **
W20-3	48	48	ROAD CLOSED 1000FT	2	MOUNT ON TWO POSTS	LEGEND BLACK BACKGROUND ORANGE **
W20-3	48	48	ROAD CLOSED 500 FT	2	MOUNT ON TWO POSTS	LEGEND BLACK BACKGROUND ORANGE **
W20-3	48	48	ROAD WORK AHEAD	2	MOUNT ON TWO POSTS	LEGEND BLACK BACKGROUND ORANGE **
SP-I	66	42	BRIDGE CLOSED VT 100 LUDLOW 3.4 MILES NORTH OF VT 103 INTERSECTION	3	MOUNT ON TWO POSTS	LEGEND BLACK BACKGROUND ORANGE **
SP-2	66	42	BRIDGE CLOSED VT 100 LUDLOW SOUTH OF LUDLOW/PLYMOUTH TOWN LINE	7	MOUNT ON TWO POSTS	LEGEND BLACK BACKGROUND ORANGE **



RII-3B
NOT TO SCALE



SP-I
NOT TO SCALE



SP-2
NOT TO SCALE

NOTES:

1. ALL DETOUR SIGNS AND REQUIRED SIGN POSTS WILL BE INCIDENTAL TO ITEM 641.11, "TRAFFIC CONTROL, ALL-INCLUSIVE".
2. ONE WEEK PRIOR (7 DAYS) TO CONSTRUCTION ON THE BRIDGE, PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) MESSAGES 1 AND 2 WILL BE DISPLAYED AT THE BRIDGE AND PCMS MESSAGES 3 AND 4 WILL BE DISPLAYED REGIONALLY.
3. DURING THE BRIDGE CLOSURE, PCMS SHALL READ MESSAGES 5 AND 6 REGIONALLY.

MESSAGES FOR PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) - AT BRIDGE

ONE WEEK PRIOR

	MESSAGE 1	MESSAGE 2	
(ROUTE) ***	VT 100	MMMM DD	(DATE) **
	BRIDGE	TO	
	CLOSED	MMMM DD	(DATE) **

MESSAGES FOR PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) - REGIONAL DETOUR

ONE WEEK PRIOR

	MESSAGE 3	MESSAGE 4	
(ROUTE) ***	VT 100	MMMM DD	(DATE) **
	BRIDGE	TO	
	CLOSED	MMMM DD	(DATE) **

DURING BRIDGE CLOSURE

	MESSAGE 5	MESSAGE 6
(ROUTE) ***	VT 100	SOUTH OF
	BRIDGE	LUD/PLY
	CLOSED	TOWN LINE

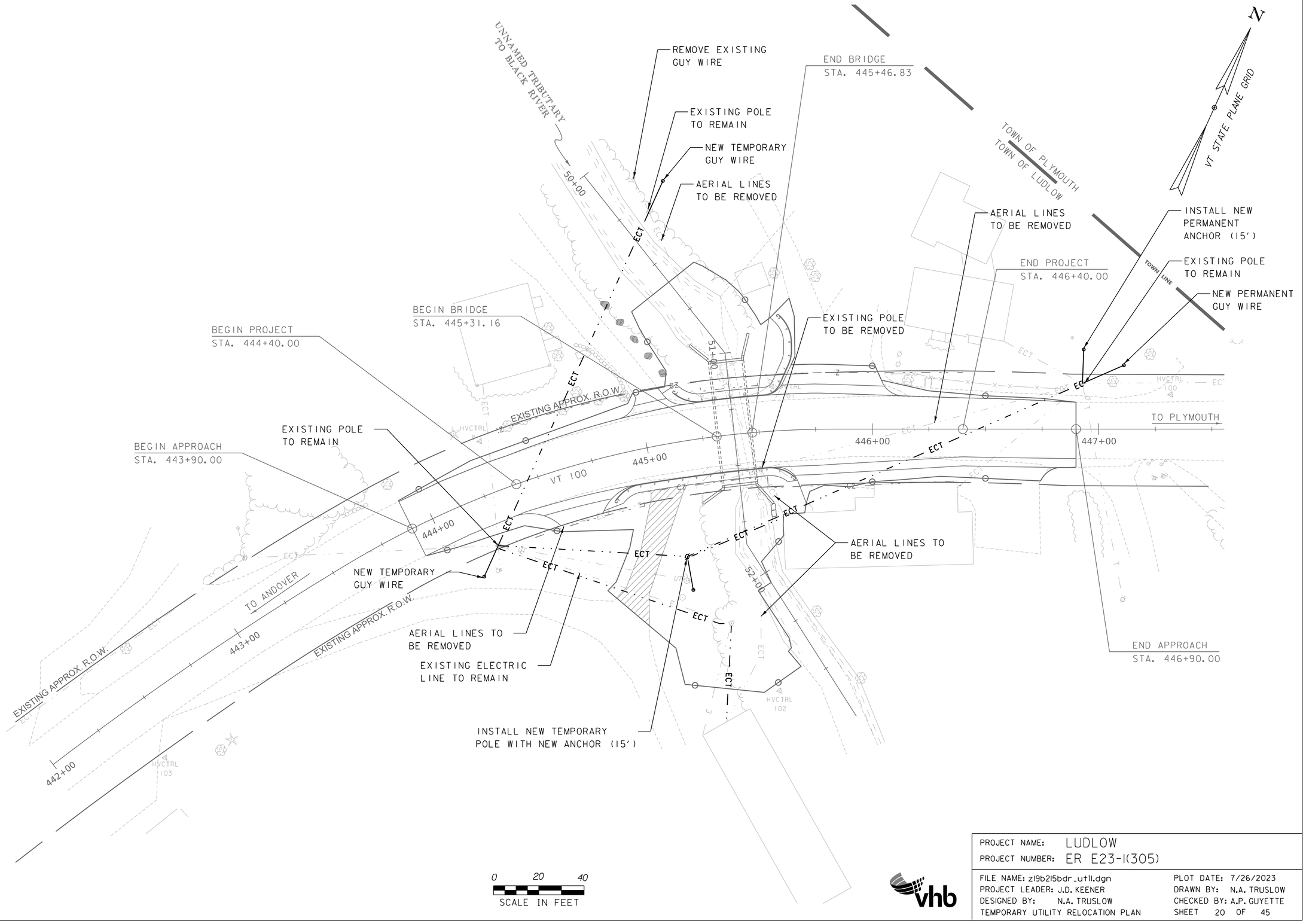
** - MONTH SHALL BE SPELLED OUT - JUNE 10 NOT 06/10

*** - ROUTE VT 100 SHALL SPECIFY N (NORTH) OR S (SOUTH) AS APPROPIATE FOR THE DETOUR.

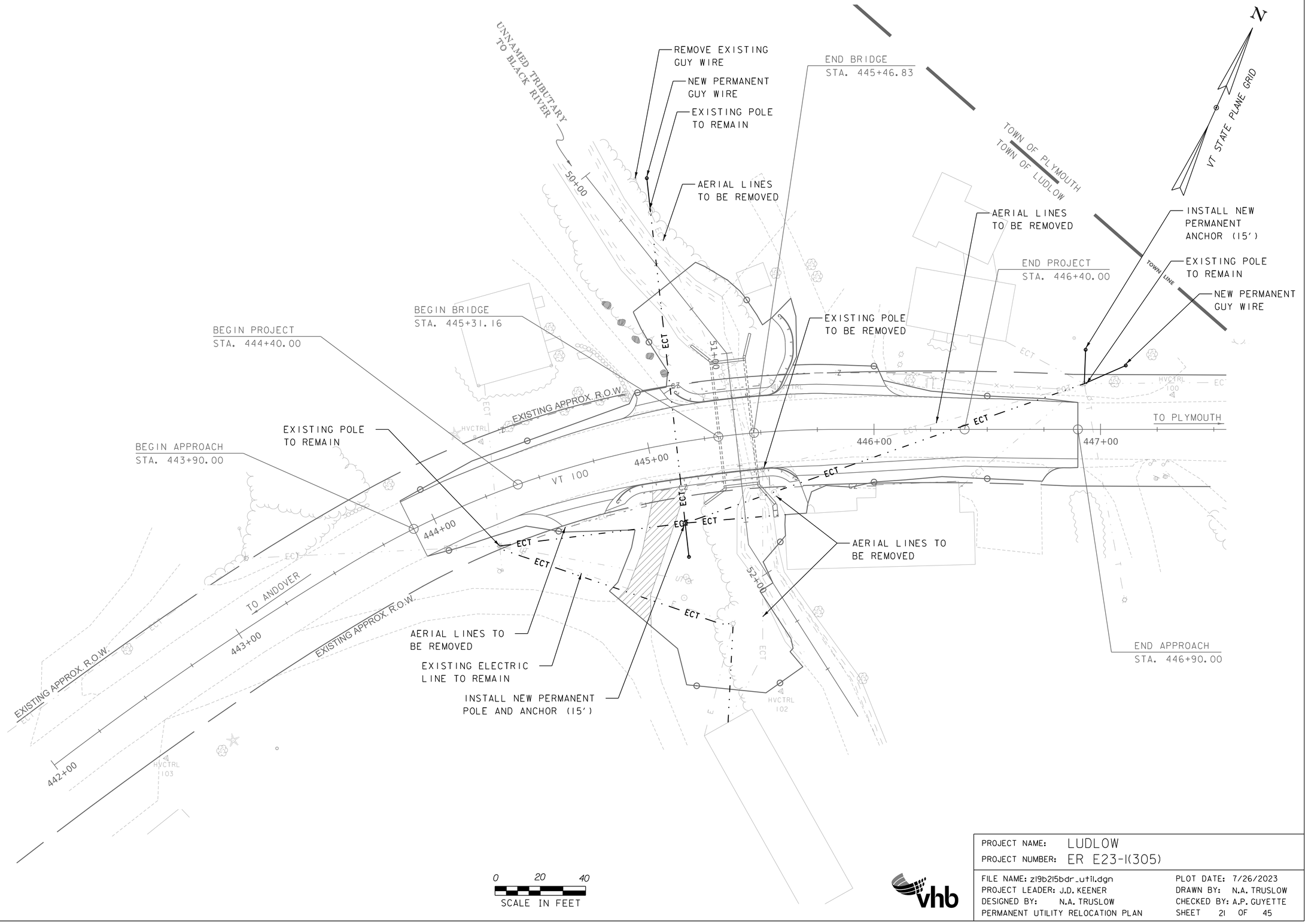
PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215detour_dts.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: D.E. MORRISSETTE
TRAFFIC CONTROL PLAN (5 OF 5)

PLOT DATE: 7/26/2023
DRAWN BY: D.E. MORRISSETTE
CHECKED BY: K.M. SENTOFF
SHEET 19 OF 45



PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)
FILE NAME: z19b215bdr_util.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: A.P. GUYETTE
TEMPORARY UTILITY RELOCATION PLAN	SHEET 20 OF 45



PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)

FILE NAME: z19b215bdr_util.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: A.P. GUYETTE
PERMANENT UTILITY RELOCATION PLAN	SHEET 21 OF 45

SIGNING LEGEND

N = NEW
RET = RETAIN
R = REMOVE
S = SALVAGE

STRIPING LEGEND

DYL = DOUBLE YELLOW LINE
SWL = SINGLE WHITE LINE

DURABLE 4 INCH YELLOW LINE, POLYUREA
STA. 443+90 - 446+90, LT & RT

DURABLE 4 INCH WHITE LINE, POLYUREA
STA. 443+90 - 446+90, LT & RT

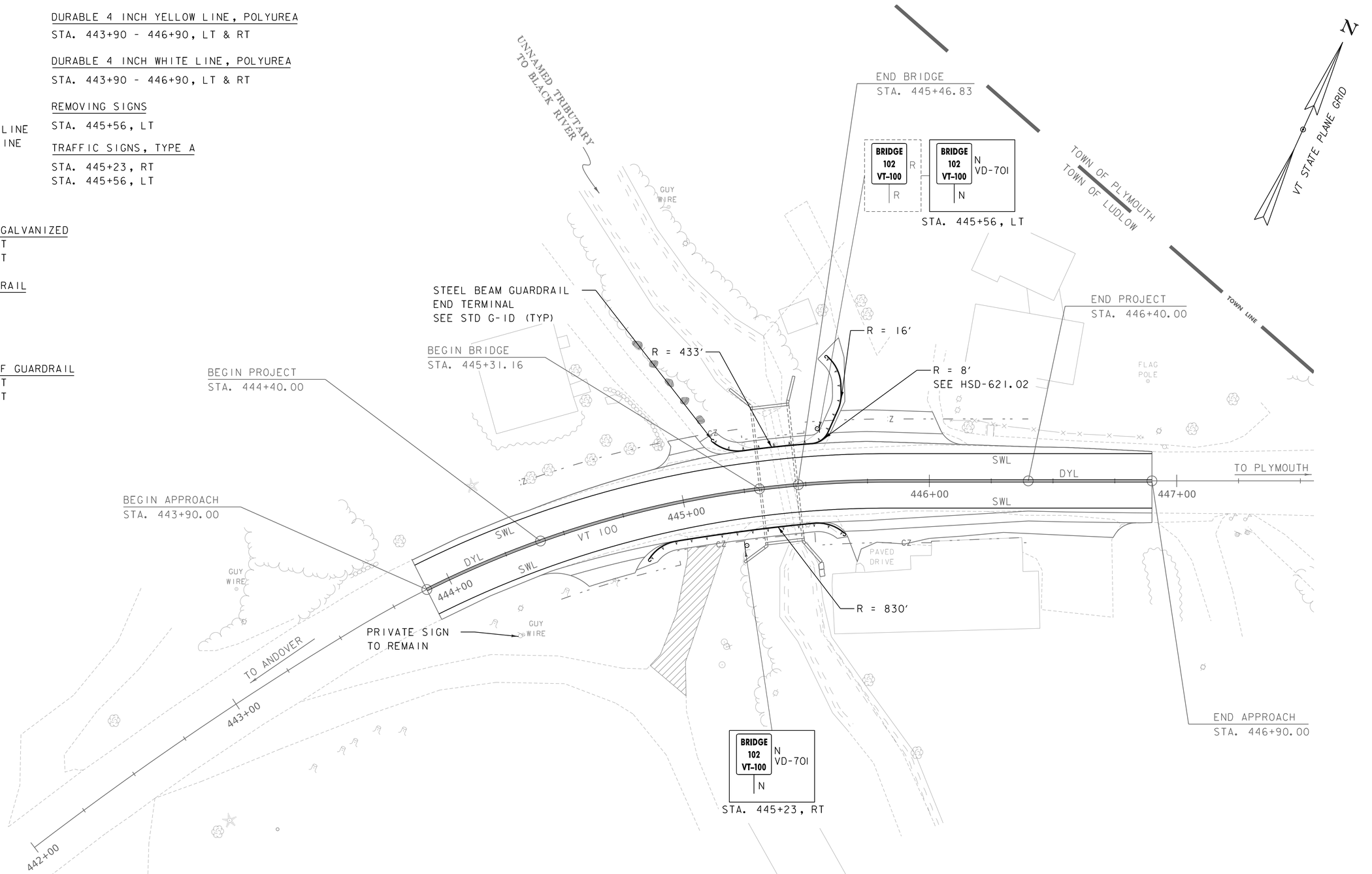
REMOVING SIGNS
STA. 445+56, LT

TRAFFIC SIGNS, TYPE A
STA. 445+23, RT
STA. 445+56, LT

STEEL BEAM GUARDRAIL, GALVANIZED
STA 444+80 - 445+65, RT
STA 445+15 - 445+66, LT

ANCHOR FOR STEEL BEAM RAIL
STA 444+88, RT
STA 445+21, LT
STA 445+58, RT
STA 445+65, LT

REMOVAL AND DISPOSAL OF GUARDRAIL
STA 445+23 - 445+57, LT
STA 445+23 - 445+61, RT



SIGN SUMMARY TABLE

LOCATION	MUTCD CODE	WIDTH	HEIGHT	SIGN LEGEND	TOT. AREA OF NEW SIGNS, TYPE A (SF)	NO. OF NEW POSTS*	TOT. LENGTH OF POSTS (FT)	STANDARD
445+23 RT 445+56 LT	VD-701	6	10	BRIDGE 102 VT-100	0.83	2	30	T-42

*POSTS SHALL BE 1.75 IN. SQUARE STEEL, 1.88 LB/FT

0 20 40
SCALE IN FEET

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215tsl.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: N.A. TRUSLOW
TRAFFIC SIGN AND LINE STRIPING LAYOUT

PLOT DATE: 7/26/2023
DRAWN BY: N.A. TRUSLOW
CHECKED BY: J.D. KEENER
SHEET 22 OF 45

SOIL CLASSIFICATION

AASHTO	
A1	Gravel and Sand
A3	Fine Sand
A2	Silty or Clayey Gravel and Sand
A4	Silty Soil - Low Compressibility
A5	Silty Soil - Highly Compressible
A6	Clayey Soil - Low Compressibility
A7	Clayey Soil - Highly Compressible

ROCK QUALITY DESIGNATION

R.Q.D. (%)	ROCK DESCRIPTION
<25	Very Poor
25 to 50	Poor
51 to 75	Fair
76 to 90	Good
>90	Excellent

SHEAR STRENGTH

UNDRAINED SHEAR STRENGTH IN P.S.F.	CONSISTENCY
<250	Very Soft
250-500	Soft
500-1000	Med. Stiff
1000-2000	Stiff
2000-4000	Very Stiff
>4000	Hard

CORRELATION GUIDE OF "N" TO DENSITY/CONSISTENCY

DENSITY (GRANULAR SOILS)		CONSISTENCY (COHESIVE SOILS)	
N	DESCRIPTIVE TERM	N	DESCRIPTIVE TERM
<5	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-24	Med. Dense	5-8	Med. Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

COMMONLY USED SYMBOLS

▼	Water Elevation
⊗	Standard Penetration Boring
⊕	Auger Boring
⊙	Rod Sounding
S	Sample
N	Standard Penetration Test Blow Count Per Foot For: 2" O.D. Sampler 1 3/8" I.D. Sampler Hammer Weight Of 140 Lbs. Hammer Fall Of 30"
VS	Field Vane Shear Test
US	Undisturbed Soil Sample
B	Blast
DC	Diamond Core
MD	Mud Drill
WA	Wash Ahead
HSA	Hollow Stem Auger
AX	Core Size 1 1/8"
BX	Core Size 1 5/8"
NX	Core Size 2 1/8"
M	Double Tube Core Barrel Used
LL	Liquid Limit
PL	Plastic Limit
PI	Plasticity Index
NP	Non Plastic
w	Moisture Content (Dry Wgt. Basis)
D	Dry
M	Moist
MTW	Moist To Wet
W	Wet
Sat	Saturated
Bo	Boulder
Gr	Gravel
Sa	Sand
Si	Silt
Cl	Clay
HP	Hardpan
Le	Ledge
NLTD	No Ledge To Depth
CNPF	Can Not Penetrate Further
TLOB	Top of Ledge Or Boulder
NR	No Recovery
Rec.	Recovery
%Rec.	Percent Recovery
ROD	Rock Quality Designation
CBR	California Bearing Ratio
<	Less Than
>	Greater Than
R	Refusal (N > 100)
VTSPG	NAD83 - See Note 7

COLOR

blk	Black	pnk	Pink
bl	Blue	pu	Purple
brn	Brown	rd	Red
dk	Dark	tn	Tan
gry	Gray	wh	White
gn	Green	yel	Yellow
lt	Light	mltc	Multicolored
or	Orange		

DEFINITIONS (AASHTO)

BEDROCK (LEDGE) - Rock in its native location of indefinite thickness.

BOULDER - A rock fragment with an average dimension > 12 inches.

COBBLE - Rock fragments with an average dimension between 3 and 12 inches.

GRAVEL - Rounded particles of rock < 3" and > 0.0787" (#10 sieve).

SAND - Particles of rock < 0.0787" (#10 sieve) and > 0.0029" (#200 sieve).

SILT - Soil < 0.0029" (#200 sieve), non or slightly plastic and exhibits no strength when air-dried.

CLAY - Fine grained soil, exhibits plasticity when moist and considerable strength when air-dried.

VARVED - Alternate layers of silt and clay.

HARDPAN - Extremely dense soil, cemented layer, not softened when wet.

MUCK - Soft organic soil (containing > 10% organic material.

MOISTURE CONTENT - Weight of water divided by dry weight of soil.

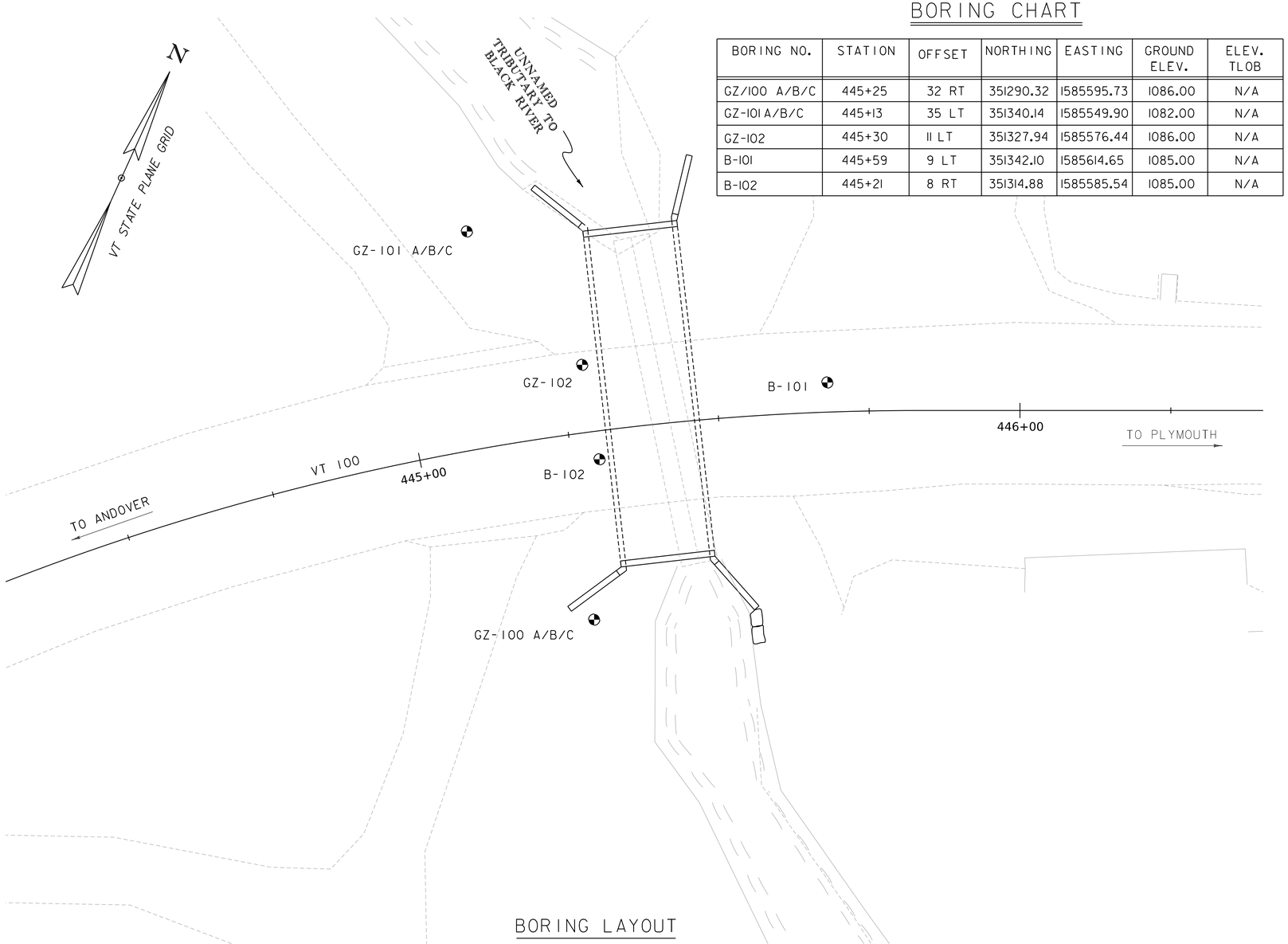
FLOWING SAND - Granular soil so saturated (loose) that it flows into drill casing during extraction of wash rod.

STRIKE - Angle from magnetic north to line of intersection of bed with a horizontal plane.

DIP - Inclination of bed with a horizontal plane.

BORING CHART

BORING NO.	STATION	OFFSET	NORTHING	EASTING	GROUND ELEV.	ELEV. TLOB
GZ/100 A/B/C	445+25	32 RT	351290.32	1585595.73	1086.00	N/A
GZ-101 A/B/C	445+13	35 LT	351340.14	1585549.90	1082.00	N/A
GZ-102	445+30	11 LT	351327.94	1585576.44	1086.00	N/A
B-101	445+59	9 LT	351342.10	1585614.65	1085.00	N/A
B-102	445+21	8 RT	351314.88	1585585.54	1085.00	N/A



BORING LAYOUT

SCALE 1" = 10'-0"

10 0 10

GENERAL NOTES

1. The subsurface explorations shown herein were made between 08/26/2014 and 11/06/2020 by the Agency.
2. Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by the Agency and may not necessarily reflect actual variations in subsurface conditions that may be encountered between individual boring or sample locations.
3. Observed water levels and/or conditions indicated are as recorded at the time of exploration and may vary according to the prevailing rainfall, methods of exploration and other factors.
4. Engineering judgment was exercised in preparing the subsurface information presented herein. Analysis and interpretation of subsurface data was performed and interpreted for Agency design and estimating purposes. Presentation of the information in the Contract is intended to provide the Contractor access to the same data available to the Agency. The subsurface information is presented in good faith and is not intended as a substitute for personal investigation, independent interpretation, independent analysis or judgment by the Contractor.
5. Pictorial structure details shown on the boring plan layout or soils profile are for illustrative purposes only and may not accurately portray final contract details.
6. Terminology used on boring logs to describe the hardness, degree of weathering, and spacing of fractures, joints and other discontinuities in the bedrock is defined in the AASHTO Manual on Subsurface Investigations, 1988.
7. Northing and Easting coordinates are shown in Vermont State Plane Grid North American Datum 1983 in meters and survey feet.

vhb

PROJECT NAME: LUDLOW

PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215bor.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: N.A. TRUSLOW
BORING INFORMATION SHEET

PLOT DATE: 7/26/2023
DRAWN BY: N.A. TRUSLOW
CHECKED BY: J.D. KEENER
SHEET 23 OF 45

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Bridge No. 102 Replacement Project
Ludlow BF 013-3(16)
Ludlow, Vermont

Boring No.: **GZ-100 A/B/C**
Page No.: 1 of 2
Pin No.: 19b215
Checked By: JLH

Boring Crew: S. Shaw (NEBC), M. Alihodzic (GZA)
Date Started: 8/26/14 Date Finished: 8/26/14
VTSPG NAD83: N 351290.32 ft E 1585595.73 ft
Station: 445+25 Offset: 32 RT
Ground Elevation: ~1086

	Casing	Sampler
Type:	AUGER	SS
I.D.:	2.5 in	1.38 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Manual/AWJ	
Rig:	TRUCK	C_E = 1.0

Groundwater Observations

Date	Depth (ft)	Notes
08/26/14	11.9	no casing; 15 min slab.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Visual Description, (Modified Burmister), S-1 (0-2'): Top 8": Medium dense, gray, fine to coarse SAND, little Silt. Bottom 8": Medium dense, brown, fine to coarse SAND, trace Gravel, Rec. = 1.3 ft	7-9-11-14 (20)				
5		Visual Description, (Modified Burmister), S-2 (5-7'): Medium dense, gray to brown, GRAVEL, fine to coarse SAND, trace Silt, Rec. = 0.9 ft, (AASHTO Classification: A-1-a) Field Note, Split spoon refusal at 5.3 feet (GZ-100A). Auger refusal at 5.5 feet below existing ground surface due to possible boulder or cobble. Relocated 5.5 feet NE from GZ-100A to GZ-100B	1-4-9-10 (13)	4.8	35.3	30.8	9.0
10		Visual Description, (Modified Burmister), S-3 (10-12'): Dense, brown, fine to coarse SAND, some Gravel, trace Silt, Rec. = 1.3 ft	13-20-19-17 (39)				
15		Visual Description, (Modified Burmister), S-4 (15-16.5'): Very dense, brown, fine to coarse SAND, some Gravel, little Silt, wet. SPlit spoon refusal on boulder or cobble., Rec. = 1.3 ft	15-16-100/6" (R)				
		Field Note, Moved from GZ-100B to GZ-100C after encountering refusal at 16.5 feet.					
20		Visual Description, (Modified Burmister), S-5 (20-22'): Dense, brown, fine to coarse SAND, some Silt, little Gravel, wet, Rec. = 1.2 ft	21-15-23-14 (38)				
25		Visual Description, (Modified Burmister), S-6 (25-27'): Medium dense, brown, fine to coarse SAND, some Silt, little Gravel, wet, Rec. = 1.3 ft	19-9-11-16 (20)				

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 04.0190074.00 - MCFARLAND-JOHNSON ROUTE 100 LUDLOW VT - FOR 191154.01.GPJ VERMONT AOT.GDT 1/13/21

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Bridge No. 102 Replacement Project
Ludlow BF 013-3(16)
Ludlow, Vermont

Boring No.: **GZ-100 A/B/C**
Page No.: 2 of 2
Pin No.: 19b215
Checked By: JLH

Boring Crew: S. Shaw (NEBC), M. Alihodzic (GZA)
Date Started: 8/26/14 Date Finished: 8/26/14
VTSPG NAD83: N 351290.32 ft E 1585595.73 ft
Station: 445+25 Offset: 32 RT
Ground Elevation: ~1086

	Casing	Sampler
Type:	AUGER	SS
I.D.:	2.5 in	1.38 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Manual/AWJ	
Rig:	TRUCK	C_E = 1.0

Groundwater Observations

Date	Depth (ft)	Notes
08/26/14	11.9	no casing; 15 min slab.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Visual Description, (Modified Burmister), S-7 (30-32'): Very dense, brown, fine to coarse SAND, some Silt, wet, Rec. = 1.1 ft	23-33-20-26 (53)				
		Field Note, Boulders were encountered throughout stratum Hole stopped @ 32.0 ft					
35		Remarks: 1. Coordinates, station/offset, and estimated ground surface elevations listed are for GZ-100 B.					
40							
45							
50							
55							

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 04.0190074.00 - MCFARLAND-JOHNSON ROUTE 100 LUDLOW VT - FOR 191154.01.GPJ VERMONT AOT.GDT 1/13/21

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-I(305)

FILE NAME: z19b215borlog.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: N.A. TRUSLOW
BORING LOGS (1 OF 5)

PLOT DATE: 7/26/2023
DRAWN BY: N.A. TRUSLOW
CHECKED BY: J.D. KEENER
SHEET 24 OF 45

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Bridge No. 102 Replacement Project
Ludlow BF 013-3(16)
Ludlow, Vermont

Boring No.: **GZ-101 A/B/C**
Page No.: 1 of 1
Pin No.: 19b215
Checked By: JLH

Boring Crew: S. Shaw (NEBC), M. Alihodzic (GZA)
Date Started: 8/26/14 Date Finished: 8/26/14
VTSPG NAD83: N 351340.14 ft E 1585549.90 ft
Station: 445+13 Offset: 35 LT
Ground Elevation: ~1082

	Casing	Sampler
Type:	AUGER	SS
I.D.:	2.5 in	1.38 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Manual/AWJ	
Rig:	TRUCK	C_E = 1.0

Groundwater Observations		
Date	Depth (ft)	Notes
		Not Encountered

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Visual Description, (Modified Burmister), S-1 (0-2'): Very loose, fine to medium SAND and Silt, trace Organics (top 1.3", topsoil), Rec. = 0.8 ft	2-2-2-1 (4)				
5		Visual Description, (Modified Burmister), S-2 (5-7'): Loose, gray to brown, fine to coarse SAND and Gravel, Rec. = 0.3 ft	4-4-4-7 (8)				
10		Visual Description, (Modified Burmister), S-3 (10-10.8'): Very dense, gray to brown, fine to medium SAND, some Silt, trace Gravel., Rec. = 0.6 ft, (AASHTO Classification: A-2-4) Field Note, Boring moved multiple times; refusal in large boulder/bedrock at depths ranging from 10.8 to 13.5 feet below ground surface	25-61-100/1" (R)	9.7	9.8	65.2	25.0
		10.8 ft - 13.5 ft, NESTED COBBLES OR LARGE BOULDER					
		Hole stopped @ 13.5 ft					
15							
20							
25							

Remarks:
1. Coordinates, station/offset, and estimated ground surface elevations listed are for GZ-101 B.

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 04.0190074.00 - MCFARLAND-JOHNSON ROUTE 100 LUDLOW VT - FOR 191154.01.GPJ VERMONT AOT.GDT 1/13/21

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Bridge No. 102 Replacement Project
Ludlow BF 013-3(16)
Ludlow, Vermont

Boring No.: **GZ-102**
Page No.: 1 of 2
Pin No.: 19b215
Checked By: JLH

Boring Crew: S. Shaw (NEBC), M. Alihodzic (GZA)
Date Started: 8/27/14 Date Finished: 8/27/14
VTSPG NAD83: N 351327.94 ft E 1585576.44 ft
Station: 445+30 Offset: 11 LT
Ground Elevation: ~1086

	Casing	Sampler
Type:	AUGER	SS
I.D.:	2.5 in	1.38 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Manual/AWJ	
Rig:	TRUCK	C_E = 1.0

Groundwater Observations		
Date	Depth (ft)	Notes
08/27/14	10.1	no casing; 5 min stab.

APPROX. BOTTOM OF BOX CULVERT EL = 1069.75

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		0.0 ft - 0.5 ft, ASPHALT					
		Visual Description, (Modified Burmister), S-1 (1-3'): Medium dense, brown, fine to coarse SAND, little Gravel, little Silt Rec. = 1.4 ft	5-9-8-18 (17)				
5		Visual Description, (Modified Burmister), S-2 (5-7'): Loose, brown, fine to coarse SAND and Gravel, Rec. = 0.2 ft	3-7-3-4 (10)				
10		Visual Description, (Modified Burmister), S-3 (9-10.1'): Very dense, brown, fine to coarse SAND, some Gravel, trace Silt Rec. = 0.3 ft	6-56-100/1" (R)				
15		Visual Description, (Modified Burmister), S-4 (14-16'): Very dense, brown, fine to coarse SAND, little Silt, little Gravel, Rec. = 0.8 ft	35-55-41-44 (96)				
20		Visual Description, (Modified Burmister), S-5 (19-21'): Very dense, brown, fine to coarse SAND, little Silt, little Gravel, Rec. = 0.9 ft	33-56-23-29 (79)				
25		Visual Description, (Modified Burmister), S-6 (24-26'): Dense, brown, GRAVEL and fine to coarse SAND, little Silt., Rec. = 0.9 ft, (AASHTO Classification: A-1-a)	30-25-23-27 (48)	9.4	22.5	29.0	12.0
		26.5 ft - 27.7 ft, BOULDER Field Note, Lost water at approximately 27 feet below ground surface					
		27.7 ft - 29.0 ft					
		Visual Description, (Modified Burmister), S-7 (29-31'): Very dense, brown, fine to coarse SAND, little Silt, little Gravel, Rec. = 2.0 ft	15-30-28-27				

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 04.0190074.00 - MCFARLAND-JOHNSON ROUTE 100 LUDLOW VT - FOR 191154.01.GPJ VERMONT AOT.GDT 1/13/21

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-I(305)

FILE NAME: z19b215borlog.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: N.A. TRUSLOW
BORING LOGS (2 OF 5)

PLOT DATE: 7/26/2023
DRAWN BY: N.A. TRUSLOW
CHECKED BY: J.D. KEENER
SHEET 25 OF 45

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Bridge No. 102 Replacement Project
Ludlow BF 013-3(16)
Ludlow, Vermont

Boring No.: **GZ-102**
Page No.: 2 of 2
Pin No.: 19b215
Checked By: JLH

Boring Crew: S. Shaw (NEBC), M. Alihodzic (GZA)
Date Started: 8/27/14 Date Finished: 8/27/14
VTSPG NAD83: N 351327.94 ft E 1585576.44 ft
Station: 445+30 Offset: 11 LT
Ground Elevation: ~1086

	Casing	Sampler
Type:	AUGER	SS
I.D.:	2.5 in	1.38 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Manual/AWJ	
Rig:	TRUCK	C_E = 1.0

Groundwater Observations		
Date	Depth (ft)	Notes
08/27/14	10.1	no casing; 5 min stab.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Field Note, Occasional cobbles and boulders encountered in stratum	(58)				
		Hole stopped @ 31.0 ft					
35							
40							
45							
50							
55							

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 04.0190074.00 - MCFARLAND-JOHNSON ROUTE 100 LUDLOW VT - FOR 191154.01.GPJ VERMONT AOT.GDT 1/13/21

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Bridge No. 102 Replacement Project
Ludlow BF 013-3(16)
Ludlow, Vermont

Boring No.: **B-101**
Page No.: 1 of 2
Pin No.: 19b215
Checked By: J. Baron

Boring Crew: K. Smith (NEBC), J. Szmyt (GZA)
Date Started: 11/05/20 Date Finished: 11/06/20
VTSPG NAD83: N 351342.10 ft E 1585614.65 ft
Station: 445+59 Offset: 9 LT
Ground Elevation: 1085.0 ft

	Casing	Sampler
Type:	WASH BORE	SS
I.D.:	4 in	2 in
Hammer Wt:	300 lb.	140 lb.
Hammer Fall:	24 in.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	Failing CF-15 Truck	C_E = 1.3

Groundwater Observations		
Date	Depth (ft)	Notes
11/06/20	15.9	Stab. time = 0.5 hrs.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Visual Description, Approximately 8 inches of pavement, ASPHALT					
		Visual Description, (Modified Burmister), S-1 (0.7-2.7'): Very dense, light brown/brown, fine to medium SAND, little Gravel, trace Silt (A-1-a). Moist, Rec. = 0.92 ft, FILL	39-31-23-22 (54)				
		Visual Description, (Modified Burmister), S-2 (2.7-4.7'): Dense, light brown/brown, fine to medium SAND, some Silt, little Gravel, trace roots (A-2-4). Moist, Rec. = 1.08 ft, SAND	15-19-12-11 (31)	23.2	20.7	46.8	32.5
5		Visual Description, (Modified Burmister), S-3 (4.7-6.7'): Dense, light brown/brown, fine to medium SAND, some Gravel, trace Silt (A-1-a). Moist, Rec. = 0.75 ft, SAND	11-7-23-11 (30)				
		Visual Description, SAND					
10		Visual Description, (Modified Burmister), S-4 (9.0-11.0'): Loose, dark brown, fine to medium SAND, little Silt, little Gravel (A-1-b). Wet, Rec. = 0.5 ft, SAND	3-3-5-7 (8)				
		Visual Description, SAND					
15		Visual Description, (Modified Burmister), S-5 (14.0-16.0'): Very dense, brown, fine to medium SAND, some Gravel, some Silt (A-1-b). Wet, Rec. = 1.17 ft, GLACIAL TILL	19-25-29-26 (54)	12.5	34.6	42.3	23.1
		Visual Description, GLACIAL TILL					
20		Visual Description, (Modified Burmister), S-6 (19.0-21.0'): Very dense, light brown, fine to medium SAND, some Gravel, little Silt (A-1-b). Wet, Rec. = 0.83 ft, GLACIAL TILL	19-23-32-24 (55)				
		Visual Description, GLACIAL TILL					
25		Visual Description, (Modified Burmister), S-7 (24.0-26.0'): Very dense, light brown/olive, fine to medium SAND, little Silt, little Gravel (A-1-b). Wet, Rec. = 0.83 ft, GLACIAL TILL	24-43-48-59 (91)				
		Visual Description, GLACIAL TILL					
30		Visual Description, (Modified Burmister), S-8 (29.0-29.3'): No Recovery. Stone in tip of spoon, Rec. = 0.0 ft, GLACIAL TILL	100/3" (REF)				
		Visual Description, GLACIAL TILL					
		Visual Description, (Modified Burmister), S-9 (34.0-36.0'): Very dense, light brown, fine to	36-41-81-43				

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 04.0191154.01 VTRANS LUDLOW BF 013-3(16).GPJ VERMONT AOT.GDT 12/18/20

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-I(305)

FILE NAME: z19b215borlog.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: N.A. TRUSLOW
BORING LOGS (3 OF 5)

PLOT DATE: 7/26/2023
DRAWN BY: N.A. TRUSLOW
CHECKED BY: J.D. KEENER
SHEET 26 OF 45

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Bridge No. 102 Replacement Project
Ludlow BF 013-3(16)
Ludlow, Vermont

Boring No.: **B-101**
Page No.: 2 of 2
Pin No.: 19b215
Checked By: J. Baron

Boring Crew: K. Smith (NEBC), J. Szmyt (GZA)
Date Started: 11/05/20 Date Finished: 11/06/20
VTSPG NAD83: N 351342.10 ft E 1585614.65 ft
Station: 445+59 Offset: 9 LT
Ground Elevation: 1085.0 ft

	Casing	Sampler
Type:	WASH BORE	SS
I.D.:	4 in	2 in
Hammer Wt:	300 lb.	140 lb.
Hammer Fall:	24 in.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	Failing CF-15 Truck	C_E = 1.3

Groundwater Observations

Date	Depth (ft)	Notes
11/06/20	15.9	Stab. time = 0.5 hrs.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		medium SAND, little Gravel, trace Silt (A-1-a). Wet, Rec. = 1.33 ft, GLACIAL TILL	(122)				
		Visual Description, GLACIAL TILL					
40		Visual Description, (Modified Burmister), S-10 (39.0-41.0'): Very dense, light brown, fine to medium SAND, little Gravel, little Silt (A-1-b). Wet, Rec. = 1.17 ft, GLACIAL TILL	22-44-50-61 (94)				
		Visual Description, GLACIAL TILL					
45		Visual Description, (Modified Burmister), S-11 (44.0-46.0'): Very dense, light brown, fine to medium SAND, little Silt, trace Gravel (A-1-b). Wet, Rec. = 1.33 ft, GLACIAL TILL	27-34-43-52 (77)				
		Visual Description, GLACIAL TILL					
50		Visual Description, (Modified Burmister), S-12 (49.0-50.1'): Very dense, gary/olive, fine to medium SAND, some Silt, trace Gravel (A-2-4). Wet, Rec. = 0.58 ft, GLACIAL TILL	40-67-50/1" (REF)				
		Hole stopped @ 50.1 ft					

Remarks:
1. Observed reduced water return at approximately 13 feet below ground surface.
2. Encountered 0.8-foot-thick cobble at approximately 26 feet below ground surface.

55 60 65

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 04.0191154.01 VTRANS LUDLOW BF 013-3(16).GPJ VERMONT AOT.GDT 12/18/20

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Bridge No. 102 Replacement Project
Ludlow BF 013-3(16)
Ludlow, Vermont

Boring No.: **B-102**
Page No.: 1 of 2
Pin No.: 19b215
Checked By: J. Baron

Boring Crew: K. Smith (NEBC), J. Szmyt (GZA)
Date Started: 11/04/20 Date Finished: 11/04/20
VTSPG NAD83: N 351314.88 ft E 1585585.54 ft
Station: 445+21 Offset: 8 RT
Ground Elevation: 1085.0 ft

	Casing	Sampler
Type:	WASH BORE	SS
I.D.:	4 in	2 in
Hammer Wt:	300 lb.	140 lb.
Hammer Fall:	24 in.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	Failing CF-15 Truck	C_E = 1.3

Groundwater Observations

Date	Depth (ft)	Notes
11/04/20	13.6	Stab. time = 0.5 hrs.

APPROX. BOTTOM OF BOX CULVERT EL = 1068.75

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Visual Description, Approximately 8 inches of pavement, ASPHALT					
		Visual Description, (Modified Burmister), S-1 (0.7-2.7'): Dense, brown, fine to medium SAND, little Gravel, trace Silt (A-1-a). Moist, Rec. = 0.5 ft, FILL	60-30-19-23 (49)				
		Visual Description, (Modified Burmister), S-2 (2.7-4.7'): Dense, brown, fine to medium SAND, little Silt, trace Gravel (A-1-b). Moist, Rec. = 0.17 ft, SAND	29-25-12-10 (37)				
5		Visual Description, (Modified Burmister), S-3 (4.7-6.7'): Medium dense, brown, fine to medium SAND, some Silt, little Gravel (A-1-b). Moist, Rec. = 0.5 ft, SAND	16-14-15-17 (29)	23.1	43.8	37.6	18.6
		Visual Description, SAND					
10		Visual Description, (Modified Burmister), S-4 (9.0-10.7'): Medium dense, brown, fine to medium SAND, some Silt, trace Gravel, trace wood (A-1-b). Wet, Rec. = 0.25 ft, SAND	8-8-6-50/4" (14)				
		Visual Description, SAND					
15		Visual Description, (Modified Burmister), S-5 (14.0-16.0'): Very dense, light brown/olive, fine to medium SAND, some Gravel, some Silt (A-1-b). Wet, Rec. = 0.75 ft, GLACIAL TILL	43-66-34-27 (100)	10.7	35.5	41.8	22.7
		Visual Description, GLACIAL TILL					
20		Visual Description, (Modified Burmister), S-6 (19.0-21.0'): Very dense, light brown/olive, fine to medium SAND, little Silt, little Gravel (A-1-b). Wet, Rec. = 0.67 ft, GLACIAL TILL	67-60-30-28 (90)				
		Visual Description, GLACIAL TILL					
25		Visual Description, (Modified Burmister), S-7 (24.0-26.0'): Dense, light brown/olive, fine to medium SAND, some Gravel, little Silt (A-1-b). Wet, Rec. = 0.83 ft, GLACIAL TILL	25-24-22-32 (46)				
		Visual Description, GLACIAL TILL					
30		Visual Description, (Modified Burmister), S-8 (29.0-31.0'): Very dense, light brown/olive, fine to medium SAND, little Gravel, little Silt (A-1-b). Wet, Rec. = 1.42 ft, GLACIAL TILL	40-76-58-51 (134)				
		Visual Description, GLACIAL TILL					

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 04.0191154.01 VTRANS LUDLOW BF 013-3(16).GPJ VERMONT AOT.GDT 12/18/20

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-I(305)

FILE NAME: z19b215borlog.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: N.A. TRUSLOW
BORING LOGS (4 OF 5)

PLOT DATE: 7/26/2023
DRAWN BY: N.A. TRUSLOW
CHECKED BY: J.D. KEENER
SHEET 27 OF 45

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Bridge No. 102 Replacement Project
Ludlow BF 013-3(16)
Ludlow, Vermont

Boring No.: **B-102**
Page No.: 2 of 2
Pin No.: 19b215
Checked By: J. Baron

Boring Crew: K. Smith (NEBC), J. Szmyt (GZA)
Date Started: 11/04/20 Date Finished: 11/04/20
VTSPG NAD83: N 351314.88 ft E 1585585.54 ft
Station: 445+21 Offset: 8 RT
Ground Elevation: 1085.0 ft

	Casing	Sampler
Type:	WASH BORE	SS
I.D.:	4 in	2 in
Hammer Wt:	300 lb.	140 lb.
Hammer Fall:	24 in.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	Failing CF-15 Truck	C_E = 1.3

Groundwater Observations

Date	Depth (ft)	Notes
11/04/20	13.6	Stab. time = 0.5 hrs.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Visual Description, (Modified Burmister), S-9 (35.0-37.0'): Very dense, light brown/olive, fine to medium SAND, little Silt, trace Gravel (A-1-b). Wet, Rec. = 1.5 ft, GLACIAL TILL	19-35-41-42 (76)				
		Visual Description, GLACIAL TILL					
40		Visual Description, (Modified Burmister), S-10 (39.0-41.0'): Very dense, light brown/olive, fine to medium SAND, little Silt, trace Gravel (A-1-b). Wet, Rec. = 1.58 ft, GLACIAL TILL	45-48-55-58 (103)				
		Visual Description, GLACIAL TILL					
45		Visual Description, (Modified Burmister), S-11 (44.0-44.8'): Very dense, gray/olive, fine to medium SAND, some Silt, little Gravel (A-2-4). Wet, Rec. = 0.67 ft, GLACIAL TILL	85-100/4" (REF)				
		Visual Description, GLACIAL TILL					
50		Visual Description, (Modified Burmister), S-12 (49.0-49.3'): Very dense, gray/olive, fine to medium SAND and Silt, trace Gravel (A-4). Wet, Rec. = 0.25 ft, GLACIAL TILL	100/4" (REF)				
		Visual Description, GLACIAL TILL					
		Hole stopped @ 51.0 ft					
55		Remarks: 1. Lost water return at approximately 11 feet below ground surface. Drilled to 14 feet through cobbles before driving casing to approximately 14 feet below ground surface. 2. Encountered 1.8-foot-thick boulder at approximately 33 feet below ground surface. 3. Encountered 1.0-foot-thick boulder at approximately 48 feet below ground surface. 4. Advanced roller bit to approximately 51 feet below ground surface to confirm split spoon refusal in sample S-12 was not on bedrock.					
60							
65							

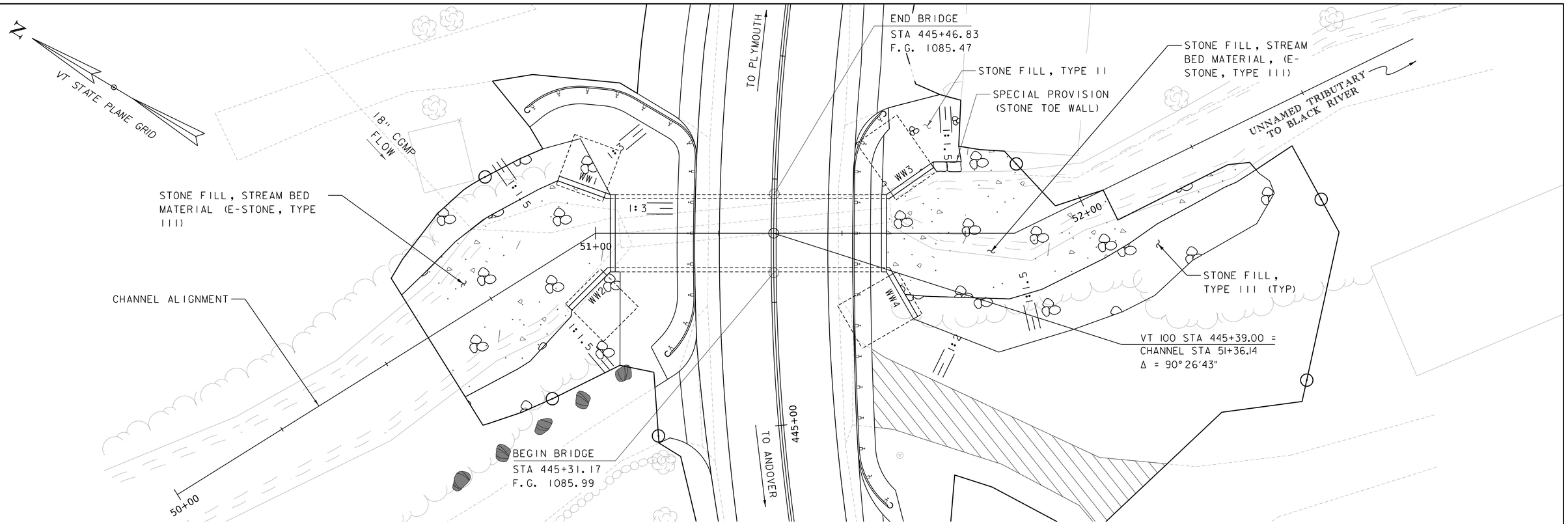
Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 04.0191154.01 VTRANS LUDLOW BF 013-3(16).GPJ VERMONT AOT.GDT 12/18/20

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-I(305)

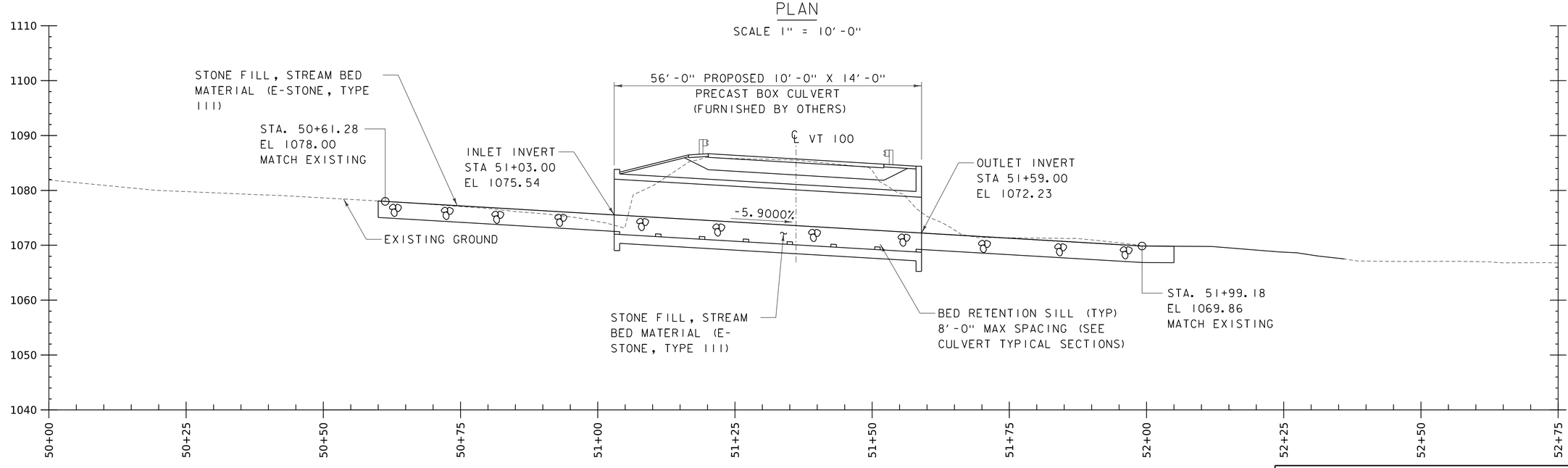
FILE NAME: z19b215borlog.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: N.A. TRUSLOW
BORING LOGS (5 OF 5)

PLOT DATE: 7/26/2023
DRAWN BY: N.A. TRUSLOW
CHECKED BY: J.D. KEENER
SHEET 28 OF 45



PLAN

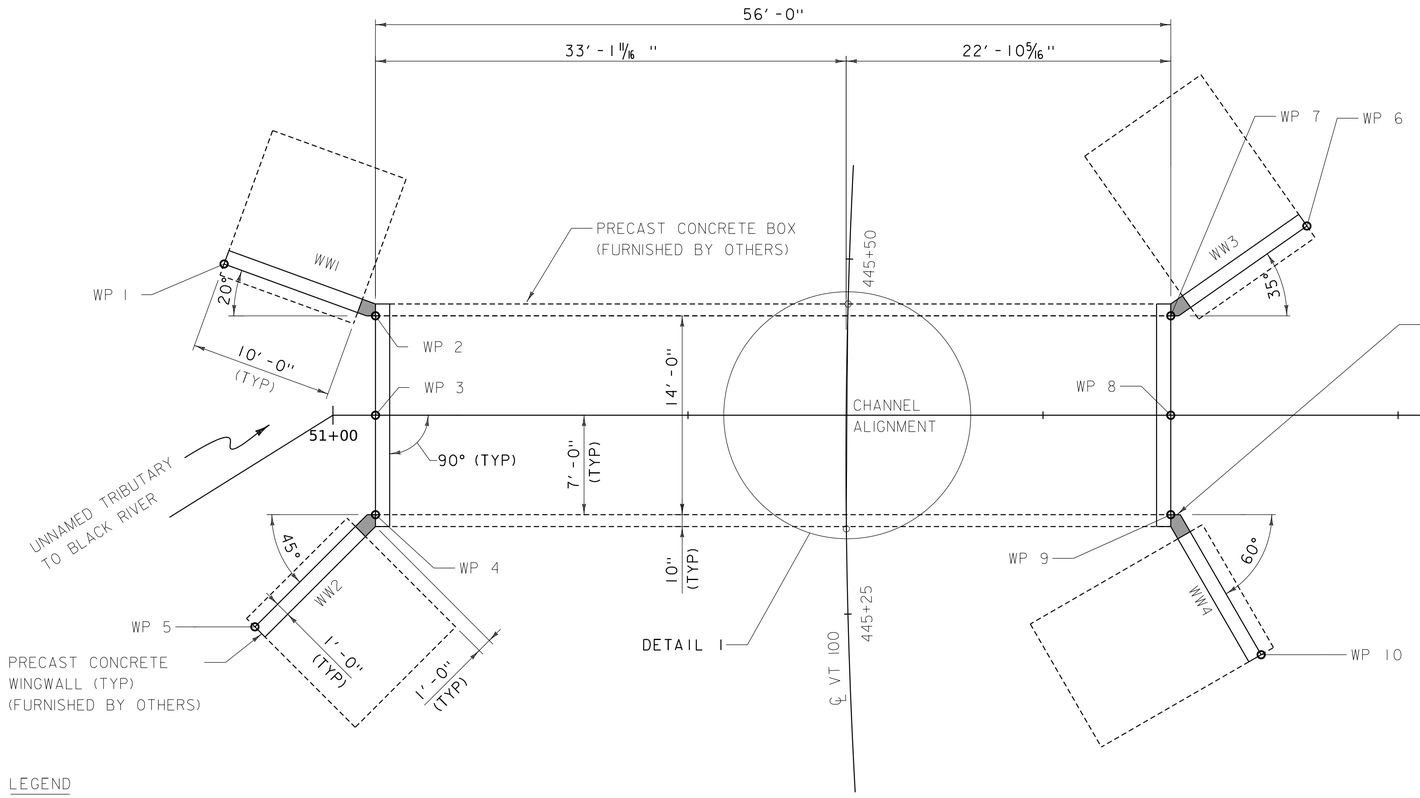
SCALE 1" = 10'-0"



LONGITUDINAL SECTION ALONG CHANNEL LINE

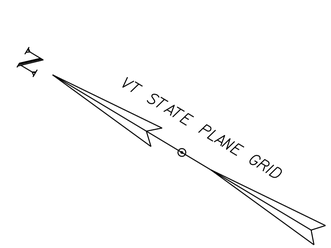
SCALE 1" = 10'-0"

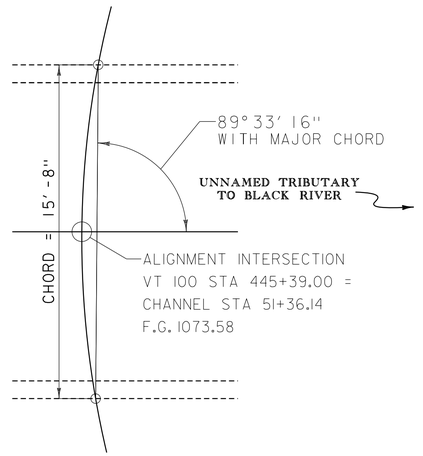
PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)
FILE NAME: zl9b215pe.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: J.D. KEENER
PLAN AND LONGITUDINAL SECTION	SHEET 29 OF 45



PRECAST CONCRETE STRUCTURE PLAN

SCALE: 3/16" = 1'-0"





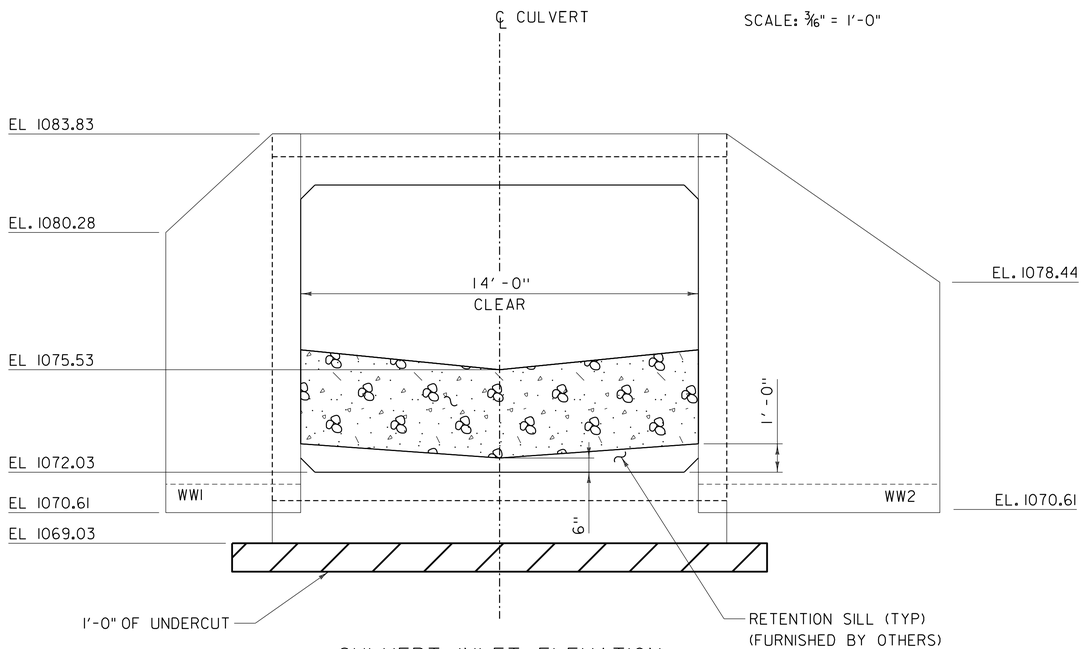
DETAIL I

NOT TO SCALE

	NORTHING	EASTING	STA.	OFF.
WP 1	351366.81	1585577.73	445+48.33	44.00' LT
WP 2	351355.79	1585580.09	445+45.24	33.24' LT
WP 3	351352.19	1585574.08	445+38.76	33.14' LT
WP 4	351348.59	1585568.08	445+32.28	33.14' LT
WP 5	351351.81	1585556.94	445+25.16	41.77' LT
WP 6	351302.80	1585619.25	445+53.71	32.10' RT
WP 7	351307.77	158608.89	445+46.59	22.74' RT
WP 8	351304.17	1585602.89	445+39.19	22.86' RT
WP 9	351300.57	1585596.89	445+31.78	22.85' RT
WP 10	351290.04	1585591.71	445+21.12	29.00' RT

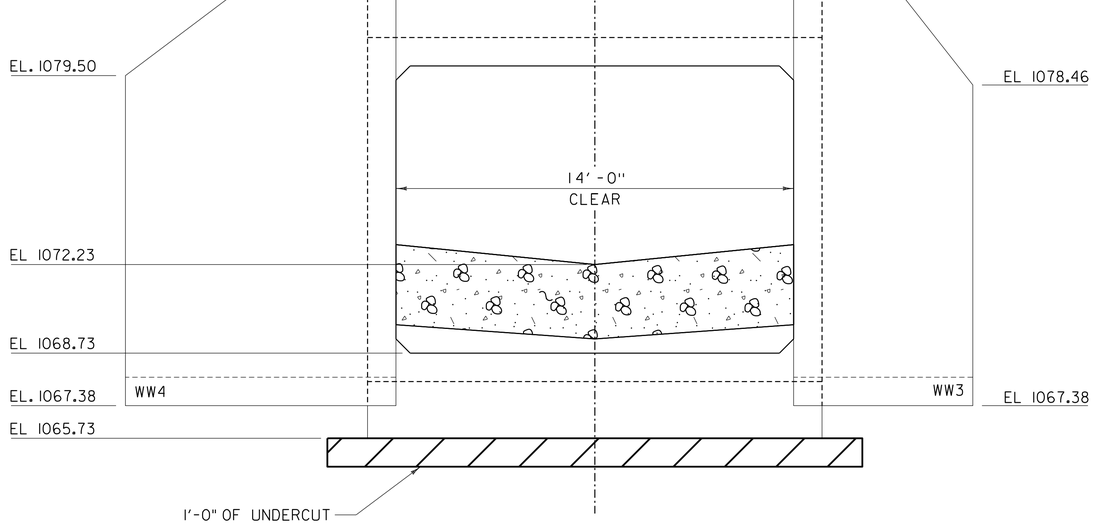
LEGEND

CLOSURE POUR



CULVERT INLET ELEVATION

SCALE 3/8" = 1'-0"



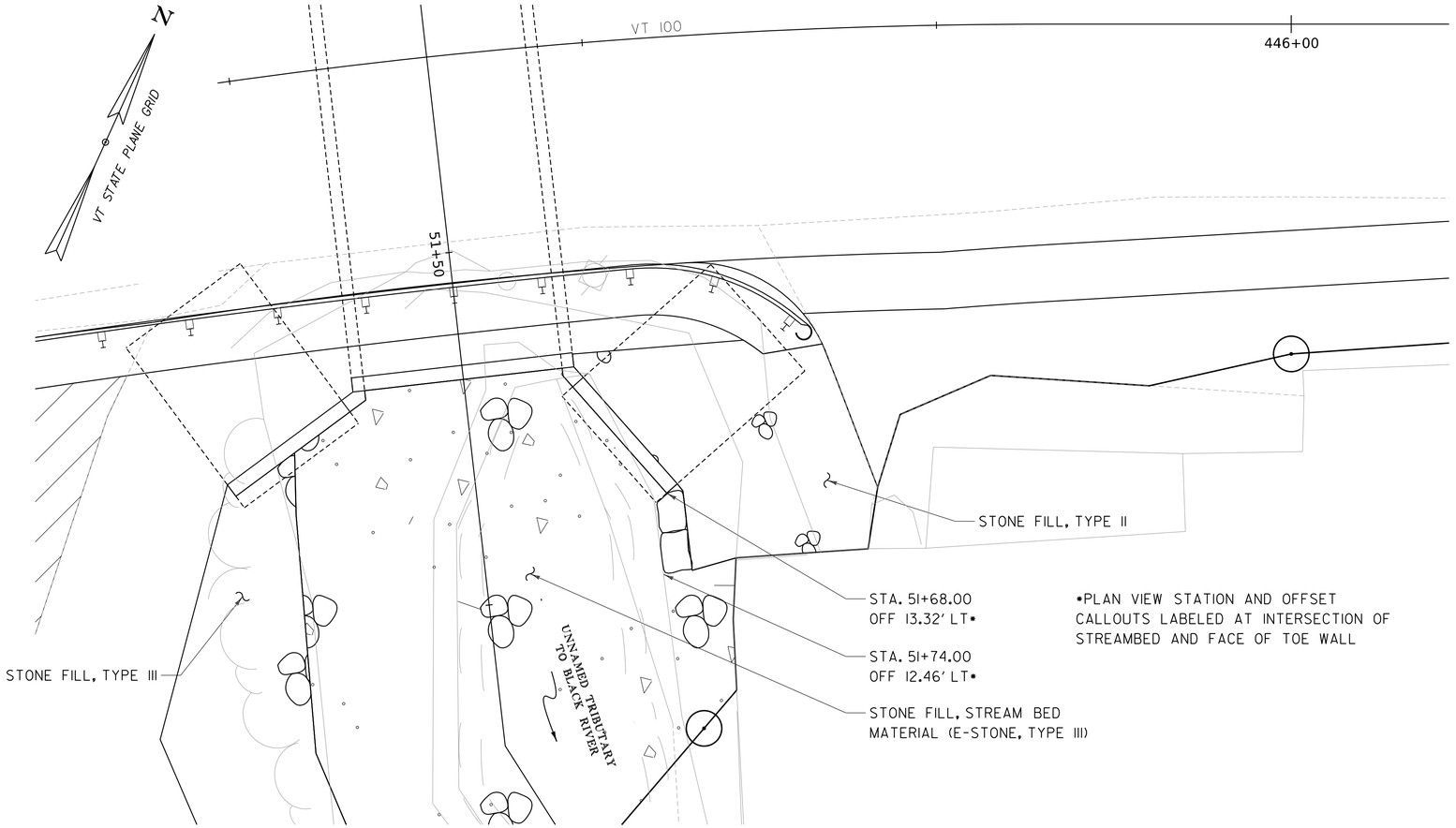
CULVERT OUTLET ELEVATION

SCALE 3/8" = 1'-0"

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215struct.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: N.A. TRUSLOW
PRECAST CONCRETE STRUCTURE PLAN

PLOT DATE: 7/26/2023
DRAWN BY: M.F. NEMETH
CHECKED BY: J.D. KEENER
SHEET 30 OF 45



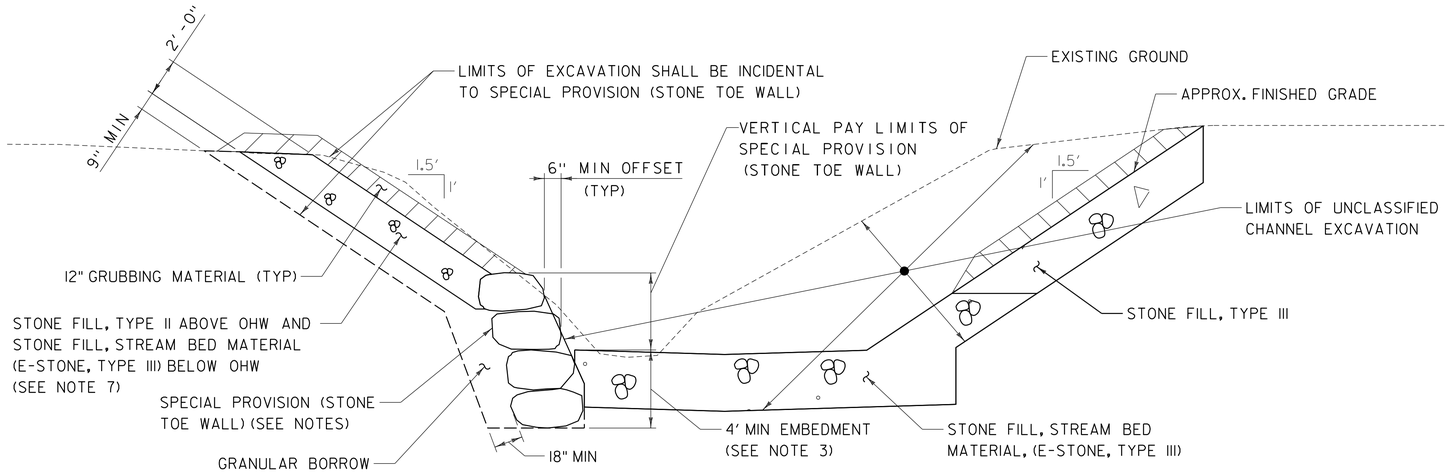
•PLAN VIEW STATION AND OFFSET CALLOUTS LABELED AT INTERSECTION OF STREAMBED AND FACE OF TOE WALL

STONE TOE WALL PLAN

SCALE: 1" = 5'-0"

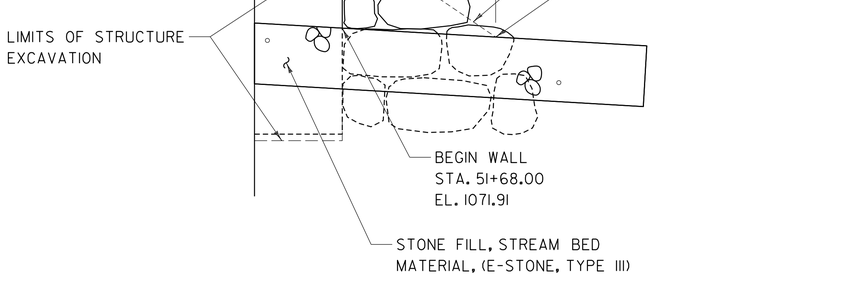
NOTES:

1. THE PRINCIPAL DIMENSION OF THE STONES USED TO CONSTRUCT THE STONE TOE WALL SHALL BE GREATER THAN 5' WITH THE LEAST DIMENSION AT LEAST 1/3 THE LONGEST DIMENSION. STONE SHALL BE RECTANGULAR, ANGULAR, ROUGH, UNHEWN, QUARRY STONE AS APPROVED BY THE ENGINEER. THE STONES SHALL BE HARD, SOUND, AND RESISTANT TO THE ACTION OF WATER AND WEATHERING.
2. WALL SHALL BE CONSTRUCTED WITH STAGGERED JOINTS BETWEEN ROCKS ON ADJACENT TIERS. JOINTS BETWEEN STONES SHALL BE 1"-3".
3. FOOTER ROCK SHALL BE EMBEDDED BELOW THE CHANNEL A MINIMUM OF 4'-0" OR ON BEDROCK.
4. CONTRACTOR SHALL CAREFULLY SELECT AND PLACE INDIVIDUAL STONES TO MAXIMIZE CONTACT WITH ADJACENT STONES AND ENSURE AESTHETIC APPEAL.
5. TO THE EXTENT PRACTICAL, TOEWALL STONES TOP SURFACE SHALL SLOPE AWAY FROM CHANNEL TO BETTER RESIST SLIDING, AS DIRECTED BY THE ENGINEER.
6. THE STONE FILL, TYPE II SLOPE ADJACENT TO TOE WALL SHALL BE NO STEEPER THAN 1.5H:1V UNLESS OTHERWISE DIRECTED BY THE ENGINEER.



STONE TOE WALL TYPICAL SECTION

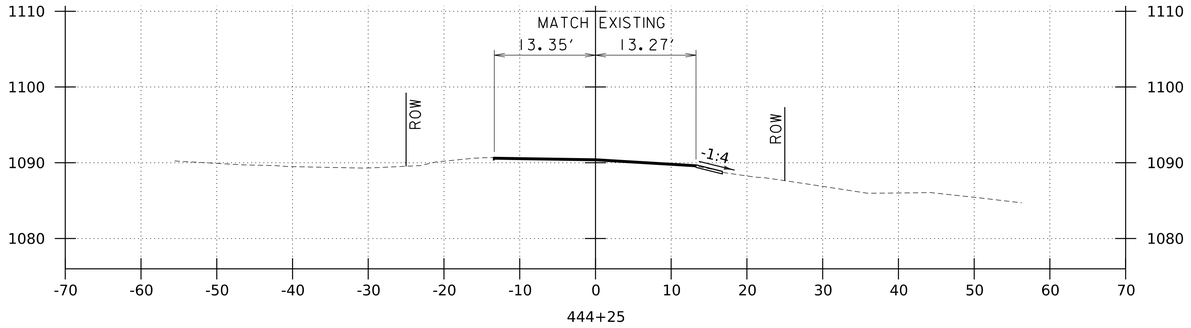
SCALE: 1/4" = 1'-0"

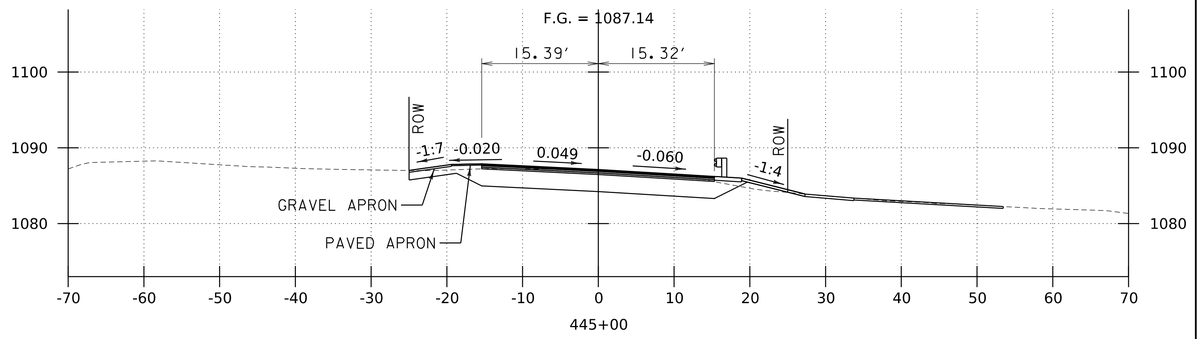


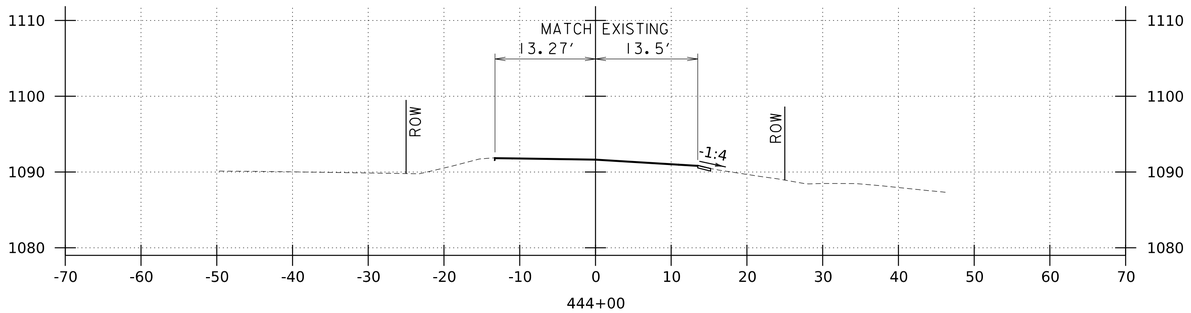
STONE TOE WALL ELEVATION

NOT TO SCALE

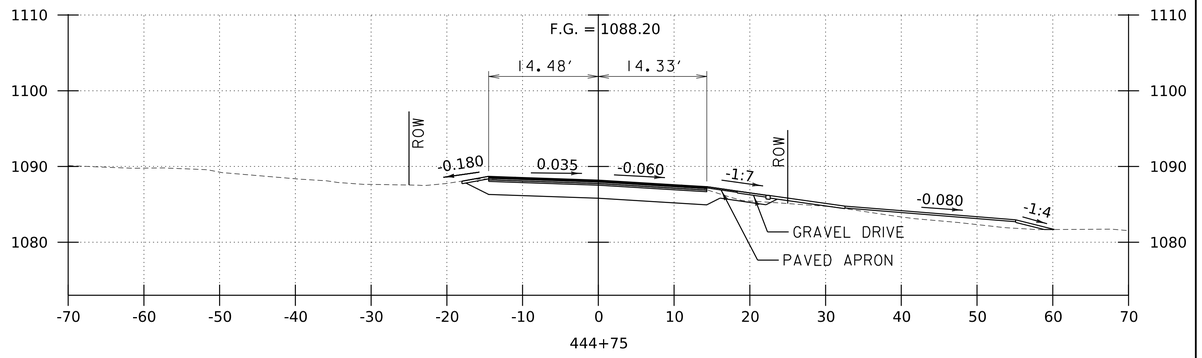
PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)
FILE NAME: z19b215retaining_wall.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: M.F. NEMETH
DESIGNED BY: M.F. NEMETH	CHECKED BY: J.D. KEENER
STONE TOE WALL DETAIL SHEET	SHEET 31 OF 45

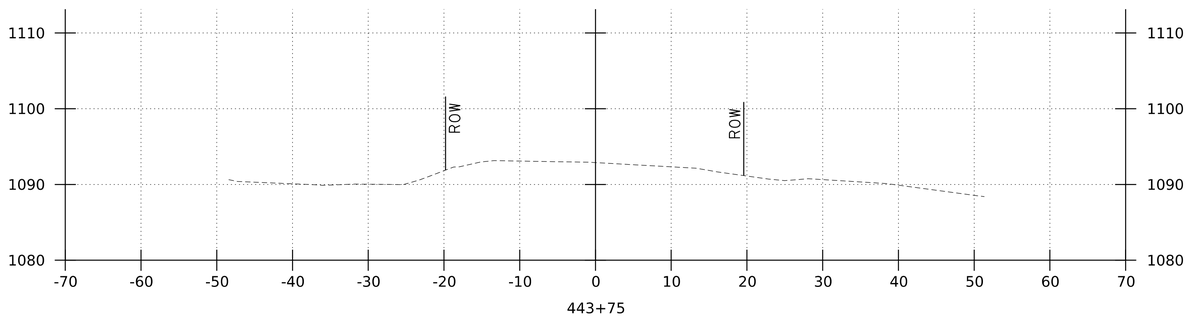


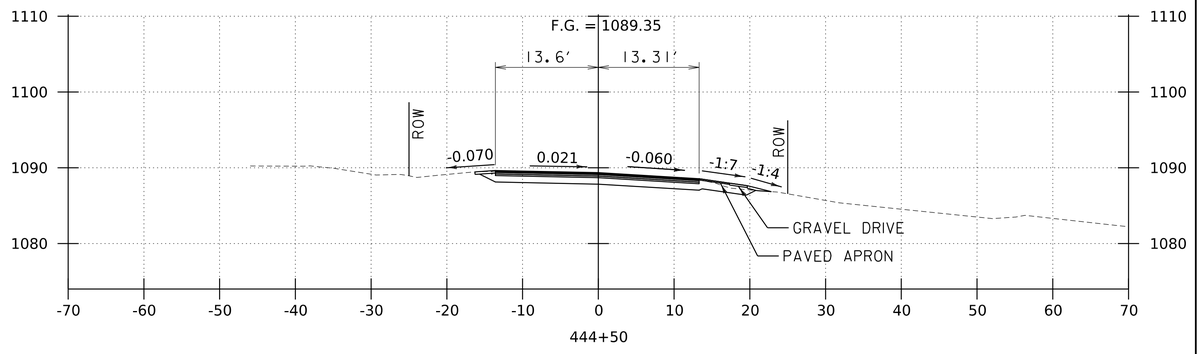




BEGIN APPROACH
STA 443+90







BEGIN PROJECT
STA. 444+40

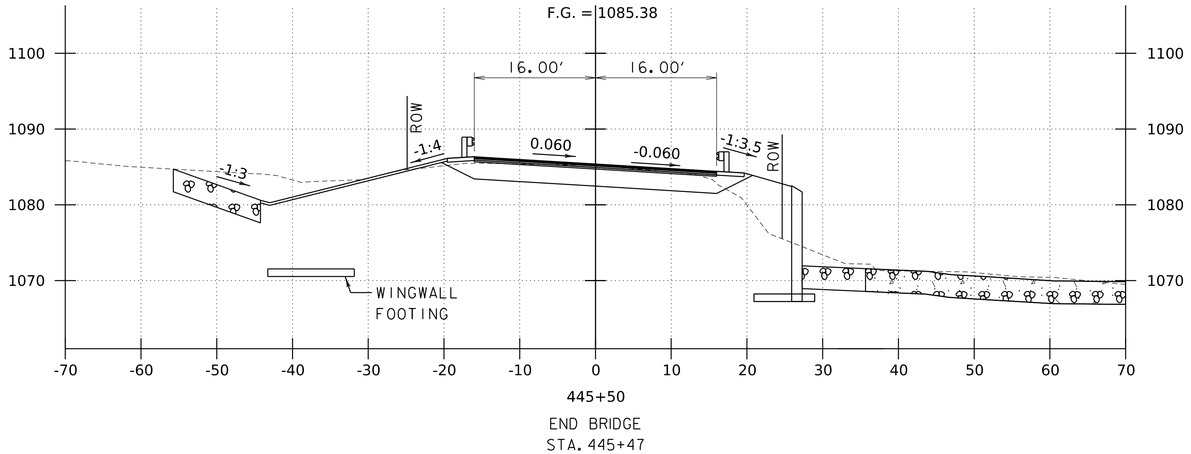
VT 100 CROSS SECTIONS

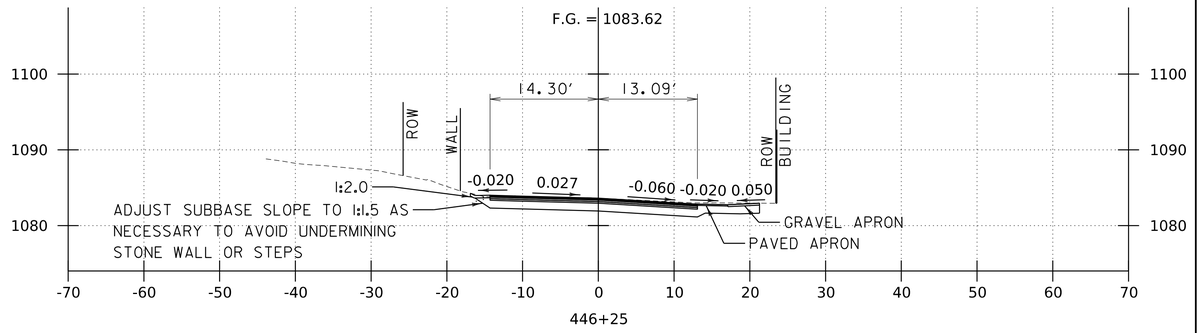
SCALE 1" = 10'-0"

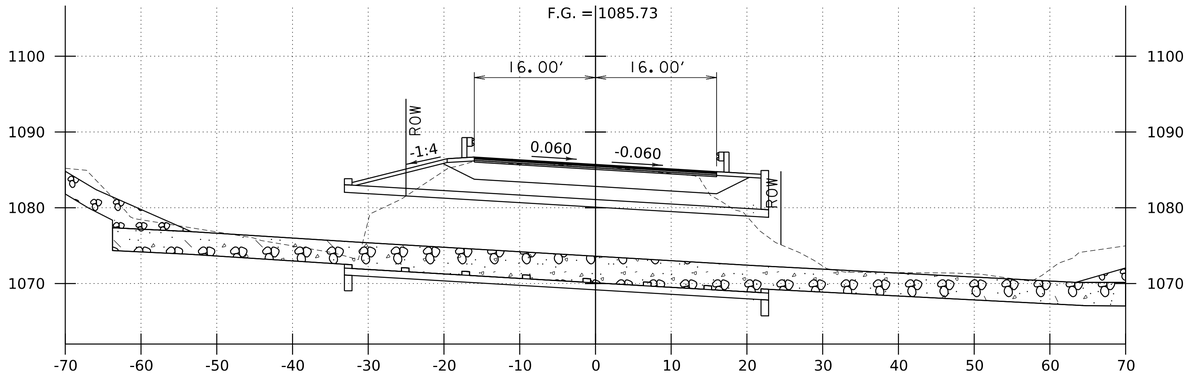
STA. 443+75 - 445+00

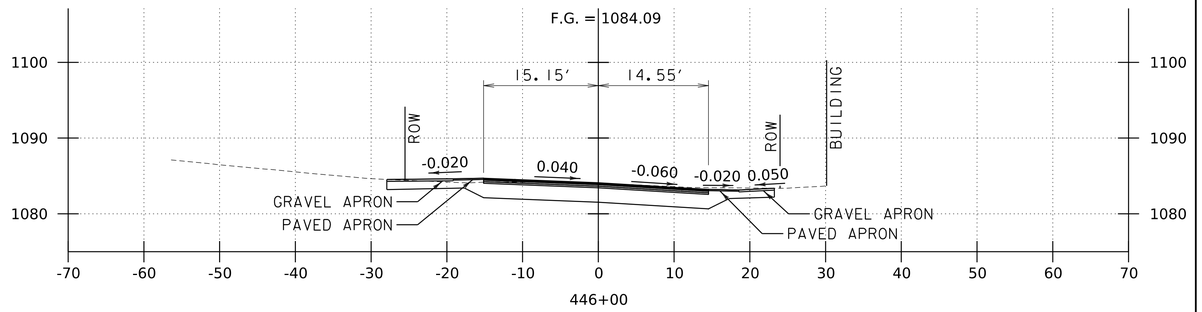
vhb

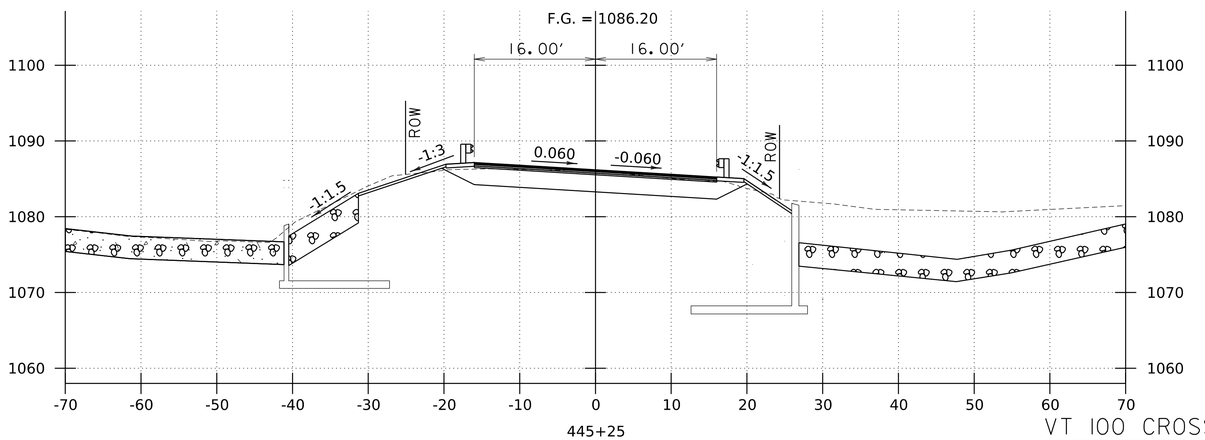
PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)
FILE NAME: z19b215xs.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: J.D. KEENER
VT 100 CROSS SECTIONS (1 OF 3)	SHEET 32 OF 45

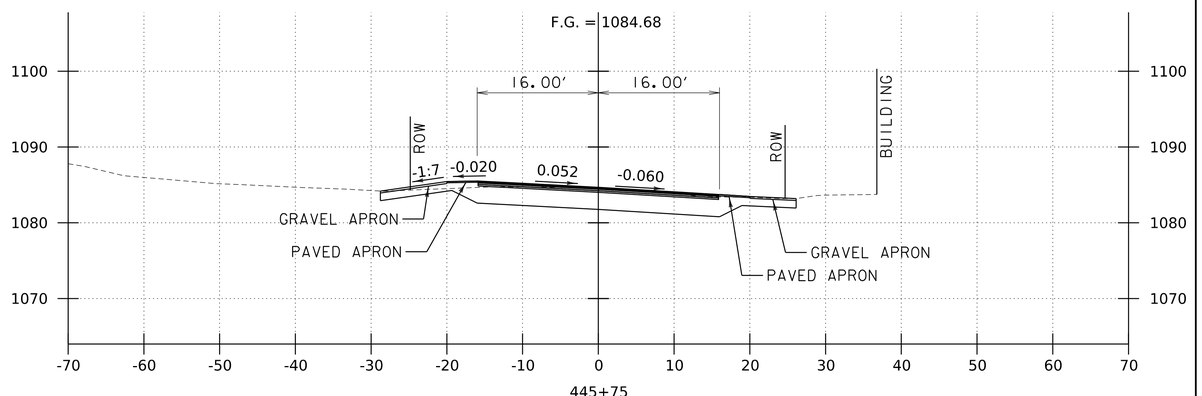










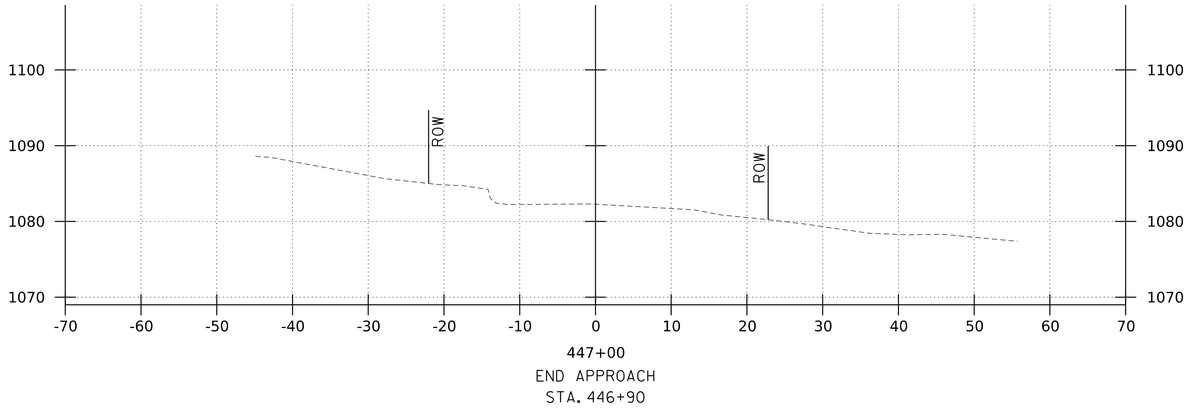


VT 100 CROSS SECTIONS

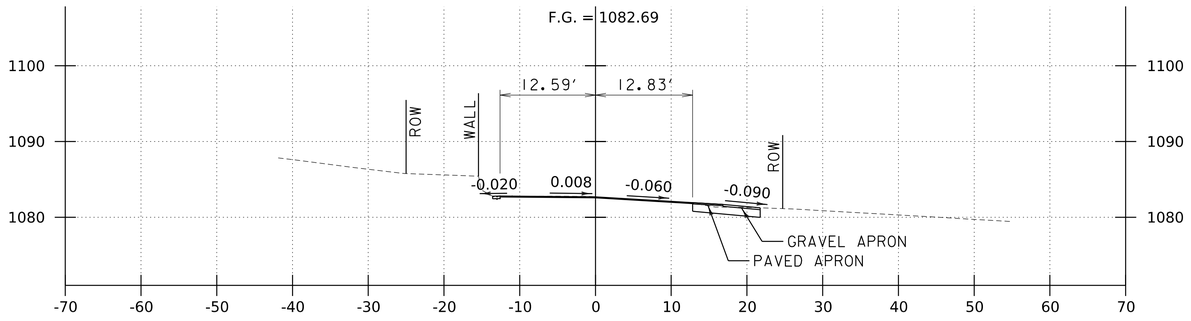
SCALE 1" = 10'-0"

STA. 444+25 - 446+25

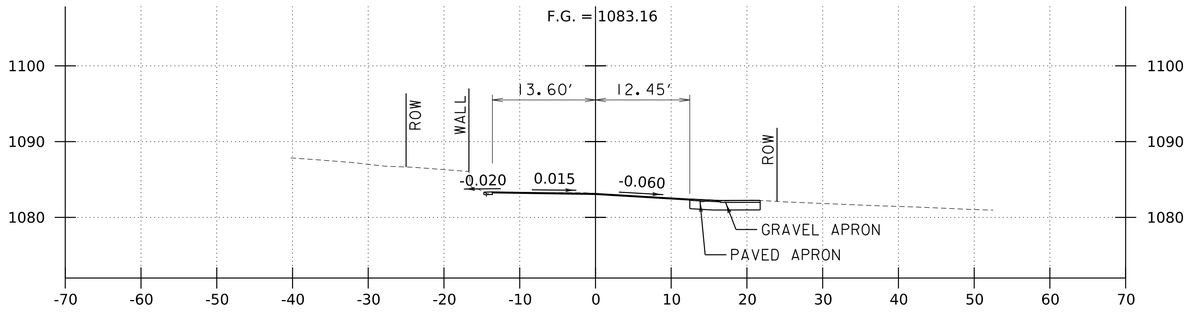
PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)
FILE NAME: z19b215xs.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: J.D. KEENER
VT 100 CROSS SECTIONS (2 OF 3)	SHEET 33 OF 45



447+00
END APPROACH
STA. 446+90



446+75

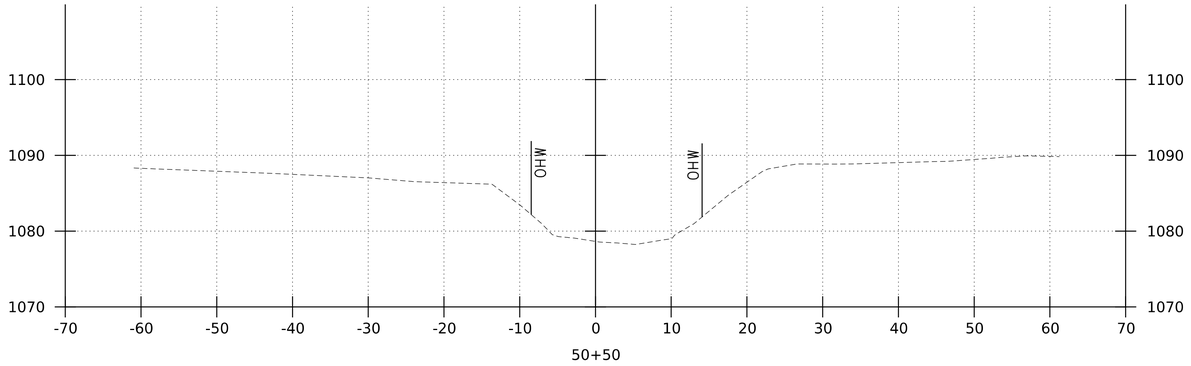


446+50
END PROJECT
STA. 446+40

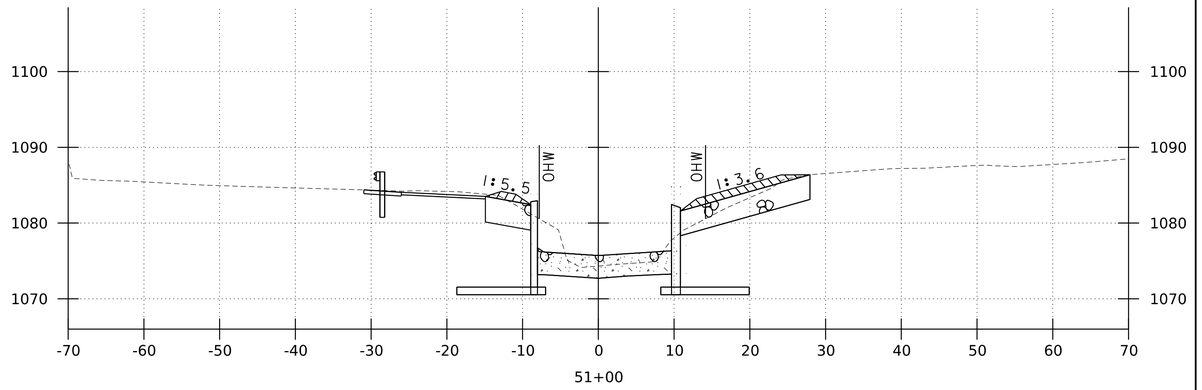
VT 100 CROSS SECTIONS

SCALE 1" = 10'-0"
STA. 446+50 - 447+00

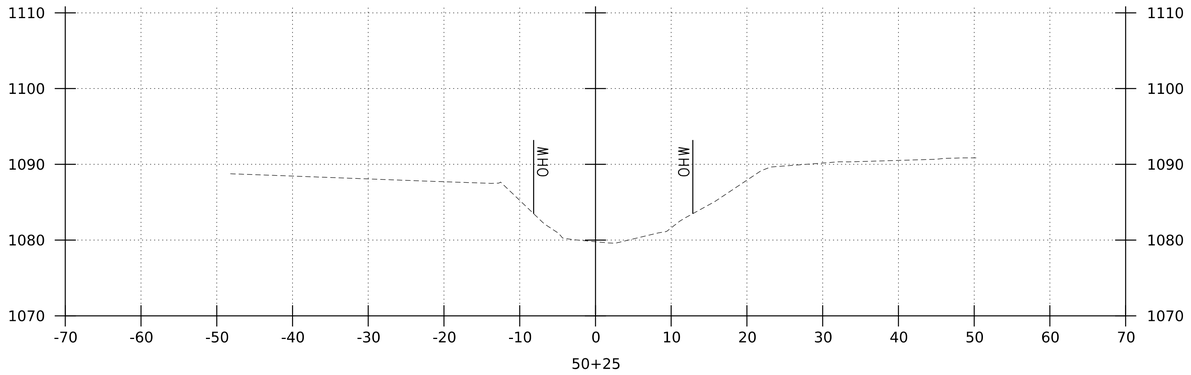
PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)
FILE NAME: z19b215xs.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: J.D. KEENER
VT 100 CROSS SECTIONS (3 OF 3)	SHEET 34 OF 45



50+50



51+00



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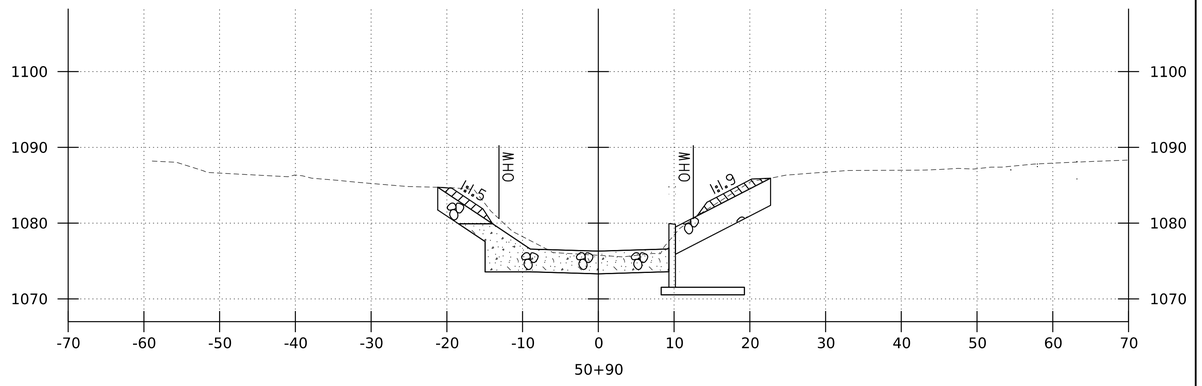

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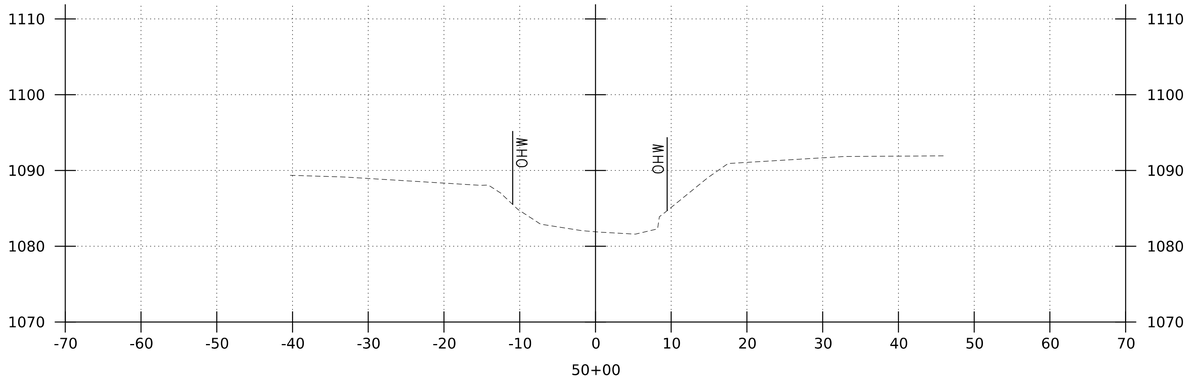
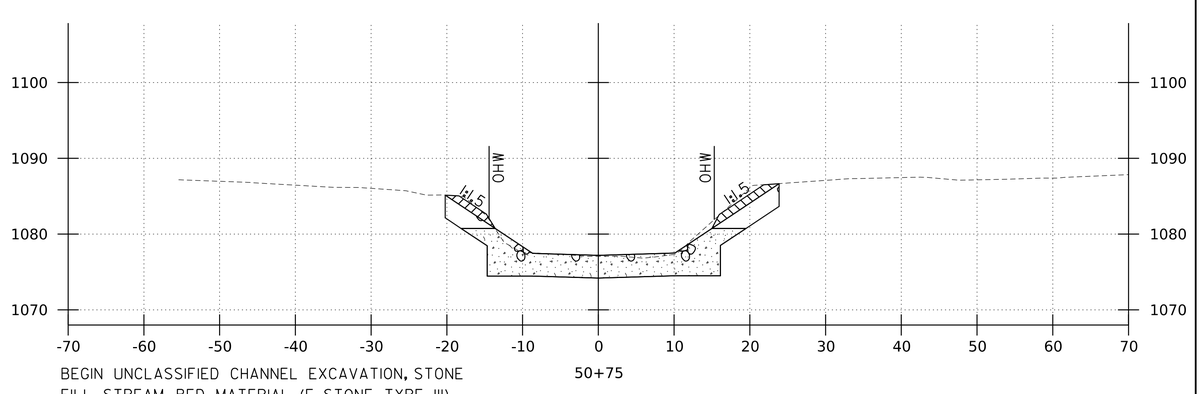


50+00



50+75

BEGIN UNCLASSIFIED CHANNEL EXCAVATION, STONE FILL, STREAM BED MATERIAL (E-STONE, TYPE III), STONE FILL, TYPE III, GRUBBING MATERIAL STA. 50+60, LT & RT

CHANNEL CROSS SECTIONS

SCALE 1" = 10'-0"

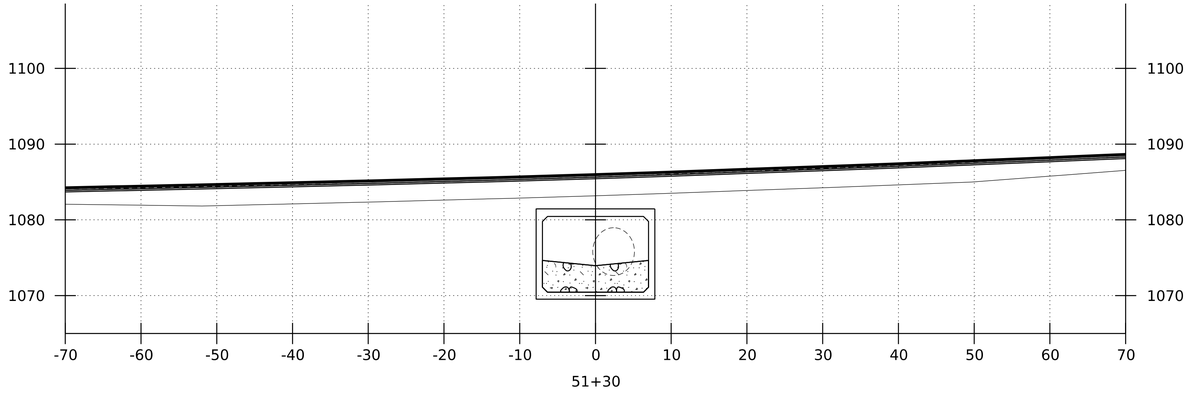
STA. 50+00 - 51+00

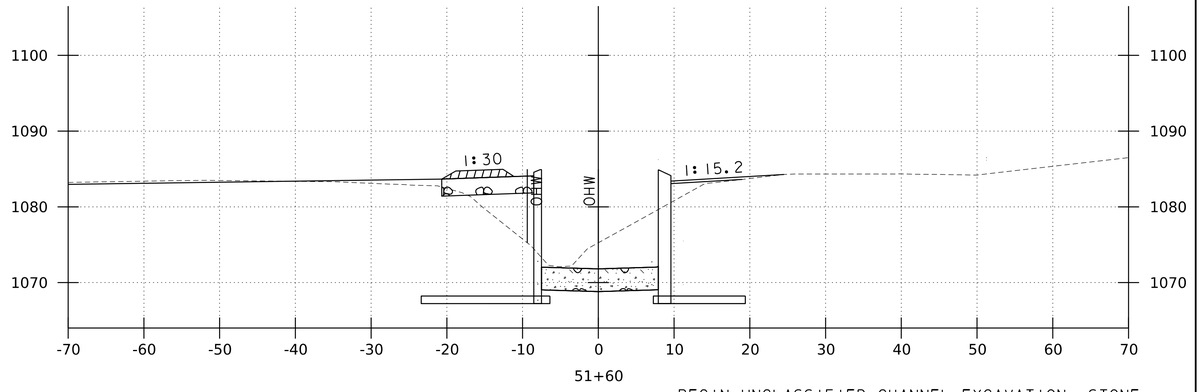
PROJECT NAME: LUDLOW

PROJECT NUMBER: ER E23-1(305)

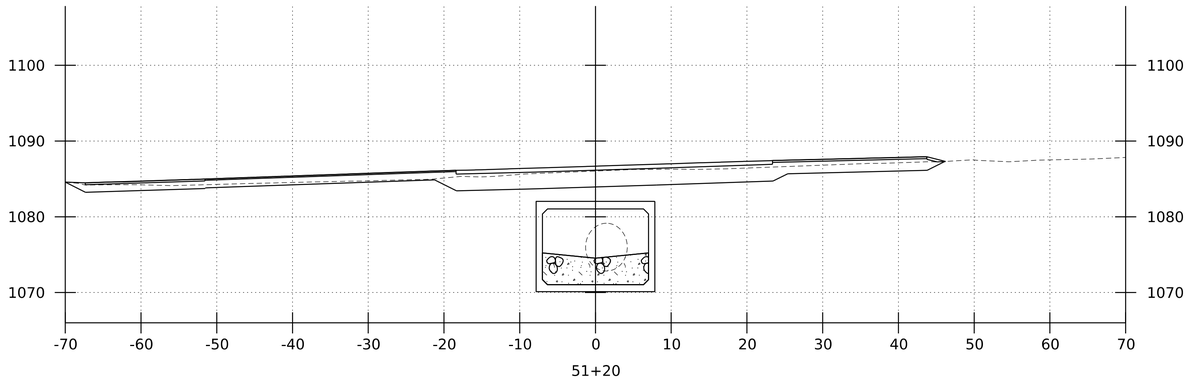
FILE NAME: z19b215xs_channel.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: N.A. TRUSLOW
CHANNEL CROSS SECTIONS (1 OF 3)

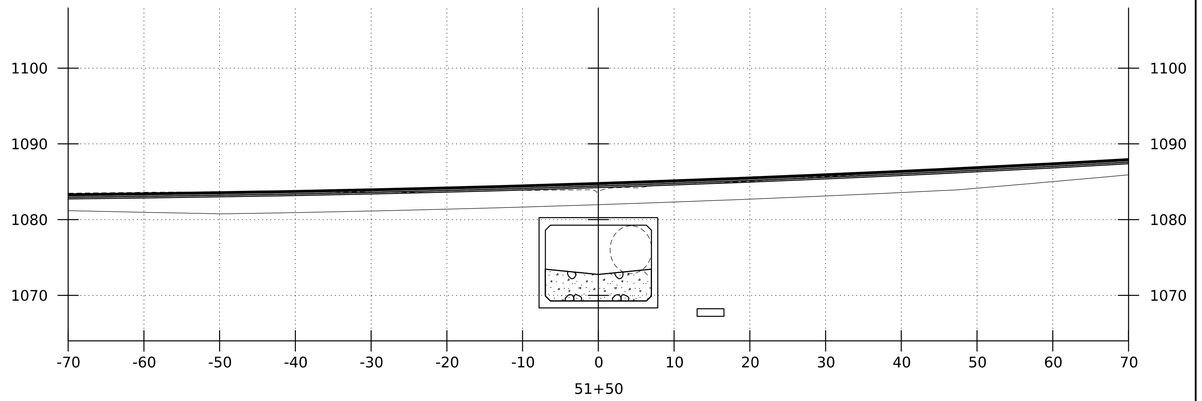
PLOT DATE: 7/26/2023
DRAWN BY: N.A. TRUSLOW
CHECKED BY: J.D. KEENER
SHEET 35 OF 45

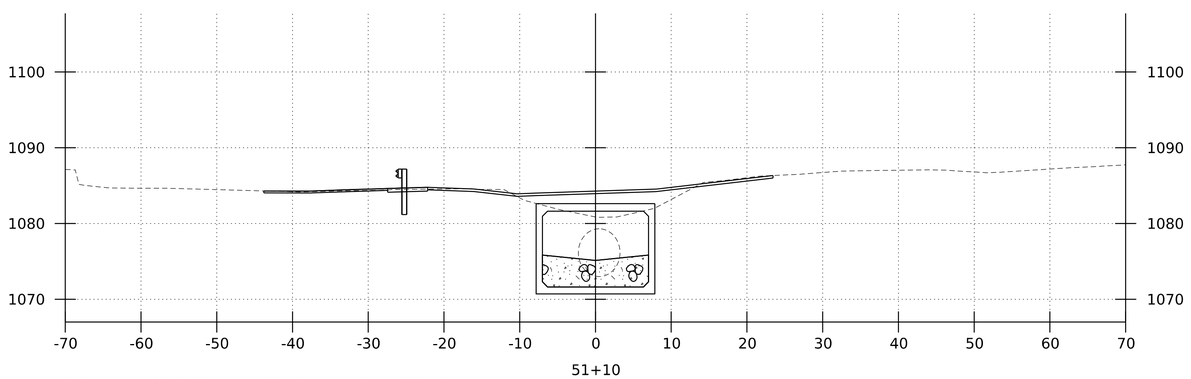




BEGIN UNCLASSIFIED CHANNEL EXCAVATION, STONE FILL, TYPE III, GRUBBING MATERIAL
STA. 51+59, LT & RT







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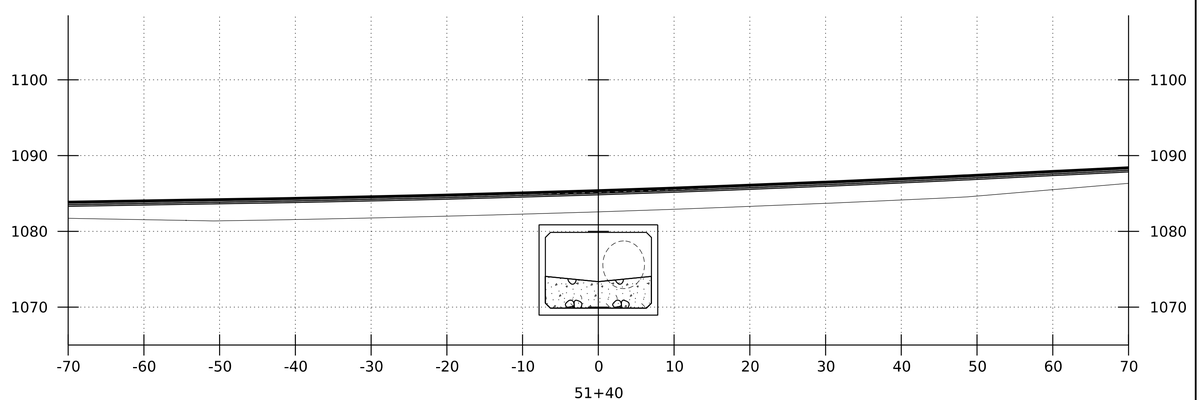
STA. 51+03, LT & RT

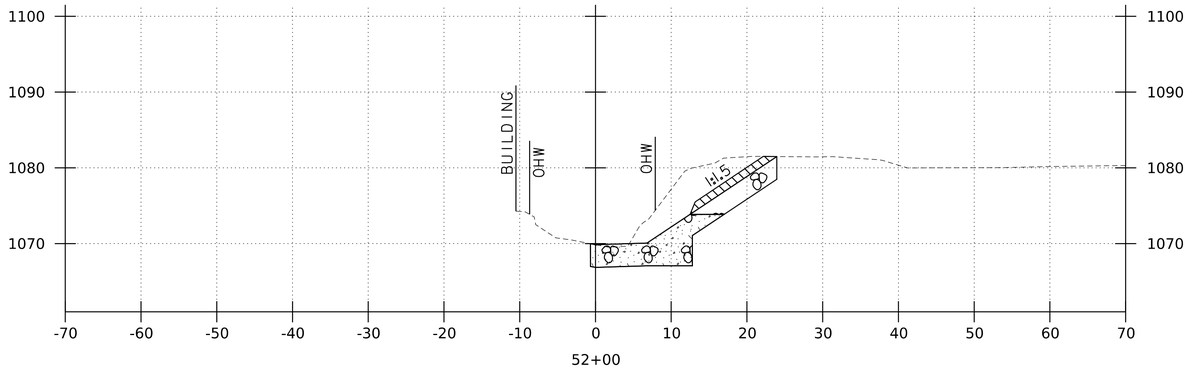


CHANNEL CROSS SECTIONS

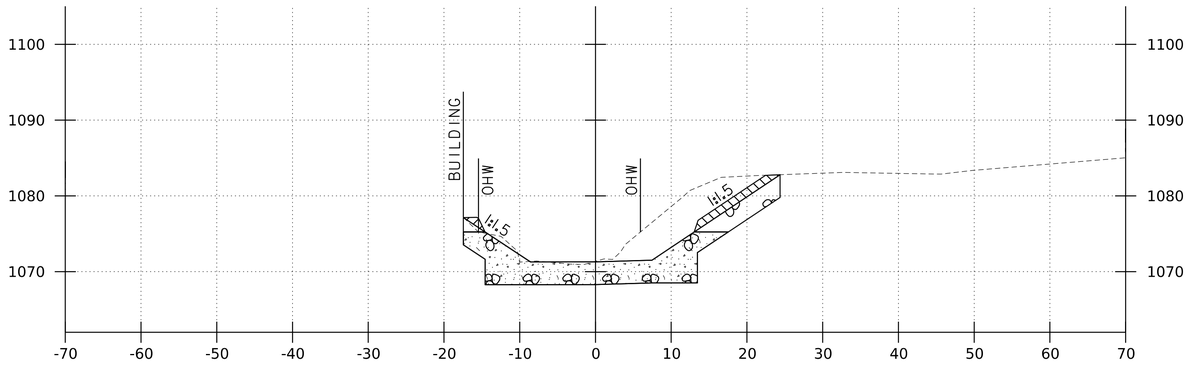
SCALE 1" = 10'-0"
STA. 51+10 - 51+60

vhb

PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)
FILE NAME: z19b215xs_channel.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: J.D. KEENER
CHANNEL CROSS SECTIONS (2 OF 3)	SHEET 36 OF 45

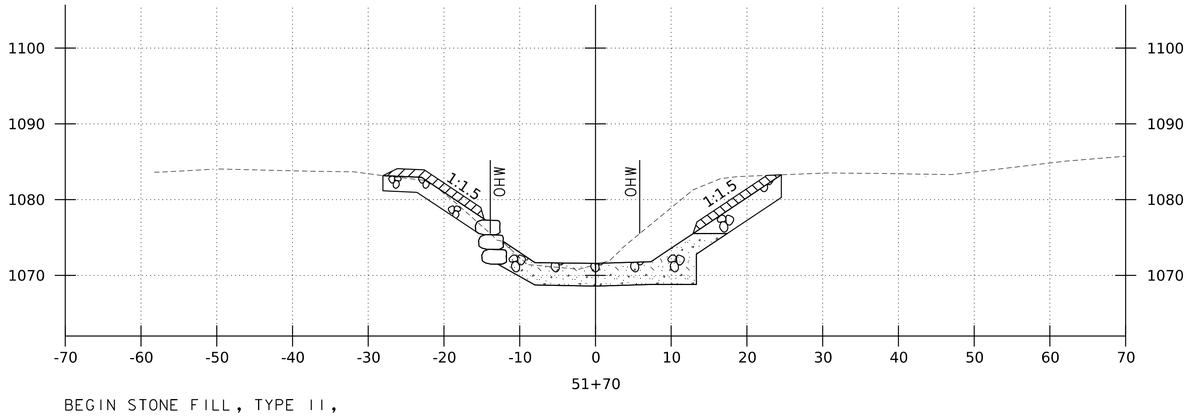


52+00



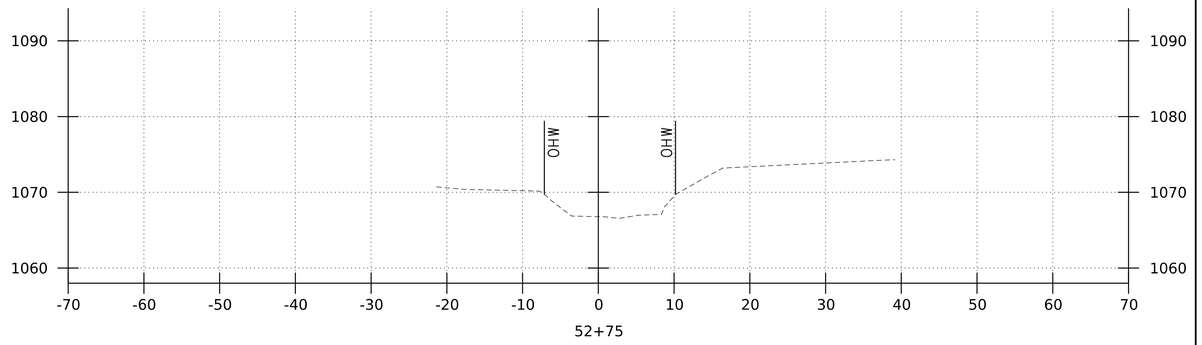
51+75

END SPECIAL PROVISION (STONE TOE WALL), STONE FILL, TYPE II, GRUBBING MATERIAL
STA. 51+74.00, LT

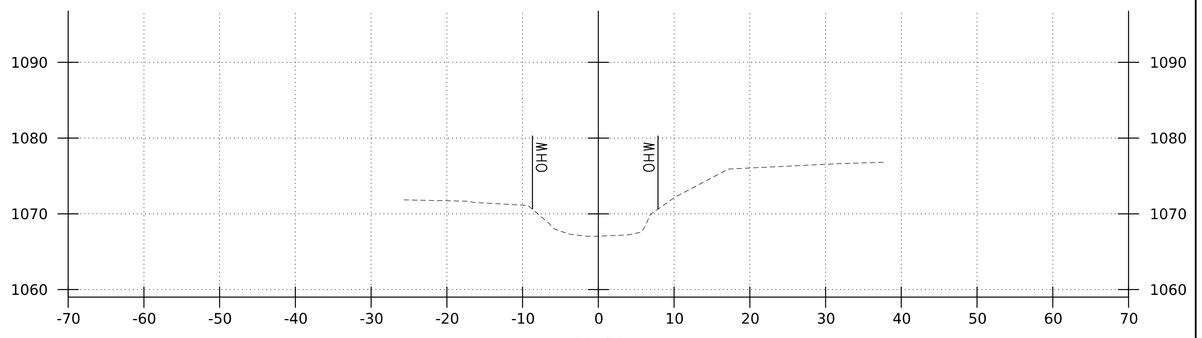


51+70

BEGIN STONE FILL, TYPE II,
SPECIAL PROVISION (STONE TOE WALL)
STA. 51+68, LT

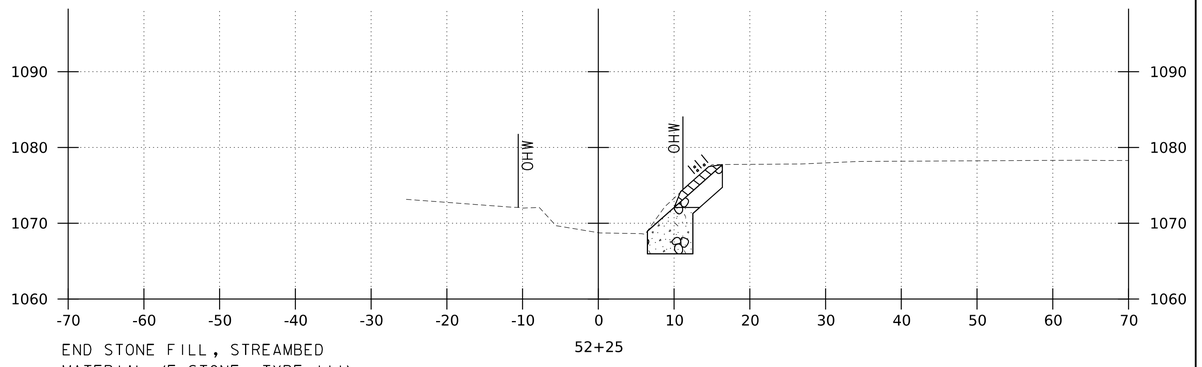


52+75



52+50

END UNCLASSIFIED CHANNEL EXCAVATION, STONE FILL, TYPE III, GRUBBING MATERIAL, STONE FILL, STREAMBED MATERIAL (E-STONE, TYPE III)
STA. 52+36 RT



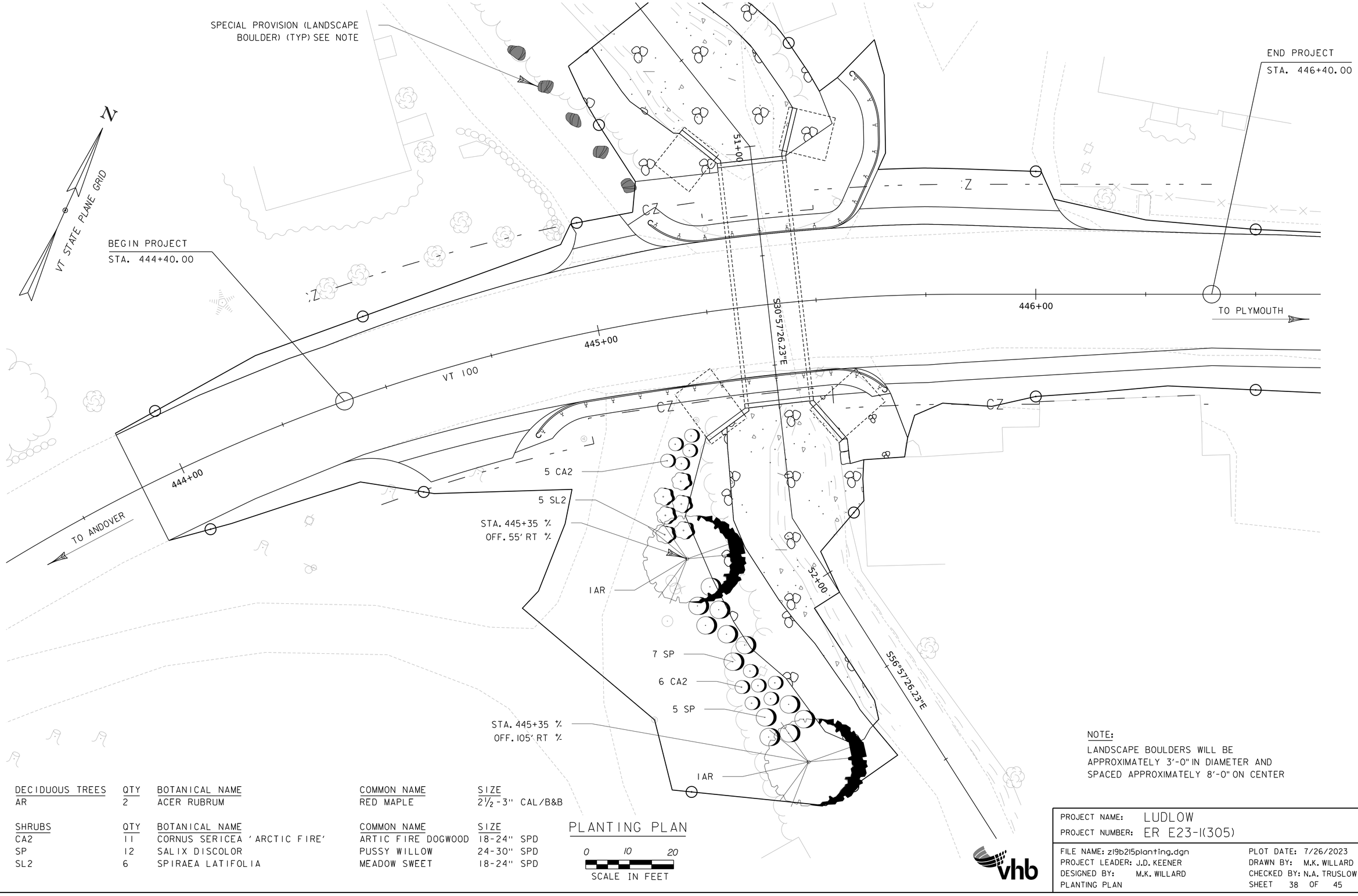
52+25

END STONE FILL, STREAMBED MATERIAL (E-STONE, TYPE III), UNCLASSIFIED CHANNEL EXCAVATION
STA 52+05, LT

CHANNEL CROSS SECTIONS

SCALE 1" = 10'-0"
STA. 51+70 - 52+75

PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)
FILE NAME: z19b215xs_channel.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: J.D. KEENER
CHANNEL CROSS SECTIONS (3 OF 3)	SHEET 37 OF 45



DECIDUOUS TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE
AR	2	ACER RUBRUM	RED MAPLE	2½-3" CAL/B&B

SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	SIZE
CA2	11	CORNUS SERICEA 'ARCTIC FIRE'	ARTIC FIRE DOGWOOD	18-24" SPD
SP	12	SALIX DISCOLOR	PUSSY WILLOW	24-30" SPD
SL2	6	SPIRAEA LATIFOLIA	MEADOW SWEET	18-24" SPD

PLANTING PLAN

0 10 20
SCALE IN FEET

NOTE:
LANDSCAPE BOULDERS WILL BE APPROXIMATELY 3'-0" IN DIAMETER AND SPACED APPROXIMATELY 8'-0" ON CENTER

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215planting.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: M.K. WILLARD
PLANTING PLAN

PLOT DATE: 7/26/2023
DRAWN BY: M.K. WILLARD
CHECKED BY: N.A. TRUSLOW
SHEET 38 OF 45

EPSC PLAN NARRATIVE

1. PROJECT DESCRIPTION

THIS PROJECT INVOLVES THE REMOVAL AND REPLACEMENT OF BRIDGE 102 AND ASSOCIATED CHANNEL WORK. BRIDGE 102 WILL BE REPLACED WITH A PRECAST CONCRETE 4-SIDED BOX CULVERT, SPANNING 14 FEET OVER AN UNNAMED TRIBUTARY OF THE BLACK RIVER. BRIDGE 102 IS LOCATED IN THE TOWN OF LUDLOW, ON VERMONT ROUTE 100, APPROXIMATELY 0.20 MILES SOUTH OF THE INTERSECTION OF VERMONT ROUTE 100 AND KINGDOM ROAD IN THE TOWN OF PLYMOUTH.

IT IS ANTICIPATED THAT THIS PROJECT WILL LAST ONE CONSTRUCTION SEASON.

2. AMOUNT OF DISTURBANCE & RISK EVALUATION

TOTAL AREA OF DISTURBANCE AS SHOWN ON THE ATTACHED EPSC PLAN IS APPROXIMATELY 0.50 ACRES.

THE MAXIMUM CONCURRENT EARTH DISTURBANCE USED TO SCORE THIS PROJECT IN APPENDIX A RISK ASSESSMENT IS 0.5 ACRES.

THIS PROJECT REQUIRES COVERAGE UNDER GENERAL PERMIT 3-9020 FOR STORMWATER RUNOFF FROM CONSTRUCTION SITES FOR LOW RISK PROJECTS.

ANY MODIFICATIONS TO THE PROJECT THAT INCREASE THE RISK TO ENVIRONMENTAL RESOURCES SHALL BE EVALUATED IN ACCORDANCE WITH THE PERMIT REQUIREMENTS. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY ADDITIONAL PERMITTING.

3. MAJOR COMPONENTS & SEQUENCING

THE CONTRACTOR SHALL SEQUENCE CONSTRUCTION ACTIVITIES TO MINIMIZE THE EXTENT OF DISTURBED SOILS LEFT OPEN TO EROSION AT ANY GIVEN TIME.

4. SITE DESCRIPTION

4.1 VEGETATED BUFFERS

MAINTAINING VEGETATED BUFFERS ALONG STREAM BANKS, WETLANDS OR OTHER SENSITIVE AREAS IS A CRUCIAL EROSION AND SEDIMENT CONTROL MEASURE THAT SHOULD BE IMPLEMENTED WHEREVER POSSIBLE.

THIS PROJECT DOES NOT RELY ON VEGETATED BUFFERS AS A MITIGATING RISK FACTOR.

4.2 STREAM CROSSINGS

THIS PROJECT DOES NOT INCLUDE ANY PROPOSED STREAM CROSSINGS.

4.3 WETLANDS

THERE ARE NO WETLANDS OR WETLAND BUFFERS BEING IMPACTED WITHIN THE PROJECT LIMITS.

4.4 TOPOGRAPHY

THE TOPOGRAPHY OF THE PROJECT AREA IS GENERALLY CHARACTERIZED BY ROLLING HILLS AND MOSTLY WELL-ESTABLISHED FOREST WITH OCCASIONAL OPEN AREAS. THERE ARE DRIVES IMMEDIATELY ADJACENT TO THE PROJECT ON ALL SIDES AND WITHIN THE PROJECT LIMITS: THE NORTHEAST, NORTHWEST, AND SOUTHWEST CORNERS HAVE RESIDENTIAL DRIVES; THE SOUTHEAST CORNER OF THE PROJECT HAS A COMMERCIAL PROPERTY AND DRIVE.

4.5 VEGETATION

THE VEGETATION IN THE PROJECT AREA CONSISTS OF HARDWOOD TREES AND MIXED RIVER COBBLE COMMUNITIES. THE IMPACT TO VEGETATION WILL BE LIMITED TO THAT WHICH IS DIRECTLY AFFECTED BY THE PROJECT. UPON COMPLETION, THE DISTURBED VEGETATION WILL BE REESTABLISHED WITH STANDARD SEED AND MULCH PRACTICES AS DESCRIBED IN THE TURF ESTABLISHMENT DETAIL AND ADDITIONAL PLANTINGS, AS SHOWN IN THE PLANTING PLAN. THE CHANNEL WILL BE REBUILT USING STREAMBED STONE TYPE E3 AND SIDE SLOPES WILL BE ARMORED WITH STONE FILL TYPE III AS SPECIFIED ON THE PLANS.

4.6 SOILS

ALL SOIL DATA CAME FROM THE U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE. SOILS ON THE PROJECT SITE INCLUDE: EXCESSIVELY DRAINED COLTON GRAVELLY SANDY LOAM. "K FACTOR" = 0.10 ASSUMED BASED ON SURROUNDING SOILS, SOIL HYDROLOGY, AND GRAIN SIZE.

NOTE: K-VALUES GENERALLY INDICATE THE FOLLOWING:
0.0-0.23 = LOW EROSION POTENTIAL
0.24-0.36 = MODERATE EROSION POTENTIAL
0.37 AND HIGHER = HIGH EROSION POTENTIAL

4.7 OTHER SENSITIVE RESOURCES

CRITICAL HABITATS: NO
HISTORICAL OR ARCHEOLOGICAL AREAS: YES
PRIME AGRICULTURAL LAND: YES
THREATENED AND ENDANGERED SPECIES: YES, THE FEDERALLY THREATENED NORTHERN LONG EARED BAT. THE STRUCTURE DOES NOT PROVIDE HABITAT.
WATER RESOURCE: UNNAMED TRIBUTARY TO THE BLACK RIVER
WETLANDS: NO

5. DRAINAGE

5.1 RECEIVING WATERS

THE UNNAMED TRIBUTARY TO THE BLACK RIVER IS THE ONLY WATER SOURCE ON THE PROJECT SITE. THE RIVER IS CLASSIFIED AS HAVING A MODERATE GRADIENT, WHICH BASED ON THE STREAM BED ALLOWS FOR COURSE SEDIMENT TRANSPORT. THE TRIBUTARY AREA AT THE CULVERT CROSSING IS 1.42 SQUARE MILES. THERE ARE TWO KNOWN CULVERTS ON SITE DRAINING FROM THE ROADWAY TO THE BROOK.

5.2 DISCHARGE POINTS

DUE TO THE NATURE OF A CULVERT PROJECT BEING LOCATED DIRECTLY AROUND THE RECEIVING WATER, THERE ARE NO DISCRETE DISCHARGE POINTS. ALL WATER FROM THE PROJECT AREA DRAINS TOWARD THE BROOK AND ENTERS THE RECEIVING WATER IN MULTIPLE LOCATIONS IN THE AREAS DIRECTLY ADJACENT TO THE CULVERT.

5.3 CONVEYANCE/FLOW PATH FROM PROJECT TO WATERS

THE PROJECT IS NOT CURBED AND RUNOFF DRAINS OVERLAND ACROSS ADJACENT VEGETATED SIDE SLOPES BEFORE REACHING THE RECEIVING WATER.

6. EROSION PREVENTION AND SEDIMENT CONTROL MEASURE

THE MEASURES INCLUDED IN THIS PLAN ARE PROVIDED AS A GUIDELINE FOR PREVENTING EROSION AND CONTROLLING SEDIMENT TRANSPORT. IT IS EXPECTED THAT THE CONTRACTOR MAY USE THIS PLAN, WITH ADJUSTMENTS AS NECESSARY, BASED ON THEIR SPECIFIC MEANS AND METHODS OF CONSTRUCTION. APPLYING THESE MEASURES THROUGHOUT CONSTRUCTION IS CRITICIAL TO THEIR SUCCESS IN MINIMIZING SEDIMENT TRANSPORT TO THE RECEIVING WATERS. REFER TO THE DETAILS INCLUDED IN THESE PLANS AND THE DEPARTMENT OF ENVIRONMENTAL CONSERVATION'S VERMONT STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION AND SEDIMENT CONTROL FOR SPECIFIC GUIDANCE.

6.1 IDENTIFY LIMITS OF DISTURBANCE

SITE BOUNDARIES AND AREAS CONSTRUCTION EQUIPMENT CAN ACCESS SHALL BE DELINEATED.

PROJECT DEMARCATION FENCING (PDF) SHALL BE USED TO PHYSICALLY MARK SITE BOUNDARIES. BARRIER FENCE SHALL BE USED INSTEAD OF PROJECT DEMARCATION FENCE WITHIN 100 FEET OF A WATER RESOURCE (STREAM, BROOK, LAKE, POND, WETLAND, ETC).

6.2 LIMIT CONCURRENT DISTURBANCE

LIMITING THE AMOUNT OF SOIL EXPOSED AT ONE TIME REDUCES THE POTENTIAL EROSION ON SITE. CONCURRENT EARTH DISTURBANCE CAN BE MINIMIZED THROUGH CONSTRUCTION PHASING BY ONLY OPENING UP EARTH AS NECESSARY AND EMPLOYING STABILIZATION PRACTICES IN INCREMENTAL STAGES AS PHASES CHANGE.

6.3 STABILIZE DISTURBED AREAS

6.3.1 ACCESS POINTS/ENTRANCE/EXITS

TRACKING OF SEDIMENT ONTO PUBLIC HIGHWAYS SHALL BE MINIMIZED TO REDUCE THE POTENTIAL FOR RUNOFF ENTERING RECEIVING WATERS. INSTALLATION SHALL COINCIDE WITH THE CONTRACTORS PROGRESS SCHEDULE.

STABILIZED CONSTRUCTION ENTRANCES ARE ANTICIPATED ON THIS PROJECT AND SHALL BE LOCATED AS SHOWN ON THIS EPSC PLAN AND ANYWHERE EQUIPMENT WILL BE GOING FROM AREAS OF EXPOSED SOILS TO PAVED SURFACES.

6.3.2 TEMPORARY MEASURES FOR EXPOSED AREAS DURING CONSTRUCTION

ALL AREAS OF EARTH DISTURBANCE MUST HAVE STABILIZATION IN PLACE WITHIN 14 DAYS OF INITIAL DISTURBANCE. AFTER THIS TIME, DISTURBED AREAS MUST BE STABILIZED IN ADVANCE OF ANY RUNOFF PRODUCING EVENT.

SURFACE ROUGHENING OF ALL EXPOSED SLOPES, COMBINED WITH TEMPORARY MULCHING, SHALL BE UTILIZED ON A REGULAR BASIS. BIODEGRADABLE EROSION CONTROL MATTING OR AN EQUIVALENT SHALL BE USED TO STABILIZE ALL SLOPES STEEPER THAN 1:3.

THE FORECAST OF RAINFALL EVENTS SHALL TRIGGER IMMEDIATE PROTECTION OF EXPOSED SOILS.

6.3.3 PERMANENT STABILIZATION AT FINAL GRADE

EXPOSED SOIL MUST BE STABILIZED WITHIN 48 HOURS OF REACHING FINAL GRADE.

SEED, MULCH, FERTILIZER AND LIME SHALL BE USED TO ESTABLISH PERMANENT VEGETATION. FOR SLOPES STEEPER THAN 1:3, ROLLED EROSION CONTROL PRODUCT, TYPE I SHALL BE USED INSTEAD OF MULCH.

6.4 DIVERT UPLAND RUNOFF

DIVERSIONARY MEASURES SHALL BE USED TO INTERCEPT RUNOFF FROM ABOVE THE CONSTRUCTION AND DIRECT IT AROUND THE DISTURBED AREA SO THAT CLEAN WATER DOES NOT BECOME MUDDIED WHILE TRAVELING OVER EXPOSED SOILS ON THE CONSTRUCTION SITE.

THE PROJECT AREA IS RELATIVELY FLAT. THEREFORE, IT IS NOT ANTICIPATED THAT DIVERSION MEASURES WILL BE NECESSARY.

6.5 INSTALL SEDIMENT BARRIERS

SEDIMENT BARRIERS SHALL BE UTILIZED TO INTERCEPT RUNOFF AND ALLOW SUSPENDED SEDIMENT TO SETTLE OUT. THEY SHALL BE INSTALLED ON THE DOWNHILL SIDE OF CONSTRUCTION ACTIVITIES, PRIOR TO ANY UP-SLOPE WORK.

SILT FENCE, TYPE II WILL BE INSTALLED AS PROPOSED ON THE EPSC PLAN.

6.6 SLOW DOWN CHANNELIZED RUNOFF

CHECK STRUCTURES SHALL BE UTILIZED TO REDUCE THE VELOCITY, AND THUS THE EROSIVE POTENTIAL, OF CONCENTRATED FLOW IN CHANNELS.

STONE CHECK DAMS ARE NOT ANTICIPATED FOR THIS PROJECT.

7. CONSTRUCT PERMANENT CONTROLS

PERMANENT STORMWATER TREATMENT DEVICES SHALL BE INSTALLED AS SHOWN ON THE PLANS AND IN ACCORDANCE WITH PERMIT CONDITIONS.

PERMANENT EROSION CONTROL STRUCTURES ARE NOT ANTICIPATED FOR THIS PROJECT.

8. DEWATERING

DISCHARGE FROM DEWATERING ACTIVITIES THAT FLOWS OFF OF THE CONSTRUCTION SITE MUST NOT CAUSE OR CONTRIBUTE TO A VIOLATION OF THE VERMONT WATER QUALITY STANDARDS. DEWATERED STORMWATER OR GROUNDWATER MUST BE FILTERED AND ROUTED IN A MANNER THAT DOES NOT RESULT IN VISIBLY TURBID DISCHARGES TO WATERS.

TREATMENT OF DEWATERING ACTIVITIES IS ANTICIPATED. FILTER BAGS FOR THE TREATMENT HAVE BEEN PROPOSED AND ARE SHOWN ON THE PLANS.

9. OFF-SITE AREAS

OFF-SITE WASTE AND BORROW AREAS HAVE NOT BEEN IDENTIFIED FOR THIS PROJECT. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO IDENTIFY AND PERMIT, AS NECESSARY, ANY OFF-SITE AREAS THAT ARE NEEDED IN ACCORDANCE WITH STANDARD SPECIFICATIONS 105.25 - 105.28. ALL EROSION PREVENTION AND SEDIMENT CONTROL MEASURES NECESSARY FOR WASTE, BORROW, AND STAGING AREAS OUTSIDE THE PROJECT LIMITS SHALL BE PAID FOR PER 105.29 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.

VEHICLE AND EQUIPMENT STORAGE AREAS OR AREAS ADJACENT TO CONSTRUCTION TRAILERS OR OTHER HIGH TRAFFIC AREAS SHALL BE COVERED WITH GEOTEXTILE FABRIC AND 12" OF GRAVEL. FOLLOWING COMPLETION OF CONSTRUCTION, ALL NON-NATIVE MATERIALS SHALL BE REMOVED FROM THE STAGING AREA. COMPACTED, RUTTED, OR OTHERWISE DISTURBED SOILS SHALL BE TILLED, RAKED, SEEDED AND MULCHED.

ERODIBLE MATERIALS STOCKPILED WITHIN THE MATERIAL STORAGE AREAS SHALL BE ISOLATED WITH SILT FENCE OR OTHER ACCEPTABLE SEDIMENT BARRIER. SOIL STOCKPILED ON THE SITE SHALL BE SEEDED AND MULCHED.

10. WINTER CONSTRUCTION

CONSTRUCTION ACTIVITIES MAY CONTINUE INTO THE WINTER CONSTRUCTION SEASON, DEPENDING ON ACTUAL FIELD AND WEATHER CONDITIONS. IF ACTIVITIES ARE ON-GOING BETWEEN OCTOBER 15 AND APRIL 15, THE CONTRACTOR SHALL FOLLOW REQUIREMENTS FOR WINTER CONSTRUCTION, AS DEFINED IN SPECIFIC PERMIT CONDITIONS AND AS FOLLOWS:

- ENLARGED ACCESS POINTS, STABILIZED TO PROVIDE FOR SNOW STOCKPILING.
- LIMITS OF DISTURBANCE MOVED OR REPLACED TO REFLECT BOUNDARY OF WINTER WORK.
- DEVELOPMENT OF A SNOW MANAGEMENT PLAN THAT INCLUDES:
  - ADEQUATE STORAGE AND CONTROL OF MELT-WATER
  - STORAGE OF CLEARED SNOW TO BE PLACED DOWN SLOPE OF DISTURBED AREAS AND OUT OF STORMWATER TREATMENT STRUCTURES
- AREAS OF DISTURBANCE WITHIN 100 FT OF A WATERBODY MUST HAVE REINFORCED (WOVEN WIRE) SILT FENCE INSTALLED ACROSS THE SLOPE, DOWNGRADIENT OF THE EARTH DISTURBANCE. ALTERNATIVELY, REGULAR, NON-WOVEN WIRE SILT FENCE MAY BE USED IF COMBINED WITH EROSION CONTROL BERM, EROSION LOG, OR STRAW WATTLE.
- DRAINAGE STRUCTURES MUST BE KEPT OPEN AND FREE OF SNOW AND ICE DAMS.
- SILT FENCE AND OTHER PRACTICES REQUIRING EARTH DISTURBANCE MUST BE INSTALLED AHEAD OF FROZEN GROUND.
- MULCH TO BE APPLIED AT A MINIMUM OF 2 INCHES DEPTH WITH 80-90% COVERAGE.
- AREAS OF DISTURBED SOILS MUST BE STABILIZED PRIOR TO ANY RUNOFF-PRODUCING EVENT, WITH THE FOLLOWING EXCEPTION:
  - STABILIZATION IS NOT REQUIRED IF THE WORK IS OCCURRING IN A SELF-CONTAINED EXCAVATION WITH NO OUTLET AND A DEPTH OF 2 FT OR GREATER (OPEN UTILITY TRENCHES), PROVIDED THAT ANY DEWATERING, IF NECESSARY, IS CONDUCTED AS REQUIRED.
- PRIOR TO STABILIZATION, SNOW OR ICE MUST REMOVED TO LESS THAN 1" THICKNESS.
- USE STONE TO STABILIZE AREAS WHERE CONSTRUCTION VEHICLE TRAFFIC IS ANTICIPATED.

11. INSPECTION & MAINTENANCE

INSPECTION AND MONITORING OF THE PROJECT'S EPSC MEASURES SHALL BE CONDUCTED IN ACCORDANCE WITH STANDARD SPECIFICATION 653.04 MONITORING EROSION PREVENTION AND SEDIMENT CONTROL PLAN, ALONG WITH PERMIT SPECIFIC INSPECTION REQUIREMENTS.

THE CONTRACTOR SHALL PROVIDE A COPY OF THEIR INSPECTION FORM AS PART OF THEIR EPSC PLAN.

ALL EPSC MEASURES SHALL BE REGULARLY MAINTAINED AND SHALL BE CHECKED FOR SEDIMENT BUILD-UP. SEDIMENT SHALL BE DISPOSED OF AT AN APPROVED SITE WHERE IT WILL NOT BE SUBJECT TO EROSION.

vhb

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215EPSC_nar.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: N.A. TRUSLOW
EPSC NARRATIVE (2 OF 2)

PLOT DATE: 7/26/2023
DRAWN BY: N.A. TRUSLOW
CHECKED BY: J.D. KEENER
SHEET 40 OF 45

N

VT STATE PLANE GRID

SOIL INFORMATION:
COLTON GRAVELLY SANDY LOAM
15 TO 25 PERCENT SLOPES
NOT HIGHLY ERODIBLE
K=0.10

UNNAMED TRIBUTARY TO BLACK RIVER

4
HINES, JOSEPH M. & DAWN M. DOWNEY-HINES

END BRIDGE
STA. 445+46.83

TOWN OF PLYMOUTH
TOWN OF LUDLOW

6
CAROLYN J. BERNSTEIN & LAWRENCE H. BERNSTEIN, TRUSTEES OF THE LAWRENCE AND CAROLYN BERNSTEIN TRUST UNDER AGREEMENT dated May 27, 2015

END PROJECT
STA. 446+40.00

TOWN LINE

2
1773, LLC

BEGIN BRIDGE
STA. 445+31.16

BEGIN PROJECT
STA. 444+40.00

LAMPERT, JOHNATHON R. & KIMBLERLY L.

EXISTING APPROX. R.O.W.

BEGIN APPROACH
STA. 443+90.00

VT 100

TO PLYMOUTH

TO ANDOVER

SOIL INFORMATION:
COLTON GRAVELLY SANDY LOAM
8 TO 15 PERCENT SLOPES
NOT HIGHLY ERODIBLE
K=0.10

SEE NOTE

3
VERMONT TELEPHONE COMPANY, INC.

5
TWO CEES REALTY, LLC

SUNDAHL, CHRISTIAN

END APPROACH
STA. 446+90.00

SOIL INFORMATION:
COLTON GRAVELLY SANDY LOAM
3 TO 8 PERCENT SLOPES
NOT HIGHLY ERODIBLE
K=0.10

1
SIGOURNEY, HEIDI JO; STRYHAS, BARBARA LIFE ESTATE

NOTE:

SEE PROJECT NOTES SHEET FOR DETAILS ON HANDLING, REUSING, AND DISPOSING OF SOILS FROM THIS DELINEATED AREA.

0 20 40
SCALE IN FEET

vhb

PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)

FILE NAME: z19b215EPSC.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: J.D. KEENER
EPSC EXISTING SITE PLAN	SHEET 41 OF 45

N

VT STATE PLANE GRID

UNNAMED TRIBUTARY TO BLACK RIVER

SPECIAL PROVISION (REMOVE AND RESET SHED)

END BRIDGE STA. 445+46.83

STONE FILL, STREAM BED MATERIAL (E-STONE, TYPE III)

STONE FILL TYPE III

50+00

BEGIN BRIDGE STA. 445+31.16

BEGIN PROJECT STA. 444+40.00

PROTECT TREES

EXISTING APPROX. R.O.W.

BEGIN APPROACH STA. 443+90.00

VT 100

445+00

444+00

TO ANDOVER

443+00

442+00

EXISTING APPROX. R.O.W.

TOWN OF PLYMOUTH
TOWN OF LUDLOW

TOWN LINE

END PROJECT STA. 446+40.00

TO PLYMOUTH

446+00

447+00

51+00

52+00

STONE FILL, TYPE II

SPECIAL PROVISION (STONE TOE WALL) (SEE STONE TOE WALL DETAIL SHEET)

STONE FILL, STREAM BED MATERIAL (E-STONE, TYPE III)

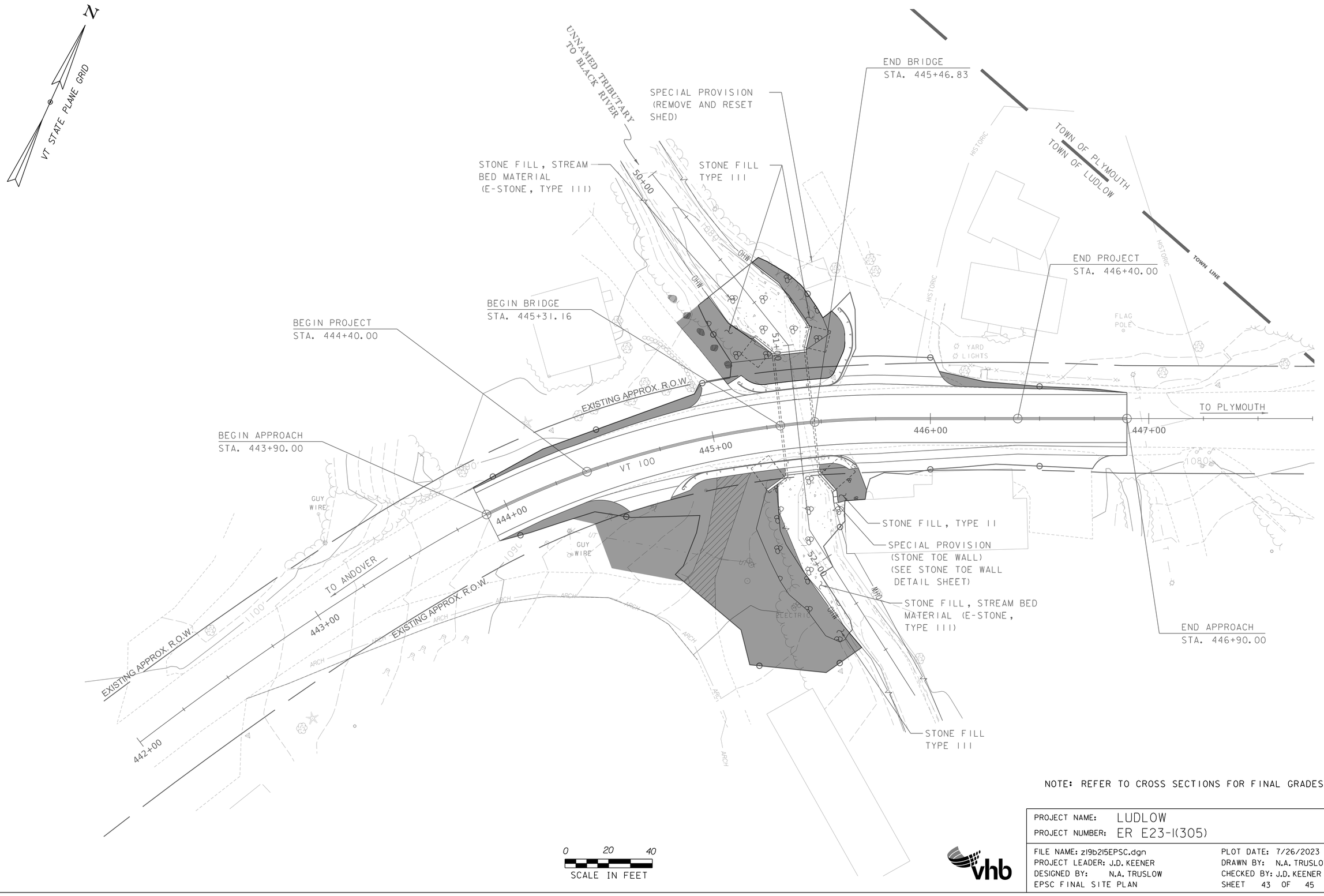
STONE FILL TYPE III

END APPROACH STA. 446+90.00

0 20 40

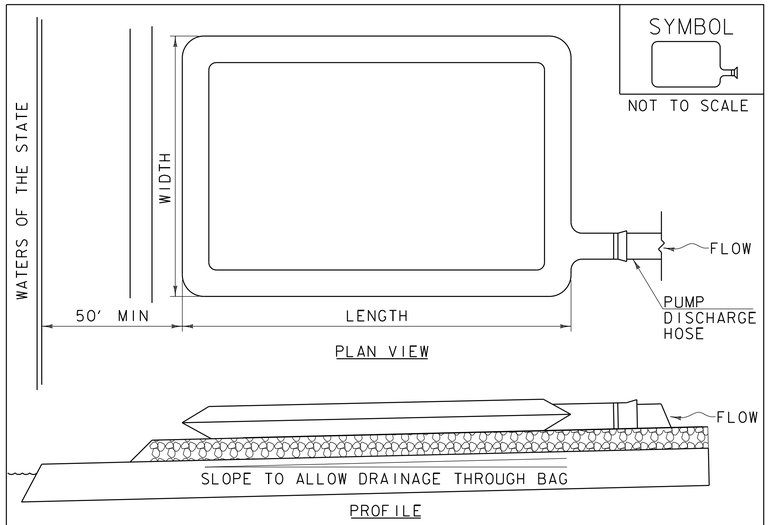
SCALE IN FEET

PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)
FILE NAME: z19b215EPSC.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: J.D. KEENER
EPSC CONSTRUCTION SITE PLAN	SHEET 42 OF 45



NOTE: REFER TO CROSS SECTIONS FOR FINAL GRADES.

PROJECT NAME:	LUDLOW
PROJECT NUMBER:	ER E23-1(305)
FILE NAME: z19b215EPSC.dgn	PLOT DATE: 7/26/2023
PROJECT LEADER: J.D. KEENER	DRAWN BY: N.A. TRUSLOW
DESIGNED BY: N.A. TRUSLOW	CHECKED BY: J.D. KEENER
EPSC FINAL SITE PLAN	SHEET 43 OF 45



CONSTRUCTION SPECIFICATIONS

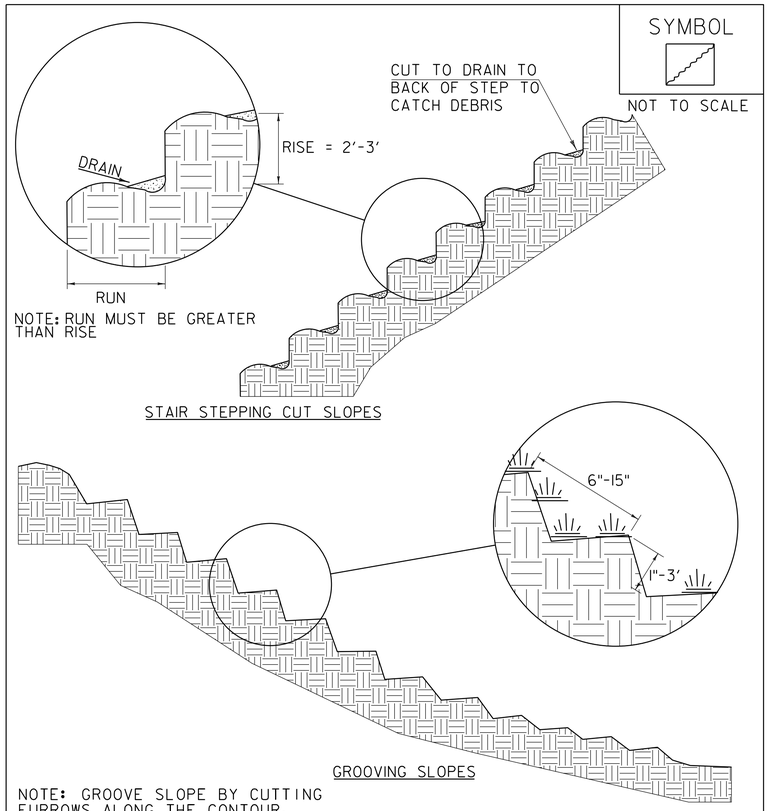
1. THE PRIMARY PURPOSE OF FILTER BAG IS TO RETAIN SILT, SAND, AND FINES DURING DEWATERING OPERATIONS.
2. FILTER BAGS SHALL BE INSTALLED ON A VEGETATED SLOPE GRADED TO ALLOW INCOMING WATER TO FLOW THROUGH THE BAG.
3. FILTER BAGS MAY ALSO BE PLACED ON COARSE AGGREGATE, STONE, OR HAYBALES TO INCREASE FILTRATION EFFICIENCY.
4. FILTER BAGS SHALL BE LOCATED A MINIMUM OF 50' FROM WATERS OF THE STATE UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. THE NECK OF THE FILTER BAG SHALL BE STRAPPED TIGHTLY TO THE DISCHARGE HOSE.
6. A FILTER BAG IS FULL WHEN IT NO LONGER CAN EFFICIENTLY FILTER SEDIMENT OR ALLOW WATER TO PASS AT A REASONABLE RATE.
7. FILTER BAG SHALL BE DISPOSED OF AS APPROVED IN THE EPSC PLAN OR AS DIRECTED BY THE ENGINEER.

FILTER BAG

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR FILTER BAG (PAY ITEM 653.45) AND AS SPECIFIED IN THE CONTRACT.

REVISIONS	
MARCH 24, 2008	WHF
JANUARY 13, 2009	WHF



NOTE: GROOVE SLOPE BY CUTTING FURROWS ALONG THE CONTOUR. IRREGULARITIES IN THE SOIL SURFACE CATCH RAINWATER AND RETAIN LIME, FERTILIZER AND SEED.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC ORIGINALLY DEVELOPED BY USDA-NRCS VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SURFACE ROUGHENING

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT

REVISIONS	
APRIL 1, 2008	WHF
JANUARY 13, 2009	WHF

VAOT LOW GROW/FINE FESCUE MIX

LBS/AC						
WEIGHT	BROADCAST	HYDROSEED	NAME	LATIN NAME	GERM	PURITY
38%	57	95	CREEPING RED FESCUE	FESTUCA RUBRA VAR. RUBRA	90%	98%
29%	43.5	72.5	HARD FESCUE	FESTUCA LONGIFOLIA	85%	95%
15%	22.5	37.5	CHEWINGS FESCUE	FESTUCA RUBRA VAR. COMMUTATA	87%	95%
15%	22.5	37.5	ANNUAL RYEGRASS	LOLIUM MULTIFLORUM	90%	95%
3%	4.5	7.5	INERTS			
100%	150	250				

VAOT RURAL AREA MIX

LBS/AC						
WEIGHT	BROADCAST	HYDROSEED	NAME	LATIN NAME	GERM	PURITY
37.5%	22.5	45	CREEPING RED FESCUE	FESTUCA RUBRA VAR. RUBRA	85%	98%
37.5%	22.5	45	TALL FESCUE	FESTUCA ARUNDINACEA	90%	95%
5.0%	3	6	RED TOP	AGROSTIS GIGANTEA	90%	95%
15.0%	9	18	WHITE FIELD CLOVER	TRIFOLIUM REPENS	85%	98%
5.0%	3	6	ANNUAL RYE GRASS	LOLIUM MULTIFLORUM	85%	95%
100%	60	120				

GENERAL AMENDMENT GUIDANCE

FERTILIZER	LIME	
10/20/10	AG LIME	PELLITIZED
500 LBS/AC	2 TONS/AC	1 TONS/AC

CONSTRUCTION GUIDANCE

1. SEED MIX: THE CONTRACTOR SHALL COORDINATE WITH THE RESIDENT ENGINEER ON WHICH SEED MIX TO USE.
2. SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED UPLAND (NON WETLAND) AREAS DISTURBED BY THE CONTRACTOR.
3. ALL SEED MIXTURES: SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.
4. FERTILIZER AND LIMESTONE: SHALL FOLLOW RATES SHOWN ON PLAN OR AS DIRECTED BY THE ENGINEER.
5. HAY MULCH: TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE, ACHIEVE 90% GROUND COVER OR AS DIRECTED BY THE ENGINEER.
6. HYDROSEEDING: ALTHOUGH GUIDANCE IS GIVEN ABOVE THE SITE CONDITIONS AND THE TYPE OF HYDROSEED PROPOSED FOR USE WILL ULTIMATELY DICTATE THE AMOUNTS AND TYPES OF SOIL AMENDMENTS TO BE APPLIED.
7. TURF ESTABLISHMENT: PLACING SEED, FERTILIZER, LIME AND MULCH PRIOR TO SEPTEMBER 15 AND AFTER APRIL 15 CAN BETTER ENSURE A VIGOROUS GROWTH OF GRASS.

ADAPTED FROM VTRANS TECHNICAL LANDSCAPE MANUAL FOR ROADWAYS AND TRANSPORTATION FACILITIES

TURF ESTABLISHMENT

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 651 FOR SEED (PAY ITEM 651.15)

REVISIONS	
JANUARY 12, 2015	WHF

vhb

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215EPSC_det.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: N.A. TRUSLOW
EPSC DETAILS SHEET (1 OF 2)

PLOT DATE: 7/26/2023
DRAWN BY: N.A. TRUSLOW
CHECKED BY: J.D. KEENER
SHEET 44 OF 45

SYMBOL

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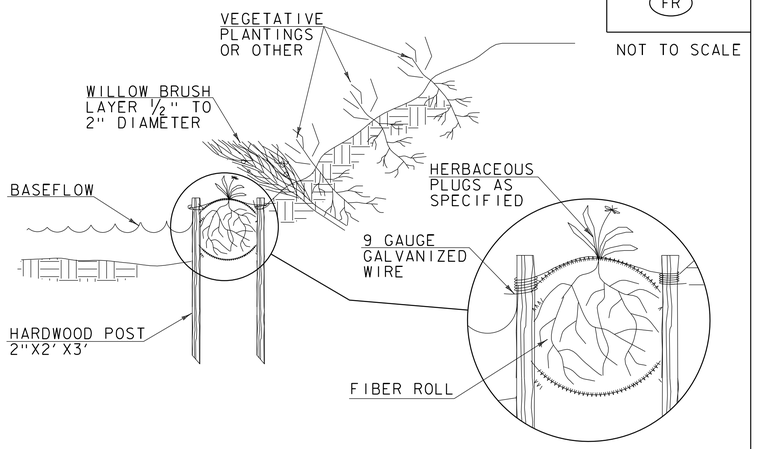
NOT TO SCALE



CONSTRUCTION SPECIFICATIONS

1. EXCAVATE A SHALLOW TRENCH SLIGHTLY BELOW BASEFLOW OR A 4" TRENCH ON SLOPE CONTOURS
2. PLACE THE ROLL IN THE TRENCH AND ANCHOR WITH 2"X2" POSTS PLACED ON BOTH SIDES FO THE ROLL AND SPACED LATERALLY ON 2' TO 4' CENTERS. TRIM THE TOP OF THE POSTS EVEN WITH THE EDGE OF THE ROLL, IF NECESSARY.
3. NOTCH THE POSTS AND TIE TOGETHER, ACROSS THE ROLL, WITH 9 GAUGE GALVANIZED WIRE OR 1/8" DIAMETER BRAIDED NYLON ROPE.
4. PLACE SOIL EXCAVATED FROM THE TRENCH BEHIND THE ROLL AND HAND TAMP. PLANTWITH SUITABLE HERBACEOUS OR WOODY VEGETATION AS SPECIFIED ELSEWHERE IN THE CONTRACT DOCUMENTS. VEGETATION SHALL BE PLACED IMMEDIATELY ADJACENT TO THE ROLL TO PROMOTE ROOT GROWTH INTO THE FIBER. HERBACEOUS VEGETATION, IF SPECIFIED, SHALL BE PLANTED INTO THE FIBER ROLL.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FIBER ROLL (EROSION LOG)

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR EROSION LOG (PAY ITEM 653.60)

REVISIONS	
MARCH 21, 2008	WHF
JANUARY 13, 2009	WHF

PROJECT NAME: LUDLOW
PROJECT NUMBER: ER E23-1(305)

FILE NAME: z19b215EPSC_det.dgn
PROJECT LEADER: J.D. KEENER
DESIGNED BY: N.A. TRUSLOW
EPSC DETAILS SHEET (2 OF 2)

PLOT DATE: 7/26/2023
DRAWN BY: N.A. TRUSLOW
CHECKED BY: J.D. KEENER
SHEET 45 OF 45