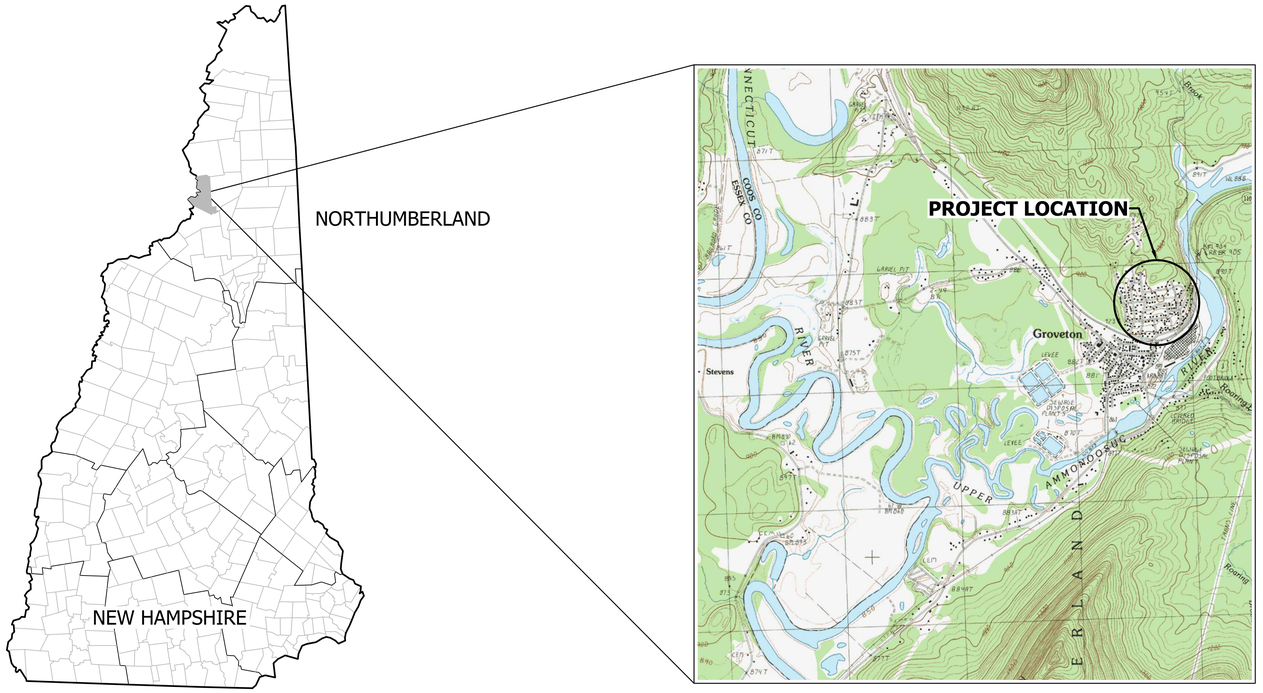
TOWN OF NORTHUMBERLAND

SEWER, WATER, DRAINAGE AND ROADWAY IMPROVEMENTS

FUNDING: DWSRF 1781010-02, DWGT-106, 1781010-02 ARPA & USDA RUS WEP

NORTHUMBERLAND, NEW HAMPSHIRE

BID DOCUMENT - JULY 2024



LOCATION PLAN

SCALE: 1" = 2000'

OWNER:

TOWN OF NORTHUMBERLAND
2 STATE STREET
GROVETON, NH 03582
(603) 636-1450

ENGINEER/SURVEYOR:

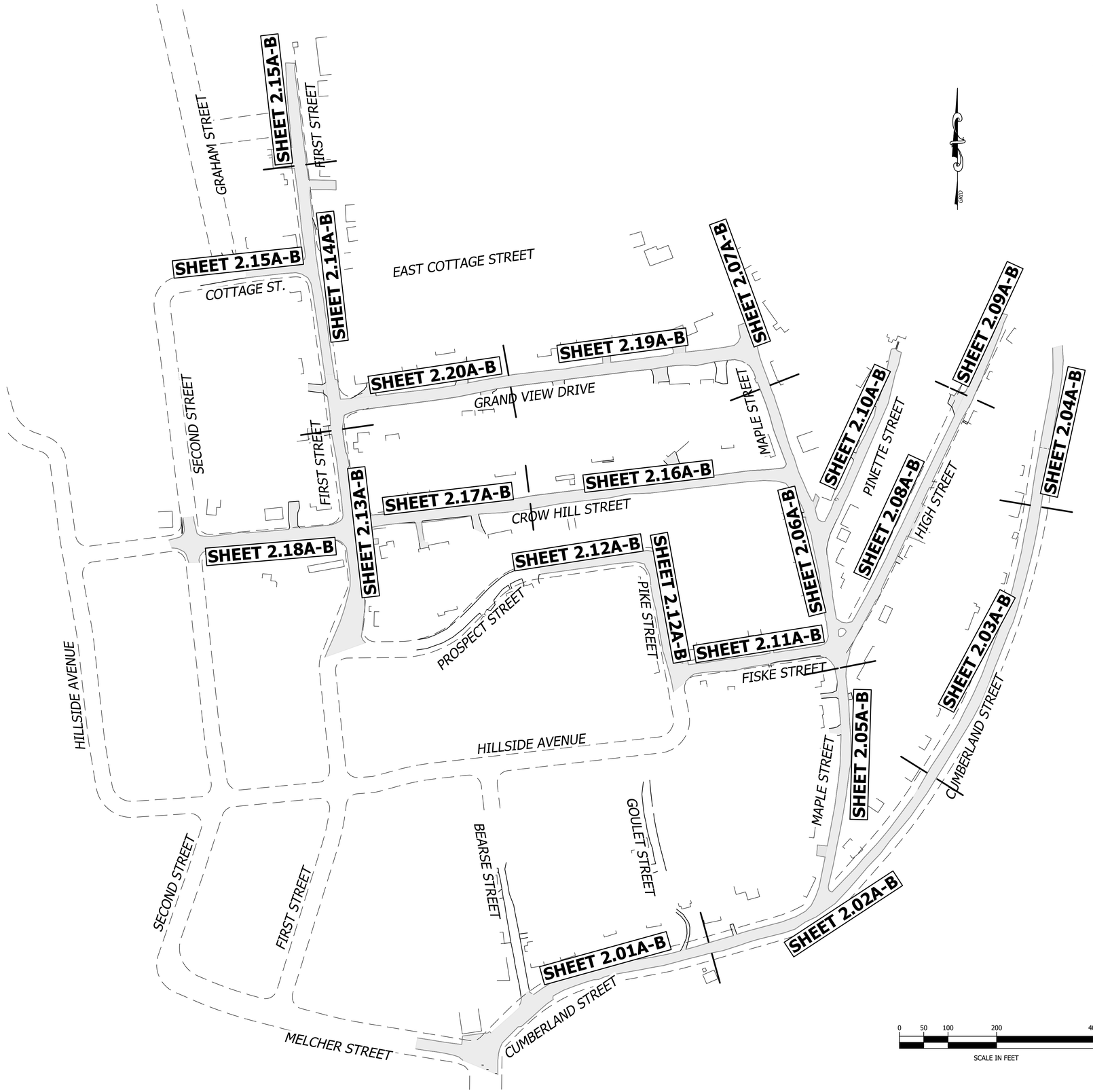
horizons Engineering

34 SCHOOL STREET
LITTLETON, NH 03561
(603) 444-4111

SHEET INDEX:

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING



LEGEND

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING TREE LINE
- STONE WALL
- RAILROAD TRACK
- EXISTING SEWER MAIN
- EXISTING WATER MAIN
- EXISTING DRAIN LINE
- EXISTING SEWER MANHOLE
- EXISTING WATER SHUTOFF
- EXISTING GATE VALVE
- EXISTING HYDRANT
- EXISTING CATCH BASIN
- EXISTING DRAIN MANHOLE
- SOIL BORING
- UTILITY POLE
- GUY WIRE
- LIGHT POLE
- SIGN
- MAILBOX
- SHRUB OR BUSH
- DECIDUOUS TREE
- CONIFER TREE
- GRAVEL
- PAVEMENT
- CONCRETE

- FINISHED GRADE MAJOR CONTOUR
- FINISHED GRADE MINOR CONTOUR
- PROPOSED SEWER MAIN
- PROPOSED WATER MAIN
- PROPOSED DRAIN LINE
- PROPOSED SEWER MANHOLE
- PROPOSED WATER SHUTOFF
- PROPOSED GATE VALVE
- PROPOSED HYDRANT
- PROPOSED CATCH BASIN
- PROPOSED DRAIN MANHOLE
- "TBA" TO BE ABANDONED

PERMIT/REVIEW REFERENCES:

1. PUBLIC WATER SYSTEM # 178100
2. WWEB DESIGN REVIEW #2024-0407
3. NHDES DESIGN REVIEW #6849

SURVEY NOTES

1. THIS PLAN IS BASED ON A FIELD SURVEY COMPLETED IN JULY, AUGUST AND OCTOBER 2023 WITH GRX-1 DUAL FREQUENCY SURVEY GRADE GPS RECEIVERS AND A NIKON ROBOTIC TOTAL STATION.
2. THE HORIZONTAL DATUM IS ON THE NEW HAMPSHIRE STATE PLANE COORDINATE SYSTEM NAD83 (2011). THE VERTICAL DATUM IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. THE RIGHT OF WAY LINES DEPICTED HEREON WAS RETRACED USING THE DEEDS OF RECORD AND REFERENCE PLANS. ABUTTING PROPERTY LINES ARE APPROXIMATE PER THE TOWN OF NORTHUMBERLAND TAX MAPS AT THE TIME THIS PLAN WAS PREPARED.

GENERAL NOTES

1. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THESE PLANS "ISSUED FOR CONSTRUCTION" AND "TECHNICAL SPECIFICATIONS FOR TOWN OF NORTHUMBERLAND, SEWER, WATER, DRAINAGE AND ROADWAY IMPROVEMENTS" DATED APRIL 2024."
2. NO EXISTING MONUMENTS, BOUNDS, OR BENCHMARKS SHALL BE DISTURBED WITHOUT FIRST MAKING PROVISIONS FOR RELOCATION.
3. ALL WORK SHALL BE PERFORMED WITHIN THE PROPERTY OF, AND EASEMENTS SECURED BY, THE OWNER.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DATA COLLECTION AND PREPARATION OF RECORD DRAWINGS.
5. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR CONTROLLING EROSION IN ALL AREAS DISTURBED BY HIS ACTIONS. COSTS FOR REQUIRED EROSION CONTROL, REGARDLESS OF WHETHER OR NOT SUCH MEASURES ARE SHOWN ON THE ENGINEERING DRAWINGS, SHALL BE BORNE BY HIM.
6. UTILITY LOCATIONS ARE BASED ON THE BEST AVAILABLE INFORMATION. THE CONTRACTOR IS RESPONSIBLE FOR LOCATION AND PROTECTION OF EXISTING UTILITIES AND SHALL REPAIR ANY DAMAGE AS QUICKLY AS POSSIBLE AT HIS OWN EXPENSE. ALL UTILITIES ENCOUNTERED SHALL BE LOCATED BY DEPTH AND TIES AND SHOWN BY THE CONTRACTOR ON HIS "AS BUILT" DRAWINGS. HAND EXCAVATION SHALL BE DONE WHEREVER UNDERGROUND UTILITIES ARE SHOWN OR ANTICIPATED. THE CONTRACTOR SHALL CONTACT DIG SAFE AND THE APPROPRIATE AUTHORITIES PRIOR TO ANY CONSTRUCTION IN ORDER TO VERIFY EXISTING CONDITIONS AND UTILITY LOCATIONS.
7. THE DESIGN INTENT REGARDING UTILITY POLES IS THAT POLES WILL NOT BE RELOCATED. HOWEVER, IF POLES ARE PROPOSED TO BE HELD OR RELOCATED, THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE UTILITY FOR SUCH WORK.
8. ALL ROAD SHOULDERS SHALL BE GRADED AT A MINIMUM OF 4% AND EXISTING DRAINAGE DITCHES AND SWALES OUTSIDE OF THE SHOULDER THAT ARE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO FREE FLOWING.
9. PERMANENT PAVEMENT PATCHES SHALL BE COMPLETED NO LATER THAN NOVEMBER 15TH. REPAIR OF ANY SETTLING OR HEAVING OF TEMPORARY OR PERMANENT PATCHES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
10. IT IS THE INTENT OF THIS CONTRACT TO LEAVE ALL DISCONTINUED/ABANDONED WATER MAIN, VALVES, SERVICE LINES, AND APPURTENANCES IN PLACE, WITH THE EXCEPTION OF VALVE BOX AND CURB BOX TOPS AND COVERS, WHICH WILL BE REMOVED AND SALVAGED TO THE OWNER. ALL ABANDONED WATER MAINS SHALL BE CAPPED AND PLUGGED. ANY SEWER OR WATER MAINS, VALVES, APPURTENANCES, OR SERVICE LINES ENCOUNTERED THAT ARE IN CONFLICT WITH THE PROPOSED WORK SHALL BE REMOVED BY THE CONTRACTOR AND PROPERLY DISPOSED OF OFF -SITE.
11. IT IS THE INTENT THAT ALL SEWER MANHOLES TO BE ABANDONED WILL HAVE FRAMES AND COVERS SALVAGED TO OWNER, TOP CONES REMOVED AND DISPOSED OF OFF SITE, SEWER MAINS PLUGGED WITH NON-SHRINK GROUT, AND MANHOLE STRUCTURES FILLED WITH COMPACTED SAND.
12. THE DESIGN INTENT FOR CONNECTION TO EXISTING MANHOLES IS THAT THE EXISTING CORES (AND SUITABLE PVC STUBS AS FOUND) WILL BE UTILIZED WHEN THE PROPOSED SEWER AND EXISTING SEWER IS AT THE SAME INVERT IN ELEVATION. FOR MANHOLES (INCLUDING DROP MANHOLES) WHERE THE NEW INVERT IN ELEVATION IS DIFFERENT THAN THE EXISTING INVERT IN ELEVATION, A NEW CORE IS REQUIRED. THE EXISTING CORE TO BE ABANDONED SHALL BE PLUGGED WITH NON-SHRINK GROUT. INVERTS MAY BE REUSED IF SUITABLE, OR RECONSTRUCTED AS NECESSARY. THE CONTRACTOR SHALL CONFIRM INVERT ELEVATIONS AND SEWER SLOPE REQUIREMENTS IN ADVANCE OF BEGINNING PIPE INSTALLATION.
13. TO THE EXTENT PRACTICABLE A MINIMUM VERTICAL SEPARATION DISTANCE OF 18 INCHES SHALL BE PROVIDED BETWEEN SEWER SERVICES AND WATER MAIN AND A MINIMUM HORIZONTAL SEPARATION DISTANCE OF 10 FEET SHALL BE PROVIDED BETWEEN WATER AND SEWER SERVICES. IF EXISTING LEAD WATER SERVICES ARE FOUND STILL IN SERVICE, THE CONTRACTOR SHALL NOTIFY THE ENGINEER.
14. THE DESIGN INTENT FOR MINIMUM VERTICAL SEPARATION AT DRAINAGE CROSSINGS IS 12 INCHES (SAND BLANKET THICKNESS). A 6 INCH BLANKET OF ¾" STONE CAN BE USED AS AN ALTERNATE (PURSUANT WITH ENV-WQ 704.11(C)) IN LOCATIONS THAT HAVE LESS THAN 12" OF SEPARATION (BUT MORE THAN 6"). IF INSULATION IS TO BE ADDED, THE CORRESPONDING THICKNESS SHOULD NOT INTERFERE WITH THE MINIMUM AMOUNT OF BLANKET THICKNESS MATERIAL. CONTRACTOR SHALL CONDUCT EXPLORATORY EXCAVATIONS AT UTILITY CROSSINGS TO ENSURE ADEQUATE SEPARATION BEFORE UTILITY INSTALLATION.

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KBP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

horizons engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

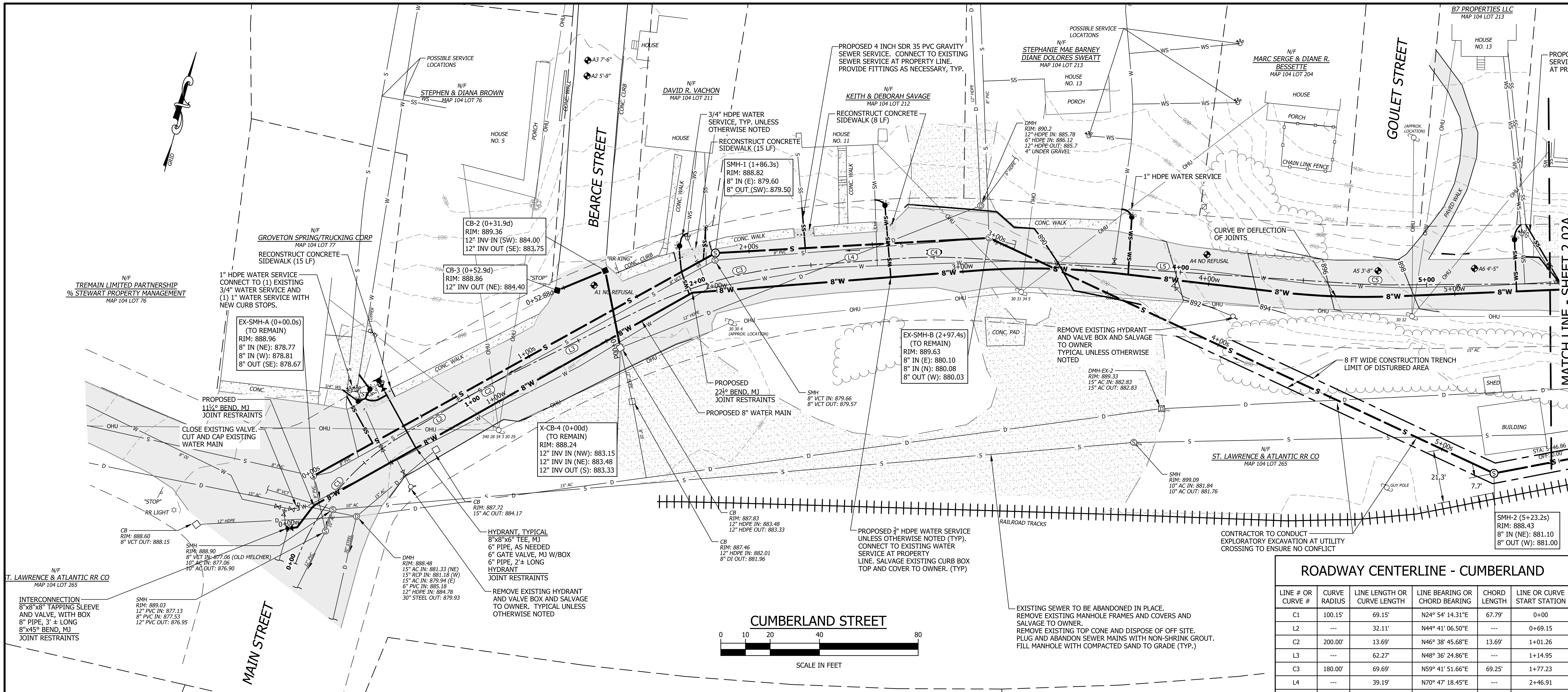
TOWN OF NORTHUMBERLAND

NORTHUMBERLAND, NEW HAMPSHIRE

SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

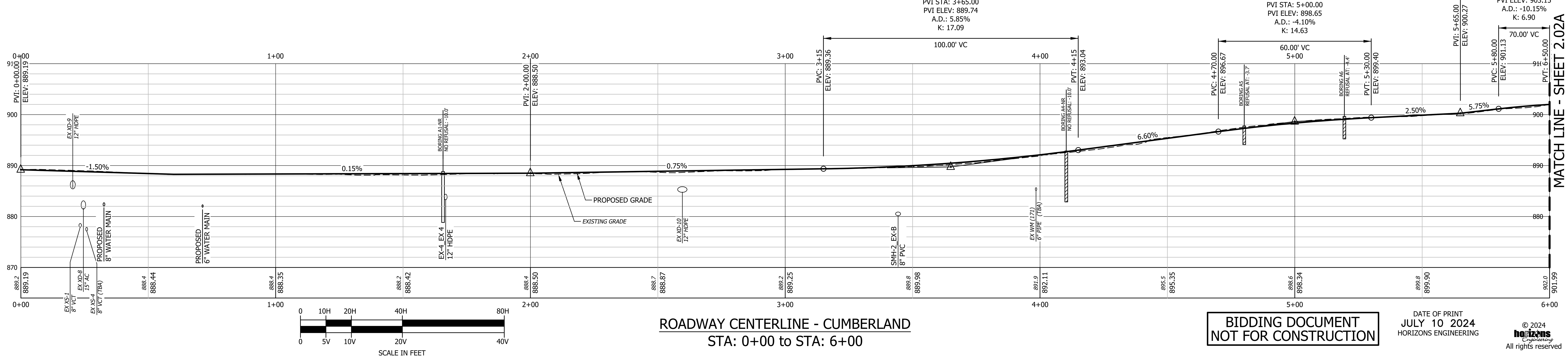
OVERVIEW, GENERAL NOTES AND LEGEND

SHEET 1.1



ROADWAY CENTERLINE - CUMBERLAND

LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
C1	100.15'	69.15'	N24° 54' 14.31"E	67.79'	0+00
L2	---	32.11'	N44° 41' 06.50"E	---	0+69.15
C2	200.00'	13.69'	N46° 38' 45.68"E	13.69'	1+01.26
L3	---	62.27'	N48° 36' 24.86"E	---	1+14.95
C3	180.00'	69.69'	N59° 41' 51.66"E	69.25'	1+77.23
L4	---	39.19'	N70° 47' 18.45"E	---	2+46.91
C4	200.00'	27.86'	N74° 46' 42.24"E	27.83'	2+86.10
L5	---	157.82'	N78° 46' 06.03"E	---	3+13.96
C5	200.00'	14.70'	N76° 39' 44.42"E	14.70'	4+71.77
L6	---	209.96'	N74° 33' 22.81"E	---	4+86.48
C7	300.00'	135.11'	N55° 04' 59.22"E	133.97'	7+19.38



ROADWAY CENTERLINE - CUMBERLAND
STA: 0+00 to STA: 6+00

BIDDING DOCUMENT NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

STATE OF NEW HAMPSHIRE - Stephen M. Lafrance No. 7145 LICENSED PROFESSIONAL ENGINEER

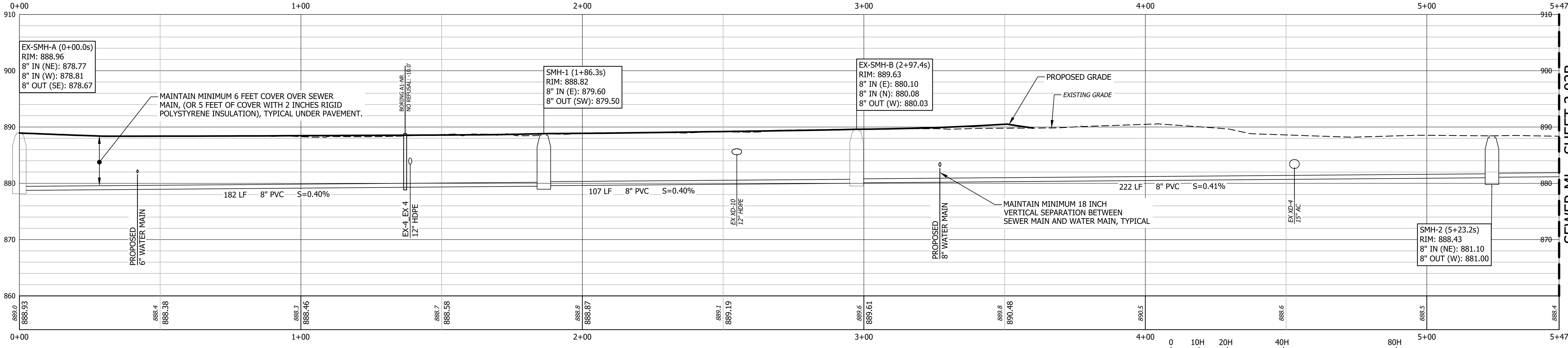
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

CUMBERLAND STREET
PLAN AND ROAD PROFILE STA 0+00 TO 6+00

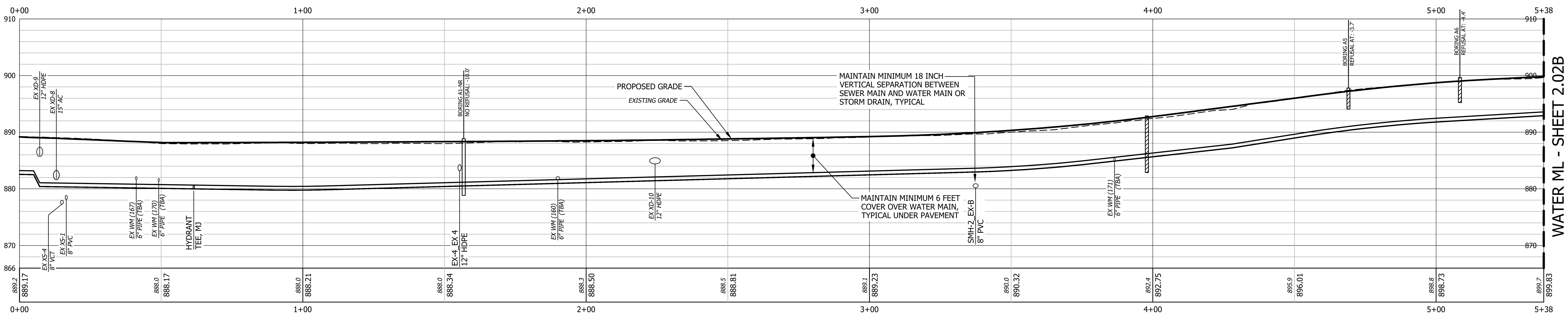
SHEET 2.01A

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.1, 7/10/2024 9:35:51 AM, KarenPhilbrick



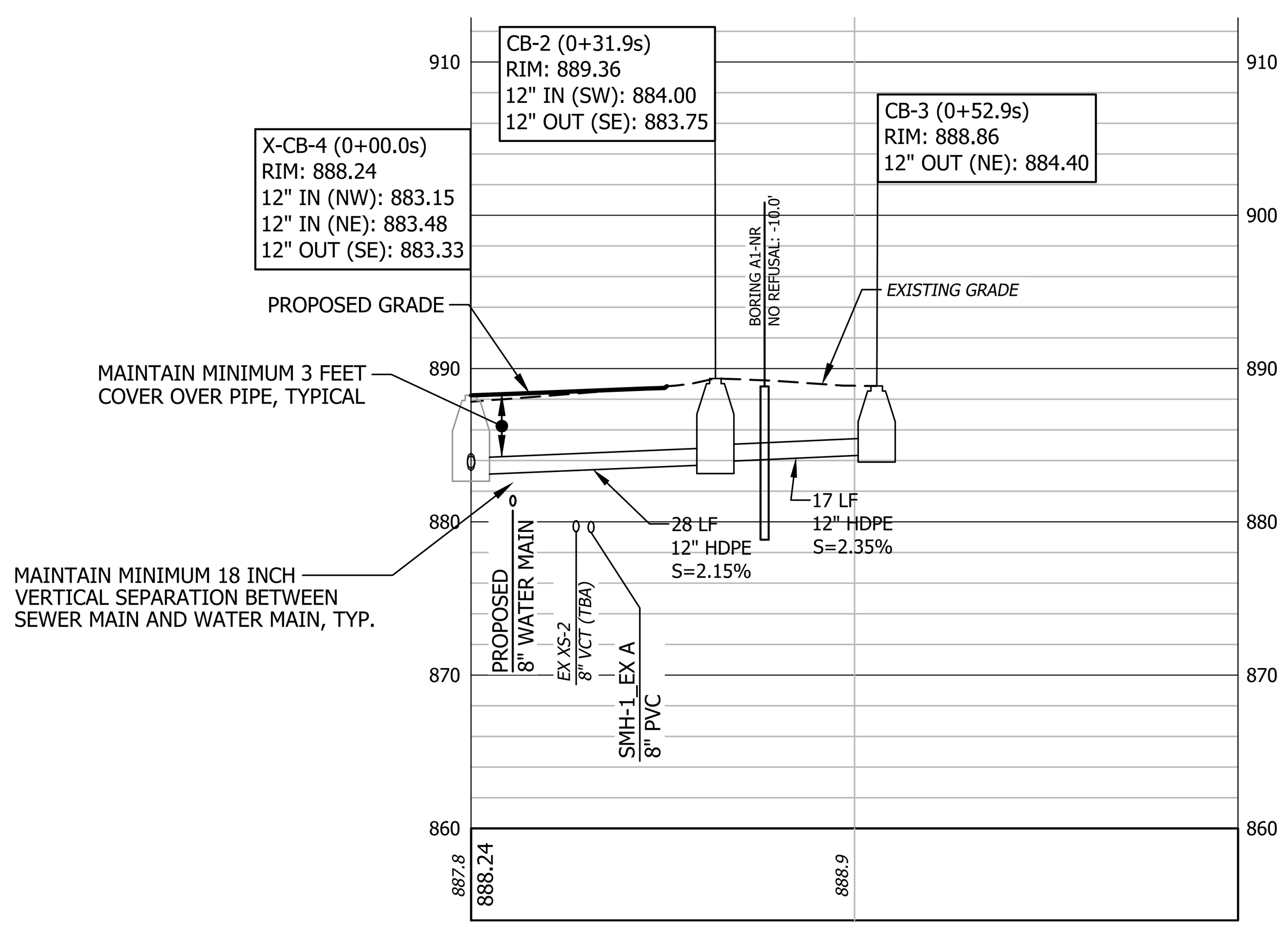
SEWER PROFILE - CUMBERLAND
STA: 0+00 to STA: 5+47

0 10H 20H 40H 80H
0 5V 10V 20V 40V
SCALE IN FEET



WATER PROFILE - CUMBERLAND
STA: 0+00 to STA: 5+38

0 10H 20H 40H 80H
0 5V 10V 20V 40V
SCALE IN FEET



DRAIN-CUMBERLAND
STA: 0+00 to STA: 1+00

0 10H 20H 40H 80H
0 5V 10V 20V 40V
SCALE IN FEET

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

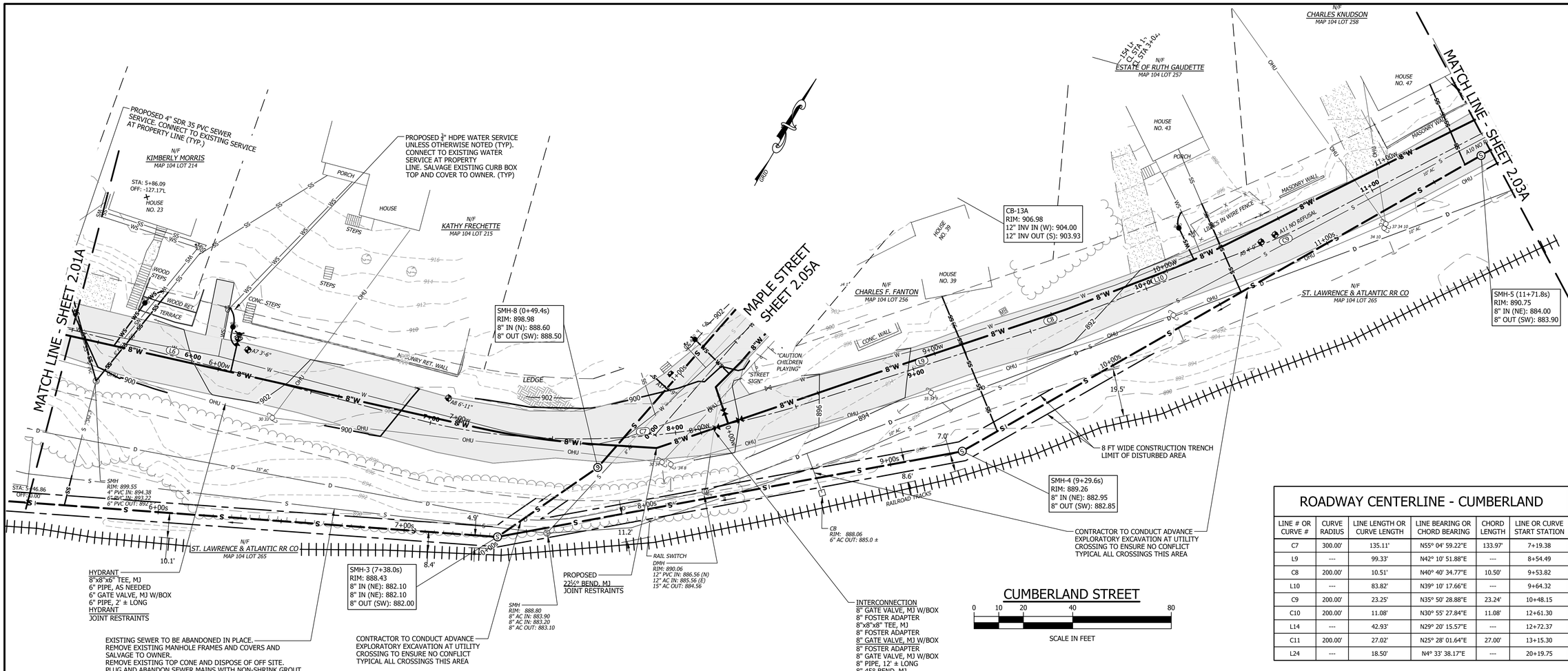
CUMBERLAND STREET
DRAINAGE PROFILE AND SEWER PROFILE STA 0+00 TO 5+47
WATER PROFILE STA 0+00 TO 5+38

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

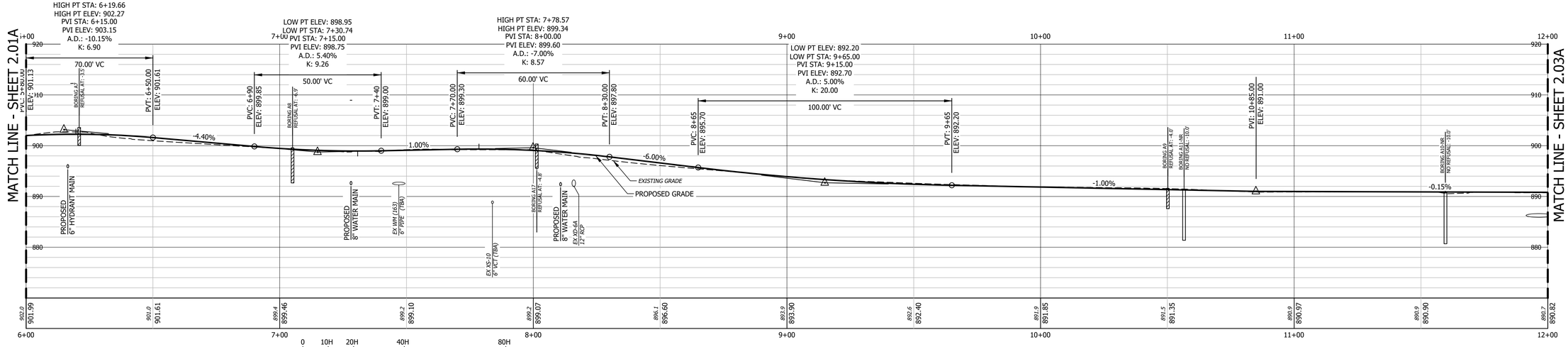
SHEET 2.01B

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.1B, 7/10/2024 9:36:51 AM, KarenPhilbrick



ROADWAY CENTERLINE - CUMBERLAND

LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
C7	300.00'	135.11'	N55° 04' 59.22"E	133.97'	7+19.38
L9	---	99.33'	N42° 10' 51.88"E	---	8+54.49
C8	200.00'	10.51'	N40° 40' 34.77"E	10.50'	9+53.82
L10	---	83.82'	N39° 10' 17.66"E	---	9+64.32
C9	200.00'	23.25'	N35° 50' 28.88"E	23.24'	10+48.15
C10	200.00'	11.08'	N30° 55' 27.84"E	11.08'	12+61.30
L14	---	42.93'	N29° 20' 15.57"E	---	12+72.37
C11	200.00'	27.02'	N25° 28' 01.64"E	27.00'	13+15.30
L24	---	18.50'	N4° 33' 38.17"E	---	20+19.75



ROADWAY CENTERLINE - CUMBERLAND
STA: 6+00 to STA: 12+00

BIDDING DOCUMENT NOT FOR CONSTRUCTION

DATE OF PRINT JULY 10 2024 HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

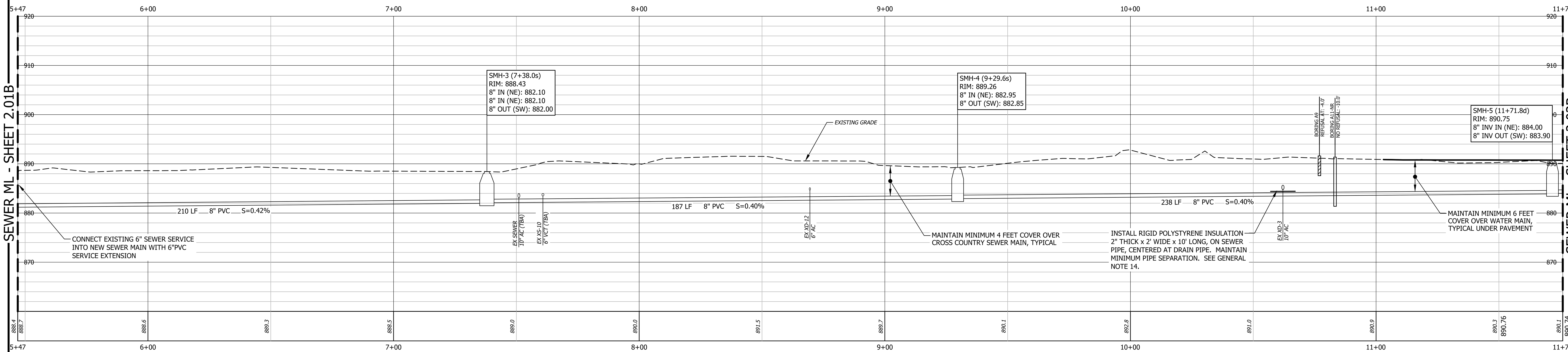
PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

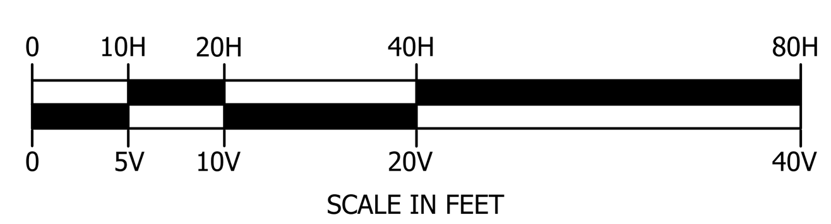
CUMBERLAND STREET
PLAN AND ROAD PROFILE STA 5+50 TO 11+50

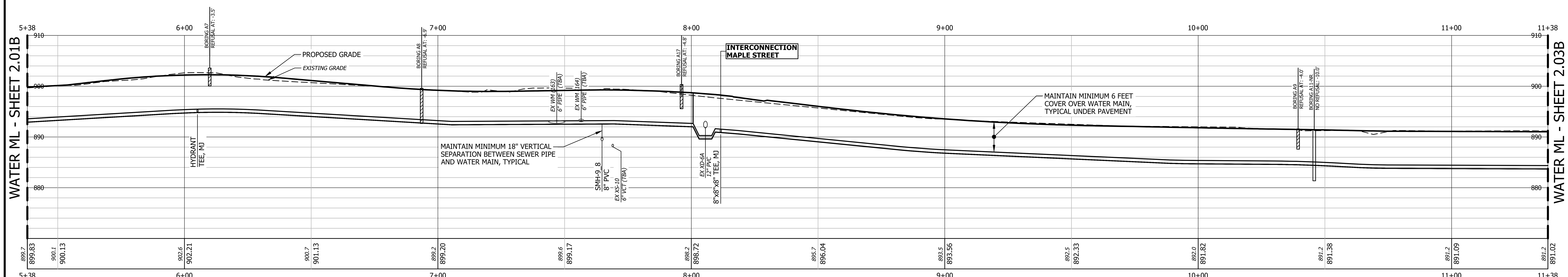
SHEET 2.02A



SEWER PROFILE - CUMBERLAND

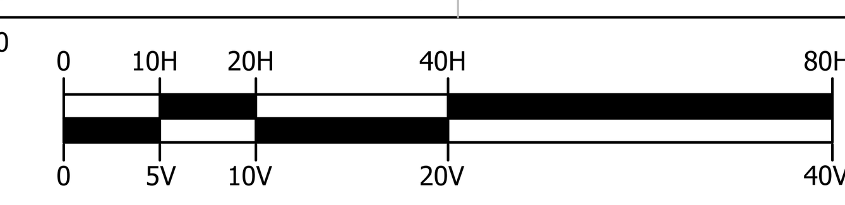
STA: 5+47 to STA: 11+76





WATER PROFILE - CUMBERLAND

STA: 5+38 to STA: 11+38



NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

STATE OF NEW HAMPSHIRE · Stephen M. LaFrance No. 7165 LICENSED · PROFESSIONAL ENGINEER

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND

NORTHUMBERLAND, NEW HAMPSHIRE

SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

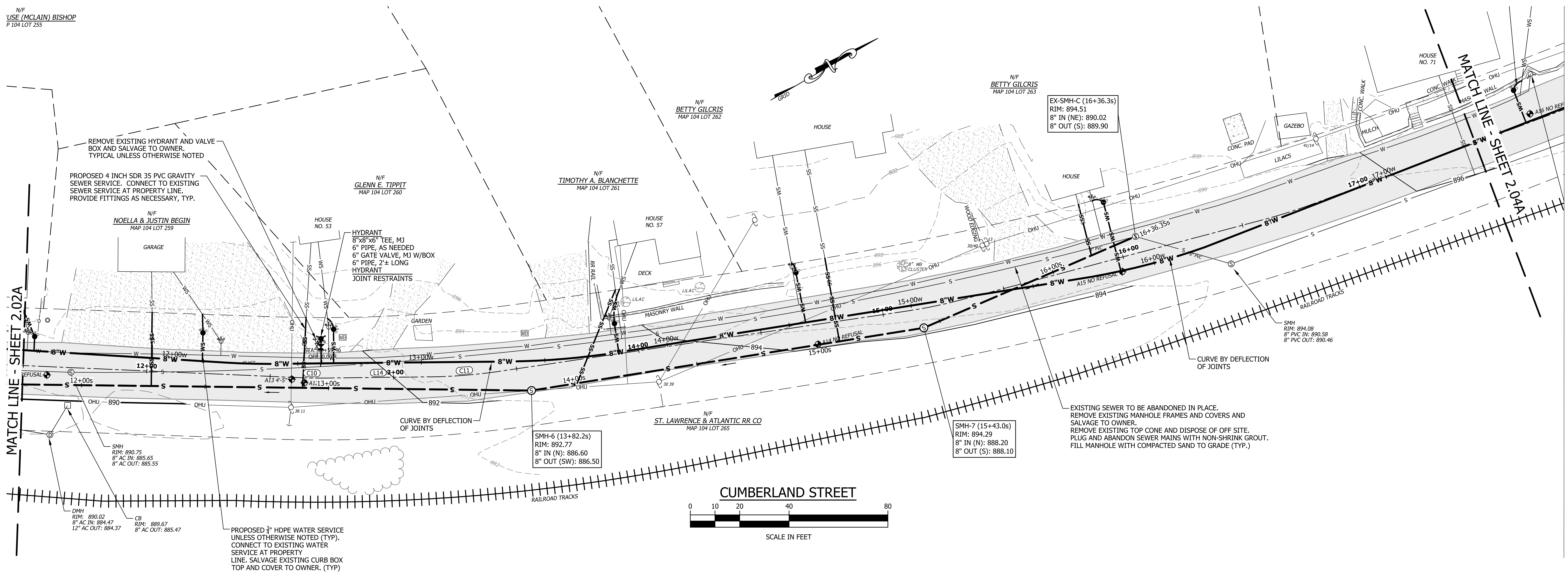
CUMBERLAND STREET
SEWER PROFILE STA 5+47 TO 11+76
WATER PROFILE STA 5+38 TO 11+38

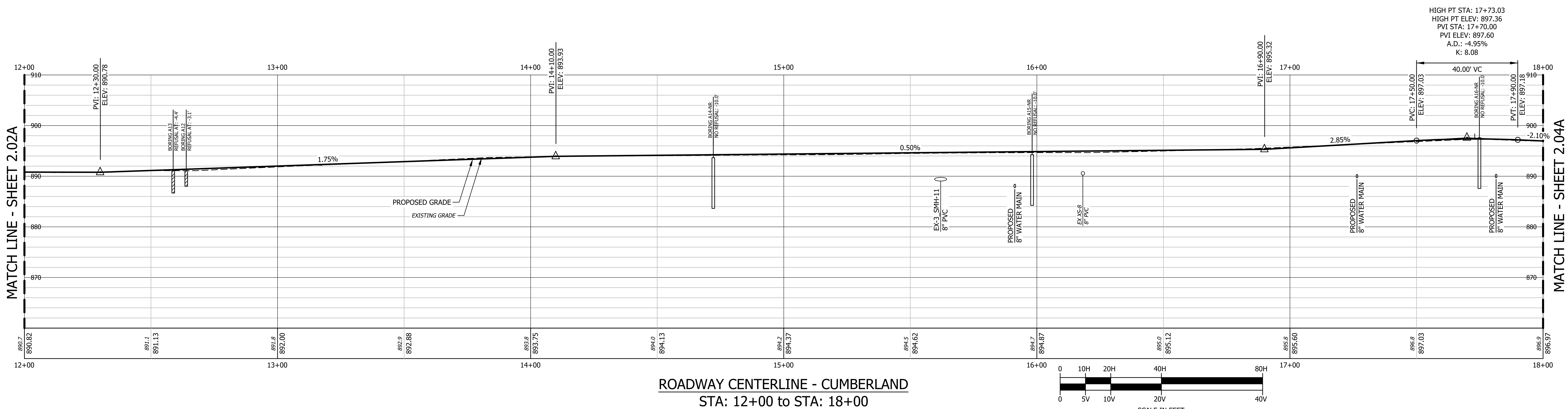
BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

SHEET 2.02B

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.2B, 7/10/2024 9:39:03 AM, KarenPhilbrick





ROADWAY CENTERLINE - CUMBERLAND
STA: 12+00 to STA: 18+00

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

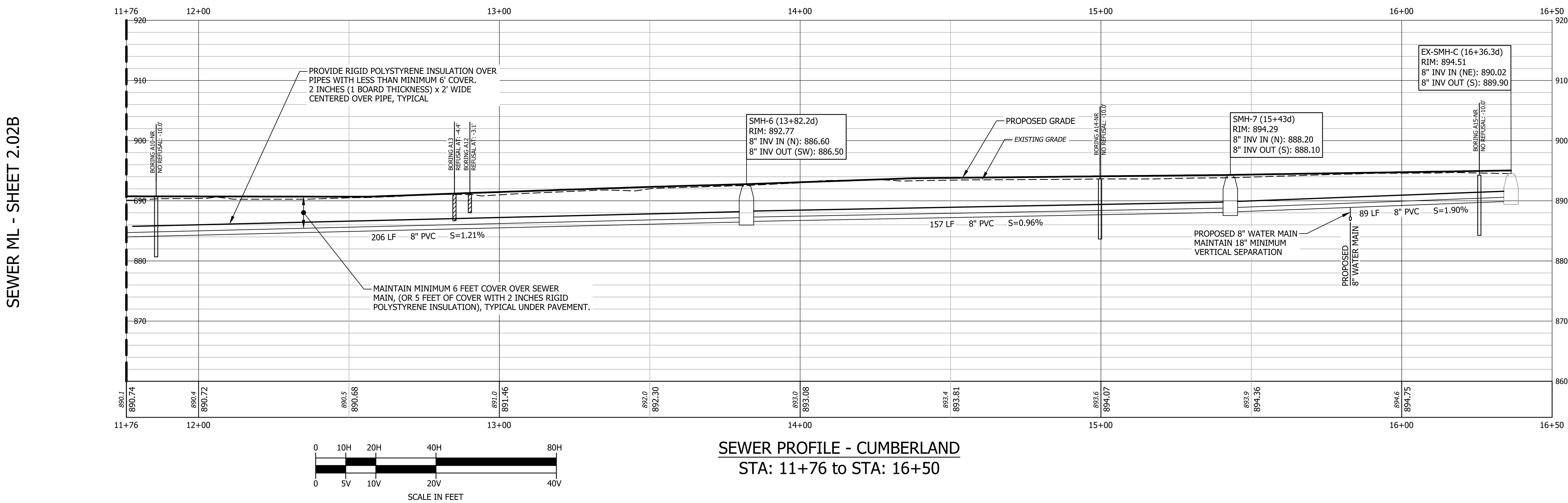
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

CUMBERLAND STREET
PLAN AND ROAD PROFILE STA 11+50 TO 17+50

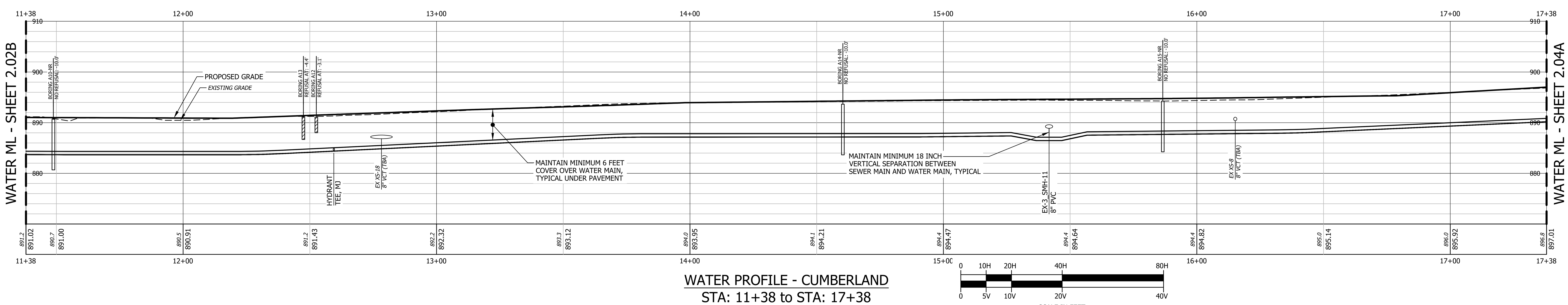
SHEET 2.03A

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.3, 7/10/2024 9:39:53 AM, KarenPhilbrick



SEWER PROFILE - CUMBERLAND

STA: 11+76 to STA: 16+50



WATER PROFILE - CUMBERLAND

STA: 11+38 to STA: 17+38

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

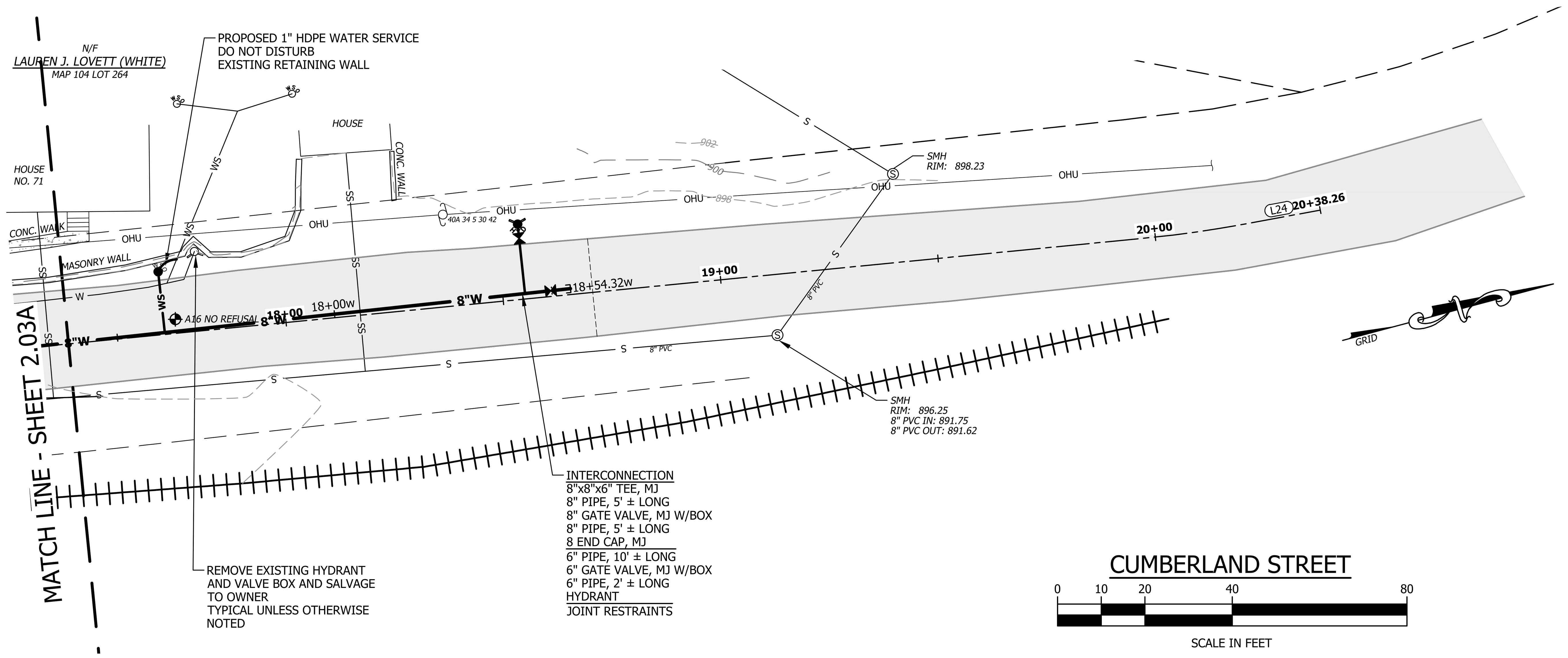
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

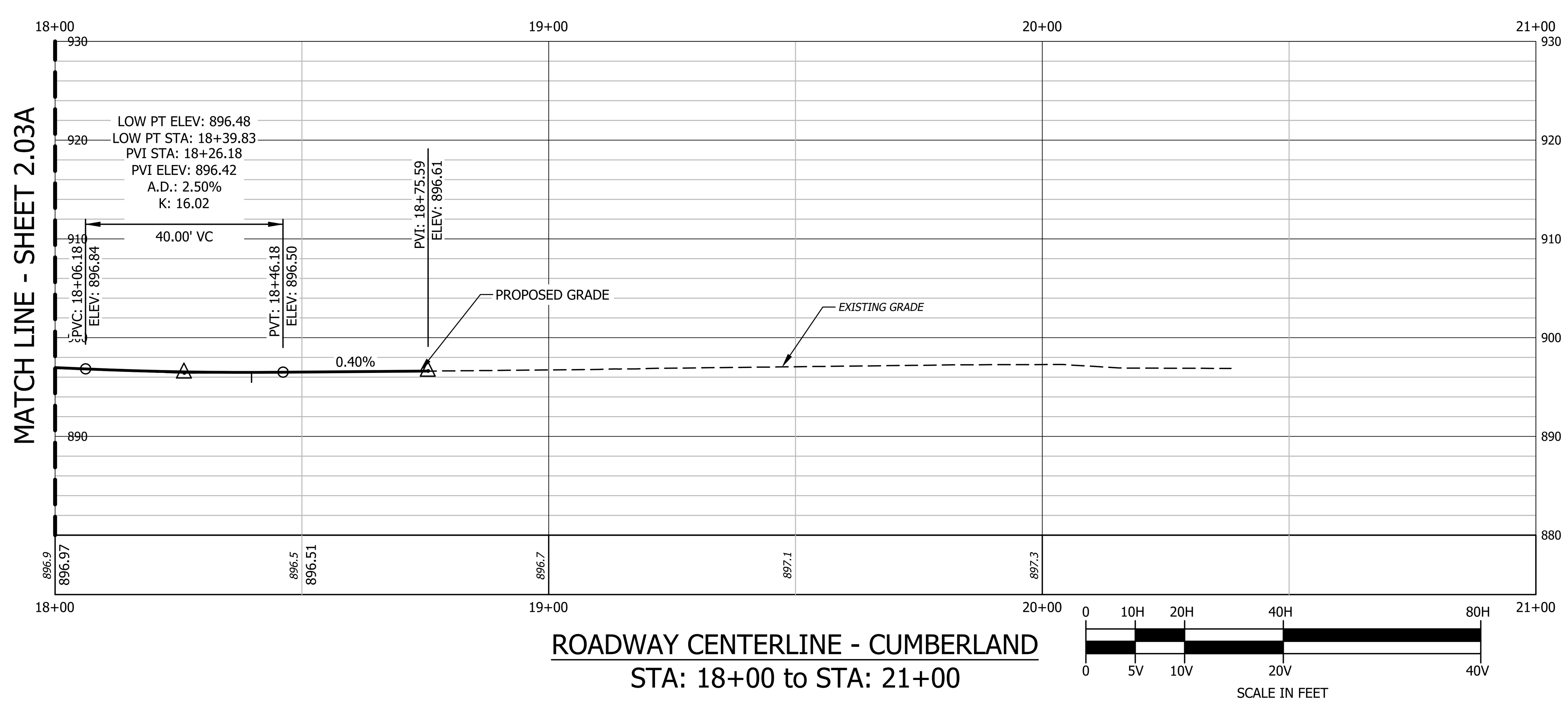
TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

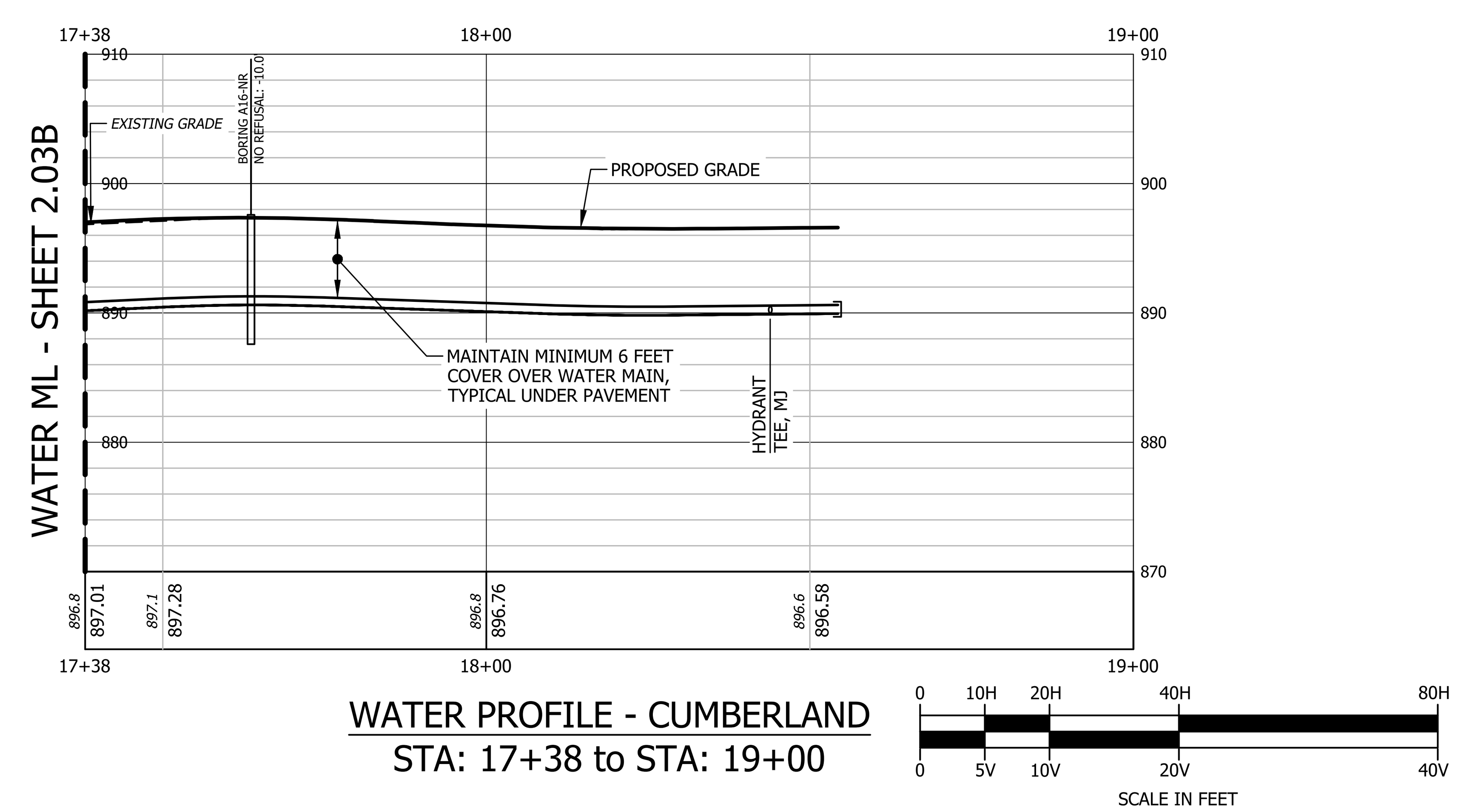
CUMBERLAND STREET
SEWER PROFILE STA 11+76 TO 16+25

SHEET 2.03B

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.3B, 7/10/2024 9:40:34 AM, KarenPhilbrick







NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

STATE OF NEW HAMPSHIRE · PROFESSIONAL ENGINEER

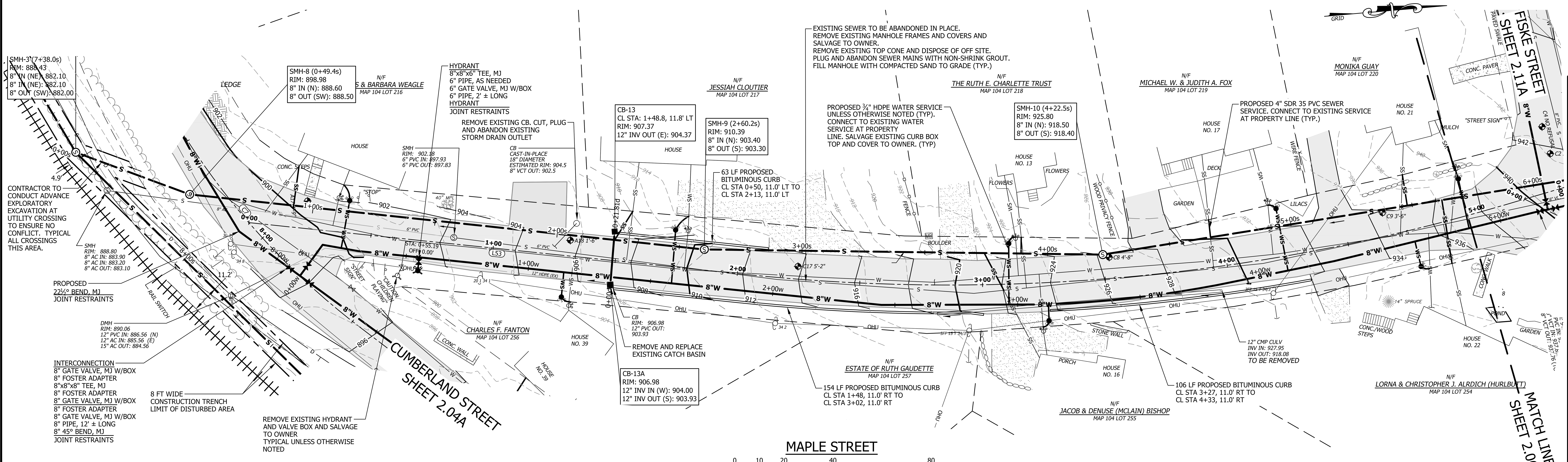
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS
CUMBERLAND STREET
PLAN AND ROAD PROFILE STA 18+00 TO 20+88
WATER PROFILE STA 17+38 TO 19+00

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

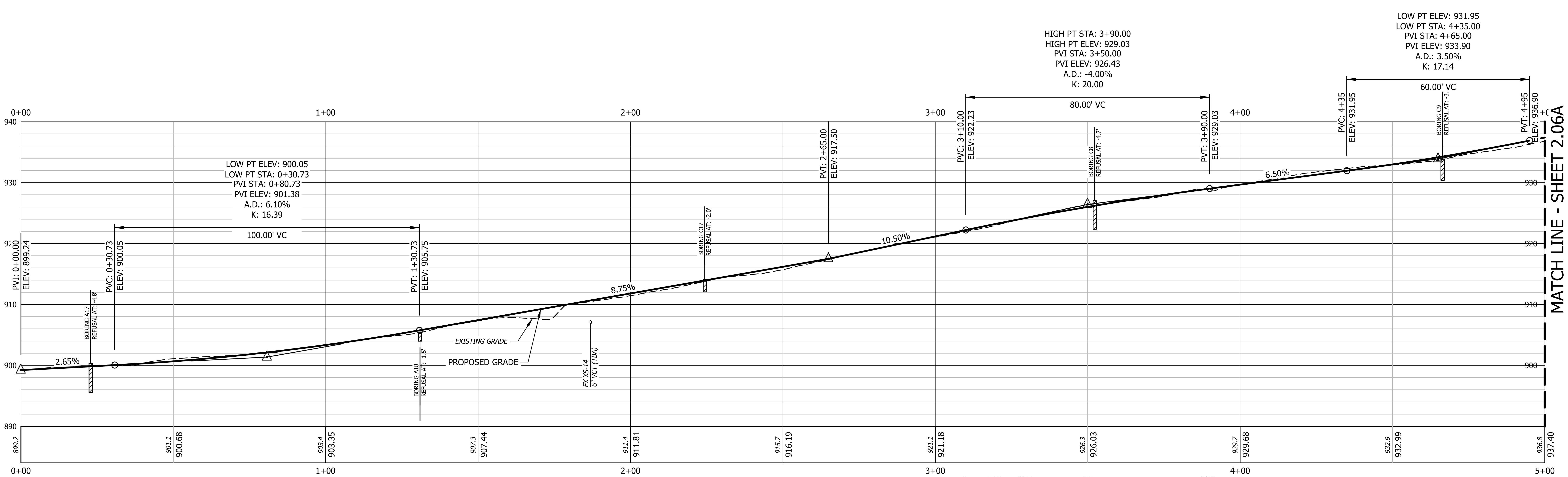
DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

SHEET 2.04A



ROADWAY CENTERLINE - MAPLE

LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
L53	---	203.49'	N10° 56' 57.23"E	---	0+00
L60	---	51.33'	N11° 18' 53.70"W	---	5+14.36
L62	---	83.79'	N11° 24' 57.56"W	---	7+00.81
L65	---	118.95'	N20° 26' 15.34"W	---	8+16.09
L68	---	182.35'	N20° 14' 30.30"W	---	11+37.02



ROADWAY CENTERLINE - MAPLE
STA: 0+00 to STA: 5+00

0 10H 20H 40H 80H
0 5V 10V 20V 40V
SCALE IN FEET

BIDDING DOCUMENT NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	DWG	ENG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

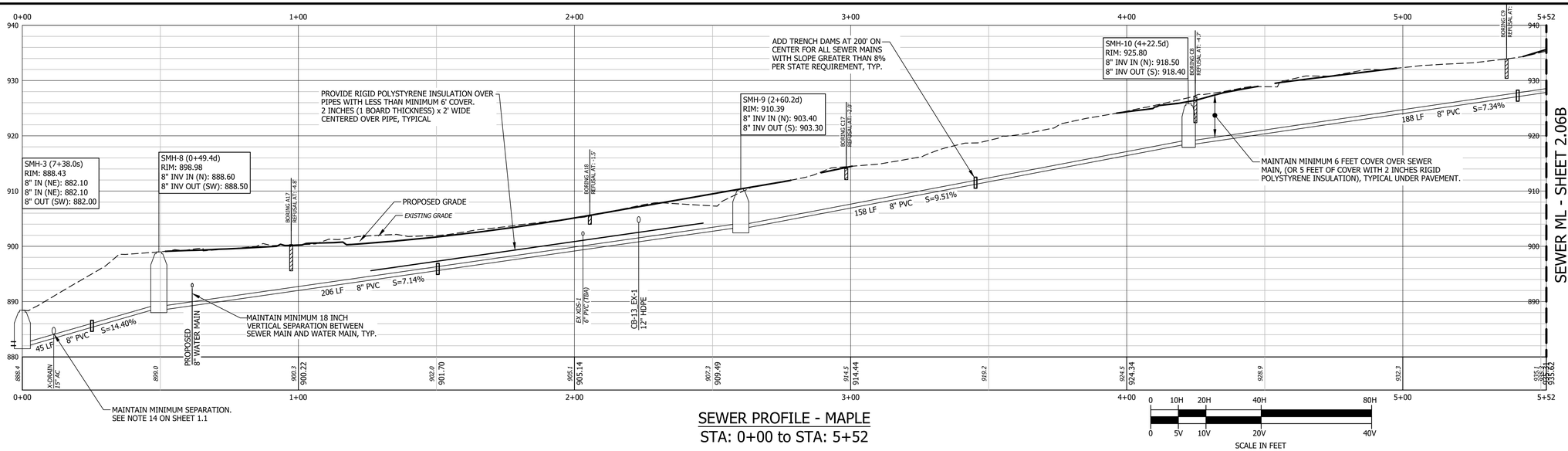
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

MAPLE STREET
PLAN AND PROFILE STA 0+00 TO 5+00

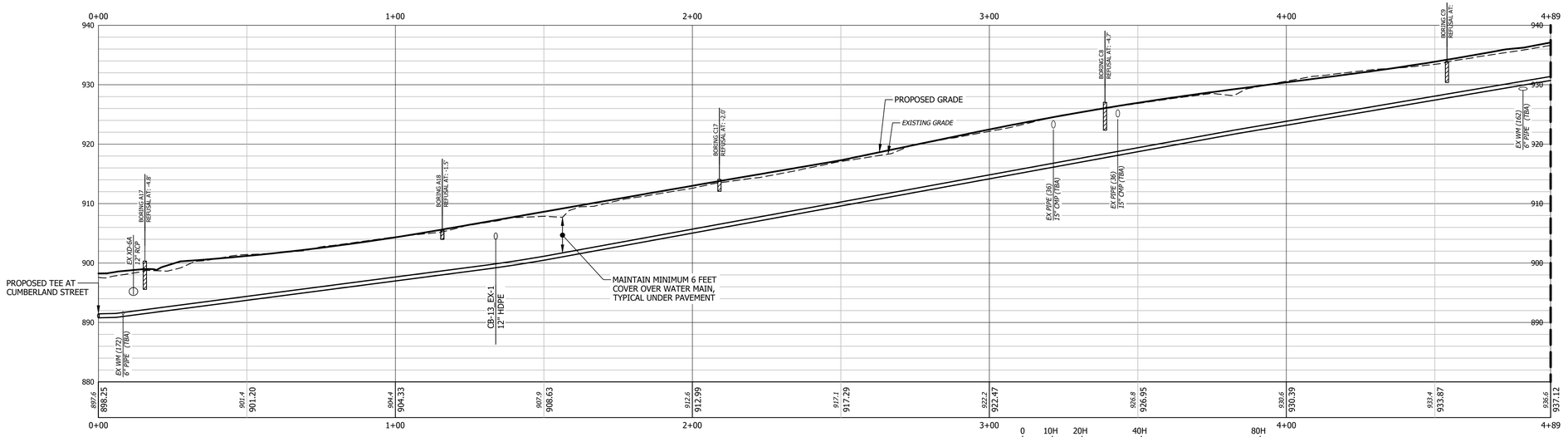
SHEET 2.05A

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.5, 7/10/2024 9:42:03 AM, KarenPhilbrick



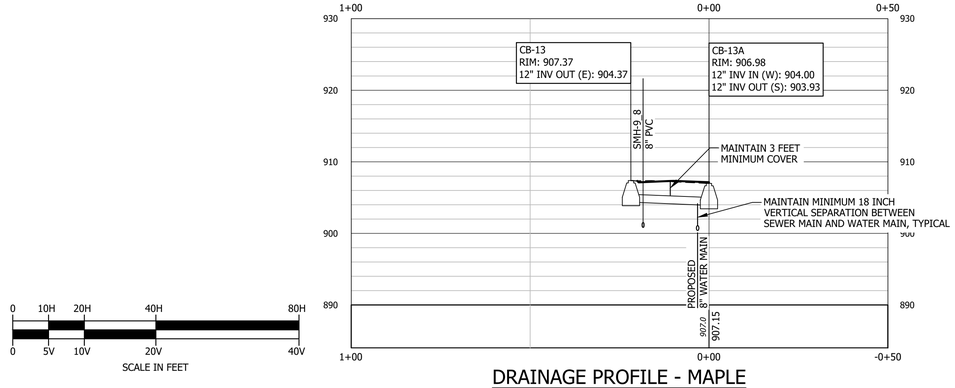
SEWER PROFILE - MAPLE
STA: 0+00 to STA: 5+52

SEWER ML - SHEET 2.06B



WATER PROFILE - MAPLE
STA: 0+00 to STA: 4+89

WATER ML - SHEET 2.06B



DRAINAGE PROFILE - MAPLE
STA: -0+50 TO STA: 1+00

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH
3	7/3/2024	CONTINGENT PLAN EDITS FOR NHDES WWEB APPROVAL	SML	KRP

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

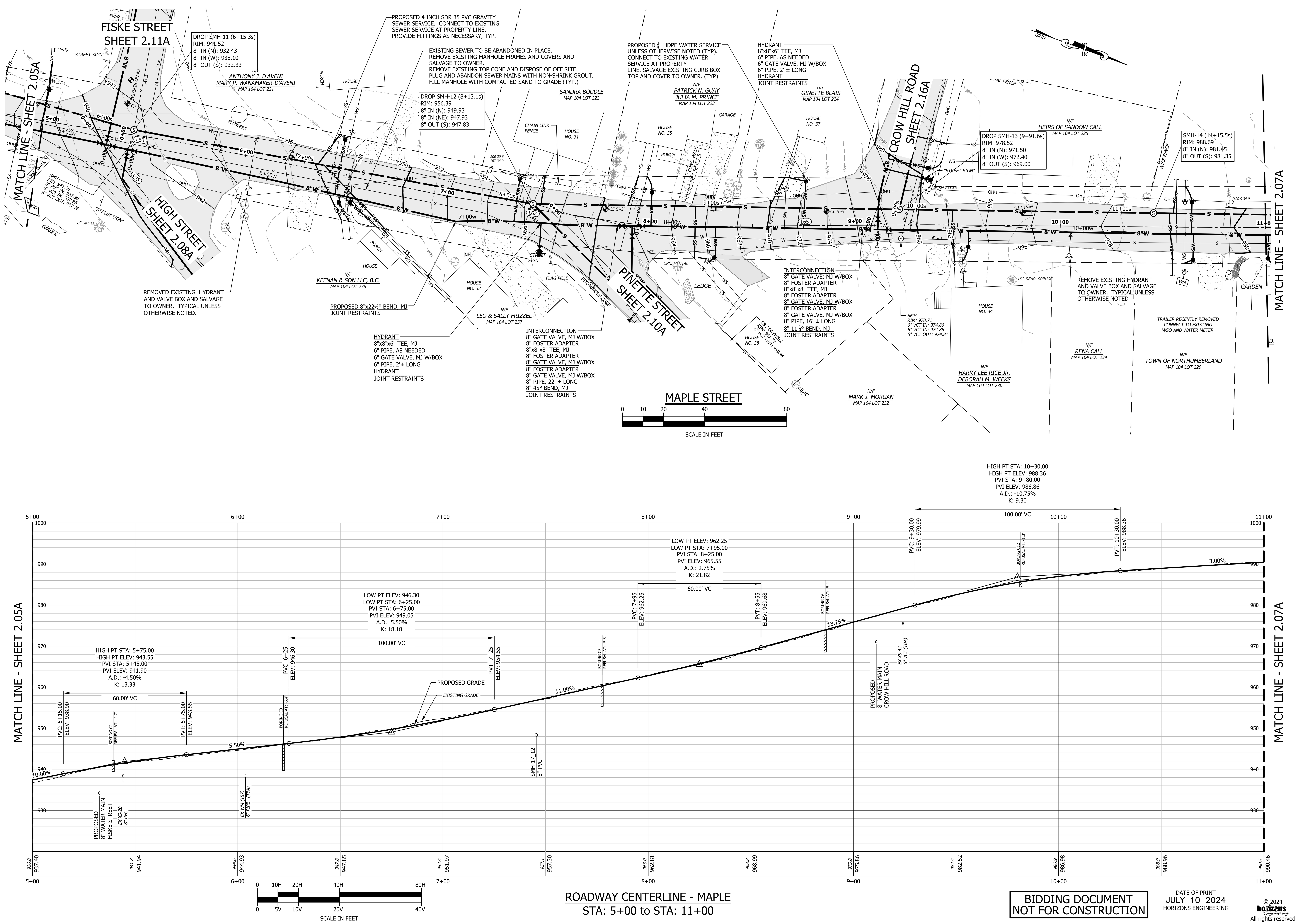
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS
MAPLE STREET
SEWER PROFILE STA 0+00 TO 5+35
WATER PROFILE STA 0+00 TO 4+89 AND DRAINAGE PROFILE

SHEET 2.05B

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING



BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH
3	7/3/2024	CONTINGENT PLAN EDITS FOR NHDES WWEB APPROVAL	SML	KRP

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	RLH
DRAWN BY:	RLH
CHECKED BY:	SML

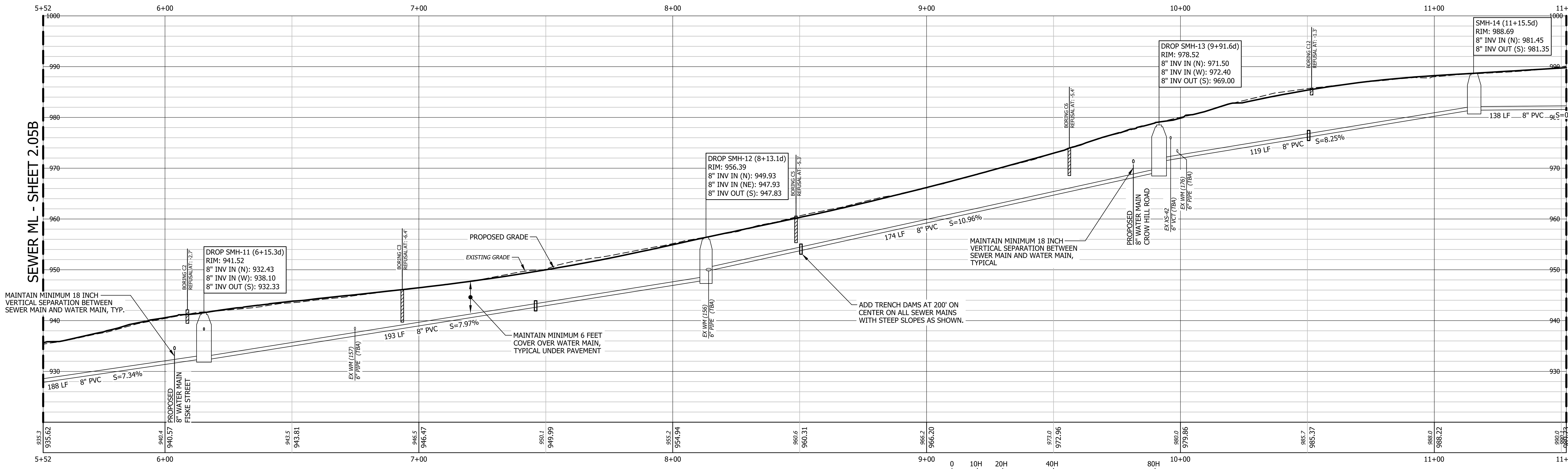
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

MAPLE STREET
ROAD PLAN AND PROFILE STA 5+00 TO 11+00

SHEET 2.06A

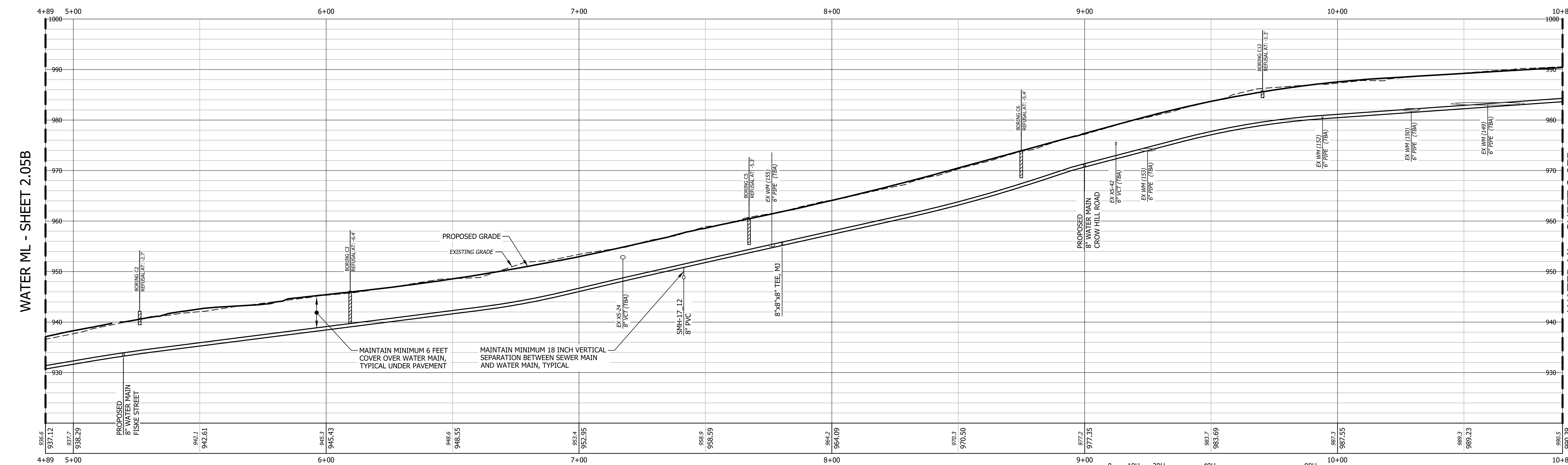
Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.6, 7/10/2024 9:43:48 AM, KarenPhilbrick



SEWER PROFILE - MAPLE

STA: 5+52 to STA: 11+52

SCALE IN FEET: 0, 10H, 20H, 40H, 80H / 0, 5V, 10V, 20V, 40V



WATER PROFILE - MAPLE

STA: 4+89 to STA: 10+89

SCALE IN FEET: 0, 10H, 20H, 40H, 80H / 0, 5V, 10V, 20V, 40V

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE):	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

STATE OF NEW HAMPSHIRE - PROFESSIONAL ENGINEER

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND

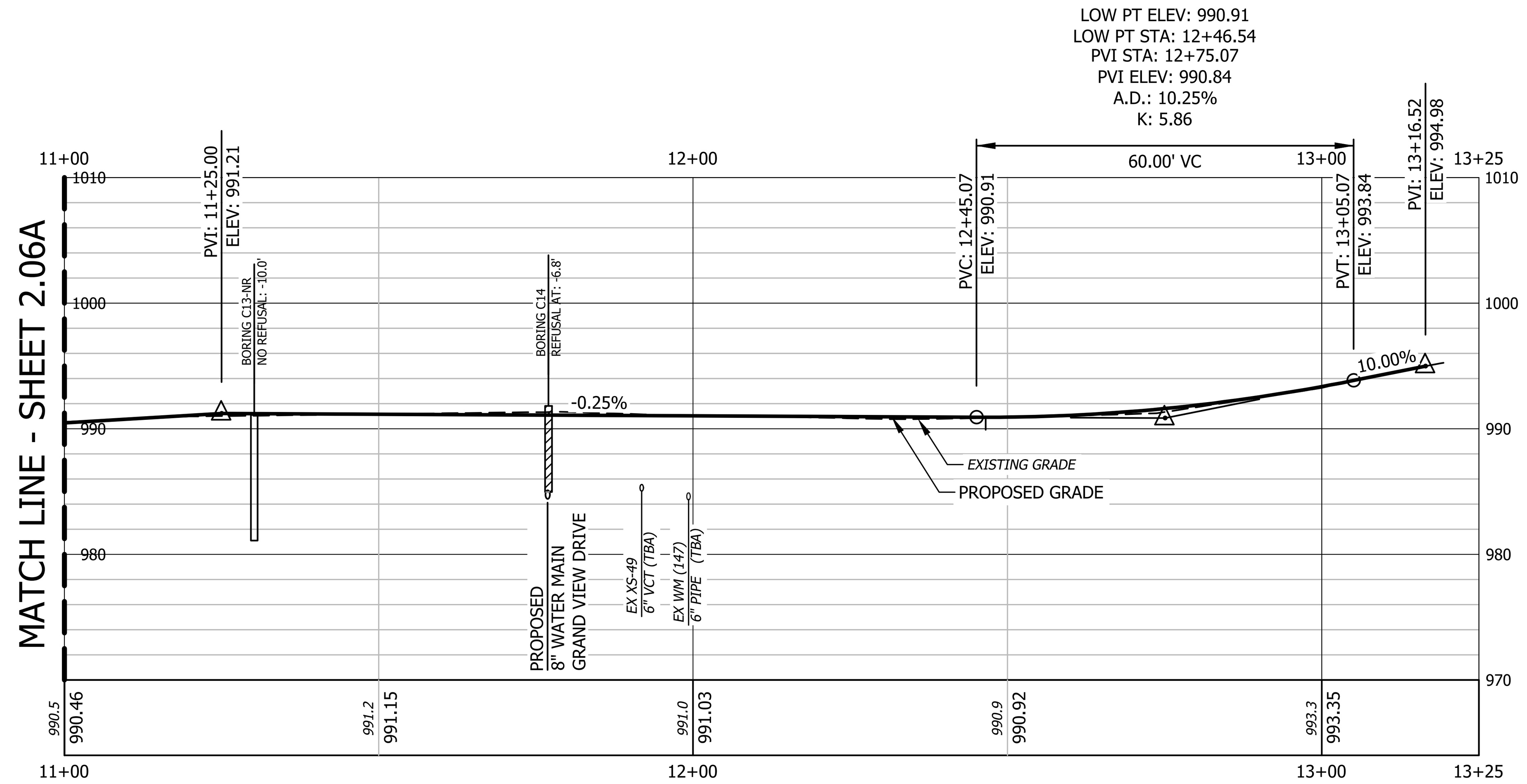
NORTHUMBERLAND, NEW HAMPSHIRE

SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

MAPLE STREET
SEWER PROFILE STA 5+35 TO 11+35
WATER PROFILE STA 4+89 TO 10+89

SHEET 2.06B

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.6B, 7/10/2024 9:44:37 AM, KarenPhilbrick

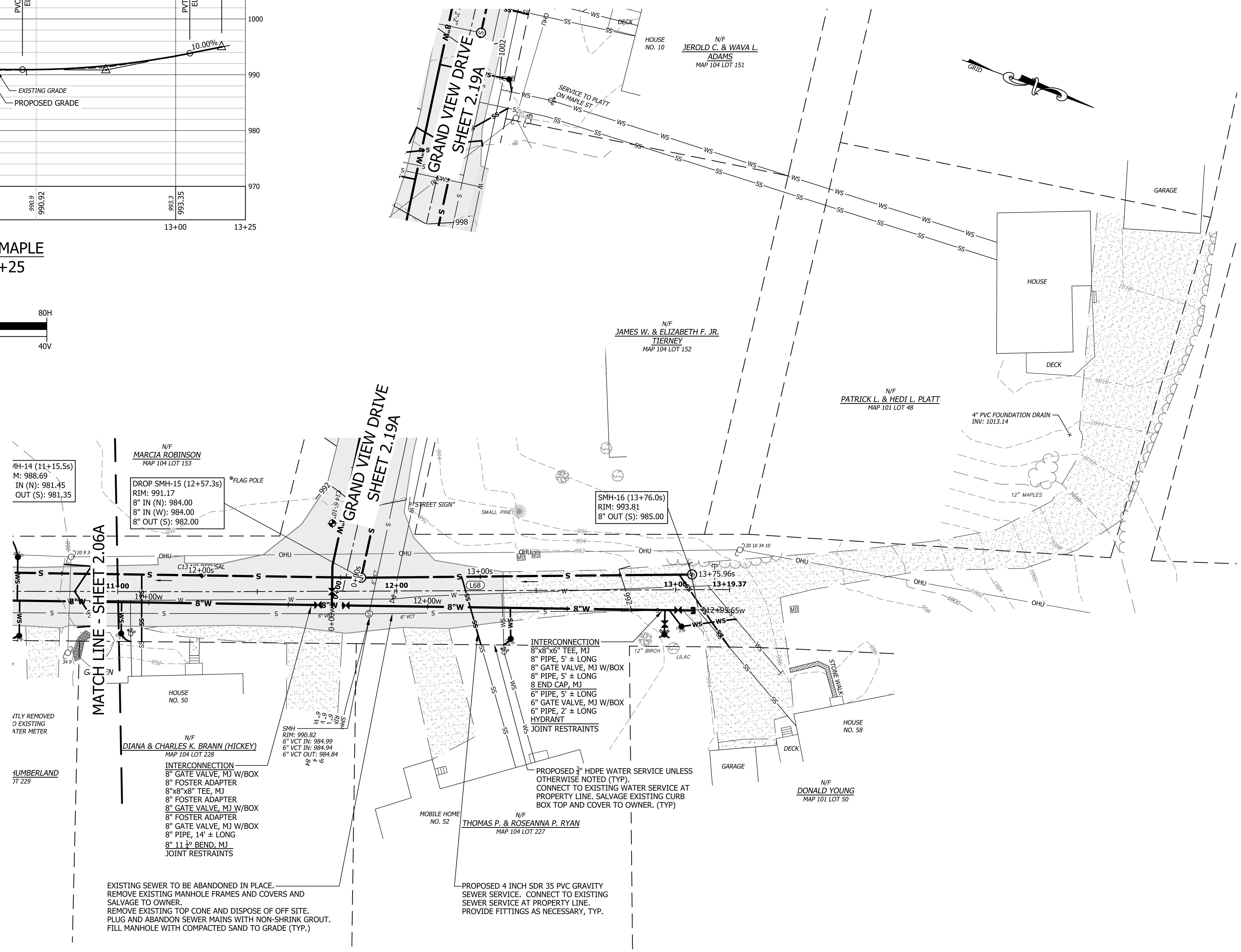


ROADWAY CENTERLINE - MAPLE

STA: 11+00 to STA: 13+25

SCALE IN FEET

ROADWAY CENTERLINE - MAPLE					
LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
L53	---	203.49'	N10° 56' 57.23"E	---	0+00
L60	---	51.33'	N11° 18' 53.70"W	---	5+14.36
L62	---	83.79'	N11° 24' 57.56"W	---	7+00.81
L65	---	118.95'	N20° 26' 15.34"W	---	8+16.09
L68	---	182.35'	N20° 14' 30.30"W	---	11+37.02



MAPLE STREET

SCALE IN FEET

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND

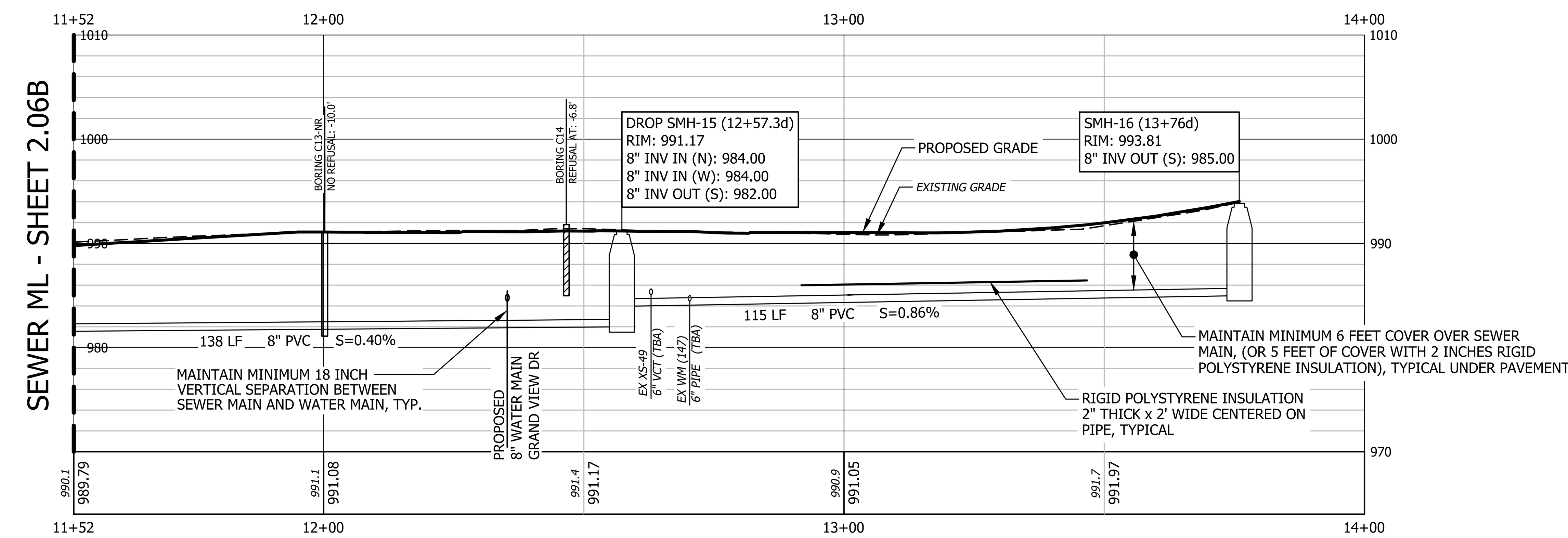
NORTHUMBERLAND, NEW HAMPSHIRE

SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

MAPLE STREET

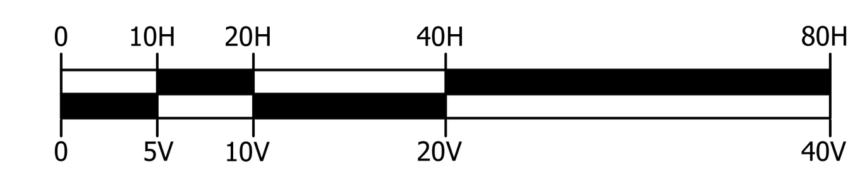
ROAD PLAN AND PROFILE STA 11+00 TO 13+25
WATER AND SEWER SERVICE TO MAP 101 LOT 48

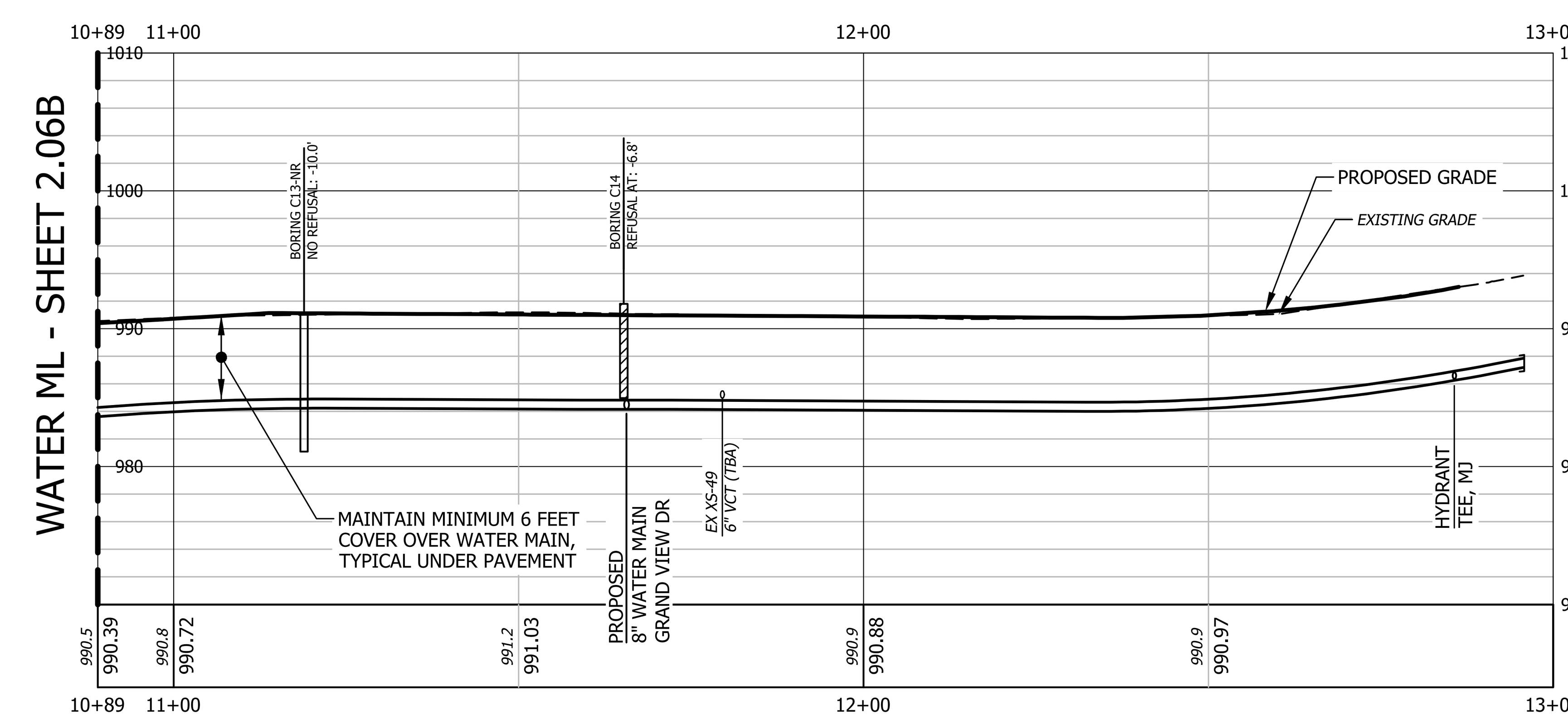
SHEET 2.07A



SEWER PROFILE - MAPLE

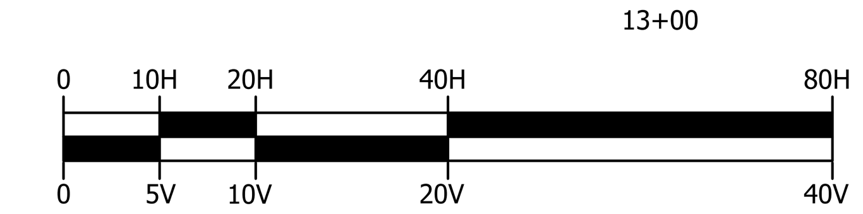
STA: 11+52 to STA: 14+00





WATER PROFILE - MAPLE

STA: 10+89 to STA: 13+00



BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH
3	7/3/2024	CONTINGENT PLAN EDITS FOR NHDES WWEB APPROVAL	SML	KRP

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

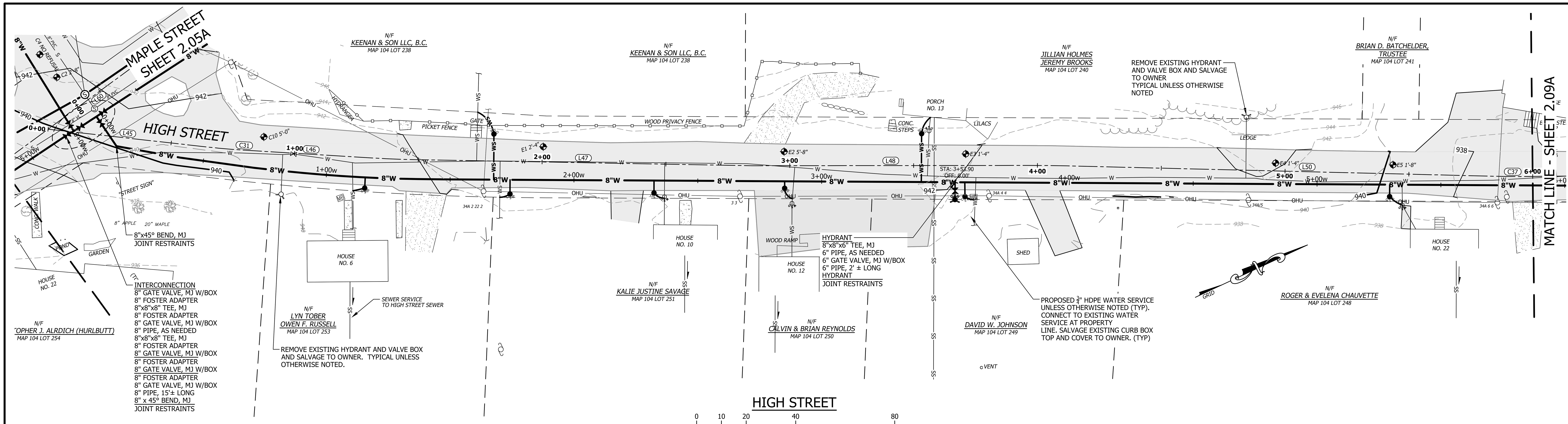
STATE OF NEW HAMPSHIRE · Stephen M. LaFrance No. 7145 · LICENSED · PROFESSIONAL ENGINEER

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS
MAPLE STREET
SEWER PROFILE STA 11+00 TO 13+50
WATER PROFILE STA 10+89 TO 13+00

SHEET 2.07B

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.7B, 7/10/2024 9:46:11 AM, KarenPhilbrick



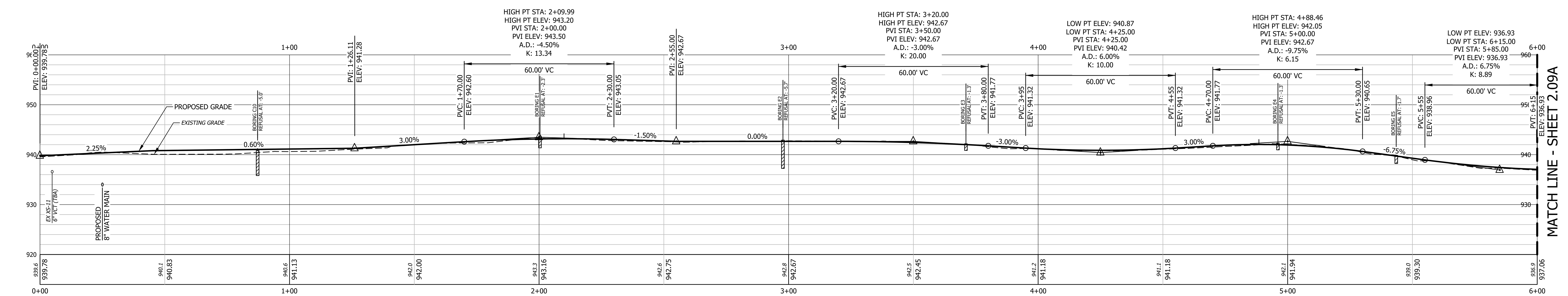
HIGH STREET

0 10 20 40 80

SCALE IN FEET

ROADWAY CENTERLINE - HIGH

LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
L45	---	64.29'	N31° 22' 59.90"E	---	0+00
C31	300.00'	15.22'	N29° 55' 47.71"E	15.22'	0+64.29
L46	---	51.89'	N28° 28' 35.53"E	---	0+79.51
L47	---	136.35'	N26° 01' 57.82"E	---	1+48.47
L48	---	111.92'	N24° 56' 26.46"E	---	2+84.82
L50	---	172.09'	N26° 23' 21.93"E	---	4+11.91
C37	450.00'	15.84'	N25° 22' 50.63"E	15.84'	5+83.99
L51	---	36.87'	N24° 22' 19.33"E	---	5+99.84
C38	300.00'	14.07'	N23° 01' 43.92"E	14.06'	6+36.71
L52	---	133.78'	N21° 41' 08.51"E	---	6+50.78



ROADWAY CENTERLINE - HIGH
STA: 0+00 to STA: 6+00

0 10H 20H 40H 80H
0 5V 10V 20V 40V
SCALE IN FEET

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

STATE OF NEW HAMPSHIRE - Stephen M. LaFrance No. 7345 - LICENSED - PROFESSIONAL ENGINEER

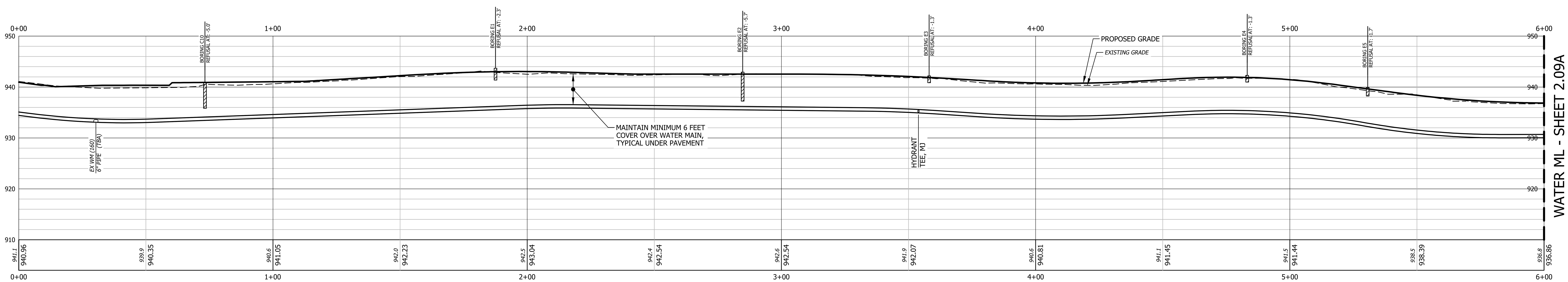
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

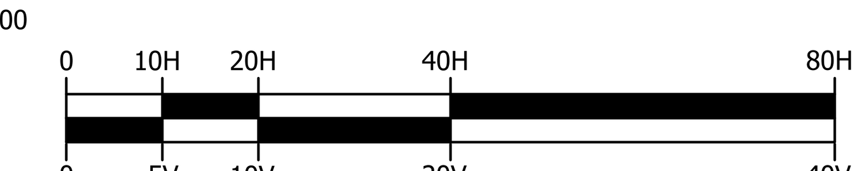
HIGH STREET
PLAN AND PROFILE STA 0+00 TO 6+00

SHEET 2.08A

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.8, 7/10/2024 9:46:35 AM, KarenPhilbrick



WATER PROFILE - HIGH
STA: 0+00 to STA: 6+00



SCALE IN FEET

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

STATE OF NEW HAMPSHIRE · Stephen M. LaFrance No. 7145 · LICENSED · PROFESSIONAL ENGINEER

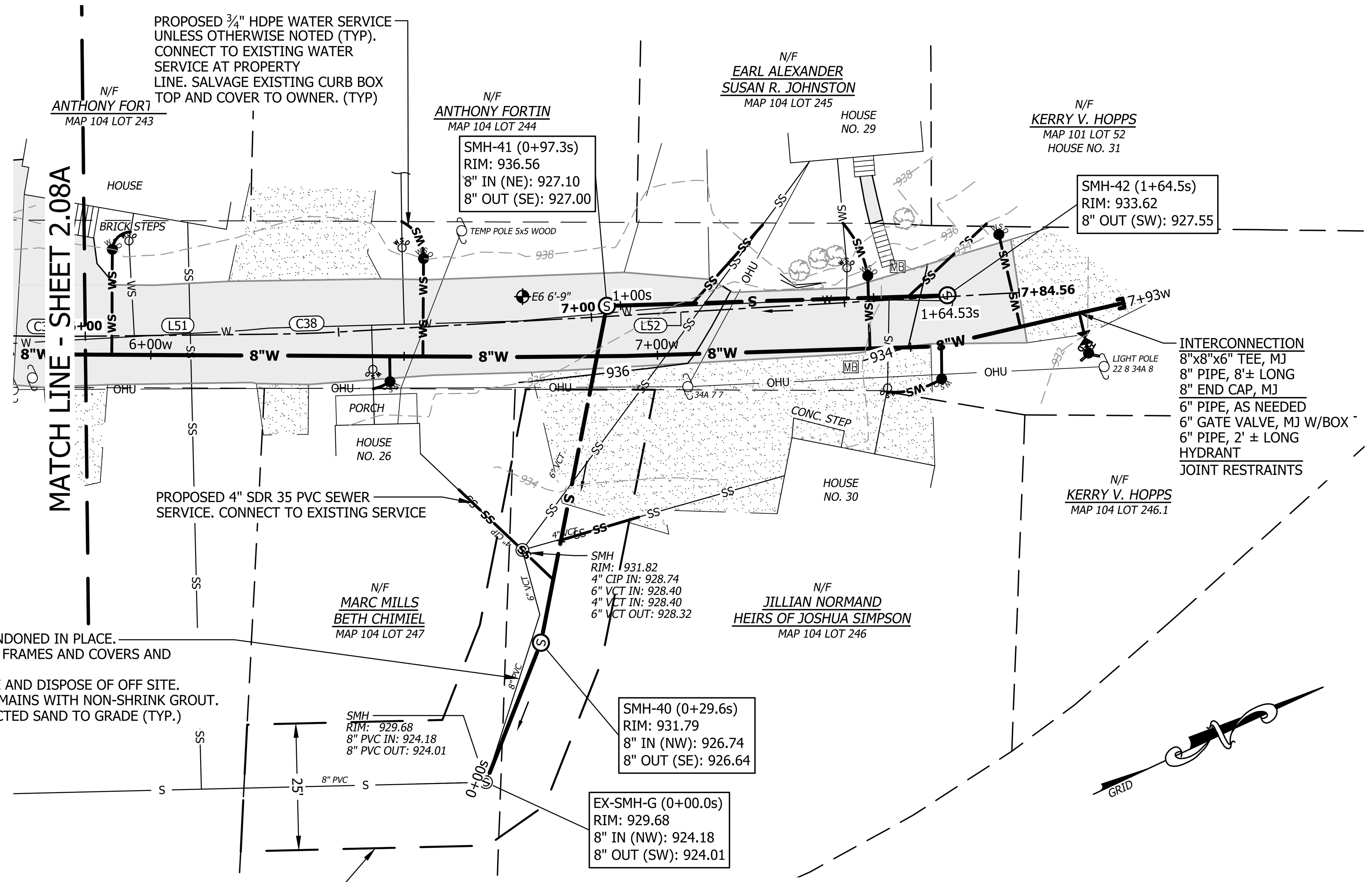
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE · NEW HAMPSHIRE · VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

HIGH STREET
WATER PROFILE STA 0+00 TO 6+00

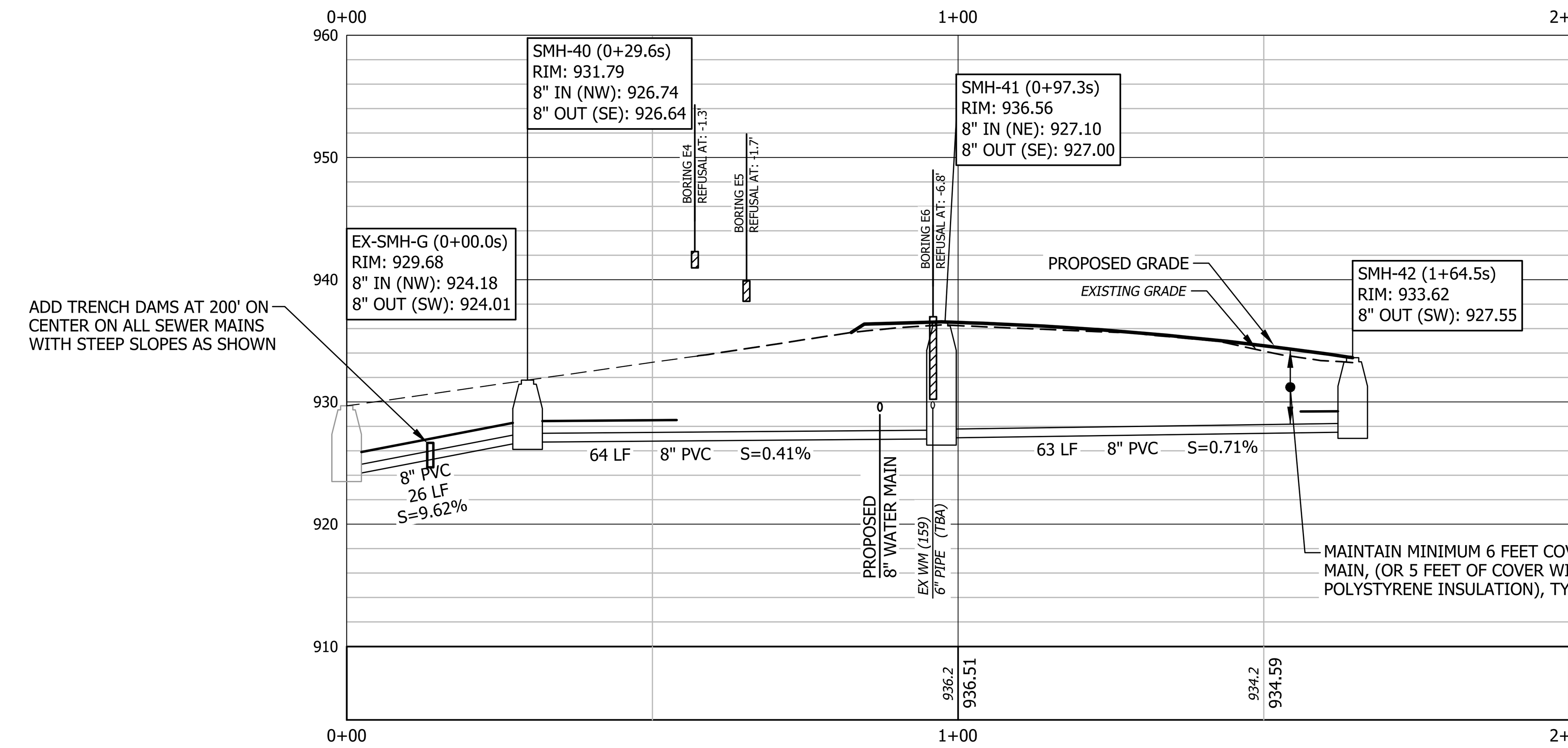
SHEET 2.08B

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.8B, 7/10/2024 9:47:16 AM, KarenPhilbrick



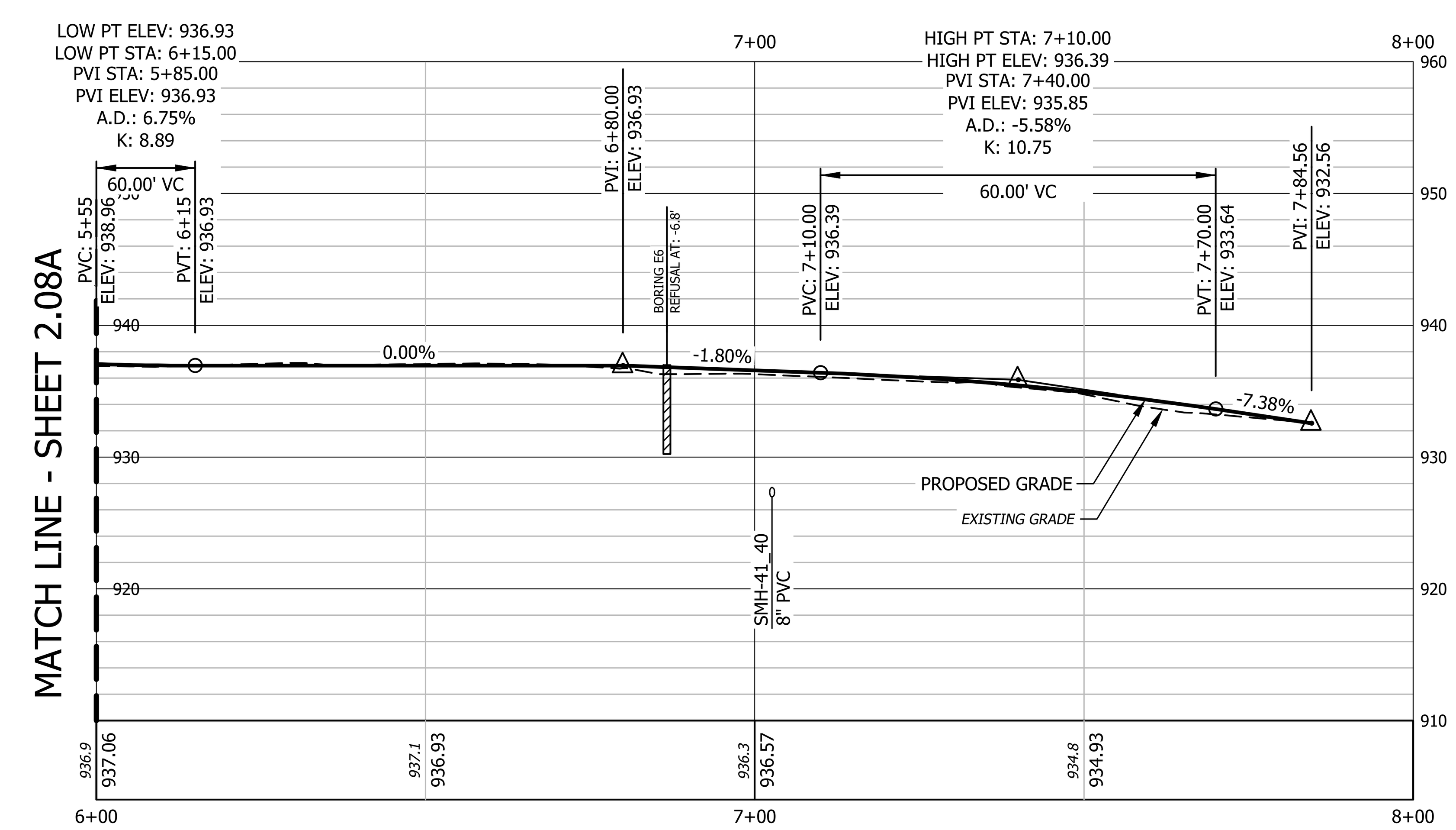
HIGH STREET

0 10 20 40 80
SCALE IN FEET



SEW-HIGH
STA: 0+00 to STA: 2+00

0 10H 20H 40H 80H
0 5V 10V 20V 40V
SCALE IN FEET

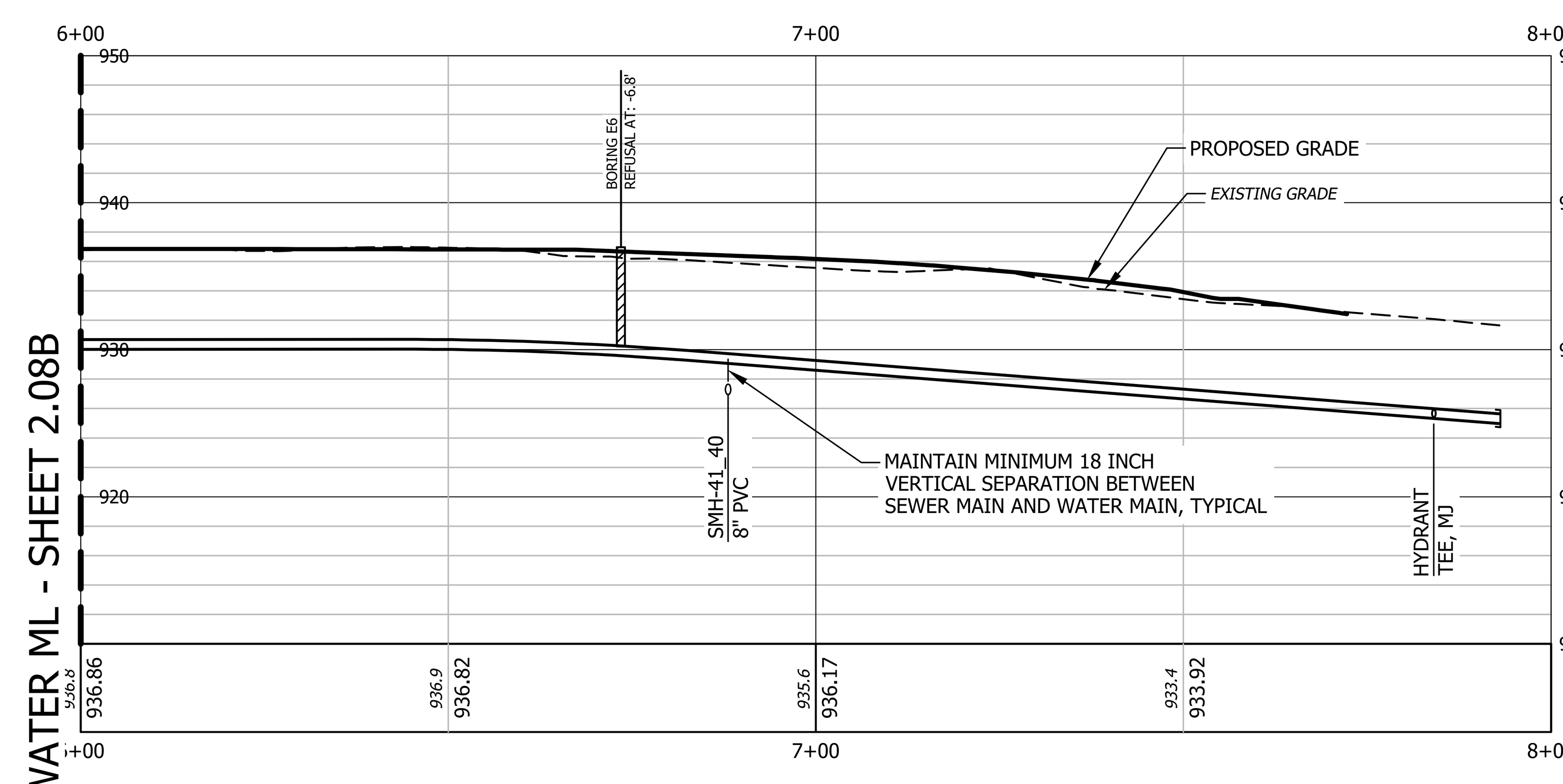


ROADWAY CENTERLINE - HIGH
STA: 6+00 to STA: 8+00

0 10H 20H 40H 80H
0 5V 10V 20V 40V
SCALE IN FEET

ROADWAY CENTERLINE - HIGH

LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
L45	---	64.29'	N31° 22' 59.90"E	---	0+00
C31	300.00'	15.22'	N29° 55' 47.71"E	15.22'	0+64.29
L46	---	51.89'	N28° 28' 35.53"E	---	0+79.51
L47	---	136.35'	N26° 01' 57.82"E	---	1+48.47
L48	---	111.92'	N24° 56' 26.46"E	---	2+84.82
L50	---	172.09'	N26° 23' 21.93"E	---	4+11.91
C37	450.00'	15.84'	N25° 22' 50.63"E	15.84'	5+83.99
L51	---	36.87'	N24° 22' 19.33"E	---	5+99.84
C38	300.00'	14.07'	N23° 01' 43.92"E	14.06'	6+36.71
L52	---	133.78'	N21° 41' 08.51"E	---	6+50.78

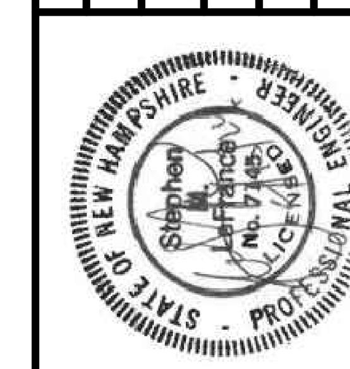


WATER PROFILE - HIGH
STA: 6+00 to STA: 8+00

0 10H 20H 40H 80H
0 5V 10V 20V 40V
SCALE IN FEET

NO.	DATE	REVISION DESCRIPTION	DWG	ENG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	KRP	SML
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	RLH	SML

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML



horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

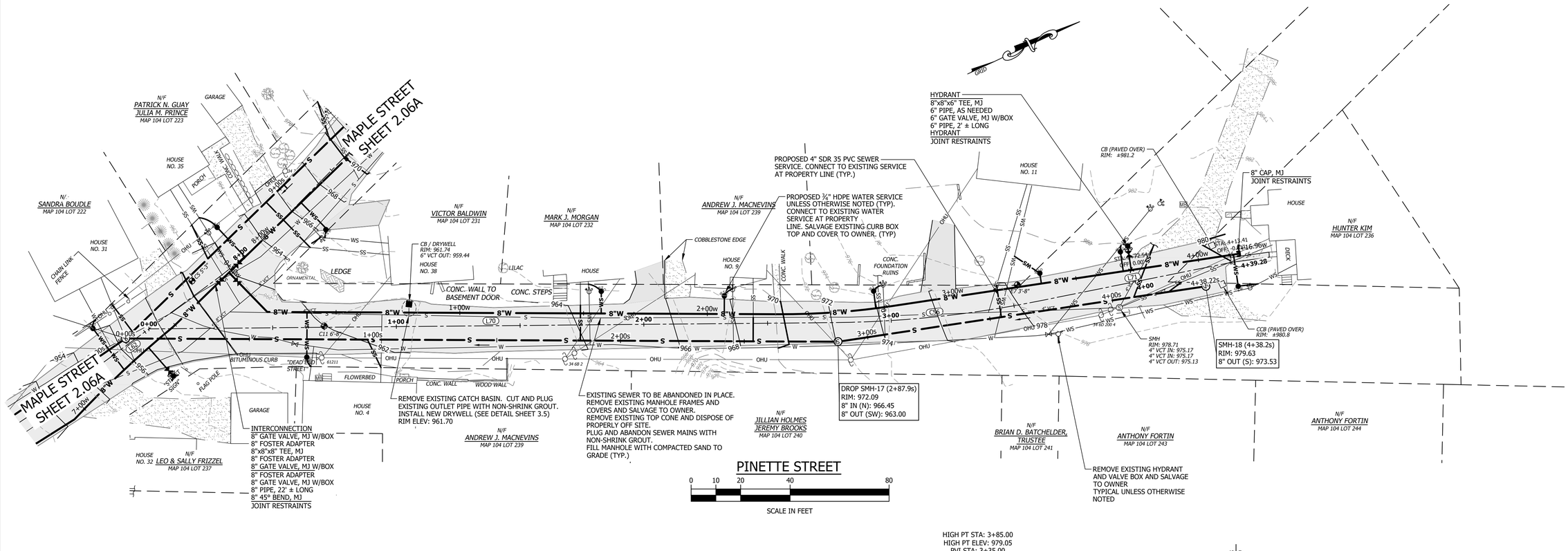
TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS
HIGH STREET PLAN AND PROFILES
ROAD AND WATER PROFILES STA 6+00 TO 8+00
SEWER PROFILE

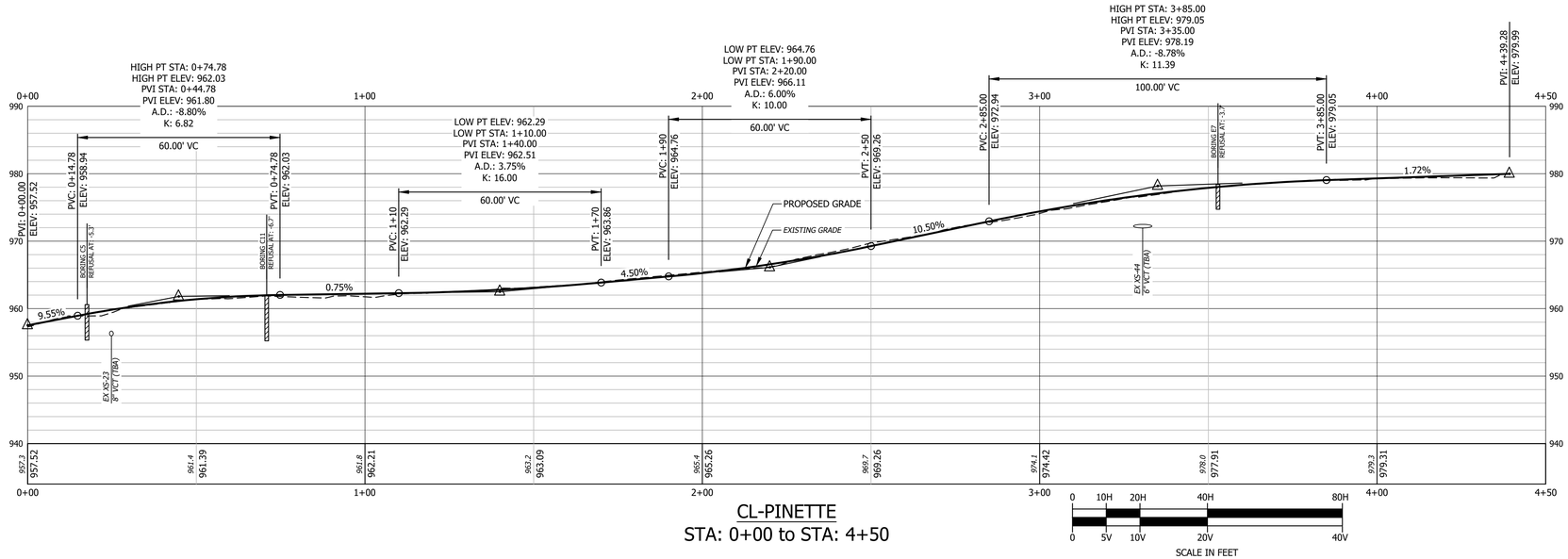
BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

SHEET 2.09A

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.9, 7/10/2024 9:47:32 AM, KarenPhilbrick





CL-PINETTE
STA: 0+00 to STA: 4+50

ROADWAY CENTERLINE - PINETTE

LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
L70	---	276.39'	N24° 28' 25.37"E	---	0+00
C56	440.00'	82.75'	N19° 05' 09.78"E	82.63'	2+76.39
L71	---	80.14'	N13° 38' 46.26"E	---	3+59.14

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

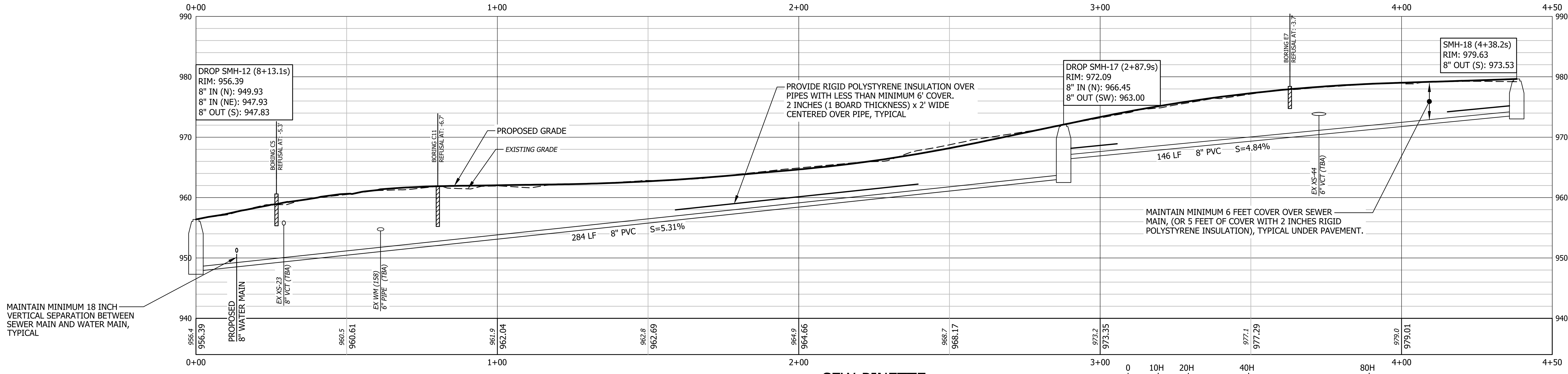
PROJECT #: 221174
DATE: APRIL 2024
MAP-LOT (OR ARCHIVE): -
SURVEYED BY: HEI
ENGINEERED BY: HEI
DRAWN BY: RLH
CHECKED BY: SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

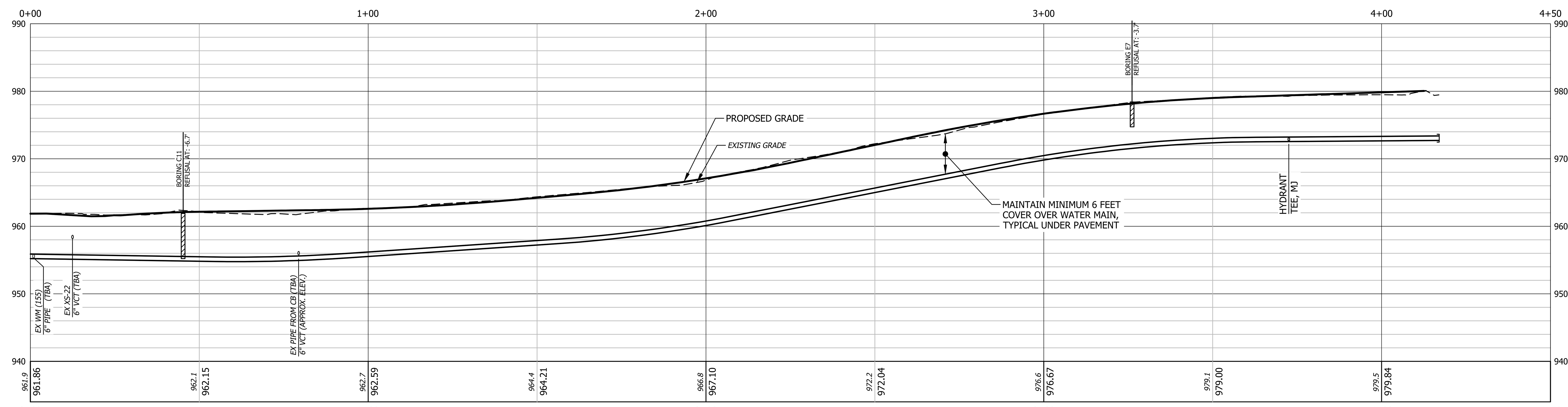
PINETTE STREET
PLAN AND PROFILE

SHEET 2.10A



0 10H 20H 40H 80H
0 5V 10V 20V 40V
SCALE IN FEET

SEW-PINETTE
STA: 0+00 to STA: 4+50



0 10H 20H 40H 80H
0 5V 10V 20V 40V
SCALE IN FEET

WAT-PINETTE
STA: 0+00 to STA: 4+50

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

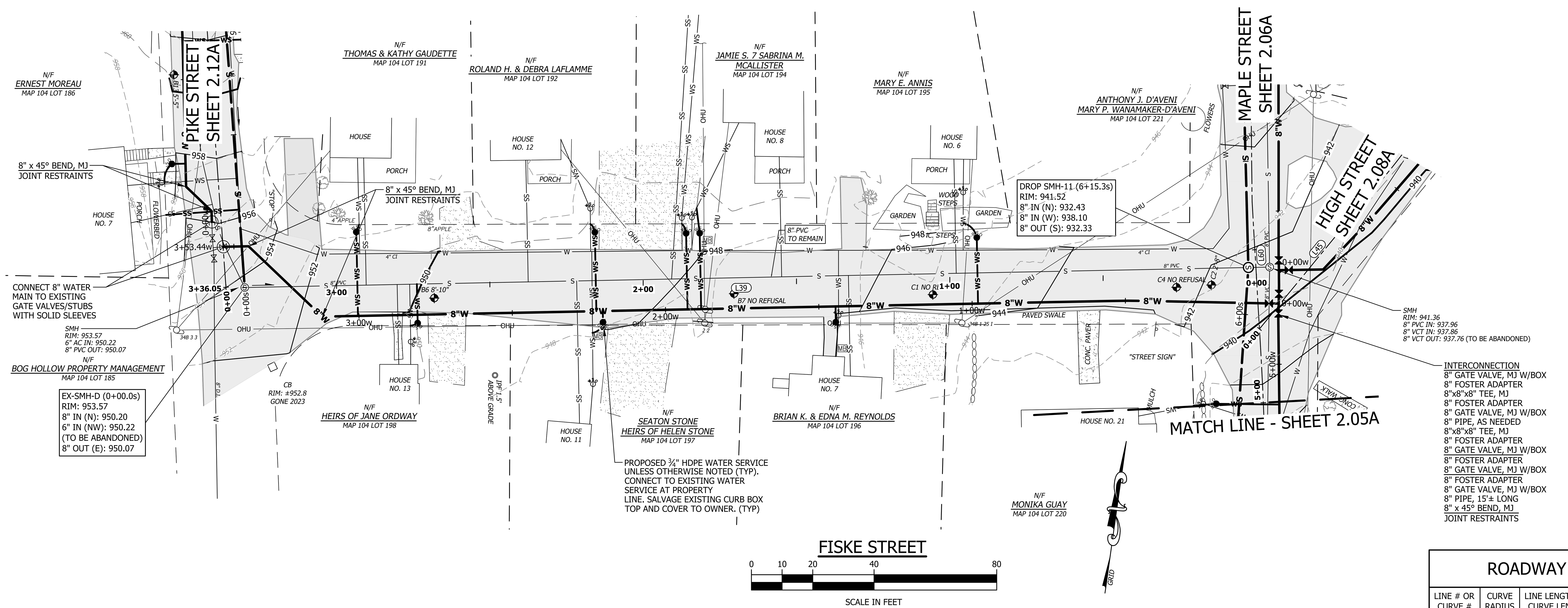
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

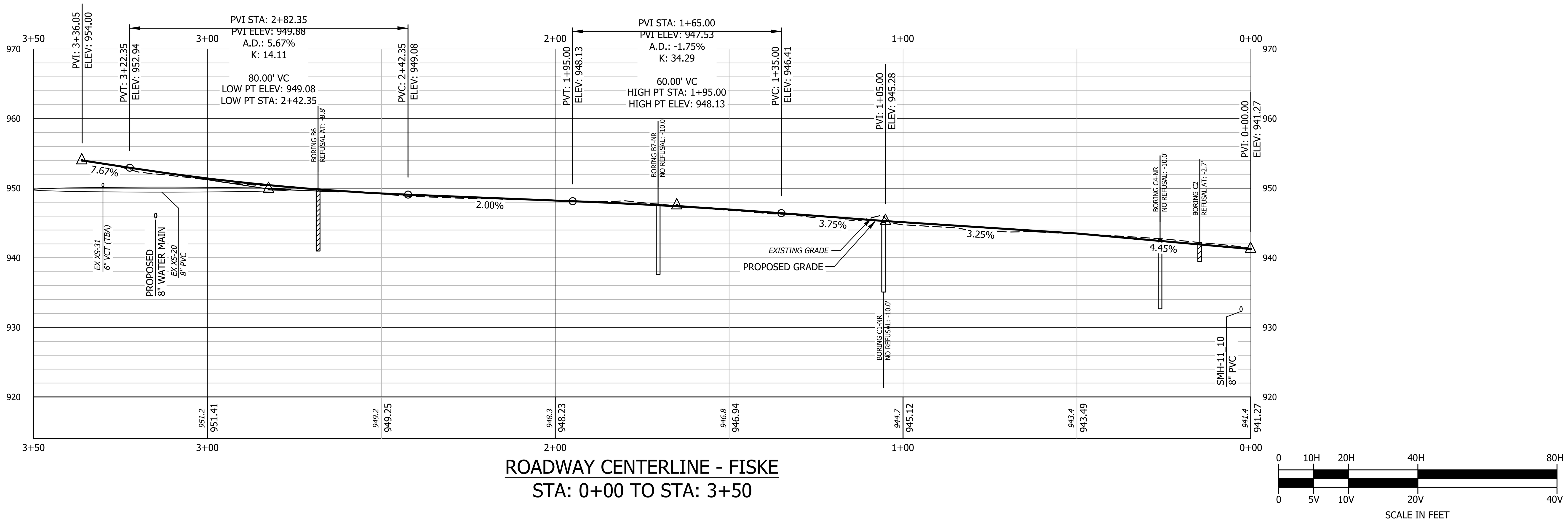
PINETTE STREET
SEWER PROFILE

SHEET 2.10B

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.10B, 7/10/2024 9:49:33 AM, KarenPhilbrick



ROADWAY CENTERLINE - FISKE					
LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
L39	---	336.05'	S81° 24' 18.66"W	---	0+00



ROADWAY CENTERLINE - FISKE
STA: 0+00 TO STA: 3+50

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH
3	7/3/2024	CONTINGENT PLAN EDITS FOR NHDES WWEB APPROVAL	SML	KRP

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

STATE OF NEW HAMPSHIRE · Stephen M. LaFrance No. 7145 LICENSED PROFESSIONAL ENGINEER

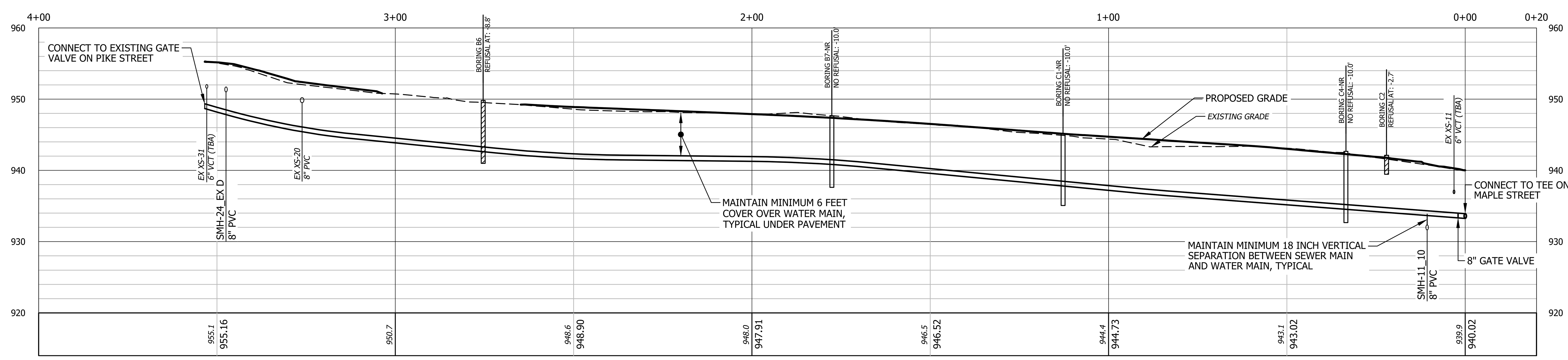
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

FISKE STREET
ROAD PLAN AND PROFILE

SHEET 2.11A

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.11, 7/10/2024 9:49:53 AM, KarenPhilbrick



WATER PROFILE - FISKE

STA: -0+20 TO STA: 4+00

0 10H 20H 40H 80H

0 5V 10V 20V 40V

SCALE IN FEET

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

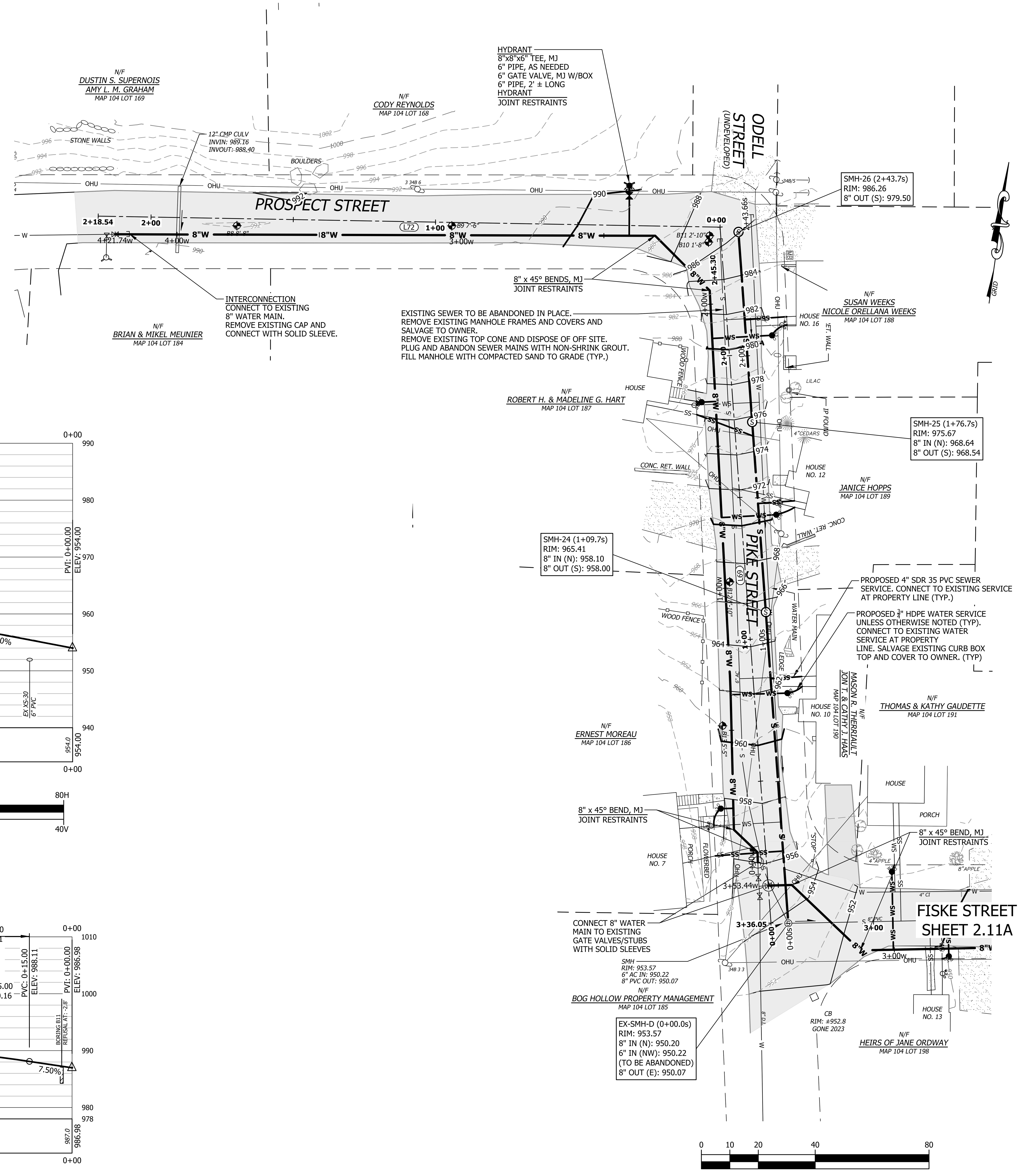
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

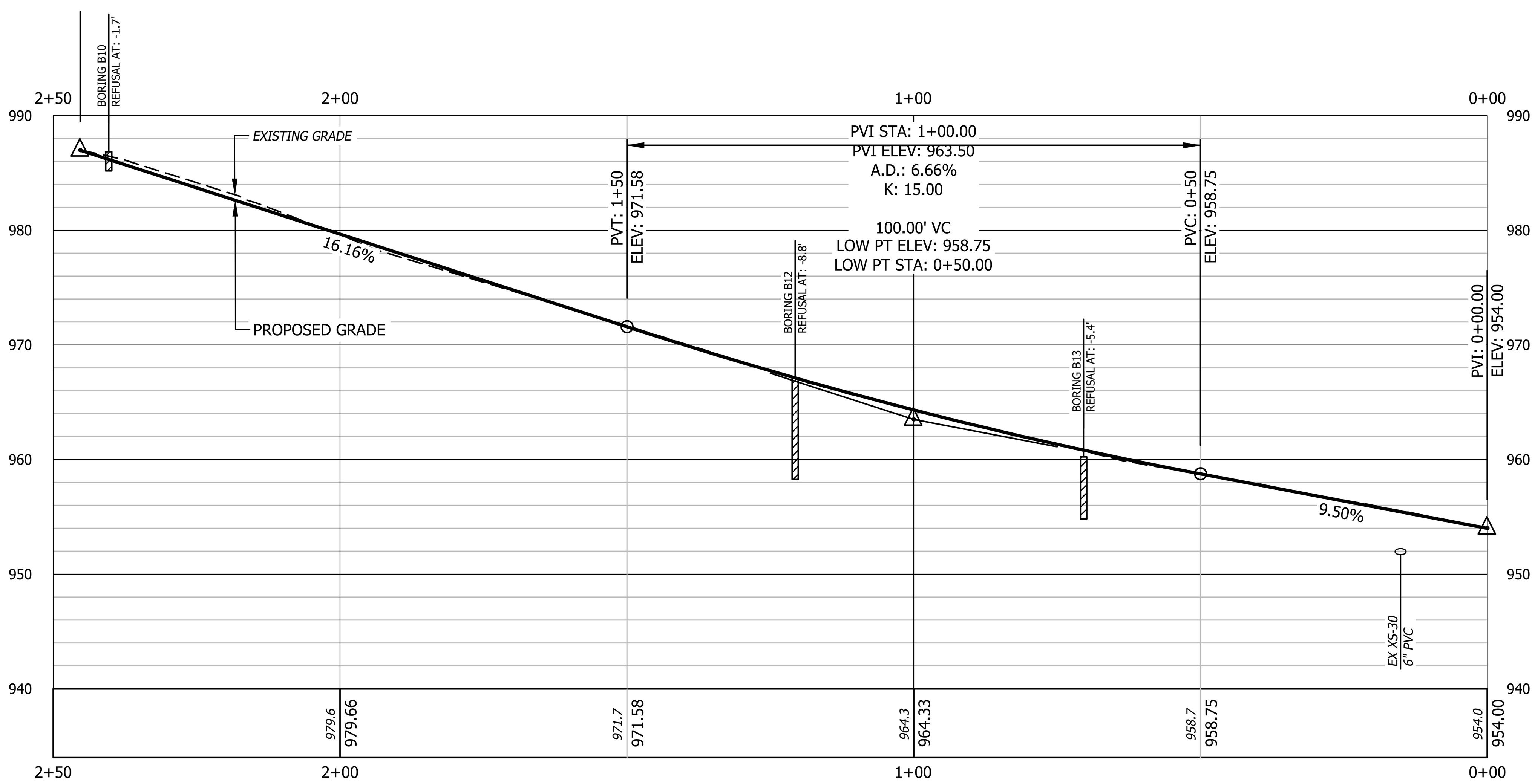
TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

FISKE STREET
WATER PROFILE

SHEET 2.11B

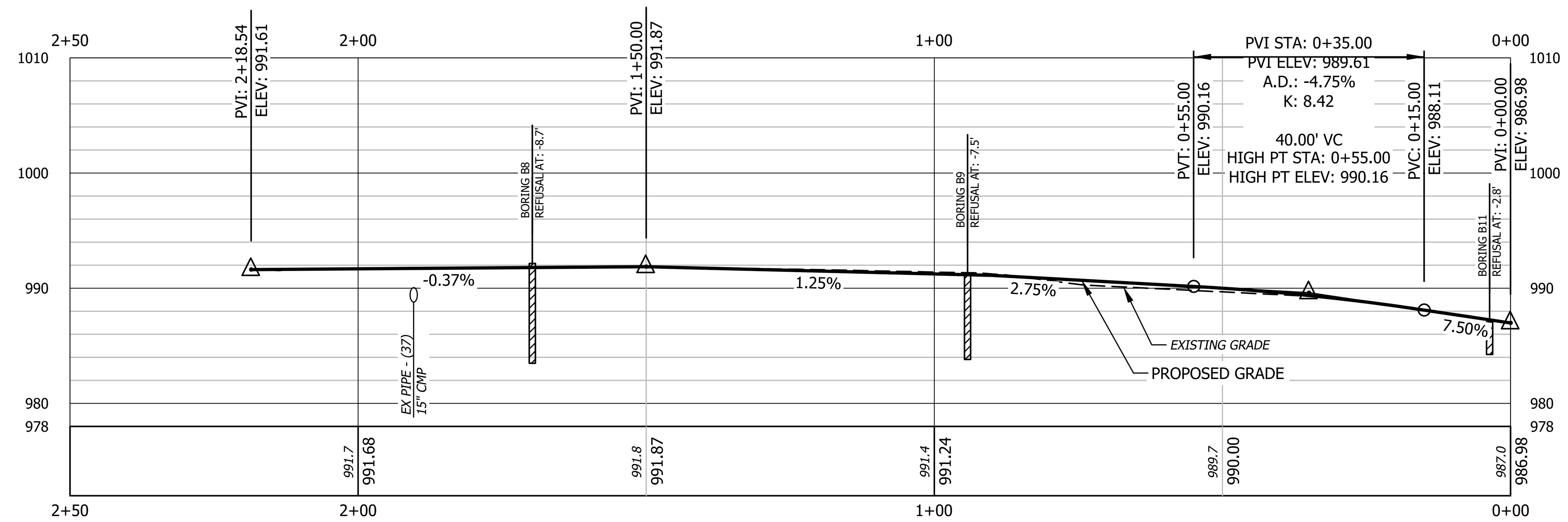
Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.11B, 7/10/2024 9:50:52 AM, KarenPhilbrick





ROADWAY CENTERLINE - PIKE
STA: 0+00 TO STA: 2+50

SCALE IN FEET



ROADWAY CENTERLINE - PROSPECT
STA: 0+00 TO STA: 2+50

SCALE IN FEET

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	DWG	ENG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	KRP	SML
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	RLH	SML

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

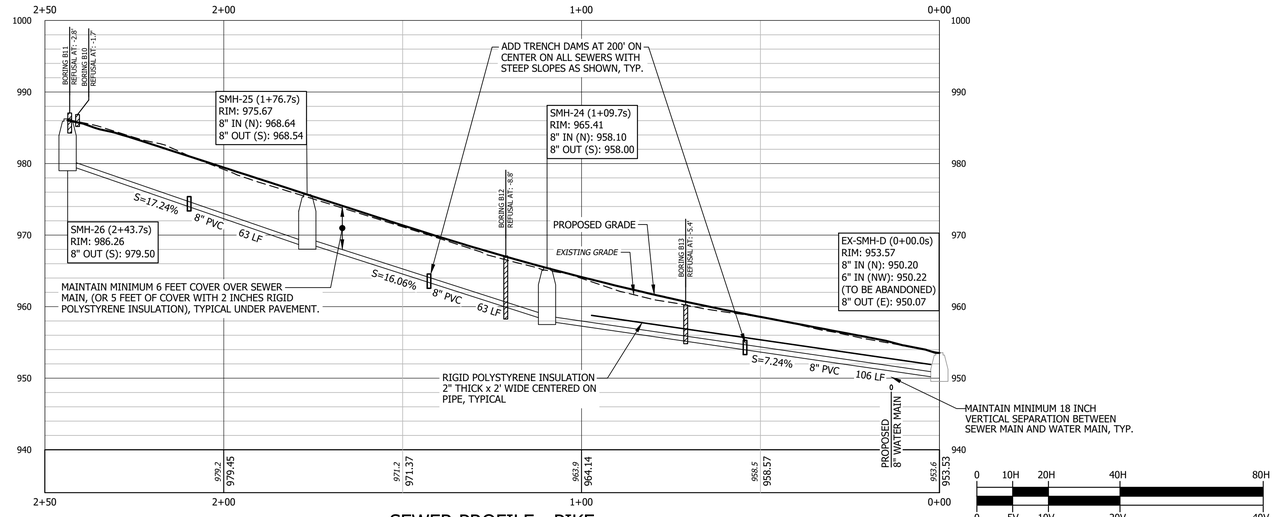
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

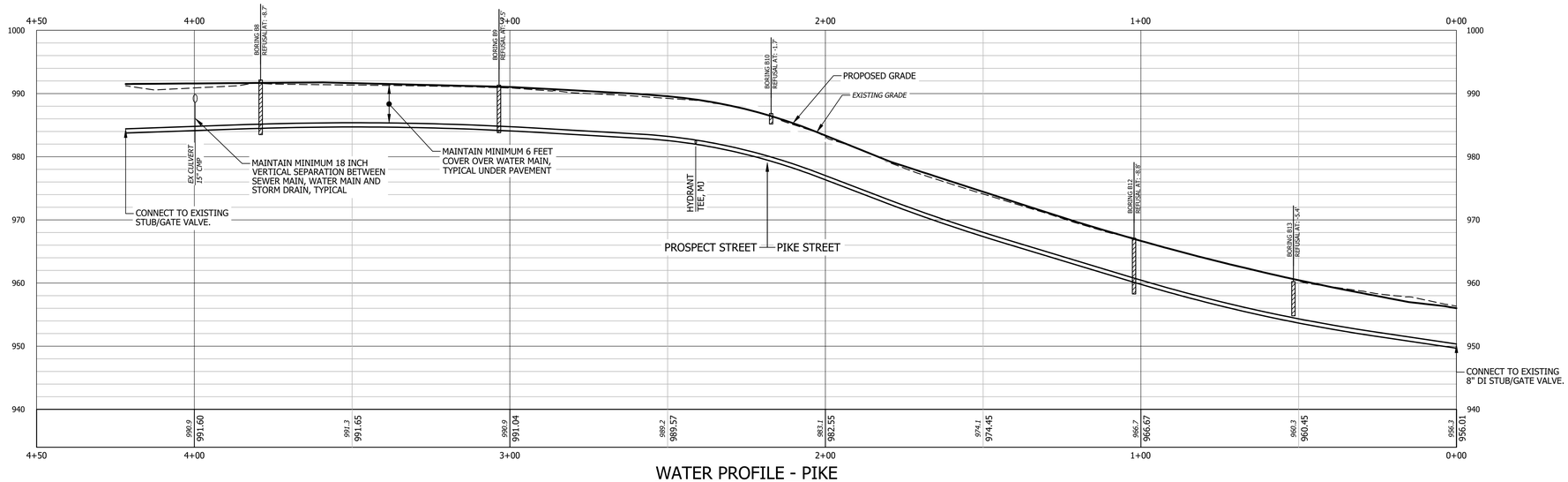
PIKE STREET AND PROSPECT STREET ROAD PLAN AND PROFILE

SHEET 2.12A

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.12alt, 7/10/2024 9:51:15 AM, KarenPhilbrick



SEWER PROFILE - PIKE
STA: 0+00 TO STA: 2+50



WATER PROFILE - PIKE
STA: 0+00 TO STA: 4+50

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

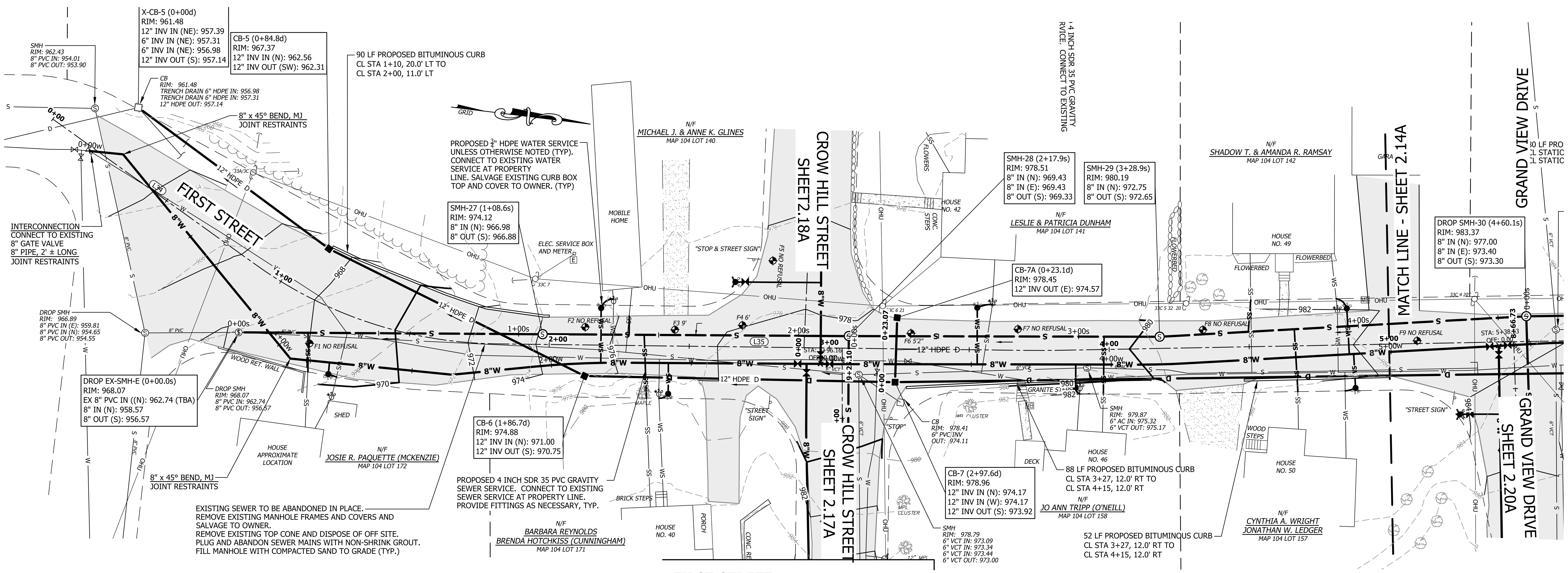
PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

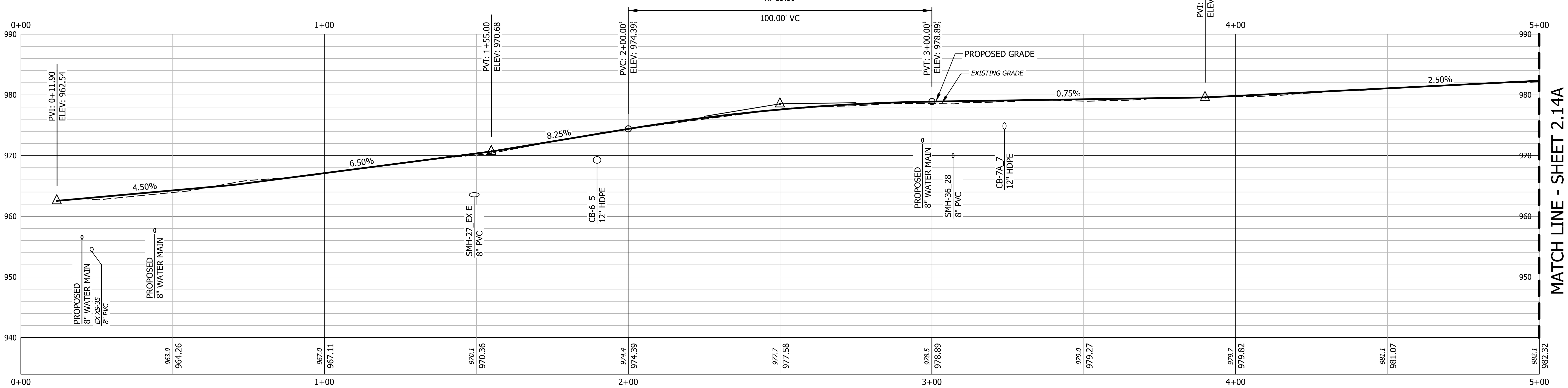
PIKE STREET AND PROSPECT STREET
SEWER AND WATER PROFILES

SHEET 2.12B



ROADWAY CENTERLINE - FIRST

LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
L34	---	89.44'	N28° 41' 00.34"E	---	0+00
L35	---	187.87'	N6° 17' 21.44"W	---	1+81
L36	---	402.06'	N8° 04' 53.06"W	---	3+84.51
C25	500.00'	23.53'	N9° 25' 46.52"W	23.53'	7+86.57
L37	---	47.03'	N10° 46' 39.99"W	---	8+10.10
C26	200.00'	13.73'	N8° 48' 38.91"W	13.73'	8+57.13
L38	---	404.14'	N6° 50' 37.83"W	---	8+70.86



ROADWAY CENTERLINE - FIRST
STA: 0+00 to STA: 5+00

SCALE IN FEET

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

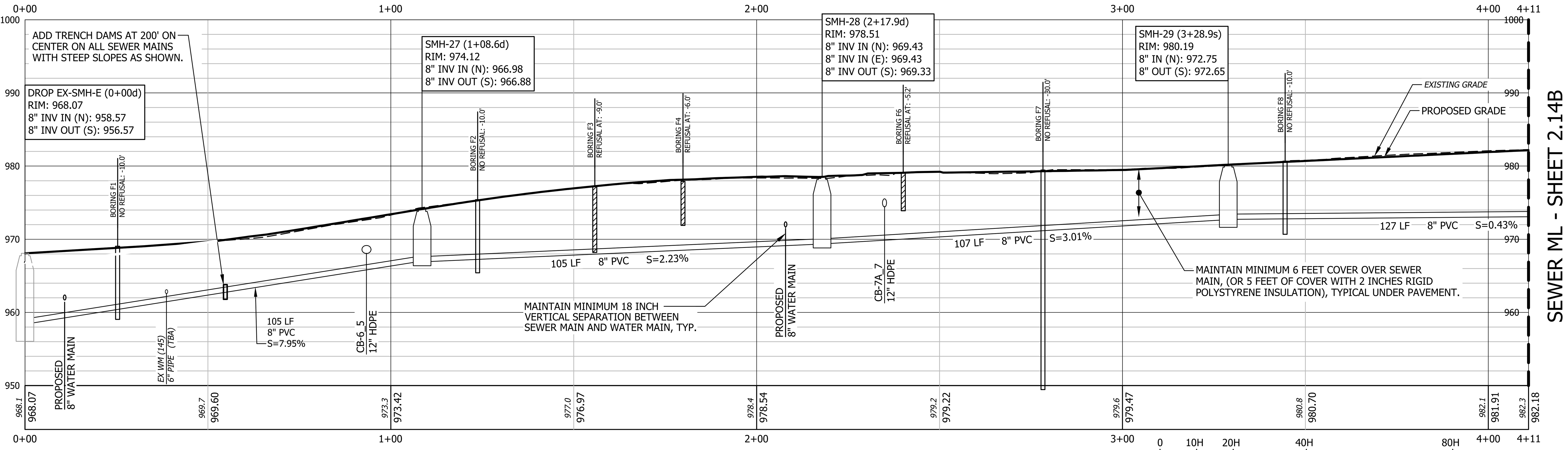
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

FIRST STREET
ROAD PLAN AND PROFILE STA 0+00 TO 5+00

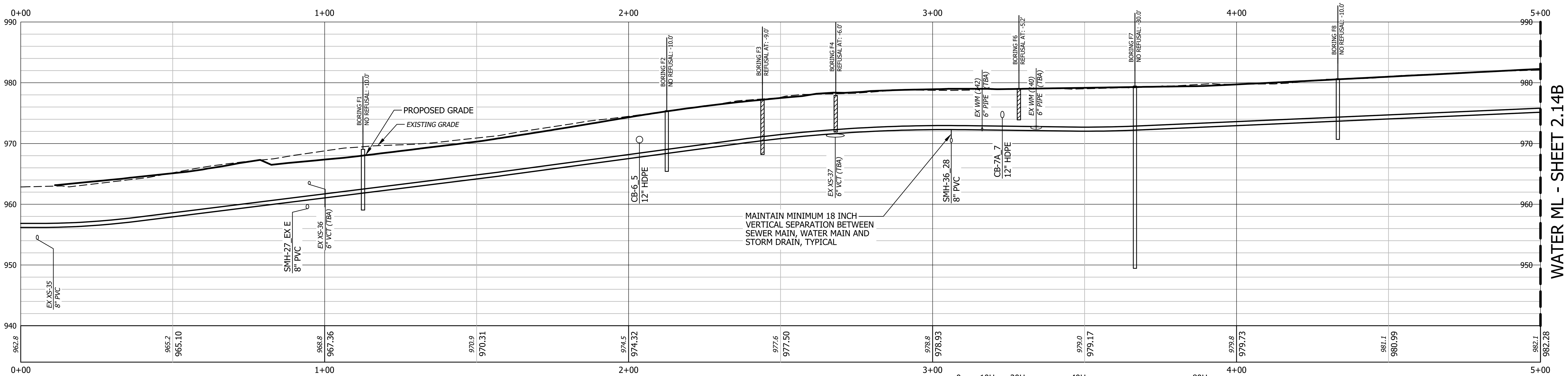
SHEET 2.13A

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.13, 7/10/2024 9:52:49 AM, KarenPhilbrick



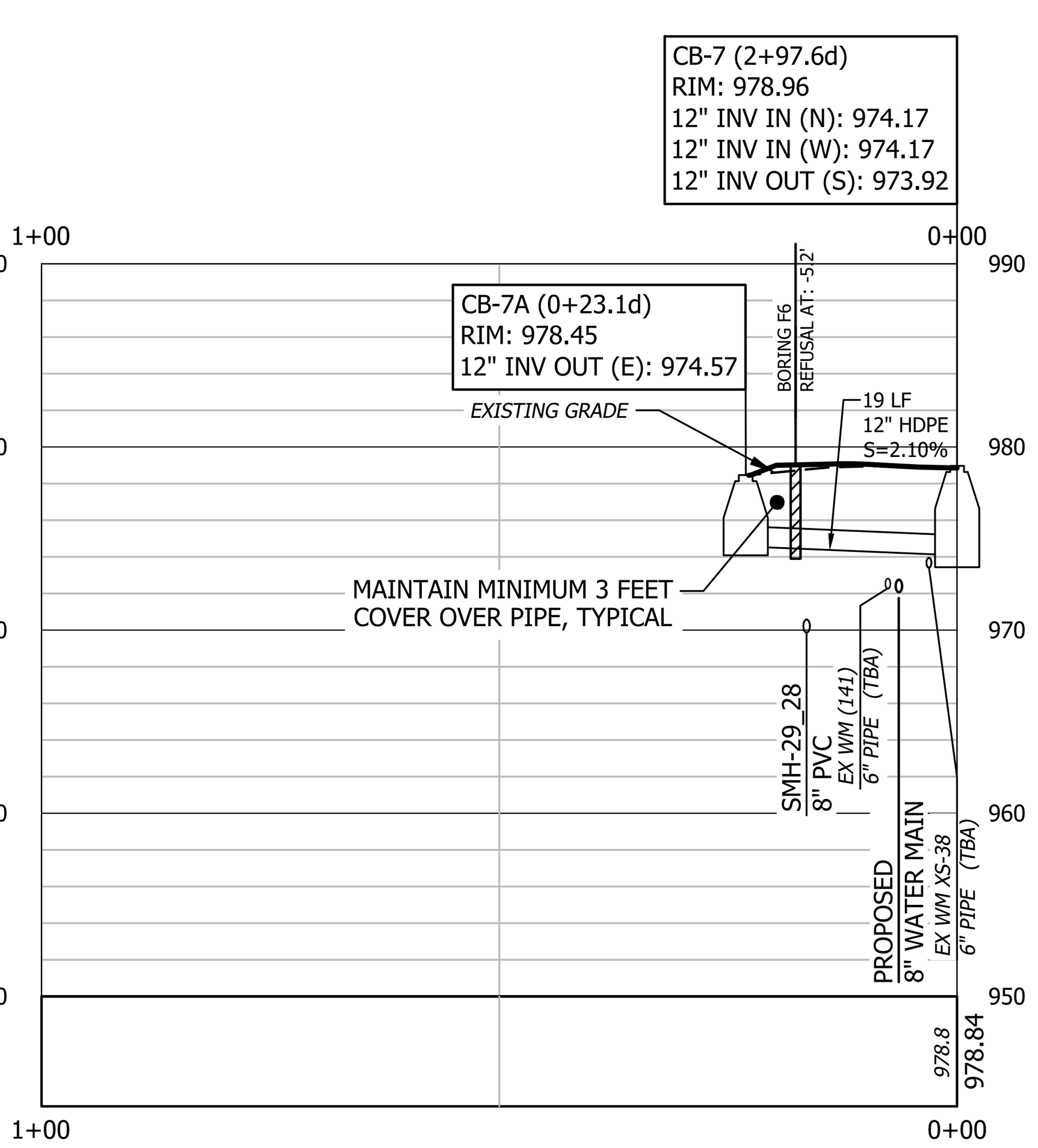
SEWER PROFILE - FIRST
STA: 0+00 to STA: 4+11

SCALE IN FEET



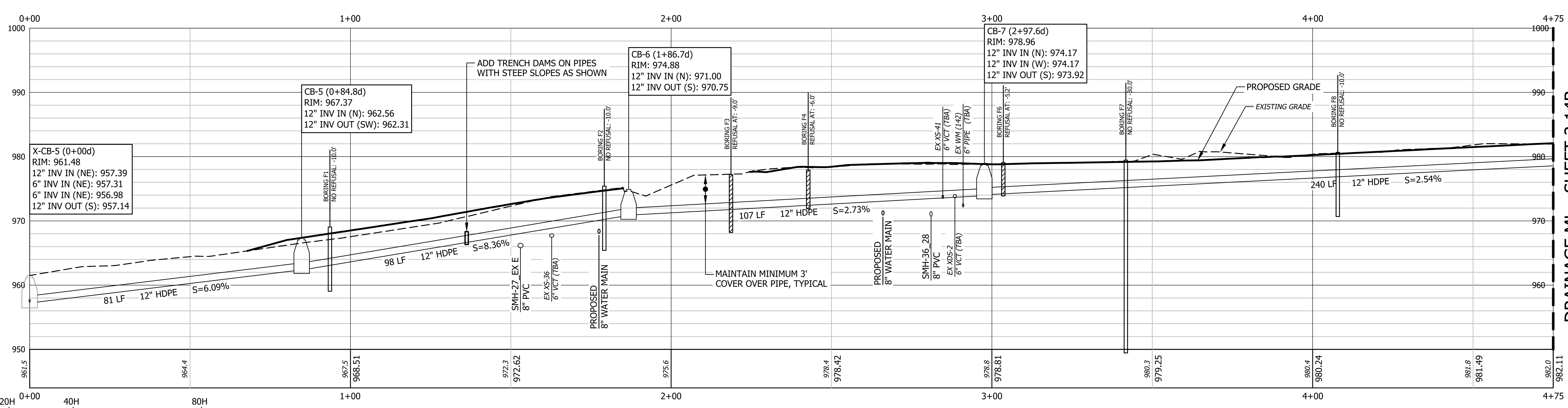
WATER PROFILE - FIRST
STA: 0+00 to STA: 5+00

SCALE IN FEET



DRAINAGE PROFILE - CROW HILL
STA: 0+00 TO STA: 1+00

SCALE IN FEET



DRAINAGE PROFILE - FIRST
STA: 0+00 to STA: 4+75

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

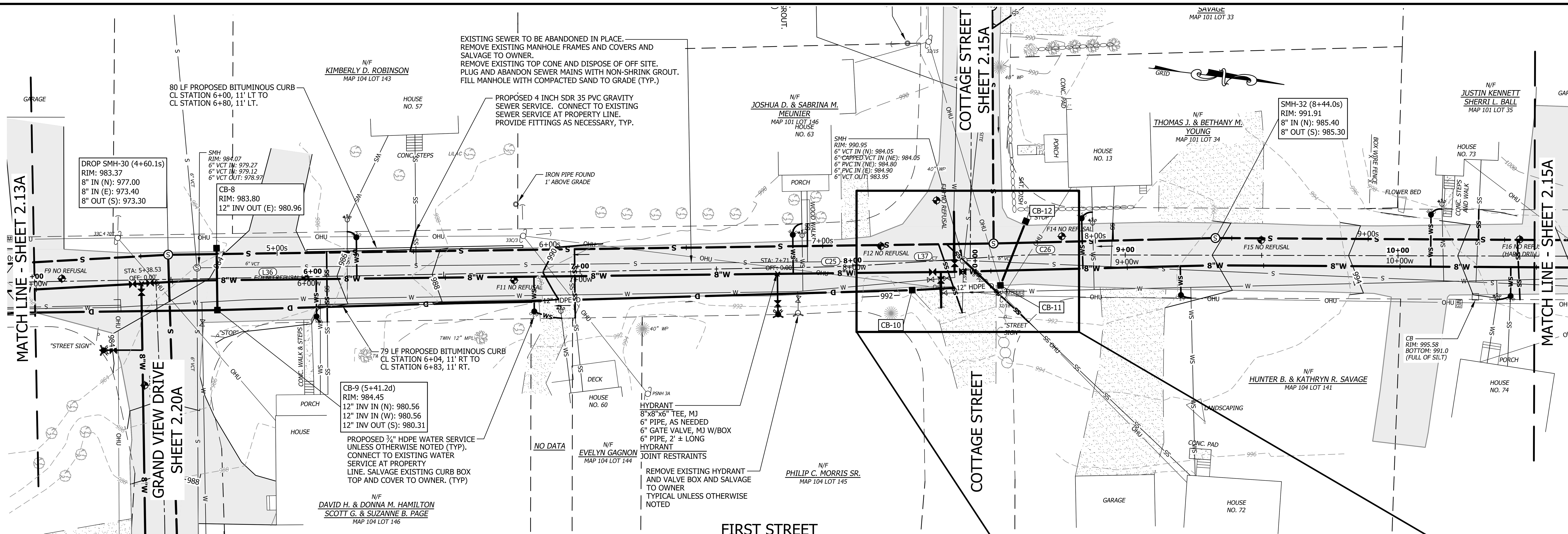
PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS
FIRST STREET SEWER PROFILE STA 0+00 TO 4+11
WATER PROFILE STA 0+00 TO 5+00
DRAINAGE PROFILE STA 0+00 TO 4+75

SHEET 2.13B

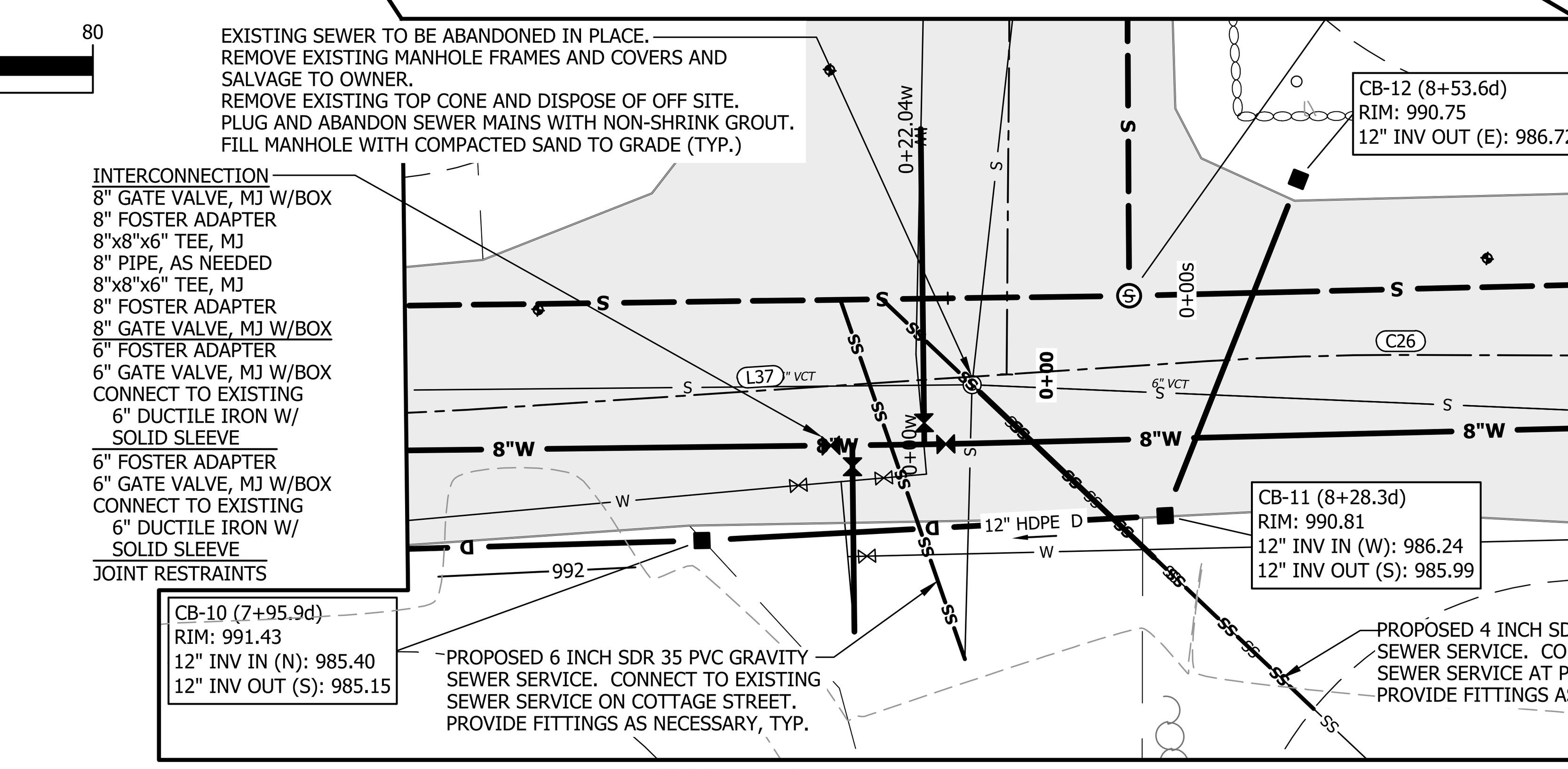
Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.13B, 7/10/2024 9:53:42 AM, KarenPhilbrick

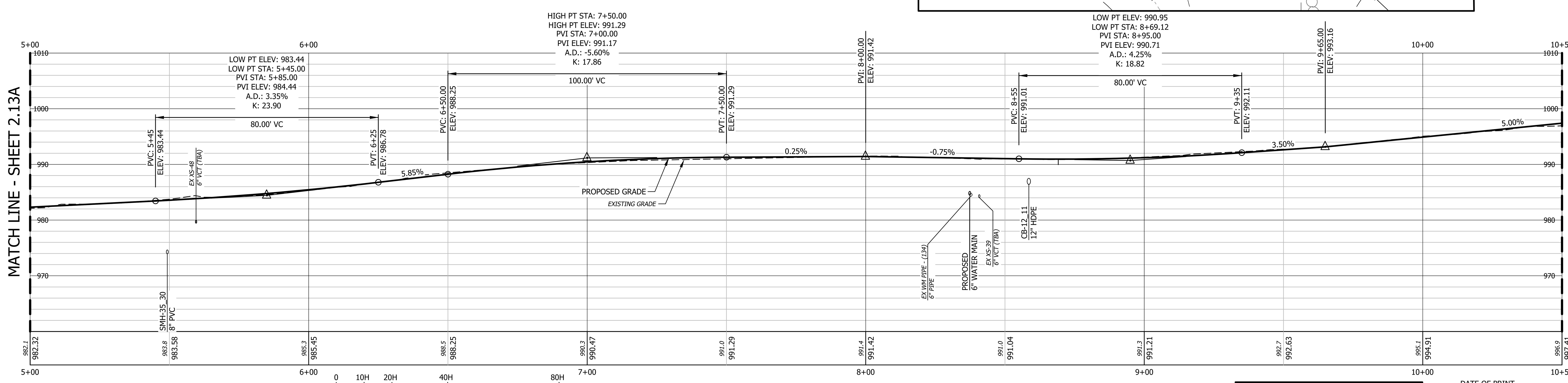


FIRST STREET

SCALE IN FEET (0, 10, 20, 40, 80)

ROADWAY CENTERLINE - FIRST					
LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
L34	---	89.44'	N28° 41' 00.34"E	---	0+00
L35	---	187.87'	N6° 17' 21.44"W	---	1+81
L36	---	402.06'	N8° 04' 53.06"W	---	3+84.51
C25	500.00'	23.53'	N9° 25' 46.52"W	23.53'	7+86.57
L37	---	47.03'	N10° 46' 39.99"W	---	8+10.10
C26	200.00'	13.73'	N8° 48' 38.91"W	13.73'	8+57.13
L38	---	404.14'	N6° 50' 37.83"W	---	8+70.86





SCALE IN FEET (0, 10H, 20H, 40H, 80H; 0, 5V, 10V, 20V, 40V)

ROADWAY CENTERLINE - FIRST
STA: 5+00 to STA: 10+50

BIDDING DOCUMENT NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	DWG	ENG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	KRP	SML
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	RLH	SML

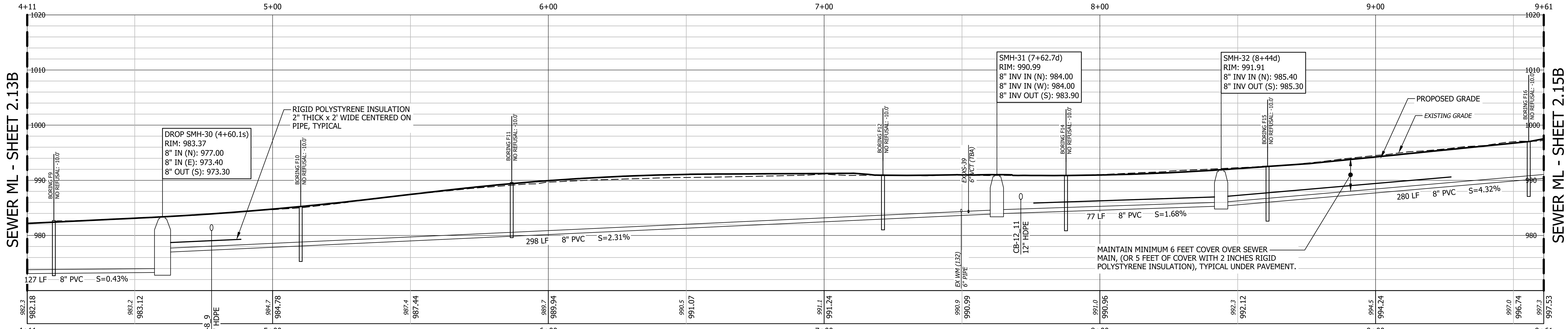
PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE):	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

FIRST STREET
ROAD PLAN AND PROFILE STA 5+00 TO 10+50

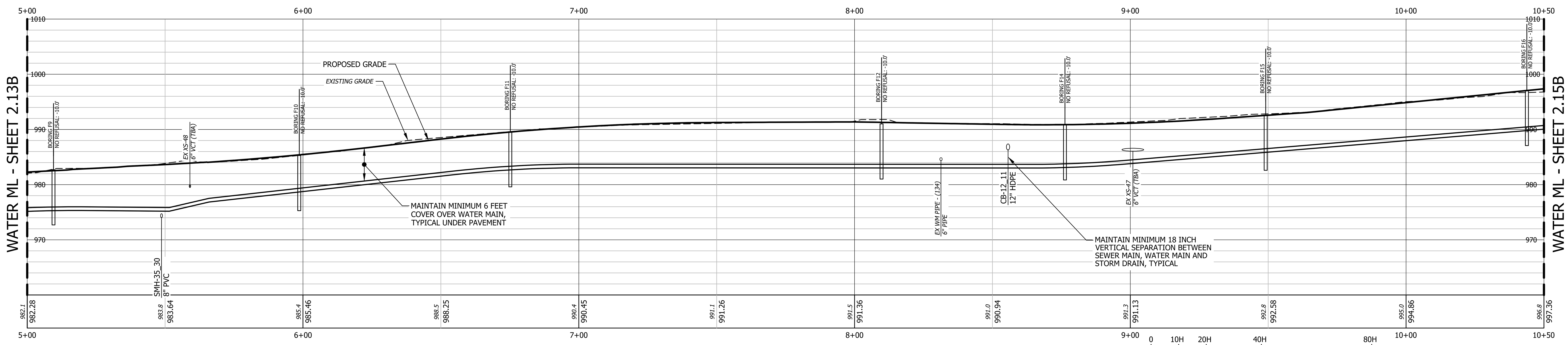
Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.14, 7/10/2024 9:54:46 AM, KarenPhilbrick



SEWER PROFILE - FIRST

STA: 4+11 to STA: 9+61

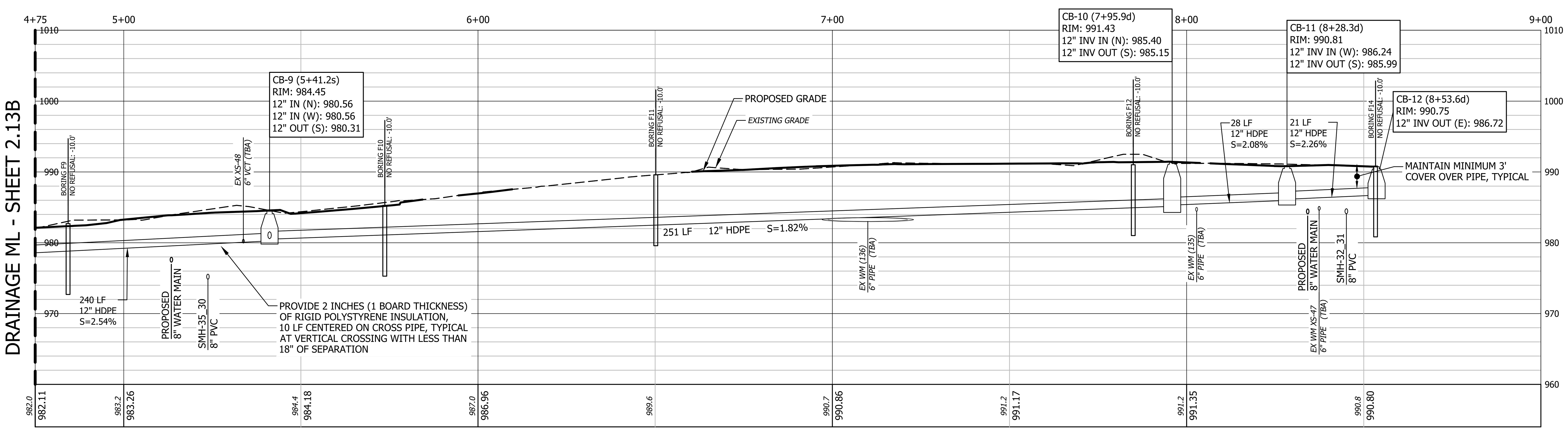
SCALE IN FEET (0, 10H, 20H, 40H, 80H / 0, 5V, 10V, 20V, 40V)



WATER PROFILE - FIRST

STA: 5+00 to STA: 10+50

SCALE IN FEET (0, 10H, 20H, 40H, 80H / 0, 5V, 10V, 20V, 40V)



DRAINAGE PROFILE - FIRST

STA: 4+75 to STA: 9+00

SCALE IN FEET (0, 10H, 20H, 40H, 80H / 0, 5V, 10V, 20V, 40V)

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE):	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

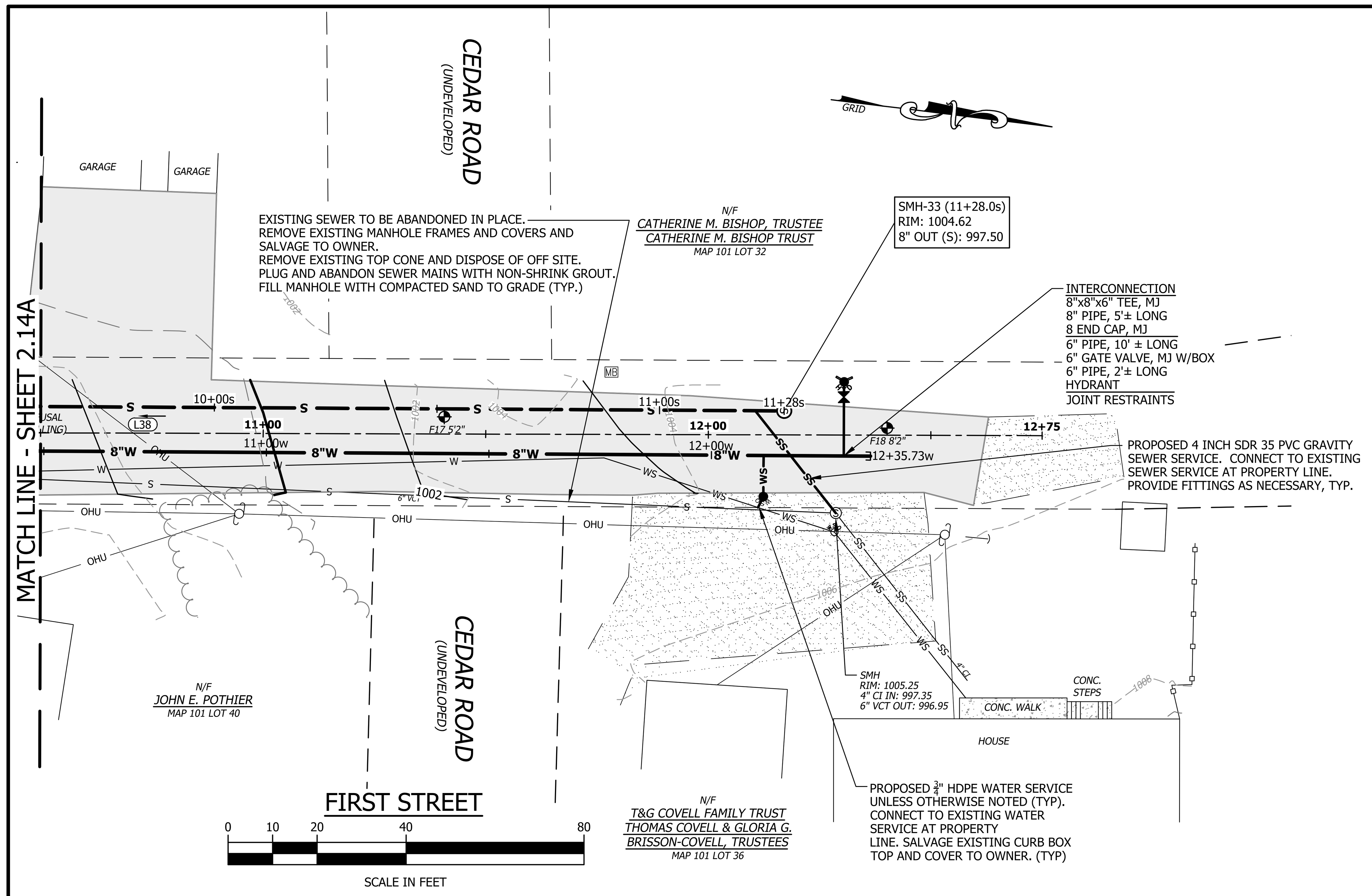
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND

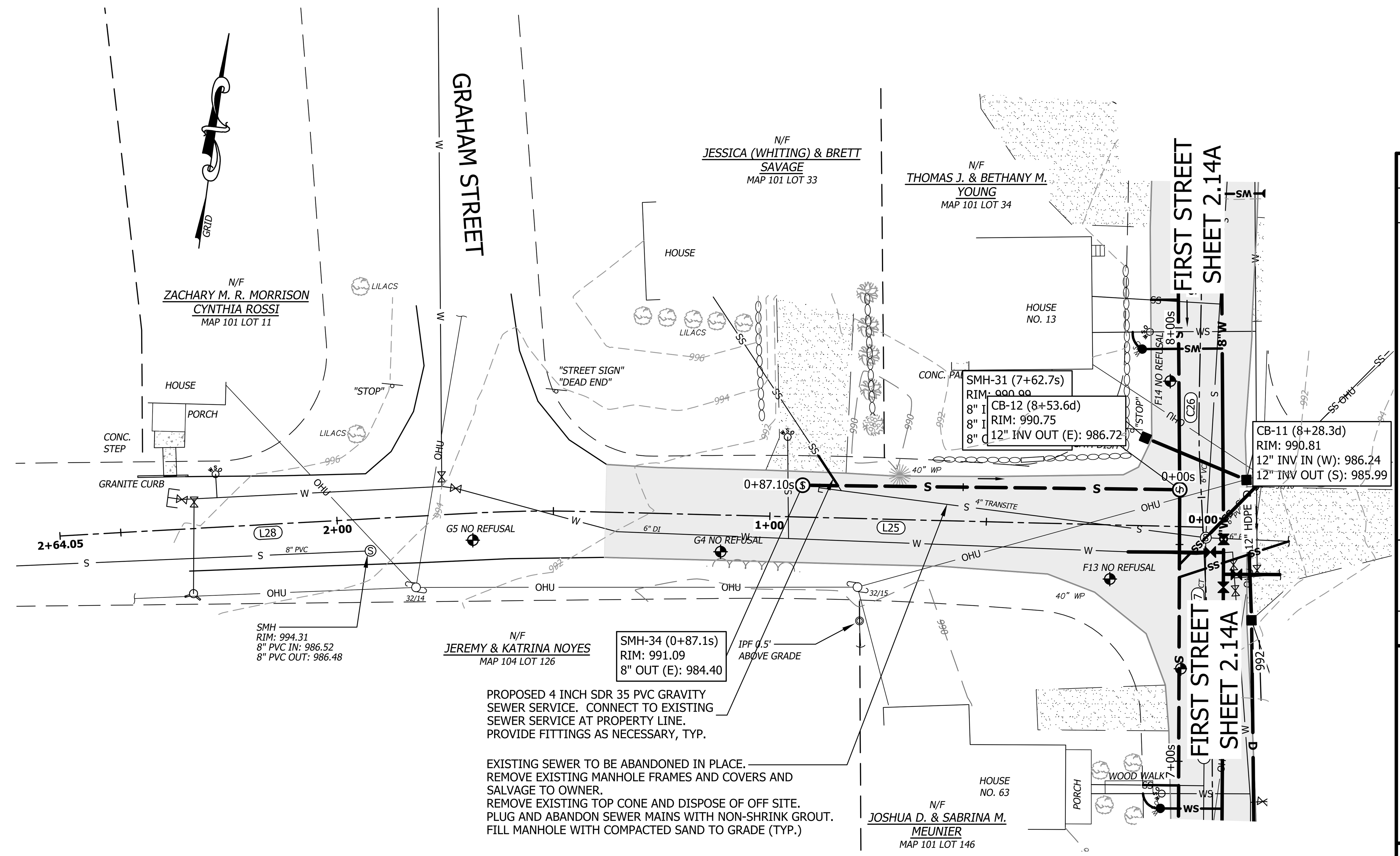
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

FIRST STREET SEWER PROFILE STA 4+11 TO 5+61
WATER PROFILE STA 5+00 TO 10+50
DRAINAGE PROFILE STA 4+75 TO 9+00

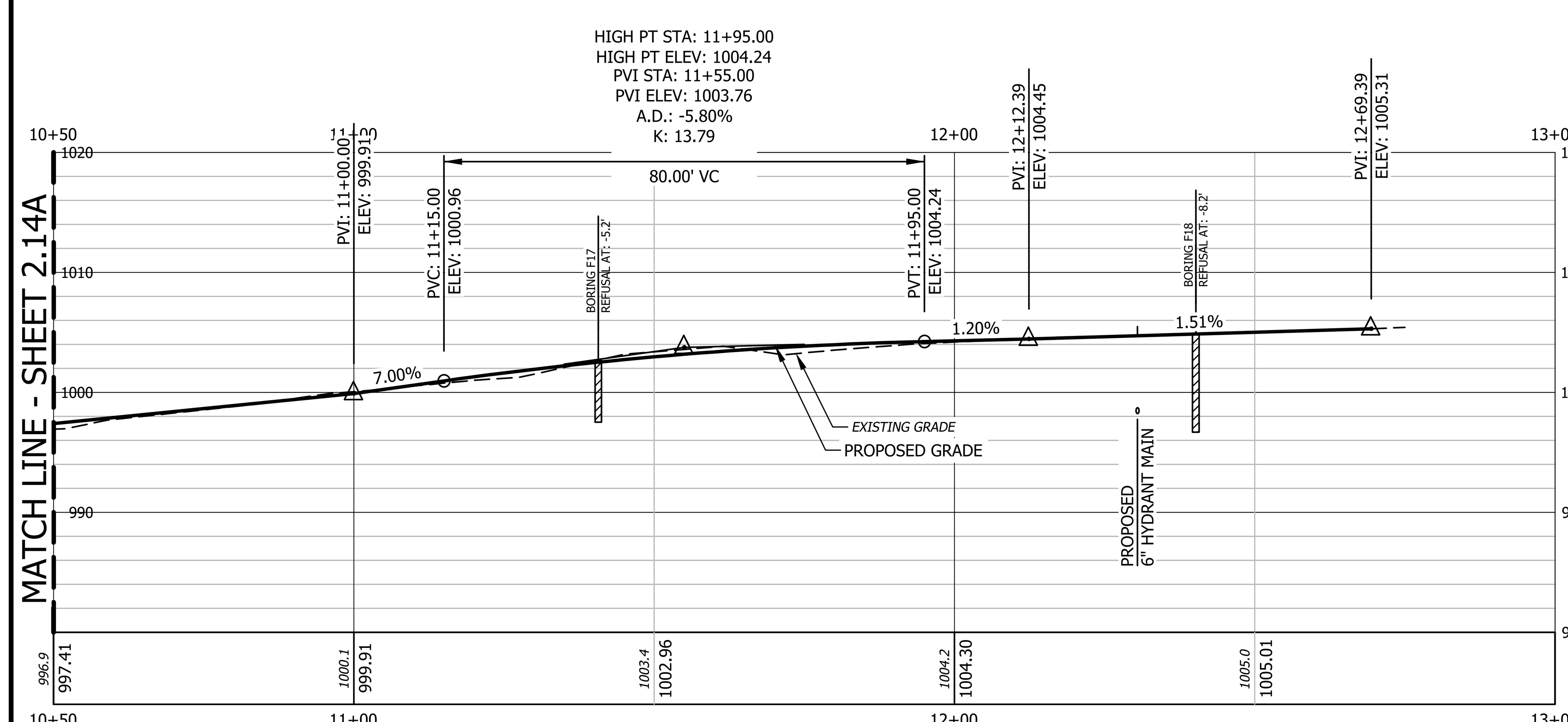
SHEET 2.14B



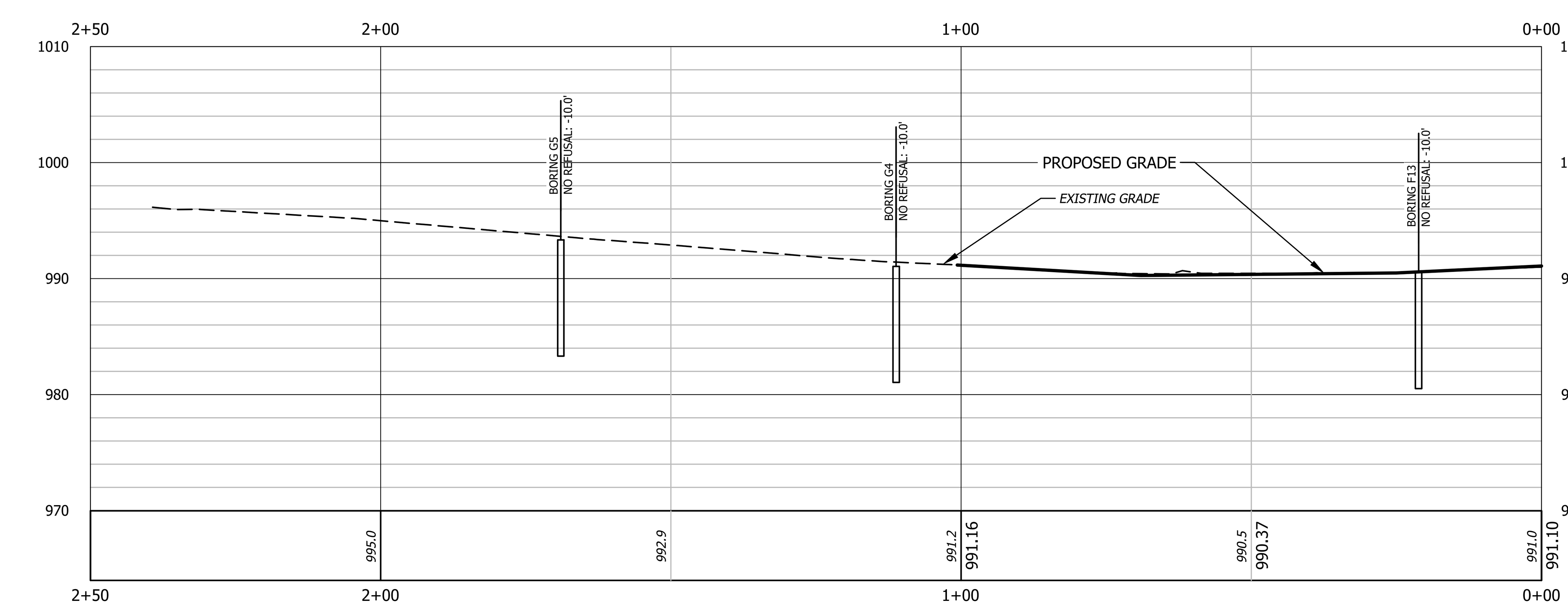
ROADWAY CENTERLINE - FIRST					
LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
L34	---	89.44'	N28° 41' 00.34"E	---	0+00
L35	---	187.87'	N6° 17' 21.44"W	---	1+81
L36	---	402.06'	N8° 04' 53.06"W	---	3+84.51
C25	500.00'	23.53'	N9° 25' 46.52"W	23.53'	7+86.57
L37	---	47.03'	N10° 46' 39.99"W	---	8+10.10
C26	200.00'	13.73'	N8° 48' 38.91"W	13.73'	8+57.13
L38	---	404.14'	N6° 50' 37.83"W	---	8+70.86



ROADWAY CENTERLINE - COTTAGE					
LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
L25	---	143.97'	S83° 26' 51.30"W	---	0+00
L28	---	95.95'	S78° 50' 18.74"W	---	1+68.10



ROADWAY CENTERLINE - FIRST
STA: 10+50 to STA: 13+00



ROADWAY CENTERLINE - COTTAGE
STA: 0+00 TO STA: 2+50

SCALE IN FEET

BIDDING DOCUMENT NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

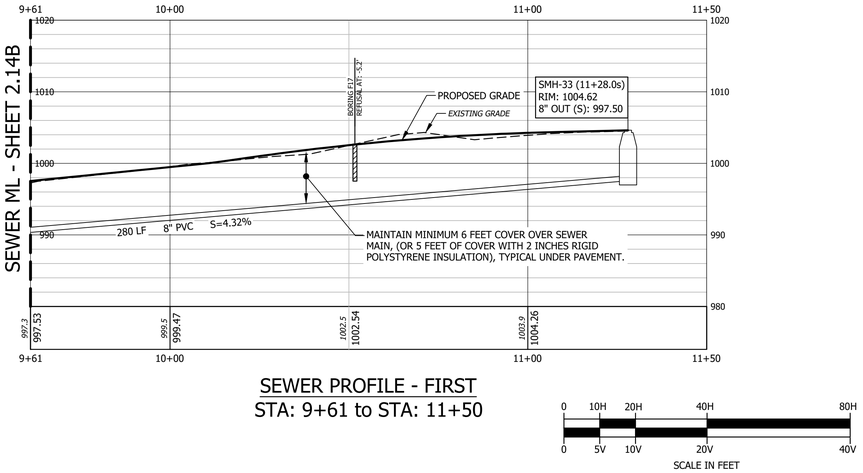
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

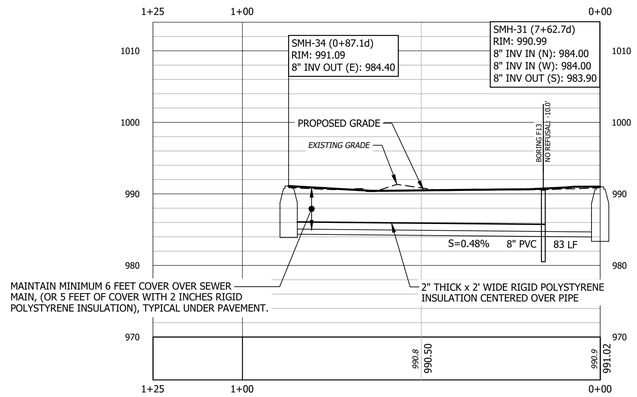
FIRST STREET AND COTTAGE STREET
FIRST ST. ROAD PLAN AND PROFILE STA 10+50 TO 13+00
COTTAGE STREET ROAD PLAN AND PROFILE

SHEET 2.15A

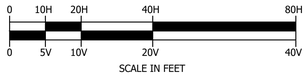
Z:\pro_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.15, 7/10/2024 9:56:52 AM, KarenPhilbrick

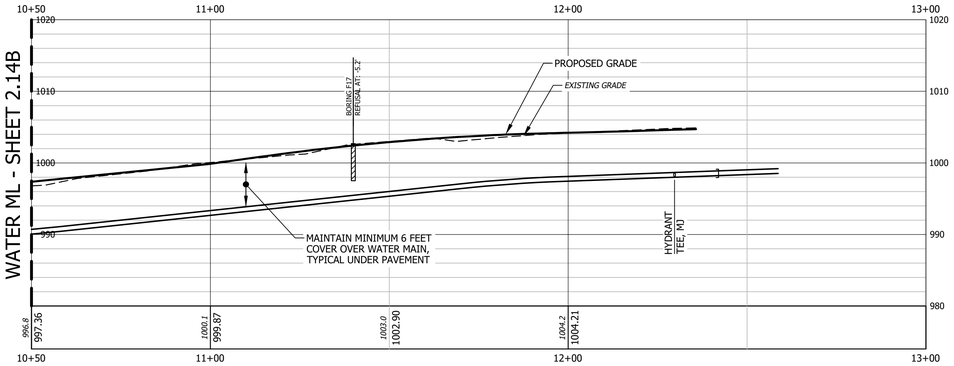


SEWER PROFILE - FIRST
STA: 9+61 to STA: 11+50

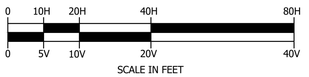


SEWER PROFILE - COTTAGE
STA: 0+00 TO STA: 1+25





WATER PROFILE - FIRST
STA: 10+50 to STA: 13+00



BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

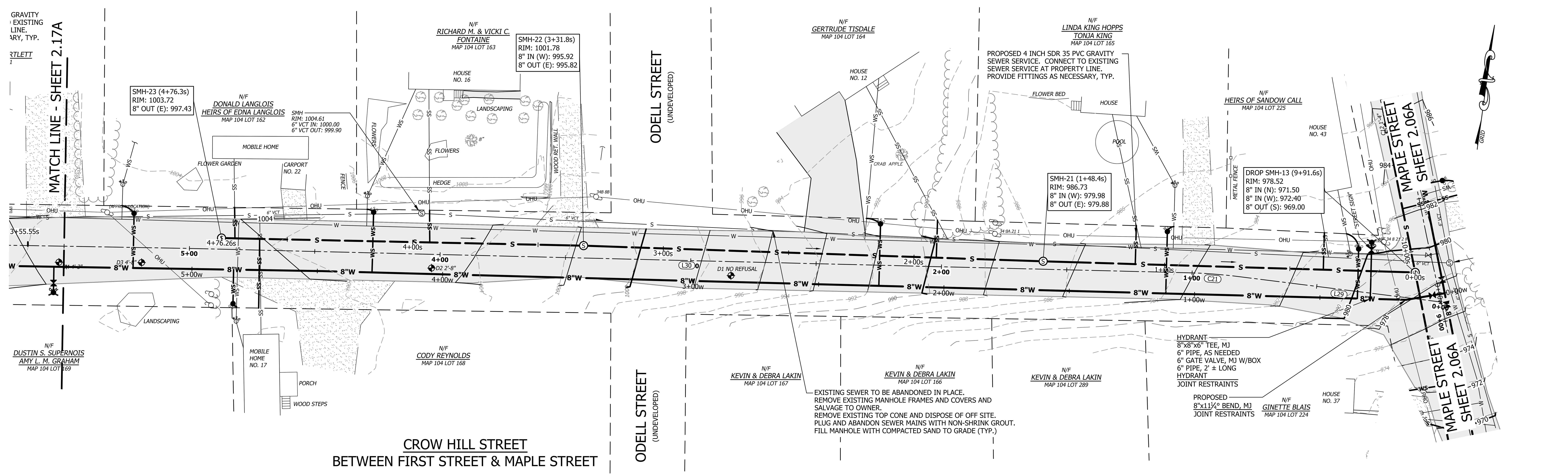
NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #: 221174
DATE: APRIL 2024
MAP-LOT (OR ARCHIVE): -
SURVEYED BY: HEI
ENGINEERED BY: HEI
DRAWN BY: RLH
CHECKED BY: SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS
FIRST STREET SEWER STA 9+61 TO 11+50
FIRST STREET WATER STA 10+50 TO 13+00
COTTAGE STREET SEWER AND WATER PROFILES

SHEET 2.15B

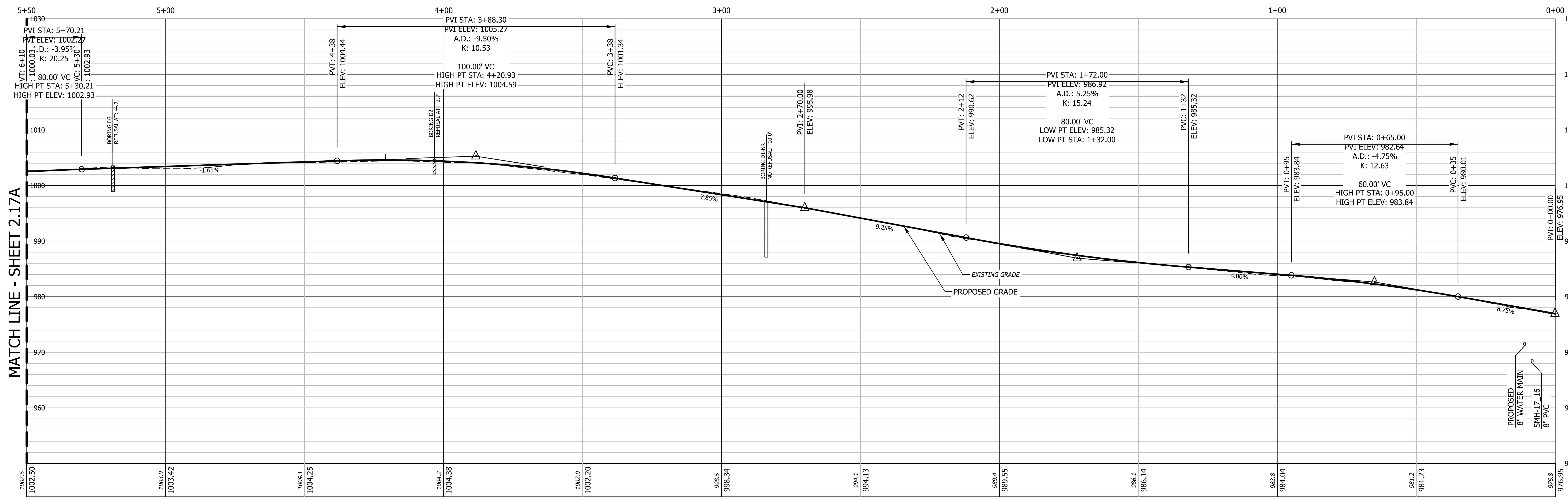


CROW HILL STREET
BETWEEN FIRST STREET & MAPLE STREET

SCALE IN FEET (0, 10, 20, 40, 80)

ROADWAY CENTERLINE - CROW HILL

LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
L29	---	81.62'	S89° 09' 09.48"W	---	0+00
C21	200.00'	20.10'	S86° 16' 27.00"W	20.09'	0+81.62
L30	---	399.65'	S83° 23' 44.52"W	---	1+01.71
L31	---	423.74'	S82° 59' 24.86"W	---	5+01.36



SCALE IN FEET (0, 10H, 20H, 40H, 80H / 0, 5V, 10V, 20V, 40V)

ROADWAY CENTERLINE - CROW HILL
STA: 0+00 TO STA: 5+50

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	DWG	ENG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	KRP	SML
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	RLH	SML

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

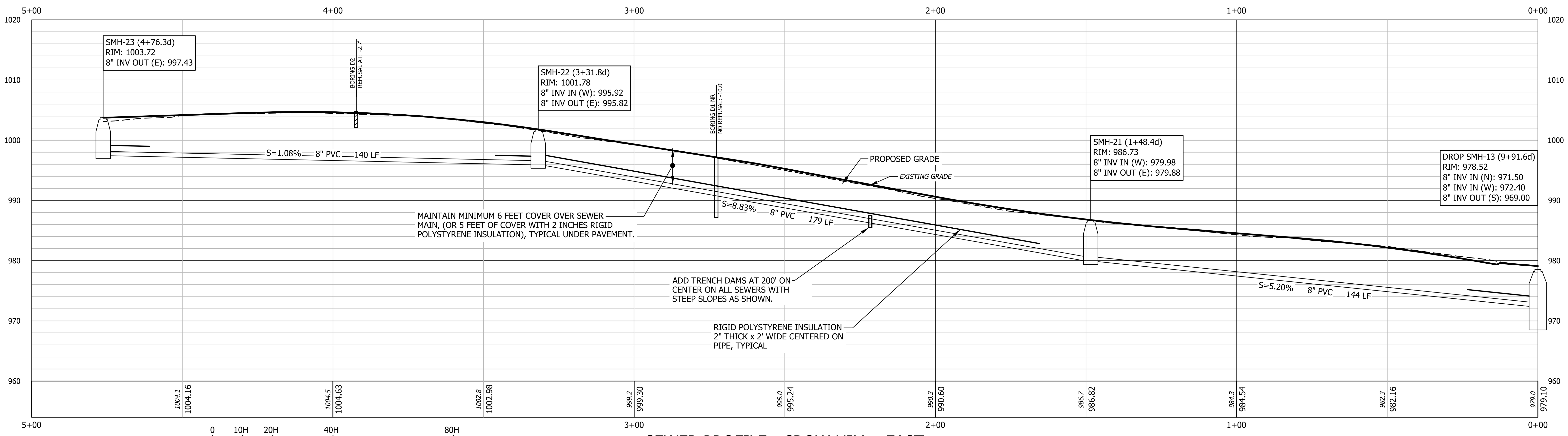
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

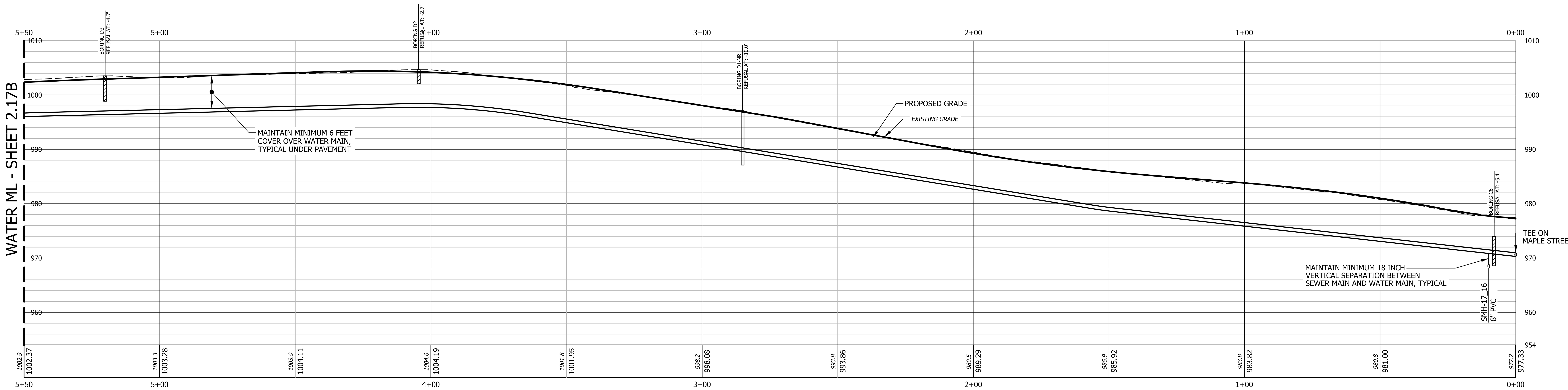
CROW HILL STREET
ROAD PLAN AND PROFILE STA 0+00 TO 5+50

SHEET 2.16A

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.16, 7/10/2024 9:58:48 AM, KarenPhilbrick



SEWER PROFILE - CROW HILL - EAST
STA: 0+00 TO STA: 5+00



WATER PROFILE - CROW HILL - EAST
STA: 0+00 TO STA: 5+50

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

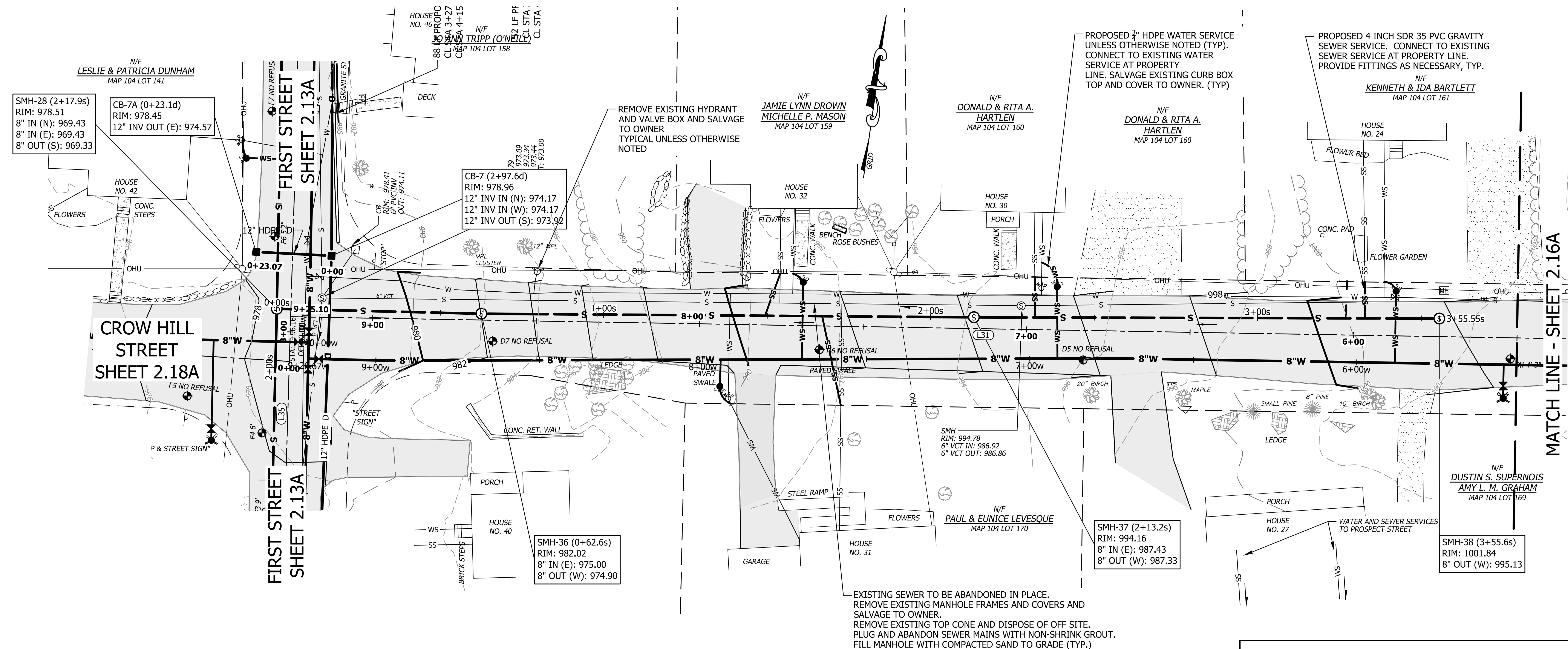
PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS
EAST CROW HILL STREET
SEWER PROFILE STA 0+00 TO 5+00
WATER PROFILE STA 0+00 TO 5+50

SHEET 2.16B

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.16B, 7/10/2024 9:59:40 AM, KarenPhilbrick

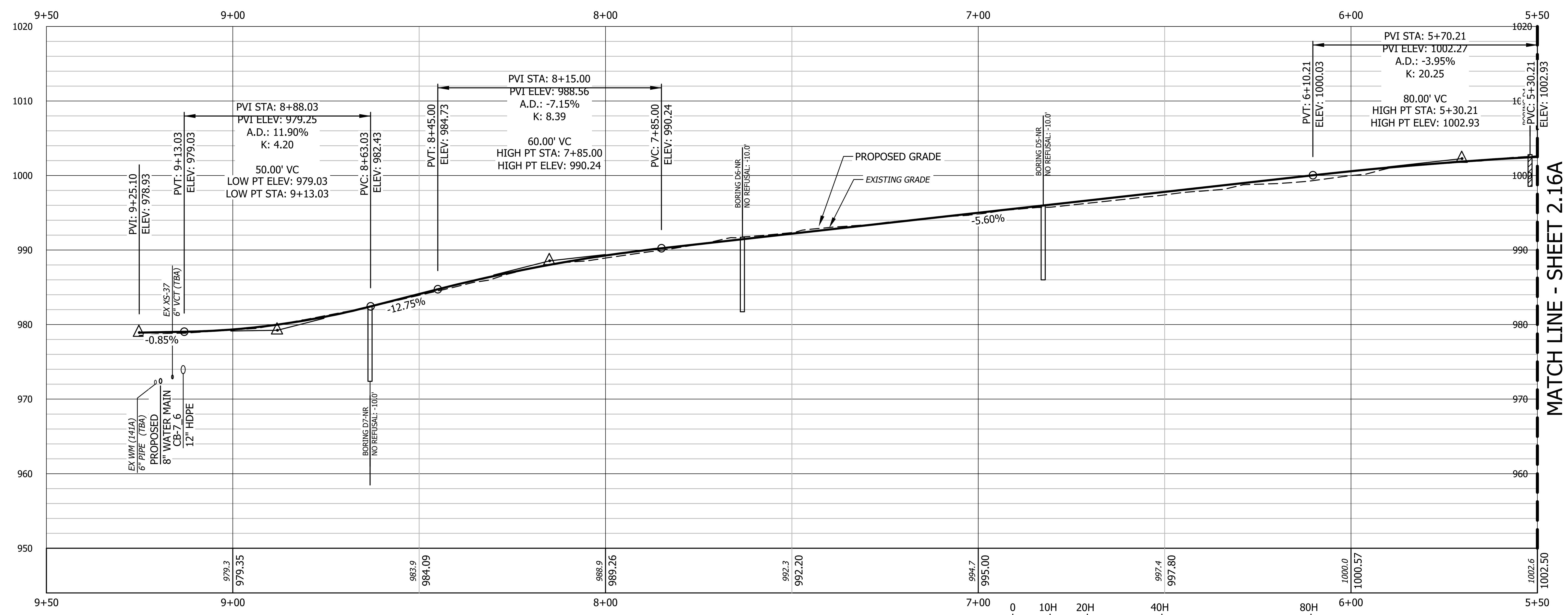


CROW HILL STREET
BETWEEN FIRST STREET & MAPLE STREET

SCALE IN FEET (0, 10, 20, 40, 80)

ROADWAY CENTERLINE - CROW HILL

LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
L29	---	81.62'	S89° 09' 09.48"W	---	0+00
C21	200.00'	20.10'	S86° 16' 27.00"W	20.09'	0+81.62
L30	---	399.65'	S83° 23' 44.52"W	---	1+01.71
L31	---	423.74'	S82° 59' 24.86"W	---	5+01.36



ROADWAY CENTERLINE - CROW HILL
STA: 5+50 TO STA: 9+50

SCALE IN FEET (0, 10H, 20H, 40H, 80H; 0, 5V, 10V, 20V, 40V)

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

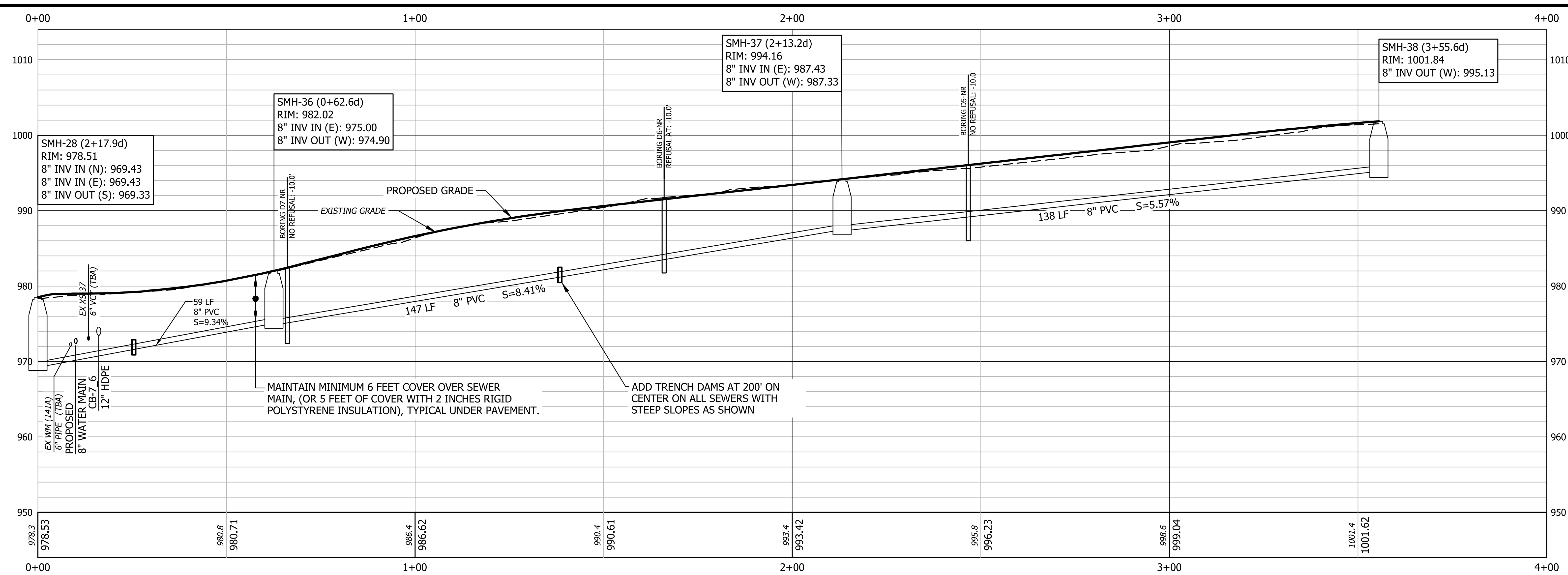
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

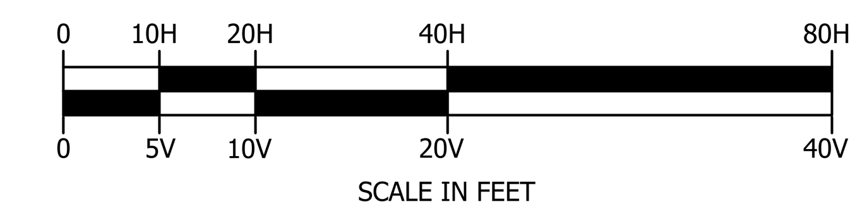
CROW HILL STREET
PLAN AND PROFILE STA 5+50 TO 9+50

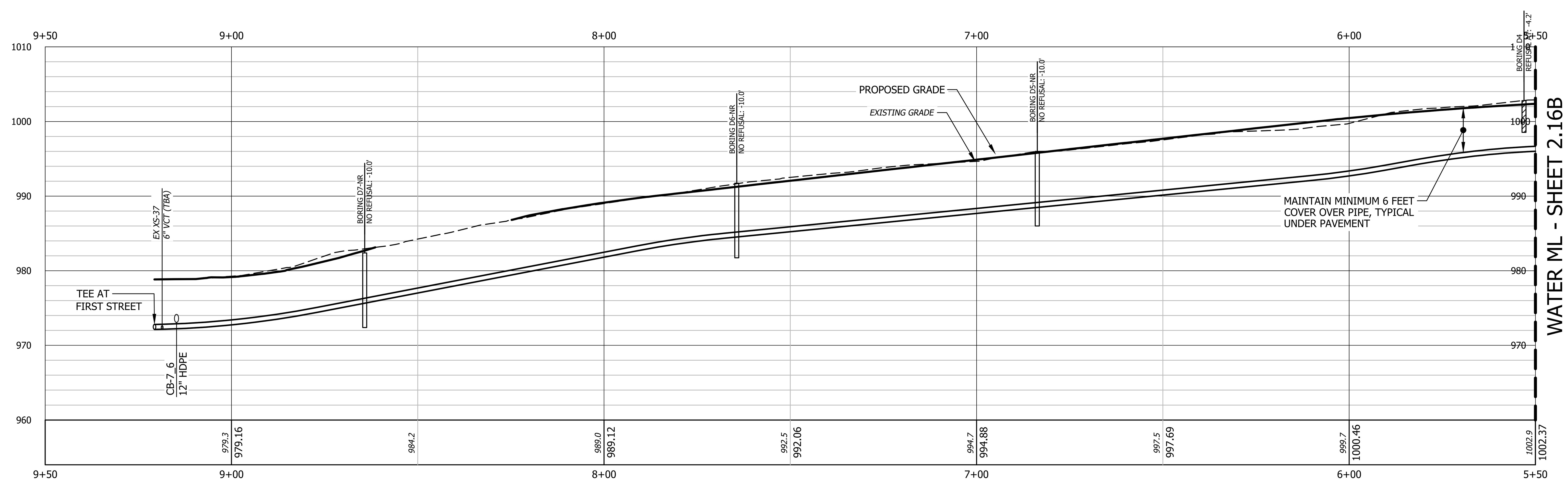
SHEET 2.17A

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.17, 7/10/2024 10:00:08 AM, KarenPhilbrick

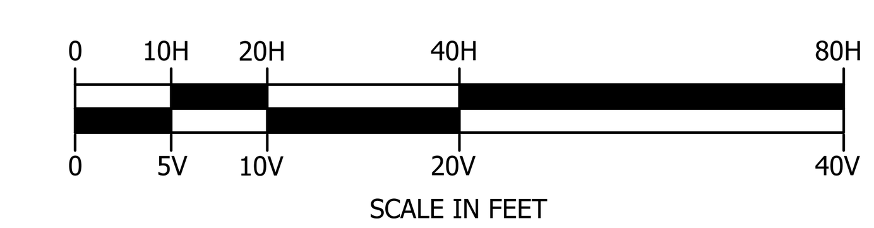


SEW-CROW HILL STREET TO FIRST STREET
STA: 0+00 to STA: 4+00





WATER PROFILE - CROW HILL - EAST
STA: 5+50 TO STA: 9+50



BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

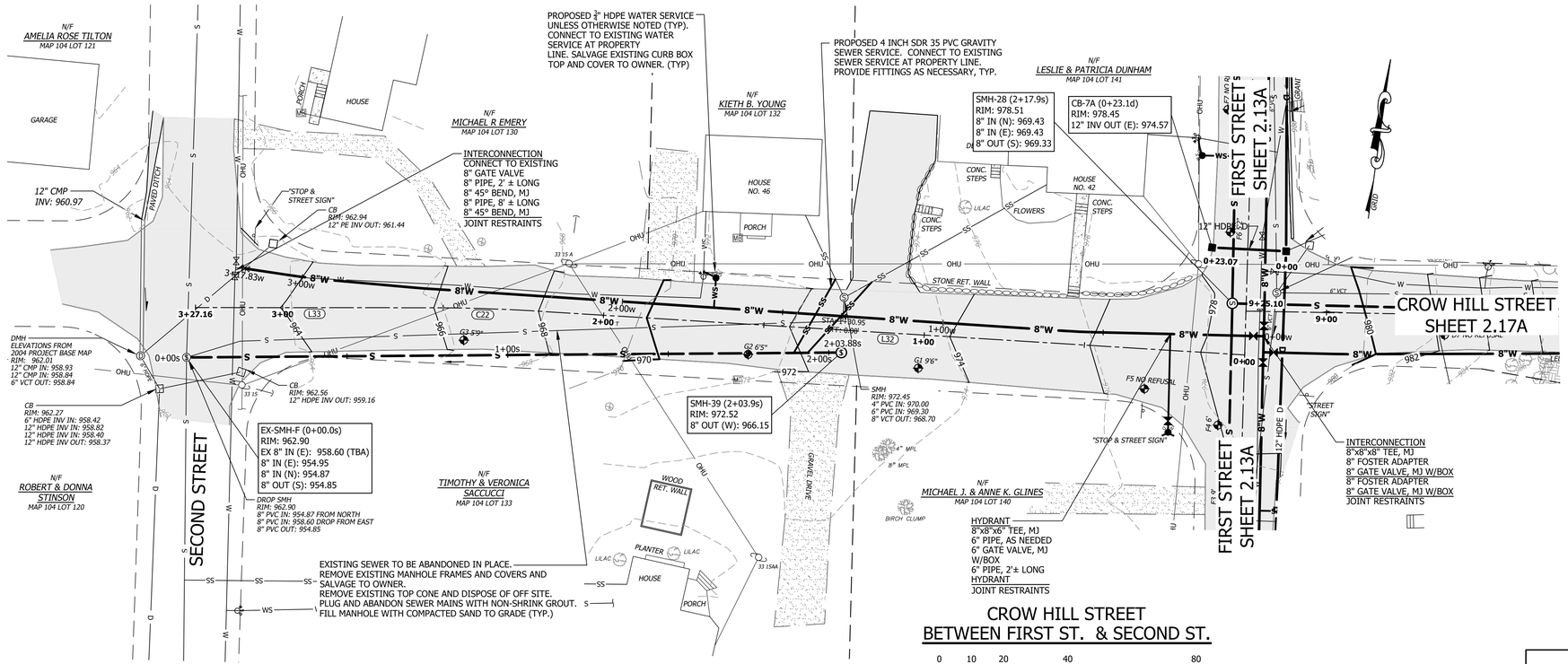
PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS
CROW HILL STREET CENTER SEWER PROFILE
EAST WATER PROFILE STA 5+50 TO 9+50
DRAINAGE PROFILE

SHEET 2.17B

Z:\pro_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.17B, 7/10/2024 10:00:47 AM, KarenPhilbrick



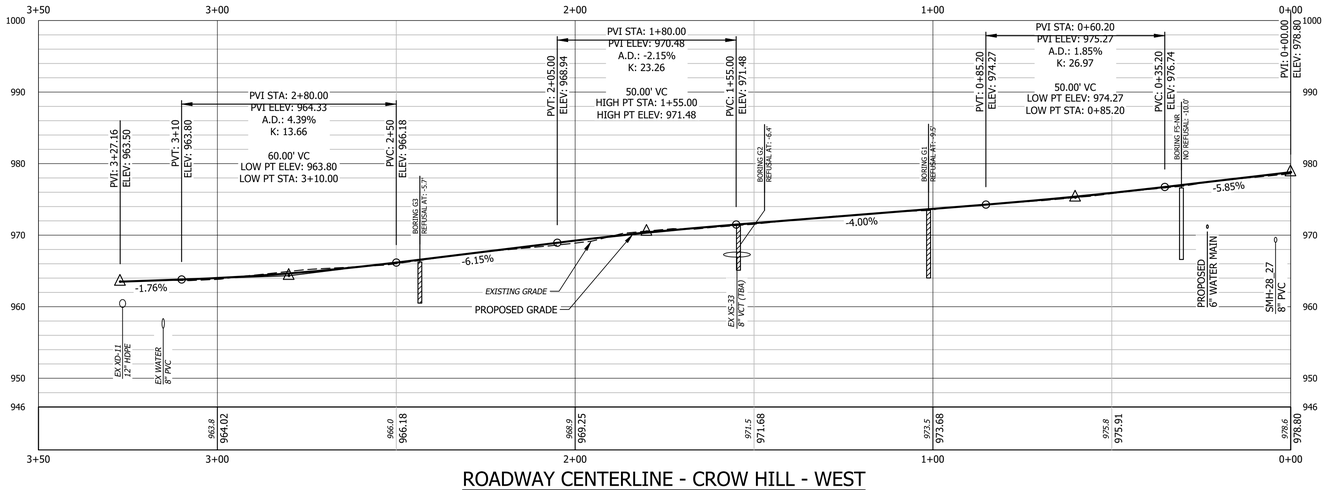
CROW HILL STREET
BETWEEN FIRST ST. & SECOND ST.

0 10 20 40 80

SCALE IN FEET

ROADWAY CENTERLINE - CROW HILL BETWEEN FIRST STREET AND SECOND STREET

LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
L32	---	222.35'	S85° 32' 47.55"W	---	0+00
C22	500.00'	30.61'	S83° 47' 34.74"W	30.60'	2+22.35
L33	---	74.20'	S82° 02' 21.93"W	---	2+52.96



ROADWAY CENTERLINE - CROW HILL - WEST
STA: 0+00 TO STA: 3+50

0 10H 20H 40H 80H
0 5V 10V 20V 40V

SCALE IN FEET

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

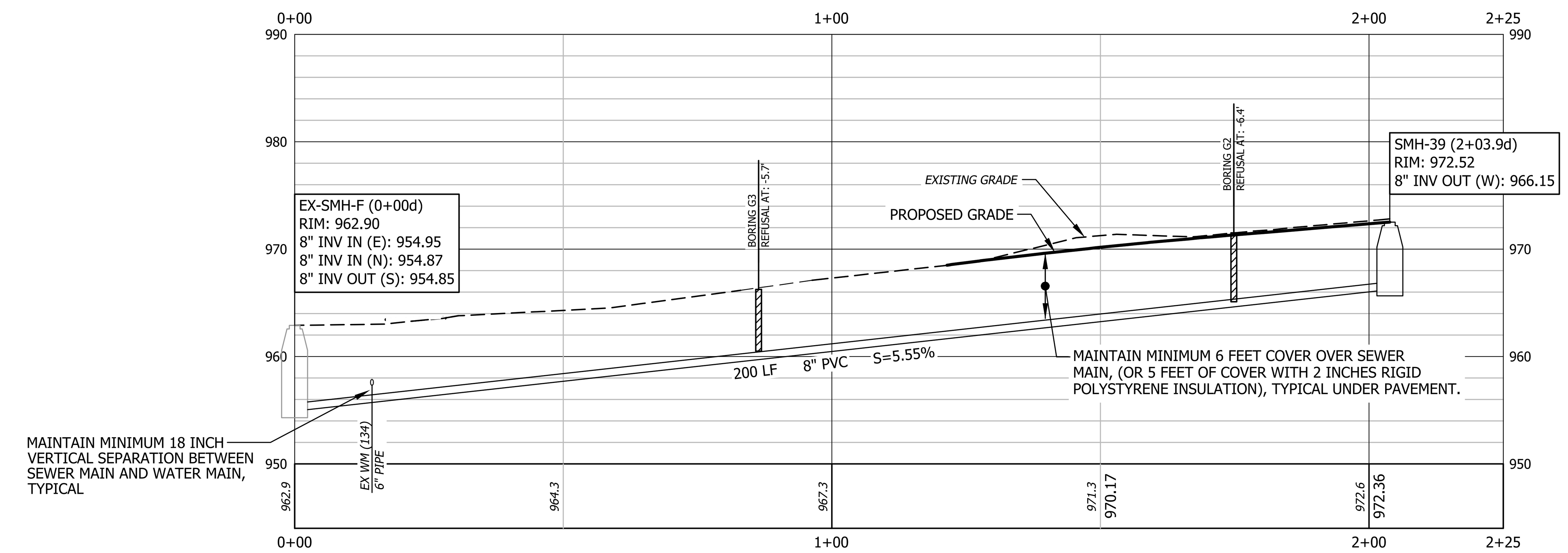
PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

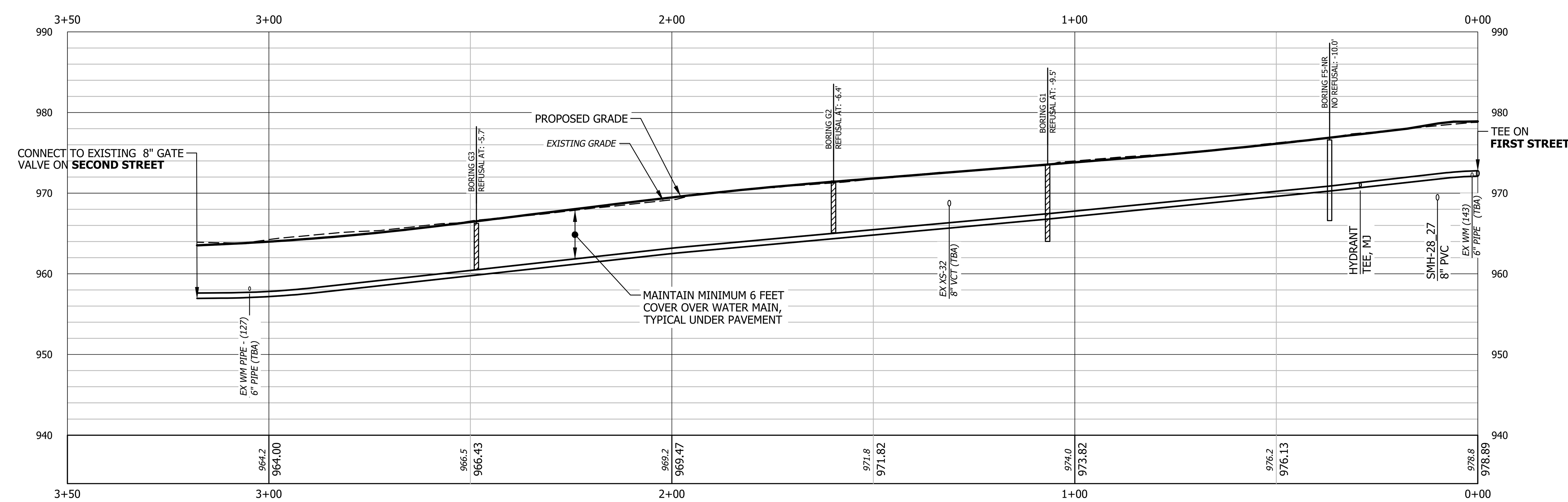
WEST CROW HILL STREET
ROAD PLAN AND PROFILE

SHEET 2.18A



SEW-CROW HILL-WEST
STA: 0+00 to STA: 2+25

0 10H 20H 40H 80H
0 5V 10V 20V 40V
SCALE IN FEET



0 10H 20H 40H 80H
0 5V 10V 20V 40V
SCALE IN FEET

WATER PROFILE - CROW HILL - WEST
STA: 0+00 TO STA: 3+50

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

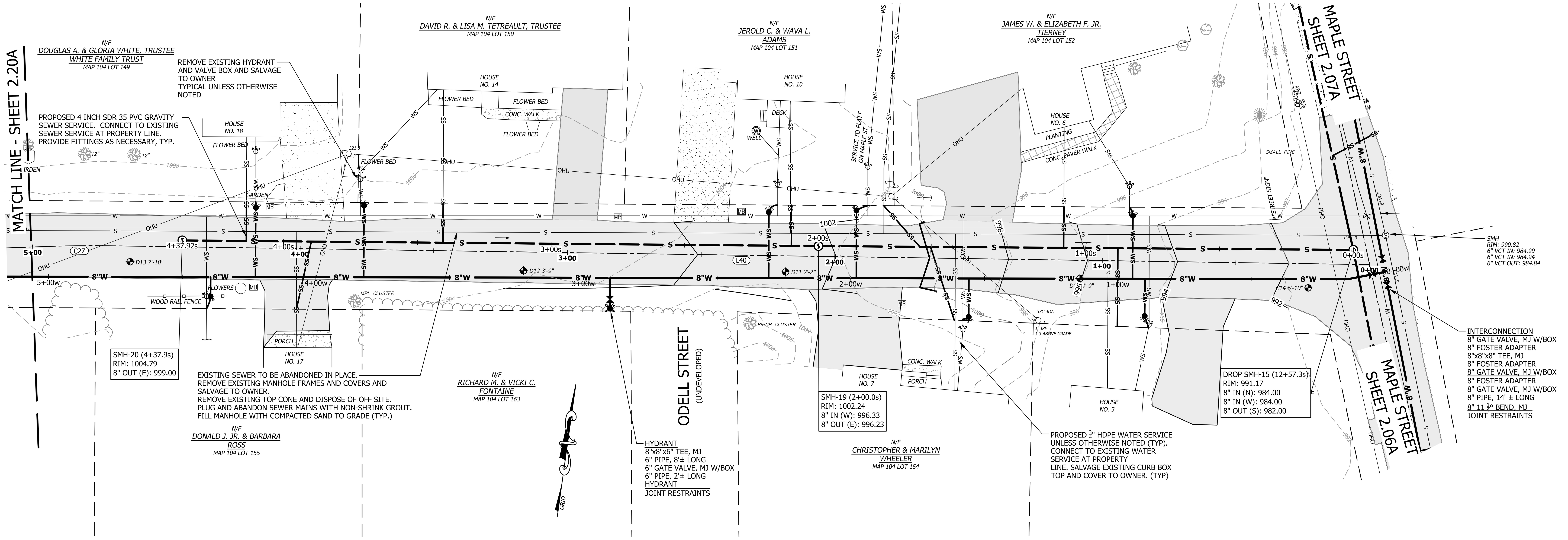
PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

WEST CROW HILL STREET
WATER AND SEWER PROFILES

SHEET 2.18B

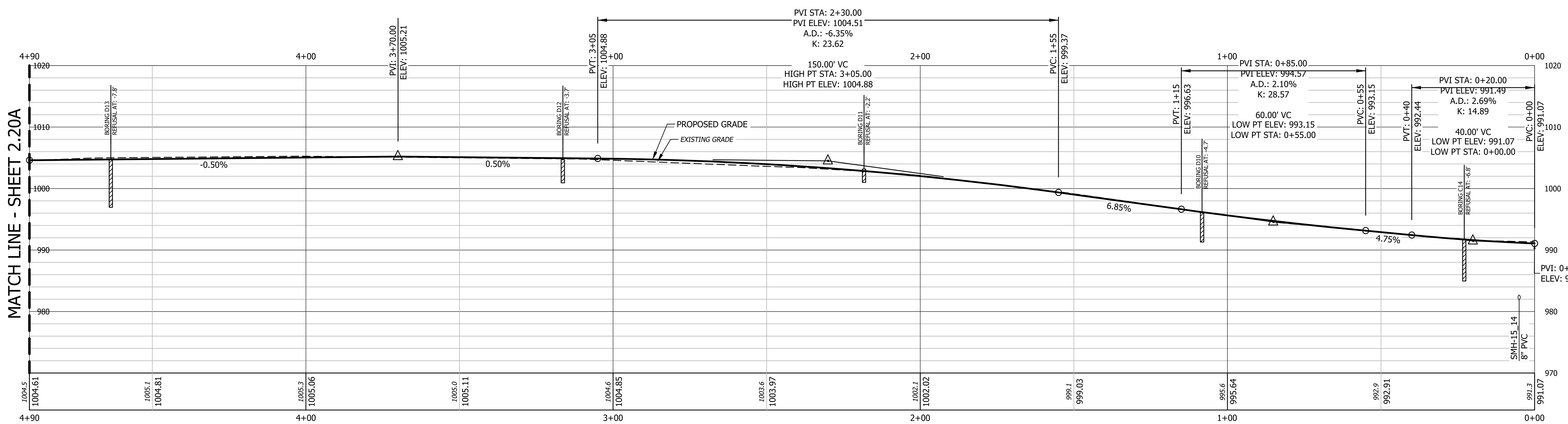


GRAND VIEW DRIVE

0 10 20 40 80
SCALE IN FEET

ROADWAY CENTERLINE - GRAND VIEW

LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
L40	---	469.83'	S82° 51' 25.64"W	---	0+00
C27	500.00'	25.48'	S81° 23' 49.56"W	25.48'	4+69.83
L41	---	130.05'	S79° 56' 13.49"W	---	4+95.31
C28	500.00'	21.39'	S81° 09' 45.56"W	21.39'	6+25.37
L42	---	59.27'	S82° 23' 17.64"W	---	6+46.76
L43	---	62.27'	S82° 54' 51.47"W	---	7+06.02
C30	500.00'	17.80'	S81° 53' 39.23"W	17.80'	7+68.30
L44	---	80.63'	S80° 52' 26.99"W	---	7+86.10



ROADWAY CENTERLINE - GRAND VIEW

STA: 0+00 TO STA: 4+90

0 10H 20H 40H 80H
0 5V 10V 20V 40V
SCALE IN FEET

BIDDING DOCUMENT NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE):	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

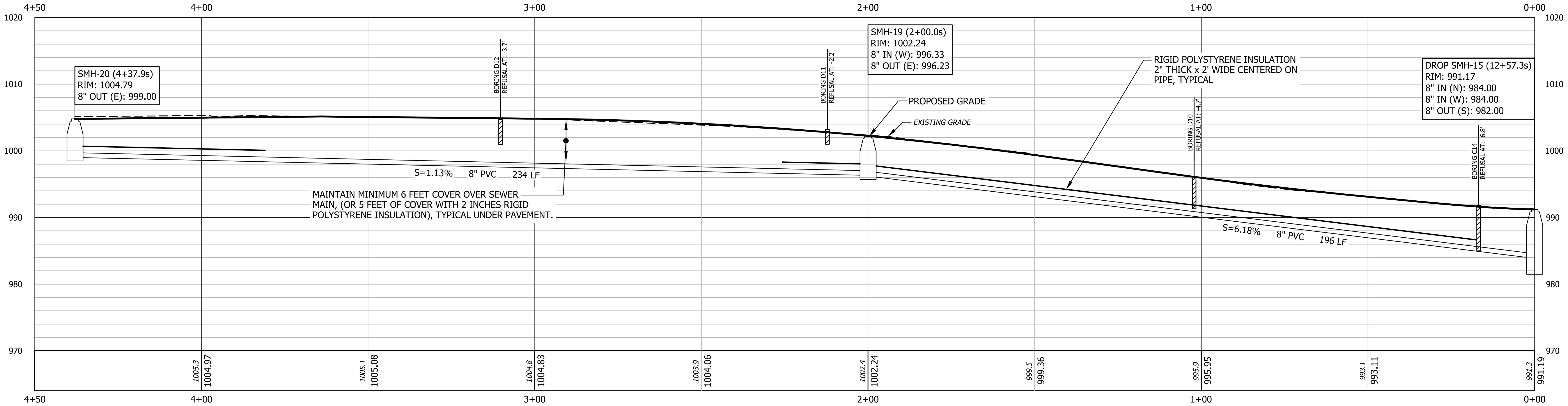
STATE OF NEW HAMPSHIRE · PROFESSIONAL ENGINEER

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

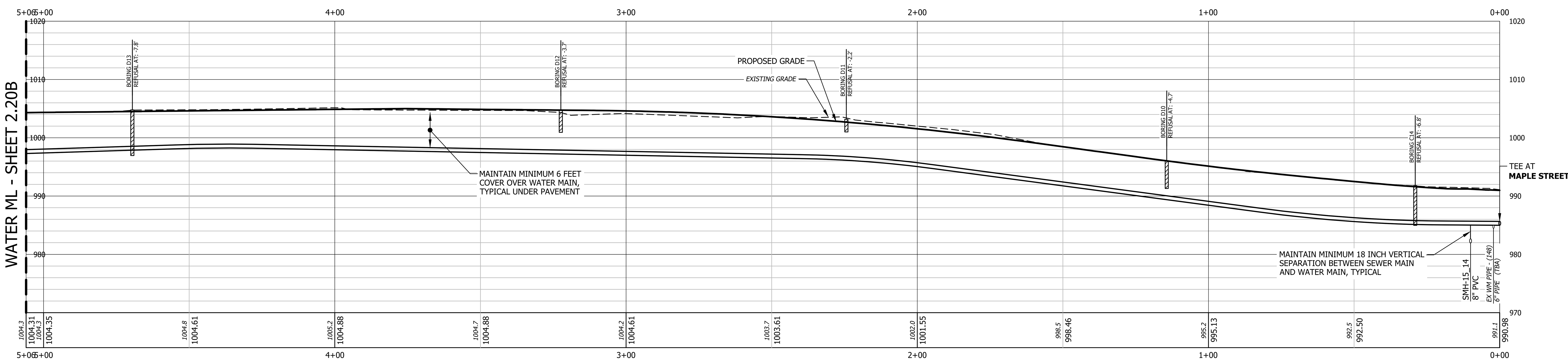
GRAND VIEW DRIVE
ROAD PLAN AND PROFILE STA 0+00 TO 5+50

SHEET 2.19A



SEWER PROFILE - GRAND VIEW - EAST
STA: 0+00 TO STA: 4+50

SCALE IN FEET



WATER PROFILE - GRAND VIEW
STA: 0+00 TO STA: 5+06

SCALE IN FEET

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

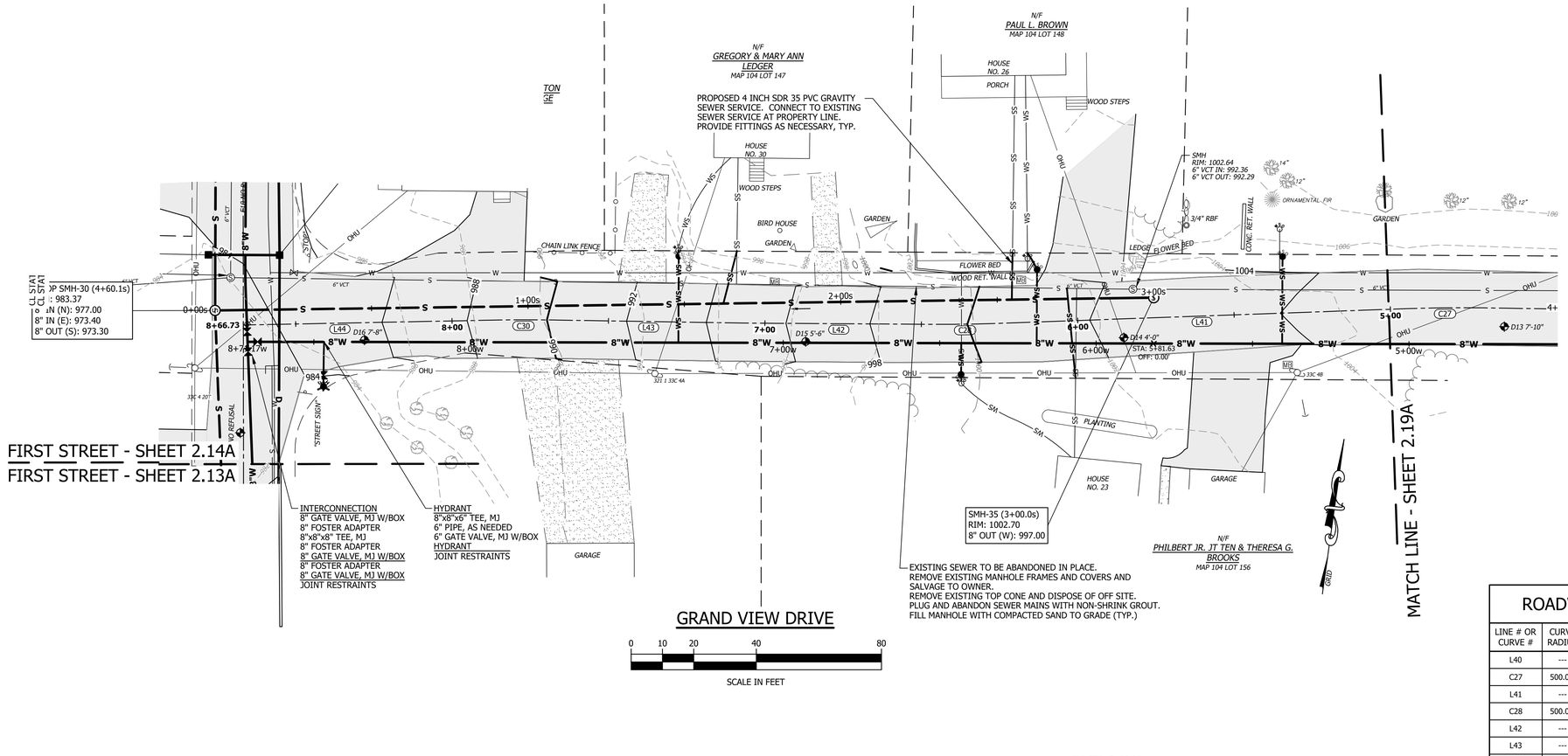
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

GRAND VIEW DRIVE
EAST GRAND VIEW SEWER PROFILE
WATER PROFILE STA 0+00 TO 5+06

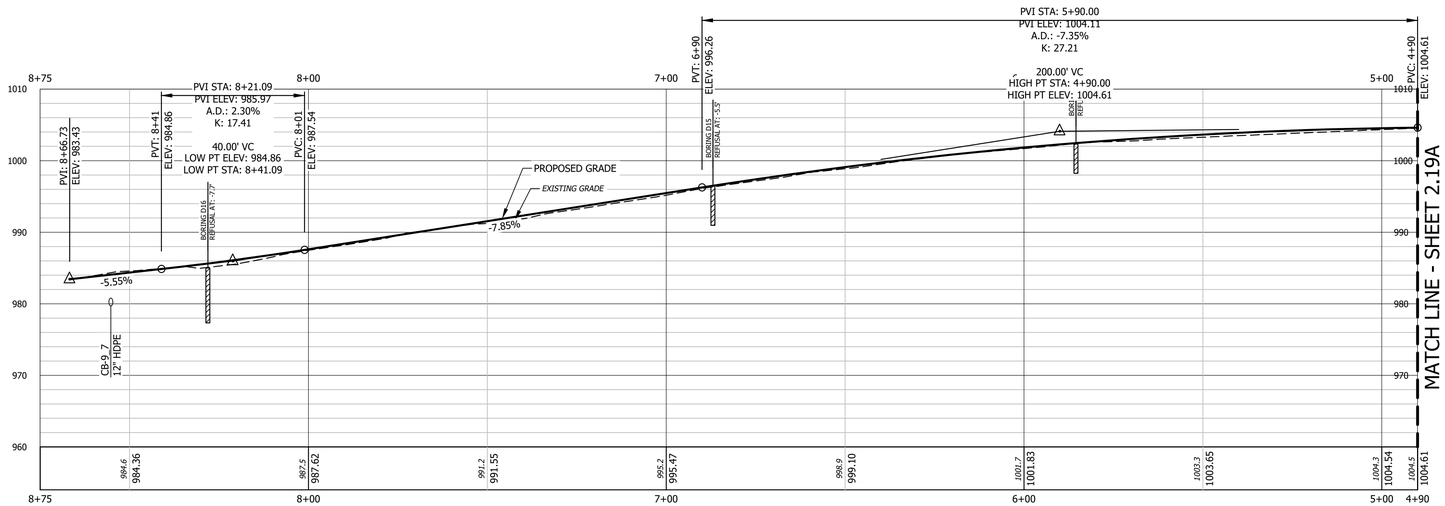
SHEET 2.19B

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.19B, 7/10/2024 10:03:34 AM, KarenPhilbrick



ROADWAY CENTERLINE - GRAND VIEW

LINE # OR CURVE #	CURVE RADIUS	LINE LENGTH OR CURVE LENGTH	LINE BEARING OR CHORD BEARING	CHORD LENGTH	LINE OR CURVE START STATION
L40	---	469.83'	S82° 51' 25.64"W	---	0+00
C27	500.00'	25.48'	S81° 23' 49.56"W	25.48'	4+69.83
L41	---	130.05'	S79° 56' 13.49"W	---	4+95.31
C28	500.00'	21.39'	S81° 09' 45.56"W	21.39'	6+25.37
L42	---	59.27'	S82° 23' 17.64"W	---	6+46.76
L43	---	62.27'	S82° 54' 51.47"W	---	7+06.02
C30	500.00'	17.80'	S81° 53' 39.23"W	17.80'	7+68.30
L44	---	80.63'	S80° 52' 26.99"W	---	7+86.10



ROADWAY CENTERLINE - GRAND VIEW
STA: 4+90 TO STA: 8+75

SCALE IN FEET

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KBP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

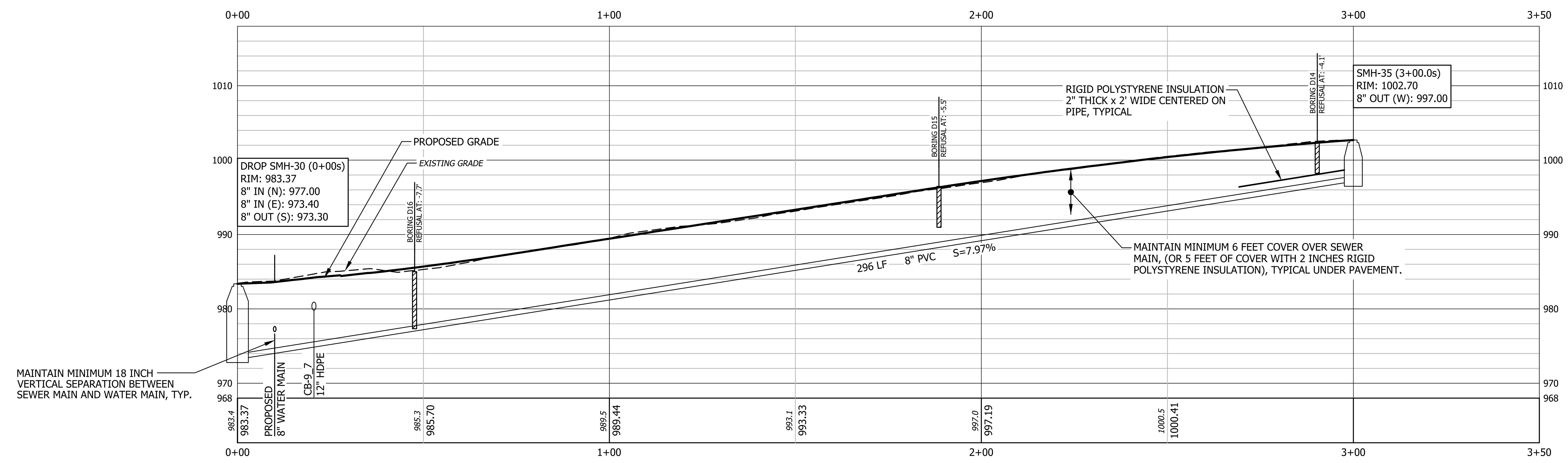
PROJECT #: 221174
DATE: APRIL 2024
MAP-LOT (OR ARCHIVE): -
SURVEYED BY: HEI
ENGINEERED BY: HEI
DRAWN BY: RLH
CHECKED BY: SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE - NEW HAMPSHIRE - VERMONT
www.horizonsengineering.com

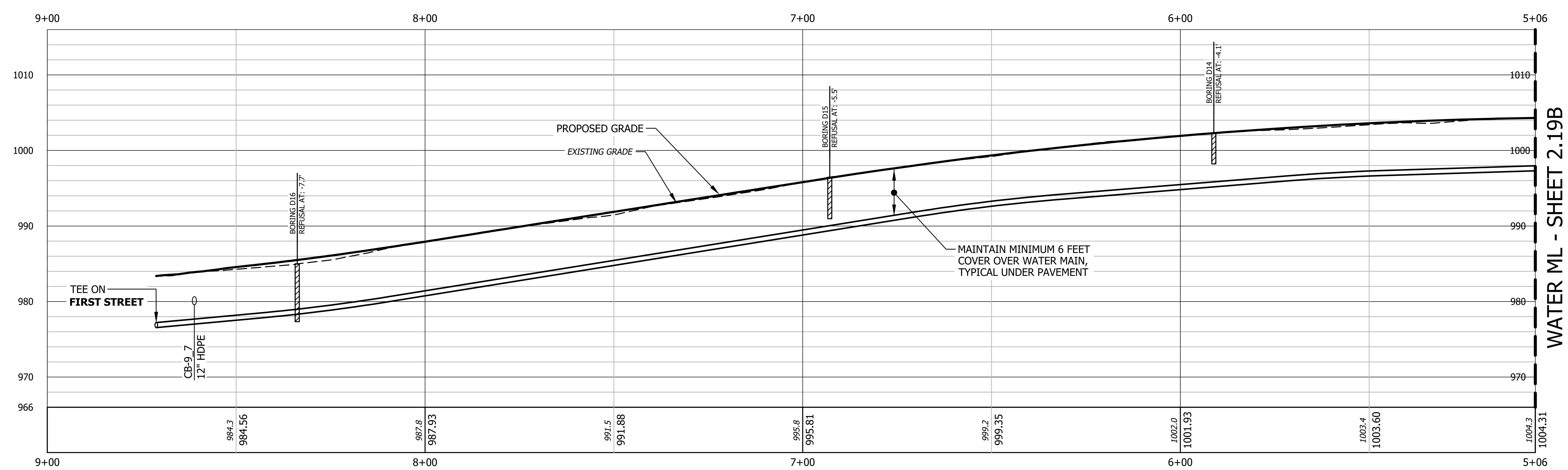
TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

GRAND VIEW DRIVE
ROAD PLAN AND PROFILE STA 5+00 TO 8+75

SHEET 2.20A



SEW-GRANDVIEW-WEST
STA: 0+00 to STA: 3+50



WATER PROFILE - GRAND VIEW
STA: 5+06 TO STA: 9+00

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE):	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS
GRAND VIEW DRIVE
WEST GRAND VIEW SEWER PROFILE
GRAND VIEW WATER PROFILE STA 5+06 TO 9+00

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

SHEET 2.20B

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.20B, 7/10/2024 10:05:05 AM, KarenPhilbrick

DRAIN PIPE TABLE

PIPE NUMBER	START STRUCT	END STRUCT	SIZE / MATERIAL	LENGTH (FEET)	SLOPE	INVERT IN	INVERT OUT
CB-3_2	CB-3	CB-2	12" HDPE	17.0	2.35%	884.40	884.00
CB-5_4	CB-5	X-CB-5	12" HDPE	80.8	6.09%	962.31	957.39
CB-6_5	CB-6	CB-5	12" HDPE	98.0	8.36%	970.75	962.56
CB-7_6	CB-7	CB-6	12" HDPE	106.9	2.73%	973.92	971.00
CB-7A_7	CB-7A	CB-7	12" HDPE	19.1	2.10%	974.57	974.17
CB-8_9	CB-8	CB-9	12" HDPE	22.7	1.76%	980.96	980.56
CB-9_7	CB-9	CB-7	12" HDPE	241.5	2.54%	980.31	974.17
CB-10_9	CB-10	CB-9	12" HDPE	252.8	1.82%	985.15	980.56
CB-11_10	CB-11	CB-10	12" HDPE	28.4	2.08%	985.99	985.40
CB-12_11	CB-12	CB-11	12" HDPE	21.3	2.26%	986.72	986.24
CB-13_EX-1	CB-13	CB-13A	12" HDPE	17.9	2.06%	904.37	904.00

SEWER PIPE TABLE

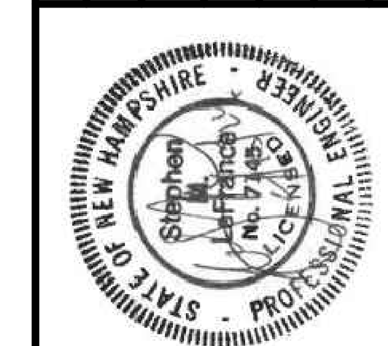
PIPE NUMBER	START STRUCT	END STRUCT	SIZE / MATERIAL	LENGTH (FEET)	SLOPE	INVERT IN	INVERT OUT
EX-2_SMH-1	EX-SMH-B	SMH-1	8" PVC	107.1	0.40%	880.03	879.60
EX-3_SMH-11	EX-SMH-C	SMH-7	8" PVC	89.3	1.90%	889.90	888.20
SMH-1_EX A	SMH-1	EX-SMH-A	8" PVC	184.3	0.40%	879.50	878.77
SMH-2_EX-B	SMH-2	EX-SMH-B	8" PVC	221.7	0.41%	881.00	880.10
SMH-3_2	SMH-3	SMH-2	8" PVC	212.8	0.42%	882.00	881.10
SMH-4_3	SMH-4	SMH-3	8" PVC	189.6	0.40%	882.85	882.10
SMH-5_4	SMH-5	SMH-4	8" PVC	238.2	0.40%	883.90	882.95
SMH-6_5	SMH-6	SMH-5	8" PVC	206.3	1.21%	886.50	884.00
SMH-7_6	SMH-7	SMH-6	8" PVC	156.9	0.96%	888.10	886.60
SMH-8_3	SMH-8	SMH-3	8" PVC	44.4	14.40%	888.50	882.10
SMH-9_8	SMH-9	SMH-8	8" PVC	205.7	7.14%	903.30	888.60
SMH-10_9	SMH-10	SMH-9	8" PVC	157.7	9.51%	918.40	903.40
SMH-11_10	DROP SMH-11	SMH-10	8" PVC	188.4	7.34%	932.33	918.50
SMH-14_13	SMH-14	DROP SMH-13	8" PVC	119.4	8.25%	981.35	971.50
SMH-15_14	DROP SMH-15	SMH-14	8" PVC	137.9	0.40%	982.00	981.45
SMH-16_15	DROP SMH-12	DROP SMH-11	8" PVC	193.3	7.97%	947.83	932.43
SMH-17_12	SMH-17	DROP SMH-12	8" PVC	283.9	5.31%	963.00	947.93
SMH-17_16	DROP SMH-13	DROP SMH-12	8" PVC	174.0	10.96%	969.00	949.93
SMH-18_17	SMH-18	SMH-17	8" PVC	146.3	4.84%	973.53	966.45
SMH-19_15	SMH-19	DROP SMH-15	8" PVC	198.0	6.18%	996.23	984.00
SMH-20_19	SMH-16	DROP SMH-15	8" PVC	116.6	0.86%	985.00	984.00
SMH-21_13	SMH-21	DROP SMH-13	8" PVC	143.9	5.20%	979.88	972.40
SMH-22_21	SMH-22	SMH-21	8" PVC	179.4	8.83%	995.82	979.98
SMH-23_22	SMH-23	SMH-22	8" PVC	140.4	1.08%	997.43	995.92
SMH-24_23	SMH-20	SMH-19	8" PVC	235.9	1.13%	999.00	996.33
SMH-24_EX D	SMH-24	EX-SMH-D	8" PVC	107.7	7.24%	958.00	950.20
SMH-25_24	SMH-25	SMH-24	8" PVC	65.0	16.06%	968.54	958.10
SMH-26_25	SMH-26	SMH-25	8" PVC	63.0	17.24%	979.50	968.64
SMH-27_EX E	SMH-27	DROP EX-SMH-E	8" PVC	104.6	7.95%	966.88	958.57
SMH-28_27	SMH-28	SMH-27	8" PVC	105.3	2.23%	969.33	966.98
SMH-29_28	SMH-29	SMH-28	8" PVC	107.0	3.01%	972.65	969.43
SMH-30_29	DROP SMH-30	SMH-29	8" PVC	127.2	0.43%	973.30	972.75
SMH-31_30	SMH-31	DROP SMH-30	8" PVC	298.6	2.31%	983.90	977.00
SMH-32_31	SMH-32	SMH-31	8" PVC	77.3	1.68%	985.30	984.00
SMH-33_32	SMH-33	SMH-32	8" PVC	280.0	4.32%	997.50	985.40
SMH-34_31	SMH-34	SMH-31	8" PVC	83.1	0.48%	984.40	984.00
SMH-35_30	SMH-35	DROP SMH-30	8" PVC	296.0	7.97%	997.00	973.40
SMH-36_28	SMH-36	SMH-28	8" PVC	58.6	9.34%	974.90	969.43
SMH-37_36	SMH-37	SMH-36	8" PVC	146.6	8.41%	987.33	975.00
SMH-38_37	SMH-38	SMH-37	8" PVC	138.3	5.57%	995.13	987.43
SMH-39_EX F	SMH-39	EX-SMH-F	8" PVC	201.9	5.55%	966.15	954.95
SMH-40_EX G	SMH-40	EX-SMH-G	8" PVC	25.6	9.62%	926.64	924.18
SMH-41_40	SMH-41	SMH-40	8" PVC	63.7	0.41%	927.00	926.74
SMH-42_41	SMH-42	SMH-41	8" PVC	63.2	0.71%	927.55	927.10

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML



horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

SEWER AND DRAIN PIPE TABLES

SHEET 2.21

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 2.21, 7/10/2024 10:05:47 AM, KarenPhilbrick

SEEDING RECOMMENDATIONS

1. GRADING AND SHAPING

A. SLOPES SHALL NOT BE STEEPER THAN 2:1; 3:1 SLOPES OR FLATTER ARE PREFERRED. WHERE MOWING WILL BE DONE, 3:1 SLOPES OR FLATTER ARE RECOMMENDED.

2. SEEDBED PREPARATION

A. SURFACE AND SEEPAGE WATER SHOULD BE DRAINED OR DIVERTED FROM THE SITE TO PREVENT DROWNING OR WINTER KILLING OF THE PLANTS.

B. STONES LARGER THAN 4 INCHES AND TRASH SHOULD BE REMOVED BECAUSE THEY INTERFERE WITH SEEDING AND FUTURE MAINTENANCE OF THE AREA. WHERE FEASIBLE, THE SOIL SHOULD BE AMENDED WITH ORGANIC MATTER AND TILLED TO A DEPTH OF ABOUT 4 INCHES TO PREPARE A SEEDBED AND MIX FERTILIZER AND LIME THOROUGHLY INTO THE SOIL. THE SEEDBED SHOULD BE LEFT IN A REASONABLY FIRM AND SMOOTH CONDITION. THE LAST TILLAGE OPERATION SHOULD BE PERFORMED ACROSS THE SLOPE WHEREVER PRACTICAL.

3. ESTABLISHING VEGETATION

A. LIME AND FERTILIZER SHOULD BE APPLIED PRIOR TO OR AT THE TIME OF SEEDING AND INCORPORATED INTO THE SOIL. KINDS AND AMOUNTS OF LIME AND FERTILIZER SHOULD BE BASED ON AN EVALUATION OF SOIL TESTS. WHEN A SOIL TEST IS NOT AVAILABLE, THE FOLLOWING MINIMUM AMOUNTS SHOULD BE APPLIED:

-AGRICULTURAL LIMESTONE, 2 TONS PER ACRE OR 100 LBS. PER 1,000 SQ. FT.
-NITROGEN (N), 50 LBS., PER ACRE OR 1.1 LBS. PER 1,000 SQ. FT.
-PHOSPHATE (P_2O_5), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ. FT.
-POTASH (K_2O), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ. FT.

(NOTE: THIS IS THE EQUIVALENT OF 500 LBS. PER ACRE OF 10-20-20 FERTILIZER OR 1,000 LBS. PER ACRE OF 5-10-10).

B. SEED SHOULD BE SPREAD UNIFORMLY BY THE METHOD MOST APPROPRIATE FOR THE SITE. METHODS INCLUDE BROADCASTING, DRILLING, AND HYDROSEEDING. WHERE BROADCASTING IS USED, COVER SEED WITH .25 INCH OF SOIL OR LESS, BY CULTIPACKING OR RAKING.

C. SEEDING GUIDE:

USE	SEEDING MIXTURE (SEE 3D)	SOIL TYPE: DROUGHTY	WELL DRAINED	MOD. WELL DRAINED	POORLY DRAINED
STEEP CUTS AND FILLS, BORROW AND DISPOSAL AREAS	A	FAIR	GOOD	GOOD	FAIR
	B	POOR	GOOD	FAIR	FAIR
	C	FAIR	EXCELLENT	EXCELLENT	POOR
WATERWAYS, EMERGENCY SPILLWAYS, AND OTHER CHANNELS WITH FLOWING WATER	A	GOOD	GOOD	GOOD	FAIR
LIGHTLY USED PARKING LOTS, ODD AREAS, UNUSED LANDS, AND LOW INTENSITY USE RECREATION SITES	A	GOOD	GOOD	GOOD	FAIR
	B	GOOD	GOOD	FAIR	POOR

D. SEEDING RATES:

MIXTURE	POUNDS PER ACRE	POUNDS PER 1,000 SQ. FT.
A TALL FESCUE	20	0.45
CREEPING RED FESCUE	20	0.45
REDTOP	2	0.05
TOTAL:	42	0.95
B TALL FESCUE	15	0.35
CREEPING RED FESCUE	10	0.25
CROWN VETCH **OR**	15 **OR**	0.35 **OR**
FLATPEA	30	0.75
TOTAL:	40 **OR** 55	0.95 **OR** 1.35
C TALL FESCUE	20	0.45
FLATPEA	30	0.75
TOTAL:	50	1.20

E. WHEN SEEDED AREAS ARE MULCHED, PLANTINGS MAY BE MADE FROM EARLY SPRING TO SEPTEMBER 15. WHEN SEEDED AREAS ARE NOT MULCHED, PLANTINGS SHOULD BE MADE FROM EARLY SPRING TO MAY 20 OR FROM AUGUST 10 TO SEPTEMBER 1.

F. TEMPORARY SEEDING RATES:

SPECIES	POUNDS PER ACRE	POUNDS PER 1,000 SQ. FT.	REMARKS
WINTER RYE	112	2.5	BEST FOR FALL SEEDING. SEED FROM AUGUST TO SEPTEMBER 5TH FOR BEST COVER. SEED TO A DEPTH OF 1 INCH.
OATS	80	2.0	BEST FOR SPRING SEEDING. SEED NO LATER THAN MAY 15TH FOR SUMMER PROTECTION. SEED TO A DEPTH OF 1 INCH.
ANNUAL RYEGRASS	40	1.0	GROWS QUICKLY, BUT IS OF SHORT DURATION. USE WHERE APPEARANCES ARE NOT IMPORTANT. SEED EARLY SPRING AND/OR BETWEEN AUGUST 15TH AND SEPTEMBER 15TH. COVER SEED WITH NO MORE THAN 0.25 INCH OF SOIL.
PERENNIAL RYEGRASS	30	0.7	GOOD COVER WHICH IS LONGER LASTING THAN ANNUAL RYEGRASS. SEED BETWEEN APRIL 1ST AND JUNE 1ST AND/OR BETWEEN AUGUST 15TH AND SEPTEMBER 15TH. MULCHING WILL ALLOW SEEDING THROUGHOUT THE GROWING SEASON. SEED TO A DEPTH OF APPROXIMATELY 0.5 INCH.

4. MULCH

A. HAY, STRAW, OR OTHER MULCH, WHEN NEEDED, SHOULD BE APPLIED IMMEDIATELY AFTER SEEDING.

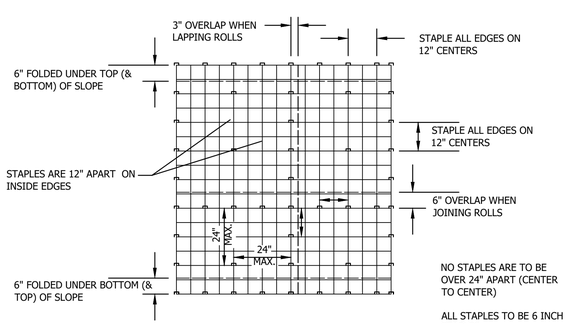
B. MULCH WILL BE HELD IN PLACE USING APPROPRIATE TECHNIQUES FROM THE BEST MANAGEMENT PRACTICE FOR MULCHING.

5. MAINTENANCE TO ESTABLISH A STAND

A. PLANTED AREAS SHOULD BE PROTECTED FROM DAMAGE BY FIRE, GRAZING, TRAFFIC, AND DENSE WEED GROWTH.

B. FERTILIZATION NEEDS SHOULD BE DETERMINED BY ON SITE INSPECTIONS. SUPPLEMENTAL FERTILIZER IS USUALLY THE KEY TO FULLY COMPLETE THE ESTABLISHMENT OF THE STAND BECAUSE MOST PERENNIALS TAKE 2 TO 3 YEARS TO BECOME ESTABLISHED.

C. IN WATERWAYS, CHANNELS, OR SWALES WHERE UNIFORM FLOW CONDITIONS ARE ANTICIPATED, OCCASIONAL MOWING MAY BE NECESSARY TO CONTROL GROWTH OF WOODY VEGETATION.



MULCH NETTING DETAIL

NO SCALE SOURCE: USDA SOIL CONSERVATION SERVICE

EROSION CONTROL GENERAL NOTES

A. KEEP SITE MODIFICATION TO A MINIMUM

1. EXPOSE AREAS OF BARE SOIL TO EROSIVE ELEMENTS FOR THE SHORTEST TIME POSSIBLE.
2. SAVE AND PROTECT DESIRABLE EXISTING VEGETATION WHERE POSSIBLE. ERECT BARRIERS TO PREVENT DAMAGE FROM CONSTRUCTION EQUIPMENT.
3. LIMIT THE GRADES OF SLOPES SO VEGETATION CAN BE EASILY ESTABLISHED AND MAINTAINED.

B. MINIMIZE POLLUTION OF WATER DURING CONSTRUCTION ACTIVITIES

1. STOCKPILE TOPSOIL REMOVED FROM CONSTRUCTION AREA AND SPREAD OVER ANY DISTURBED AREAS PRIOR TO REVEGETATION. TOPSOIL STOCKPILES MUST BE PROTECTED FROM EROSION.
2. PROTECT BARE SOIL AREAS EXPOSED BY GRADING ACTIVITIES WITH TEMPORARY VEGETATION OR MULCHES.
3. USE SEDIMENT BASINS TO TRAP DEBRIS AND SEDIMENT WHICH WILL PREVENT THESE MATERIALS FROM MOVING OFF SITE.
4. USE DIVERSIONS TO DIRECT WATER AROUND THE CONSTRUCTION AREA AND AWAY FROM EROSION PRONE AREAS TO POINTS OF SAFE DISPOSAL.
5. PLACE CONSTRUCTION FACILITIES, MATERIALS, AND EQUIPMENT STORAGE AND MAINTENANCE AREAS AWAY FROM DRAINAGE WAYS.

C. PROTECT AREA AFTER CONSTRUCTION.

1. ESTABLISH GRASS OR OTHER SUITABLE VEGETATION ON ALL DISTURBED AREAS. SELECT SPECIES ADAPTED TO THE SITE CONDITIONS AND THE FUTURE USE OF THE AREA. FINAL GRADES SHALL BE SEEDED WITHIN 72 HOURS. STABILIZATION SHALL BE DEFINED AS 85% VEGETATIVE COVER.
2. MAINTAIN VEGETATED AREAS USING PROPER VEGETATIVE 'BEST MANAGEMENT PRACTICES' DURING THE CONSTRUCTION PERIOD.
3. MAINTAIN NEEDED STRUCTURAL 'BEST MANAGEMENT PRACTICES' AND REMOVE SEDIMENT FROM DETENTION PONDS AND SEDIMENT BASINS AS NEEDED.
4. DETERMINE RESPONSIBILITY FOR LONG TERM MAINTENANCE OF PERMANENT 'BEST MANAGEMENT PRACTICES'.
5. IF CONSTRUCTION IS ANTICIPATED DURING WINTER MONTHS, GRADED AREAS ARE TO BE STABILIZED WITH NORTH AMERICAN GREEN DS150 MATTING OR EQUAL.

D. INVASIVE SPECIES MONITORING / ELIMINATION

1. PRECAUTIONS SHALL BE TAKEN TO PREVENT IMPORT OR TRANSPORT OF SOIL OR SEED STOCK CONTAINING NUISANCE OR INVASIVE SPECIES SUCH AS PURPLE LOOSESTRIFE, KNOTWEED OR PHRAGMITES. THE CONTRACTOR SHALL ADDRESS INVASIVE SPECIES IN ACCORDANCE WITH THE REPORT "NH DOT BEST MANAGEMENT PRACTICES FOR ROADSIDE INVASIVE PLANTS (2008)".
2. TO PREVENT THE INTRODUCTION OF INVASIVE PLANT SPECIES TO THE SITE, THE CONTRACTOR SHALL CLEAN ALL SOILS AND VEGETATION FROM CONSTRUCTION EQUIPMENT AND MATTING BEFORE SUCH EQUIPMENT IS MOVED TO THE SITE.

COLD WEATHER SITE STABILIZATION REQUIREMENTS

TO ADEQUATELY PROTECT WATER QUALITY DURING COLD WEATHER AND DURING SPRING RUNOFF, THE FOLLOWING ADDITIONAL STABILIZATION TECHNIQUES SHALL BE EMPLOYED DURING THE PERIOD FROM OCTOBER 15 THROUGH MAY 1:

1. THE AREA OF EXPOSED, UNSTABILIZED SOIL SHALL BE LIMITED TO 1 ACRE AND SHALL BE PROTECTED AGAINST EROSION BY THE METHODS DESCRIBED IN THIS SECTION PRIOR TO ANY THAW OR SPRING MELT EVENT.
2. ALL PROPOSED VEGETATED AREAS HAVING A SLOPE OF LESS THAN 15% WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE SEEDED AND COVERED WITH 3 TO 4 TONS OF HAY OR STRAW MULCH PER ACRE, SECURED WITH ANCHORED NETTING OR TACKIFIER, OR 2 INCHES OF EROSION CONTROL MIX MEETING THE CRITERIA OF ENV-WQ 1506.05(D) THROUGH (H).
3. ALL PROPOSED VEGETATED AREAS HAVING A SLOPE OF GREATER THAN 15% WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE SEEDED AND COVERED WITH PROPERLY INSTALLED AND ANCHORED EROSION CONTROL MATTING OR WITH A MINIMUM 4 INCH THICKNESS OF EROSION CONTROL MIX MEETING THE CRITERIA OF ENV-WQ 1506.05(D) THROUGH (H).
4. INSTALLATION OF ANCHORED HAY MULCH OR EROSION CONTROL MIX, MEETING THE CRITERIA OF ENV-WQ 1506.05(D) THROUGH (H), SHALL NOT OCCUR OVER SNOW OF GREATER THAN 1 INCH IN DEPTH.
5. INSTALLATION OF EROSION CONTROL MATTING SHALL NOT OCCUR OVER SNOW OF GREATER THAN ONE INCH IN DEPTH OR ON FROZEN GROUND.
6. ALL PROPOSED STABILIZATION IN ACCORDANCE WITH NOTES 2 OR 3 ABOVE, SHALL BE COMPLETED WITHIN 1 DAY OF ESTABLISHING THE GRADE THAT IS FINAL OR THAT OTHERWISE WILL EXIST FOR MORE THAN 5 DAYS.
7. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS, AS DETERMINED BY THE OWNER'S ENGINEERING CONSULTANT.

CONSTRUCTION SEQUENCE

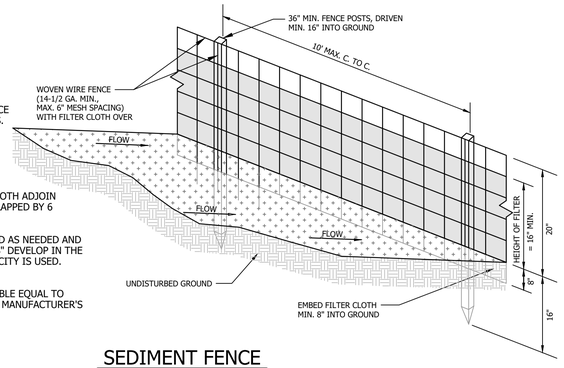
1. INSTALL SEDIMENT FENCES, ROCK CHECK DAMS, AND OTHER APPROPRIATE EROSIONS CONTROL MEASURES AT LOCATIONS SHOWN ON THE PLANS AND AS NEEDED.
2. PROCEED WITH WORK, LIMITING THE DURATION OF DISTURBANCE. THE MAXIMUM LENGTH OF TIME THAT A WORK UNIT MAY BE LEFT UNSTABILIZED IS 30 DAYS.
3. BEGIN SEEDING AND MULCHING IMMEDIATELY AFTER GRADING. ALL DISTURBED AREAS SHALL BE STABILIZED WITH APPROVED METHODS WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.

AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
A) BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
B) A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
C) A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED; OR
D) EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.

4. INSPECT ALL EROSION CONTROL MEASURES ON A DAILY BASIS AND AFTER EVERY 0.5 INCHES OF PRECIPITATION. MAINTAIN SEDIMENT FENCE, SEDIMENT TRAPS, HAY BALES, ETC., AS NECESSARY.
5. PLACE TOPSOIL, SEED AND MULCH.
6. MONITOR THE SITE AND MAINTAIN STRUCTURES AS NEEDED UNTIL FULL VEGETATION IS ESTABLISHED.

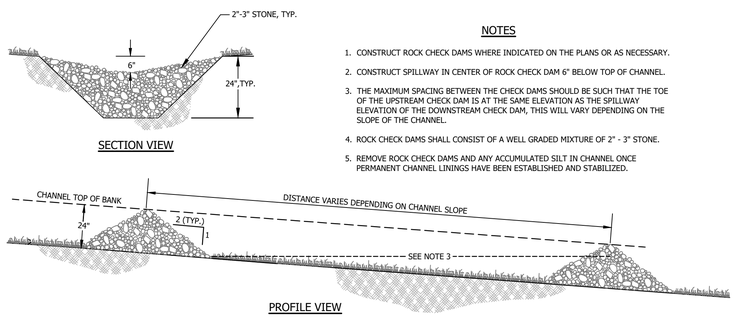
CONSTRUCTION NOTES FOR SEDIMENT FENCE

1. WOVEN WIRE FENCE, IF REQUIRED, TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP, MID SECTION, AND BOTTOM.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY 6 INCHES, FOLDED AND STAPLED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SEDIMENT FENCE, OR 50% OF CAPACITY IS USED.
5. 12" DIAMETER FILTREXX SILTSOXX SHALL BE CONSIDERED AN ACCEPTABLE EQUAL TO SEDIMENT FENCE IF INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.



SEDIMENT FENCE

NO SCALE



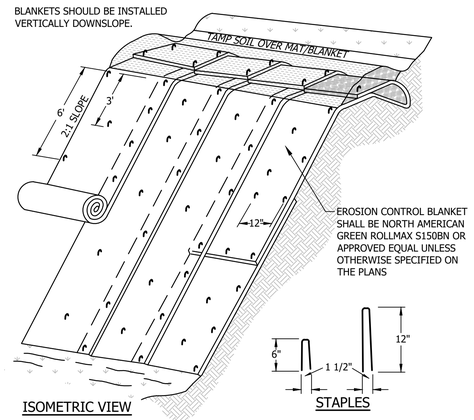
NOTES

1. CONSTRUCT ROCK CHECK DAMS WHERE INDICATED ON THE PLANS OR AS NECESSARY.
2. CONSTRUCT SPILLWAY IN CENTER OF ROCK CHECK DAM 6" BELOW TOP OF CHANNEL.
3. THE MAXIMUM SPACING BETWEEN THE CHECK DAMS SHOULD BE SUCH THAT THE TOE OF THE UPSTREAM CHECK DAM IS AT THE SAME ELEVATION AS THE SPILLWAY ELEVATION OF THE DOWNSTREAM CHECK DAM, THIS WILL VARY DEPENDING ON THE SLOPE OF THE CHANNEL.
4. ROCK CHECK DAMS SHALL CONSIST OF A WELL GRADED MIXTURE OF 2" - 3" STONE.
5. REMOVE ROCK CHECK DAMS AND ANY ACCUMULATED SILT IN CHANNEL ONCE PERMANENT CHANNEL LININGS HAVE BEEN ESTABLISHED AND STABILIZED.

ROCK CHECK DAM DETAIL

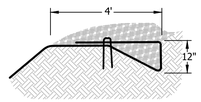
NO SCALE

BLANKETS SHOULD BE INSTALLED VERTICALLY DOWNSLOPE.



ISOMETRIC VIEW

STAPLES



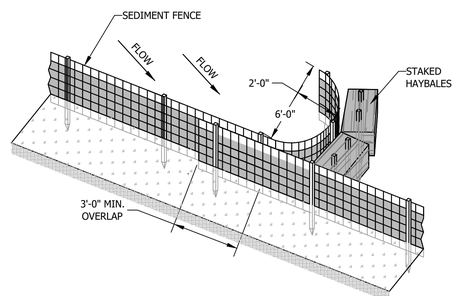
DETAIL DIGITIZED FROM NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, NHDES 2008

NOTES:

1. DIMENSION GIVEN IN THE DRAWINGS ARE EXAMPLES; DEVICE SHOULD BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS.
2. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
3. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
4. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

EROSION CONTROL BLANKET INSTALLATION DETAIL

NOT TO SCALE



SEDIMENT FENCE POCKET

NO SCALE

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #: 221174
DATE: APRIL 2024
MAP-LOT (OR ARCHIVE): -
SURVEYED BY: HEI
ENGINEERED BY: HEI
DRAWN BY: RLH
CHECKED BY: SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

EROSION CONTROL NOTES AND DETAILS

BIDDING DOCUMENT NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

SHEET 3.1

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 3.1 Erosion, 7/10/2024 10:06:30 AM, KarenPhilbrick

last revised: 2015 MAY 25

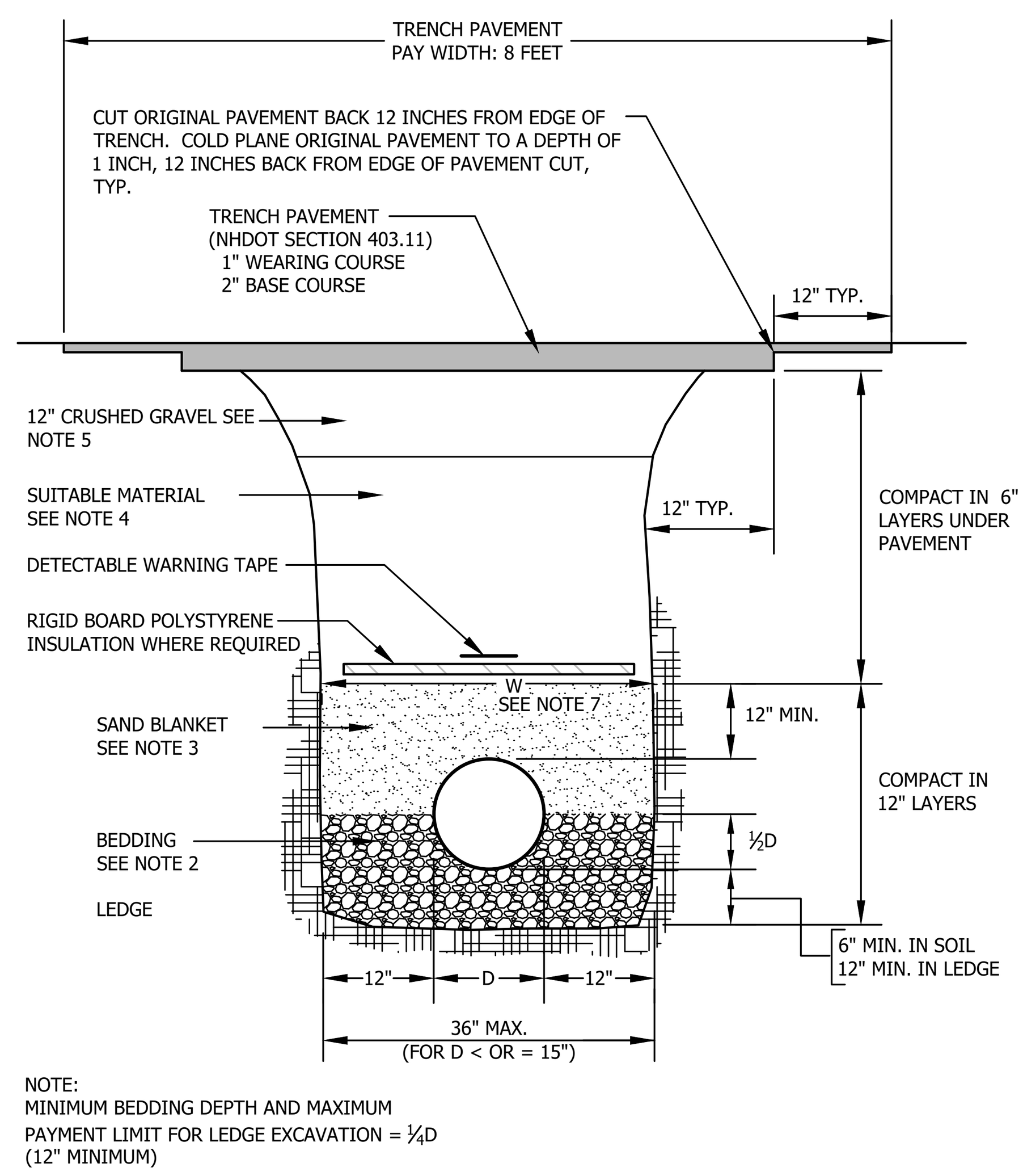
STANDARD TRENCH NOTES - WATER

1. ORDERED EXCAVATION OF UNSUITABLE MATERIAL BELOW GRADE SHALL BE REPLACED WITH BEDDING MATERIAL. SEE ALSO NOTE 4.
2. BEDDING: SCREENED GRAVEL AND/OR CRUSHED STONE FREE FROM ORGANIC MATTER, CLAY, AND/OR LOAM MEETING ASTM C33 STONE SIZE NO. 67.

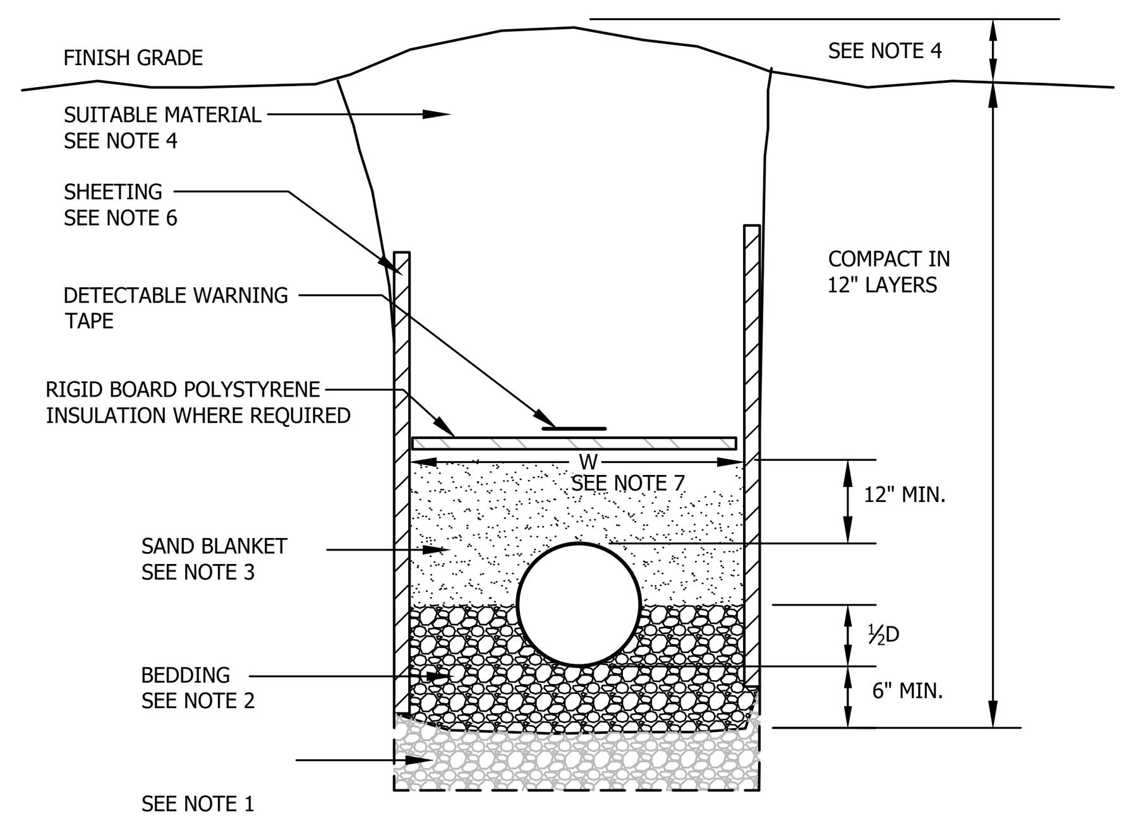
100% PASSING	1 INCH SCREEN
90-100% PASSING	¾ INCH SCREEN
20-55% PASSING	⅜ INCH SCREEN
0-10% PASSING	#4 SIEVE
0-5% PASSING	#8 SIEVE

3. SAND BLANKET: CLEAN SAND FREE FROM ORGANIC MATTER, SO GRADED THAT 100% PASSES A ½ INCH SIEVE AND NOT MORE THAN 15% PASSES A #200 SIEVE.
4. SUITABLE MATERIAL: IN ROADS, ROAD SHOULDERS, WALKWAYS, AND TRAVELED WAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED FROM THE TRENCH DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS, PIECES OF PAVEMENT, ORGANIC MATTER, TOP SOIL, WET OR SOFT MUCK, PEAT OR CLAY, EXCAVATED LEDGE MATERIAL, AND ALL ROCKS OVER SIX INCHES IN LARGEST DIMENSION, OR ANY MATERIAL NOT APPROVED BY THE ENGINEER.

   TRENCH BACKFILL IN CROSS-COUNTRY LOCATIONS SHALL BE SUITABLE MATERIAL AS DESCRIBED ABOVE, EXCEPT THAT TOP SOIL, LOAM, MUCK, OR PEAT MAY BE USED PROVIDED THAT THE COMPLETED CONSTRUCTION WILL BE STABLE AND ACCESS TO THE PIPE FOR MAINTENANCE AND RECONSTRUCTION IS PRESERVED. BACKFILL SHALL BE MOUNDED TO A HEIGHT OF SIX INCHES ABOVE THE ORIGINAL GROUND SURFACE
5. BASE COURSE FOR TRENCH REPAIR SHALL MEET THE REQUIREMENTS OF SECTION 300 OF THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION OF THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION.
6. SHEETING: ALL TRENCH SUPPORTS SHALL CONFORM TO OSHA STANDARDS. CONTRACTOR IS RESPONSIBLE FOR OSHA COMPLIANCE AND WORKER SAFETY THROUGHOUT CONSTRUCTION.
7. TRENCH DIMENSIONS: W = MAXIMUM ALLOWABLE TRENCH WIDTH MEASURED 12 INCHES ABOVE THE PIPE. FOR PIPES 15 INCHES NOMINAL DIAMETER (D) OR LESS, W SHALL BE NO MORE THAN 36 INCHES; FOR PIPES GREATER THAN 15 INCHES NOMINAL DIAMETER, W SHALL BE 24 INCHES PLUS THE PIPE OUTSIDE DIAMETER. W SHALL ALSO BE THE PAYMENT WIDTH FOR LEDGE EXCAVATION AND FOR ORDERED EXCAVATION BELOW GRADE. THE MAXIMUM ALLOWABLE TRENCH PAVEMENT PAYMENT WIDTH SHALL BE 8 FEET CENTERED OVER PIPE.
8. WATER/SEWER SEPARATION: WATER MAINS SHALL BE SEPARATED FROM SANITARY SEWER BY A MINIMUM OF 10 FEET HORIZONTALLY AND A MINIMUM OF 18 INCHES VERTICALLY, WITH THE WATER MAIN ABOVE THE SEWER.
9. PIPE COVER:
   COVER OVER WATER MAIN SHALL BE 6 FEET MINIMUM IN ALL LOCATIONS. EXCEPT AS MAY BE NOTED ON PLANS.



LEDGE/SUB PAVEMENT CONSTRUCTION



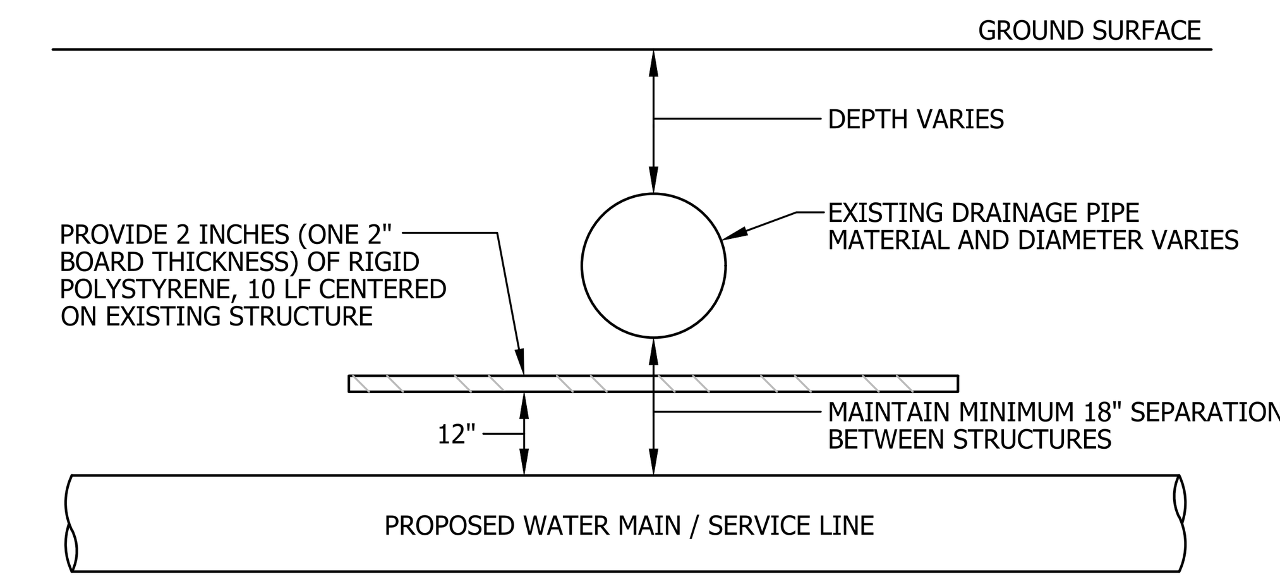
EARTH CONSTRUCTION WITH OR WITHOUT SHEETING

STANDARD TRENCH SECTIONS

NOT TO SCALE

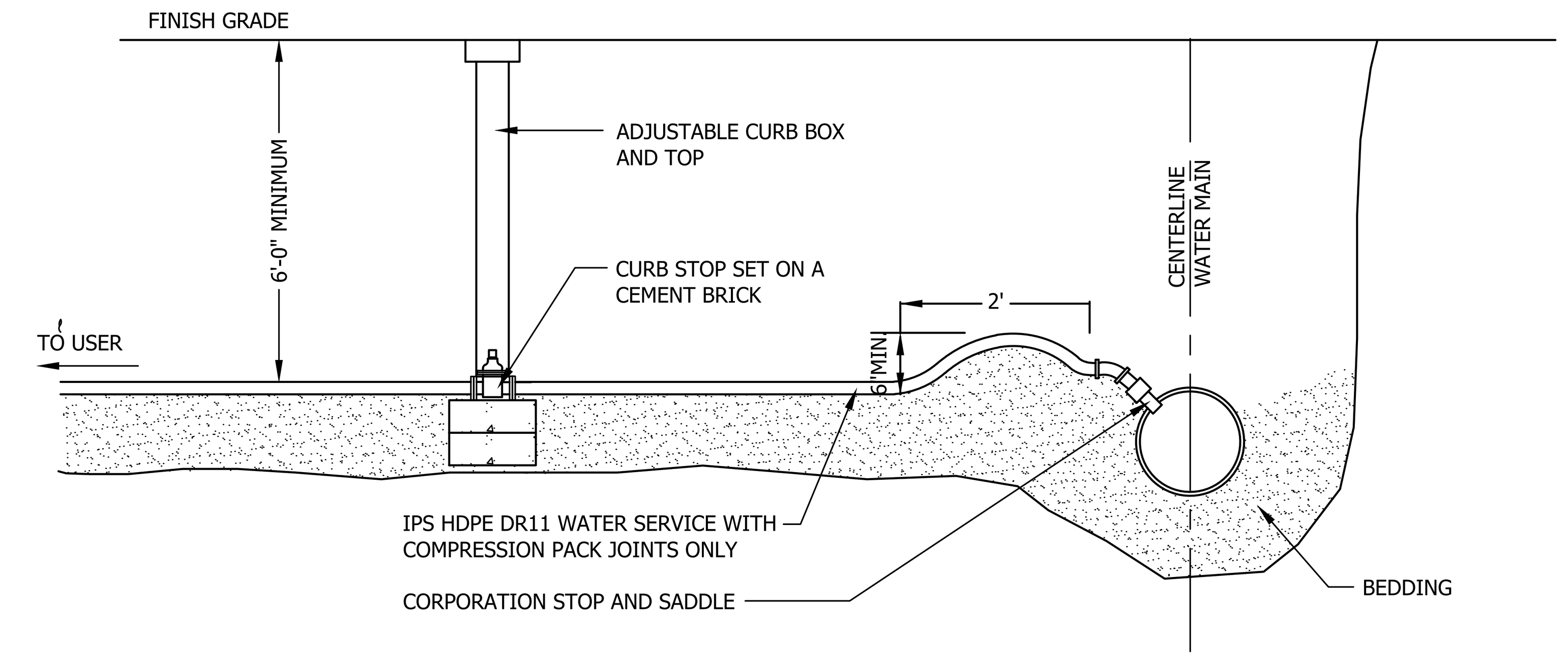
DRAINAGE CROSSING NOTES

1. INSULATION THICKNESS AT DRAINAGE CROSSINGS SHALL BE 2 INCHES (ONE 2" BOARD THICKNESS OF RIGID POLYSTYRENE) UNLESS DIRECTED OTHERWISE IN FIELD.
2. MINIMUM SEPARATION BETWEEN EXISTING DRAINAGE STRUCTURES AND NEW WATER MAIN AND APPURTENANCES SHALL BE 18 INCHES.



TYPICAL DRAINAGE CROSSING DETAIL

NO SCALE



WATER SERVICE CONNECTION

NOT TO SCALE

- BLOCKS MUST BE POURED AGAINST UNDISTURBED SOIL
- THE PIPE JOINT AND BOLTS MUST BE ACCESSIBLE.
- CONCRETE SHOULD BE CURED FOR AT LEAST 5 DAYS AND SHOULD HAVE A COMPRESSION STRENGTH OF 3,000 LBS. AT 28 DAYS.
- BLOCKS MUST BE POSITIONED TO COUNTERACT THE DIRECTION OF THE RESULTANT THRUST FORCE.

RESTRAINED JOINTS MAY BE USED FOR RESISTING THRUST FORCES WHERE THERE IS A SHORTAGE OF SPACE OR WHERE THE SOIL BEHIND A FITTING WILL NOT PROVIDE ADEQUATE SUPPORT. THIS RESTRAINING METHOD INVOLVES PLACEMENT OF THESE SPECIAL JOINTS AT APPROPRIATE FITTINGS AND FOR A PREDETERMINED NUMBER OF PIPE LENGTHS ON EACH SIDE, (MINIMUM 15 FEET).

RESULTANT THRUST AT FITTINGS AT 100 PSI WATER PRESSURE

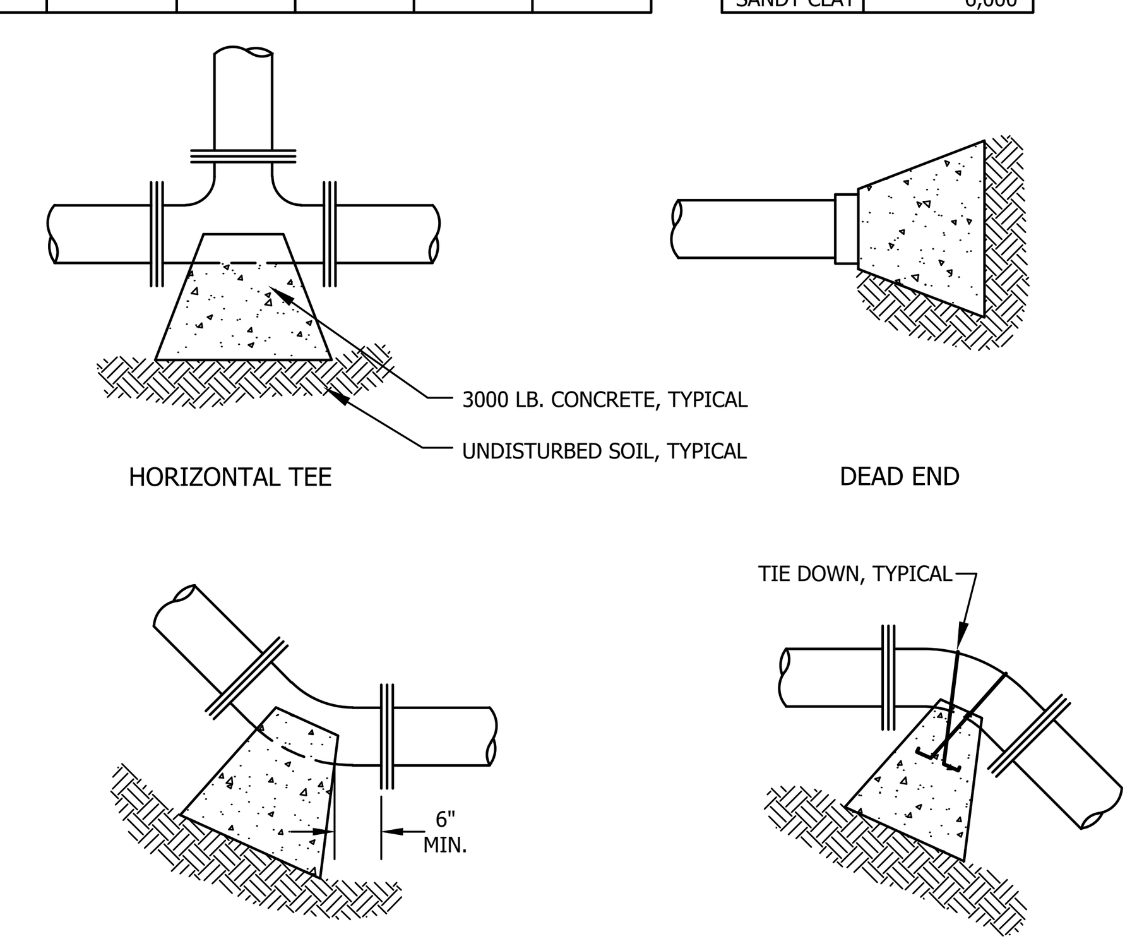
NOMINAL PIPE DIA. (INCHES)	TOTAL THRUST (POUNDS) DEAD END	90° BEND	45° BEND	22½° BEND	11¼° BEND
4	1,810	2,559	1,385	706	355
6	3,739	5,288	2,862	1,459	733
8	6,433	9,097	4,923	2,510	1,261
10	9,677	13,685	7,406	3,776	1,897
12	13,685	19,353	10,474	5,340	2,683
14	18,385	26,001	14,072	7,174	3,604
16	23,779	33,628	18,199	9,278	4,661
18	29,865	42,235	22,858	11,653	5,855
20	36,644	51,822	28,046	14,298	7,183
24	52,279	73,934	40,013	20,398	10,249

NOTE:
TO DETERMINE THRUST AT PRESSURES OTHER THAN 100 PSI, MULTIPLY THE THRUST OBTAINED IN THE TABLE BY THE RATIO OF THE PRESSURE TO 100. FOR EXAMPLE, THE THRUST ON A 12 INCH, 90° BEND AT 125 PSI IS:

$$\frac{19{,}353 \times 125}{100} = 24{,}191 \text{ POUNDS}$$

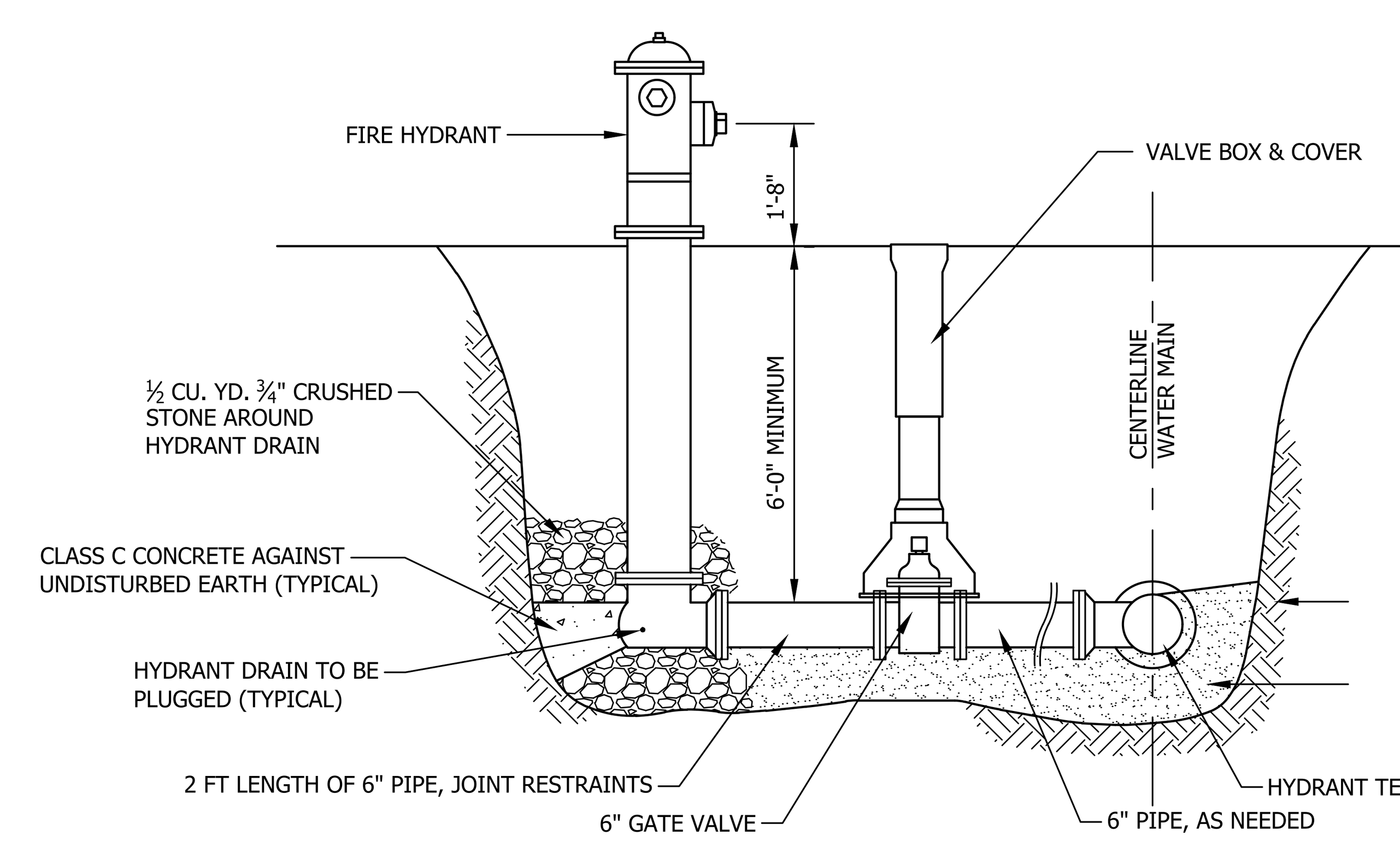
TO DETERMINE THE SIZE OF A CONCRETE THRUST BLOCK, DIVIDE THE TOTAL FORCE BY THE BEARING VALUE OF THE SOIL. THE QUOTIENT WILL BE THE SIZE OF THE BEARING AREA OF THE THRUST BLOCK IN SQUARE FEET. APPROXIMATE VALUES FOR VARIOUS TYPES OF SOIL ARE LISTED BELOW.

SOIL	BEARING LOAD (LBS./SQ. FT.)
MUCK	0
SOFT CLAY	1,000
SILT	1,500
SANDY SILT	3,000
SAND	4,000
SANDY CLAY	6,000



THRUST BLOCK NOTES & DETAILS

NOT TO SCALE



FIRE HYDRANT DETAIL

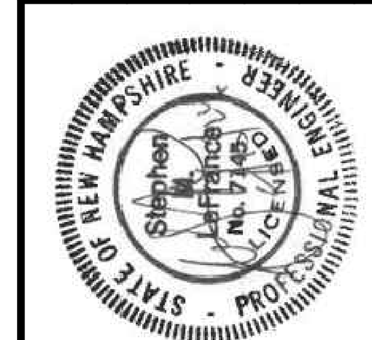
NOT TO SCALE

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML



horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

STANDARD WATER SYSTEM DETAILS AND NOTES

SHEET 3.2

last revised: 2007 DEC 26

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 3.2 Water, 7/10/2024 10:06:32 AM, KarenPhilbrick

SEWER NOTES

1. GENERAL

CONSTRUCTION OF ALL COMPONENTS OF THE SANITARY SEWER SYSTEM SHALL CONFORM TO THE MOST CURRENT VERSION OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES ENV-WQ 700.

2. TYPES OF SEWERS

A. THERE SHALL BE NO CONNECTION BETWEEN SANITARY SEWERS AND STORM SEWERS.
B. RUNOFF FROM ROOFS, STREETS, AND OTHER AREAS AND GROUNDWATER FROM FOUNDATION DRAINS, SUMP PUMPS, OR OTHER SUBSURFACE DRAINS SHALL BE EXCLUDED FROM SANITARY SEWERS.

3. SEWER SIZE AND COVER

A. MINIMUM PIPE SIZE FOR GRAVITY SEWER MAINS SHALL BE 8 INCHES.
B. MINIMUM PIPE SIZE FOR GRAVITY SEWER SERVICES SHALL BE 4 INCHES.
C. MINIMUM PIPE SIZE FOR FORCE MAIN SEWER SERVICES SHALL BE 2 INCHES.
D. SANITARY SEWERS SHALL HAVE 6 FEET MINIMUM COVER IN ALL ROADWAY LOCATIONS AND 4 FEET MINIMUM COVER IN ALL CROSS-COUNTRY LOCATIONS.

4. PIPE AND FITTING MATERIALS:

A. DUCTILE IRON PIPE

DUCTILE IRON PIPE AND FITTINGS SHALL CONFORM TO THE FOLLOWING STANDARDS OF THE AMERICAN WATER WORKS ASSOCIATION:
(1) AWWA C151 FOR DUCTILE IRON PIPE, CENTRIFUGALLY CAST IN METAL OR SAND LINED MOLDS, FOR WATER OR OTHER LIQUIDS;
(2) AWWA C150 FOR THICKNESS DESIGN OF DUCTILE IRON PIPE AND WITH ASTM A 536 IRON CASTINGS; AND
(3) JOINTS SHALL BE MECHANICAL TYPE, PUSH-ON TYPE, OR BALL-AND-SOCKET TYPE;

B. PVC (POLY VINYL CHLORIDE) PIPE

PVC PIPE AND FITTINGS SHALL BE APPROVED FOR SEWAGE SERVICE AND CONFORM TO THE FOLLOWING:
(1) PVC PIPE USED FOR GRAVITY SEWERS SHALL BE TYPE SDR 35 CONFORMING TO ASTM D3034;
(2) PVC PIPE USED FOR FORCE MAINS SHALL BE TYPE SDR 26 CONFORMING TO ASTM D2241 OR ASTM D1785;
(3) JOINTS SHALL BE PUSH-ON, BELL-AND-SPIGOT TYPE HAVING OIL RESISTANT COMPRESSION RINGS OF ELASTOMERIC MATERIAL CONFORMING TO ASTM D3212.

5. BEDDING

PIPE BEDDING SHALL BE SCREENED GRAVEL AND/OR CRUSHED STONE FREE FROM ORGANIC MATTER, CLAY, AND/OR LOAM MEETING ASTM C33 STONE SIZE NO. 67. BEDDING SHALL EXTEND FROM THE SPRING LINE OF THE PIPE TO A MINIMUM DEPTH OF 6" BELOW THE BOTTOM OF THE PIPE OUTSIDE SURFACE.

100% PASSING	1 INCH SCREEN
90-100% PASSING	¾ INCH SCREEN
20-55% PASSING	⅜ INCH SCREEN
0-10% PASSING	#4 SIEVE
0-5% PASSING	#8 SIEVE

6. MANHOLES

A. PRECAST CONCRETE BARREL SECTIONS, CONES, AND BASES SHALL CONFORM TO ASTM C478.
B. MANHOLES SHALL BE DESIGNED FOR H-20 LOADING.
C. HORIZONTAL JOINTS BETWEEN BARREL SECTIONS SHALL BE OF AN OVERLAPPING TYPE WHICH SHALL DEPEND UPON A DOUBLE ROW OF ELASTOMERIC OR MASTIC-LIKE SEALANT FOR WATER TIGHTNESS.
D. PIPE TO MANHOLE JOINTS SHALL BE AS FOLLOWS:
(1) ELASTOMERIC, RUBBER SLEEVE WITH WATERTIGHT JOINTS AT THE MANHOLE OPENING AND PIPE SURFACES;
(2) CAST INTO THE WALL OR SECURED WITH STAINLESS STEEL CLAMPS;
(3) ELASTOMERIC SEALING RING CAST IN THE MANHOLE OPENING WITH SEAL FORMED ON THE SURFACE OF THE PIPE BY COMPRESSION OF THE RING; AND
(4) NON-SHRINK GROUTED JOINTS WHERE WATERTIGHT BONDING TO THE MANHOLE AND PIPE CAN BE OBTAINED.
E. MANHOLES SHALL HAVE A BRICK PAVED SHELF AND INVERT CONSTRUCTED TO CONFORM TO THE SIZE OF PIPE AND FLOW. AT CHANGES IN DIRECTION, THE INVERTS SHALL BE LAID OUT IN CURVES OF THE LONGEST RADIUS POSSIBLE TANGENT TO THE CENTER LINE OF THE SEWER PIPES. SHELVES SHALL BE CONSTRUCTED TO THE ELEVATION OF THE HIGHEST PIPE CROWN AND SLOPED TO DRAIN TOWARD THE FLOWING THROUGH CHANNEL. UNDERLAYMENT OF INVERT AND SHELF SHALL CONSIST OF BRICK MASONRY. INVERTS AND SHELVES SHALL BE PLACED AFTER TESTING.

7. PROTECTION OF WATER SUPPLIES

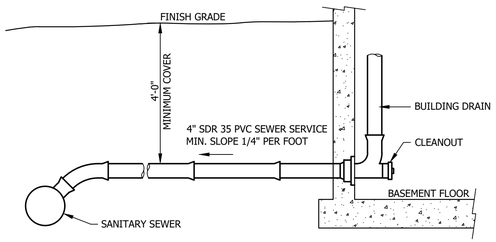
A. THERE SHALL BE NO PHYSICAL CONNECTION BETWEEN A PUBLIC OR PRIVATE WATER SUPPLY SYSTEM AND A SEWER OR SEWER APPURTENANCE WHICH WOULD PERMIT THE PASSAGE OF SEWAGE OR POLLUTED WATER INTO THE POTABLE SUPPLY. NO WATER PIPE SHALL PASS THROUGH OR COME IN CONTACT WITH ANY PART OF A SEWER OR SEWER MANHOLE.

B. NO SEWER SHALL BE LOCATED WITHIN THE WELL PROTECTIVE RADII ESTABLISHED IN ENV-WS 300 FOR ANY PUBLIC WATER SUPPLY WELLS OR WITHIN 100 FEET OF ANY PRIVATE WATER SUPPLY WELL.

C. SEWERS SHALL BE LOCATED AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED WATER MAIN.

D. A DEVIATION FROM THE SEPARATION REQUIREMENTS OF (B) OR (C) ABOVE SHALL BE ALLOWED WHERE NECESSARY TO AVOID CONFLICT WITH SUBSURFACE STRUCTURES, UTILITY CHAMBERS, AND BUILDING FOUNDATIONS, PROVIDED THAT THE SEWER IS CONSTRUCTED IN ACCORDANCE WITH THE FORCE MAIN CONSTRUCTION REQUIREMENTS SPECIFIED IN ENV-WQ 704.06.

E. WHENEVER SEWERS MUST CROSS WATER MAINS, THE SEWER SHALL BE CONSTRUCTED AS FOLLOWS:
(1) VERTICAL SEPARATION OF THE SEWER AND WATER MAIN SHALL BE NOT LESS THAN 18 INCHES, WITH WATER ABOVE SEWER; AND
(2) SEWER PIPE JOINTS SHALL BE LOCATED AT LEASE 6 FEET HORIZONTALLY FROM THE WATER MAIN.



SEWER SERVICE DETAIL
NOT TO SCALE

STANDARD TRENCH NOTES - SEWER

1. ORDERED EXCAVATION OF UNSUITABLE MATERIAL BELOW GRADE SHALL BE REPLACED WITH BEDDING MATERIAL. SEE ALSO NOTE 4.

2. BEDDING: SCREENED GRAVEL AND/OR CRUSHED STONE FREE FROM ORGANIC MATTER, CLAY, AND/OR LOAM MEETING ASTM C33 STONE SIZE NO. 67.

100% PASSING	1 INCH SCREEN
90-100% PASSING	¾ INCH SCREEN
20-55% PASSING	⅜ INCH SCREEN
0-10% PASSING	#4 SIEVE
0-5% PASSING	#8 SIEVE

3. SAND BLANKET: CLEAN SAND FREE FROM ORGANIC MATTER, SO GRADED THAT 100% PASSES A ½ INCH SIEVE AND NOT MORE THAN 15% PASSES A #200 SIEVE.

4. SUITABLE MATERIAL: IN ROADS, ROAD SHOULDERS, WALKWAYS, AND TRAVELED WAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED FROM THE TRENCH DURING THE COURSE OF CONSTRUCTION, AFTER EXCLUDING DEBRIS, PIECES OF PAVEMENT, ORGANIC MATTER, TOP SOIL, WET OR SOFT MUCK, PEAT OR CLAY, EXCAVATED LEDGE MATERIAL, AND ALL ROCKS OVER SIX INCHES IN LARGEST DIMENSION, OR ANY MATERIAL NOT APPROVED BY THE ENGINEER.

TRENCH BACKFILL IN CROSS-COUNTRY LOCATIONS SHALL BE SUITABLE MATERIAL AS DESCRIBED ABOVE, EXCEPT THAT TOP SOIL, LOAM, MUCK, OR PEAT MAY BE USED PROVIDED THAT THE COMPLETED CONSTRUCTION WILL BE STABLE AND ACCESS TO THE PIPE FOR MAINTENANCE AND RECONSTRUCTION IS PRESERVED. BACKFILL SHALL BE MOUNDED TO A HEIGHT OF SIX INCHES ABOVE THE ORIGINAL GROUND SURFACE

5. BASE COURSE FOR TRENCH REPAIR SHALL MEET THE REQUIREMENTS OF SECTION 300 OF THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION OF THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION.

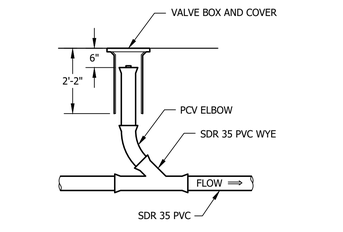
6. SHEETING: ALL TRENCH SUPPORTS SHALL CONFORM TO OSHA STANDARDS. CONTRACTOR IS RESPONSIBLE FOR OSHA COMPLIANCE AND WORKER SAFETY THROUGHOUT CONSTRUCTION.

7. TRENCH DIMENSIONS: W = MAXIMUM ALLOWABLE TRENCH WIDTH MEASURED 12 INCHES ABOVE THE PIPE. FOR PIPES 15 INCHES NOMINAL DIAMETER (D) OR LESS, W SHALL BE NO MORE THAN 36 INCHES; FOR PIPES GREATER THAN 15 INCHES NOMINAL DIAMETER, W SHALL BE 24 INCHES PLUS THE PIPE OUTSIDE DIAMETER. W SHALL ALSO BE THE PAYMENT WIDTH FOR LEDGE EXCAVATION AND FOR ORDERED EXCAVATION BELOW GRADE. THE MAXIMUM ALLOWABLE TRENCH PAVEMENT PAYMENT WIDTH SHALL BE 8 FEET CENTERED OVER PIPE.

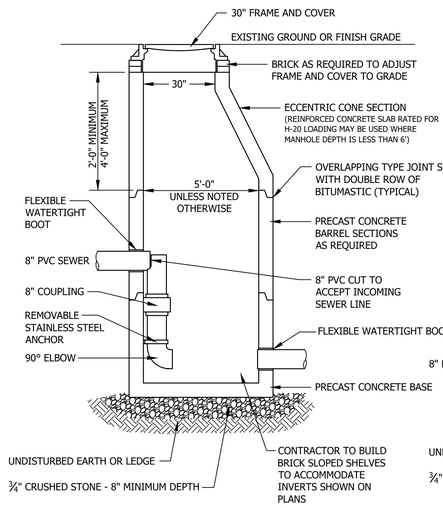
8. PIPE INSULATION AT STORM DRAIN CROSSING: INSTALL 2" THICK RIGID FOAM INSULATION OVER SEWER AT STORM DRAIN CROSSINGS, EXTEND INSULATION 5 FEET EITHER SIDE OF STORM DRAIN ALONG SEWER.

IF VERTICAL DROP INTO SEWER IS GREATER THAN 4 FEET, A CHIMNEY SHALL BE CONSTRUCTED AT THE CONNECTION.

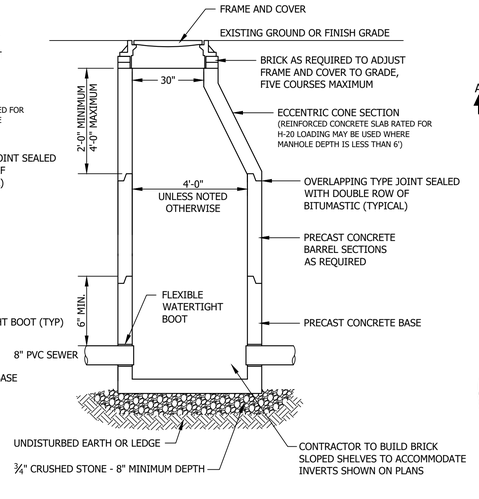
CHIMNEY AT NEW SEWER CONNECTION
NOT TO SCALE



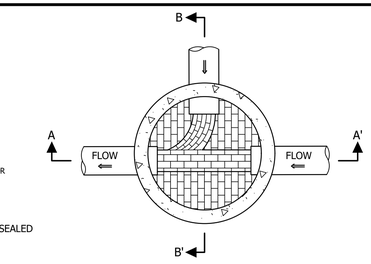
SEWER CLEANOUT DETAIL
NOT TO SCALE



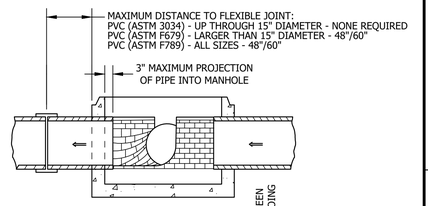
INSIDE DROP MANHOLE DETAIL
NOT TO SCALE



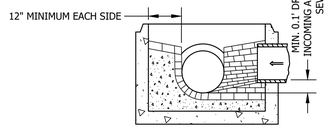
SANITARY SEWER MANHOLE DETAIL
NOT TO SCALE



PLAN VIEW

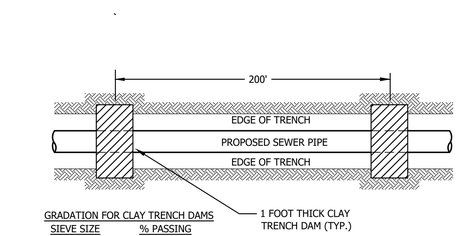


SECTION A-A'



SECTION B-B'

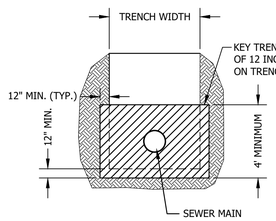
MANHOLE INVERT DETAILS
NOT TO SCALE



GRADATION FOR CLAY TRENCH DAMS

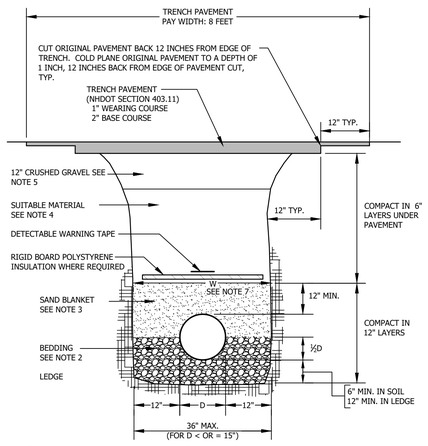
SIEVE SIZE	% PASSING
#4	80-100
#40	60-90
#100	40-60
#200	25-45

DAMS TO BE INSTALLED ON ALL SEWER MAINS WITH SLOPES EXCEEDING 8% OR AS SHOWN ON THE SEWER PROFILES.



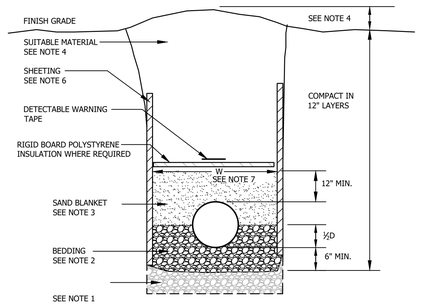
TRENCH DAM SECTION

CLAY TRENCH DAM DETAILS
NOT TO SCALE



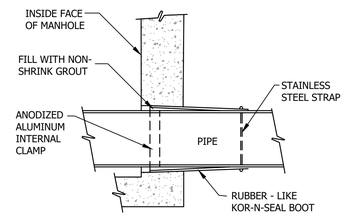
NOTE:
MINIMUM BEDDING DEPTH AND MAXIMUM PAYMENT LIMIT FOR LEDGE EXCAVATION = ½D (12" MINIMUM)

LEDGE/SUB PAVEMENT CONSTRUCTION

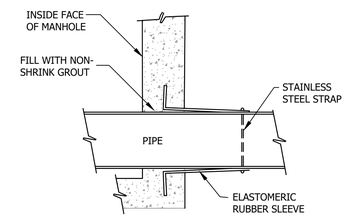


EARTH CONSTRUCTION
WITH OR WITHOUT SHEETING

STANDARD TRENCH SECTIONS
NOT TO SCALE



KOR-N-SEAL JOINT SLEEVE



LOCK-JOINT FLEXIBLE MANHOLE SLEEVE

JOINTING DETAILS
NOT TO SCALE

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

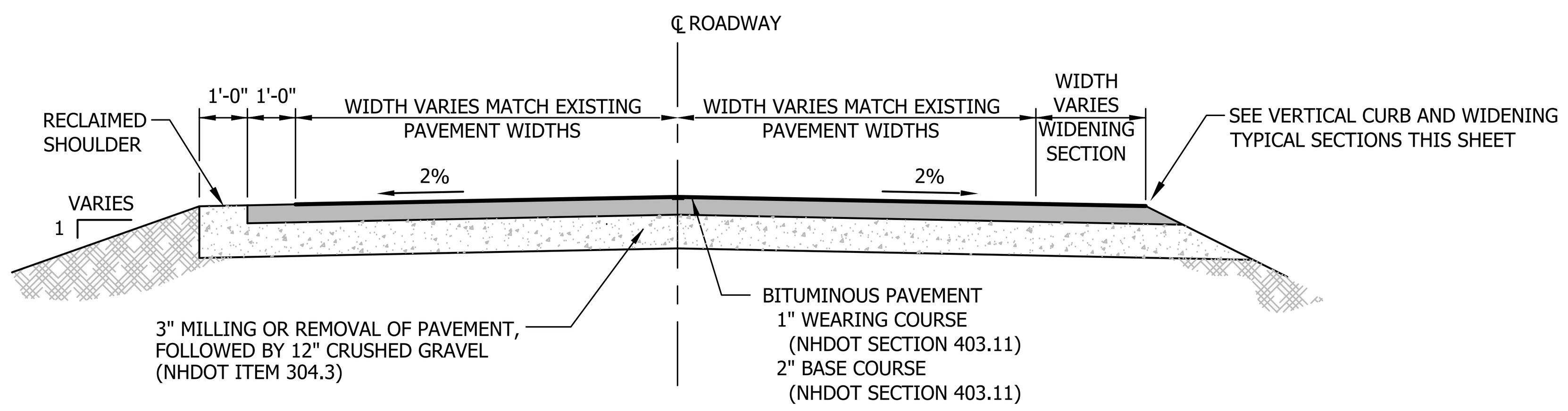
PROJECT #: 221174
DATE: APRIL 2024
MAP-LOT (OR ARCHIVE): -
SURVEYED BY: HEI
ENGINEERED BY: HEI
DRAWN BY: RLH
CHECKED BY: SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE - NEW HAMPSHIRE - VERMONT
www.horizonsengineering.com

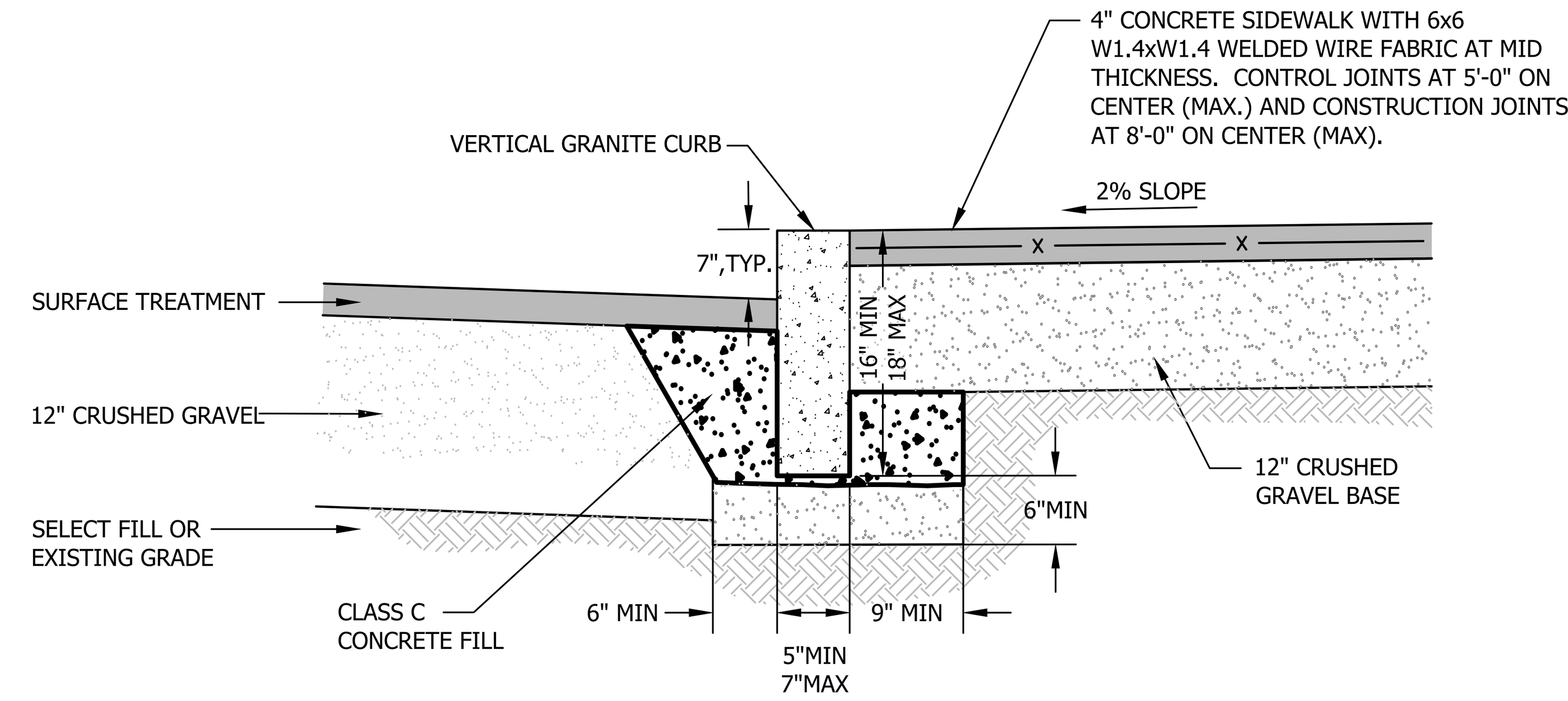
TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

STANDARD SEWER SYSTEM DETAILS AND NOTES

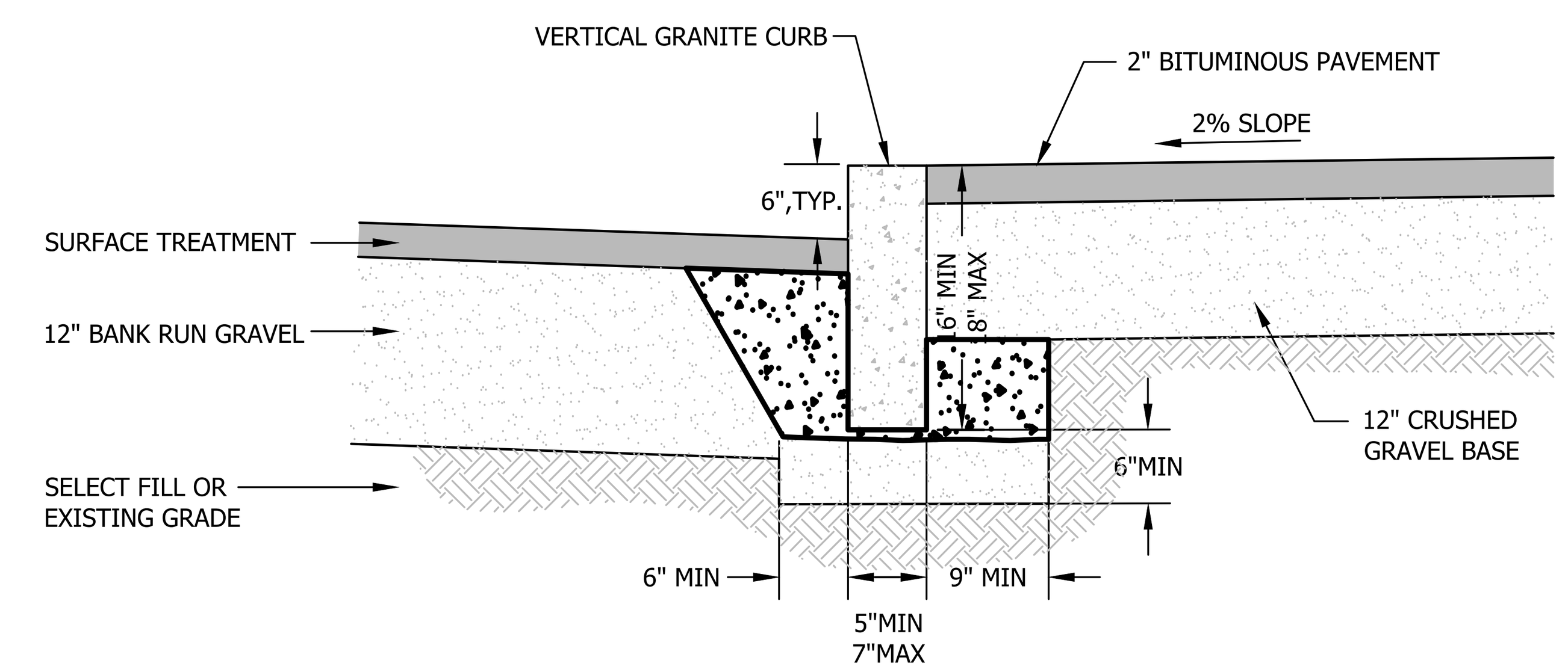
SHEET 3.3



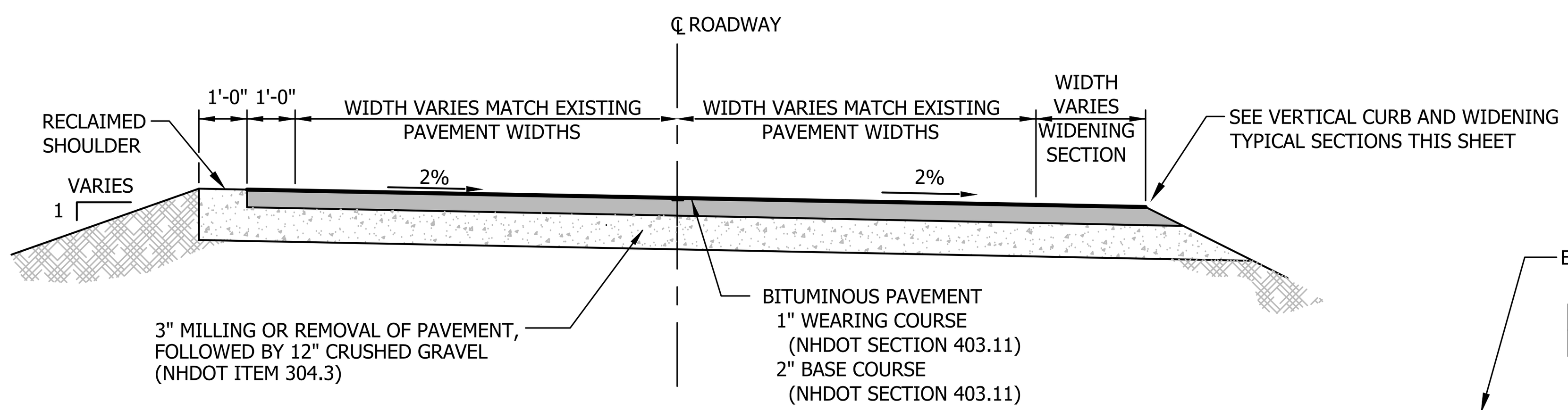
TYPICAL ROAD CROSS SECTION
NOT TO SCALE



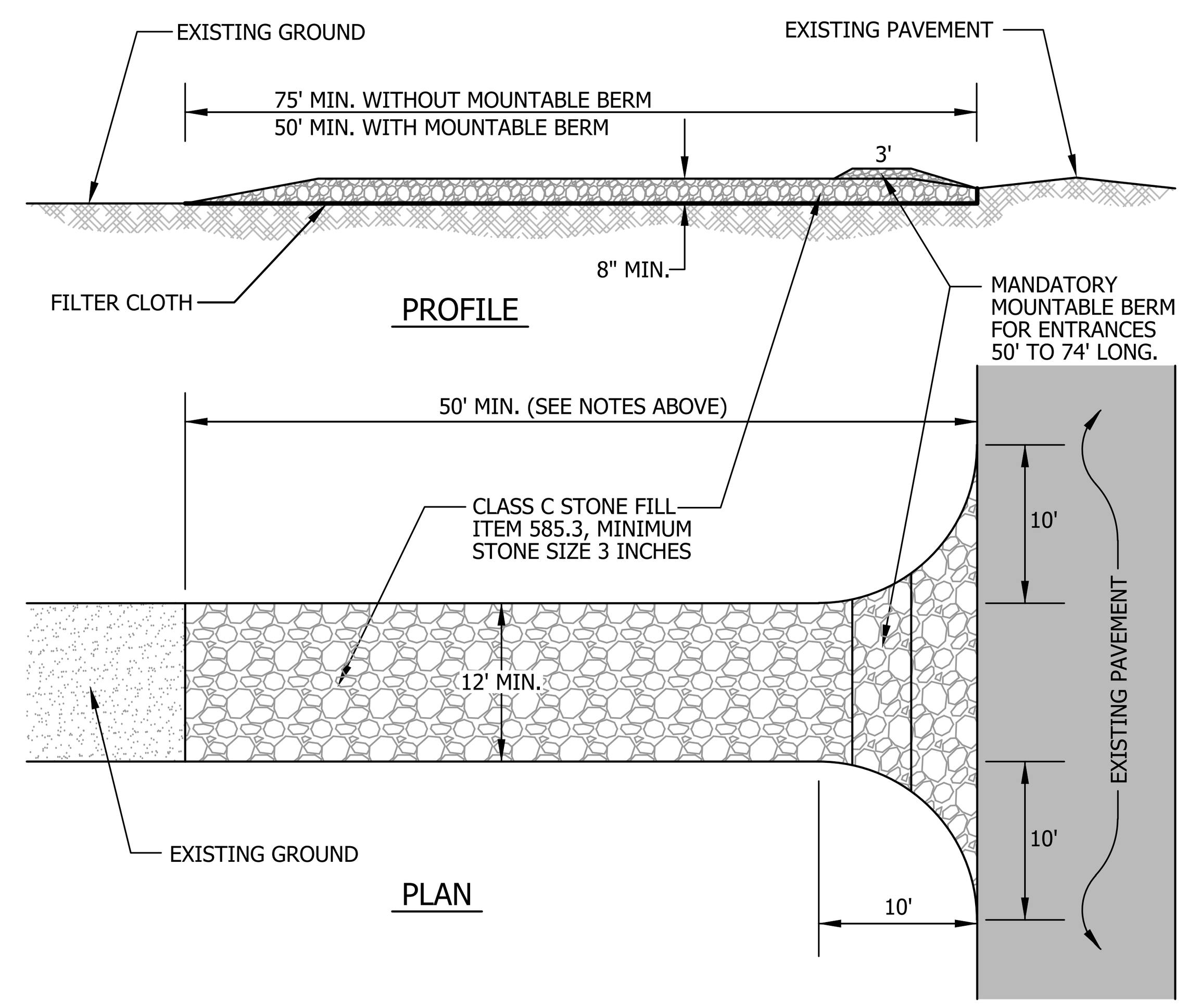
CONCRETE SIDEWALK WITH VERTICAL CURB DETAIL
NOT TO SCALE



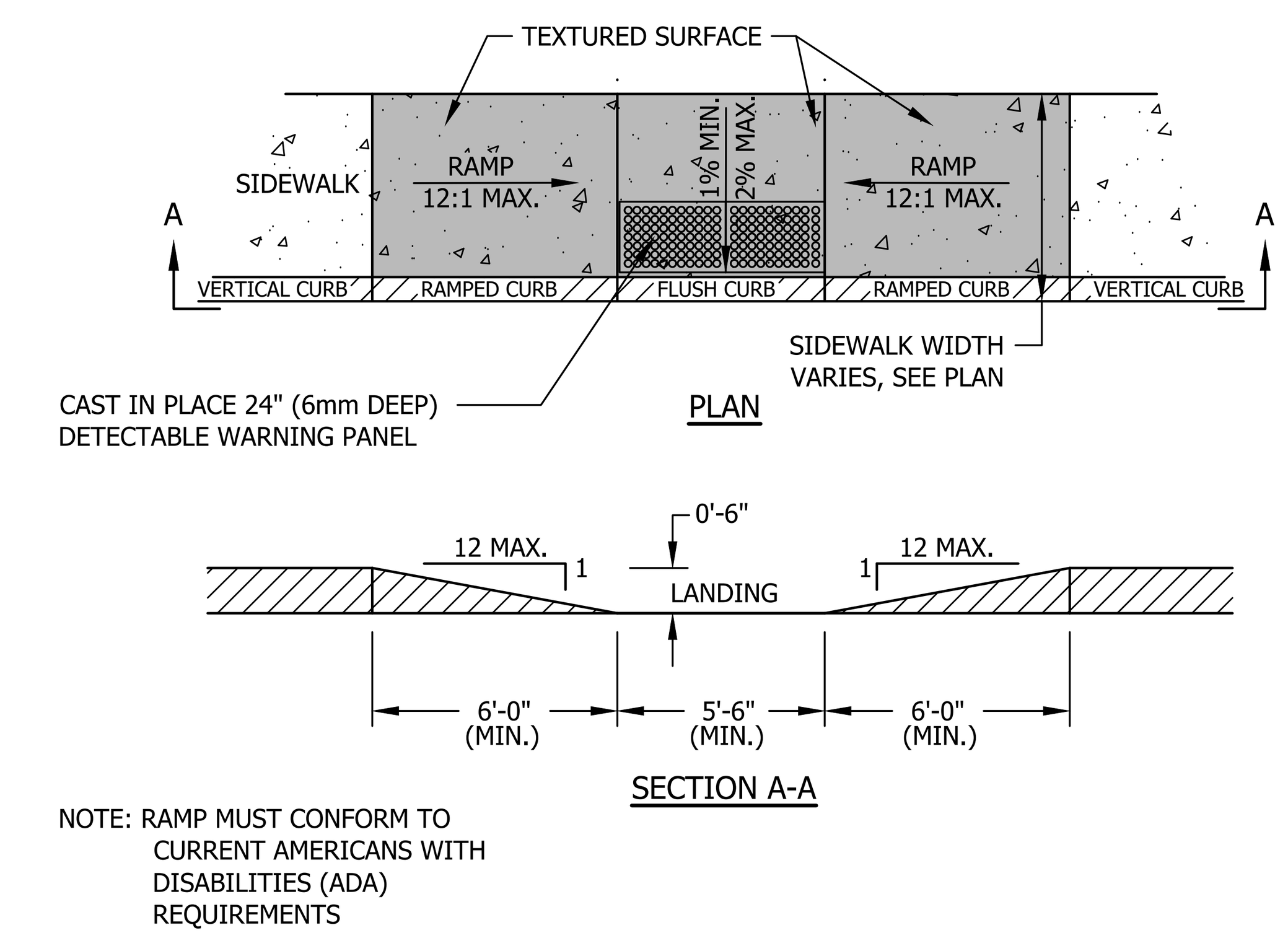
BITUMINOUS PAVEMENT SIDEWALK WITH VERTICAL CURB DETAIL
NOT TO SCALE



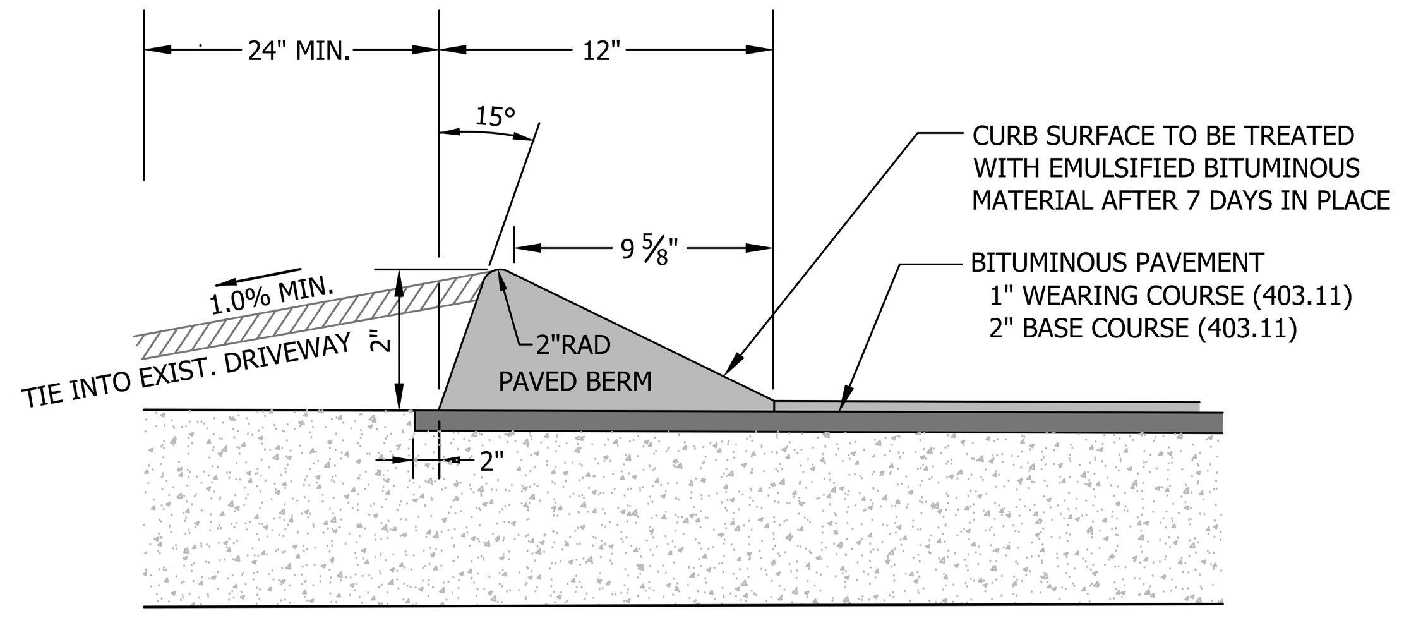
TYPICAL ROAD CROSS SECTION NO CROWN
NOT TO SCALE



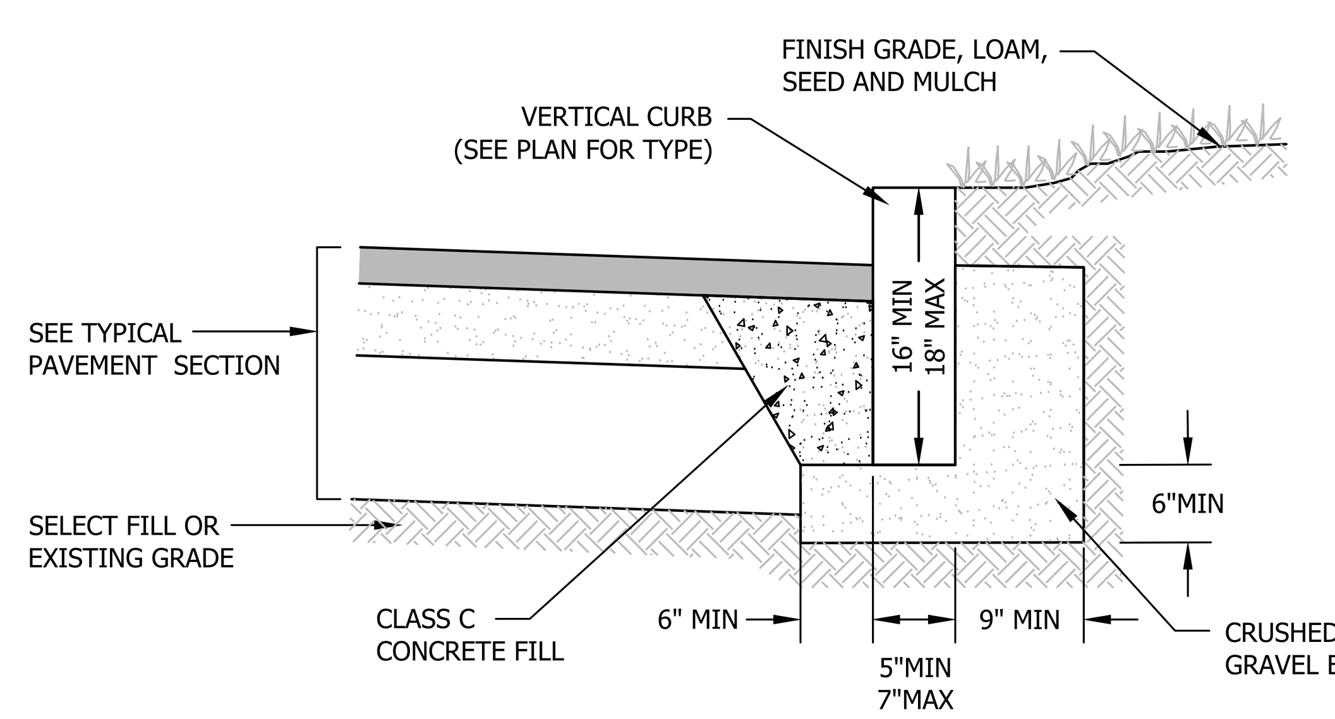
STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE



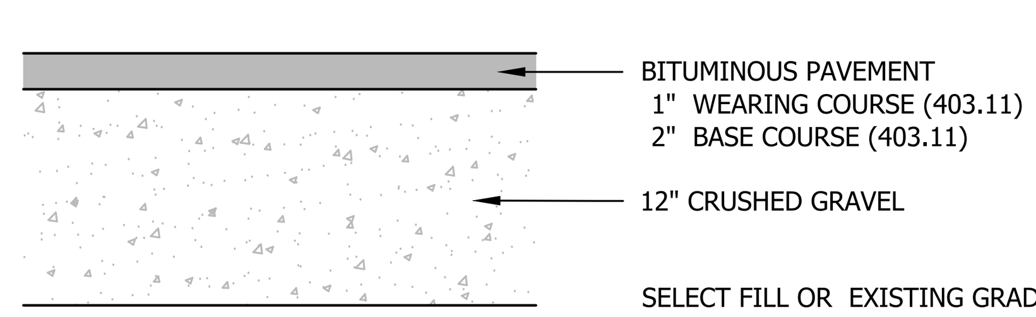
SIDEWALK RAMP DETAIL WITH WARNING PANEL
NOT TO SCALE



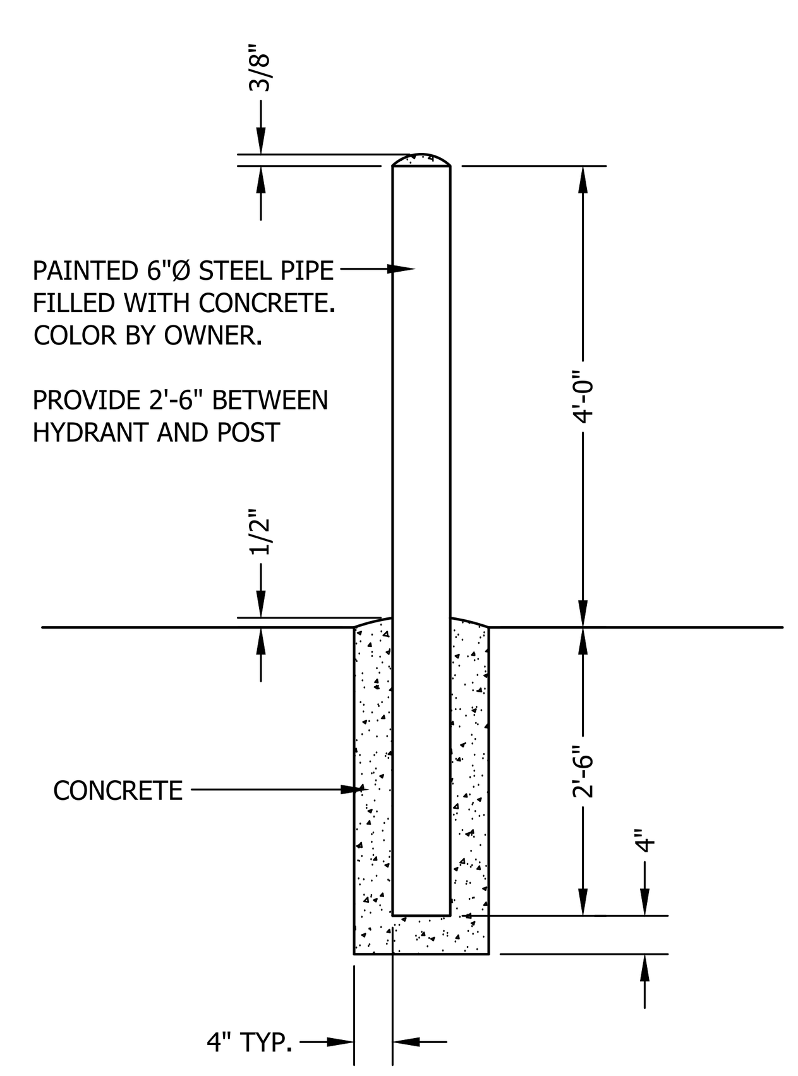
TYPICAL 2" PAVED BERM SECTION
NOT TO SCALE



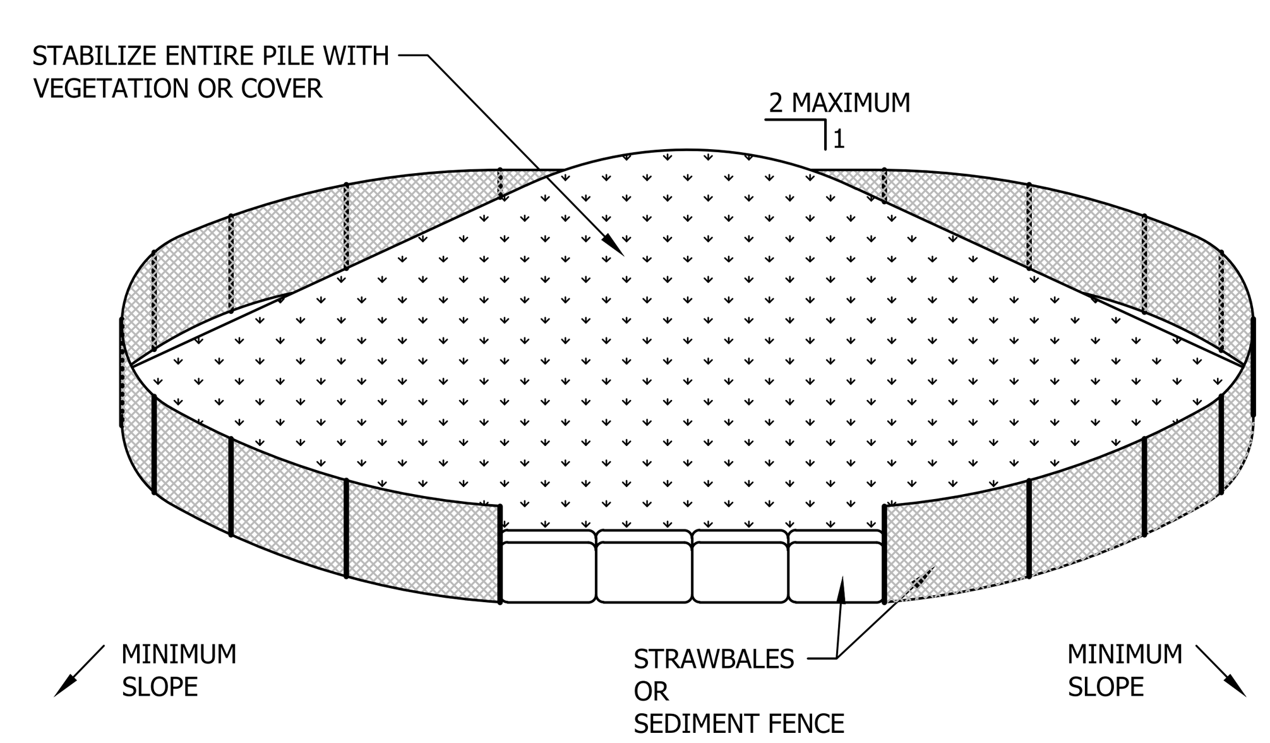
TYPICAL VERTICAL CURB DETAIL
NOT TO SCALE



TYPICAL WIDENING PAVEMENT SECTION
NOT TO SCALE



CONCRETE FILLED BOLLARD DETAIL
NOT TO SCALE



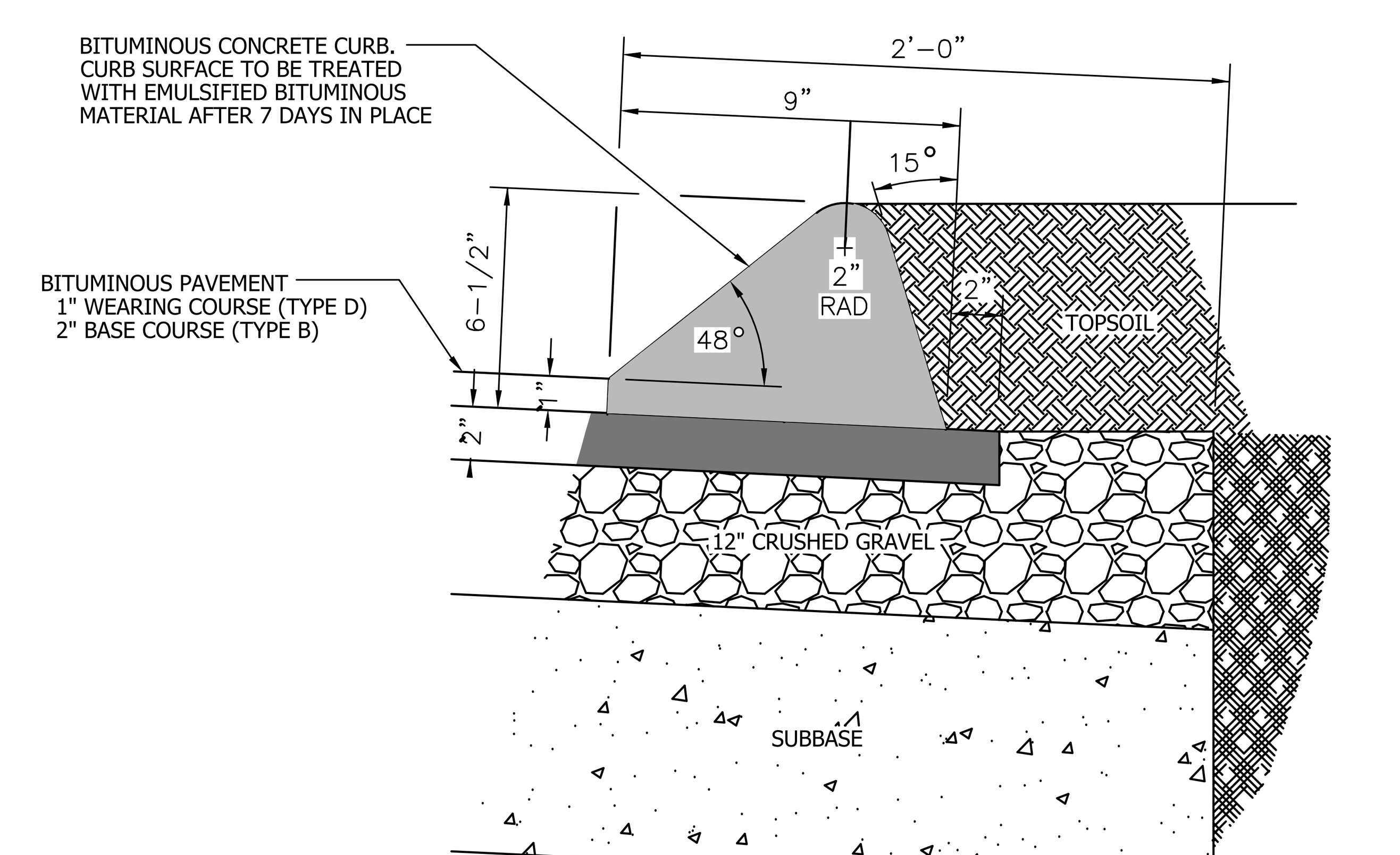
SOIL STOCKPILING IS TO BE USED WHERE TOPSOIL IS NECESSARY FOR REGRADING AND VEGETATING DISTURBED AREAS.

TEMPORARY STOCKPILE STABILIZATION MEASURES INCLUDE VEGETATIVE COVERS, MULCH, NON-VEGETATIVE COVERS, AND PERIPHERAL SEDIMENT TRAPPING BARRIERS. THE STABILIZATION MEASURE(S) SELECTED SHOULD BE APPROPRIATE FOR THE TIME OF YEAR, SITE CONDITIONS, AND REQUIRED PERIOD OF USE.

INSTALLATION NOTES:

1. AREA CHOSEN FOR STOCKPILING OPERATIONS SHALL BE DRY AND STABLE.
2. MAXIMUM SLOPE OF STOCKPILE SHALL BE 2:1.
3. UPON COMPLETION OF SOIL STOCKPILING, EACH PILE SHALL BE SURROUNDED WITH EITHER SILT FENCING OR STRAWBALES AND THEN STABILIZED WITH VEGETATION OR COVERED.

SOIL STOCKPILING DETAIL
NOT TO SCALE



TYPICAL CURB SECTION
NOT TO SCALE

BIDDING DOCUMENT NOT FOR CONSTRUCTION

DATE OF PRINT JULY 10 2024 HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KRP
2	6/20/2024	EDITS PER RAILROAD COMMENTS.	SML	RLH

PROJECT #:	221174
DATE:	APRIL 2024
MAP-LOT (OR ARCHIVE)	-
SURVEYED BY:	HEI
ENGINEERED BY:	HEI
DRAWN BY:	RLH
CHECKED BY:	SML

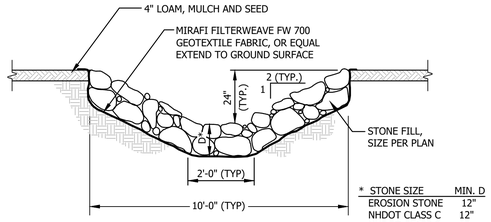
horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

STANDARD SITE DETAILS AND NOTES

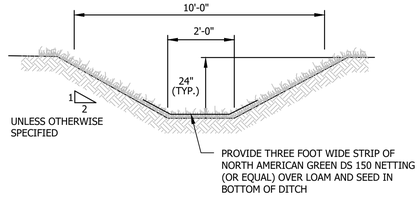
SHEET 3.4

Z:\proj_2022\221174 Town of Northumberland Hill Infrastructure\Internal\Civil\Final\221174_CUT_08 Bid Document.dwg, 3.4 Site, 7/10/2024 10:06:34 AM, KarenPhilbrick



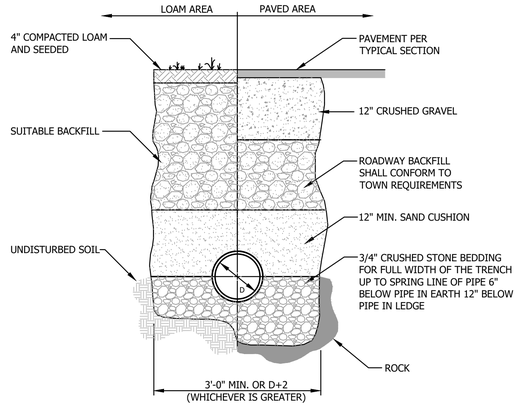
STONE LINED DITCH DETAIL

NOT TO SCALE



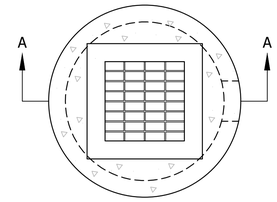
GRASS LINED DITCH DETAIL

NOT TO SCALE

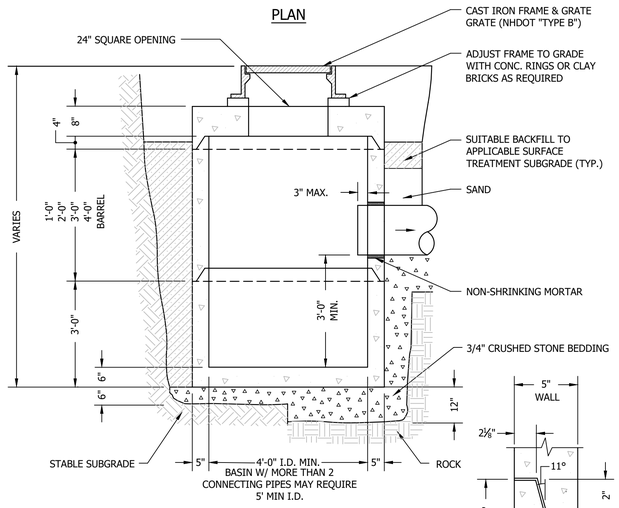


TYPICAL DRAINAGE TRENCH DETAIL

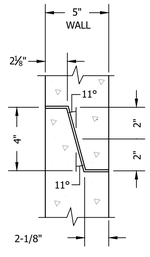
NOT TO SCALE



PLAN



SECTION A - A



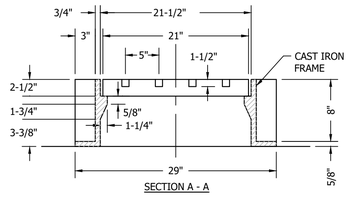
DETAIL OF SHIP LAP JOINT

NOTES:

1. CONCRETE SHALL BE 4,000 P.S.I. AFTER 28 DAYS.
2. REINFORCING H-20 LOADING 4 x 4/4 x 4 W.W.M.
3. SHIP LAP JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQ. IN. PER LINEAR FT. AND SHALL BE SEALED WITH 1 STRIP OF 1" DIA. BUTYL RUBBER SEALANT.
4. EACH CASTING TO HAVE LIFTING HOLES CAST IN.

TYPICAL CATCH BASIN DETAIL

NOT TO SCALE



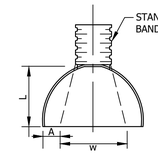
SECTION A - A

REFERENCE:

NH DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS PLATE 2 OF STANDARD NO. 3

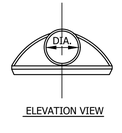
TYPE "B" GRATE DETAIL ITEM 604.72

NOT TO SCALE

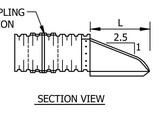


PLAN VIEW

DIMENSIONS TABLE			
PIPE DIA. (IN.)	A (IN.)	L (IN.)	W (IN.)
12	6	20	24
15	7	26	30
18	8	30	36
24	10	40	48
30	12	50	60
36	14	60	72



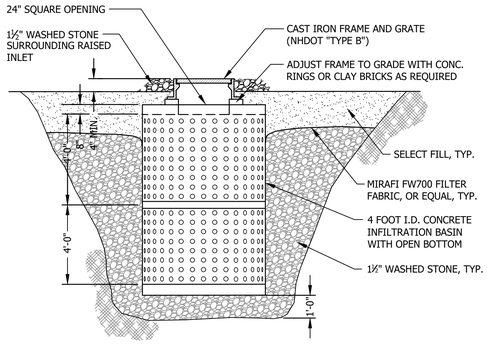
ELEVATION VIEW



SECTION VIEW

FLARED END SECTION DETAIL

NO SCALE



DRYWELL DETAIL

NOT TO SCALE

BIDDING DOCUMENT
NOT FOR CONSTRUCTION

DATE OF PRINT
JULY 10 2024
HORIZONS ENGINEERING

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	6/10/2024	EDITS PER AGENCY COMMENTS.	SML	KBP
2	6/20/2024	EDITS PER MAJ/ARAD COMMENTS.	SML	RLH

PROJECT #: 221174
DATE: APRIL 2024
MAP-LOT (OR ARCHIVE): -
SURVEYED BY: HEI
ENGINEERED BY: HEI
DRAWN BY: RLH
CHECKED BY: SML

horizons Engineering
Civil and Structural Engineering
Land Surveying and Environmental Consulting
MAINE • NEW HAMPSHIRE • VERMONT
www.horizonsengineering.com

TOWN OF NORTHUMBERLAND
NORTHUMBERLAND, NEW HAMPSHIRE
SEWER, WATER DRAINAGE AND ROADWAY IMPROVEMENTS

STANDARD DRAINAGE SYSTEM DETAILS AND NOTES

SHEET 3.5