Appendix G
Site Conditions and Plans

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NOTES

1. EXISTING CONDITIONS INFORMATION AND SURVEYED PROPERTY LINES SHOWN ON THIS PLAN ARE BASED ON THE OCTOBER 3 & 4, 2016 LAND SURVEY PERFORMED BY LIGHTHOUSE LAND SURVEYING, LLC, OF TAUNTON, MASSACHUSETTS.
2. HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE (MAINLAND ZONE) - US FOOT - NAD83 VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAD88).
3. TREE LOCATIONS SHOWN DO NOT REFLECT EXTENTS OF CANOPY. SIZES SHOWN REFLECT APPROXIMATE TRUNK DIAMETER.
4. AVERAGE HIGH WATER MARK LOCATIONS SHOWN ON PLAN WERE DELINEATED ON SEPTEMBER 26, 2016, BY CHARLES CARON OF CARON ENVIRONMENTAL CONSULTING OF WESTMINSTER, MASSACHUSETTS.
5. 100-YEAR FLOOD ZONE INFORMATION SHOWN ON THIS PLAN WAS OBTAINED FROM FEMA'S ONLINE FLOOD MAP SERVICE CENTER AND IS CONSIDERED APPROXIMATE.

LEGEND

EXISTING

- PROPERTY/ROW LINE
- SETBACK LINE
- EASEMENT LINE
- CENTERLINE
- EDGE OF PAVEMENT
- CURBING
- EDGE OF GRAVEL
- EDGE OF CONCRETE
- CONTOUR (122)
- BUILDING
- STONEWALL
- TREELINE
- CHAIN LINK FENCE
- STOCKADE FENCE
- BARB WIRE FENCE
- RETAINING WALL
- GUARDRAIL
- 8" S — SEWER
- 4" FM — SEWER FORCE MAIN
- 4" G — GAS
- 8" W — WATER
- 15" SD — STORM DRAIN
- 6" UD — UNDERDRAIN
- 12" CMP — CULVERT
- UGE — UNDERGROUND ELECTRIC
- OHE — OVERHEAD ELECTRIC
- UGT — UNDERGROUND TELEPHONE
- CATV — UNDERGROUND CABLE TV
- IRON PIPE/REBAR
- DRILLHOLE
- MONUMENT
- SURVEY CONTROL POINT
- 124.6 — SPOT ELEVATION
- SMH — SEWER MANHOLE
- DMH — DRAINAGE MANHOLE
- CB CB CB — CATCH BASIN
- SHUTOFF VALVE
- WATER SERVICE SHUTOFF
- HYDRANT
- UTILITY POLE
- UTILITY POLE W/ GUY
- UTILITY POLE W/ LIGHT
- LIGHT POLE
- BOLLARD
- FLAGPOLE
- CONIFEROUS TREE
- DECIDUOUS TREE
- SHRUB
- WETLAND FLAG
- EDGE OF WATER
- STREAM
- EDGE OF WETLANDS
- FLOODPLAIN
- WETLANDS
- DRAINAGE FLOW
- DRAINAGE SWALE
- PAVEMENT MARKINGS
- SIGN
- MB — MAILBOX
- TEMPORARY BENCH MARK
- TP — TEST PIT
- B — TEST BORING
- P — TEST PROBE
- MW — MONITORING WELL


N
PROJECT BENCHMARK SPK UP 1 ELEV=20.04'
PROJECT BENCHMARK SPK UP 1 ELEV=17.20'
EAST BROADWAY ROAD
RAILROAD TIE EDGING
STONE DRIVE
APPROXIMATE LOCATION OF STONE DRIVE
APPROXIMATE PROPERTY LINE
6' HIGH POST AND RAIL CORRAL FENCE
EXISTING 2 ½ STORY WOOD FRAME DWELLING
BRICK PATIO
SUN ROOM
CONC.
STONE CHIMNEY
SHED
WOOD
N/F
GRAVEL DRIVEWAY
WOOD SHED
EXISTING GRAVEL PARKING AREA
EXISTING CONCRETE PAD
EXISTING CONCRETE CURB
EXISTING ASPHALT PAVEMENT
EXISTING GRAVEL PARKING AREA

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NOTES

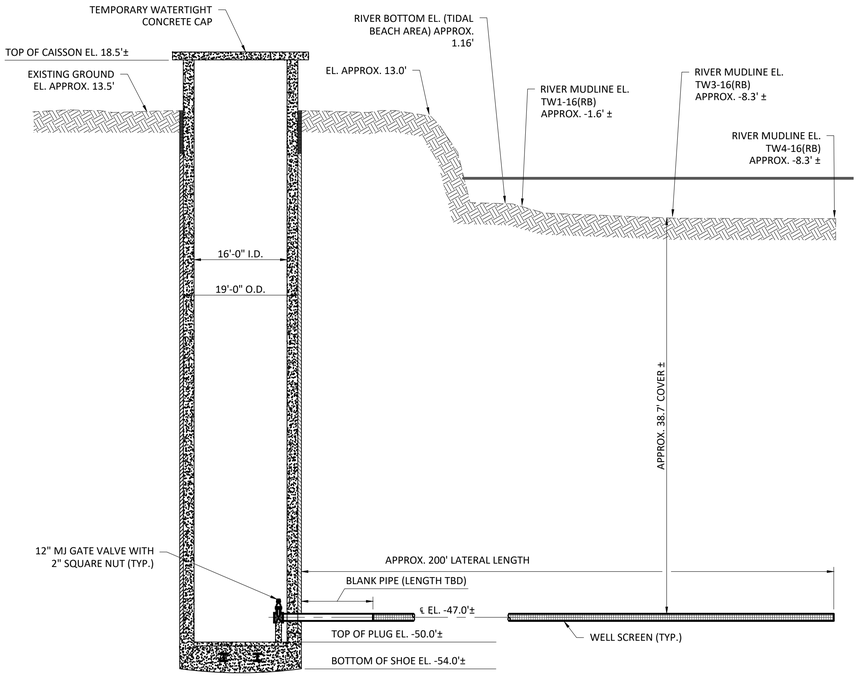
1. EXISTING CONDITIONS INFORMATION AND SURVEYED PROPERTY LINES SHOWN ON THIS PLAN ARE BASED ON THE OCTOBER 3 & 4, 2016 LAND SURVEY PERFORMED BY LIGHTHOUSE LAND SURVEYING, LLC, OF TAUNTON, MASSACHUSETTS.
2. HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE (MAINLAND ZONE) - US FOOT - NAD83 VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAD88).
3. PROPERTY LINES SHOWN ARE BASED UPON AVAILABLE ASSESSORS GIS INFORMATION AND ARE FOR GRAPHICAL REPRESENTATION PURPOSES ONLY AND SHOULD BE CONSIDERED APPROXIMATE.
4. PROPOSED PROPERTY LINES ARE BASED ON THE PLAN TITLED "CONCEPTUAL PLAN, LOCATED IN HAVERHILL, MASS. #309 EAST BROADWAY, PREPARED FOR THE CITY OF HAVERHILL" CREATED BY THE MORIN-CAMERON GROUP, INC., OF HAVERHILL, MASSACHUSETTS, DATED 10/1/2021.
5. TREE LOCATIONS SHOWN DO NOT REFLECT EXTENTS OF CANOPY. SIZES SHOWN REFLECT APPROXIMATE TRUNK DIAMETER.
6. AVERAGE HIGH WATER MARK LOCATIONS SHOWN ON PLAN WERE DELINEATED ON SEPTEMBER 26, 2016, BY CHARLES CARON OF CARON ENVIRONMENTAL CONSULTING OF WESTMINSTER, MASSACHUSETTS.
7. 100-YEAR FLOOD ZONE INFORMATION SHOWN ON THIS PLAN WAS OBTAINED FROM FEMA'S ONLINE FLOOD MAP SERVICE CENTER AND IS CONSIDERED APPROXIMATE.

LEGEND

- PROPERTY LINE-PROPOSED
- PROPERTY/ROW LINE-SURVEYED
- SETBACK LINE
- EASEMENT LINE
- EASEMENT LINE-PROPOSED
- FLOOD ZONE (AE)
- EDGE OF PAVEMENT
- EDGE OF GRAVEL
- EDGE OF CONCRETE
- 122 CONTOUR
- BUILDING
- PROPOSED BUILDING
- GRAVEL ACCESS ROAD
- CAISSON STRUCTURE
- WELL SCREEN LATERAL
- TREELINE
- FENCE
- OHE OVERHEAD ELECTRIC
- IRON PIPE/REBAR
- DRILLHOLE
- DMH DRAINAGE MANHOLE
- CB CATCH BASIN
- UTILITY POLE
- UTILITY POLE W/ GUY
- UTILITY POLE W/ LIGHT
- AVERAGE HIGH WATER
- SIGN
- MB MAILBOX
- MW MONITORING WELL

AREA DESIGNATIONS

- AREA SUBJECT TO FLOODING
- RIVERFRONT AREA
- RE-ESTABLISHED VEGETATION
- STORMWATER BMPs
- HEAVY DUTY ASPHALT
- PERVIOUS PAVEMENT (GRASSPAVE)
- CRUSHED STONE

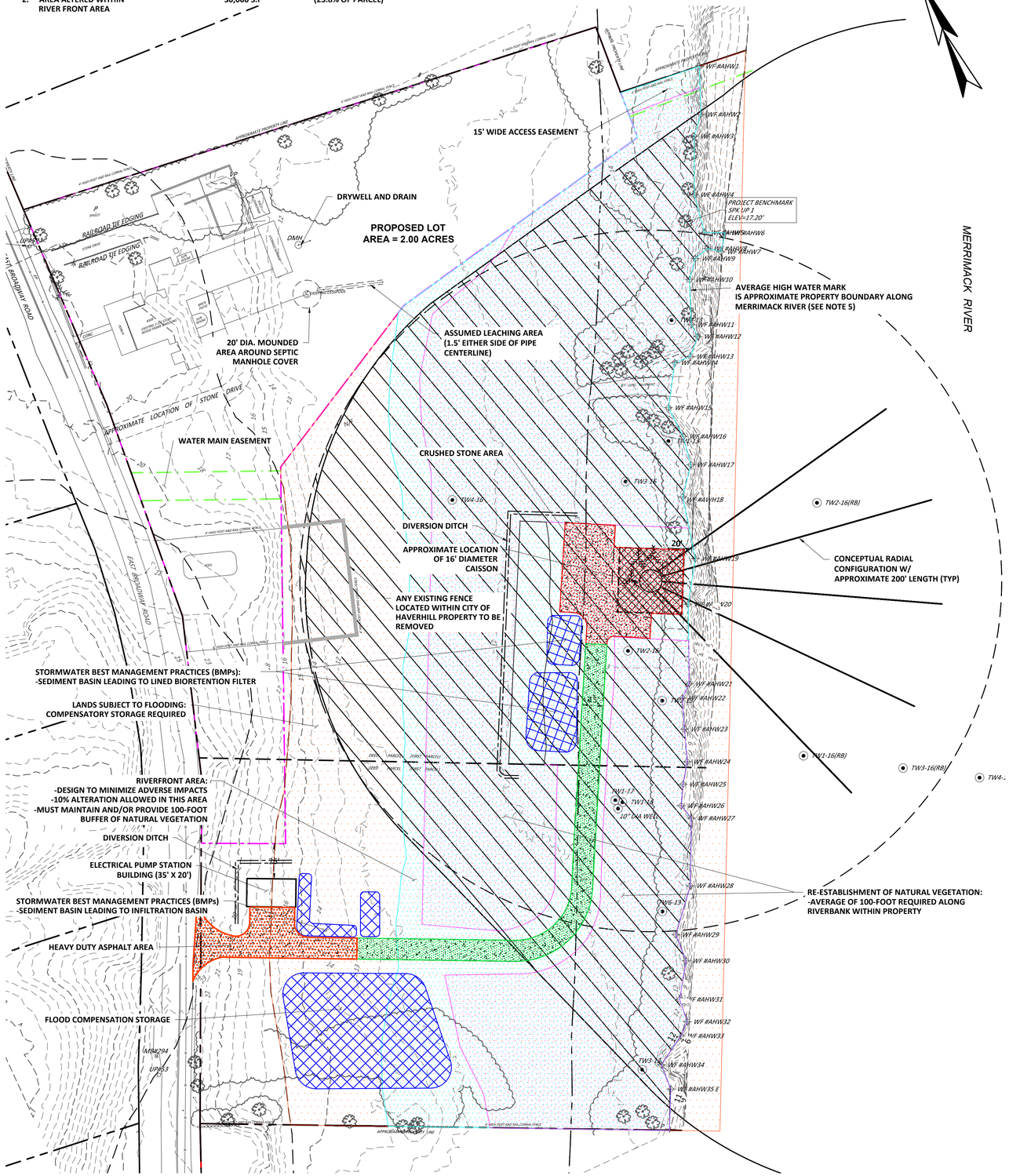


SECTION VIEW - CONCRETE CAISSON

SCALE: NTS

AREA CALCULATIONS

1.	PROPOSED ZONE 1/ 250' WELL SCREEN BUFFER	126,260.78 S.F.	(2.89 ACRES)
2.	AREA ALTERED WITHIN RIVER FRONT AREA	30,000 S.F	(23.8% OF PARCEL)



SITE PLAN

SCALE: 1"=40'

NO	REVISIONS	APP'D	DATE
1			
2			
3			
4			
5			
6			

PROJECT NO: 13582C
DESIGNED:
CAD COORD: W.EDGAR
CAD:
CHECKED:
DATE:
APPROVED:
DATE:
SUBMISSION:

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CITY OF HAVERHILL, MASSACHUSETTS
RADIAL COLLECTOR WELL
HILL PROPERTY SITE - 309 E. BROADWAY
HAVERHILL, MASSACHUSETTS

RADIAL COLLECTOR WELL SITE PLAN

DRAWING
C-2

J:\ENG\MA\HAVERHILL\13582-MERRIMACKRVRANGLEWELLTESTING\13582C-RADIAL COLLECTOR DESIGN\DRAWINGS\CVI\13582-CS-SITEPLAN.DWG | SitePlan - Option 1 | 1:2.5849 | ---- | 8/26/2022 11:23:19 AM | WILLIAM.EDGAR

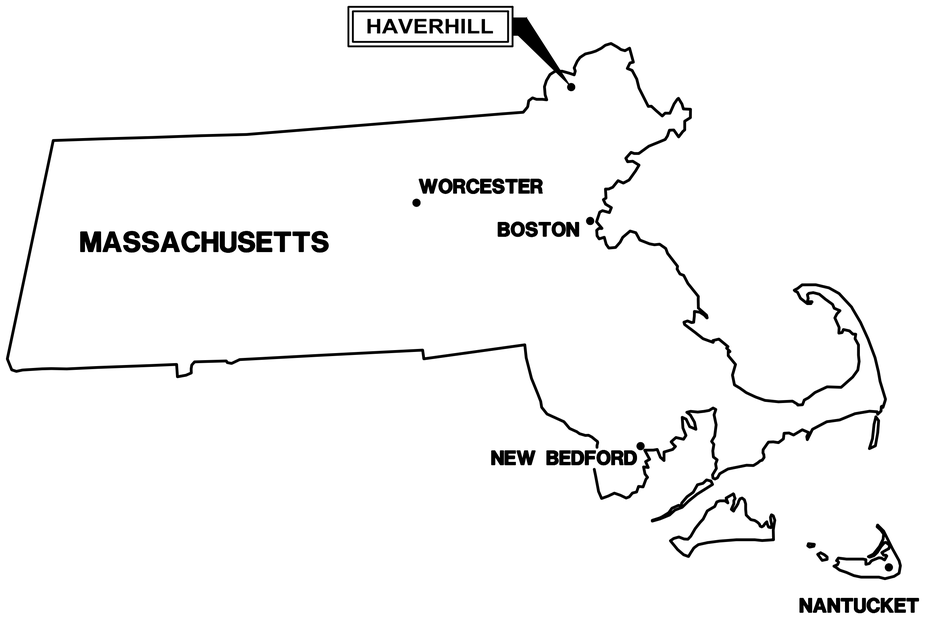
BID SET No. _____

CITY OF HAVERHILL, MASSACHUSETTS

CONTRACT DRAWINGS FOR

RAW WATER TRANSMISSION MAIN
HAVERHILL, MASSACHUSETTS

AUGUST 2022



DRAWING INDEX

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LOCATION PLAN
1"=2,000'

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FOR REVIEW _____

FOR BIDDING _____

WP PROJECT No. 13582B

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GENERAL NOTES

1. THE CONTRACTOR IS REFERRED TO DIVISION 1 OF THE SPECIFICATIONS REGARDING COORDINATION WITH OTHERS, INCLUDING RESPONSIBILITIES AND RELATED COSTS.

2. THE LOCATIONS OF UNDERGROUND UTILITIES AND STRUCTURES, AS SHOWN ON THE DRAWINGS, ARE APPROXIMATE AND MAY NOT BE COMPLETE. NO GUARANTEE IS MADE THAT UTILITIES OR STRUCTURES WILL BE ENCOUNTERED WHERE SHOWN OR THAT ALL UNDERGROUND UTILITIES AND STRUCTURES ARE SHOWN. PRIVATE UNDERGROUND UTILITIES SUCH AS, BUT NOT LIMITED TO, SEWER LINES, WATER LINES AND BURIED ELECTRICAL SERVICE ENTRANCES ARE NOT SHOWN. THE CONTRACTOR SHALL ASCERTAIN THE LOCATION AND SIZE OF EXISTING UTILITIES IN THE FIELD WITH THE RESPECTIVE UTILITY COMPANY REPRESENTATIVE PRIOR TO COMMENCING WORK. ADDITIONAL TEST PITS, BEYOND THOSE SHOWN, MAY BE REQUIRED. IDENTIFIED CONFLICTS WITH EXISTING PIPING AND UTILITIES WILL BE REVIEWED WITH THE ENGINEER PRIOR TO COMMENCING INSTALLATION. THE HORIZONTAL ALIGNMENT OF NEW PIPING MAY BE ADJUSTED IN THE FIELD SUBJECT TO PRIOR REVIEW AND ACCEPTANCE OF THE ENGINEER. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY LAYOUT OF ALL PROPOSED WORK AS SHOWN ON THE DRAWINGS AND REPORT ANY LAYOUT DISCREPANCIES IMMEDIATELY TO THE ENGINEER.

3. ALL EXISTING SEWER AND STORM DRAIN LINES ENCOUNTERED DURING CONSTRUCTION ARE TO REMAIN IN SERVICE. ANY EXISTING SEWERS, STORM DRAIN LINES OR CULVERTS DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER, EXCEPT WHEN IN DIRECT CONFLICT WITH THE NEW PIPING OR WHEN NOT SHOWN OR INDICATED.

4. ALL PIPING, EQUIPMENT AND MATERIALS TO BE DEMOLISHED AND/OR REMOVED FROM SERVICE SHALL BE COORDINATED WITH THE OWNER AND ENGINEER BEFORE COMMENCING THAT WORK. EXISTING PIPES AND CONDUITS DESIGNATED AS "ABANDONED" MAY BE REMOVED IF THE CONTRACTOR SO CHOOSES. IF ABANDONED PIPE CONFLICTS WITH PROPOSED PIPING, THEN A PORTION OF THE ABANDONED PIPE SHALL BE REMOVED AND THE NEW ENDS OF ABANDONED PIPE CAPPED, OR PLUGGED WITH CONCRETE.

5. ALL STRUCTURES AND PIPELINES LOCATED ADJACENT TO ANY TRENCH EXCAVATION SHALL BE PROTECTED AND FIRMLY SUPPORTED BY THE CONTRACTOR UNTIL THE TRENCH IS BACKFILLED. DAMAGE TO ANY SUCH STRUCTURES CAUSED BY OR RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. ALL UTILITIES REQUIRING REPAIR, RELOCATION OR ADJUSTMENT AS A RESULT OF THE PROJECT SHALL BE COORDINATED THROUGH THE OWNER.

6. CONTRACTOR SHALL INSTALL AND MAINTAIN TRAFFIC CONTROL SIGNS IN ACCORDANCE WITH MUTCD REQUIREMENTS.

7. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING TRAFFIC FLOW AT ALL TIMES. THE CONTRACTOR IS REQUIRED TO SUBMIT A TRAFFIC CONTROL PLAN TO THE OWNER PRIOR TO COMMENCING CONSTRUCTION.

8. THE OWNER WILL BE RESPONSIBLE FOR OBTAINING THE PERMITS LISTED IN THE SUPPLEMENTARY CONDITIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO BE FAMILIAR WITH THE APPLICABLE PROVISIONS OF EACH PERMIT AS THEY APPLY TO THE WORK PRIOR TO BIDDING AND ABIDE BY THOSE PROVISIONS DURING CONSTRUCTION. ALL PERMITS ARE THE RESPONSIBILITY OF THE CONTRACTOR.

9. THE OWNER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY RIGHTS-OF-WAY AND EASEMENTS. THE CONTRACTOR SHALL VERIFY THAT THE NECESSARY EASEMENTS HAVE BEEN SECURED BY THE OWNER. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO BE FAMILIAR WITH THE APPLICABLE PROVISIONS OF EACH EASEMENT AS THEY APPLY TO THE WORK PRIOR TO BIDDING AND ABIDE BY THOSE PROVISIONS DURING CONSTRUCTION. COPIES OF ALL RIGHTS-OF-WAY AND EASEMENTS ARE AVAILABLE FOR REVIEW FROM THE HAVERHILL DEPARTMENT OF PUBLIC WORKS. THE CONTRACTORS WORK SHALL BE LIMITED TO WITHIN THE EASEMENTS AND RIGHT-OF-WAY AT ALL TIMES, AND SHALL NOT IMPACT PRIVATE PROPERTY.

10. ALL TEST PITS SHALL BE EXCAVATED PRIOR TO CONSTRUCTION LAYOUT AND RESULTS REPORTED TO THE ENGINEER FOR REVIEW FOR CONFORMANCE TO THE PLANS. TEST PITS ARE REQUIRED WHERE SHOWN ON THE PLANS AND/OR AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LAYOUT OF ALL PROPOSED LINES AND STRUCTURES AS SHOWN ON THE DRAWINGS. THE LAYOUT PLAN SHALL BE REVIEWED BY THE ENGINEER PRIOR TO CONSTRUCTION.

11. CONTRACTOR SHALL MINIMIZE CLEARING OPERATIONS. CLEARING AND GRUBBING SHALL BE IN ACCORDANCE WITH DIVISION 2. CLEARING LIMITS SHALL BE AS INDICATED ON THE DRAWINGS, BUT AT ALL TIMES WITHIN EXISTING ROAD RIGHTS-OF-WAY AND PROPERTY LINES ON STATE OR CITY_OWNED PROPERTY OR EASEMENTS. ALL GRUBBINGS AND EXCESS EXCAVATED MATERIAL ARE THE PROPERTY OF THE CONTRACTOR AND WILL BE DISPOSED OF AT A SITE PROVIDED BY THE CONTRACTOR IN COMPLIANCE WITH ALL STATE AND LOCAL LAWS.

12. THE CONTRACTOR SHALL PROVIDE AND INSTALL PRIOR TO BEGINNING ANY WORK, PROPER EROSION CONTROL AND DRAINAGE MEASURES IN ALL AREAS OF WORK, AND CONFINE SOIL SEDIMENT TO WITHIN THE LIMITS OF EXCAVATION AND GRADING. PRIOR TO BEGINNING EXCAVATION WORK, EROSION CONTROL FENCE SHALL BE INSTALLED AT THE DOWN GRADIENT PERIMETER OF THE ACTUAL LIMITS OF GRUBBING AND/OR GRADING, AND AS SHOWN ON THE DRAWINGS. EROSION CONTROL MEASURES SHOWN ON THE DRAWINGS ARE A MINIMUM, CONTRACTOR SHALL TAKE ALL OTHER NECESSARY MEASURES. ALL DISTURBED EARTH SURFACES ARE TO BE STABILIZED IN THE SHORTEST PRACTICAL TIME AND TEMPORARY EROSION CONTROL DEVICES SHALL BE EMPLOYED UNTIL SUCH TIME AS ADEQUATE SOIL STABILIZATION HAS BEEN ACHIEVED. TEMPORARY STORAGE OF EXCAVATED MATERIAL IS TO BE IN A MANNER THAT WILL MINIMIZE EROSION. THE CONTRACTOR SHALL DISPOSE OF UNSUITABLE EXCAVATED MATERIAL AT A SITE PROVIDED BY HIM WHICH IS IN COMPLIANCE WITH ALL STATE AND LOCAL LAWS. ALL INSTALLED EROSION CONTROL FACILITIES SHALL BE REMOVED AT THE END OF THE PROJECT. REFER TO DIVISION 2.

13. COMPACTION TESTS SHALL BE PERFORMED IN ACCORDANCE WITH DIVISION 2. ANY SETTLEMENT OCCURRING WITHIN ONE YEAR OF SUBSTANTIAL COMPLETION OF THE PROJECT WILL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER.

14. OPEN TRENCHES IN THE ROADWAY MUST BE BACKFILLED AT THE END OF THE WORKDAY. OPEN TRENCHES OUTSIDE OF THE WAY MAY BE LEFT OPEN IF THE CONTRACTOR PROVIDES ADEQUATELY SAFE BARRICADING AND LIGHTS.

15. CONTRACTOR SHALL CONTROL DUST TO A TOLERABLE LIMIT AS OUTLINED IN DIVISION 1. CONTRACTOR SHALL NOT TRACK OR SPILL EARTH AND DEBRIS ON PUBLIC STREETS OUTSIDE THE PROJECT AREA. STREETS OPENED TO THE PUBLIC SHALL BE KEPT SWEPT AND FREE OF DEBRIS.

16. WHEREVER PROPOSED STRUCTURES ARE LOCATED PARTLY WITHIN A PAVED AREA AND PARTLY IN A NON-PAVED AREA, A BITUMINOUS CONCRETE PAVED APRON 2 FEET WIDE SHALL BE SUPPLIED AROUND THE PROPOSED COVER. PAVEMENT SHALL SLOPE AWAY FROM THE COVER.

17. ALL ROAD AND PARKING AREA SURFACES SHALL PITCH 1/4 INCH PER FOOT MINIMUM UNLESS OTHERWISE NOTED. ALL VEGETATED AREAS ABOVE MEAN HIGH WATER ELEVATION THAT ARE EXCAVATED, FILLED OR OTHERWISE DISTURBED BY THE CONTRACTOR AND ARE NOT TO BE PAVED OR FILLED WITH RIPRAP SHALL BE LOAMED, GRADED, LIMED, FERTILIZED, SEEDED AND MULCHED AT NO ADDITIONAL EXPENSE TO THE OWNER.

18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESETTING ALL EXISTING PROPERTY MONUMENTATION THAT IS DISTURBED BY HIS OPERATIONS AT NO EXPENSE TO THE OWNER. THIS WORK IS TO BE DONE BY A LAND SURVEYOR REGISTERED IN THE COMMONWEALTH OF MASSACHUSETTS.

19. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE REGULATIONS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA).

20. SEE THE SPECIFICATIONS FOR BORING LOGS. THESE ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

21. THE CONTRACTOR SHALL NOT HAVE ANY RIGHT OF PROPERTY IN ANY MATERIALS TAKEN FROM ANY EXCAVATION. SUITABLE EXCAVATED MATERIAL MAY BE INCORPORATED IN THE PROJECT, WITH EXCESS MATERIAL DISPOSED OF AT A LOCATION PROVIDED BY THE CONTRACTOR. THESE PROVISIONS SHALL IN NO WAY RELIEVE THE CONTRACTOR OF HIS OBLIGATIONS TO PROPERLY DISPOSE OF AND REPLACE ANY MATERIAL DETERMINED BY THE ENGINEER TO BE UNSUITABLE FOR BACKFILLING. THE CONTRACTOR SHALL DISPOSE OF UNSUITABLE AND EXCESS MATERIAL IN ACCORDANCE WITH THE APPLICABLE SECTIONS OF THE CONTRACT DOCUMENTS.

22. CONTRACTOR TO NOTE THAT, IN GENERAL, ALL EXISTING CONDITION INFORMATION ON THE DRAWINGS ARE SHOWN WITH A LIGHTER LINE WEIGHT AND WITH A SLANTED TYPE TEXT.

23. ALL STORM DRAINAGE INLETS SHALL BE PROTECTED BY HAY BALE FILTERS TO PREVENT ENTRY OF SEDIMENT FROM RUNOFF WATERS DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF ALL COLLECTED SEDIMENT, AND THAT WHICH COLLECTS IN THE STORM DRAIN SYSTEM.

24. ALL CATCH BASINS, MANHOLES, VALVE PITS, VALVE BOXES AND OTHER BURIED FACILITIES WITH SURFACE ACCESS SHALL BE ADJUSTED TO MATCH FINAL GRADES, UNLESS OTHERWISE INDICATED.

26. CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL DEBRIS AND EXCESS EXCAVATED MATERIAL FROM WITHIN THE CONSTRUCTION LIMIT OF WORK, TO A SUITABLE SITE PROVIDED BY THE CONTRACTOR, IN COMPLIANCE WITH ALL STATE AND LOCAL REGULATIONS. ANY EXCESS SUITABLE MATERIAL MAY REMAIN ON SITE AT THE REQUEST OF THE OWNER.

27. CONTRACTOR SHALL REMOVE AND REPLACE, OR REPAIR, ALL CURBS, SIDEWALKS, PAVEMENT AND OTHER ITEMS DAMAGED BY HIS CONSTRUCTION ACTIVITIES TO AT LEAST THEIR ORIGINAL CONDITION, TO THE SATISFACTION OF THE OWNER AND ENGINEER.

28. WHERE EXISTING PAVEMENT IS REMOVED AND REPLACED, MATCH EXISTING GRADES TO THE EXTENT POSSIBLE. COORDINATE FINE GRADING WITH THE ENGINEER.

29. SEVERING OF EXISTING UTILITIES FOR ABANDONMENT, OR REMOVAL OF A SEGMENT FROM SERVICE, SHALL BE PERFORMED IN SUCH A MANNER AS TO ALLOW THE REMAINING ACTIVE SEGMENT TO CONTINUE IN ITS INTENDED SERVICE. CAP ACTIVE SEGMENTS WITH APPROPRIATE FITTINGS, JOINT RESTRAINT, ETC. TO ENSURE THEIR INTEGRITY. PLUG ENDS OF ABANDONED PIPE SEGMENTS WITH CONCRETE UNLESS SPECIAL CIRCUMSTANCES DICTATE PLUGGING ABANDONED PIPES WITH BLIND FLANGES, RESTRAINED MECHANICAL JOINT PLUGS, ETC. AS APPROPRIATE.

30. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND DISPOSING OF ALL DEMOLISHED PIPING, EQUIPMENT AND MATERIALS. DISPOSAL SHALL BE IN ACCORDANCE WITH ALL STATE AND LOCAL REGULATIONS.

31. THE CONTRACTOR SHALL KEEP A RECORD OF DEMOLITION AS PART OF THE PROJECT RECORD DOCUMENTS IN ACCORDANCE WITH SPECIFICATION DIVISION 1.

32. THE CONTRACTOR SHALL TAKE ALL NECESSARY STEPS TO ENSURE THAT ALL PROCESS FLOWS ARE MAINTAINED DURING CONSTRUCTION. PUMPED BYPASSES AND OTHER MEANS OF MAINTAINING FLOW SHALL BE SUBJECT TO THE REVIEW AND ACCEPTANCE OF THE ENGINEER. THE CONTRACTOR SHALL COORDINATE ANY TEMPORARY STOPPAGES OR BYPASSES WITH THE OWNER AND ENGINEER.

33. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE APPROPRIATE DISPOSAL OF FLOWS RESULTING FROM PRECIPITATION AND HIS DEWATERING OPERATIONS.

34. FLOWS FROM DEWATERING EFFORTS SHALL NOT BE DISCHARGED TO SANITARY SEWERS, TO ANY WATER BODY, OR TO KENOZA LAKE WITHOUT PRIOR TREATMENT.

35. THE CONTRACTOR IS TO TAKE SPECIAL CARE NOT TO DAMAGE TREES WITHIN THE CONSTRUCTION AREA UNLESS THEY ARE NOTED TO BE REMOVED.

36. TRENCH INSULATION SHALL BE USED WHERE DEPTH OF COVER IS LESS THAN 4 FEET. REFER TO CIVIL DETAILS.

37. REFER TO DIVISION 2 FOR PIPE AND STRUCTURE BEDDING AND BACKFILL REQUIREMENTS.

38. WHERE NEW PIPING IS TO BE CONNECTED TO EXISTING PIPING, THE CONTRACTOR SHALL FURNISH AND INSTALL ALL ADAPTERS, FITTINGS, AND ADDITIONAL PIPE AS REQUIRED TO COMPLETE THE CONNECTION. CONTRACTOR SHALL VERIFY LOCATION, ELEVATION, ORIENTATION AND MATERIAL OF CONSTRUCTION. TEST PITS SHALL BE USED AS REQUIRED.

39. IF RELOCATION IS REQUIRED, WATER LINES SHOULD BE INSTALLED OVER WASTEWATER LINES. A MINIMUM SEPARATION OF 18 INCHES BETWEEN THE BOTTOM OF THE WATER LINE AND THE TOP OF THE WASTEWATER LINE SHALL BE MAINTAINED, IF POSSIBLE. WHERE A WATER LINE CROSSES UNDER A WASTEWATER LINE, A FULL LENGTH OF PIPE SHALL BE CENTERED ABOVE THE WATER LINE SO THAT BOTH JOINTS WILL BE AS FAR FROM THE WATER LINE AS POSSIBLE.

40. ALL BURIED CONNECTIONS TO NEW STRUCTURES WHICH CONNECT TO EXISTING PIPING, INCLUDING BUT NOT LIMITED TO MANHOLES SHALL HAVE SLEEVE TYPE FLEXIBLE CONNECTIONS (FERNCO OR EQUIVALENT) APPROXIMATELY 4 FEET FROM THE STRUCTURES. REFER TO DIVISION 2 AND TYPICAL DETAILS FOR ADDITIONAL INFORMATION. COUPLINGS ARE NOT REQUIRED ON PROPOSED SEWER BETWEEN NEW MANHOLES OR STRUCTURES.

41. REFER TO DIVISION 1 FOR RESTRICTIONS ON MAXIMUM DURATION OF SHUTDOWNS, NOTIFICATION REQUIREMENTS AND PROJECT PHASING REQUIREMENTS.

SITE LAYOUT NOTES

1. THE LOCATION AND LIMITS OF ALL ON SITE WORK AND STORAGE AREAS SHALL BE REVIEWED AND COORDINATED WITH, AND ACCEPTABLE TO, THE OWNER AND ENGINEER. THE CONTRACTOR SHALL LIMIT HIS ACTIVITIES TO THESE AREAS.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LAYOUT OF ALL PROPOSED WORK AS SHOWN ON THE DRAWINGS. THE ENGINEER WILL PROVIDE ELECTRONIC DATA FOR HORIZONTAL CONTROL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THIS CONTROL THROUGHOUT THE PROJECT.

3. DO NOT SCALE DRAWINGS UNLESS OTHERWISE NOTED. WRITTEN DIMENSIONS AND COORDINATES SHALL PREVAIL. TOPOGRAPHY BASED ON SURVEY COMPILED BY LIGHTHOUSE LAND SURVEYING, LLC IN JULY/AUGUST 2017 AND ROADWAY PROFILE GRADES PERFORMED IN JULY 2018.

4. HORIZONTAL DATUM: MASSACHUSETTS STATE PLAN - MAINLAND ZONE NAD83 (2011) EPOCH 2010.00 - US FEET
   VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (GEOID 128) - US FEET.

ABBREVIATIONS

BLDG	BUILDING
BFV	BUTTERFLY VALVE
CAS	CAST IRON PIPE
CB	CATCH BASIN
CDF	CONTROLLED DENSITY FILL
CL	CENTERLINE
CONC	CONCRETE
DEMO	DEMOLITION
DMH	DRAIN MANHOLE
DI	DUCTILE IRON PIPE
DR	DRAIN
DWG	DRAWING
EL	ELEVATION
EMH	ELECTRIC MANHOLE
FM	FORCE MAIN
FT	FEET
G	GAS
GV	GATE VALVE
HYD	HYDRANT
IN	INCH
INV	INVERT ELEVATION
L	LENGTH
LP	LIGHT POLE
MH	MANHOLE
MIN	MINIMUM
MW	MONITORING WELL
N	NORTH
NGVD	NATIONAL GEODETIC VERTICAL DATUM
N/A	NOT AVAILABLE/APPLICABLE
NTS	NOT TO SCALE
OHE	OVERHEAD ELECTRICAL
OUT	OUTFALL
P.C.	POINT OF CURVATURE
PCCP	PRESTRESSED CONCRETE CYLINDER PIPE
PE	POLYETHYLENE PIPE
PVC	POLYVINYL CHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
REQ'D	REQUIRED
S	SEWER
SD	STORM DRAIN
SF	SQUARE FEET
SMH	SANITARY SEWER MANHOLE
STA	STATION
SS	STAINLESS STEEL PIPE
TBM	TEMPORARY BENCH MARK
TOF	TOP OF FOUNDATION
TYP	TYPICAL
UD	UNDERDRAIN
UG	UNDERGROUND
UGE	UNDERGROUND ELECTRIC
UP	UTILITY POLE
VC	VITRIFIED CLAY
W	WATER
XFMR	TRANSFORMER

LEGEND

	EXISTING	PROPOSED
PROPERTY/ROW LINE		
SETBACK LINE		
EASEMENT LINE		
CENTERLINE		
EDGE OF PAVEMENT		
CURBING		
EDGE OF GRAVEL		
EDGE OF CONCRETE		
CONTOUR	122	123
BUILDING		
STONEWALL		
TREELINE		
CHAIN LINK FENCE		
STOCKADE FENCE		
BARB WIRE FENCE		
RETAINING WALL		
GUARDRAIL		
SEWER	8"S	8"S
SEWER FORCE MAIN	4"FM	4"FM
GAS	4"G	4"G
WATER	4"W	8"W
STORM DRAIN	15"SD	15"SD
UNDERDRAIN	6"UD	6"UD
CULVERT	12" CMP	12" CMP
UNDERGROUND ELECTRIC	UGE	UGE
OVERHEAD ELECTRIC	OHE	OHE
IRON PIPE/REBAR		
DRILLHOLE		
MONUMENT		
SURVEY CONTROL POINT		
SPOT ELEVATION	124.6	134.5
SEWER MANHOLE	SMH	SMH
DRAINAGE MANHOLE	DMH	DMH
CATCH BASIN	CB CB	CB CB
ELECTRIC MANHOLE	EMH	EMH
TELEPHONE MANHOLE	TMH	TMH
GATE VALVE		
CURB STOP		
YARD HYDRANT		
HYDRANT		
UTILITY POLE		
UTILITY POLE W/ GUY		
UTILITY POLE W/ LIGHT		
LIGHT POLE		
BOLLARD		
FLAGPOLE		
CONIFEROUS TREE		
DECIDUOUS TREE		
SHRUB		
EDGE OF WATER		
STREAM		
EDGE OF WETLANDS		
FLOODPLAIN		
WETLANDS		
DRAINAGE FLOW		
DRAINAGE SWALE		
PAVEMENT MARKINGS		
SIGN		
MAILBOX	MB	
TEMPORARY BENCH MARK		
TEST PIT	TP-2	
TEST BORING	B-3	
TEST PROBE	P-4	
BORING/PROBE REFUSAL		
BOTTOM OF EXPLORATION (BOE)		
MONITORING WELL	MW	
LIMIT OF WORK		
SILT FENCE		
RIPRAP		
RAILROAD		
MATCHLINE		
ROCK OUTCROP		
SANDBAGS		

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1			
2			
3			
4			

DESIGNED BY: D.LARY
CAD COORD: W.EDGAR
CAD: W.EDGAR
CHECKED BY:
DATE:
APPROVED BY:
DATE:
PROJECT NO: 13582B

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CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

GENERAL NOTES, LEGEND AND ABBREVIATIONS

DRAWING
C-1

J:\ENG\MA\HAVERHILL\13582-MERRIMACKRVRANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIV\13582B-GENERALNOTES&LEGEND.DWG | GeneralNotes&Legend | 1:4.56 | ---- | 8/23/2022 2:48:56 PM | WILLIAM.EDGAR

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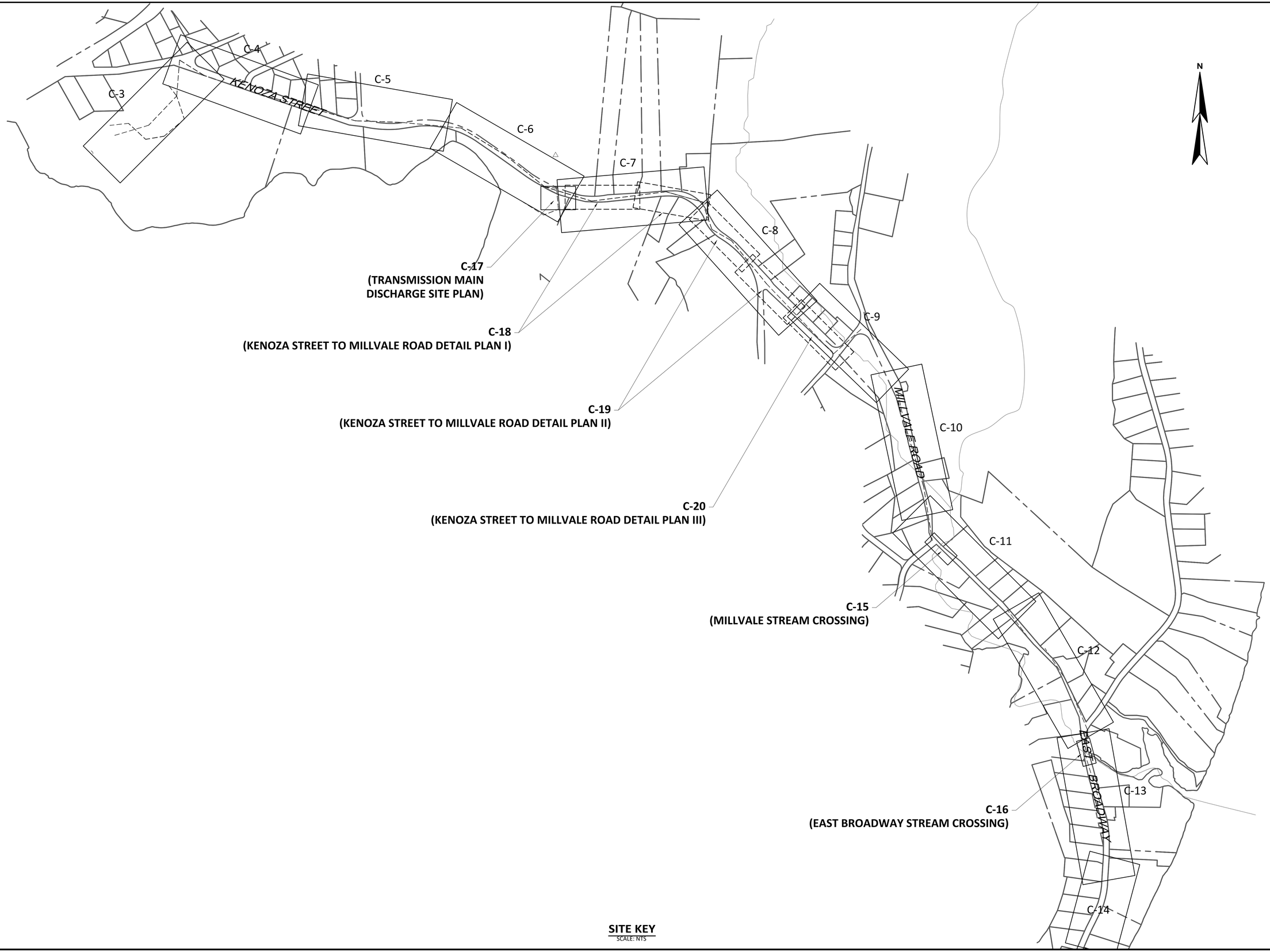

SITE KEY
SCALE: NTS

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1			
2			
3			
4			

DESIGNED BY: D.LARY
CAD COORD: W.EDGAR
CAD: W.EDGAR
CHECKED BY:
DATE:
APPROVED BY:
DATE:
PROJECT NO: 13582B

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CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

SITE KEY PLAN

DRAWING
C-2

J:\ENGWA\HAVERHILL\13582-MERRIMACKRVRANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIVL13582B-SITEKEYPLAN.DWG | SiteKeyPlan | 14:56 | —- | 8/23/2022 3:05:22 PM | WILLIAM.EDGAR

LAST SAVED BY: WILLIAM.EDGAR 8/19/2022 4:29 PM
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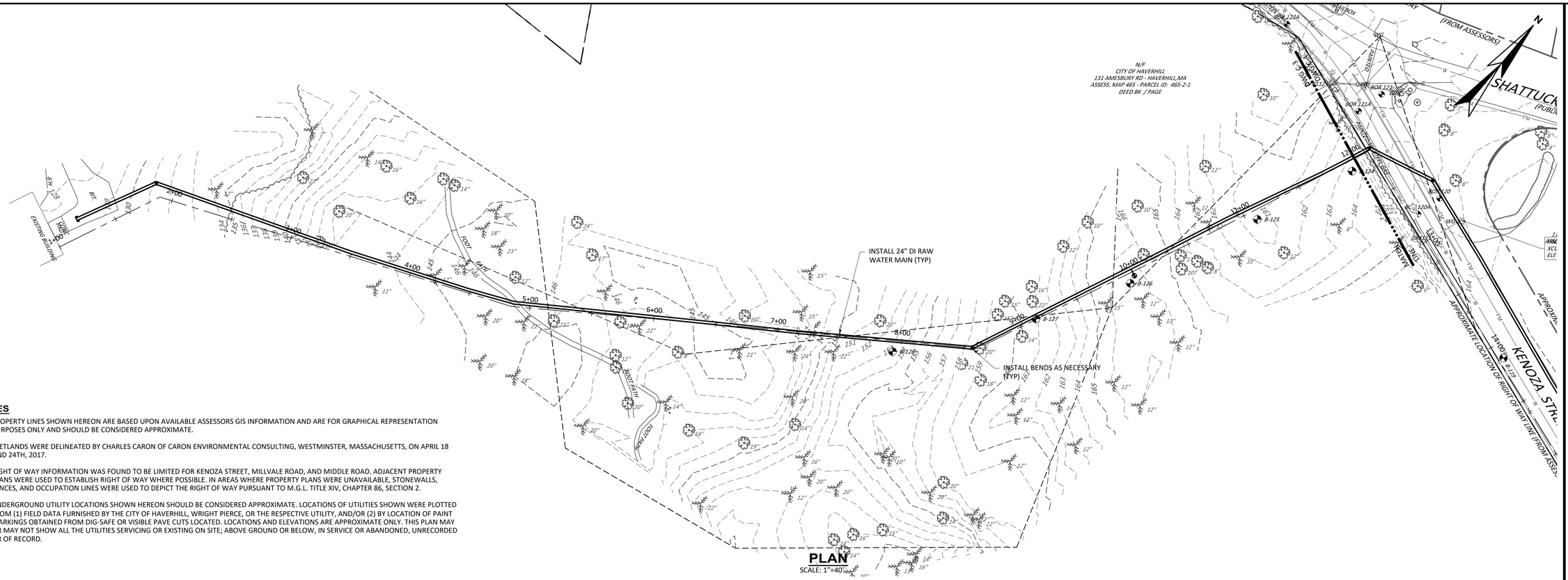
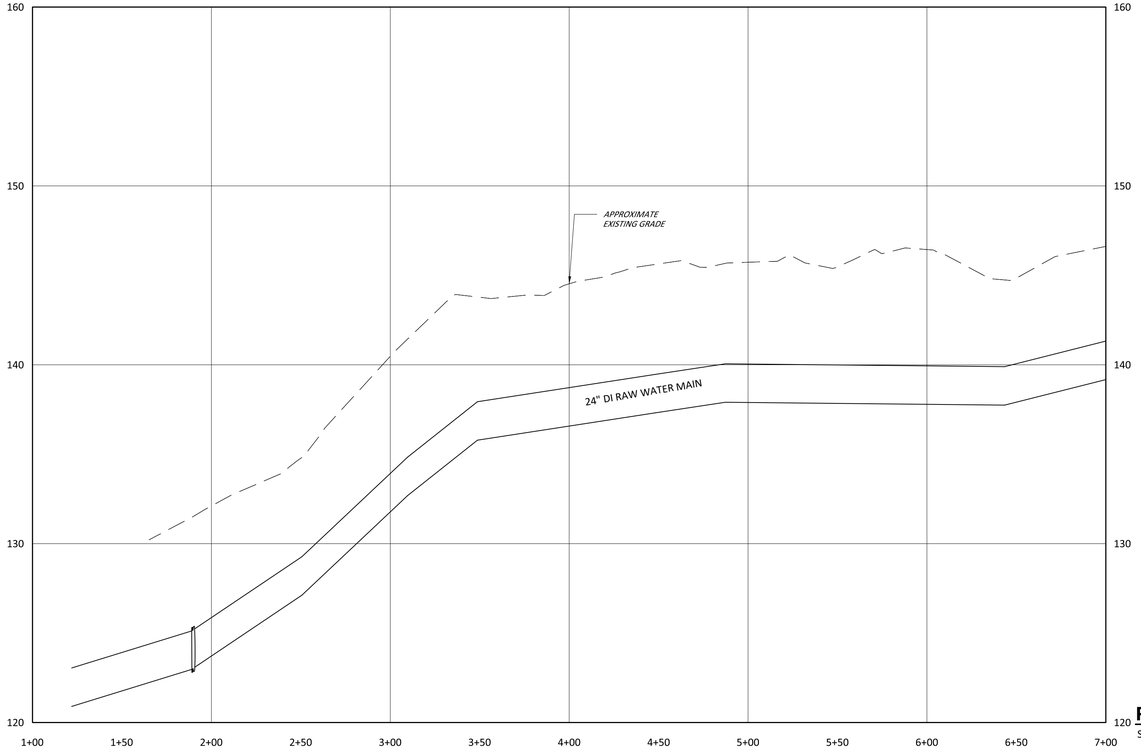
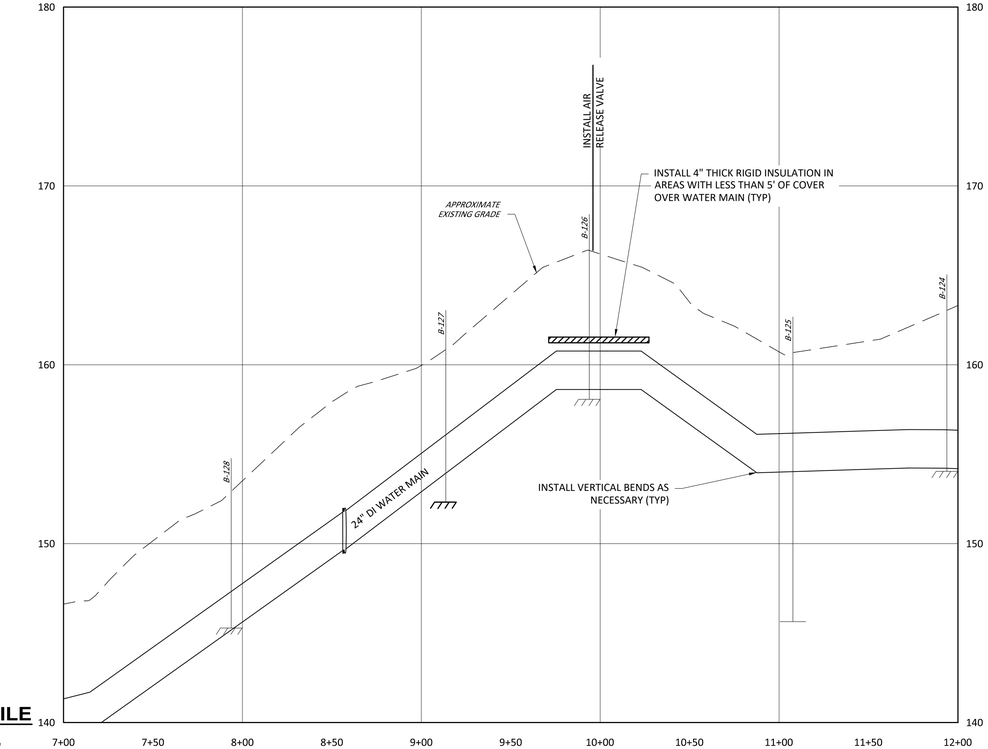


PLAN
SCALE: 1"=40'

NOTES

1. PROPERTY LINES SHOWN HEREON ARE BASED UPON AVAILABLE ASSESSORS GIS INFORMATION AND ARE FOR GRAPHICAL REPRESENTATION PURPOSES ONLY AND SHOULD BE CONSIDERED APPROXIMATE.
2. WETLANDS WERE DELINEATED BY CHARLES CARON OF CARON ENVIRONMENTAL CONSULTING, WESTMINSTER, MASSACHUSETTS, ON APRIL 18 AND 24TH, 2017.
3. RIGHT OF WAY INFORMATION WAS FOUND TO BE LIMITED FOR KENOZA STREET, MILLVALE ROAD, AND MIDDLE ROAD. ADJACENT PROPERTY PLANS WERE USED TO ESTABLISH RIGHT OF WAY WHERE POSSIBLE. IN AREAS WHERE PROPERTY PLANS WERE UNAVAILABLE, STONEWALLS, FENCES, AND OCCUPATION LINES WERE USED TO DEPICT THE RIGHT OF WAY PURSUANT TO M.G.L. TITLE XIV, CHAPTER 86, SECTION 2.
4. UNDERGROUND UTILITY LOCATIONS SHOWN HEREON SHOULD BE CONSIDERED APPROXIMATE. LOCATIONS OF UTILITIES SHOWN WERE PLOTTED FROM (1) FIELD DATA FURNISHED BY THE CITY OF HAVERHILL, WRIGHT PIERCE, OR THE RESPECTIVE UTILITY, AND/OR (2) BY LOCATION OF PAINT MARKINGS OBTAINED FROM DIG-SAFE OR VISIBLE PAVE CUTS LOCATED. LOCATIONS AND ELEVATIONS ARE APPROXIMATE ONLY. THIS PLAN MAY OR MAY NOT SHOW ALL THE UTILITIES SERVICING OR EXISTING ON SITE; ABOVE GROUND OR BELOW, IN SERVICE OR ABANDONED, UNRECORDED OR OF RECORD.





PROFILE
SCALES
VERT:1"=4'
HORIZ:1"=40'

NO	SUBMISSIONS/REVISIONS	DATE	APP'D
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DESIGNED BY: D.LARY
CAD COORD: W.EDGAR
CAD: W.EDGAR
CHECKED BY:
DATE:
APPROVED BY:
DATE:
PROJECT NO: 13582B

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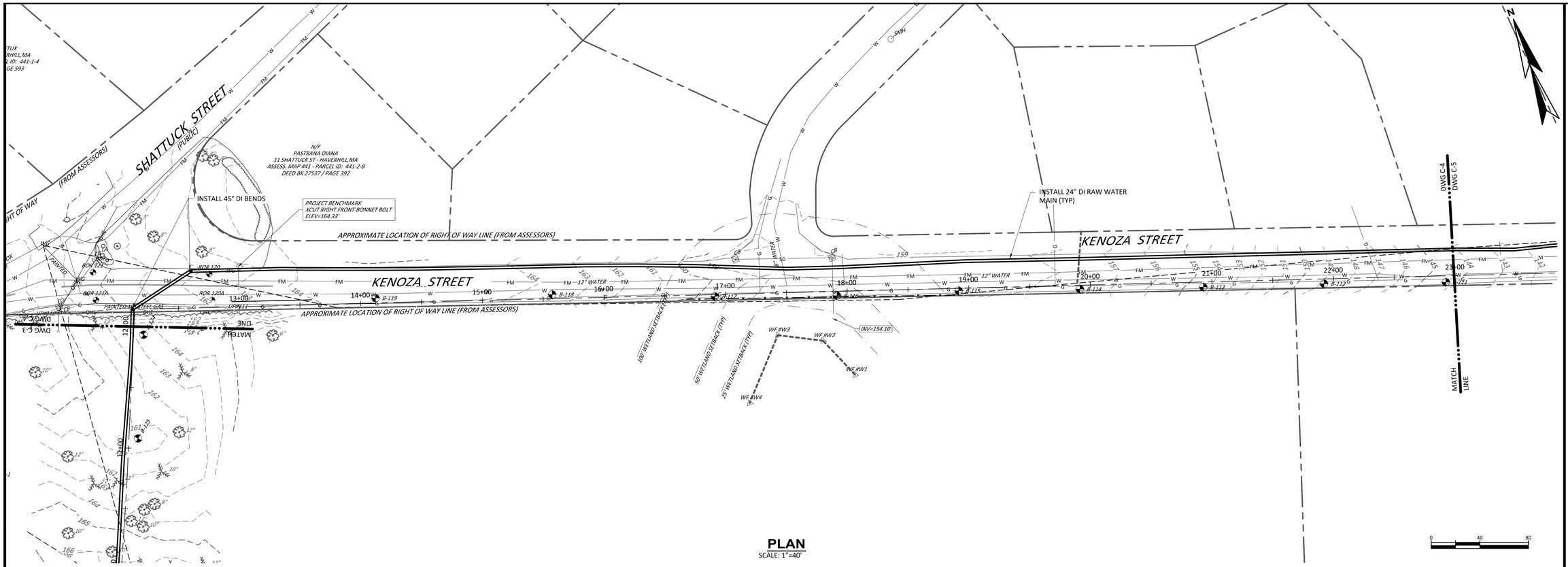
CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

PLAN AND PROFILE I
STA. 1+00 TO STA. 12+00

DRAWING
C-3

LAST SAVED BY: WILLIAM.EDGAR 8/23/2022 2:00 PM
J:\ENG\MA\HAVERHILL\13582-MERRIMACKRVRANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIV\13582B-P&P2.DWG | Plan & Profile II | 14:56 | ---- | 8/23/2022 2:50:12 PM | WILLIAM.EDGAR



PLAN
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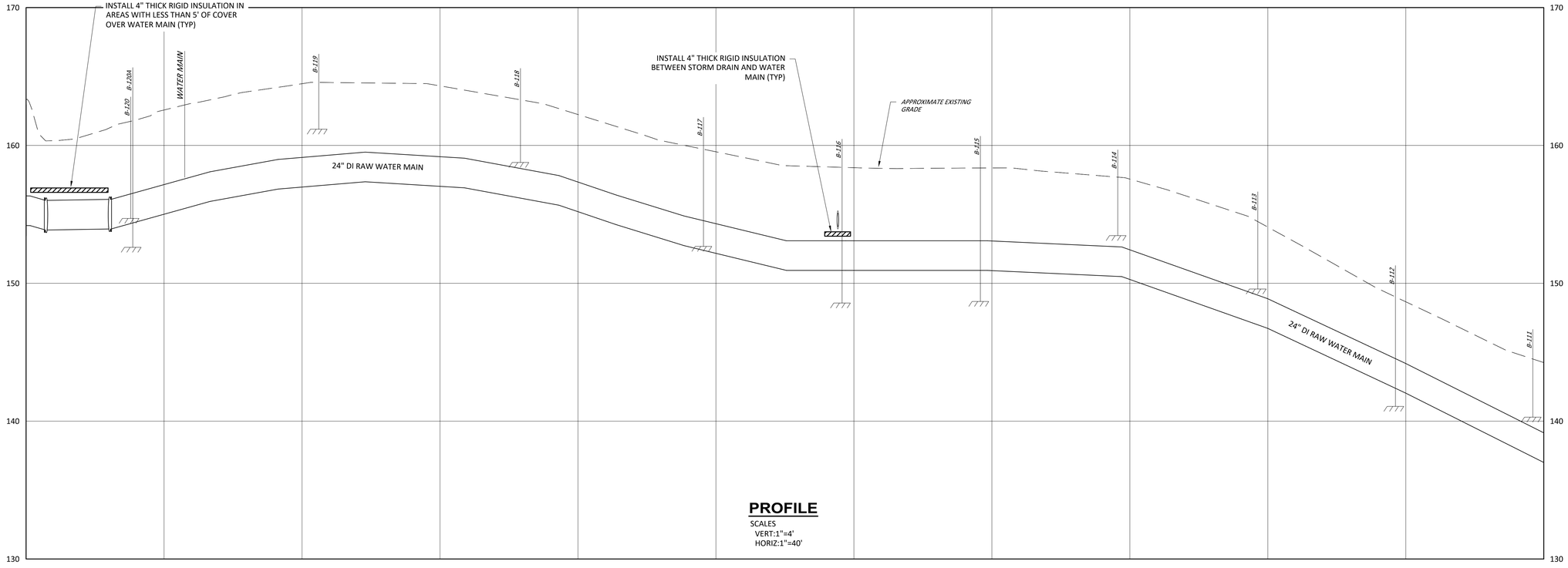

PROFILE
SCALES
VERT:1"=4'
HORIZ:1"=40'

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
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DESIGNED BY: D.LARY
CAD COORD: W.EDGAR
CAD: W.EDGAR
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DATE:
APPROVED BY:
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PROJECT NO: 13582B

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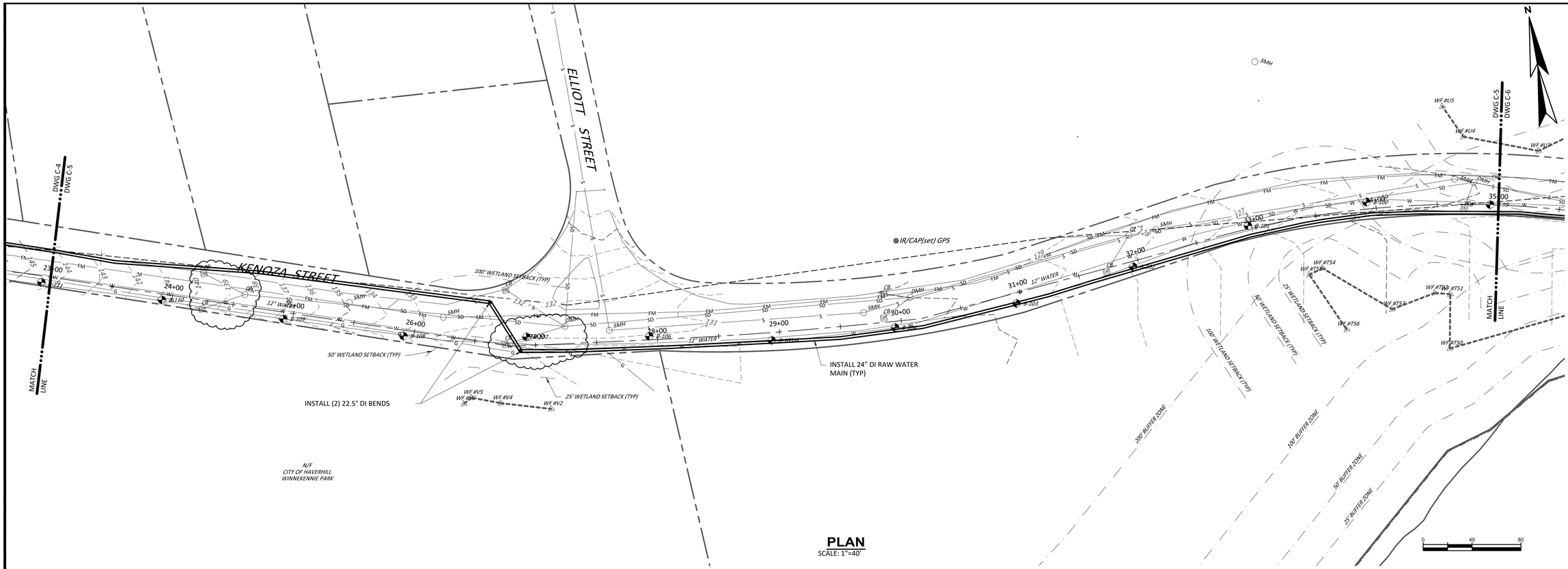
CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

PLAN AND PROFILE II
STA. 12+00 TO STA. 23+00

DRAWING
C-4

LAST SAVED BY: WILLIAM.EDGAR 8/23/2022 2:06 PM



PLAN
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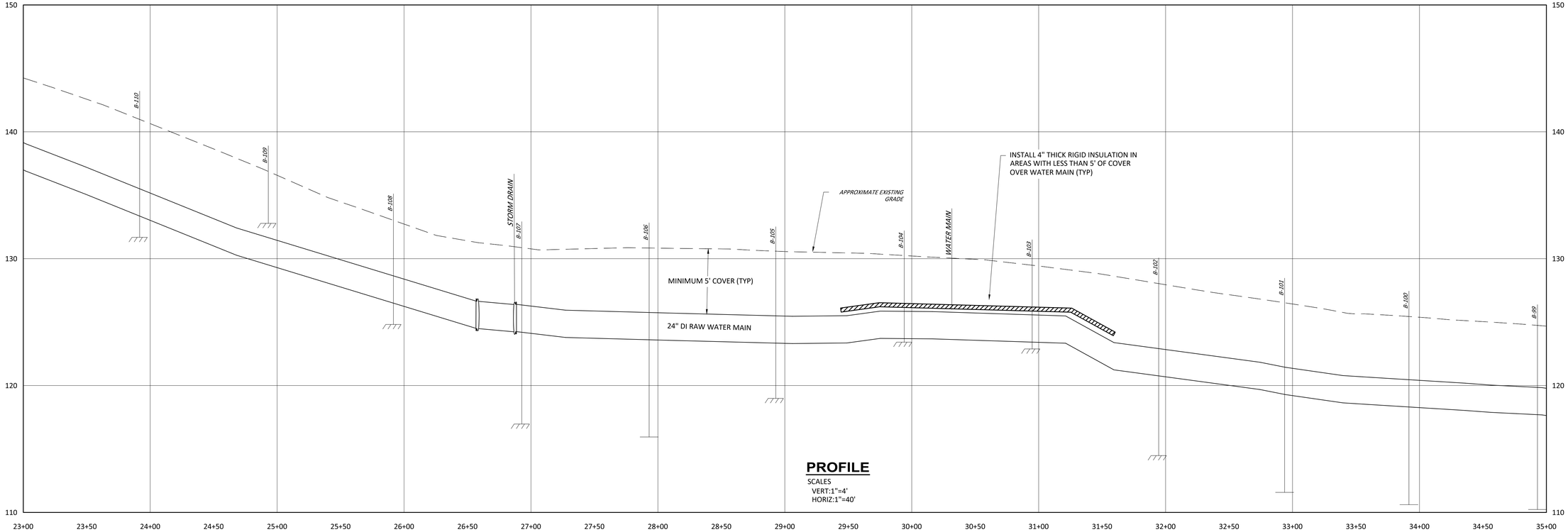

PROFILE
SCALES
VERT:1"=4'
HORIZ:1"=40'

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
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DESIGNED BY: D.LARY
CAD COORD: W.EDGAR
CAD: W.EDGAR
CHECKED BY:
DATE:
APPROVED BY:
DATE:
PROJECT NO: 13582B

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CITY OF HAVERHILL
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RAW WATER TRANSMISSION MAIN

PLAN AND PROFILE III
STA. 23+00 TO STA. 35+00

DRAWING
C-5

J:\ENG\MA\HAVERHILL\13582-MERRIMACKRVRANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIV\13582B-P&P3.DWG | Plan & Profile III | 1:4.56 | ---- | 8/23/2022 2:50:41 PM | WILLIAM.EDGAR

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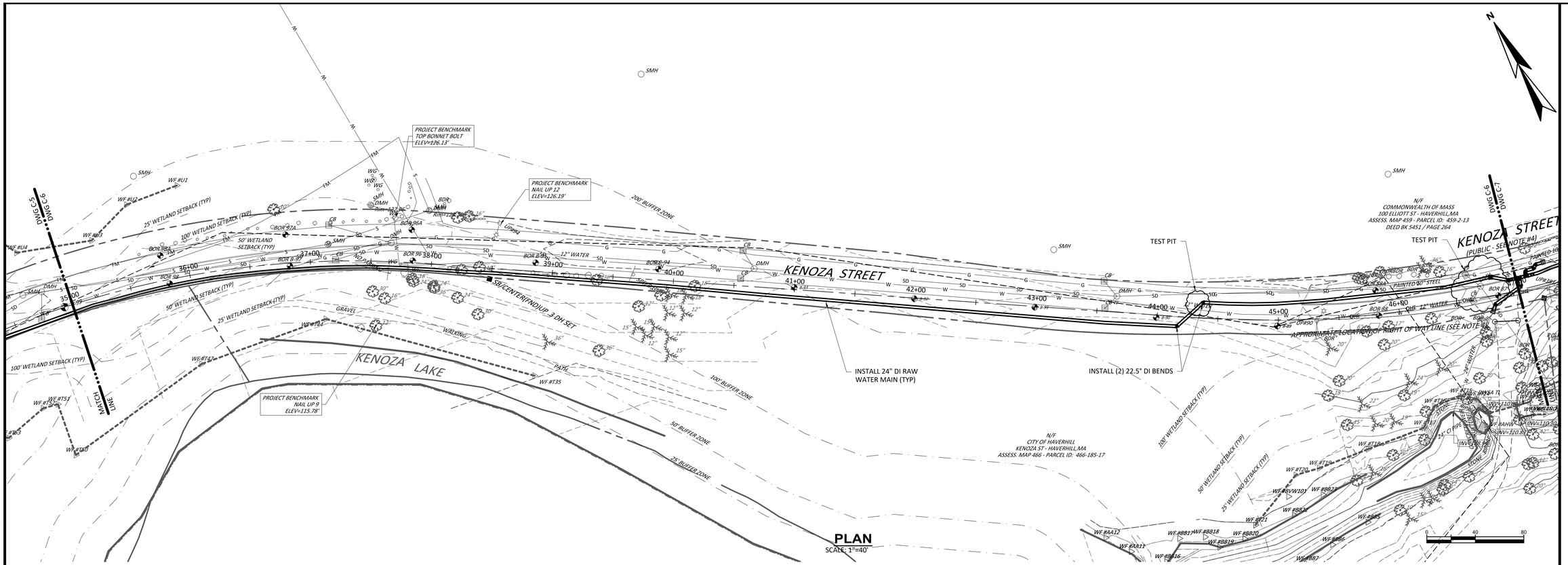

PLAN
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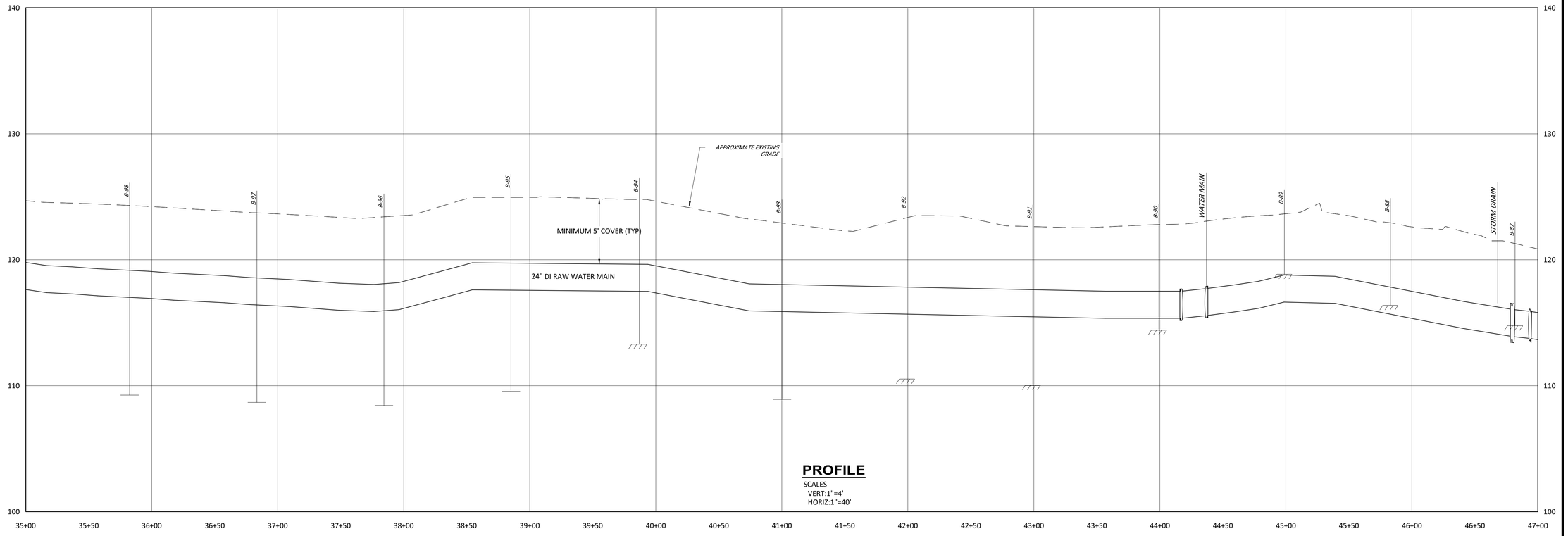

PROFILE
SCALES
VERT:1"=4'
HORIZ:1"=40'

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1			
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DESIGNED BY: D.LARY
CAD COORD: W:\EDGAR
CAD: W:\EDGAR
CHECKED BY:
DATE:
APPROVED BY:
DATE:
PROJECT NO: 13582B

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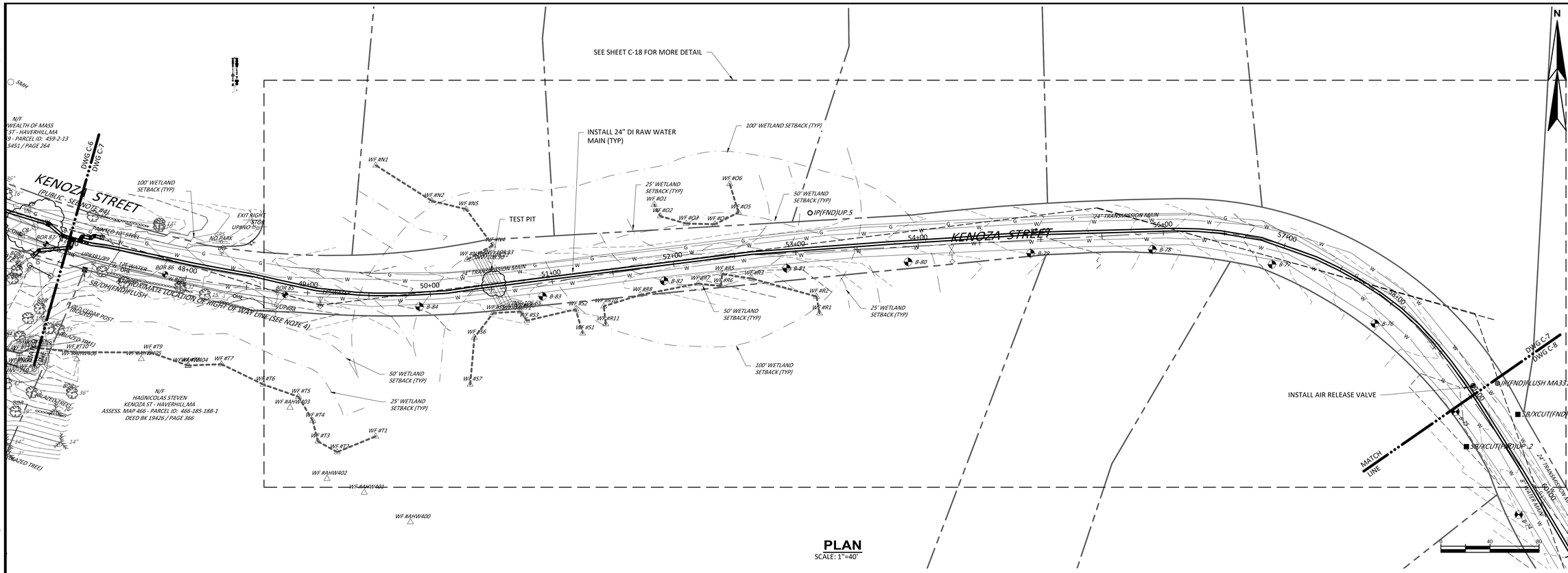
CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

PLAN AND PROFILE IV
STA. 35+00 TO STA. 47+00

DRAWING
C-6



PLAN

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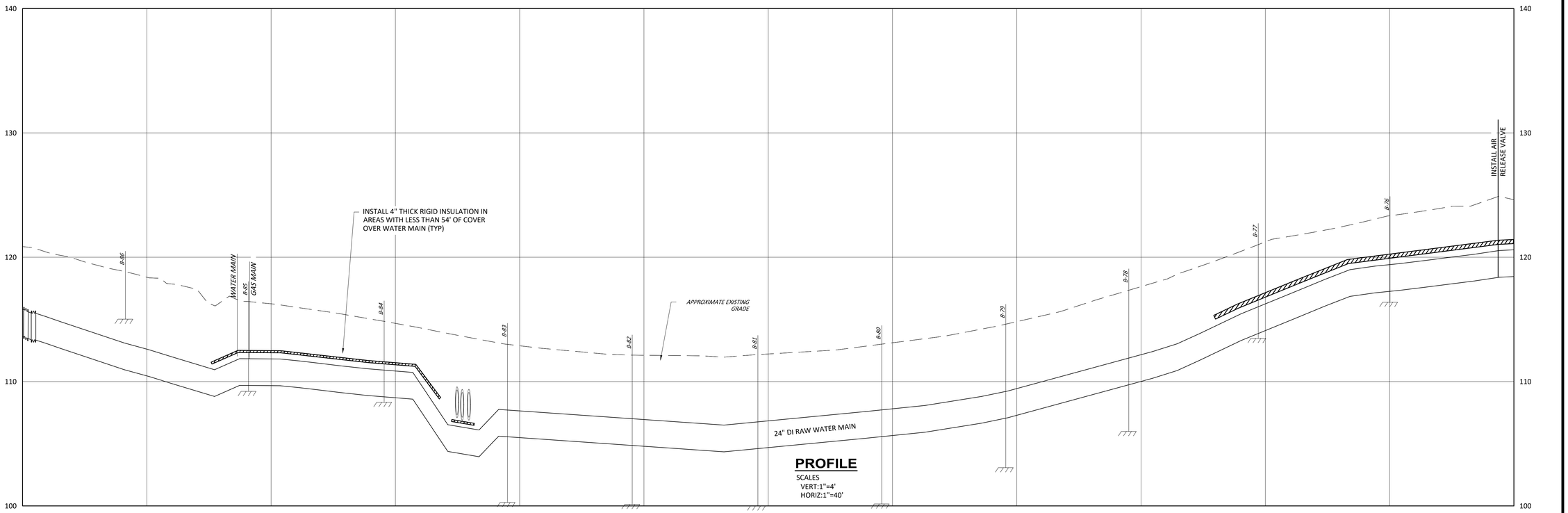

PROFILE

SCALES
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HORIZ:1"=40'

LAST SAVED BY: WILLIAM.EDGAR 8/23/2022 2:08 PM

J:\ENG\MA\HAVERHILL\13582-MERRIMACKRVRANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIV\13582B-P&P5.DWG | Plan & Profile V | 1:4.56 | ---- | 8/23/2022 2:51:42 PM | WILLIAM.EDGAR

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1			
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CAD: W.EDGAR
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APPROVED BY:
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PROJECT NO: 13582B

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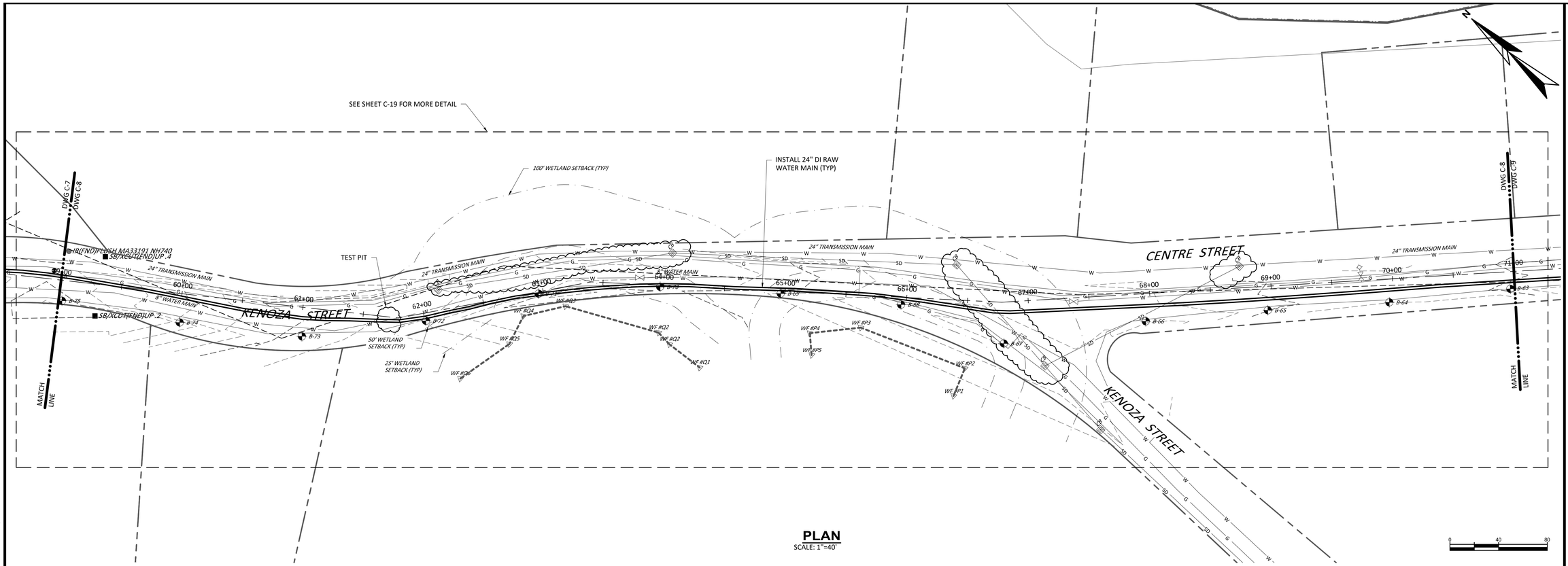
CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

PLAN AND PROFILE V
STA. 47+00 TO STA. 59+00

DRAWING
C-7

LAST SAVED BY: WILLIAM.EDGAR 8/23/2022 2:12 PM

J:\ENG\MA\HAVERHILL\13582-MERRIMACKRVRANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIV\13582B-P&Ps.DWG | Plan & Profile VI | 1:4.56 | ---- | 8/23/2022 2:52:11 PM | WILLIAM.EDGAR



PLAN
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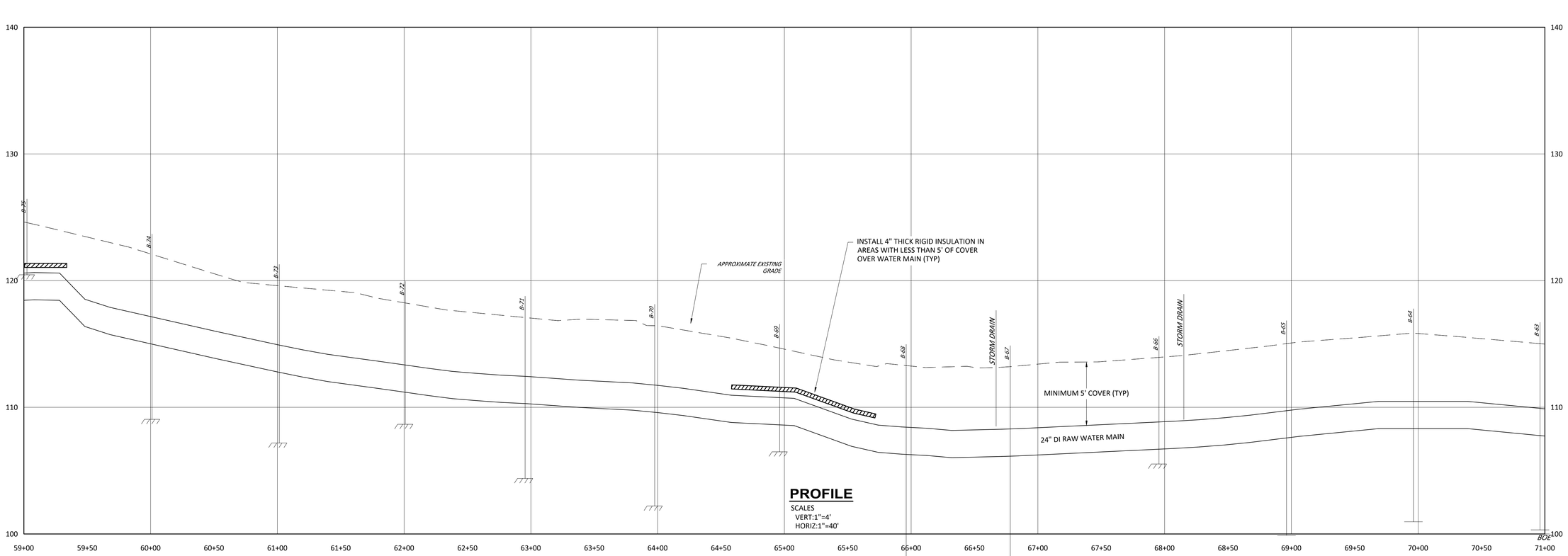

PROFILE
SCALES
VERT:1"=4'
HORIZ:1"=40'

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
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DESIGNED BY: D.LARY
CAD COORD: W.EDGAR
CAD: W.EDGAR
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DATE:
APPROVED BY:
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PROJECT NO: 13582B

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CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

PLAN AND PROFILE VI
STA. 59+00 TO STA. 71+00

DRAWING
C-8

LAST SAVED BY: WILLIAM.EDGAR 8/23/2022 2:14 PM
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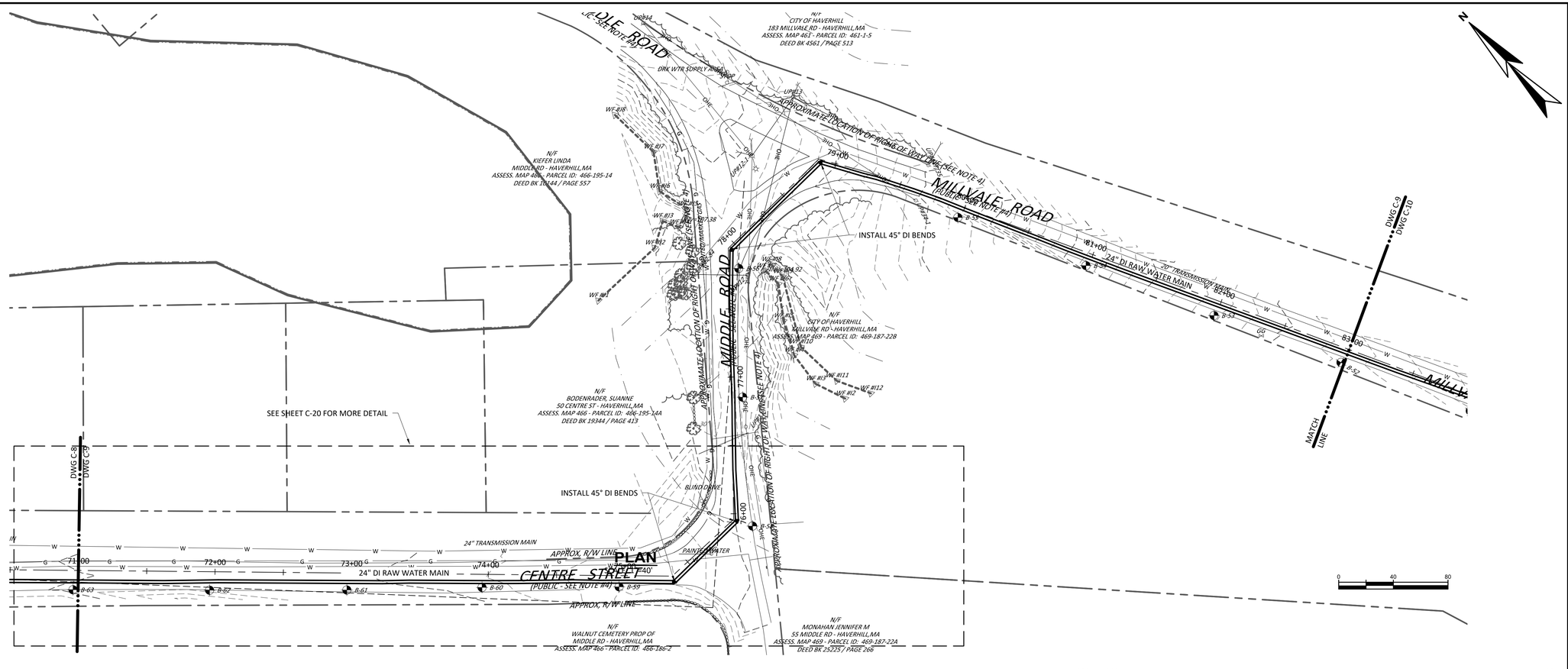

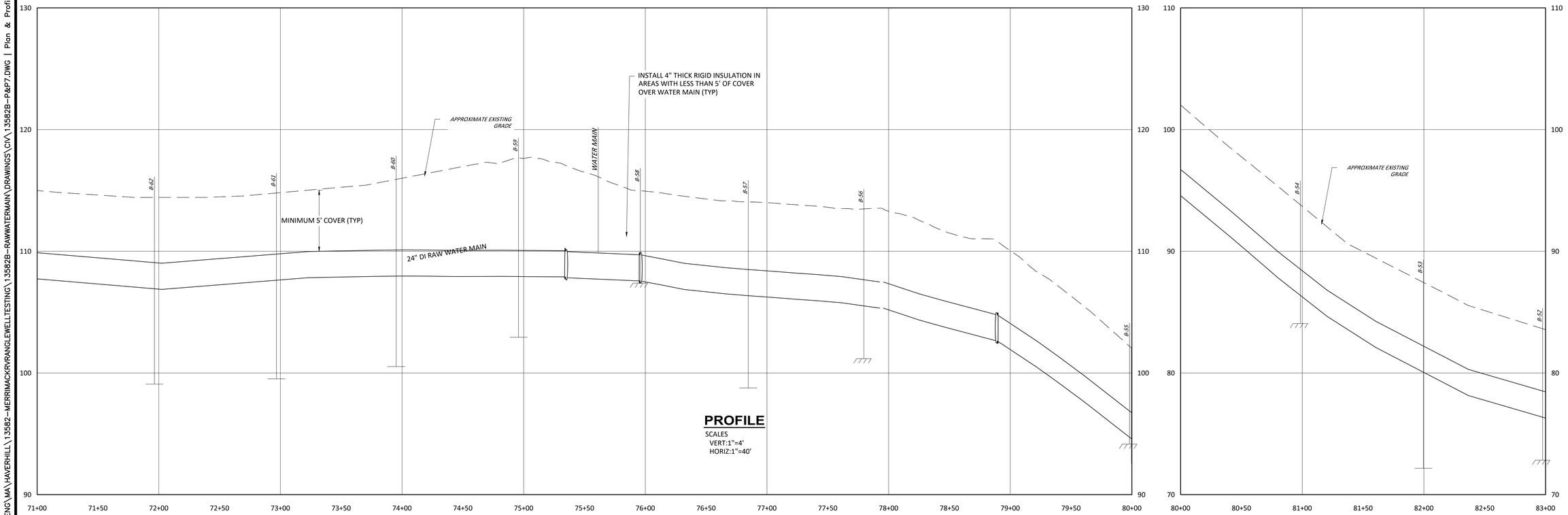

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
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DESIGNED BY: D.LARY
CAD COORD: W.EDGAR
CAD: W.EDGAR
CHECKED BY:
DATE:
APPROVED BY:
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PROJECT NO: 13582B

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CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

PLAN AND PROFILE VII
STA. 71+00 TO STA. 83+00

DRAWING
C-9

J:\ENG\MA\HAVERHILL\13582--MERRIMACKRVRANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIV\13582B-P&PB.DWG | Plan & Profile VIII | 1:4.56 | ---- | 8/23/2022 2:53:31 PM | WILLIAM.EDGAR
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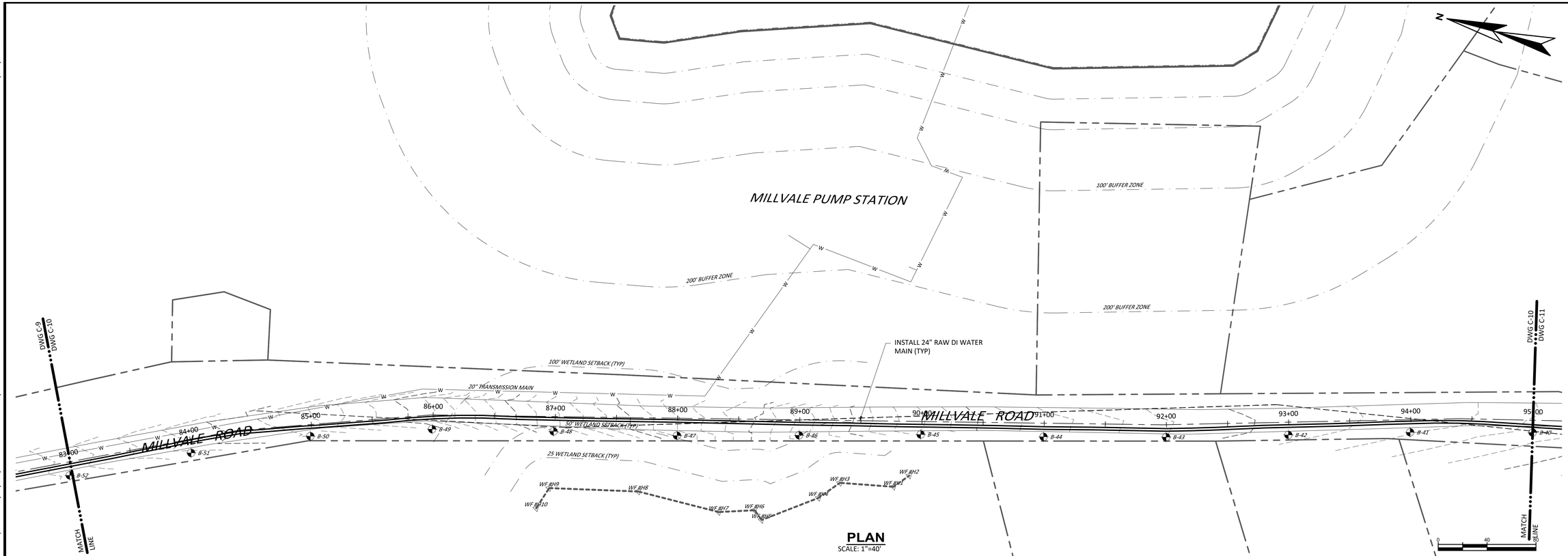

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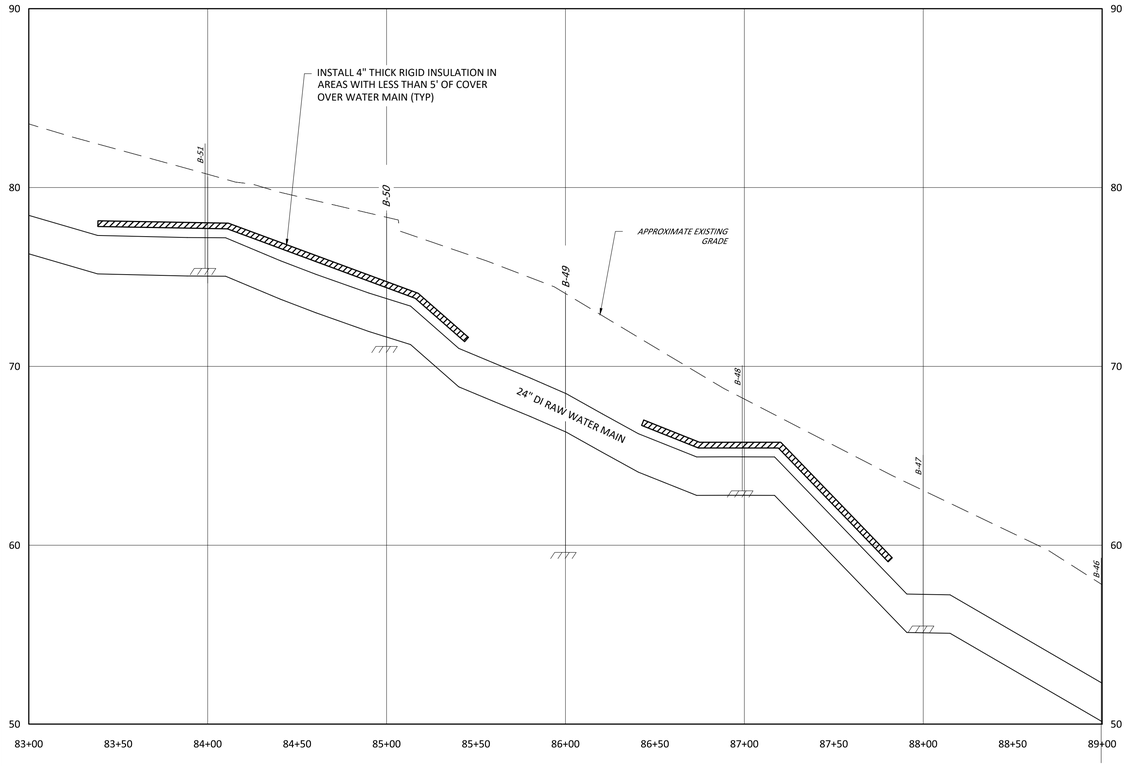

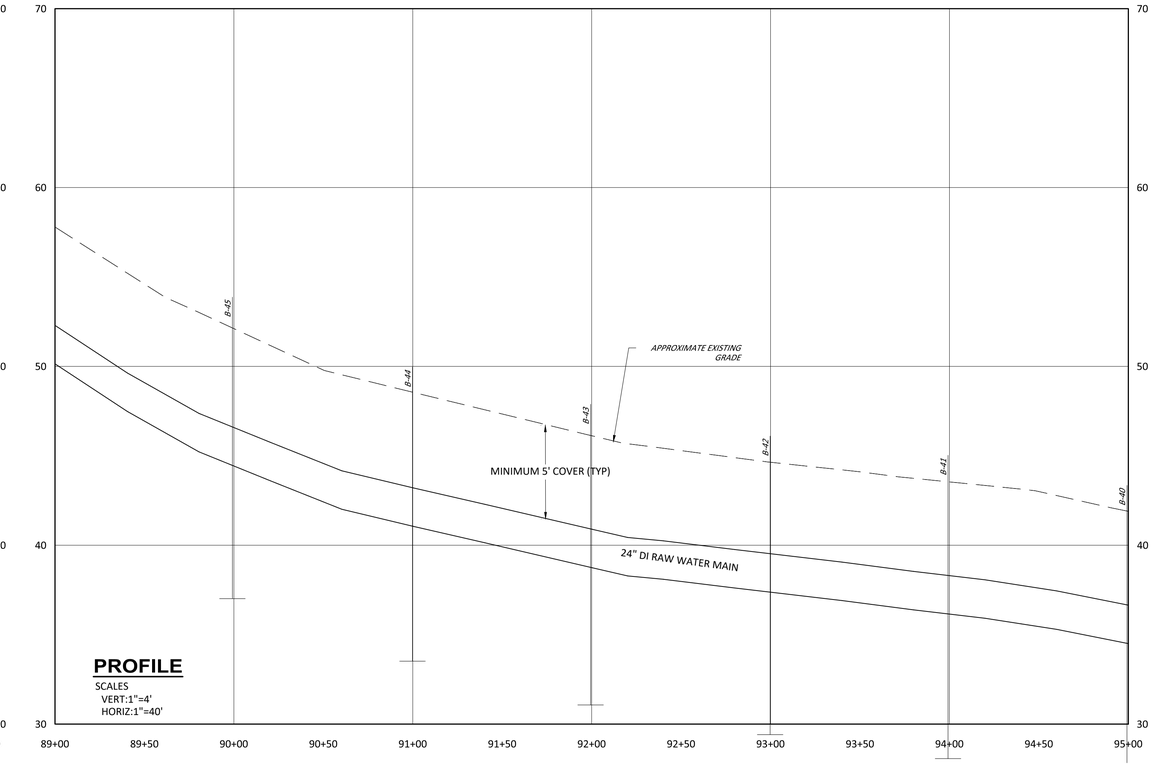

PROFILE
SCALES
VERT:1"=4'
HORIZ:1"=40'

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1			
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DESIGNED BY: D.LARY
CAD COORD: W.EDGAR
CAD: W.EDGAR
CHECKED BY:
DATE:
APPROVED BY:
DATE:
PROJECT NO: 13582B

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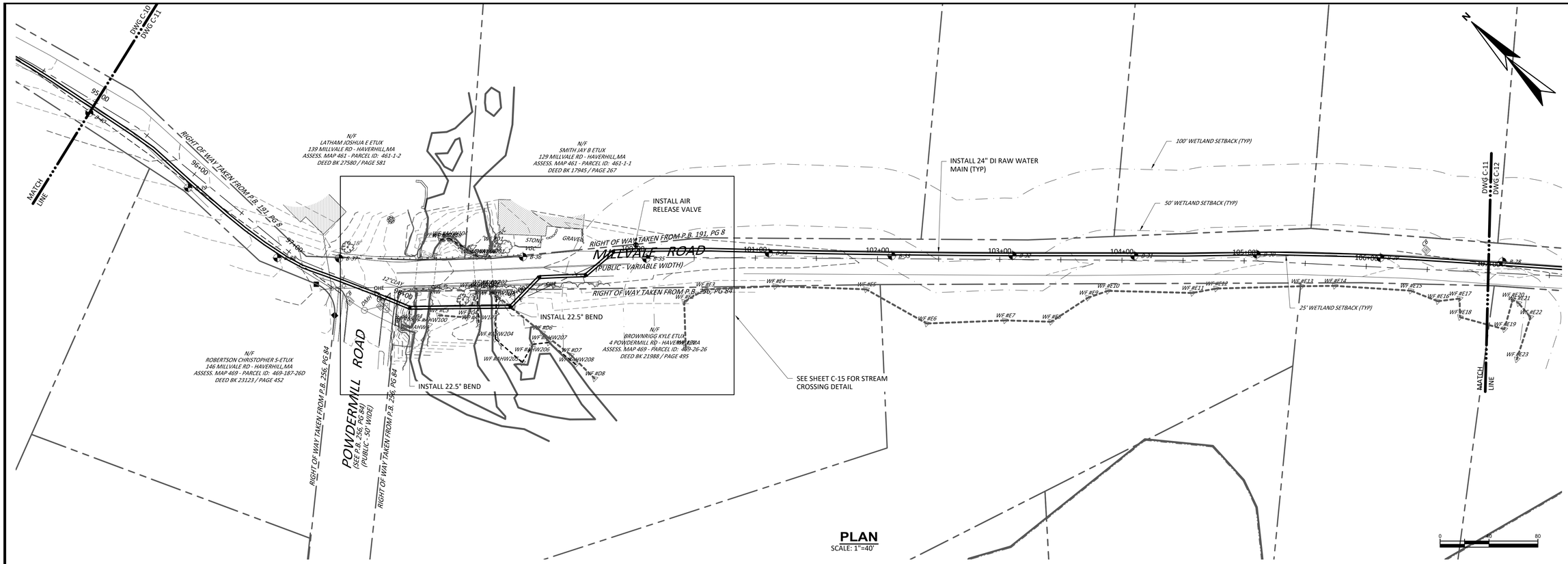
CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

PLAN AND PROFILE VIII
STA. 83+00 TO STA. 95+00

DRAWING
C-10

LAST SAVED BY: WILLIAM.EDGAR 8/23/2022 9:51 AM

J:\ENG\MA\HAVERHILL\13582-MERRIMACKVRANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIV\13582B-P&P9.DWG | Plan & Profile IX | 1:4.56 | ---- | 8/23/2022 2:54:02 PM | WILLIAM.EDGAR



PLAN
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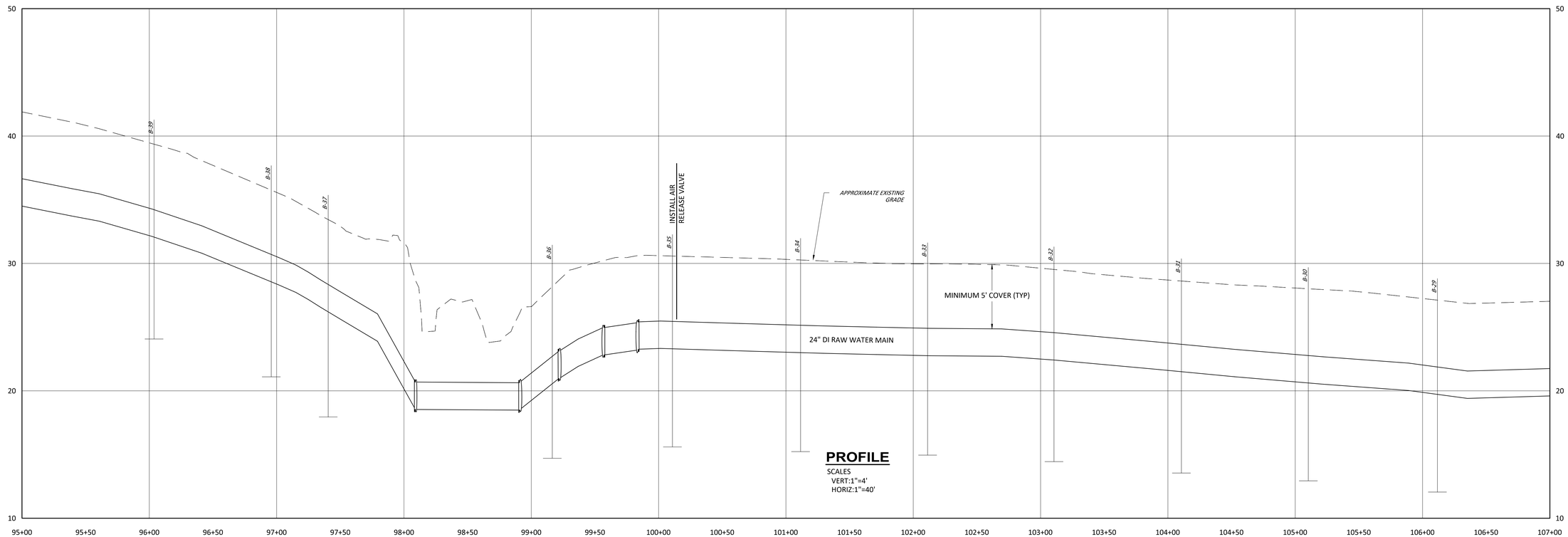

PROFILE
SCALES
VERT:1"=4'
HORIZ:1"=40'

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1			
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DESIGNED BY: D.LARY
CAD COORD: W.EDGAR
CAD: W.EDGAR
CHECKED BY:
DATE:
APPROVED BY:
DATE:
PROJECT NO: 13582B

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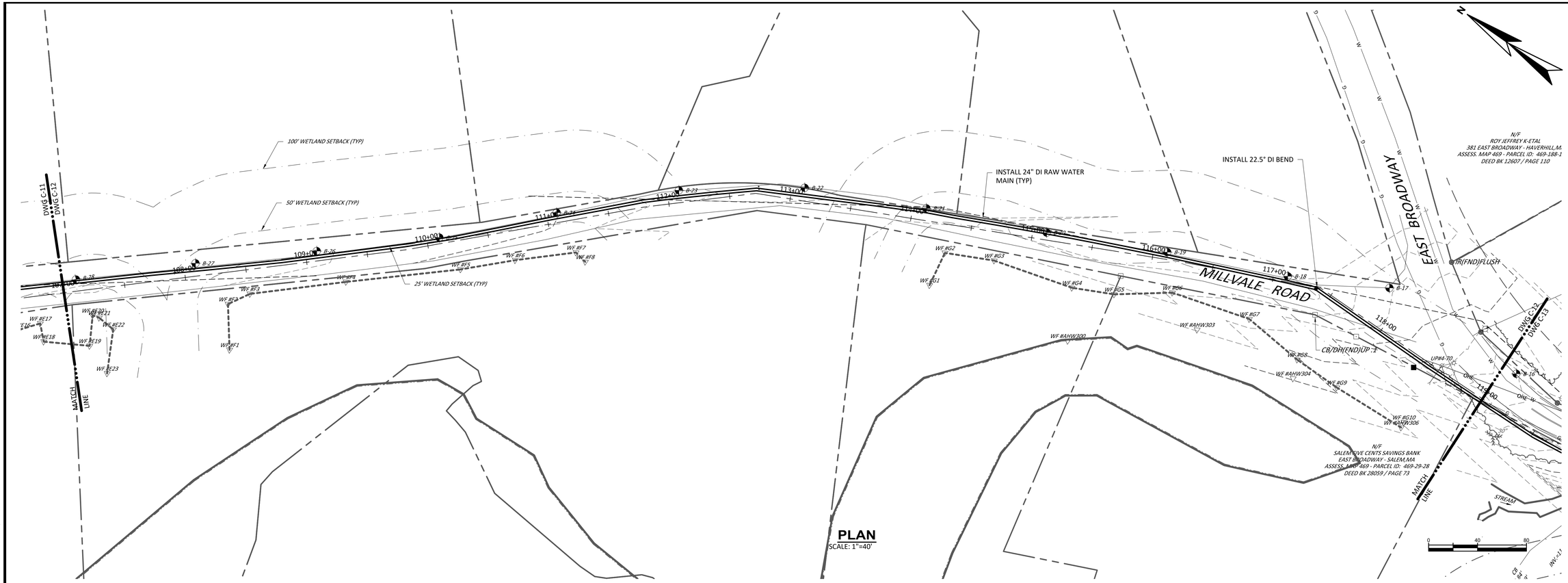
CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

PLAN & PROFILE IX
STA. 95+00 TO STA. 107+00

DRAWING
C-11

LAST SAVED BY: WILLIAM.EDGAR 8/23/2022 9:55 AM

J:\ENG\MA\HAVERHILL\13582-MERRIMACKRVRANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIV\13582B-P&P10.DWG | Plan & Profile X | 1:4.56 | ---- | 8/23/2022 2:54:31 PM | WILLIAM.EDGAR



PLAN
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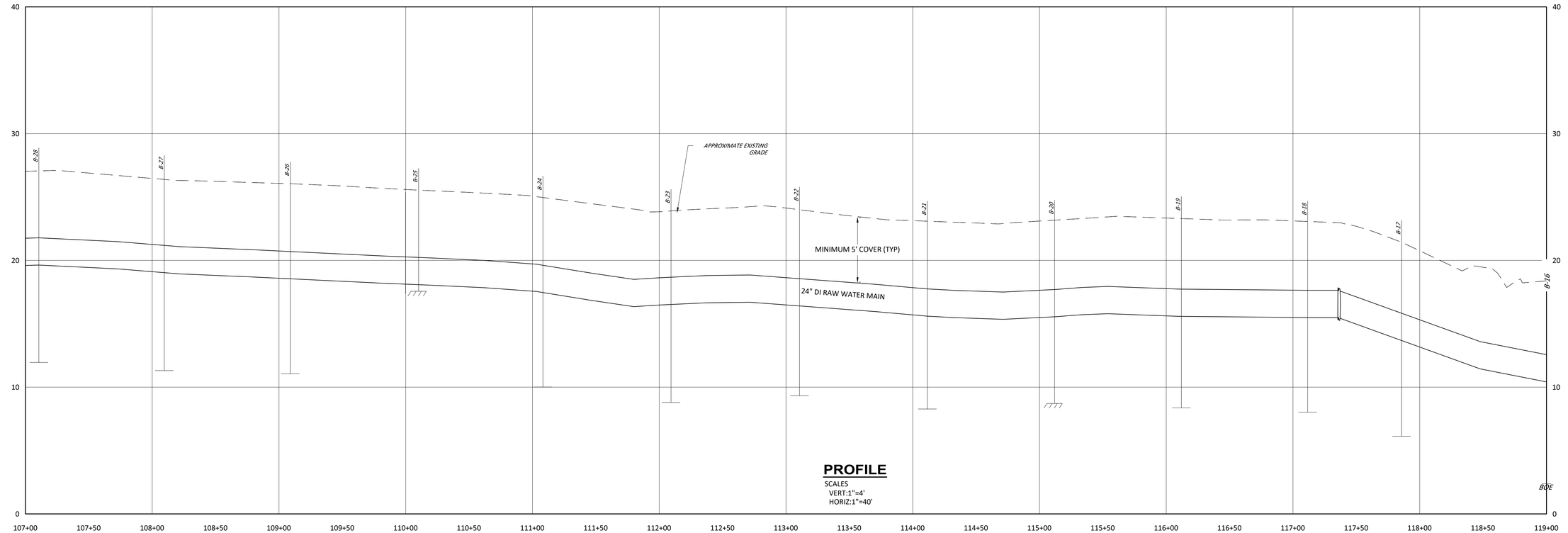

PROFILE
SCALES
VERT:1"=4'
HORIZ:1"=40'

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
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DESIGNED BY: D.LARY
CAD COORD: W:\EDGAR
CAD: W:\EDGAR
CHECKED BY:
DATE:
APPROVED BY:
DATE:
PROJECT NO: 13582B

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CITY OF HAVERHILL
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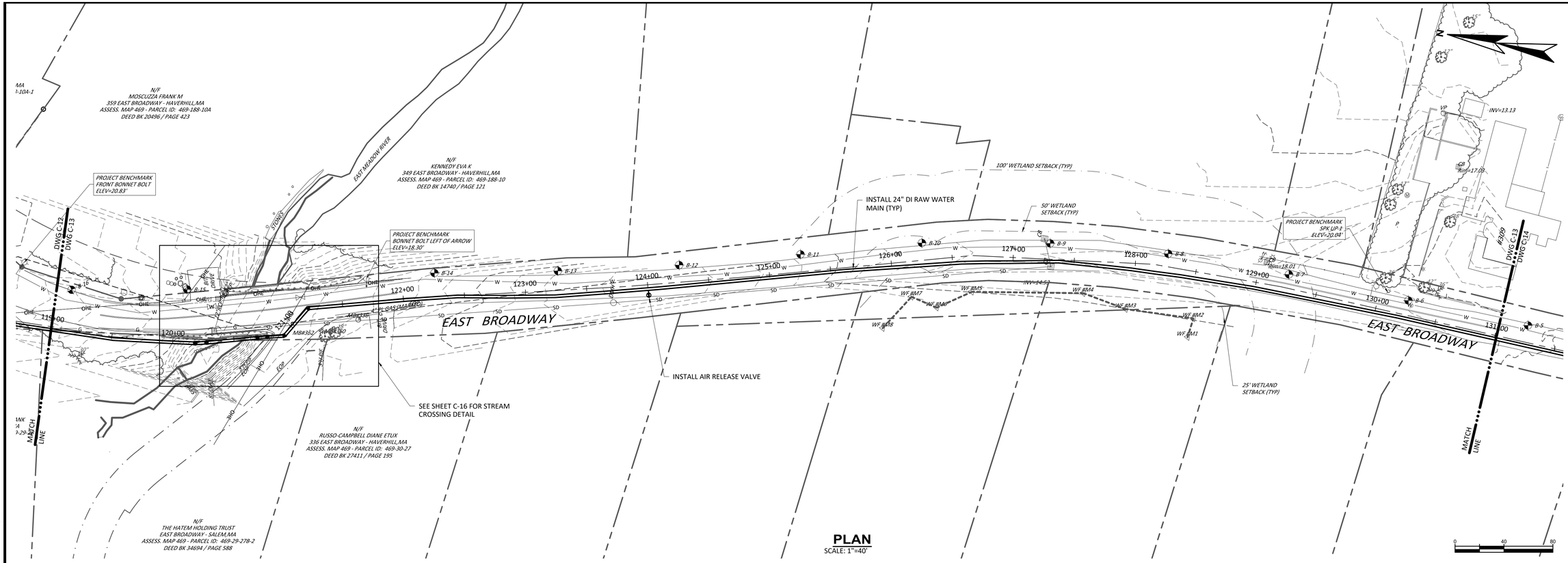
RAW WATER TRANSMISSION MAIN

PLAN & PROFILE X
STA. 107+00 TO STA. 119+00

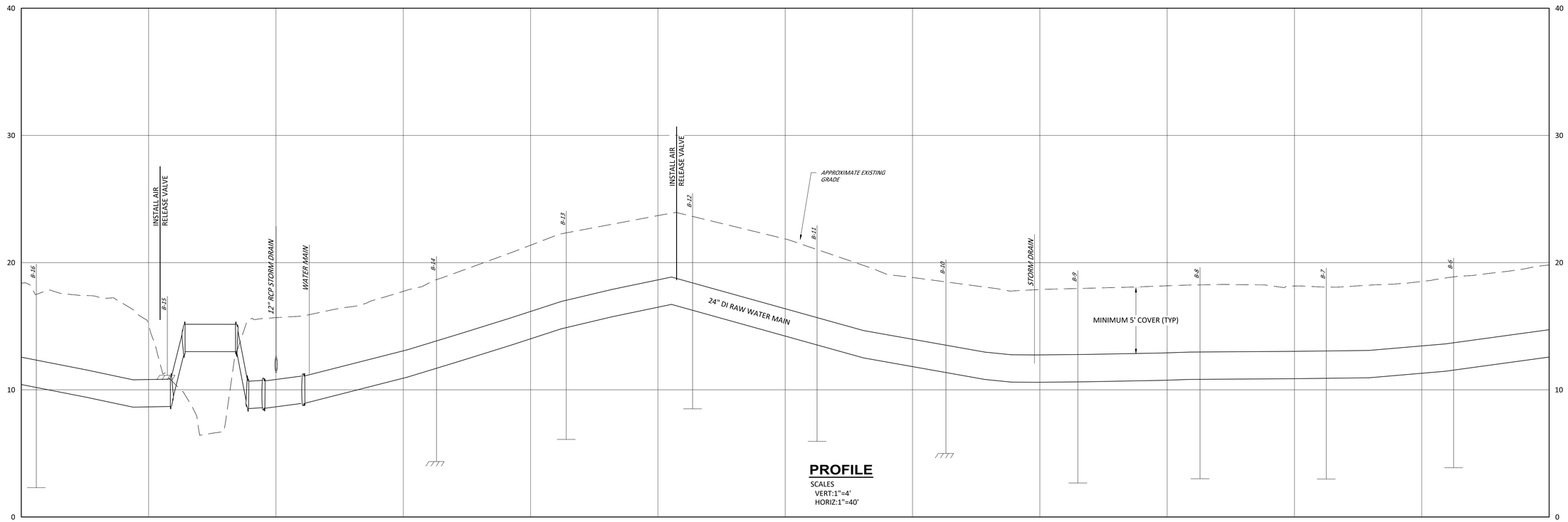
DRAWING
C-12

LAST SAVED BY: WILLIAM.EDGAR 8/23/2022 2:05 PM

J:\ENG\MA\HAVERHILL\13582-MERRIMACKRVRANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIVIL\13582B-P&P11.DWG | Plan & Profile XI | 14.56 | --- | 8/23/2022 2:55:02 PM | WILLIAM.EDGAR



PLAN
SCALE: 1"=40'



PROFILE
SCALES
VERT:1"=4'
HORIZ:1"=40'

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1			
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4			

DESIGNED BY: D.LARY
CAD COORD: W:\EDGAR
CAD: W:\EDGAR
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DATE:
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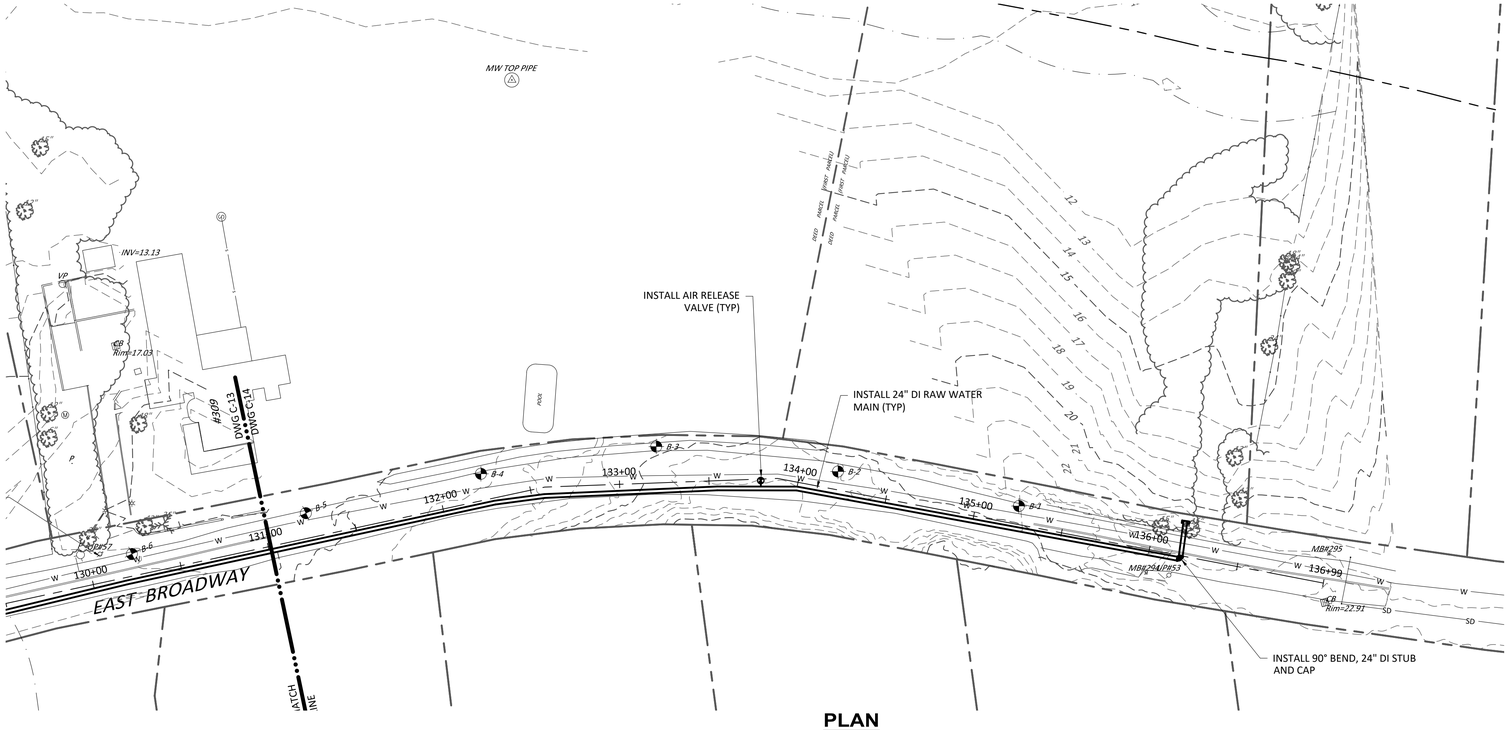
CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

PLAN & PROFILE XI
STA. 119+00 TO STA. 131+00

DRAWING
C-13

LAST SAVED BY: WILLIAM.EDGAR 8/23/2022 11:56 AM

J:\ENG\MA\HAVERHILL\13582-MERRIMACKRIVRANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIV\13582B-P&P12.DWG | Plan & Profile XII | 1:4.56 | ---- | 8/23/2022 2:55:31 PM | WILLIAM.EDGAR



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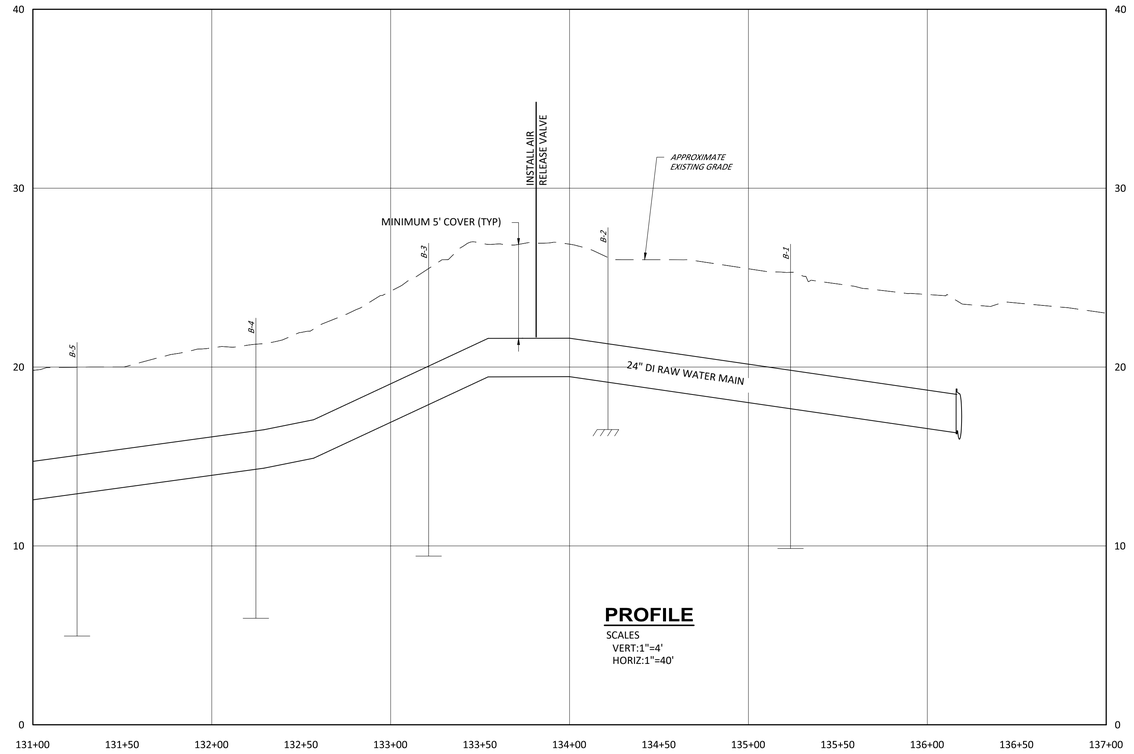
SCALE: 1"=40'



PROFILE
SCALES
VERT:1"=4'
HORIZ:1"=40'

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
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CAD: W.EDGAR
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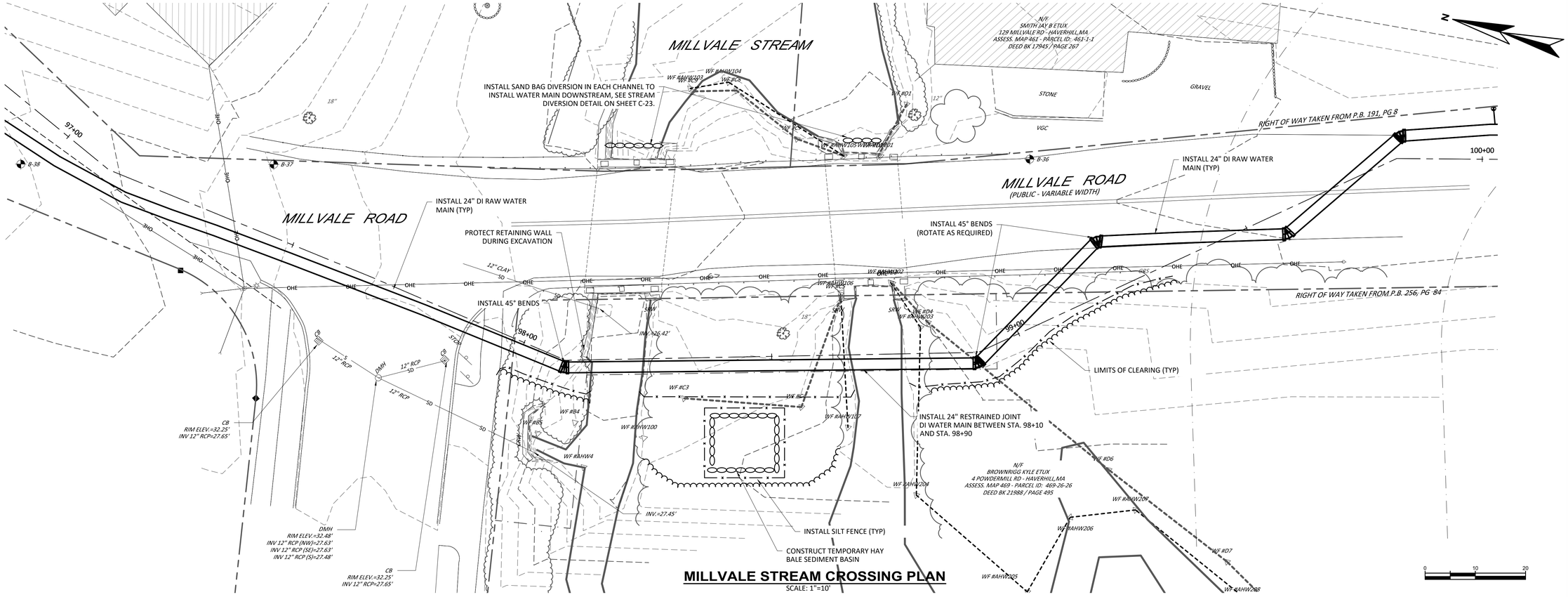
RAW WATER TRANSMISSION MAIN

PLAN & PROFILE XII
STA. 131+00 TO STA. 137+00

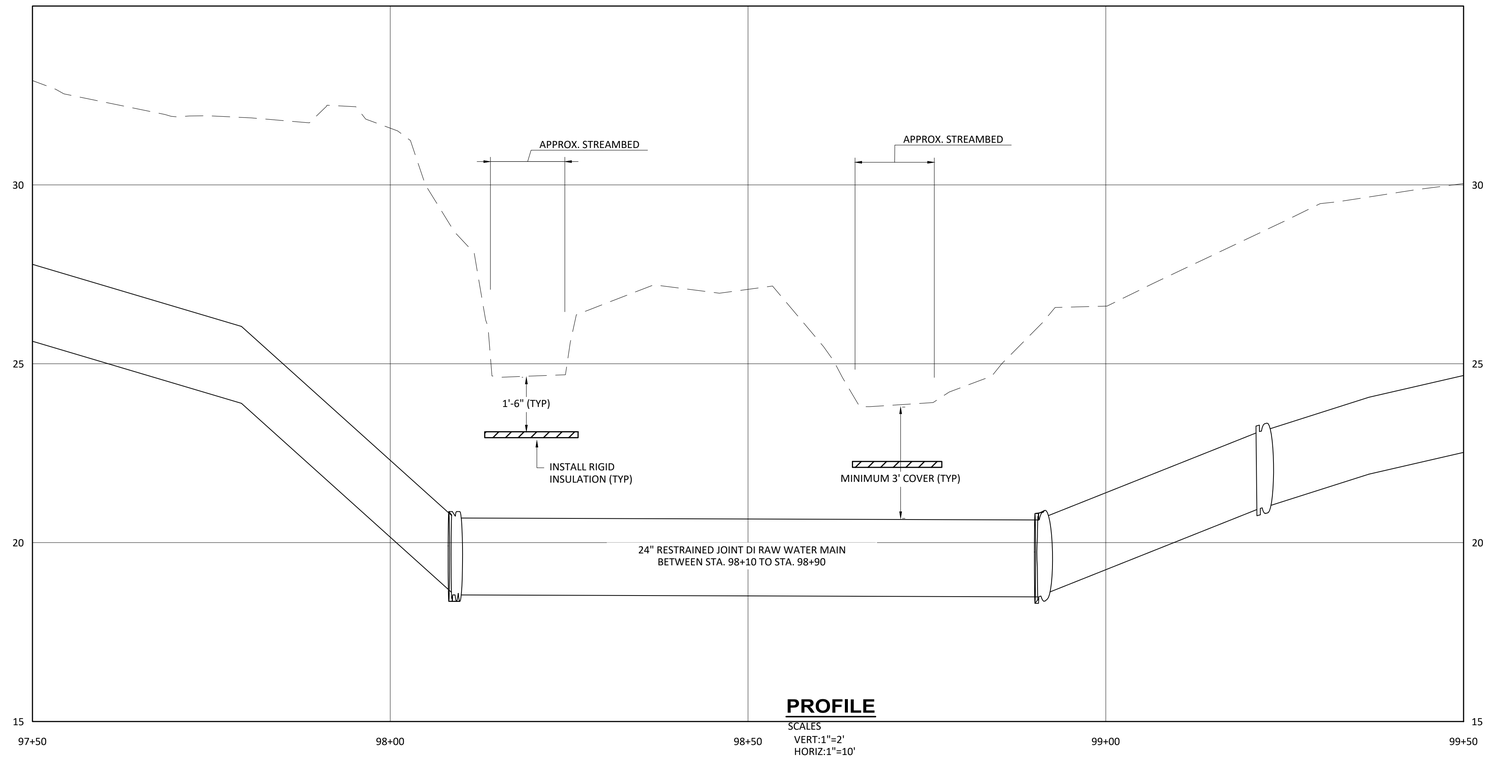
DRAWING
C-14

LAST SAVED BY: WILLIAM.EDGAR 8/23/2022 1:26 PM



MILLVALE STREAM CROSSING PLAN

SCALE: 1"=10'



PROFILE

SCALES
VERT:1"=2'
HORIZ:1"=10'

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1			
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4			

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CAD: W.EDGAR
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CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

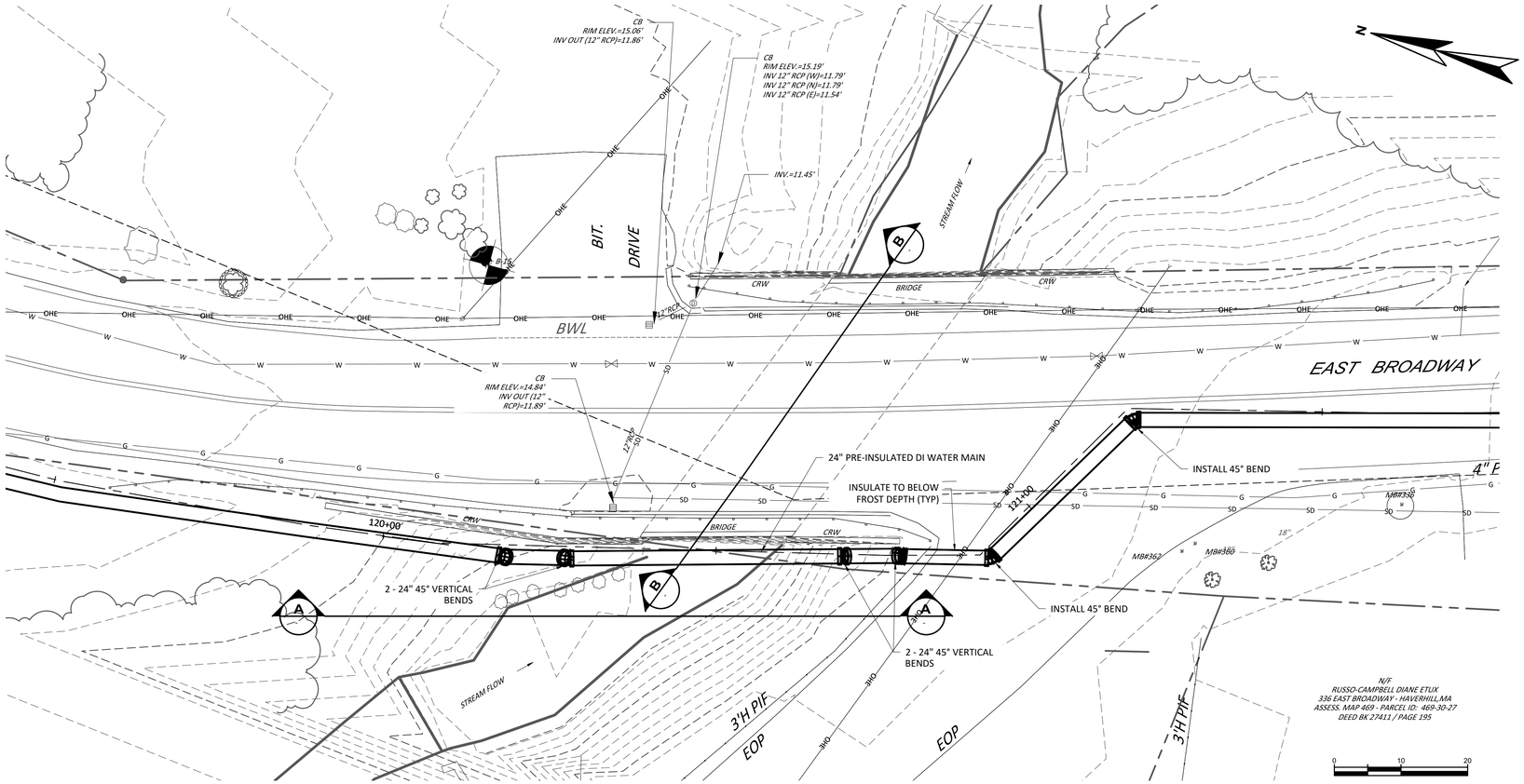
MILLVALE ROAD STREAM CROSSING

DRAWING
C-15

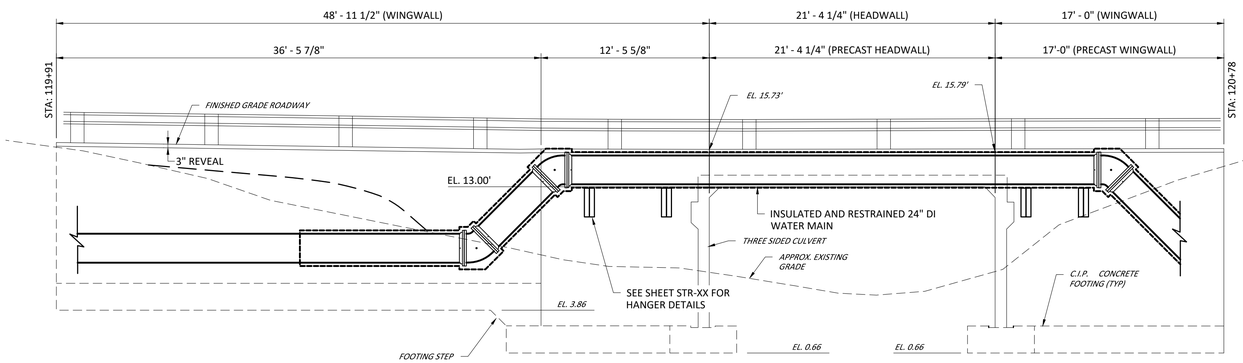
J:\ENGS\MA\HAVERHILL\13582-MERRIMACKVRANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIV\13582B-MILLVALECROSSING.DWG | MillvaleCrossing | 1:10.12364677 | --- | 8/23/2022 2:56:07 PM | WILLIAM.EDGAR

NOTES

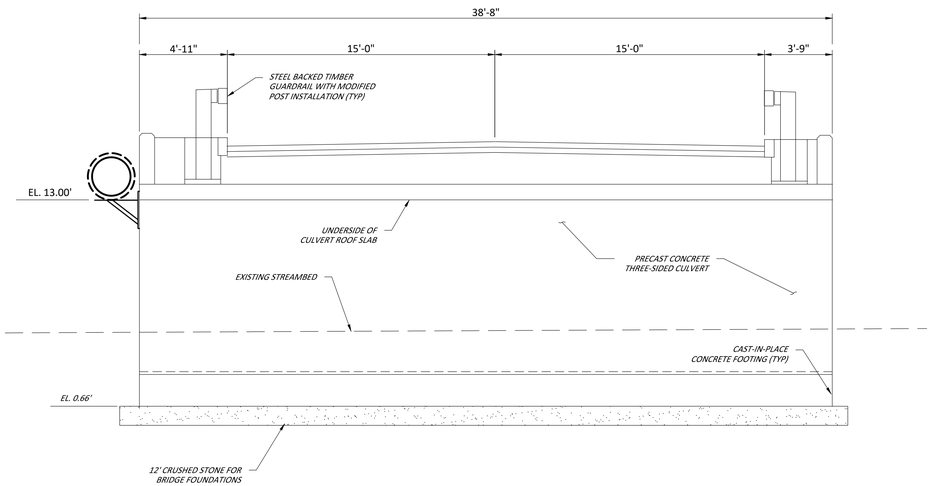
1. EXISTING CULVERT AND BRIDGE INFORMATION SHOWN WAS OBTAINED FROM THE CITY OF HAVERHILL, MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS EAST BROADWAY CULVERT REPLACEMENT CONSTRUCTION PLANS, DATED FEBRUARY 2016, PREPARED BY BETA, INC. OF LINCOLN, RHODE ISLAND.



PLAN
SCALE: 1"=10'



SECTION A-A - WEST ELEVATION
SCALE: 3/16"=1'-0"



SECTION B-B - LONGITUDAL CULVERT SECTION
SCALE: 1/4"=1'-0"

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1			
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3			
4			

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CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

EAST BROADWAY STREAM CROSSING PLAN

DRAWING
C-16

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J:\ENG\MA\HAVERHILL\13582-MERRIMACKRVRANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIV\13582B-BROADWAYCROSSING.DWG | EBroadwayCrossing | 1:10.12364677 | ---- | 8/23/2022 2:56:43 PM | WILLIAM.EDGAR

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J:\ENG\MA\HAVERHILL\13582-MERRIMACKVRANGEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIVIL\13582B-DISCHARGESITEPLAN.DWG | Discharg6SitePlan | 1:10.12364677 | --- | 8/23/2022 2:57:06 PM | WILLIAM.EDGAR

KENOZA STREET

(PUBLIC - SEE NOTE #4)

TEST PIT

22.5° 24" DI BEND

45° 24" DI BEND

24" GATE VALVE

24" TEE

90° 24" DI BEND

PAINTED 10" STEEL

24" WATER MAIN

24" DI RAW WATER MAIN

ADAPT TO EXISTING 24" PIPE

(2) 45° 24" DI BENDS

24" GATE VALVE

22.5° 24" DI BEND

45° 24" DI BEND

24" TEE

ADAPT TO EXISTING 24" PIPE

UP#381/89

12" WATER

SB/DH(FND)FLUSH

APPROXIMATE LOCATION OF RIGHT OF WAY LINE (SEE

50' WETLAND SETBACK (TYP)

25' WETLAND SETBACK (TYP)

100' WETLAND SETBACK (TYP)

APPROXIMATE LOCATION OF RIGHT OF WAY LINE (SEE NOTE 4)

24" DI RAW WATER MAIN

PAINTED 10" STEEL

12" WATER

24" WATER

45+00

47+00

UP#90

UP#88A

BOR 88A

BOR 88

BOR 87

DMH

CB

OHE

W

SD

G

BDR

OLD CEDAR POST (BLAZED)

(BLAZED TREE)

HAGN
KENOZA S
ASSESS. MAP 466
DEED BK

WF #T20

WF #T19

WF #T18

WF #T17

WF #T16

WF #T15

WF #T14

WF #T13

WF #T12

WF #T11

WF #T10

WF #T9

WF #BB23

WF #BB6

WF #BB5

WF #AHW406

WF #AHW405

WF #NO

STONE

RIPRAP

24" CI PIPE

CONCRETE WEIR

STRUCTURE

DWSA TL

INV=110.84

INV=108.94

INV=110.83

INV=110.39

INV=110.13

INV=110.30

PLAN
SCALE: 1"=20'

0 20 40

N

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1			
2			
3			

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CAD: W.EDGAR
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APPROVED BY:
DATE:
PROJECT NO.: 13582B

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CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

TRANSMISSION MAIN DISCHARGE SITE PLAN

DRAWING
C-17

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KENOZA STREET
(PUBLIC - SEE NOTE #4)

12" WATER

APPROXIMATE LOCATION OF RIGHT-OF-WAY/LINE (SEE NOTE 4)

EXIT RIGHT

STOP

NO PARK

PAINTED 10" STEEL

24" TRANSMISSION MAIN

12" WATER

INSTALL 24" DI RAW WATER MAIN (TYP)

25' WETLAND SETBACK (TYP)

100' WETLAND SETBACK (TYP)

50' WETLAND SETBACK (TYP)

N/F
HAGNICOLAS STEVEN
KENOZA ST - HAVERHILL,MA
ASSESS. MAP 466 - PARCEL ID: 466-185-18B-1
DEED BK 19426 / PAGE 366

WF #N1
WF #N2
WF #N3
WF #N4
WF #N5
INV=108.39
INV=108.23
INV=108.30
INV=106.65
INV=106.50
INV=106.21
WF #O1
WF #O2
WF #O3
WF #O4
WF #O5
WF #O6
WF #T1
WF #T2
WF #T3
WF #T4
WF #T5
WF #T6
WF #T7
WF #T9
WF #T10
WF #AHW401
WF #AHW402
WF #AHW403
WF #AHW404
WF #AHW405
WF #S1
WF #S2
WF #S3
WF #S4
WF #S5
WF #S6
WF #S7
WF #R1
WF #R2
WF #R3
WF #R4
WF #R5
WF #R6
WF #R7
WF #R8
WF #R10
WF #R11
B-82
B-83
B-84
B-85
B-76
B-77
B-78
B-79
B-80
47+00
48+00
49+00
50+00
51+00
52+00
53+00
54+00
55+00
56+00
57+00
58+00
THIS SHEET
THIS SHEET
MATCH LINE
MATCH LINE
THIS SHEET C-21
SEE EXCLUT (FND) UP. 2

PLAN
SCALE: 1"=20'

0 20 40

PLAN
SCALE: 1"=20'

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1			
2			
3			
4			

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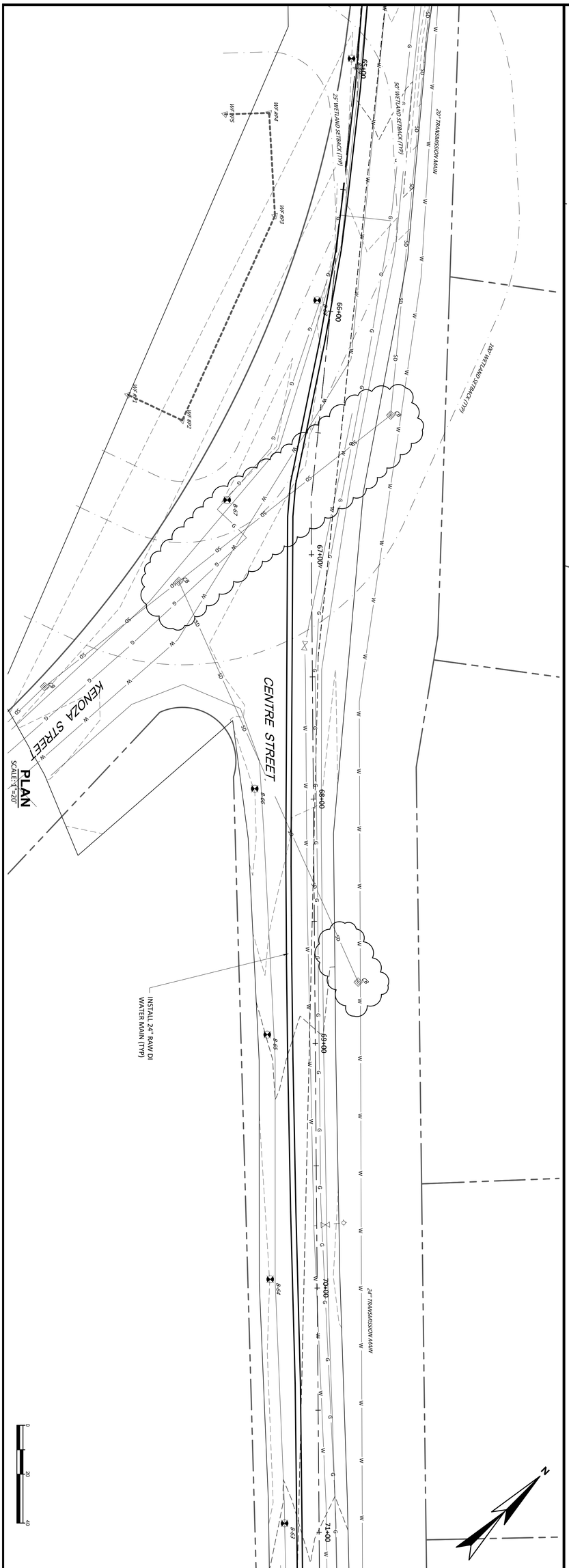
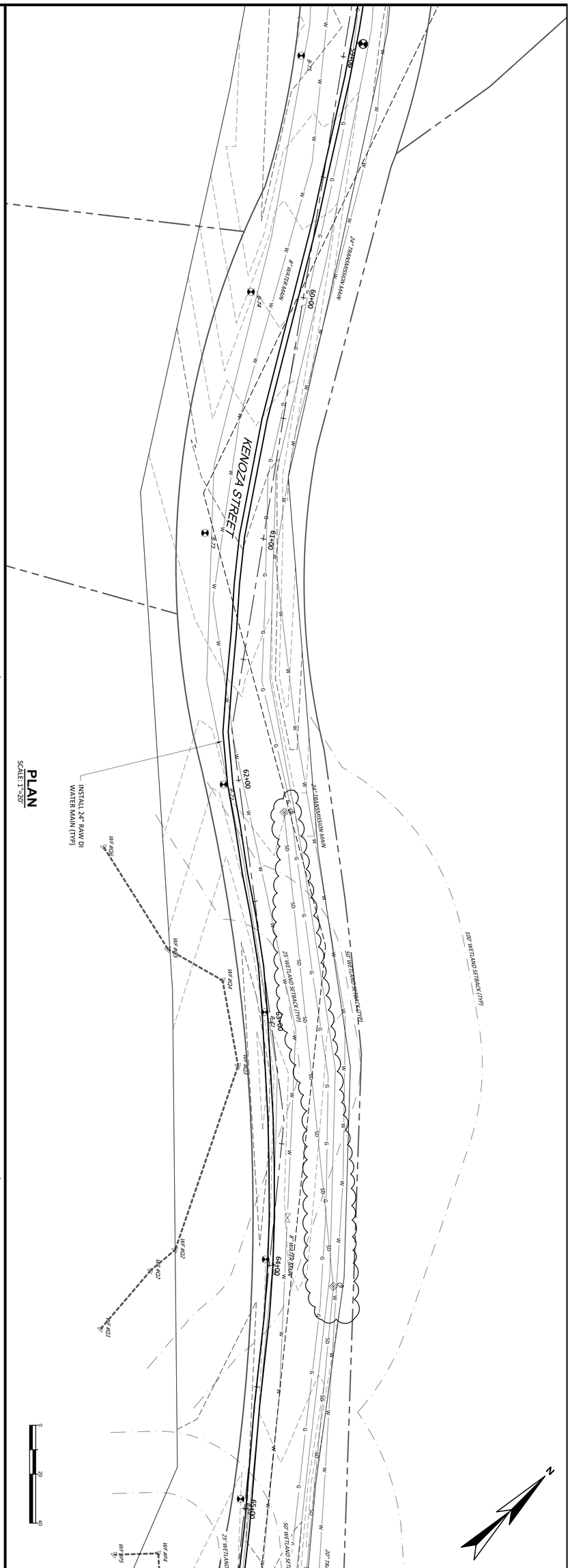
CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

KENOZA STREET TO MILLVALE ROAD DETAIL PLAN SHEET I
STA. 47+00 TO 59+00

DRAWING
C-18

J:\ENG\MA\HAVERHILL\13582-MERRIMACRIVRANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIV\13582B-KEN-MILLVALEPS_1.DWG | Kenoza to Millvale PS | 1:1 | 0.12364677 | --- | 8/23/2022 2:57:39 PM | WILLIAM.EDGAR





CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

KENOZA STREET TO MILLVALE ROAD DETAIL PLAN SHEET II
STA. 59+00 TO STA.+71+00

DRAWING C-19

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NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1			
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PLAN
SCALE: 1"=20'

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1			
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DESIGNED BY: D.LARY
CAD COORD: W.EDGAR
CAD: W.EDGAR
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DATE:
PROJECT NO: 13582B

CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS
RAW WATER TRANSMISSION MAIN

KENOZA STREET TO MILLVALE ROAD DETAIL PLAN SHEET III
STA. 71+00 TO STA. 76+00

DRAWING
C-20

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LAST SAVED BY: WILLIAM.EDGAR 8/23/2022 1:55 PM
J:\ENG\MA\HAVERHILL\13582-MERRIMACRIVRANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIVIL\13582B-KEN-MILLVALEPS_III.DWG | Kenoza to Millvale PS III | 1:10.12356477 | — | 8/23/2022 2:58:37 PM | WILLIAM.EDGAR

LAST SAVED BY: WILLIAM.EDGAR 8/23/2022 2:46 PM

J:\ENG\MA\HAVERHILL\13582-MERRIMACKRVANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIVIL\13582B-EROSIONCNTRLNOTES&DET.DWG | ErosionCntrlNotes&Det | 14.56 | ---- | 8/23/2022 2:58:43 PM | WILLIAM.EDGAR

EROSION AND SEDIMENTATION CONTROL NOTES

THIS PLAN HAS BEEN DEVELOPED AS A STRATEGY TO CONTROL SOIL EROSION AND SEDIMENTATION DURING AND AFTER CONSTRUCTION. THIS PLAN IS BASED ON THE STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION IN URBAN AND SUBURBAN AREAS AS CONTAINED IN THE "MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS", FRANKLIN, HAMPDEN, HAMPSHIRE CONSERVATION DISTRICTS, DATED MARCH, 1997.

THE PROPOSED LOCATIONS OF SILTATION AND EROSION CONTROL STRUCTURES REQUIRED FOR THE PUMP STATION AND WATER METERING STATION ARE SHOWN ON THE GRADING/EROSION CONTROL PLANS. PROVIDE SILT FENCE, STONE CHECK DAMS AND OTHER EROSION CONTROL MEASURES AS REQUIRED TO ADEQUATELY PREVENT SEDIMENT TRANSPORT AS NOTED IN THE BMP.

1. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE DONE IN ACCORDANCE WITH THE "MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS", FRANKLIN, HAMPDEN, HAMPSHIRE CONSERVATION DISTRICTS, DATED MARCH, 1997.
2. THOSE AREAS UNDERGOING ACTUAL CONSTRUCTION WILL BE MAINTAINED IN AN UNTREATED OR UNVEGETATED CONDITION FOR THE MINIMUM TIME REQUIRED. IN GENERAL, AREAS TO BE VEGETATED SHALL BE PERMANENTLY STABILIZED WITHIN 15 DAYS OF FINAL GRADING AND TEMPORARILY STABILIZED WITHIN 30 DAYS OF INITIAL DISTURBANCE OF THE SOIL.
3. SEDIMENT BARRIERS (SILT FENCE, STONE CHECK DAMS, ETC.) SHOULD BE INSTALLED PRIOR TO ANY SOIL DISTURBANCE OF UPGRADIENT DRAINAGE AREAS.
4. INSTALL SILT FENCE AT TOE OF SLOPES TO FILTER SILT FROM RUNOFF. SEE SILT FENCE DETAIL FOR PROPER INSTALLATION. SILT FENCE WILL REMAIN IN PLACE PER NOTE #5.
5. ALL EROSION CONTROL STRUCTURES WILL BE INSPECTED, REPLACED AND/OR REPAIRED EVERY 7 DAYS AND IMMEDIATELY FOLLOWING ANY SIGNIFICANT RAINFALL OR SNOW MELT OR WHEN NO LONGER SERVICEABLE DUE TO SEDIMENT ACCUMULATION OR DECOMPOSURE. SEDIMENT DEPOSITS MUST BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE HALF THE HEIGHT OF THE BARRIER. SEDIMENT CONTROL DEVICES SHALL REMAIN IN PLACE AND BE MAINTAINED BY THE CONTRACTOR UNTIL AREAS UPSLOPE ARE PERMANENTLY STABILIZED.
6. NO SLOPES, EITHER PERMANENT OR TEMPORARY, SHALL BE STEEPER THAN TWO HORIZONTAL TO ONE VERTICAL (2 TO 1) UNLESS STABILIZED WITH PERMANENT EROSION CONTROL MEASURES.
7. IF FINAL SEEDING OF THE DISTURBED AREAS IS NOT TO BE COMPLETED 30 DAYS PRIOR TO THE ANTICIPATED DATE OF THE FIRST KILLING FROST, USE TEMPORARY MULCHING (DORMANT SEEDING MAY BE ATTEMPTED AS WELL) TO PROTECT THE SITE AND DELAY PERMANENT SEEDING, UNTIL UPGRADIENT AREAS ARE STABILIZED.
8. WHEN FEASIBLE, TEMPORARY SEEDING OF DISTURBED AREAS THAT HAVE NOT BEEN FINISH GRADED SHALL BE COMPLETED 30 DAYS PRIOR TO THE FIRST KILLING FROST.
9. DURING THE CONSTRUCTION PHASE, INTERCEPTED SEDIMENT WILL BE RETURNED TO THE SITE AND REGRADED ONTO OPEN AREAS. POST SEEDING SEDIMENT, IF ANY, WILL BE DISPOSED OF IN AN ACCEPTABLE MANNER.
10. REVEGETATION MEASURES WILL COMMENCE UPON COMPLETION OF CONSTRUCTION EXCEPT AS NOTED ABOVE. ALL DISTURBED AREAS NOT OTHERWISE STABILIZED WILL BE GRADED, SMOOTHED, AND REVEGETATED AS FOLLOWS:
    - A. A MINIMUM OF FOUR (4) INCHES OF LOAM WILL BE SPREAD OVER DISTURBED AREAS AND SMOOTHED TO A UNIFORM SURFACE.
    - B. APPLY LIMESTONE AND FERTILIZER ACCORDING TO SOIL TEST. IF SOIL TESTING IS NOT DEEMED FEASIBLE ON SMALL OR VARIABLE SITES, OR WHERE TIMING IS CRITICAL, FERTILIZER MAY BE APPLIED AT THE RATE OF 800 POUNDS PER ACRE OR 18.4 POUNDS PER 1,000 SQUARE FEET USING 10-20-20 (N-P205-K20) OR EQUIVALENT. APPLY GROUND LIMESTONE (EQUIVALENT TO 50% CALCIUM PLUS MAGNESIUM OXIDE) AT A RATE OF 3 TONS PER ACRE (138 LB PER 1,000 SQ. FT.).
    - C. FOLLOWING SEED BED PREPARATION, DITCHES AND BACK SLOPES WILL BE SEEDED WITH A MIXTURE OF 47% CREEPING RED FESCUE, 5% REDTOP, AND 48% TALL FESCUE. THE LAWN AREAS WILL BE SEEDED WITH A PREMIUM TURF MIXTURE OF 44% KENTUCKY BLUEGRASS, 44% CREEPING RED FESCUE, AND 12% PERENNIAL RYE GRASS: SEEDING RATE IS 3.0 LBS PER 1000 SQ. FT. LAWN QUALITY SOD MAY BE SUBSTITUTED FOR SEED.
    - D. HAY MULCH AT THE RATE OF 70-90 LBS PER 1000 SQUARE FEET OR A HYDRO-APPLICATION OF CELLULOSE FIBER SHALL BE APPLIED FOLLOWING SEEDING. A SUITABLE BINDER WILL BE USED ON HAY MULCH FOR WIND CONTROL.
11. ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED ONCE THE WORK AREA IS STABILIZED.
12. WETLANDS (EXCEPTING THOSE WHICH ARE TO BE FILLED IN ACCORDANCE WITH STATE AND FEDERAL REGULATIONS) WILL BE PROTECTED WITH SILT FENCE INSTALLED AT THE EDGE OF THE WETLAND OR THE BOUNDARY OF WETLAND DISTURBANCE.
13. IN GENERAL, AREAS WITHIN 100 FEET OF DELINEATED WETLANDS OR STREAMS SHALL HAVE A MAXIMUM PERIOD OF EXPOSURE OF NOT MORE THAN 15 DAYS.
14. FOLLOW APPROPRIATE EROSION CONTROL MEASURES PRIOR TO EACH STORM IN ALL AREAS WITHIN 100 FEET OF DELINEATED WETLANDS OR STREAMS.

EROSION CONTROL DURING WINTER CONSTRUCTION

1. WINTER CONSTRUCTION PERIOD DEFINED: NOVEMBER 1 THROUGH APRIL 15
2. WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE SITE IS WITHOUT STABILIZATION AT ANY ONE TIME.
3. EXPOSED AREA SHOULD BE LIMITED TO THAT THAT CAN BE MULCHED IN ONE DAY PRIOR TO ANY PRECIPITATION EVENT.
4. AN AREA SHALL BE CONSIDERED TO HAVE BEEN STABILIZED WHEN EXPOSED SURFACES HAVE BEEN EITHER MULCHED WITH STRAW OR HAY AT A RATE OF 100 LB. PER 1,000 SQUARE FEET (WITH OR WITHOUT SEEDING) OR DORMANT SEEDED, MULCHED AND ADEQUATELY ANCHORED BY AN APPROVED ANCHORING TECHNIQUE. IN ALL CASES, MULCH SHALL BE APPLIED SUCH THAT SOIL SURFACE IS NOT VISIBLE THROUGH THE MULCH.
5. BETWEEN THE DATES OF OCTOBER 15 AND APRIL 1ST, LOAM OR SEED WILL NOT BE REQUIRED. DURING PERIODS OF ABOVE-FREEZING TEMPERATURES, THE SLOPES SHALL BE FINE GRADED AND EITHER PROTECTED WITH MULCH OR TEMPORARILY SEEDED AND MULCHED UNTIL SUCH TIME AS THE FINAL TREATMENT CAN BE APPLIED. IF THE DATE IS AFTER NOVEMBER 1ST AND IF THE EXPOSED AREA HAS BEEN LOAMED, FINAL GRADED AND IS SMOOTH, THEN THE AREA MAY BE DORMANT SEEDED AT A RATE 200 - 300% HIGHER THAN SPECIFIED FOR PERMANENT SEED AND THEN MULCHED. IF CONSTRUCTION CONTINUES DURING FREEZING WEATHER, ALL EXPOSED AREAS SHALL BE GRADED BEFORE FREEZING AND THE SURFACE TEMPORARILY PROTECTED FROM EROSION BY THE APPLICATION OF MULCH. SLOPES SHALL NOT BE LEFT EXPOSED OVER THE WINTER OR ANY OTHER EXTENDED TIME OF WORK SUSPENSION UNLESS TREATED IN THE ABOVE MANNER. UNTIL SUCH TIME AS WEATHER CONDITIONS ALLOW DITCHES TO BE FINISHED WITH THE PERMANENT SURFACE TREATMENT, EROSION SHALL BE CONTROLLED BY THE INSTALLATION OF BALES OF HAY OR STONE CHECK DAMS IN ACCORDANCE WITH THE STANDARD DETAILS.
6. A) BETWEEN THE DATES OF NOVEMBER 1ST AND APRIL 15TH ALL MULCH SHALL BE EITHER WOOD CELLULOSE FIBER OR BE ANCHORED WITH MULCH NETTING OR CHEMICAL TACK.
    - B) MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL DRAINAGE WAYS WITH A SLOPE GREATER THAN 3%, FOR SLOPES EXPOSED TO DIRECT WINDS AND FOR ALL OTHER SLOPES GREATER THAN 8%.
    - C) MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL AREAS WITH SLOPES GREATER THAN 15%. AFTER OCTOBER 1ST, THE SAME APPLIES FOR ALL SLOPES GREATER THAN 8%.
7. AFTER NOVEMBER 1ST THE CONTRACTOR SHALL APPLY DORMANT SEEDING OR MULCH AND ANCHORING ON ALL BARE EARTH AT THE END OF EACH WORKING DAY.
8. DURING WINTER CONSTRUCTION PERIODS ALL SNOW SHALL BE REMOVED FROM AREAS OF SEEDING AND MULCHING PRIOR TO PLACEMENT.

MULCH ANCHORING

ANCHOR MULCH WITH: MULCH NETTING (AS PER MANUFACTURER); ASPHALT EMULSION (0.05 GALLONS PER SQ. YD.); CHEMICAL TACK (AS PER MANUFACTURER'S SPECIFICATIONS); OR BE WOOD CELLULOSE FIBER (2000 LBS/ACRE). WETTING FOR SMALL AREAS AND ROAD DITCHES MAY BE PERMITTED.

ADDITIONAL TEMPORARY SEED MIXTURE (OR PERIODS LESS THAN 12 MONTHS)

DATES	SEED	RATE
4/1/02 - 7/1/02 8/15/02 - 9/15/02	OATS	80 LBS/ACRE
4/1/02 - 6/1/02 (8/15/02 - 9/15/02)	ANNUAL RYE GRASS	40 LBS/ACRE
(8/15/02 - 10/15/02)	WINTER RYE	120 LBS/ACRE
(11/1/02 - 4/1/03)	MULCH W/ DORMANT SEED	80 LBS/ACRE*
(5/1/02 - 6/30/01)	FOXTAIL MILLET	30 LBS/ACRE

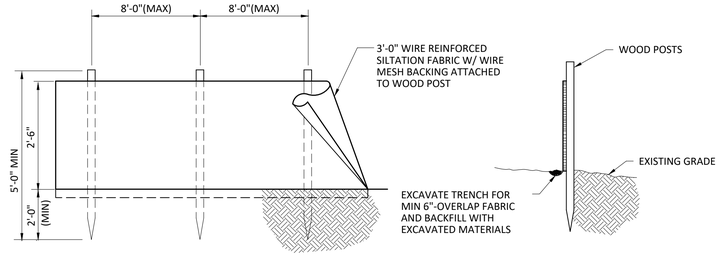
*SEED RATE ONLY

MULCH AND MULCH ANCHORING

MULCH

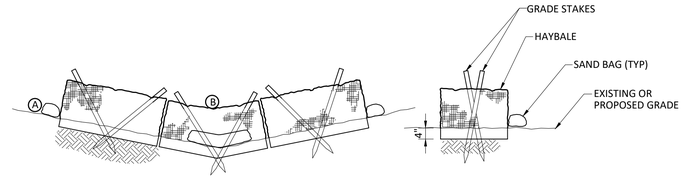
LOCATION	MULCH	RATE (1000 S.F.)
PROTECTED AREA	STRAW OR HAY *	100 POUNDS
WINDY AREAS	STRAW OR HAY (ANCHORED) *	100 POUNDS
MODERATE TO HIGH VELOCITY AREAS OR STEEP SLOPES (GREATER THAN 3:1)	JUTE MESH, EXCELSIOR MAT OR EQUIV.	AS REQUIRED AS REQUIRED

* A HYDRO-APPLICATION OF CELLULOSE FIBER MAY BE APPLIED FOLLOWING SEEDING. A SUITABLE BINDER SHALL BE USED ON HAY MULCH FOR WIND CONTROL.



SILT FENCE INSTALLATION DETAIL

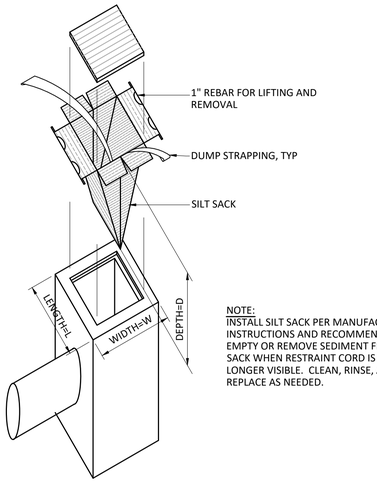
SCALE: "NTS"



EROSION CHECK TO BE BALES OF HAY SECURED TO THE GROUND WITH TWO 4' LONG GRADE STAKES FOR EACH BALE. SAND BAG AS REQUIRED, PLACE SUFFICIENT BALES TO ESTABLISH ELEVATIONS AT A AT LEAST 6 INCHES ABOVE OVERFLOW AT B

HAY BALE CHECK DAM

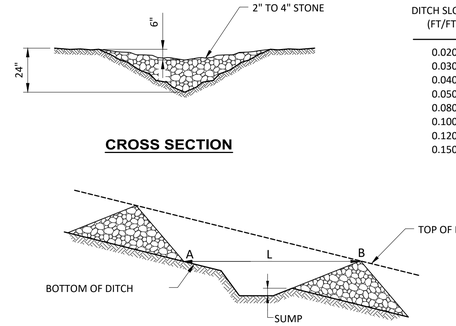
SCALE: "NTS"



NOTE:
INSTALL SILT SACK PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. EMPTY OR REMOVE SEDIMENT FROM SILT SACK WHEN RESTRAINT CORD IS NO LONGER VISIBLE. CLEAN, RINSE, AND REPLACE AS NEEDED.

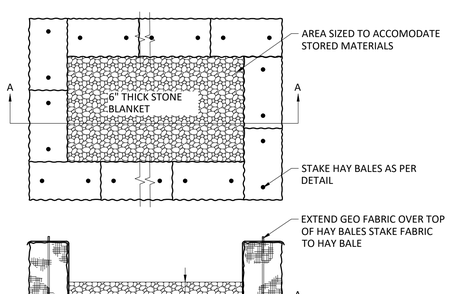
SILT SACK CATCH BASIN INLET

SCALE: NTS



CROSS SECTION

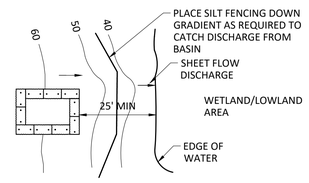
DITCH SLOPE (FT/FT)	L (FT)
0.020	100
0.030	66
0.040	50
0.050	40
0.080	25
0.100	20
0.120	17
0.150	13



PROFILE

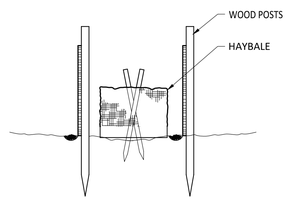
STONE CHECK DAM DETAIL

SCALE: "NTS"



TEMPORARY HAY BALE SEDIMENT BASIN

SCALE: "NTS"



COMBINATION SILT FENCE AND HAY BALE BARRIER

SCALE: "NTS"

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1			
2			
3			
4			

D.LARY
DESIGNED BY: W.EDGAR
CAD COORD: W.EDGAR
CAD: W.EDGAR
CHECKED BY:
DATE:
APPROVED BY:
DATE:
PROJECT NO: 13582B

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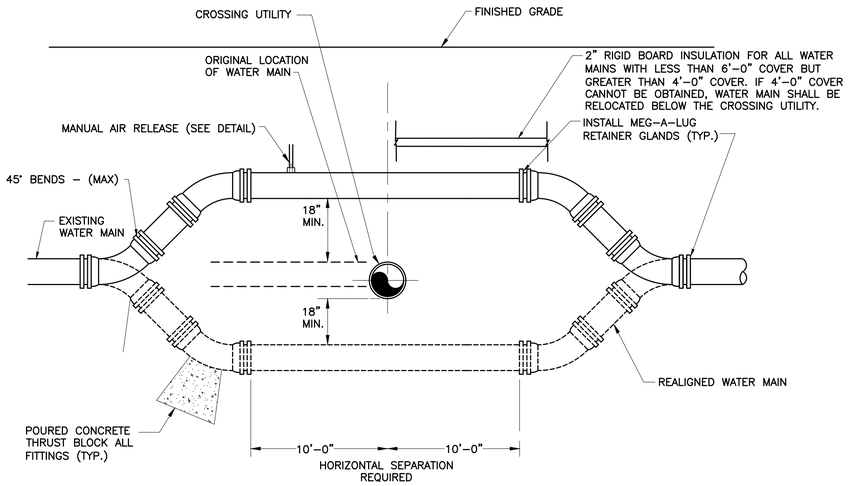
RAW WATER TRANSMISSION MAIN

EROSION CONTROL NOTES & DETAILS

DRAWING
C-21

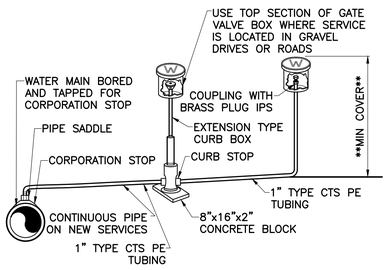
LAST SAVED BY: WILLIAM.EDGAR 8/9/2022 2:49 PM
J:\ENG\MA\HAVERHILL\13582-MERRIMACK\RANGLEWELLTESTING\13582B-RAWWATERMAIN\DRAWINGS\CIV\13582B-DETAILS.DWG | 8/23/2022 2:58:47 PM | WILLIAM.EDGAR | ---- | 1:4.56 | Details I



WATER MAIN RELOCATION
NTS

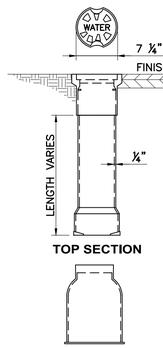
NOTES:

1. ALL FITTINGS AND JOINTS IN LOWERING AREA TO BE RESTRAINED.
2. WHEN IT IS IMPOSSIBLE TO OBTAIN HORIZONTAL OR VERTICAL SEPARATION AS INDICATED IN THE DETAIL ABOVE, BOTH THE WATER AND THE SEWER SHOULD BE ENCASED IN CONTROLED DENSITY FILL FOR A DISTANCE OF 10 FEET ON EITHER SIDE OF THE CROSSING.
3. ALL DUCTILE IRON PIPE AND FITTINGS SHALL BE WRAPPED WITH POLYETHYLENE ENCASEMENT WHEN CONTACTING POURED CONCRETE PRODUCTS



**MINIMUM DEPTH OF COVER AS REQUIRED BY OWNER

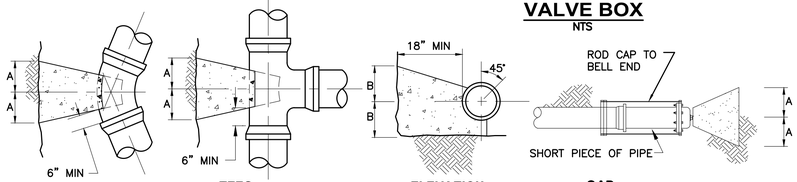
MANUAL AIR RELEASE ASSEMBLY
NTS



TOP SECTION

BOTTOM SECTION

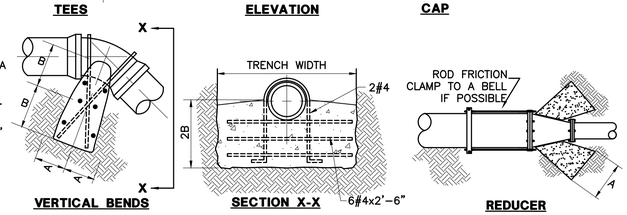
VALVE BOX
NTS



ALL BENDS | TEES | ELEVATION | CAP

NOTES

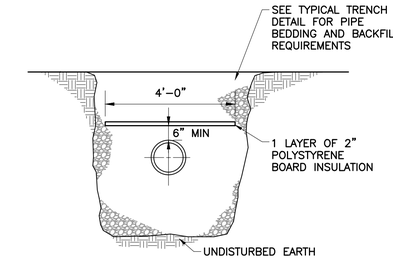
1. THRUST BLOCK SIZES SHOWN ARE BASED ON A SOIL BEARING CAPACITY OF 2000 PSF AND TEST PRESSURES OF 180 PSI.
2. ALL BENDS, TEES, WYES, HYDS. & DEAD ENDS SHALL BE BRACED WITH CONCRETE THRUST BLOCKS.
3. RODDING MAY BE REQUIRED



VERTICAL BENDS | SECTION X-X | REDUCER

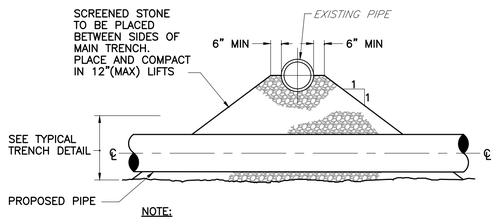
PIPE SIZE	90° BEND		45° BEND		22 1/2° BEND		11 1/4° BEND		TEE		VERTICAL BEND (DOWN)		PLUG		REDUCER	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
4"	15"	12"	12"	9"	9"	6"	6"	6"	12"	12"	24"	21"	12"	12"	12"	12"
6"	15"	12"	12"	9"	9"	6"	6"	6"	12"	12"	24"	21"	12"	12"	12"	12"
8"	20"	15"	14"	12"	9"	9"	9"	6"	18"	12"	33"	24"	14"	14"	18"	12"
10"	21"	21"	18"	15"	15"	9"	9"	9"	20"	18"	40"	27"	16"	16"	20"	18"
12"	27"	24"	23"	15"	15"	12"	12"	9"	25"	18"	48"	30"	18"	18"	25"	18"
16"	37"	30"	30"	21"	21"	15"	13"	12"	32"	24"	57"	36"	22"	22"	32"	24"

THRUST BLOCKS
NTS



NOTE:
TRENCH PIPE INSULATION TO BE USED WHERE DEPTH OF COVER IS LESS THAN 6 FEET OR AS DIRECTED BY THE ENGINEER

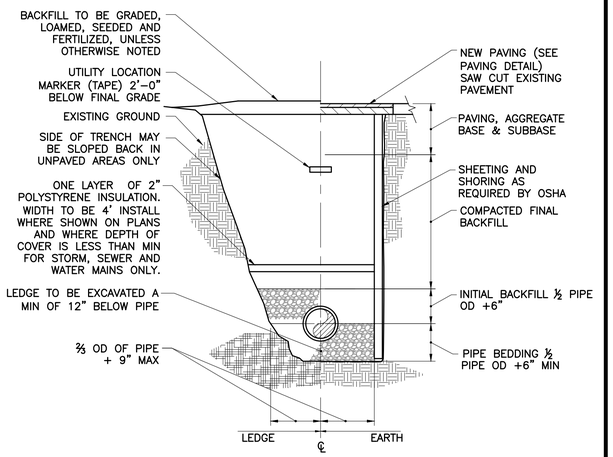
TRENCH PIPE INSULATION
NTS



NOTE:

1. JOINTS SHALL BE A MINIMUM 10' EITHER SIDE OF CROSSING.

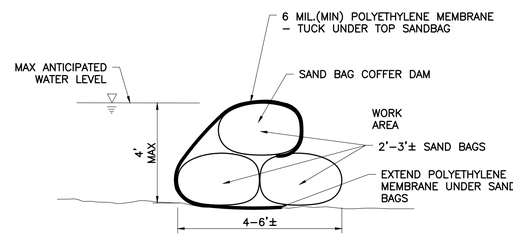
PIPE CROSSING
NTS



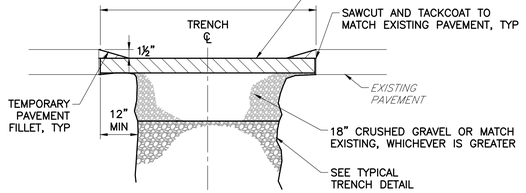
NOTES:

1. ALL EXCAVATION MUST MEET OSHA STANDARDS.
2. SEE SPECIFICATIONS FOR BEDDING AND BACKFILL REQUIREMENTS.

PIPE TRENCH
NTS



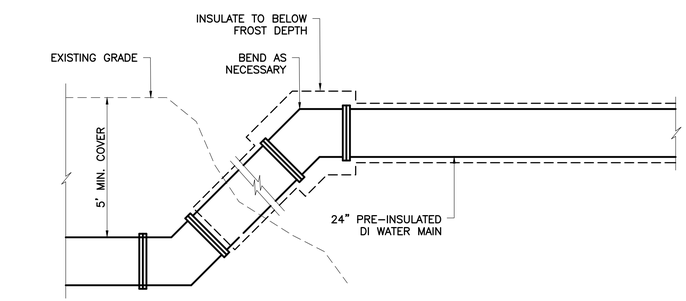
SAND BAG COFFER DAM
SCALE: NTS



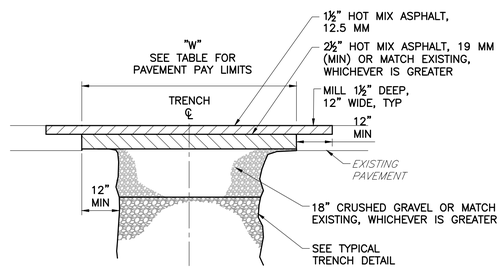
PAVEMENT PAY LIMITS	
PIPE I.D.	"W" (FOR 0' – 10' DEEP)
6" – 15"	7'–0"
16" – 21"	8'–0"

"W" SHALL BE INCREASED BY 1'–0" FOR TRENCHES 10' – 15', AND BY 2'–0" FOR TRENCHES 15' – 20' DEEP.

INITIAL TRENCH PAVING
SCALE: NTS



EAST BROADWAY BRIDGE - INSULATED WATER MAIN DETAIL
SCALE: NTS



FINAL TRENCH PAVING
SCALE: NTS

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DETAILS I

DRAWING
C–22