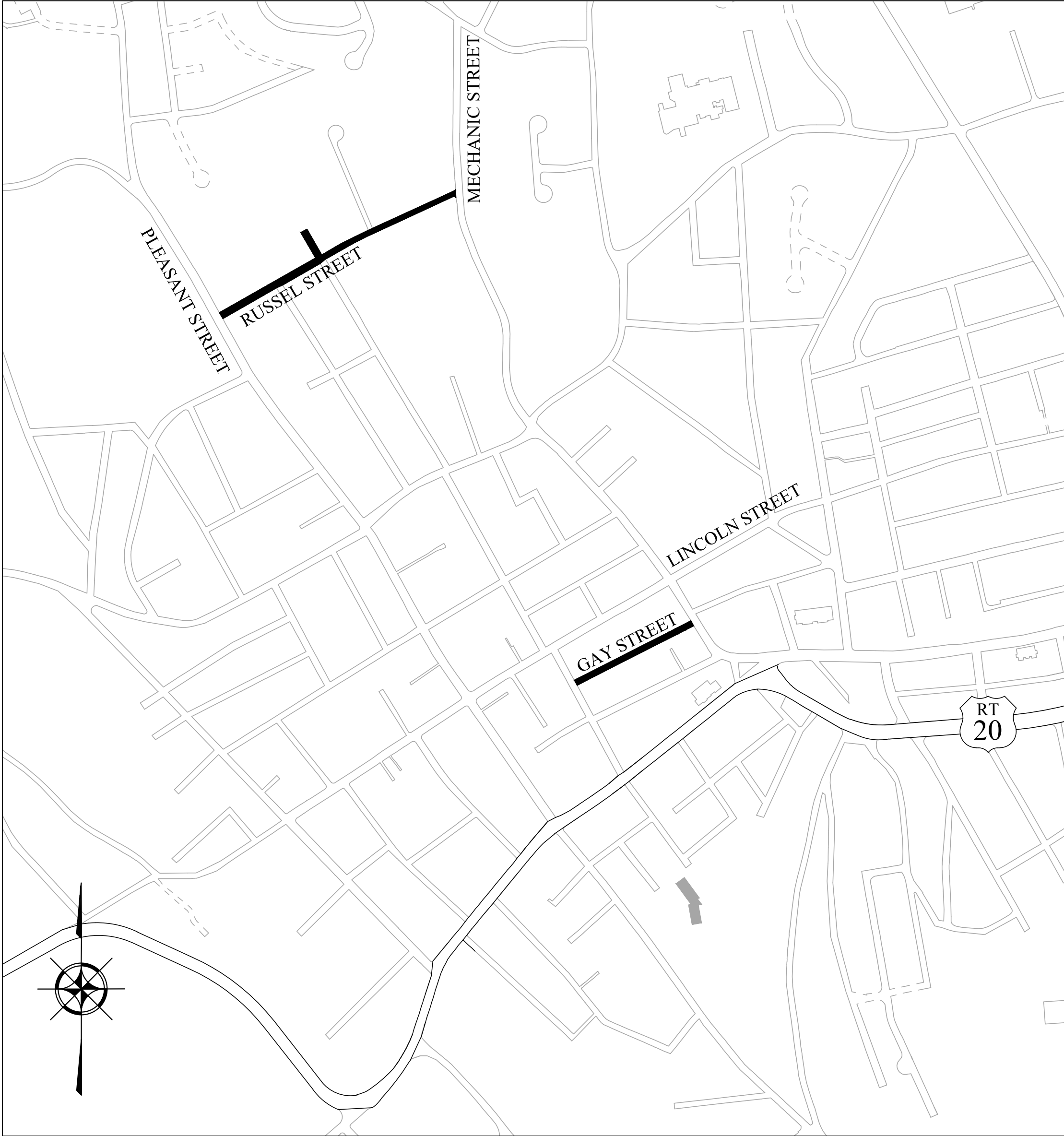


RECONSTRUCTION OF VARIOUS STREETS AND APPURTENANT WORK

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LOCUS
1"=250'



CONTRACT NO. ED 2023-11
MAY 25, 2023

PREPARED BY: City of Marlborough
Department of Public Works
Engineering Division
135 Neil Street
Marlborough, MA 01752

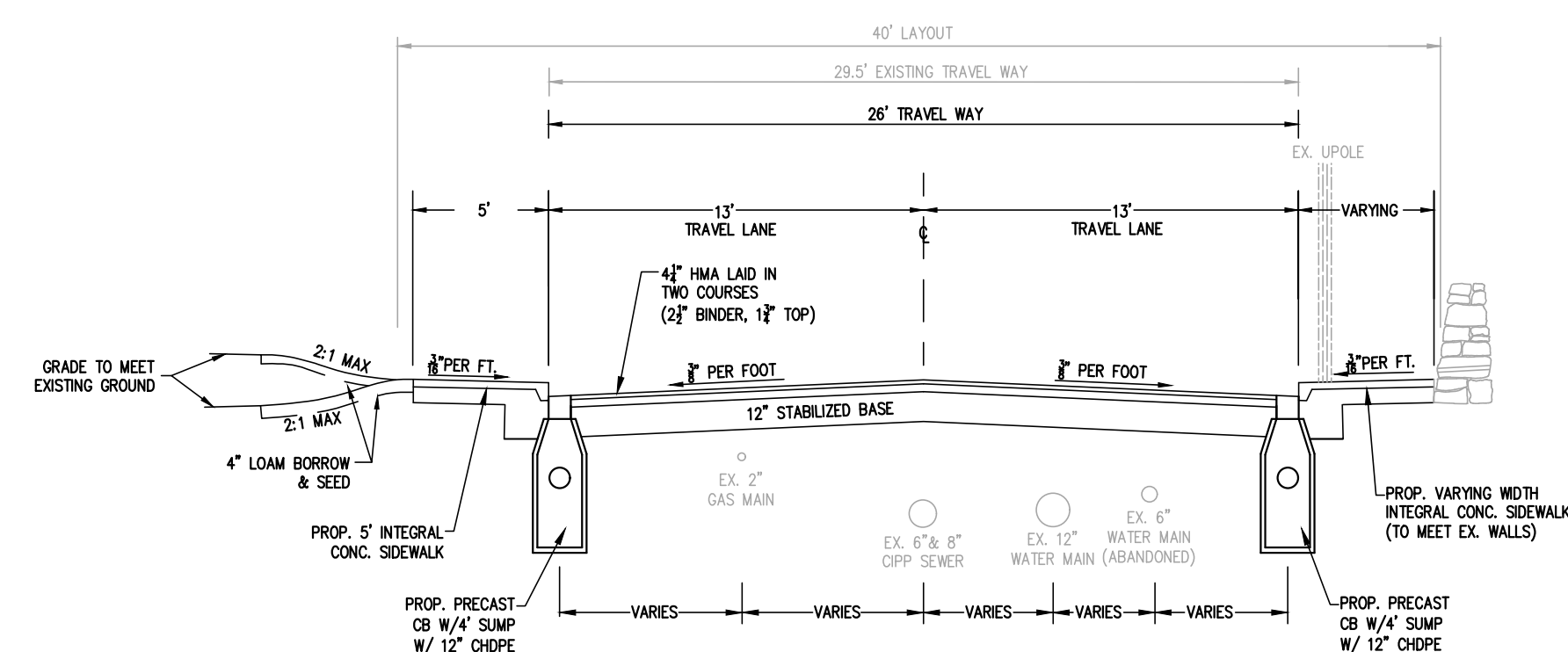
UNLESS OTHERWISE PROVIDED FOR IN THE PROJECT SPECIFICATIONS, THE FOLLOWING DOCUMENTS SHALL GOVERN THE CONSTRUCTION ON THIS PROJECT:

- THE 2023 MHD STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES....AS AMENDED
- THE 2006 PROJECT DEVELOPMENT & DESIGN GUIDE.....AS AMENDED
- THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS HIGHWAY DIVISION AND ANY AMENDMENTS THERETO
- THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1)

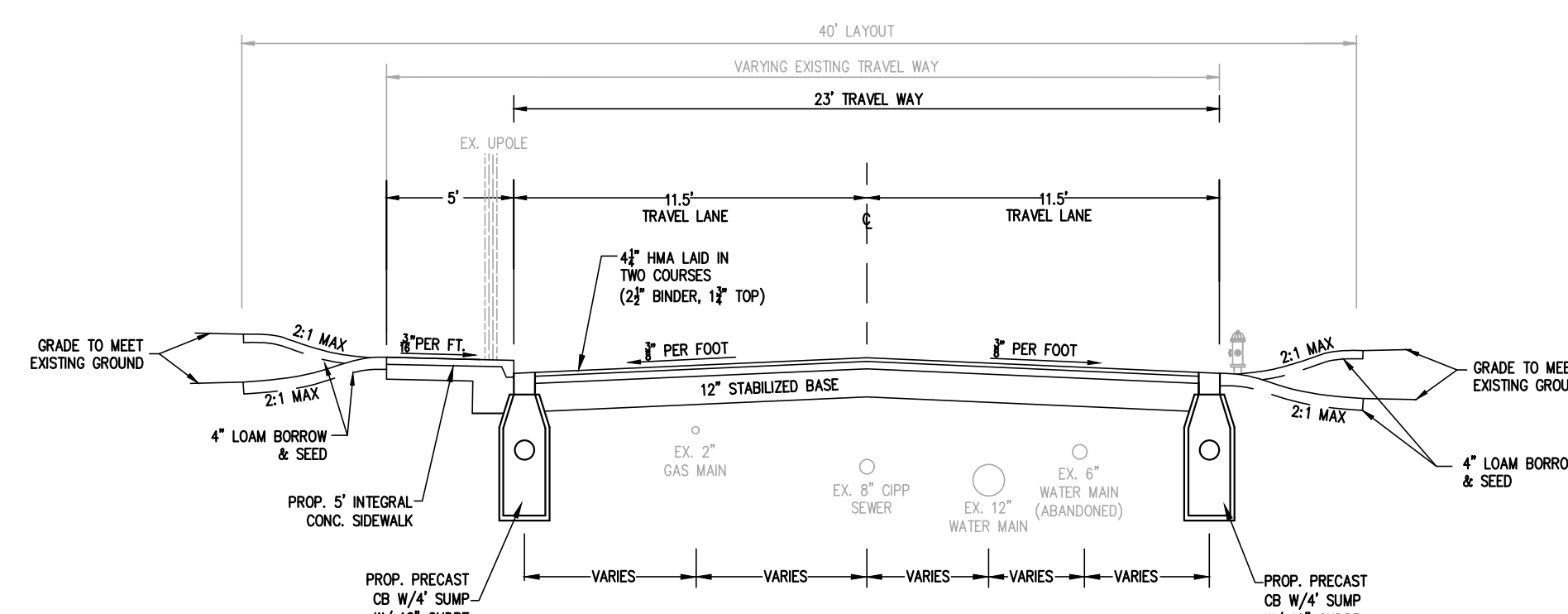


DEPARTMENT
PUBLIC
WORKS

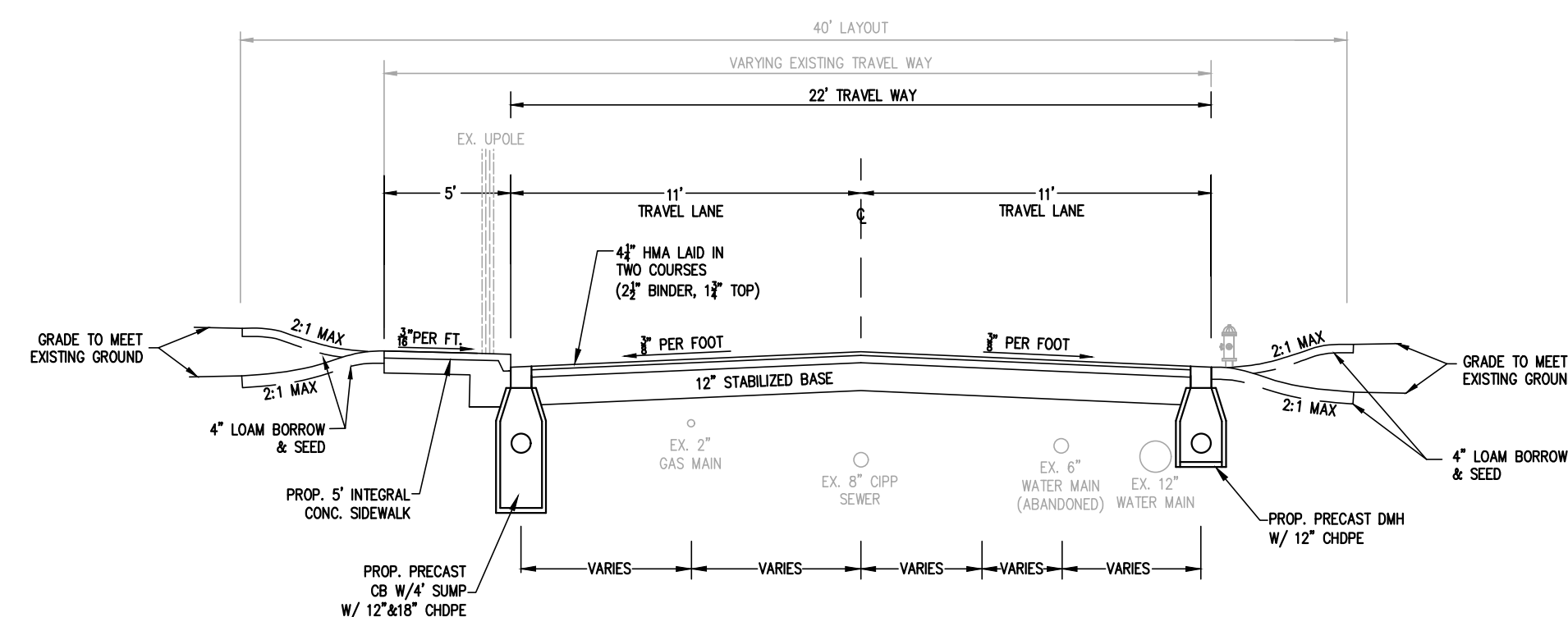
RUSSELL STREET
STA 0+00 TO STA. 6+82
N.T.S



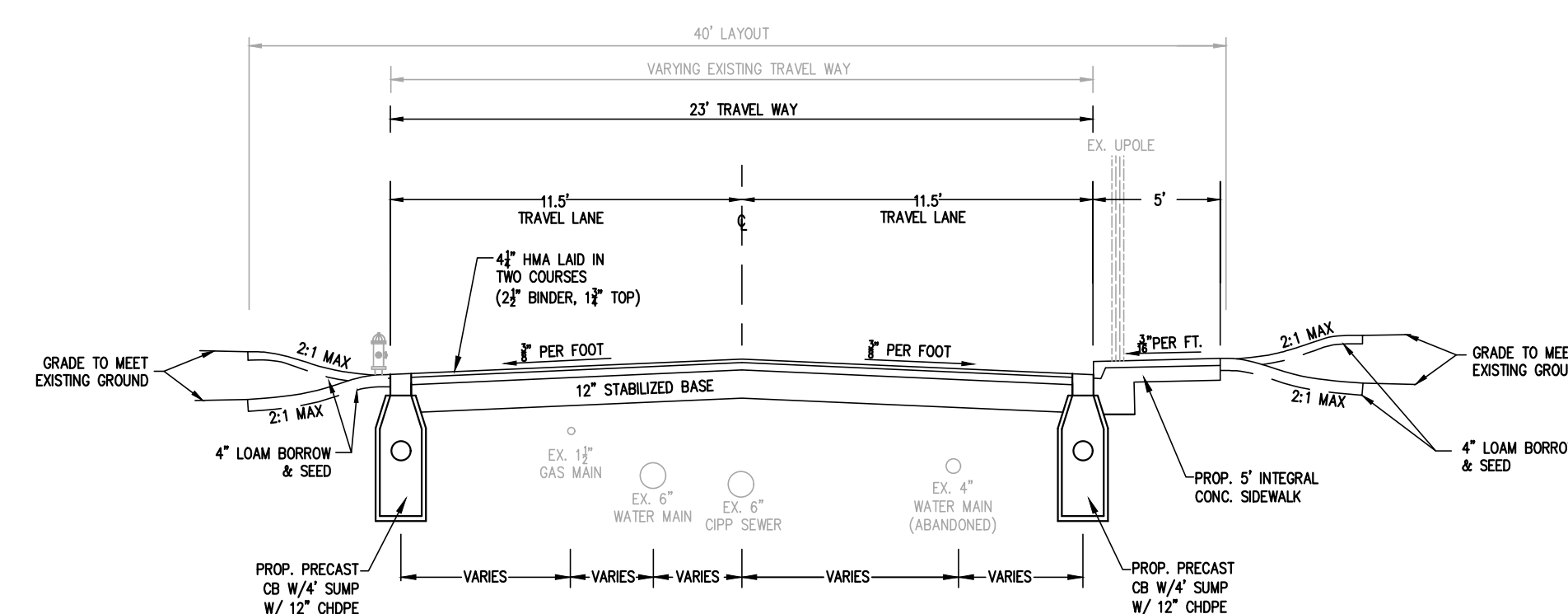
RUSSELL STREET
STA. 6+82 TO STA. 10+26
N.T.S



RUSSELL STREET
STA. 10+26 TO STA. 15+14
N.T.S



MAPLEWOOD AVE
STA 0+00 TO STA. 1+73
N.T.S

[illegible]

Drawn By: RM Designed By: RM Checked By: MD Approved By: TD

Project Title:

RECONSTRUCTION
VARIOUS STREETS &
APPURTENANT WORK

Sheet Title:

TYPICAL SECTIONS

Contract No:
ED-2023-11

Date: 5-25-2023

Scale: N.T.S.

Sheet No. _____

—

THE FOLLOWING DESCRIBES MATERIALS AND METHODS AS THEY PERTAIN TO ROAD OPENING WORK. ALL WORK SHALL CONFORM TO THE 1988 STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, AND ALL SUBSEQUENT SUPPLEMENTAL SPECIFICATIONS THERETO.

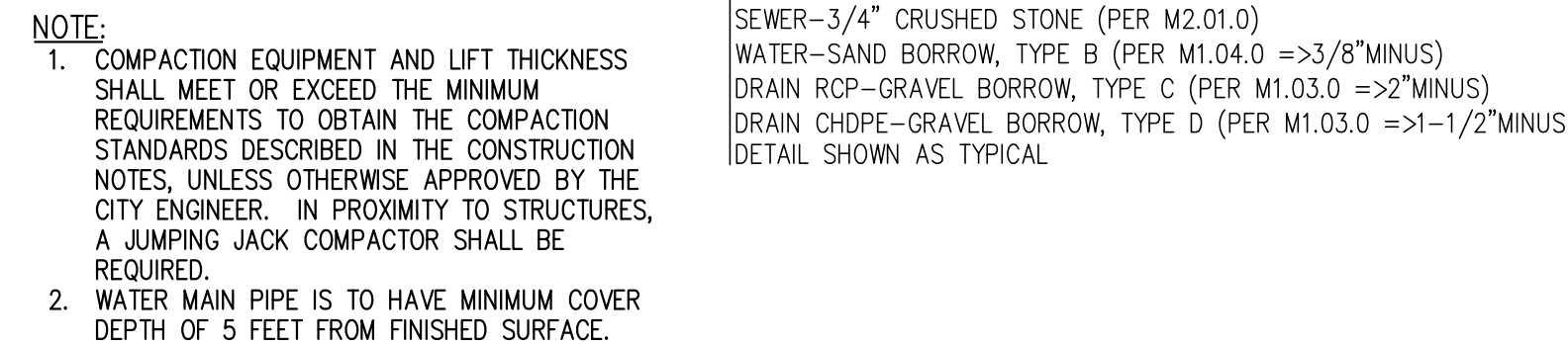
EXCAVATIONS IN THE STREET PAVEMENT AREAS SHALL BE CAREFULLY BACKFILLED WITH LAYERS OF SUITABLE GRAVEL. THE TWELVE (12) INCHES OF BEDDING MATERIAL AROUND PIPES SHALL BE SAND (M1.04.0) FOR WATER, 3" CRUSHED STONE (M2.01.0) FOR SEWER, GRAVEL BORROW - TYPE C (M1.03.0) FOR RCP DRAIN & TYPE D (M1.03.0) FOR HDPE DRAIN OR AS SPECIFIED BY THE OWNER OF THE UTILITY AND APPROVED BY THE CITY OF MARLBOROUGH.

BACKFILL MATERIAL SHALL CONSIST OF CONTROLLED DENSITY FILL (CDF) - TYPE I OR TYPE II (M4.08.0) FOR ALL MAJOR ROADWAYS OF THE CITY OR AS DIRECTED BY THE COMMISSIONER OF PUBLIC WORKS. WHERE REQUIRED, CDF SHALL BE PLACED TO WITHIN A MINIMUM OF 5" FROM THE TOP OF THE EXISTING PAVEMENT OR AS DIRECTED BY THE CITY'S INSPECTOR. CDF SHALL BE TYPE I VERY FLOWABLE (EXCAVATABLE) OR TYPE II FLOWABLE (EXCAVATABLE) WITH A MAXIMUM STRENGTH OF 200 PSI AND 25-30% AIR. CDF (TYPE I AND II) SHALL BE EXCAVATABLE USING SIMPLE HAND TOOLS WHERE REQUIRED.

BACKFILL SHALL BE UNIFORMLY DISTRIBUTED IN SUCCESSIVE LAYERS, EACH LAYER BEING THOROUGHLY COMPACTED BEFORE THE SUCCEEDING LAYER IS PLACED. THE ENTIRE WIDTH OF THE TRENCH SHALL BACKFILLED AND MECHANICALLY TAMPED IN LIFT DEPTHS NOT GREATER THAN (6) INCHES. COMPACTION EQUIPMENT AND LIFT THICKNESS SHALL MEET OR EXCEED THE MINIMUM REQUIREMENTS TO OBTAIN THE COMPACTION STANDARDS UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER. THE TOP LAYER OF BACKFILL SHALL BE FOURTEEN (14) INCHES OF GRAVEL COMPACTED TO 97% OF MAXIMUM DENSITY.

THE FINAL HOT MIX ASPHALT SURFACE SHALL NOT BE PLACED ANY EARLIER THAN 65 DAYS OR NO LATER THAN 90 DAYS FROM THE DATE OF COMPLETION OF THE TEMPORARY SURFACE WITHOUT APPROVAL FROM THE COMMISSIONER OF PUBLIC WORKS. THE TEMPORARY PAVEMENT SHALL BE MILLED TO A DEPTH OF ONE AND ONE-HALF (1 1/2) INCHES, TWELVE (12) INCHES OUTSIDE OF THE TEMPORARY PAVING LIMITS. PAVEMENT LIMITS JOINTS ARE TO BE SEALED WITH HOT APPLIED HMA CRACK SEALER, PER M3.05.4. IN SOME INSTANCES, FOR PROJECTS BEYOND A SIMPLE TRENCH EXCAVATION ADDITIONAL PAVEMENT DETAILS AND RESURFACING REQUIREMENTS MAY BE INCLUDED AS A SPECIAL CONDITION IN THE PERMIT.

ALL EXCAVATIONS MUST BE PROPERLY SLOPED, SHORED, OR SHIELDED UNLESS THEY ARE MADE ENTIRELY IN STABLE ROCK, OR LESS THAN (5) FEET DEEP AND DECLARED SAFE AFTER AN INSPECTION BY A COMPETENT PERSON.



NOTE:

1. THE CITY RESERVES THE RIGHT NOT TO ALLOW THE USE OF STEEL PLATES TO SECURE TRENCHES AT ANY TIME THROUGHOUT CONSTRUCTION.
2. PLACE 48"x48" ORANGE AND BLACK CONSTRUCTION SIGN, STATING "STEEL PLATES 100 FT." TO PROVIDE DRIVERS WITH ADVANCED NOTICE. SEE TRAFFIC MANAGEMENT PLAN FOR PLACEMENT OF SIGNAGE.
3. NOT MORE THAN (1) STEEL PLATE SHALL BE USED AT ANY TIME AND CAN NOT BE USED ON EXCAVATIONS GREATER THAN 7- FEET WIDE.
4. STEEL PLATE DIMENSIONS AND THICKNESS SHALL BE DESIGNED BY THE CONTRACTOR. STEEL PLATE THICKNESS SHALL BE DESIGNED TO ALLOW DEFLECTION OF NOT MORE THAN 0.25".
5. PROVIDE WOOD WEDGES UNDER PLATE EDGES AT UNEVEN SURFACES TO MINIMIZE MOVEMENT.

NOTE:
1. COMPACTION EQUIPMENT AND LIFT THICKNESS SHALL MEET OR EXCEED THE MINIMUM REQUIREMENTS TO OBTAIN THE COMPACTION STANDARDS DESCRIBED IN THE CONSTRUCTION NOTES, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER. IN PROXIMITY TO STRUCTURES, A JUMPING JACK COMPACTOR SHALL BE REQUIRED.

1 1/2" PAVEMENT MILLING

JOINTS TO BE SEALED WITH HOT APPLIED HMA CRACK SEALER, PER M3.05.4 (SEE ALSO FEDERAL SPECIFICATION SS-S-1041)(TYP.)

12" MIN. (TYP.)

TACK COAT (ASPHALT EMULSION)

1 1/2" HOT MIX ASPHALT - TOP (PER M3.11.04 - 3/8" TYP.)

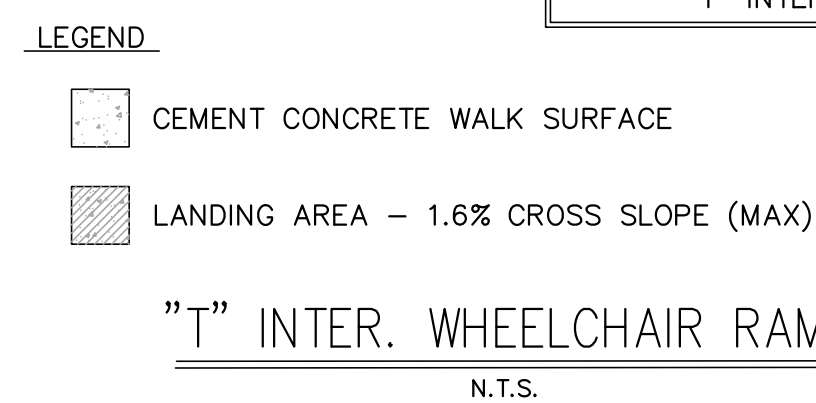
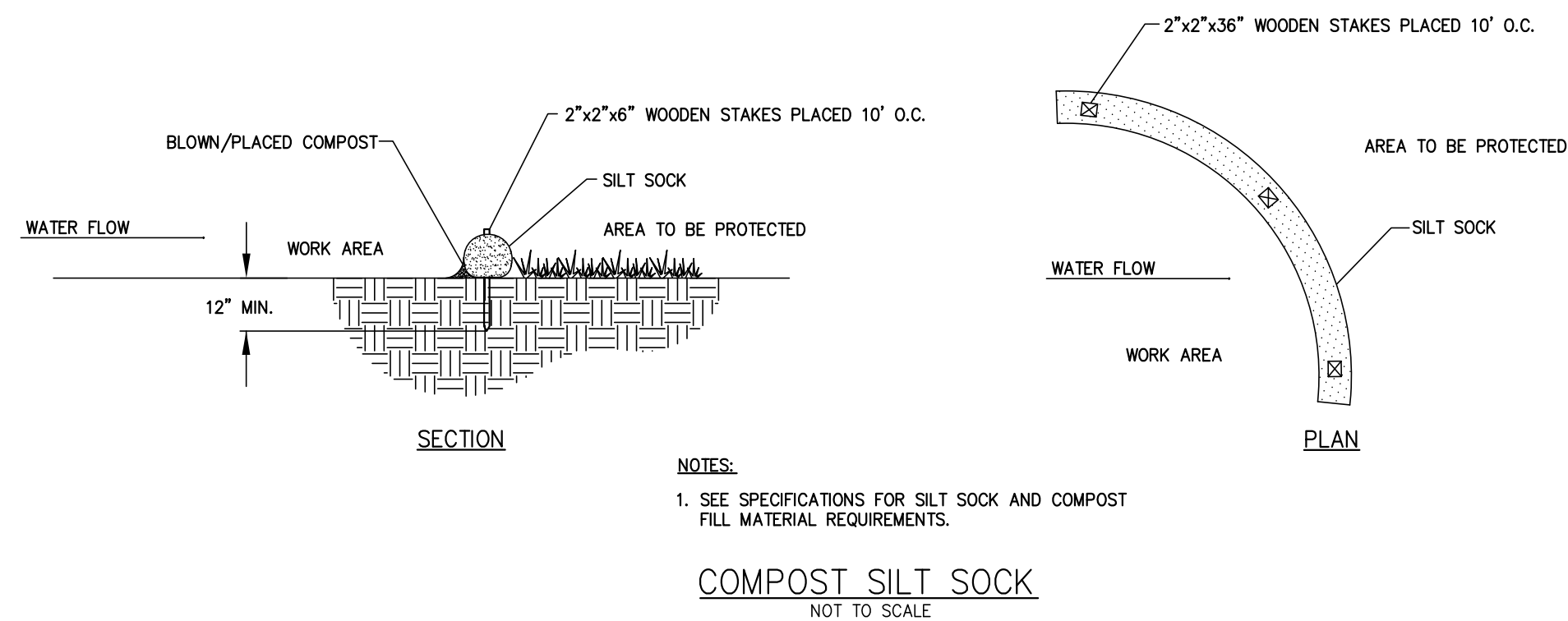
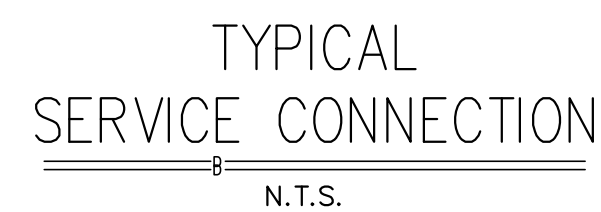
LIMITS OF EXISTING TEMP. TRENCH PAVING

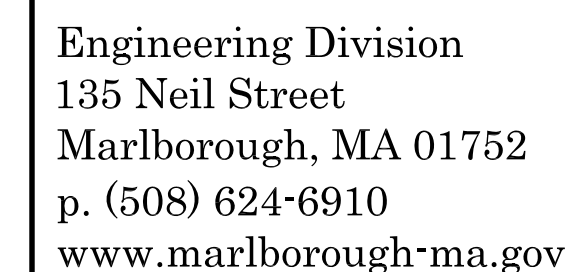
TRENCH WIDTH

Diagram illustrating the cross-section of a trench repair structure, showing the layers and dimensions:

- JOINTS TO BE SEALED WITH HOT APPLIED HMA CRACK SEALER, PER M3.05.4 (SEE ALSO FEDERAL SPECIFICATION SS-S-1041)(TYP.)**
- 2 1/2" HOT MIX ASPHALT (PER M3.11.03-BINDER COURSE)**
- ORIGINAL TRENCH LIMIT**
- 1 1/2" HOT MIX ASPHALT - TOP (PER M3.11.04 - 3/8" TYP.)**
- SAWCUT (TYP.)**
- CONTROL DENSITY FILL (CDF)**
- MIN. 12" (TYP.)**
- VARIES**
- CONTROLLED DENSITY FILL (PER M4.08.0, TYPE 1E OR 2E)**
- WARNING RIBBON IS TO BE PLACED IN OPEN TRENCH 2' ABOVE PIPE, RUN CONTINUOUSLY ABOVE AND ALONG THE CENTERLINE OF PIPE, WITH WORDING FACING UP**
- 12"**
- 12"**
- 12"**
- MATERIAL AROUND PIPE VARIES WITH TYPE OF UTILITY INSTALLATION:**
 - SEWER-3/4" CRUSHED STONE (PER M2.01.0)
 - WATER-SAND BORROW, TYPE B (PER M1.04.0 =>3/8"MINUS)
 - DRAIN RCP-GRAVEL BORROW, TYPE C (PER M1.03.0 =>2"MINUS)
 - DRAIN CHDPE-GRAVEL BORROW, TYPE D (PER M1.03.0 =>1-1/2"MINUS)
- DETAIL SHOWN AS TYPICAL**

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Project Title:

RECONSTRUCTION
VARIOUS STREETS &
APPURTENANT WORK

Contract No: ED-2023-11

Date: 5-25-2023

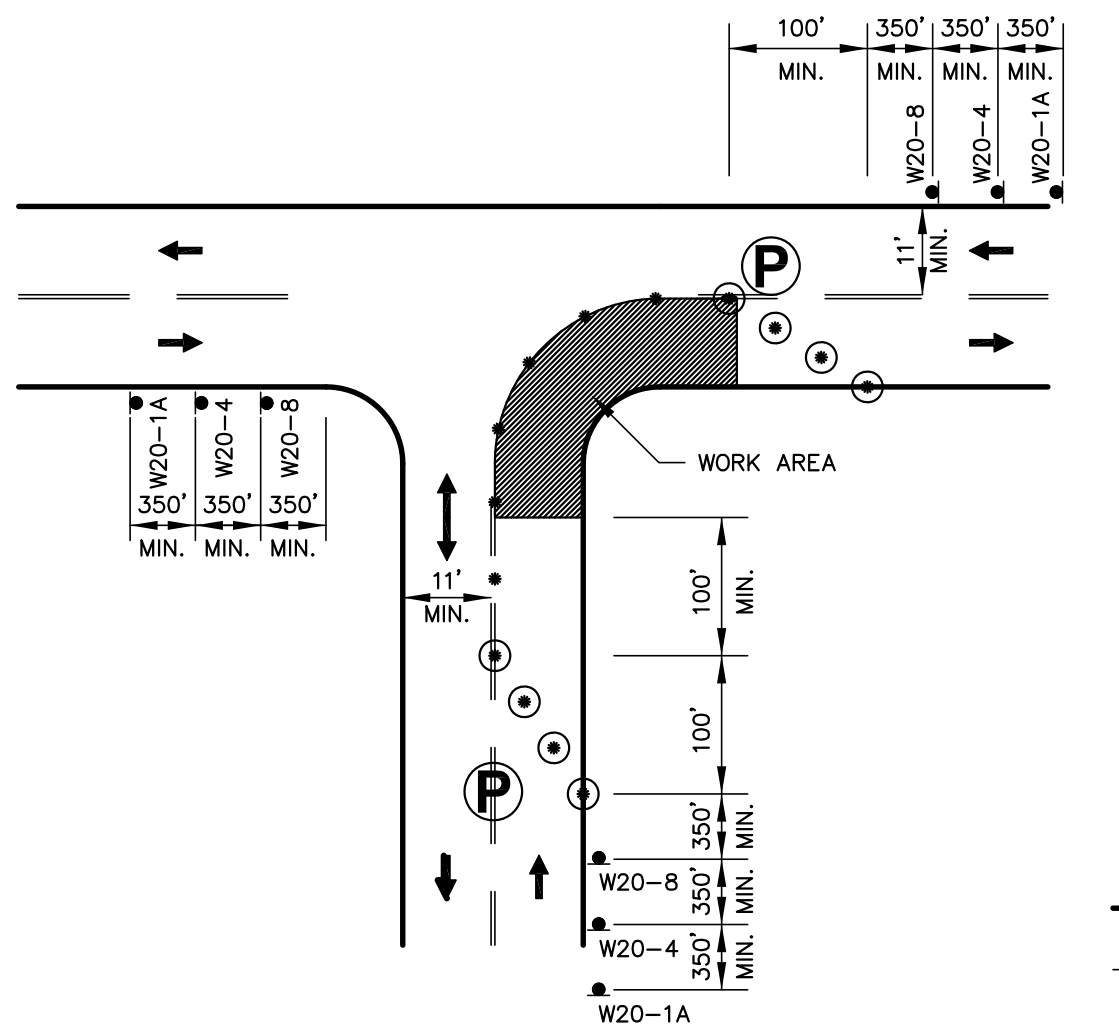
Scale: N.T.S.

Sheet No.: 10

PIPE DIAMETER	DIMENSIONS (INCHES)					
	PART No.	A(1±)	B MAX	H(1±)	L(1/2±)	W(2±)
2" AND 15'	1210NP	6.5	10	6.5	25	29
18"	1810NP	7.5	15	6.5	32	35
24"	2410NP	7.5	18	6.5	36	45

IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS			COLOR			UNIT AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW	BACK- GROUND	LEGEND	BORDER	
W20-1D	48"	48"		MUTCD STANDARD DETAIL			MUTCD STANDARD DETAIL			16.0
W20-1A	48"	48"								16.0
W20-1B	48"	48"								16.0
W20-1C	48"	48"								16.0
W20-4	48"	48"								16.0
W20-7b	48"	48"								16.0
W20-8	48"	48"								16.0
G20-2	36"	18"								4.5
R11-2	48"	30"								10.0
W5-1	48"	48"								16.0
W1-4L	30"	30"								6.25
W1-4R	30"	30"								6.25
M4-8A	24"	18"								3.0
M4-9L	30"	24"								5.0
M4-9R	30"	24"								5.0
M4-9V	30"	24"								5.0
W20-2	48"	48"								16.0

SINGLE DIRECTION TRAFFIC FLOW ARROW		LANE DELINEATOR	
DOUBLE DIRECTION TRAFFIC FLOW ARROW		CONE	
TRAFFIC MANAGEMENT SIGN		POLICE DETAIL	
TRAFFIC BARREL / DRUM		SPECIAL LIGHTING UNIT	
CHANGEABLE MESSAGE SIGN		PROPOSED WORK AREA	



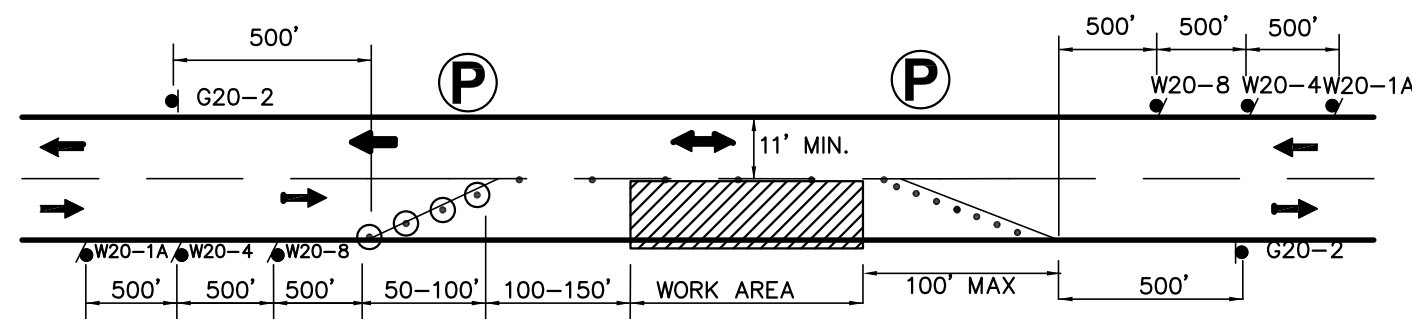
NOTE:
1. ADVANCE WARNING SIGN PLACEMENT TO BE ADJUSTED AS NECESSARY.
2. ALL DRUMS AND CONES TO BE SPACED @ 20' O.C.

100" LIMIT OF STEEL PLATE

TEMPORARY STEEL PLATE

W20-1D

1. ALL CONSTRUCTION SIGNING, DRUMS, BARRICADES AND OTHER DEVICES SHALL CONFORM WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AS AMENDED.
2. ALL DRUMS SHALL BE APPROXIMATELY PLACED AND MOVED AS NECESSARY TO MAINTAIN ADEQUATE ABUTTER ACCESS AT ALL TIMES. WORK MAY REQUIRE ADDITIONAL SIGNS, DRUMS AND OTHER TRAFFIC CONTROL DEVICES, GRADING AND TEMPORARY PAVEMENT FOR PASSAGE OF PEDESTRIAN, VEHICULAR AND EMERGENCY TRAFFIC THROUGH THE WORK AREAS, BOTH DURING AND AFTER WORKING HOURS, TO MAINTAIN SUCH ACCESS.
3. THE CONTRACTOR SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT AND SIMILAR OPERATIONS.
4. DURING WORK IN INTERSECTIONS A MINIMUM OF ONE LANE OF ALTERNATING TRAFFIC SHALL BE ALLOWED TO PASS AT ALL TIMES. (POLICE DETAILS SHALL BE PRESENT DURING THIS WORK.)
5. GRADE SEPARATIONS IN EXCESS OF 2" DURING NON-WORKING HOURS WILL REQUIRE DELINEATION BY USE OF DRUMS.
6. EXCAVATION EDGES IN EXCESS OF 4" DEEP SHALL BE PROTECTED DURING NON-WORKING HOURS BY BACKFILLING WITH A WEDGE OF GRAVEL OR SOIL TO COMPACTED 4:1 SLOPE.
7. 11' MINIMUM TRAVEL LANE WIDTHS SHALL BE MAINTAINED AT ALL TIMES.
8. NON-ESSENTIALS TRAFFIC CONTROL DEVICES SHALL BE COVERED OR REMOVED DURING NON-WORKING HOURS.
9. TRAFFIC MANAGEMENT SHALL INCLUDE CONSIDERATIONS FOR PEDESTRIANS ACCESS AT ALL TIMES.
10. NO SIGNAGE SHALL BE INSTALLED ON UTILITY POLES OR OTHER PRIVATE PROPERTY UNLESS CONTRACTOR RECEIVES WRITTEN PERMISSION FROM OWNER AND PROVIDES A COPY OF SAID AGREEMENT TO THE ENGINEER.
11. SPECIFIC SIGNAGE SHALL BE USED WHEN TEMPORARY TRENCH PLATES ARE INSTALLED. (SEE DETAIL ON THIS SHEET).
12. TRAFFIC MANAGEMENT PLAN REPRESENTS MINIMUM REQUIREMENTS. CONTRACTOR TO BE SOLELY RESPONSIBLE FOR TRAFFIC MANAGEMENT AND SAFETY IN WORK ZONE AREAS. DETOUR SHALL ONLY BE ESTABLISHED AND/OR ALTERED BY WITH THE APPROVAL OF THE ENGINEER.
13. THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING THE RESPECTIVE PUBLIC SERVICE CORPORATIONS OR OFFICIALS OF THEIR INTENTIONS AT LEAST ONE WEEK IN ADVANCE OF THE COMMENCEMENT OF OPERATIONS. THE CONTRACTOR MAY HAVE TO COORDINATE ON A DAILY BASIS IF THE DETOUR OR WORK ZONES HAVE CHANGED. FOR A LIST OF SAID CORPORATIONS PLEASE SEE THE CONTRACT DOCUMENTS "GENERAL CONDITIONS".



The plan view shows a four-way intersection. The north-south road has a centerline with a 22' minimum clearance. The east-west road has a centerline with a 100' minimum clearance. A shaded rectangular area labeled 'WORK AREA' is located in the southeast quadrant. A 'P' symbol is placed near the intersection. Lane markings include 'G20-2', 'W-4L', 'W-4R', 'W5-1', 'W5-4R', 'W5-1A', and 'G20-2'. Dimensions of 500' and 100' are indicated for various segments. Arrows indicate traffic flow in all directions.

NOTE: THIS DETAIL SHOWS A RIGHT LANE CLOSURE DETAIL.
THIS DETAIL CAN ALSO BE USED FOR LEFT LANE CLOSURES,
WITH THE SIGN PLACEMENT REVERSED AS APPROPRIATE.

L=WS²/60 (FEET) FOR 40 MPH OR LESS W=WIDTH OF OFFSET (FT)
L=WS FOR 45 MPH OR MORE S= POSTED SPEED LIMIT (MPH)

ALL DRUMS AND SIGNS ARE SHOWN AS THEY SHOULD APPEAR DURING THE WORKING DAY, OR WHILE OPERATING IN THE WORK ZONE.

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Drawn By: RJM Designed By: RJM Checked By: MJD Approved By: TD

Project Title:

RECONSTRUCTION
VARIOUS STREETS &
APPURTENANT WORK

Sheet Title:

TRAFFIC
MANAGEMENT PLAN

Contract No:
ED-2023-11

Date:
5-25-2023

Scale:
N.T.S.

Sheet No. 2

1