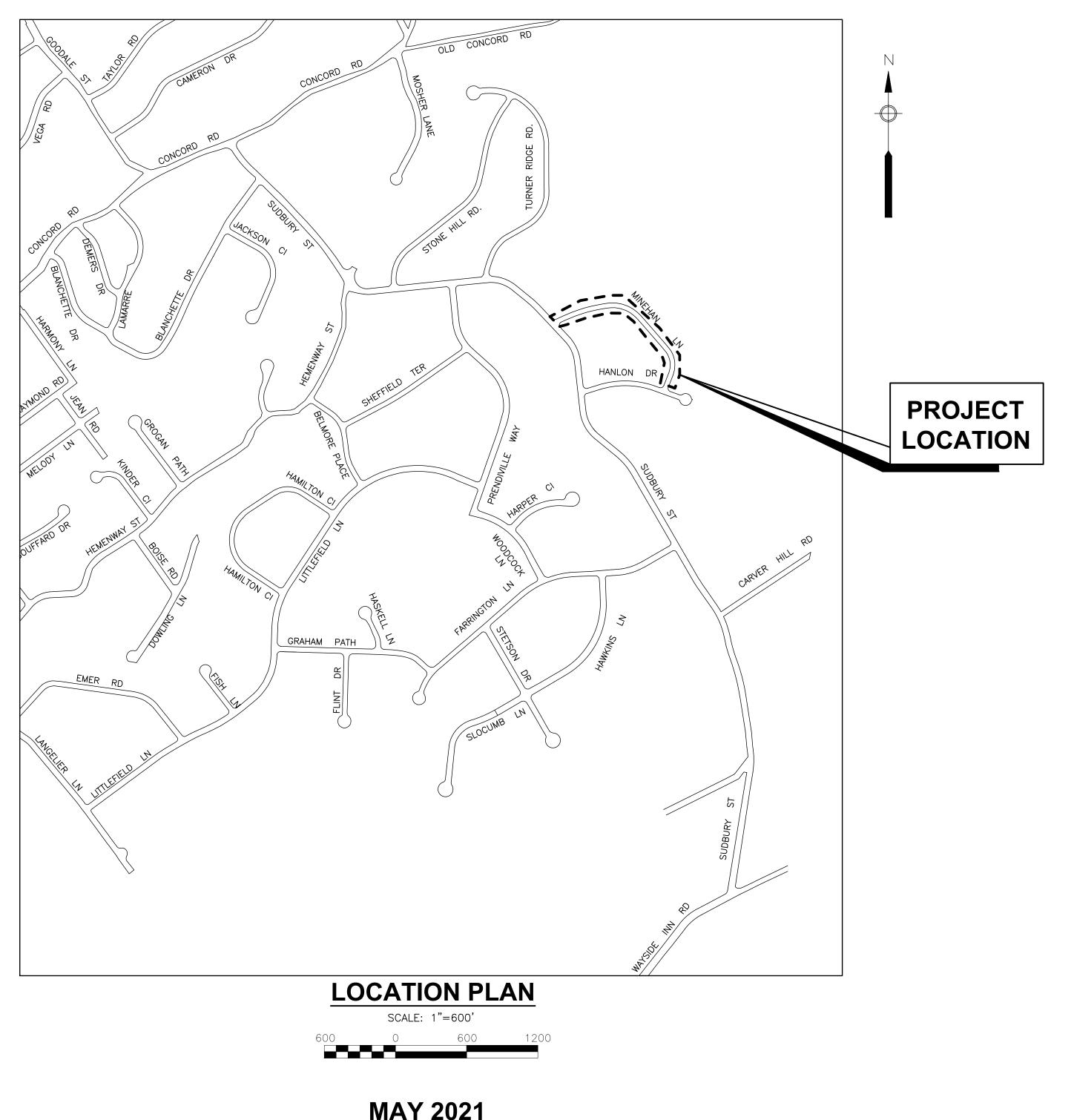
CITY OF MARLBOROUGH, MASSACHUSETTS SUDBURY STREET AREA SEWER PROJECT CONTRACT NO. ED 2021-06

MAYOR

ARTHUR G. VIGEANT

DEPARTMENT OF PUBLIC WORKS

SEAN M. DIVOLL, P.E. COMMISSIONER THOMAS DIPERSIO, JR., P.E., P.L.S. CITY ENGINEER



MAY 2021

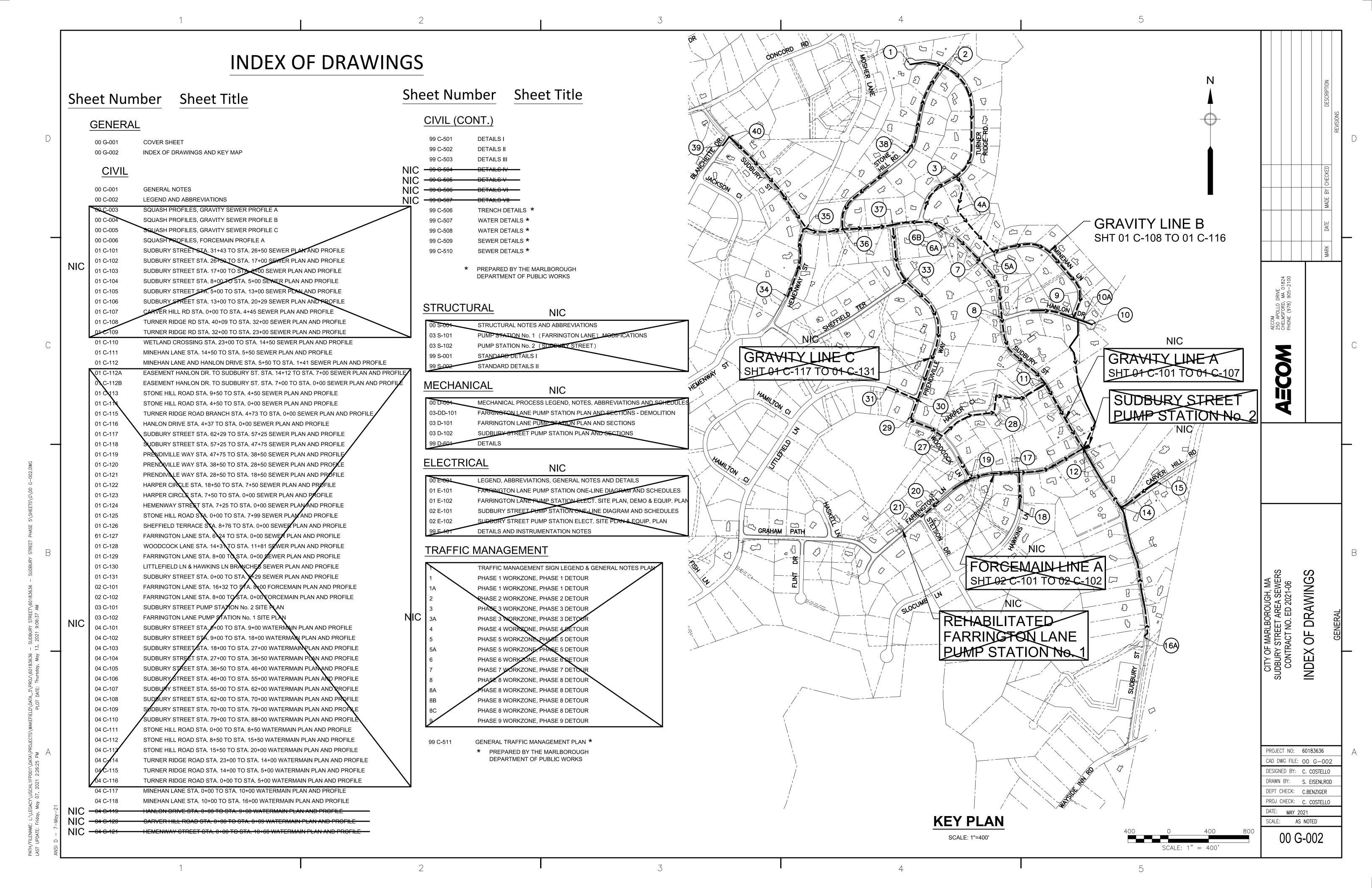
COVER SHEET

PROJECT NO: 60183636

DEPT CHECK: C. BENZIGER

AS NOTED

00 G-001



- 2. PROJECT BENCHMARKS ARE BASED ON CONTROL POINTS USED BY TOWN FOR THE 2000 MAPPING OF THE TOWN.
- 3. PROPERTY LINES SHOWN ARE APPROXIMATE ONLY.
- 4. BORING LOCATIONS ARE SHOWN ON THE PLANS. BORING LOGS ARE PROVIDED IN APPENDIX TO THE SPECIFICATIONS.
- THE WETLANDS SHOWN WERE FIELD LOCATED AND FLAGGED IN THE FIELD BY A CERTIFIED SOIL SCIENTIST FROM AECOM IN MAY OF 2010 AND BY THE CITY OF MARLBOROUGH IN OCTOBER 2012.
- 6. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM ALL WORK AS INDICATED ON THE DRAWINGS. IN THE SPECIFICATIONS AND AS DIRECTED BY THE ENGINEER IN CONFORMANCE WITH ALL APPLICABLE CODES IN A PROPER AND WORKMANLIKE MANNER.
- 7. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING CONDITIONS AT THE SITE
- 8. THE ENGINEER MAY DIRECT THE CONTRACTOR TO VARY THE PROPOSED WORK DURING CONSTRUCTION TO MEET EXISTING CONDITIONS.
- 9. ALL CONSTRUCTION ACTIVITY SHALL BE CONFINED TO THE AREA WITHIN THE PERMANENT EASEMENTS AND STREET RIGHT-OF-WAY LINES UNLESS OTHERWISE AUTHORIZED BY THE CITY AND PRIVATE PARTIES.
- 10. NO EQUIPMENT, VEHICLES OR CONSTRUCTION MATERIALS SHALL BE STORED OUTSIDE OF DESIGNATED WORK AREAS DURING EITHER WORKING OR NON-WORKING HOURS. THE LOCATION FOR ANY STORAGE OF EQUIPMENT BY THE CONTRACTOR DURING NON-WORKING HOURS SHALL BE AS APPROVED BY CITY.
- 11. WORKING HOURS WITHIN THE CITY ARE 7:00 A.M. TO 3:30 P.M., MONDAY THROUGH FRIDAY. PERMISSION IS REQUIRED FROM THE CITY VIA THE ENGINEER TO WORK ON SATURDAY, SUNDAY, LEGAL HOLIDAYS, OR ANY WEEKDAY NIGHT PAST THE HOURS SPECIFIED. THIS PERMISSION MUST BE REQUESTED 72 HOURS IN ADVANCE. SUNDAY WORK WILL ONLY BE ALLOWED IN CASE OF EMERGENCY.
- 12. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF THE EXISTING FEATURES AND STRUCTURES WITHIN AND ADJACENT TO THE WORK. ANY ITEM DISTURBED OR IN CONFLICT WITH THE PROPOSED WORK SHALL BE REMOVED AND RESET OR REPLACED AT THE CONTRACTOR'S EXPENSE. IN THE EVENT OF DAMAGE, THE REPAIRS OR REPLACEMENT SHALL BE COMPLETED AT THE CONTRACTOR'S EXPENSE AS APPROVED BY THE ENGINEER.
- 13. THE CONTRACTOR SHALL DO ALL THE CLEARING AND GRUBBING NECESSARY TO CONSTRUCT THE SEWER AND APPURTENANCES AS SHOWN ON DRAWINGS. NO TREES OR TREE LIMBS SHALL BE CUT UNLESS DIRECTED BY THE ENGINEER.
- 14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTINUOUS CLEANING OF MUD, DIRT AND DEBRIS OFF STREETS, WHEN SUCH MUD, DIRT OR DEBRIS IS DEPOSITED THERE AS A RESULT OF HIS CONSTRUCTION ACTIVITY. ANY DEBRIS, MUD, OR DELETERIOUS MATERIAL FROM THE PROJECT WILL BE REMOVED FROM THE STREET AND SURROUNDING STREETS BY CONTRACTOR AT THE END OF EACH WORKING DAY, OR BEFORE, IF DIRECTED BY THE CITY.
- 15. USE WATER SPRINKLING, TEMPORARY ENCLOSURES AND OTHER SUITABLE METHODS TO LIMIT DUST AND DIRT RISING AND SCATTERING IN THE AIR.
- 16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SECURING A SITE FOR DISPOSAL OF ALL EXCAVATED UNACCEPTABLE MATERIAL THAT IS UNSUITABLE FOR USE AS BACKFILL AND ALL OTHER EXCESS EXCAVATED MATERIALS. THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH THE LOCATION OF THE DISPOSAL SITE AND WRITTEN PERMISSION FOR USE OF THE SITE FROM THE PROPERTY OWNER. THE COST FOR SECURING AND MAINTAINING THE DISPOSAL SITE SHALL BE INCIDENTAL TO THE TOTAL PROJECT COST.
- 17. ROCK REMOVAL BY THE MECHANICAL METHOD SHALL CONSIST OF CUTTING AWAY ROCK AT TRENCH BOTTOM TO FORM A LEVEL BEARING SURFACE 12-INCHES BELOW INVERT ELEVATION OF PIPE.
- 18. ALL UNEXCAVATED ROCK WITHIN 3'-0" HORIZONTALLY OF THE ENDS OF BUILDING CONNECTIONS, BRANCHES AND STUBS, AND DOWN TO A HORIZONTAL PLANE 12-INCHES BELOW THE BOTTOMS OF SUCH CONNECTIONS, BRANCHES AND STUBS, SHALL BE
- 19. ALL EXCESS SOIL FROM CONSTRUCTION TO BE STOCKPILED OUTSIDE OF 100 FOOT BUFFER ZONE. DISPOSE OF EXCESS AND UNSUITABLE MATERIAL IN ACCORDANCE WITH SPECIFICATION SECTION 02210.
- 20. IF AT ANY TIME THE CONSTRUCTION EXCAVATION REVEALS ANY ARTICLE OF HISTORIC OR ARCHEOLOGICAL SIGNIFICANCE, WORK AT THE LOCATION WILL CEASE AND THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER.
- 21. THE CONTRACTOR IS RESPONSIBLE FOR RESTORING UNPAVED AREAS DISTURBED BY THE CONTRACTOR TO ORIGINAL CONDITIONS INCLUDING ALL GRADING, LOAMING, SEEDING, ETC. ASSOCIATED WITH CONSTRUCTION.
- 22. THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO APPROXIMATE EXISTING GRADES UPON COMPLETION OF THE SEWER CONSTRUCTION AND TESTING, EXCEPT WHERE PERMANENT GRADE CHANGES ARE SPECIFICALLY NOTED OR

EROSION AND SEDIMENT CONTROL NOTES

- THE CONTRACTOR SHALL TAKE NECESSARY MEASURES TO CONTROL SOIL EROSION AND PREVENT THE FLOW OF SEDIMENT FROM THE CONSTRUCTION SITE SO AS TO PREVENT DAMAGE TO ANY STREAM OR WETLANDS. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE SEQUENCE OF OPERATIONS FOR EROSION AND SEDIMENT CONTROL PRESENTED IN THE DETAILS ON THE DRAWINGS.
- INSTALL EROSION AND SEDIMENTATION CONTROL STRUCTURES IMMEDIATELY AFTER SITE IS CLEARED AND BEFORE TRENCH
- ALL DRAINAGE OUTLETS SHALL BE LOCATED AND HAVE SILT FENCE OR STRAW BALES INSTALLED AS REQUIRED PRIOR TO
- THE CONTRACTOR'S OPERATIONS SHALL NOT EXTEND INTO ANY WETLAND AREA OR THE 20' BUFFER ZONE. DISTURBANCE OF AREAS OUTSIDE OF THE LIMITS ESTABLISHED FOR EROSION CONTROL BARRIERS IS NOT ALLOWED.
- 5. ALL EROSION AND SEDIMENTATION CONTROL STRUCTURES SHALL BE MAINTAINED IN EFFECTIVE CONDITION THROUGHOUT THE CONSTRUCTION PERIOD.
- EROSION CONTROLS SHALL BE INSPECTED AND MAINTAINED ON A DAILY BASIS IN ACCORDANCE WITH REQUIREMENTS OF ORDER OF CONDITIONS ATTACHED AS APPENDIX TO THE SPECIFICATIONS.
- 7. IN ALL AREAS WHERE DEWATERING IS NECESSARY, MEASURES SHALL BE TAKEN TO ENSURE THE PRESERVATION OF WATERCOURSES AND COMPLIANCE WITH ALL REGULATIONS AND LAWS. ALL DEWATERING MUST BE DISCHARGED INTO SEDIMENT TRAPS AS INDICATED IN THE DETAILS AND AS SPECIFIED IN SPECIFICATION SECTION 01568. UNDER NO CIRCUMSTANCES SHALL THE DISCHARGE BE ALLOWED TO DIRECTLY ENTER ANY STORM DRAIN SYSTEM.
- 8. EASEMENTS ARE TO BE RESTORED AS SOON AS PRACTICABLE FOLLOWING INSTALLATION OF SEWER.

EXISTING UTILITIES NOTES

- 1. THE SURFACE EVIDENCE OF THE UTILITIES SHOWN HAS BEEN LOCATED BY FIELD SURVEY UNLESS DENOTED WITH RECORD (REC) NOTATION.
- 2. EXISTING WATER DISTRIBUTION SYSTEM AND HYDRANT LATERALS ARE FROM CITY OF MARLBOROUGH RECORD DRAWING
- 3. ASSUMED DEPTH OF COVER FOR EXISTING GAS MAINS IS 30". ASSUMED DEPTH OF COVER FOR EXISTING WATER MAINS IS 4'-6".
- 4. EXISTING PROPERTY LINES AND UNDERGROUND UTILITIES AS SHOWN ARE FROM THE BEST INFORMATION AVAILABLE. ADDITIONAL UTILITIES MAY BE PRESENT. PRIOR TO EXCAVATING, THE CONTRACTOR SHALL DETERMINE THE ACCURATE LOCATIONS OF THE UTILITIES SHOWN AND THE POSSIBLE EXISTENCE OF OTHER UNDERGROUND UTILITIES BY PROVIDING OBSERVATION TEST PITS AND CONTACTING UTILITY COMPANIES. CHAPTER 82, SECTION 40 OF THE M.G.L. REQUIRES 72 HOURS NOTICE TO ALL UTILITY OWNERS PRIOR TO ANY EXCAVATION. CALL "DIG SAFE" (1-888-344-7233) AND EACH UTILITY OWNER.
- 5. PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL COORDINATE UTILITY SUPPORT AND/OR RELOCATION WITH THE UTILITY OWNER FOR ALL EXISTING UTILITIES WHICH WILL BE AFFECTED DURING CONSTRUCTION. WHERE EXISTING POWER OR TELEPHONE POLES ARE IN CLOSE PROXIMITY TO WORK, THE CONTRACTOR SHALL COORDINATE HIS WORK EFFORTS WITH THOSE OF THE UTILITY COMPANIES SUCH THAT THE MAINTENANCE OF THEIR EXISTING FACILITIES CAN BE MAINTAINED AND PROTECTED DURING THE TIME WORK IS GOING ON ADJACENT TO THE UTILITY.
- 6. EXISTING UTILITIES IN THE STREETS AND WITHIN THE LIMITS OF THE WORK ARE TO REMAIN IN OPERATION DURING CONSTRUCTION
- 7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ALL ARRANGEMENTS FOR ANCHORING, SUPPORTING AND/OR RELOCATING AND PROTECTING ALL UTILITIES DURING CONSTRUCTION. ALL COSTS SHALL BE INCLUDED IN THE UNIT PRICES BID. IN THE EVENT OF DAMAGE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF ALL REPAIRS.
- 8. ALL PIPES OR OTHER UTILITIES DAMAGED DURING THE CONTRACTOR'S OPERATIONS SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR OR REPLACE AT NO COST TO THE CITY OF MARLBOROUGH.
- 9. ALL UTILITY BOXES, FRAMES, GRATES, ETC. DISTURBED BY CONTRACTOR AND NOT TO BE ABANDONED SHALL BE RESET TO THE
- 10. DELAYS TO THE CONTRACTOR AS A RESULT OF TIMING OF ANY UTILITY RELOCATION OR PROTECTION SHALL NOT BE CONSIDERED COMPENSABLE DELAYS, AS IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE HIS WORK IN CONFORMANCE TO THE UTILITY COMPANY'S SCHEDULE.

COMCAST/AT&T BROADBAND

11. THE UTILITIES' OWNERSHIPS INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:

PUBLIC UTILITIES MUNICIPAL GARAGE 135 NEIL STREET MARLBOROUGH, MA 01752 PHONE: 508.624.6910x33200

245 SOUTH MAIN STREET

CONTACT: ROBERT W. RUSSELL

HOPEDALE, MA 01747

PHONE: 508.482.1283

NATIONAL GRID

WESTFORD, MA 01886 PHONE: 800.556.9979 CONTACT: OPERATIONS CENTER VERIZON 146 LELAND STREET

4 LYBETRY WAY

EVERSOURCE ENERGY 157 CORDAVILLE ROAD SOUTHBOROUGH, MA 01772 PHONE: 508.305.7034 CONTACT: CHRISTOPHER HOWARD

OPEN EXCAVATIONS NOTES

1. THE CONTRACTOR SHALL NOTIFY PROPERTY OWNERS IN WRITING 48 HOURS PRIOR TO BEGINNING EXCAVATION ON THEIR PROPERTY.

FRAMINGHAM, MA 01702

CONTACT: ELLEN CUMMINGS

PHONE: 508.820.3557

- 2. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING PROPER AND ADEQUATE TRENCH SHORING AND BRACING AT ALL TIMES IN ACCORDANCE WITH RECOMMENDED/REQUIRED SAFETY STANDARDS.
- 3. CONTRACTOR SHALL COVER OPEN EXCAVATIONS AND TRENCHES FOR UTILITY RELOCATION WITH STEEL PLATES SUITABLE FOR VEHICULAR TRAFFIC OR OTHER METHOD ACCEPTABLE TO THE CITY. DURING NON-WORK HOURS. SUCH WORK SHALL BE INCIDENTAL TO THE TOTAL PROJECT COST.
- 4. IN ADDITION TO COMPLIANCE WITH THE GENERAL REQUIREMENTS SECTION OF THE SPECIFICATIONS, THE CONTRACTOR SHALL TAKE ALL NECESSARY MEASURES AND SHALL PROVIDE ALL NECESSARY CONTINUOUS BARRIERS OF SUFFICIENT TYPE. SIZE AND STRENGTH TO PREVENT ACCESS TO ALL OPEN EXCAVATIONS AT THE COMPLETION OF EACH DAY'S WORK.

WATER NOTES

- 1. THE PROPOSED WATER MAINS ARE TO BE CONSTRUCTED IN THE SAME HORIZONTAL AND VERTICAL LOCATION AS THE EXISTING WATER MAIN, EXCEPT AS OTHERWISE SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER. REMOVE EXISTING 8" ASBESTOS CEMENT WATER MAINS AND ASSOCIATED COMPONENTS AND SERVICES. THE CONTRACTOR IS TO DISPOSE OF EXISTING WATER MAINS AND ASSOCIATED COMPONENTS IN ACCORDANCE WITH STATE AND FEDERAL LAWS. THE CITY HAS FIRST RIGHT OF REFUSAL ON FITTINGS AND APPURTENANCES BEFORE DISPOSAL.
- 2. THE CONTRACTOR IS TO PROVIDE TEMPORARY BY-PASS PIPING TO SUPPLY WATER TO RESIDENTS, IN ACCORDANCE WITH SPECIFICATION SECTION 02630.
- 3. WHEN CROSSING EXISTING UTILITIES, THE CONTRACTOR SHALL DEFLECT THE PIPE WHERE POSSIBLE TO REDUCE THE AMOUNT OF BENDS REQUIRED.
- 4. NEW WATER AND SEWER LINES SHALL MAINTAIN A 10 FT. SEPARATION TO THE EXTENT POSSIBLE.
- 5. ALL WATER SERVICES SHALL BE TYPE "K" COPPER WITH A MIN. DIAMETER OF $\frac{3}{4}$ ". LARGER SERVICES SHALL BE REPLACED IN KIND AS DIRECTED BY THE ENGINEER.
- 6. ALL EXIST. WATER SERVICES SHALL BE REMOVED AND REPLACED FROM THE MAIN TO THE CURB STOP/PROPERTY LINE IN THE SAME LOCATION OR AS DIRECTED BY THE ENGINEER.
- 7. ALL CURB STOPS AND BOXES ARE TO BE REMOVED AND REPLACED WITH NEW, AND SHALL BE LOCATED BEHIND THE BACK OF SIDEWALK OR IMMEDIATELY OUTSIDE THE RIGHT OF WAY LAYOUT WHERE POSSIBLE
- 8. THE EXIST. HYDRANTS TO BE REPLACED (AS NOTED ON THE PLAN) SHALL BE REPLACED IN THE LOCATIONS INDICATED ON THE PLANS. HYDRANTS REMOVED ARE TO BE RETURNED TO THE DEPARTMENT OF PUBLIC WORKS LOCATED AT 135 NEIL STREET, MARLBOROUGH, MA. REMOVAL AND DELIVERY OF HYDRANTS IS TO BE INCLUDED IN THE APPROPRIATE UNIT PRICE ITEM IN THE BID.
- 9. THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING ANY ABUTTERS AFFECTED BY A SHUTDOWN (48 HOURS IN ADVANCE).
- 10. TEMPORARY PIPING AND HOSE DISINFECTION MUST BE PERFORMED IN ACCORDANCE WITH AWWA STANDARDS AND MUST BE DESIGNATED FOR POTABLE WATER USE BY NSF.
- 11. ANALYTICAL TESTING OF WATER SHALL BE CONDUCTED BY A LABORATORY CERTIFIED IN THE STATE OF MASSACHUSETTS.
- 12. A NIGHT CAP/PLUG, PROVIDED BY THE PIPE SUPPLIER, SHALL BE USED TO CAP THE PIPE AT THE END OF EACH WORK DAY
- 13. WATER SERVICE CONNECTIONS ON THE EXISTING WATER MAINS ARE SHOWN ACCORDING TO THE BEST AVAILABLE INFORMATION. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION OF ALL EXISTING SERVICE CONNECTIONS PRIOR TO CONSTRUCTING THE NEW SERVICE CONNECTIONS.
- 14. WATER MAINS AND SERVICE CONNECTIONS TO BE INSTALLED TO A MINIMUM DEPTH OF 5-FEET TO TOP OF PIPE, UNLESS OTHERWISE INDICATED ON THE DRAWINGS...

PIPELINE (GRAVITY) NOTES

- 1. PIPE SHALL BE AS INDICATED IN THE SPECIFICATIONS.
- 2. THE ALIGNMENT AND PROFILES SHOWN FOR THE PROPOSED PIPING MAY BE REVISED BASED UPON LAYING LENGTHS OF PIPE AND FIELD CONDITIONS.
- 3. ALL STATIONING SHOWN ON PLANS IS APPROXIMATE IN NATURE AND MAY BE REASONABLY ADJUSTED, AS NECESSARY, IN THE FIELD UPON APPROVAL OF THE ENGINEER AND/OR CITY.
- 4. ALL PIPES SHALL SLOPE UNIFORMLY BETWEEN ELEVATIONS SHOWN UNLESS OTHERWISE INDICATED ON THE DRAWINGS OR DIRECTED BY THE ENGINEER.
- 5. PIPE LENGTHS FOR THE GRAVITY SYSTEM SHOWN ON THE DRAWINGS ARE FROM MANHOLE CENTERLINE TO MANHOLE CENTERLINE.
- 6. PIPE DEFLECTION SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATION.
- MINIMUM PIPE COVER WILL BE 4'-6", UNLESS OTHERWISE SPECIFIED ON THE DRAWINGS. COVER IS TO BE MEASURED FROM EXISTING TOP OF ROAD, OR GROUND SURFACE TO TOP OF PIPE.
- 8. WHENEVER POSSIBLE, THE GRAVITY SEWER SHALL BE LAID AT LEAST 10 FEET HORIZONTALLY FROM AN EXISTING WATER MAIN. WHERE THE GRAVITY SEWER CROSSES UNDER EXISTING WATER MAINS, THE GRAVITY SEWER SHALL BE LAID AT SUCH AN ELEVATION THAT THE TOP IS AT LEAST 18 INCHES BELOW THE BOTTOM OF THE WATER MAIN. WHEN THE ELEVATION OF THE GRAVITY SEWER CANNOT BE VARIED TO MEET THIS VERTICAL SEPARATION, THE WATER MAIN SHALL BE RELOCATED OR RECONSTRUCTED WITH MECHANICAL JOINT PIPE FOR A DISTANCE OF 10 FEET ON EITHER SIDE OF THE SEWER. WHEREVER THIS HORIZONTAL AND/OR VERTICAL SEPARATION CANNOT BE MAINTAINED, BOTH THE WATER MAIN AND SEWER SHALL BE CONSTRUCTED OF MECHANICAL-JOINT CEMENT LINED DUCTILE IRON PIPE. BOTH PIPES SHALL BE PRESSURE TESTED AS SPECIFIED IN SECTION 02615. CONCRETE ENCASEMENT SHALL NOT BE USED.

MANHOLE NOTES

- 1. MANHOLE FRAMES AND COVERS IN OFF STREET AREAS (I.E. WETLANDS, NOT LAWNS) SHALL EXTEND 2-FEET ABOVE FINISHED GRADE UNLESS OTHERWISE DIRECTED BY ENGINEER.
- 2. ALL STREET MANHOLES SHALL HAVE THEIR RIMS SET TO ACTUAL FINISH GRADE REGARDLESS OF ANY PROPOSED ELEVATIONS INDICATED, UNLESS SPECIFICALLY NOTED OTHERWISE.

HOUSE SEWER CONNECTION NOTES

1. EXACT LOCATIONS OF HOUSE SEWER CONNECTIONS WILL BE DETERMINED IN THE FIELD BY THE CONTRACTOR WITH COORDINATION WITH HOME OWNERS AND THE CITY OF MARLBOROUGH.

ROADWAY AND PAVEMENT CONTROL NOTES

- PAVEMENT SHALL BE COMPLETED AS INDICATED AND SPECIFIED.
- 2. SAW CUT ALL PAVEMENT FOR REMOVAL. ANY PAVEMENT INTENDED TO REMAIN THAT IS DAMAGED DURING CONSTRUCTION SHALL BE SAW CUT, REMOVED, AND REPLACED AT NO ADDITIONAL COST TO THE CITY.
- 3. INITIAL TRENCH WIDTH PAVEMENT SHALL BE INSTALLED AT THE END OF EACH WORK WEEK UNLESS OTHERWISE DIRECTED BY
- 4. DRIVE APRONS DAMAGED AS A RESULT OF CONSTRUCTION OR CONSTRUCTION EQUIPMENT SHALL BE REPLACED IN FULL. FROM THE EDGE OF PAVEMENT TO THE LIMIT OF DISTURBANCE

MAINTENANCE OF TRAFFIC NOTES

- 1. THE CONTRACTOR SHALL MAINTAIN VEHICLE ACCESS AT ALL TIMES DURING THE PROJECT TO RESIDENTS AND BUSINESSES THE RESPECTIVE RESIDENTS AND BUSINESS OWNERS SHALL RECEIVE WRITTEN NOTICE AT LEAST 48 HOURS IN ADVANCE OF ANY WORK IN DRIVEWAY OR ACCESS AREAS. ALL EFFORTS SHALL BE MADE TO MINIMIZE DISRUPTION AND INCONVENIENCE TO THE OWNERS AND PATRONS. STEEL PLATES AND GRAVEL MAY BE USED FOR TEMPORARY ACCESS.
- 2. THE CITY RESERVES THE RIGHT TO REQUIRE THE CONTRACTOR TO FURNISH, ERECT, OPERATE, MAINTAIN, MOVE, RELOCATE AND REMOVE TRAFFIC CONTROL DEVICES AND/OR MODIFY THE TRAFFIC CONTROL PLAN TO MORE EFFECTIVELY ACCOMMODATE CHANGED TRAFFIC CONDITIONS. AT NO ADDITIONAL COST TO THE CITY, IF PROPER MAINTENANCE OF TRAFFIC FACILITIES, AND PROVISIONS FOR TRAFFIC CONTROL ARE NOT BEING PROVIDED BY THE CONTRACTOR, AND THE SAFETY OF THE PUBLIC IS ENDANGERED, THE CITY MAY TAKE THE NECESSARY STEPS TO PLACE THEM IN PROPER CONDITION AND THE COST OF SUCH SERVICES SHALL BE DEDUCTED FROM ANY PAYMENT WHICH MAY BE DUE THE CONTRACTOR.
- THE CONTRACTOR WILL BE RESPONSIBLE FOR THE PROPER MAINTENANCE OF ALL TRAFFIC CONTROL DEVICES INSTALLED INCLUDING PROPER LOCATION, INSTALLATION, ARRANGEMENT, AND CONDITIONS AS DESIGNATED IN THE CONTRACT PLANS AND SPECIAL PROVISIONS, OR REQUIRED BY THE CITY FOR THE DURATION OF THIS CONTRACT. THE CONTRACTOR SHALL PROVIDE THE NECESSARY MANPOWER, VEHICLES, EQUIPMENT, AND SUPPLIES OF EXTRA TRAFFIC CONTROL DEVICES TO ADEQUATELY FULFILL THIS RESPONSIBILITY. AS A MINIMUM, ONE INDIVIDUAL SHALL BE DESIGNATED BY THE CONTRACTOR WHOM THE CITY MAY CONTACT TO REPORT TRAFFIC CONTROL DEFICIENCIES, AND WHO WILL BE RESPONSIBLE FOR INSURING THAT THEY ARE CORRECTED. IN ADDITION, THE CONTRACTOR SHALL PROVIDE THE CITY THE NAMES AND TELEPHONE NUMBERS OF TWO INDIVIDUALS WHO WILL BE AVAILABLE 24-HOURS A DAY, 7-DAYS A WEEK TO RESPOND TO CALLS FROM THE CITY TO CORRECT TRAFFIC CONTROL DEFICIENCIES DURING THOSE PERIODS OF TIME WHEN THE CONTRACTOR'S INDIVIDUAL RESPONSIBLE FOR TRAFFIC CONTROL CANNOT BE REACHED.

MA 905

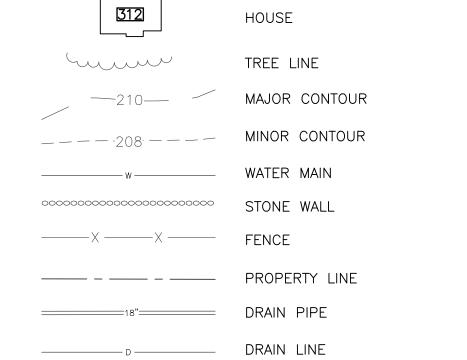
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PROJ CHECK: C. COSTELLO DATE: **MAY 2021** AS NOTED

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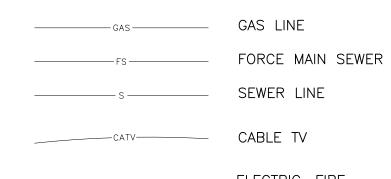
LEGEND

EXISTING	
	DECIDUOUS
0	STUMP
යි	ROCK
	HYDRANT
℃ #15/13	UTILITY POLE
0	POLE
⊘ WG	WATER GATE VALVE
	CATCH BASIN
•	DRAIN MANHOLE
-	ELECTRIC MANHOLE
• GW	GUY WIRE
×220.4	SPOT GRADE
HH	CABLE

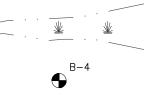


ELECTRIC/COMMUNICATIONS

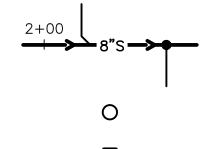
BORING NUMBER AND LOCATION







PROPOSED

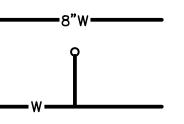


SANITARY SEWER PIPE WITH FLOW DIRECTION, STATION POINT AND BUILDING CONNECTION WITH WYE OR CHIMNEY

SEWER MANHOLE

SEWER/FM INTERSECTION NODE

CHIMNEY WITH BUILDING ADDRESS



WATER SERVICE

TYPICAL HYDRANT ASSEMBLY

WATER MAIN

CONNECTION

GATE VALVE

TEE FITTING

BEND FITTING

TRANSITION COUPLING

REDUCER

WATER MAIN CAP

WATER MAIN BLOWOFF

MANUAL AIR RELEASE VALVE TEST PIT

ABBREVIATIONS

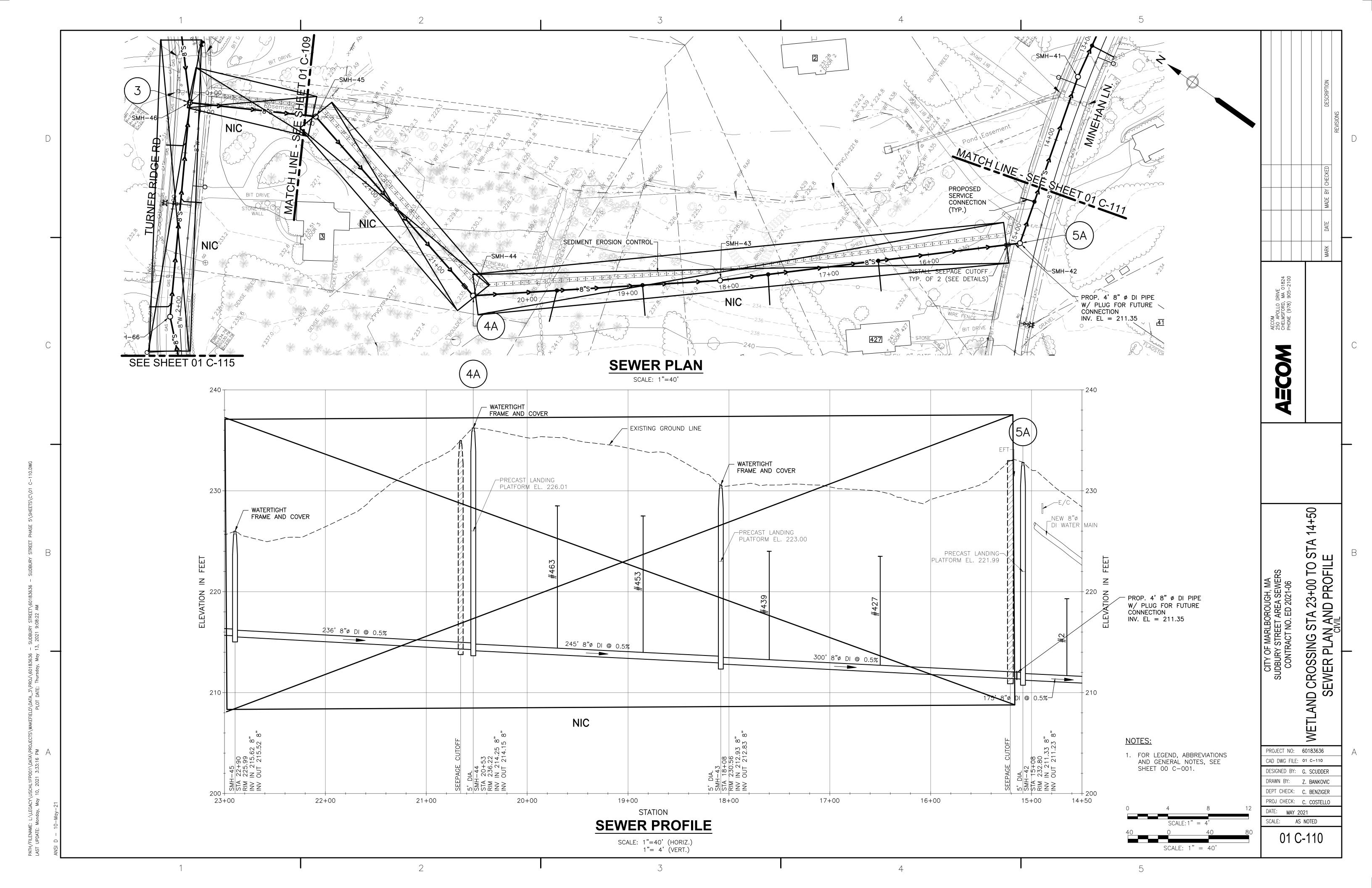
APPROX	APPROXIMATE	LN.	LANE
BIT	BITUMINOUS CONCRETE	MECH	MECHANICAL
BLDG	BUILDING	MH	MANHOLE
CATV	CABLE TV	NIC	NOT IN CONTRACT
CBBC	CATCH BASIN BACK CENTER	NO.	NUMBER
Q.	CENTER LINE	N.P.V.	NO PIPES VISIBLE
CONC	CONCRETE	PLNTR	PLANTER
CMP	CORRUGATED METAL PIPE	PROP.	PROPOSED
D	DRAIN	PVC	POLYVINYL CHLORIDE
DI	DUCTILE IRON	PS	PUMP STATION
DICL	DUCTILE IRON CEMENT LINED	R	RIM
DIA OR Ø	DIAMETER	RCP	REINFORCED CONCRETE PIPE
DIM	DIMENSION	RED	REDUCER
DEC	DECIDUOUS TREE	RET	RETAINING
DS	DOWN SPOUT	RWW	RAW WASTE WATER
EL OR ELEV	ELEVATION	S	SANITARY
EXIST.	EXISTING	SEW	SEWER
FFE	FINISHED FLOOR ELEVATION	SHT	SHEET
EFT	ELECTRIC, FIRE & TELEPHONE	SMH	SEWER MANHOLE
E/C	ELECTRIC/COMMUNICATIONS	STA.	STATION
EHH	ELECTRIC HAND HOLE	STR.	STRUCTURE
FM OR FS	FORCE MAIN	STY	STORY
GP	GATE POST	T.H.	TOP HOOD
GV	GATE VALVE	VERT	VERTICAL
G/S	GAS SERVICE	W	WATER
HR	HAND RAIL	WCR	WHEEL CHAIR RAMP
INV	INVERT	W/S	WATER SERVICE
I OW	LIMIT OF WORK	•	

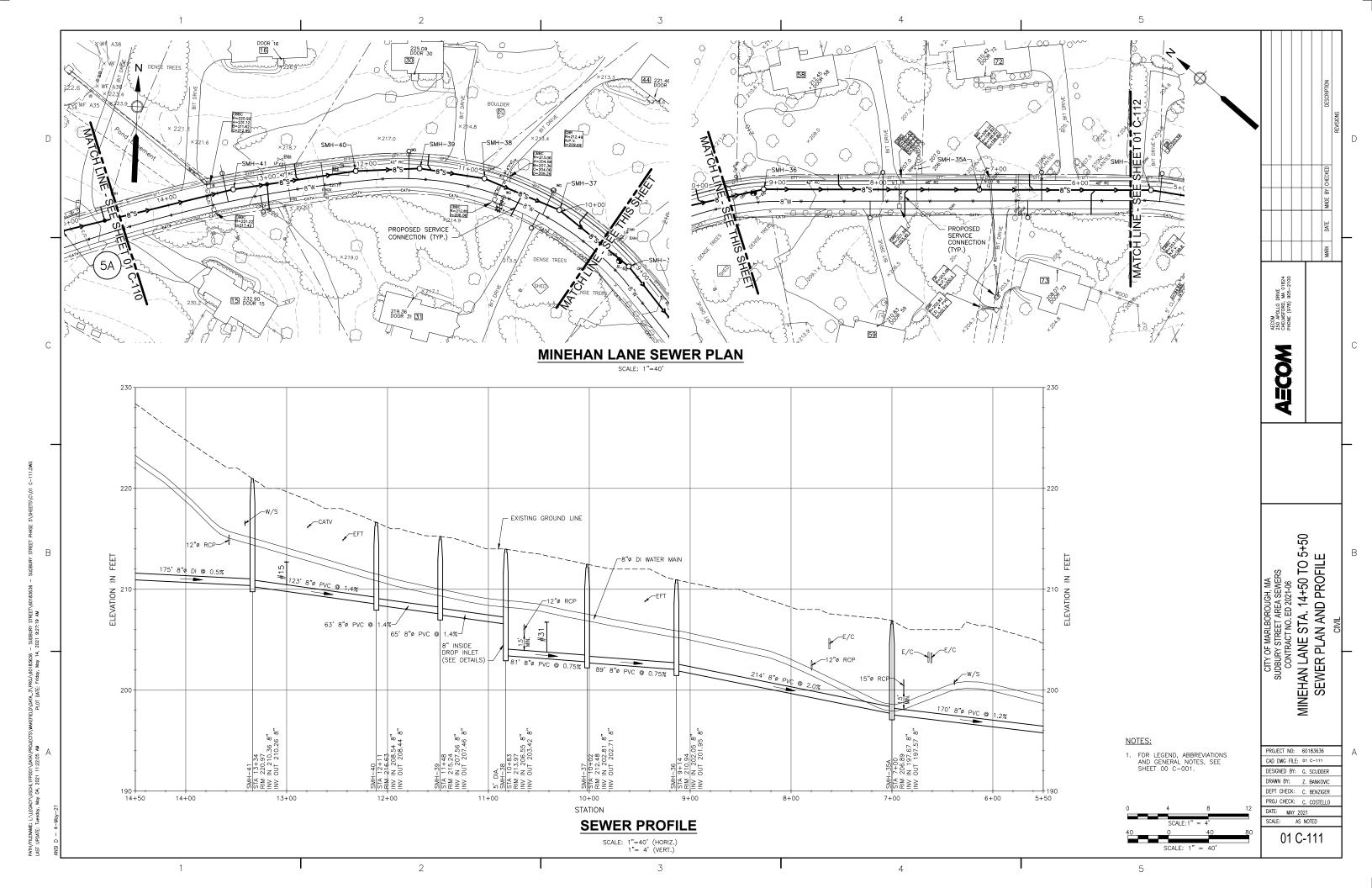
AECOM 250 APOLLO DRIVE CHELMSFORD, MA 01824 PHONE (978) 905—2100 **≡COM** LEGEND AND ABBREVIATIONS PROJECT NO: 60183636 CAD DWG FILE: 00 C-002 DESIGNED BY: C. COSTELLO DRAWN BY: S. EISENLROD DEPT CHECK: C. BENZIGER PROJ CHECK: C. COSTELLO DATE: MAY 2021

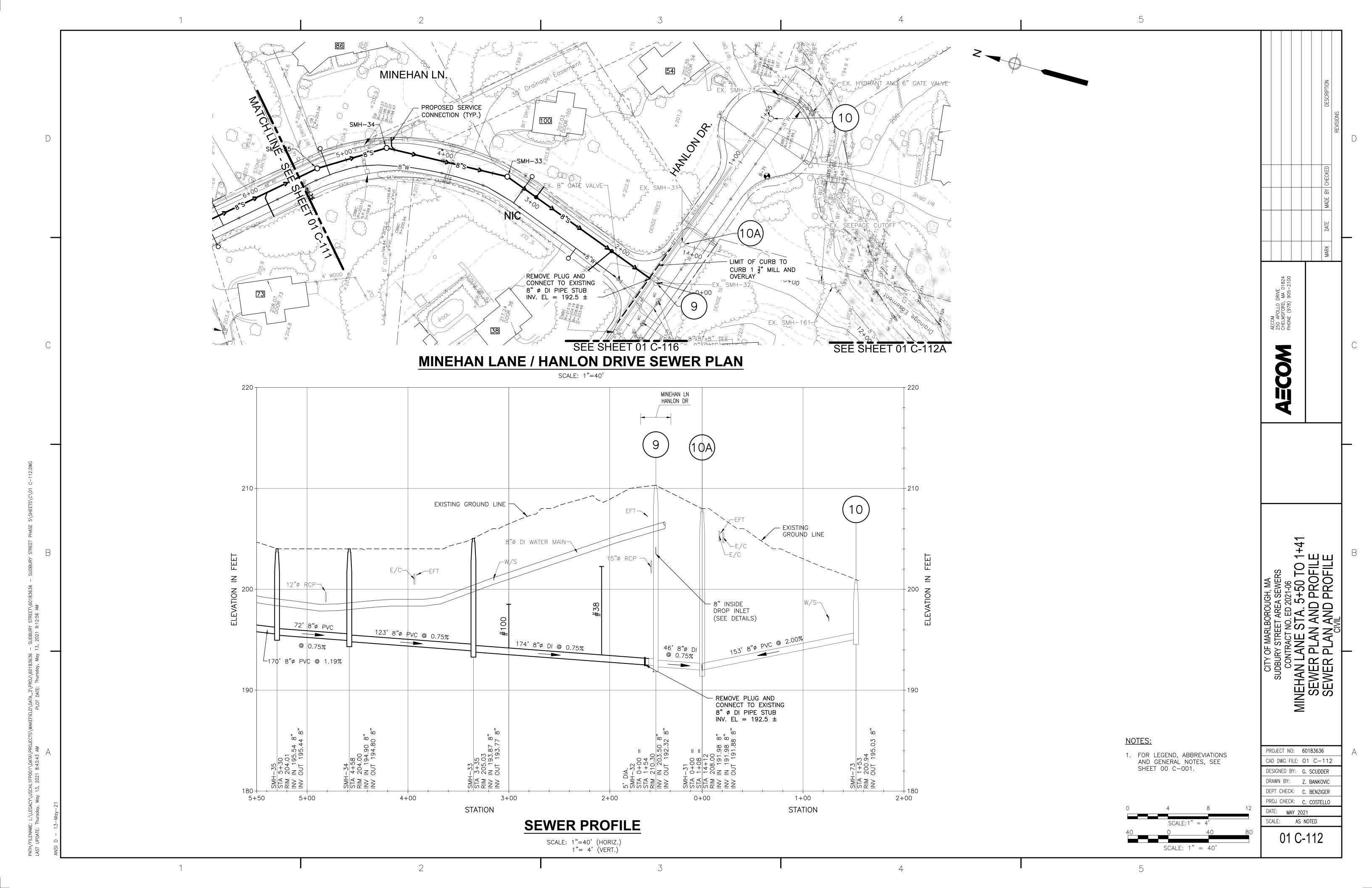
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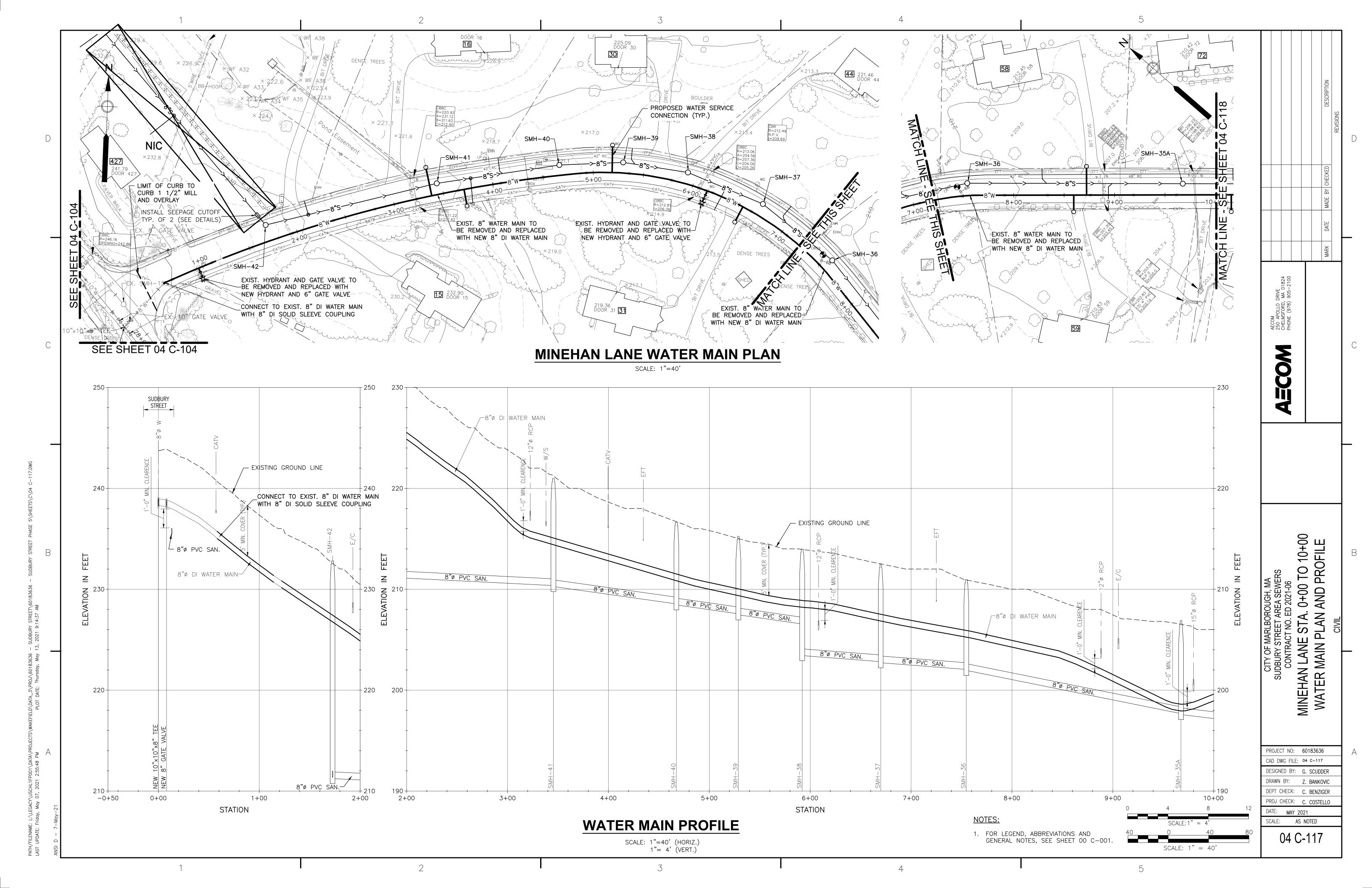
LIMIT OF WORK

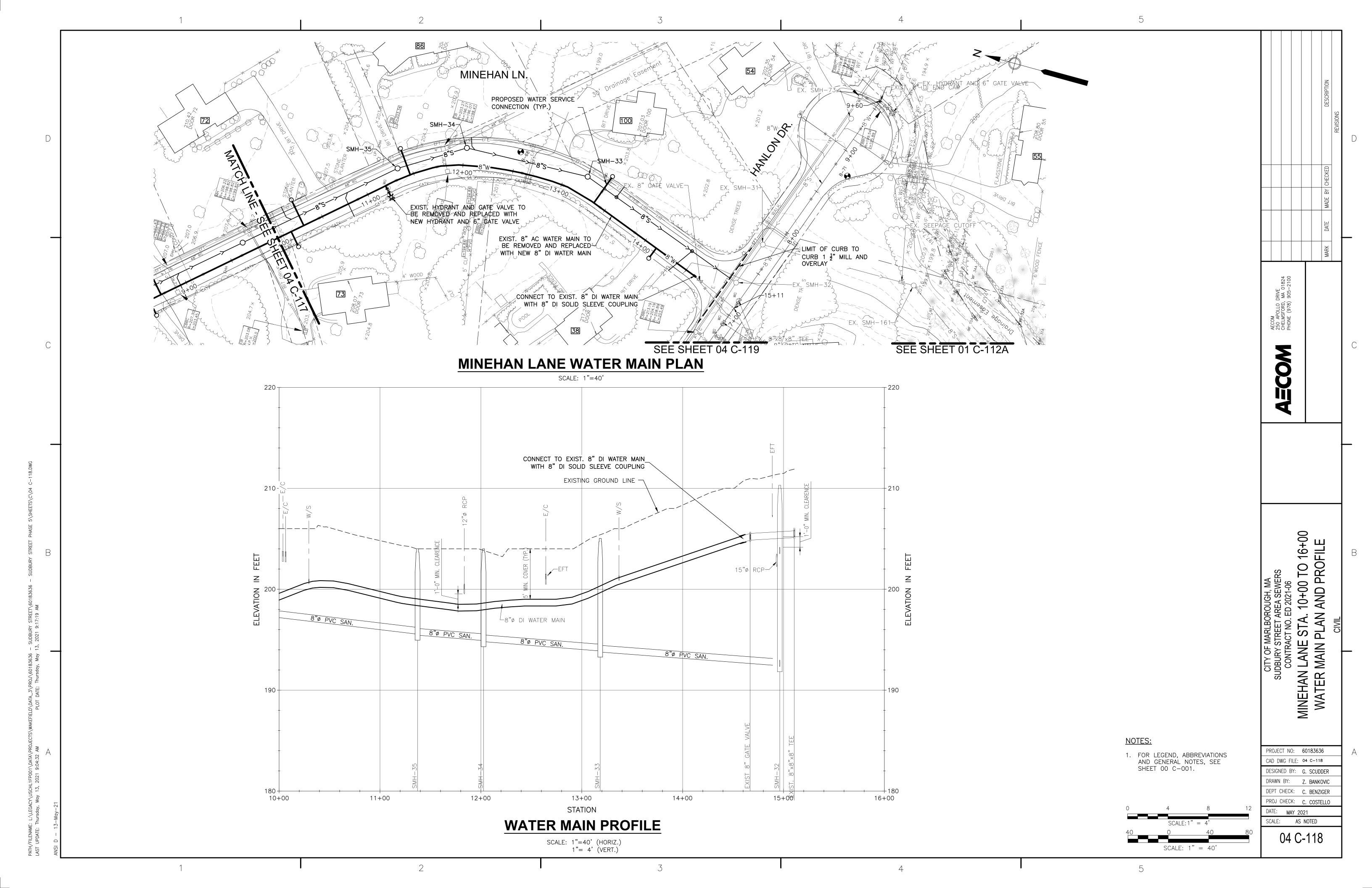
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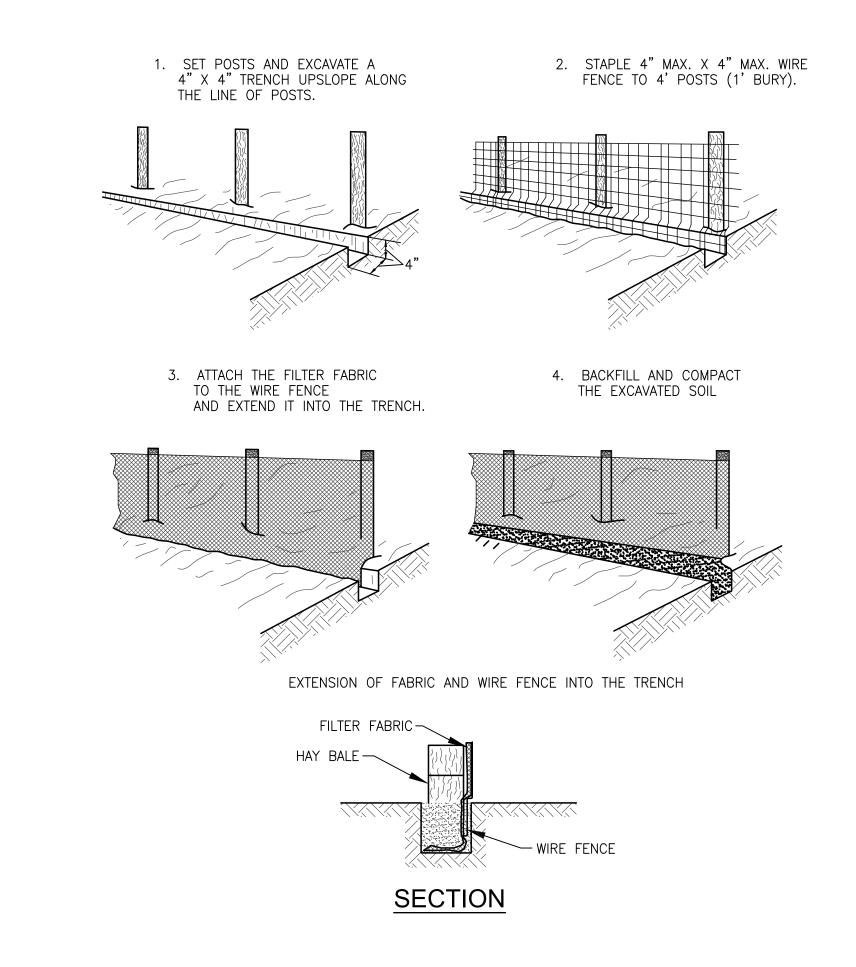
STRAW BALE EROSION CONTROL

NTS 2-1.60.4A (REV. 01-10-13)

CONSTRUCTION SEQUENCE

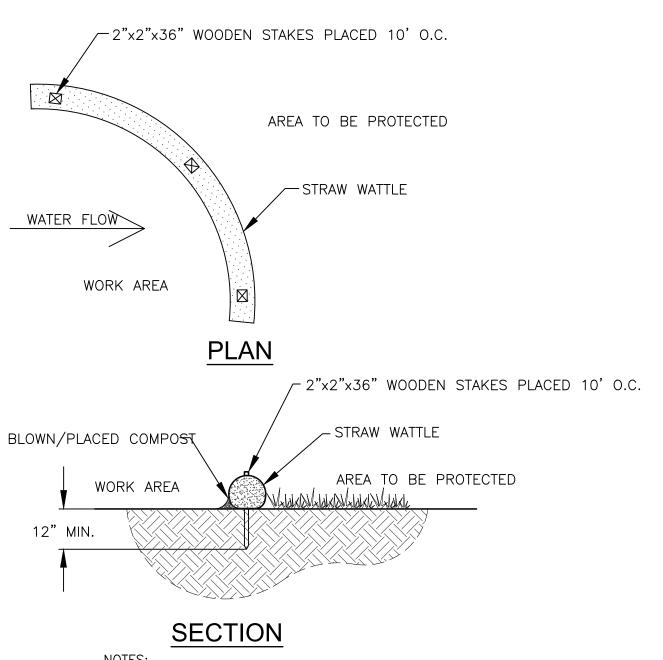
TO MINIMIZE EROSION AND SEDIMENTATION DUE TO CONSTRUCTION, THE CONTRACTOR SHALL FOLLOW THIS GENERAL CONSTRUCTION SEQUENCE. MODIFICATIONS TO THE SEQUENCE NECESSARY TO THE CONTRACTOR'S SCHEDULE SHALL INCLUDE APPROPRIATE TEMPORARY AND PERMANENT EROSION AND SEDIMENTATION CONTROL MEASURES. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS IN THE CITY OF MARLBOROUGH CONSERVATION COMMISSION ORDER OF CONDITIONS PROVIDED IN APPENDIX C OF THE SPECIFICATIONS.

- 1. INSTALL ALL PERIMETER EROSION PROTECTION MEASURES AS INDICATED ON THE PLANS AND AS INDICATED BY THE EROSION PROTECTION NOTES PRIOR TO THE COMENCEMENT OF EARTH WORK.
- 2. DURING CONSTRUCTION EVERY EFFORT SHALL BE MADE TO MANAGE SURFACE RUN-OFF
- 3. EROSION PROTECTION MEASURES SHALL BE CONSTRUCTED AROUND MATERIAL STOCKPILES IN A MANNER TO PROVIDE ACCESS AND AVOID EROSION OUTSIDE OF THE AREA.
- 4. CONSTRUCT TEMPORARY CULVERTS AND DIVERSIONS CHANNELS AS REQUIRED.
- 5. BEGIN PERMANENT AND TEMPORARY INSTALLATION OF SEED, MULCH AND RIPRAP.
- 6. DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINS, DITCHES, SILT FENCES, SEDIMENT TRAPS, ETC. MULCH AND SEED AS REQUIRED.
- 7. REMOVE TEMPORARY EROSION CONTROL MEASURES AFTER SEEDED AREAS HAVE BECOME FIRMLY ESTABLISHED AND CONSTRUCTION IS COMPLETE.
- 8. DURING THE COURSE OF THE WORK AND UPON COMPLETION, THE CONTRACTOR SHALL REMOVE ALL SEDIMENT DEPOSITS, EITHER ON OR OFF SITE, DRAIN PIPES, DITCHES, CURB LINES, ETC., RESULTING FROM SOIL EROSION AND/OR CONSTRUCTION OPERATIONS. MATERIAL SHALL NOT BE DEPOSITED NEAR WETLANDS AND OR WATER COURSE.



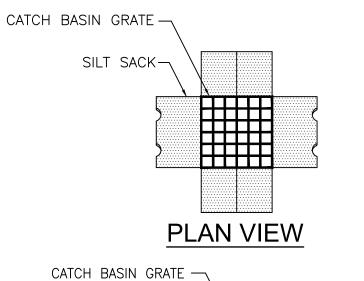
SILT FENCE

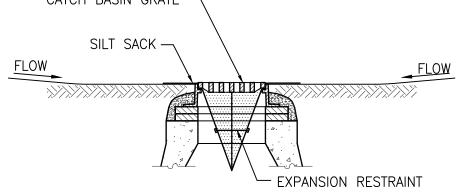
2-1.60.3 (REV. 05-20-09)



1. SEE SPECIFICATION FOR STRAW WATTLE AND FILL MATERIAL REQUIREMENTS.

STRAW WATTLE



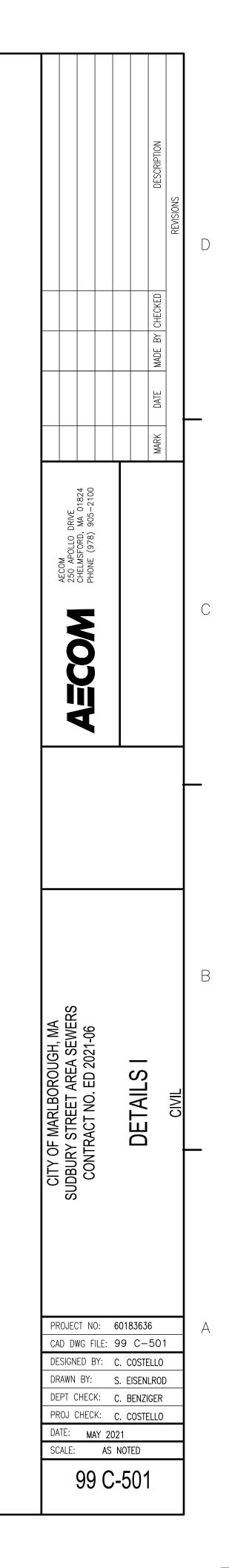


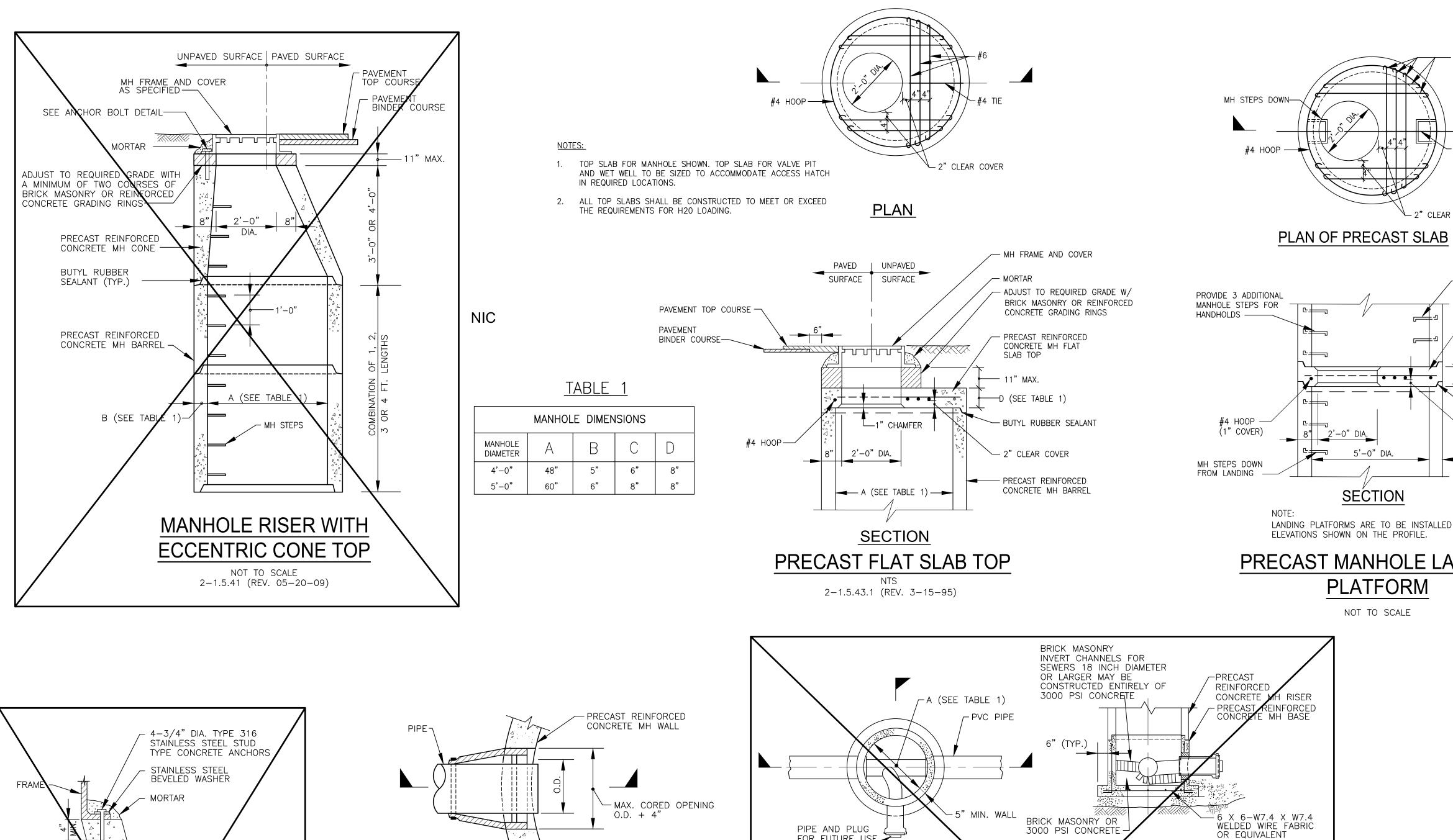
SECTION VIEW

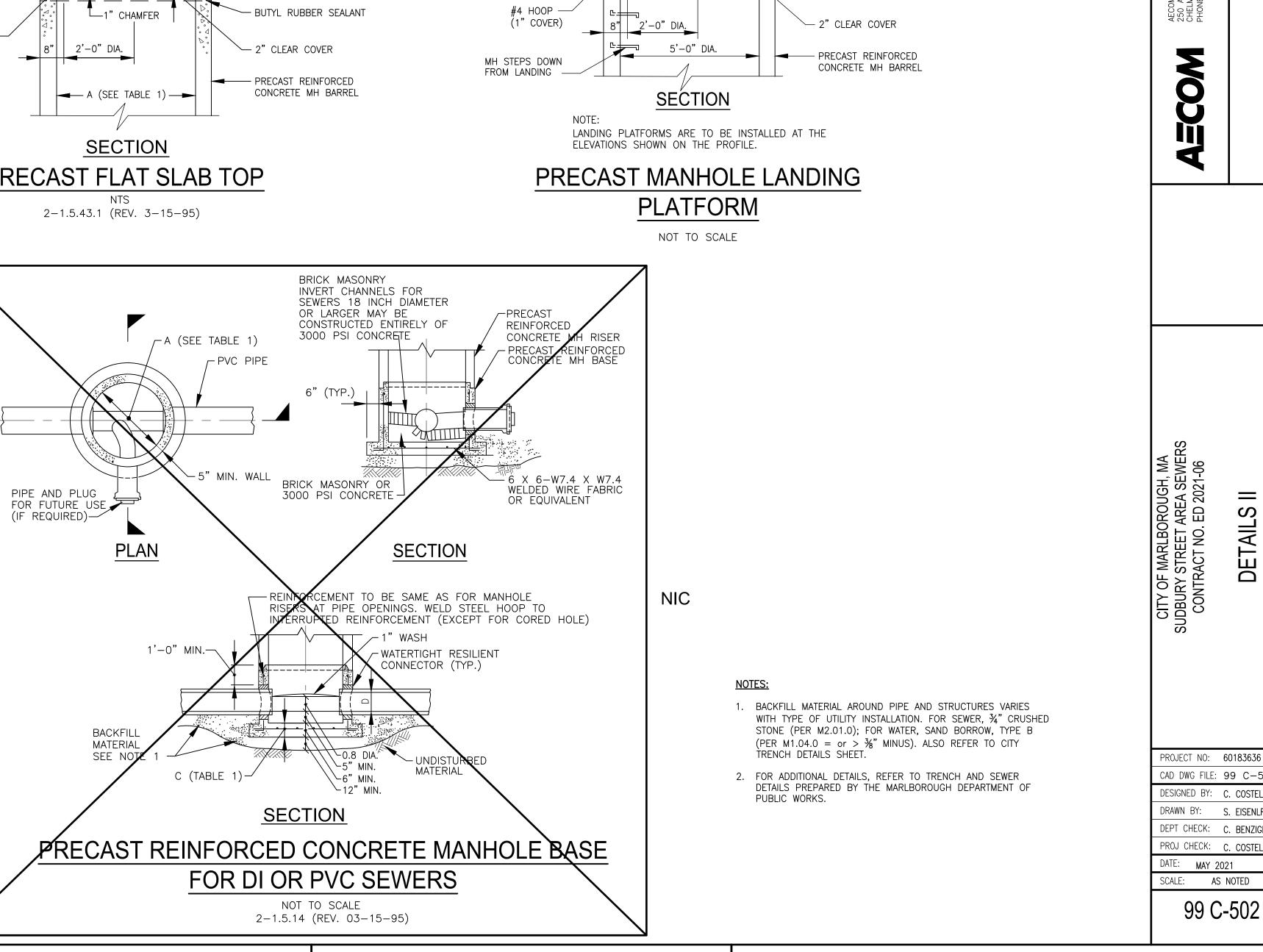
1. INSTALL SILT SACK IN ALL CATCH BASINS BEFORE COMMENCING WORK OR IN PAVED AREAS AFTER BINDER COURSE IS PLACED AND STRAW BALES HAVE BEEN REMOVED. GRATE TO BE PLACED OVER SILT SACK.

- 2. SILT SACK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORMS.
- 3. EVENTS AND CLEANING OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED.

SILT SACK SEDIMENT TRAP







- 2" CLEAR COVER

MANHOLE STEPS UP

PRECAST REINFORCED CONCRETE MANHOLE

- BUTYL RUBBER SEALANT

LANDING PLATFORM

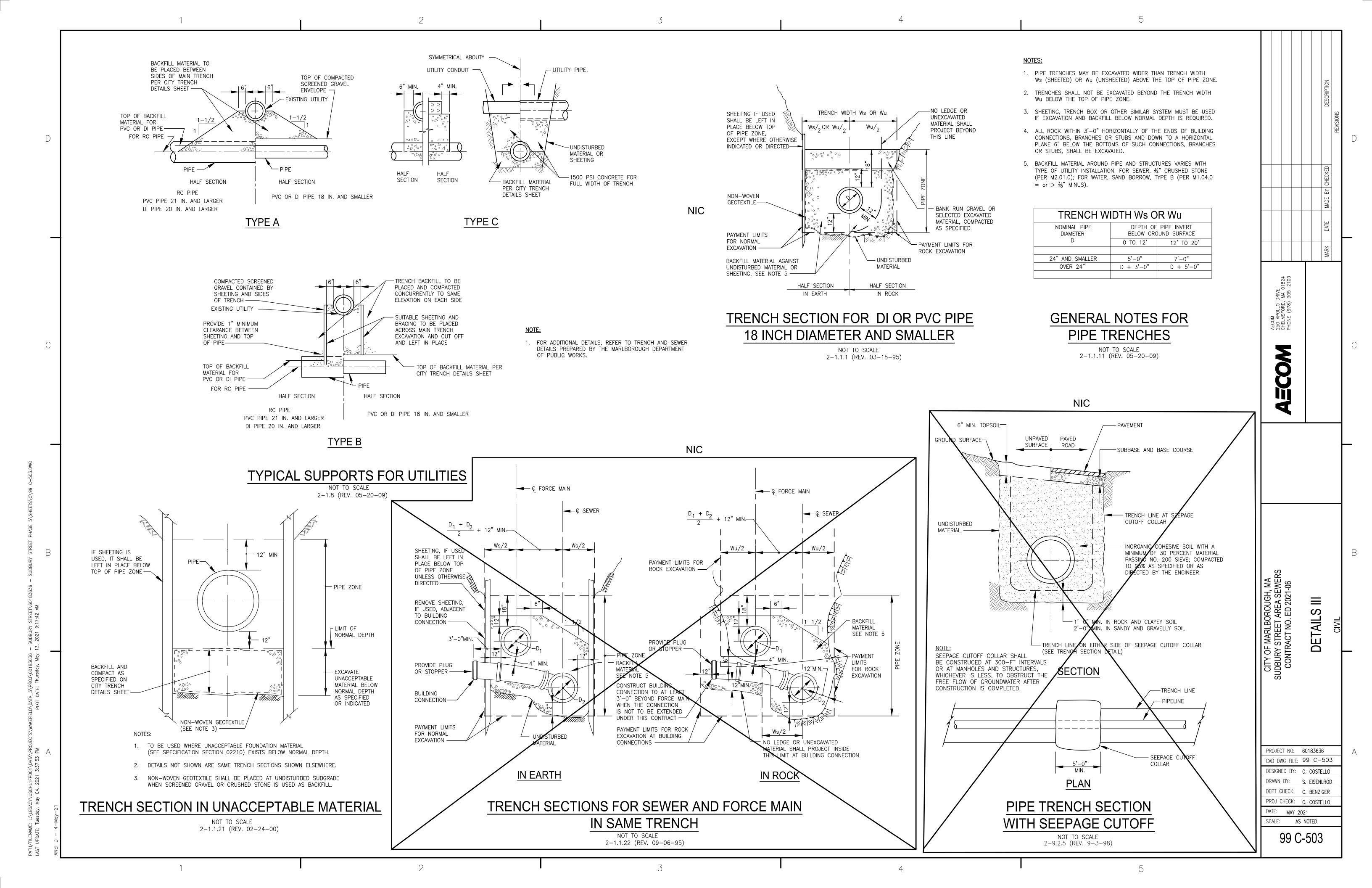
FROM LANDING

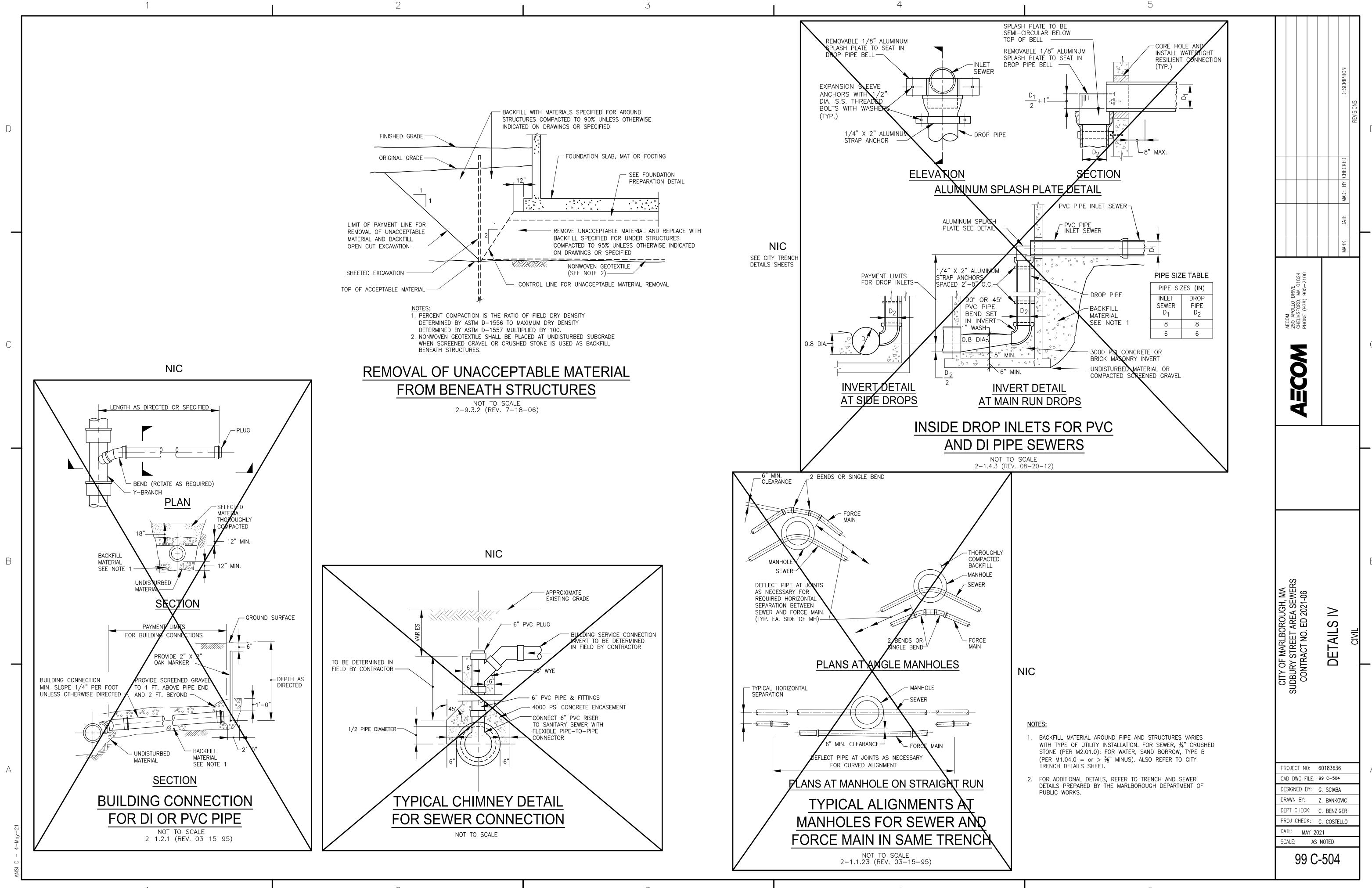
- PRECAST REINFORCED CONCRETE MH CONE /4" DIA. TYPE 316 STAINLESS STEEL STUD TYPE CONCRETE ANCHORS BEVELED WASHER PRECAST REINFORCED CONCRETE MH FLAT SLAB TOP ANOTHOR BOLT DETAILS FOR ÉRAMES FOR MANHOLÈ TOPS IN UNPAVED AREAS NOT TO SCALE 2-1.5.61 (REV. 03-15-95)

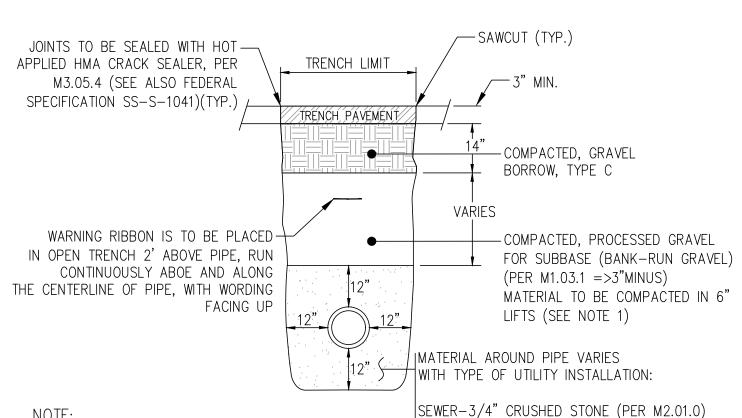
STAINLESS STEEL STRAP CLAMP ---PRECAST REINFORCED CONCRETE MH WALL PIPE \ NIC RESILIENT CONNECTOR **SECTION** WATERTIGHT RESILIENT CONNECTOR FOR CONNECTING PIPES TO PRECAST CONCRETE MANHOLES

DRIVE MA 905 JM APOLLO [LMSFORD, NE (978) **DETAIL**(PROJECT NO: 60183636 CAD DWG FILE: 99 C-502 DESIGNED BY: C. COSTELLO DRAWN BY: S. EISENLROD DEPT CHECK: C. BENZIGER PROJ CHECK: C. COSTELLO

NOT TO SCALE 2-1.5.62.1 (REV. 05-20-09)





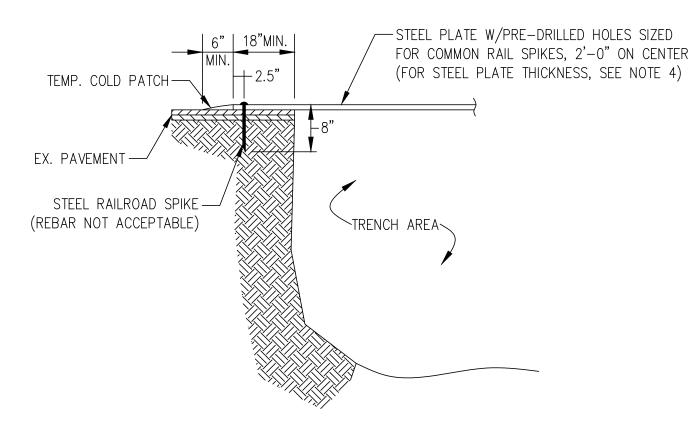


. COMPACTION EQUIPMENT AND LIFT THICKNESS SHALL MEET OR EXCEED THE MINIMUM REQUIREMENTS TO OBTAIN THE COMPACTION STANDARDS DESCRIBED IN THE CONSTRUCTION NOTES, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER. IN PROXIMITY TO STRUCTURES, A JUMPING JACK COMPACTOR SHALL BE REQUIRED.

2. WATER MAIN PIPE IS TO HAVE MINIMUM COVER DEPTH OF 5 FEET FROM FINISHED SURFACE.

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

TYPICAL EXCAVATION TRENCH



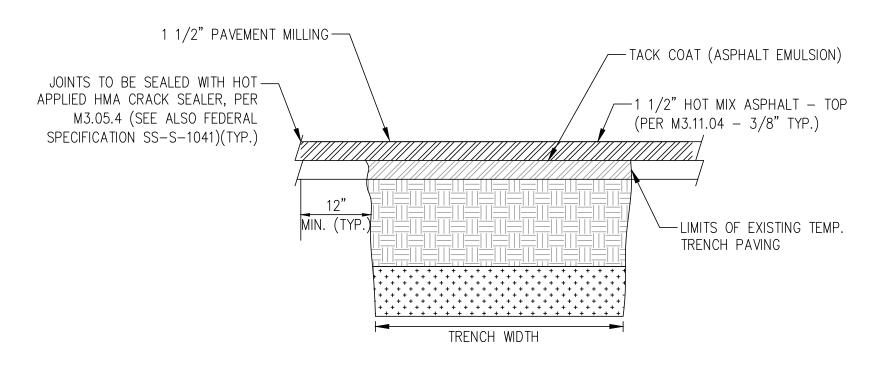
- 1. THE CITY RESERVES THE RIGHT NOT TO ALLOW THE USE OF STEEL PLATES TO SECURE TRENCHES AT ANY TIME THROUGHOUT CONSTRUCTION.
- 2. PLACE 48"X48" ORANGE AND BLACK CONSTRUCTION SIGN, STATING "STEEL PLATES 100 FT." TO PROVIDE DRIVERS WITH ADVANCED NOTICE. SEE TRAFFIC MANAGEMENT PLAN FOR PLACEMENT OF SIGNAGE.
- 3. NOT MORE THAN ONE (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

STEEL PLATE DETAIL

-3" MIN. HOT MIX ASPHALT (PER M3.11.03-BINDER COURSE) EXISTING PAVEMENT THICKNESS VARIES 14" COMPACTED GRAVEL BORROW TYPE-C TRENCH WIDTH 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.

TEMPORARY TRENCH PAVING



FINAL TRENCH PAVING TYPICAL SECTION

CONSTRUCTION NOTES

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.

BACKFILL MATERIALS

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, $\frac{3}{4}$ CRUSHED STONE (M2.01.0) FOR SEWER, GRAVEL BORROW — TYPE C (M1.03.0) FOR RCP DRAIN & TYPE D (M1.03.0) FOR CHDPE DRAIN OR AS SPECIFIED BY THE OWNER OF THE UTILITY AND APPROVED BY THE CITY OF MARLBOROUGH.

SUITABLE BANK-RUN GRAVEL MATERIAL FOR BACKFILLING SHALL BE GRANULAR FILL CONSISTING OF MINERAL SOIL SUBSTANTIALLY FREE FROM CLAY, ORGANIC MATERIALS, LOAM, WOOD, TRASH OR OTHER OBJECTIONABLE MATERIAL WHICH MAY NOT BE COMPRESSIBLE OR WHICH CANNOT BE PROPERTY COMPACTED. IT SHALL NOT CONTAIN STONES, BROKEN CONCRETE, MASONRY RUBBLE OR OTHER SIMILAR MATERIALS. IT SHALL HAVE PHYSICAL PROPERTIES SUCH THAT IT CAN BE READILY SPREAD AND COMPACTED. IT SHALL NOT CONTAIN ANY SNOW, ICE OR FROZEN SOIL.

BACKFILL MATERIAL SHALL CONSIST OF CONTROLLED DENSITY FILL (CDF) - TYPE 1E OR 2E (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 BY TYPE 1E VERY FLOWABLE (EXCAVATABLE) OR TYPE 2E FLOWABLE (EXCAVATABLE) WITH A MAXIMUM STRENGTH OF 200 PSI AND 25-30% AIR. CDF (TYPE 1E AND 2E) SHALL BE EXCAVATABLE USING SIMPLE HAND TOOLS WHERE REQUIRED.

IF CONTROL DENSITY FILL IS USED TO BACKFILL THE TRENCH, PERMANENT TRENCH PAVING CAN BE PERFORMED ONCE THE CONTROL DENSITY FILL HAS SET, ELIMINATING THE TEMPORARY TRENCH PAVING REQUIREMENT. PROOF OF CONTROL DENSITY FILL SHALL BE REQUIRED IN ORDER TO BE GRANTED RELIEF FROM PERMANENT TRENCH PAVING. PLEASE NOTE, SHOULD THE TRENCH SHOW ANY SIGNS OF FAILURE, THE CONTRACTOR SHALL EXCAVATE THE HOT MIX ASPHALT IN QUESTION AND PERFORM TRENCH PAVING MEETING THE CITY OF MARLBOROUGH'S SPECIFICATIONS.

COMPACTION OF BACKFILL

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.

GRADING ROLLING AND FINISHING

PAVEMENT PLACED SHALL BE PLACED AND RAKED TO A UNIFORM SURFACE, ROLLED TO THE REQUIRED THICKNESS AND TO A GRADE THAT WILL MATCH THE EXISTING BITUMINOUS ROAD SURFACE. THE PERMITTEE SHALL MAINTAIN THE SURFACING AND SHALL PROMPTLY FILL WITH SIMILAR MATERIAL ANY DEPRESSION AND HOLES THAT MAY OCCUR SO AS TO KEEP THE SURFACING IN A SAFE AND SATISFACTORY CONDITION FOR TRAFFIC.

TEMPORARY PAVEMENT

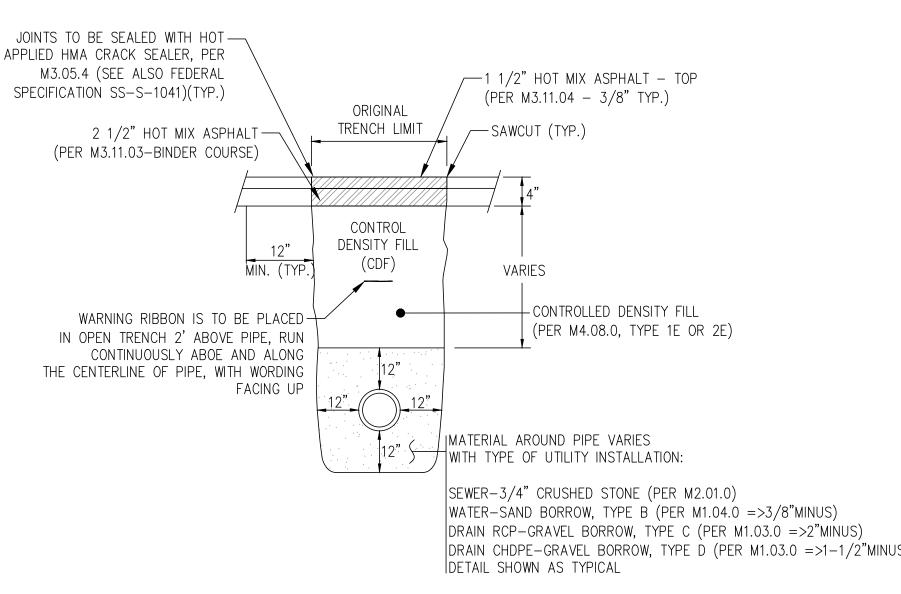
A TEMPORARY PAVEMENT SHALL BE PLACED ON THE SURFACE OF THE FILL AND THOROUGHLY COMPACTED. A TEMPORARY PAVEMENT SHALL BE HOT MIX ASPHALT NO LESS THAN THE EXISTING BASE COURSE OR A MINIMUM THREE (3) INCHES THICK (SEE EXCAVATION TRENCH DETAIL). IF PLATES ARE USED PRIOR TO TEMPORARY PAVING, THEY SHALL BE RAMPED TO MATCH THE EXISTING PAVEMENT. TEMPORARY PAVING OR STEEL PLATING SHALL IMMEDIATELY FOLLOW THE BACKFILLING OPERATION OR AS DIRECTED BY ENGINEER.

PERMANENT PAVING

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 $\frac{1}{2}$) 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.

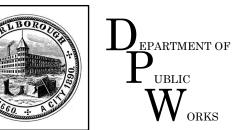
PROTECTIVE SYSTEMS

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.



TYPICAL EXCAVATION TRENCH FLOWABLE FILL N.T.S.

MARLBOROUGH



Engineering Division 135 Neil Street Marlborough, MA 01752 p. (508) 624-6910 f. (508) 624-7699 www.marlborough-ma.gov

		REVISIONS
No.	Date	Description
1.		

Drawn By:	Designed By:	Checked By:	Approved By:
<u>ENG</u>	<u>ENG</u>	<u>ENG</u>	<u>ENG</u>

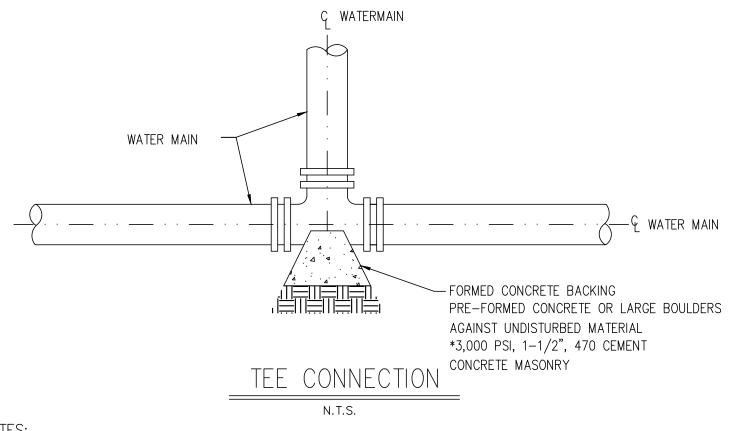
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SUDBURY STREET AREA SEWER PROJECT PHASE 4

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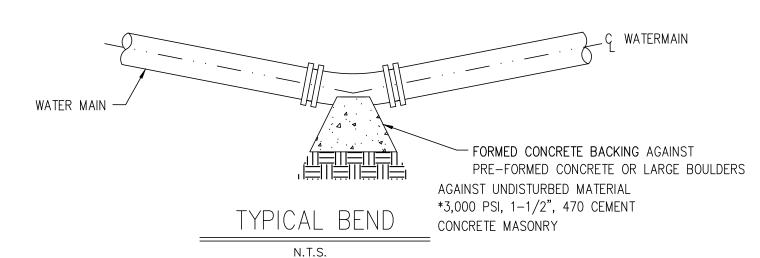
TRENCH DETAILS

Contract No: ED-2019-01	Sheet No.:
Date: 1/10/2018	99 C-506
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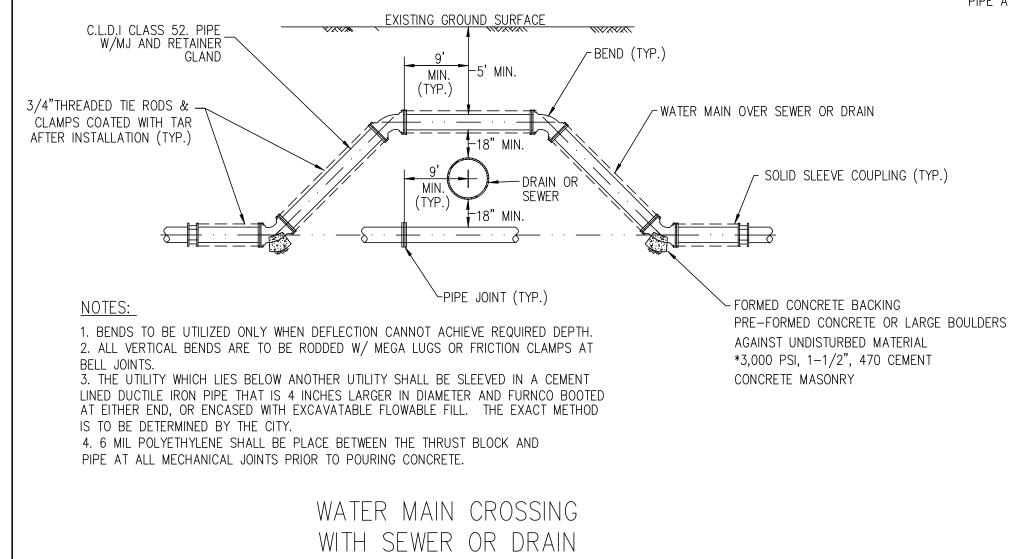


1. PROVIDE RESTRAINTS FOR MECHANICAL JOINTS (MEGALUGS OR FRICTION CLAMPS). 2. 6 MIL POLYETHYLENE SHALL BE PLACE BETWEEN THE THRUST BLOCK AND PIPE AT ALL MECHANICAL JOINTS PRIOR TO PORING CONCRETE.

TABLE OF BEARING AREAS IN SQUARE FEET AGAINST UNDISTURBED MATERIAL FOR WATER MAIN FITTINGS SIZE OF 45° BEND 22 1/2° MAIN (IN.) (S.F.) PLUGS BEND 10 8"&LESS 10" - 12"



 PROVIDE RESTRAINTS FOR MECHANICAL JOINTS (MEGALUGS OR FRICTION CLAMPS). 2. 6 MIL POLYETHYLENE SHALL BE PLACE BETWEEN THE THRUST BLOCK AND PIPE AT ALL MECHANICAL JOINTS PRIOR TO PORING CONCRETE.



WATER MAIN -

~SERVICE BOX [ERIE STYLE] EDGE OF PAVEMENT/CURBING-3/4" ROD COVER WITH COUNTER SUNK 1" BRASS PLUG, W/ 1" PIPE THREAD, 4-1/2' TO 5-1/2' EXTENSION TYPE ROADWAY SERVICE BOX H.D. SLIDE TOP WITH SLIDE BOTTOM 5' MIN. CORPORATION STOP -PROVIDE ADAPTORS AS REQUIRED (CITY STANDARD) CONNECT CURB STOP TO EXISTING SERVICE. C.L.D.I. WATER MAIN -PROVIDE ADAPTORS AS REQUIRED. SHALL BE COPPER TO COPPER THREAD, OPEN RIGHT -3/4" MIN. COPPER TUBING WITH DRAIN. AS MANUFACTURED BY FARNUM OR MUELLER CO. 1. FLUSH ALL NEW SERVICE LINES PRIOR TO CONNECTION.

2. UPON CONNECTION, REMOVE AND DISPOSE OF OLD SERVICE LINE FROM CORPORATION VALVE TO CURB STOP, CURB STOP AND BOX.

<u>NOTES:</u>

- 2. COPPER TUBING TYPE-K AND CURB STOP TO BE ENCASED IN 12" MIN. SAND.
- 3. ALL FITTINGS, CONNECTIONS, CORPORATIONS, CURB STOPS AND SERVICE APPURTENANCES SHALL BE SERVICE BRASS AS FOLLOWS: SERVICE BRASS SHALL CONFORM TO AWWA STANDARD C-800 (LATEST REVISION) AND PACK JOINT END CONNECTIONS SHALL CONSIST OF BUNA-N BEVELED GASKET FOR WATERTIGHT SEAL. AN INDEPENDENT, SPLIT-CLAMP LOCKING DEVICE OR STAINLESS STEEL BEVELED GRIPPER SHALL BE INCORPORATED IN THE DESIGN FOR ADDITIONAL RESTRAINT. FORD, MUELLER, OR RED HED SERVICE BRASS IS ACCEPTED WITHOUT SUBSTITUTE.



WATER MAIN ——

1. PROVIDE RESTRAINTS FOR MECHANICAL JOINTS (MEGALUGS OR FRICTION CLAMPS). 2. 6 MIL POLYETHYLENE SHALL BE PLACE BETWEEN THE THRUST BLOCK AND PIPE AT ALL MECHANICAL JOINTS PRIOR TO PORING CONCRETE.

WATER NOTES

THE FOLLOWING DESCRIBES MATERIALS AND METHODS OF INSTALLATION OF WATER MAINS IN GENERAL. ALL WORK SHALL CONFORM TO THE 1988 STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, ALL SUBSEQUENT SUPPLEMENTAL SPECIFICATIONS IN THE PARTICULAR CONTRACT AND IN ACCORDANCE WITH THE MOST RECENT A.W.W.A STANDARDS.

MAIN INSTALLATION

ALL MAINS WILL BE A MINIMUM OF EIGHT INCH DUCTILE IRON PIPE, CLASS 52, CEMENT LINED MECHANICAL JOINT - OR PUSH-ON JOINT IN ACCORDANCE WITH A.W.W.A. STANDARDS. ALL MAINS OVER EIGHT (8) INCHES IN DIAMETER WILL BE DUCTILE IRON CLASS 52, INCLUDING NIPPLE PIECES. ALL HYDRANT BRANCHES SHALL BE SIX (6) INCH DUCTILE IRON CLASS 52. ALL INTERSECTIONS OF MAINS WILL BE GATED IN THEIR RESPECTIVE DIRECTIONS. NO MAIN GATE WILL EXTEND OVER ONE THOUSAND (1,000) FEET OF EACH OTHER OR SO SPACED AT THE DIRECTION OF THE DEPARTMENT OF PUBLIC WORKS OR FIRE CHIEF. ALL HYDRANTS WILL BE GATED. ALL TAPS TO THE EXISTING PUBLIC SYSTEM WILL SPECIFY A TAPPING SLEEVE AND GATE VALVE. EXCAVATION WILL BE TO A DEPTH. THAT PROVIDES A MINIMUM OF FIVE (5) FEET OF COVER MINIMUM OF 12 INCH SPACING AROUND THE PIPE OVER THE PIPE. IF THE EXCAVATION IS IN LEDGE, A WILL BE REQUIRED TO ALLOW FOR SELECTED BACKFILL MATERIAL (SEE TRENCHING DETAILS). IT WILL BE AT THE DISCRETION OF THE DEPARTMENT OF PUBLIC WORKS AS TO THE TYPE OF BEDDING USED AND WILL DEPEND ON THE FIELD CONDITIONS. IN ANY EVENT, IT WILL BE EITHER CRUSHED BANK GRAVEL, SAND BORROW, OR THREE-FOURTHS INCH STONE. NO STONES LARGER THAN THREE (3) BE USED WITHIN THE FIRST FOOT OF BACKFILL OVER THE PIPE. ONCE THE PIPE HAS SUFFICIENT COVER WITH THE SELECTED MATERIAL, NORMAL BACKFILLING MAY PROCEED WITH CARE. JOINTING OF TYTON JOINT CAST IRON WILL BE WITH THE USE OF A COME-ALONG OR BAR. IF A BAR IS USED A BLOCK OF WOOD WILL BE USED BETWEEN IT AND THE PIPE; THE SAME APPLIES FOR HAVING A BACKHOE/EXCAVATOR SET LARGER DIAMETER PIPE, A BLOCK OF WOOD WILL BE INSERTED BETWEEN THE BUCKET

AND THE PIPE; IN NO EVENT WILL THERE BE A METAL-TO-METAL DRIVING FORCE TO SET THE PIPE. IF THIS IS NOT STRICTLY COMPLIED WITH THE LENGTH OF THE PIPE WILL BE REMOVED AND A NEW ONE USED IN ITS PLACE.

MAIN GATE VALVES AND BOXES

MAIN GATE VALVES SHALL BE OPEN RIGHT, DUCTILE IRON BODY, RESILIENT WEDGE DESIGN AS MANUFACTURED BY MUELLER CO. OR APPROVED EQUAL. MAIN GATE BOXES SHALL BE CAST-IRON, SLIDE TYPE WITH AT LEAST SIX (6) INCHES OF ADJUSTMENT AND AT LEAST FIVE (5) FEET LONG. THE COVERS SHALL BE FLUSH, CLOSE-FITTING WITH THE LETTER "W" OR THE WORD "WATER" CAST INTO THE COVER.

MAIN LINE TAPS

MAIN LINE TAPS WILL ALWAYS BE DONE WITH THE USE OF TAPPING SLEEVE AND GATE VALVE. THE TAPPING SLEEVE TO BE MUELLER OR APPROVED EQUAL. IF THE CONTRACTOR IS TO MAKE THE TAP ON THEIR OWN, THEY MUST FURNISH EVIDENCE OF THEIR COMPETENCE THROUGH PREVIOUS WORK AND HAVE THE NECESSARY TOOLS TO PERFORM THE WORK SATISFACTORILY.

THRUST BLOCKS

ALL PLUGS, CAPS, TEES, BENDS AND HYDRANTS SHALL BE PROVIDED WITH A CONCRETE THRUST BLOCK, OR APPROVED OTHER, TO PREVENT MOVEMENT. THE THRUST BLOCK SHALL CONSIST OF A FORMED CONCRETE BACKING AGAINST UNDISTURBED MATERIAL, POURED IN PLACE WITH 3,000 PSI, 1-1/2", 470 CEMENT CONCRETE MASONRY. THE CONTRACTOR IS TO INSTALL A 6MIL POLYETHYLENE BARRIER BETWEEN THE THRUST BLOCK AND DUCTILE IRON AT ALL MECHANICAL JOINTS PRIOR TO POURING CONCRETE.

INSPECTIONS

FORMED CONCRETE BACKING

CEMENT CONCRETE MASONRY

PRE-FORMED CONCRETE OR LARGE

MATERIAL *3,000 PSI, 1-1/2", 470

BOULDERS AGAINST UNDISTURBED

INSPECTION WILL BE PROVIDED BY THE CITY OF MARLBOROUGH WATER AND SEWER INSPECTOR. BEFORE ANY BACKFILLING IS DONE, THE DEPARTMENT OF PUBLIC WORKS WATER DIVISION WILL BE NOTIFIED TWENTY-FOUR (24) HOURS IN ADVANCE, AND AN INSPECTOR WILL INSPECT THE COMPLETED WORK. THIS METHOD OF OPERATION WILL BE USED FOR HYDRANT INSTALLATION, MAIN TAPS, SERVICE TAPS, TESTING, ETC. IF THE DEPARTMENT OF PUBLIC WORKS FEELS THAT INSUFFICIENT WORKMANSHIP AND CARE IS BEING TAKEN IN THE INSTALLATION, THIS WORK MAY BE TERMINATED UNTIL FURTHER APPROVAL FROM THE CITY ENGINEER.

SERVICE CONNECTIONS

SERVICE CONNECTIONS SHALL HAVE A MINIMUM SIZE OF THREE-FOURTHS (3/4) INCH IN DIAMETER, ALL SERVICE PIPES SHALL BE TYPE K COPPER TUBING. ANY SERVICE PIPE LARGER THAN TWO (2) INCHES SHALL BE CEMENT LINED DUCTILE IRON CLASS 52, CEMENT LINED MECHANICAL JOINT OR PUSH-ON JOINT IN ACCORDANCE WITH A.W.W.A STANDARDS. ALL NEW MAIN CONNECTIONS WILL BE MADE BY WAY OF DIRECT WET TAP. THE USE OF A TWO-STRAP CORPORATION SADDLE SHALL ONLY BE USED WITH APPROVAL OF ENGINEER (TYPE, SMITH-BLAIR OR MUELLER) AND IF A REPAIR SADDLE (TYPE, SMITH BLAIR). A CURB STOP SHALL BE (CTS) THREAD, OPEN RIGHT W/ STOP, AS MANUFACTURED BY FARNUM OR MUELLER. ANY SERVICE ONE (1) INCH OR GREATER SHALL EMPLOY AN ORISEAL CURB WITH WITH STOP. THE SERVICE SHALL BE INSTALLED AT 90° FROM THE ROAD, UNLESS OTHERWISE APPROVED BY THE DEPARTMENT OF PUBLIC WORKS. UNDER NO CIRCUMSTANCES WILL ANY INVERTED KEY CURBS BE INSTALLED IN ANY WATER SYSTEM IN THE CITY OF MARLBORDUGH. THE SERVICE BOX FOR SERVICES UP TO TWO (2) INCHES SHALL BE FOUR-AND-ONE-HALF (4) عكم TO FIVE-AND-ONE-HALF (5 أَي FEET, EXTENSION-TYPE, THREE-FOURTHS INCH ROD, AND COVER TO BE WITH COUNTER SUNK ONE INCH BRASS PLUG TAPPED FOR ONE INCH IRON PIPE. THE SERVICE BOX FOR TWO (2) INCH SERVICES SHALL BE TWO-AND-ONE-HALF (2 1/2) BUFFALO STYLE BOX SLIDE TYPE WITH SERVICE BOX FOOT PIECE, MINIMUM COVER FOR SERVICES SHALL BE FIVE (5) FEET ZERO (0) INCHES, A SAND BACKFILL MATERIAL WILL BE CAREFULLY PLACED AROUND THE SERVICE PIPE TO PROTECT IT FROM NORMAL BACKFILL AND COMPACTION.

TESTING

THE CONTRACTOR SHALL FURNISH A WATER METER PRESSURE GAUGE, TESTING PLUGS, PUMPS, PIPE CONNECTIONS AND OTHER REQUIRED APPARATUS APPROVED BY THE CITY. THE SECTION OF PIPE TO BE TESTED WILL BE COMPLETELY FILLED WITH WATER AND AIR BLOWN OFF THROUGH A HIGH POINT SECTION UNDER TEST WILL BE MAINTAINED FULL AND UNDER PRESSURE SUCH AS A HYDRANT, THE AT 200 LBS. FOR A PERIOD OF ONE (1) HOUR. THE LINE SHALL BE FILLED AND TESTED WITHIN ONE (1) TO THREE (3) DAYS AFTER FILLING. ANY FAILURE OF THE VARIOUS PIPELINES, STRUCTURES, VALVES, HYDRANTS AND RELATED ACCESSORIES THAT OCCURS BEFORE FINAL ACCEPTANCE OF THE WORK SHALL BE REPLACED AT THE EXPENSE OF THE CONTRACTOR. A SUCCESSFUL WATER PRESSURE TEST IS NOT TO BE INTERPRETED AS FINAL ACCEPTANCE. THE PRESSURE AND LEAKAGE TEST SHALL CONSIST OF FIRST RAISING THE WATER PRESSURES (BASED ON THE ELEVATION) TO A PRESSURE IN POUNDS PER SQUARE INCH NUMERICALLY EQUAL TO THE PRESSURE RATING OF THE PIPE. WHILE MAINTAINING PRESSURE, THE CONTRACTOR SHALL MAKE A LEAKAGE TEST BY METERING THE FLOW OF WATER INTO THE PIPE. IF THE AVERAGE LEAKAGE DURING A TWO-HOUR PERIOD EXCEEDS A RATE OF TEN (10) GALLONS PER INCH OF DIAMETER PER TWENTY-FOUR (24) HOURS PER MILE OF PIPELINE, THE SECTION WILL BE HAVING FAILED THE TEST. AFTER TESTING THE PIPELINE IS TO BE DISINFECTED WITH A CHLORINE CONCENTRATION OF APPROXIMATELY FIFTY (50) PARTS PER MILLION PRIOR TO BEING PLACED IN SERVICE. THE INTRODUCTION OF THIS CHLORINE SHALL BE ACCOMPLISHED BY HYDROCHLORIDE SOLUTION INTO THE MAIN. THE PUMPING OR SIPHONING A CALCIUM CHLORINATION WATER IS TO REMAIN IN THE NEW PIPELINE FOR A PERIOD OF TWENTY-FOUR (24) HOURS. DURING THIS PERIOD, PROPER PRECAUTIONS ARE TO BE TAKEN TO PREVENT THIS CHLORINATED WATER FROM FLOWING BACK INTO THE EXISTING SYSTEM. AFTER CHLORINATION AND DE-CHLORINATION A MINIMUM OF (2) BACTERIA SAMPLES ARE TO BE TAKEN TWENTY-FOUR (24) HOURS APART BY AN INDEPENDENT TESTING FIRM HIRED BY THE CONTRACTOR THAT SPECIALIZES IN WATER LINE TESTING AND DISINFECTIONS OF WATER DISTRIBUTION SYSTEMS APPROVED BY THE CITY ENGINEER, ALL TESTING SHALL BE PERFORMED IN THE PRESENCE OF THE CITY REPRESENTATIVE AND ANY TESTS PERFORMED IN THE ABSENCE REPRESENTATIVE SHALL BE CONSIDERED INVALID AND SHALL BE REPEATED AT THE CONTRACTOR'S EXPENSE. ALL TEST TAPS ARE TO BE REMOVED AND REPLACED WITH THREADED BRASS PLUGS ONCE THE MAIN HAS BEEN TESTED AND ACCEPTED BY THE CITY.

MARLBOROUGH



Engineering Division 135 Neil Street Marlborough, MA 01752 p. (508) 624-6910 f. (508) 624-7699 www.marlborough-ma.gov

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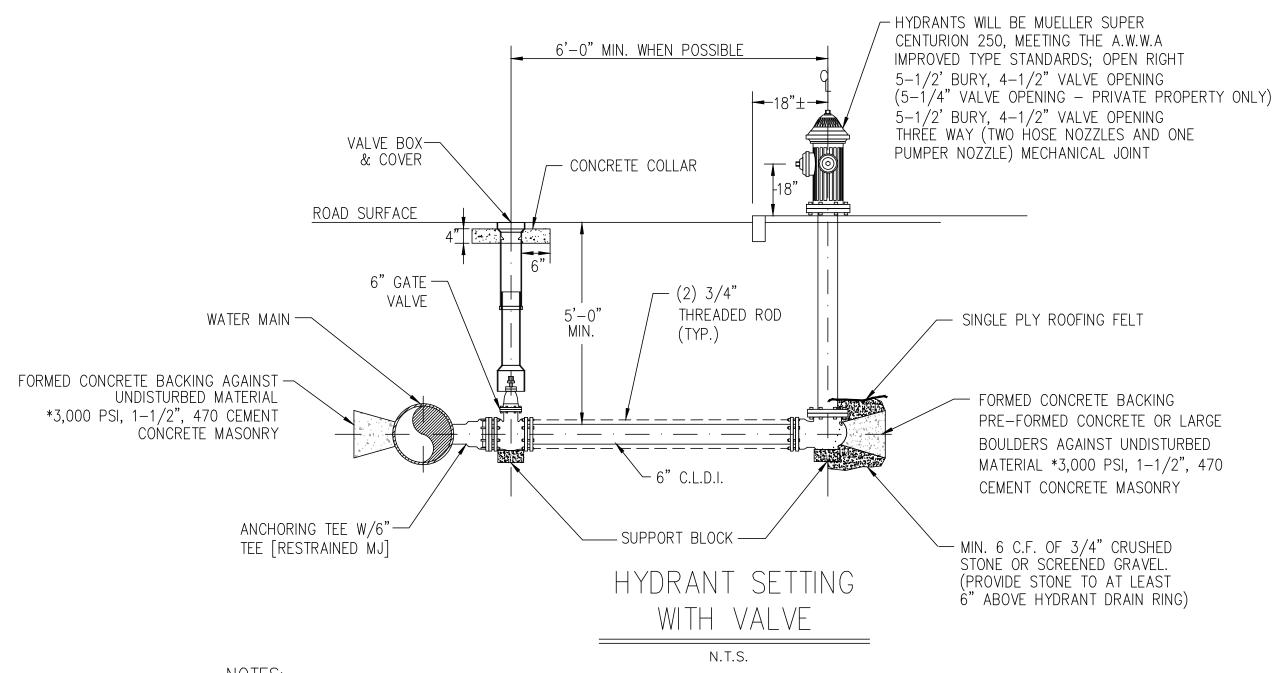
Project Title:

SUDBURY STREET AREA SEWER PROJECT PHASE 4

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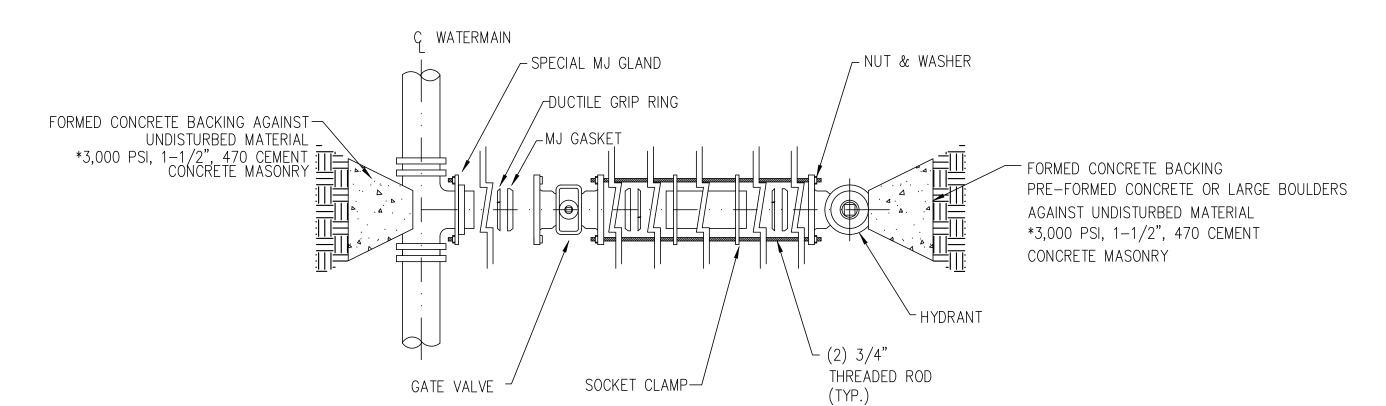
WATER DETAILS

Contract No: ED-2019-01	Sheet No.:
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Scale: N.T.S.	



NOTES:

- 1. PROVIDE HYDRANT AND VALVE JOINTS WITH MECHANICAL JOINTS (MEGALUG OR APPROVED EQUAL).
- 2. SUPPORT BLOCKS TO BE PRESSURE TREATED WOOD OR CONCRETE MASONRY BLOCKS.
- 3. ALL VALVES OPEN RIGHT.
- 4. 6 MIL POLYETHYLENE SHALL BE PLACE BETWEEN THE THRUST BLOCK AND PIPE AT ALL MECHANICAL JOINTS PRIOR TO PORING CONCRETE.

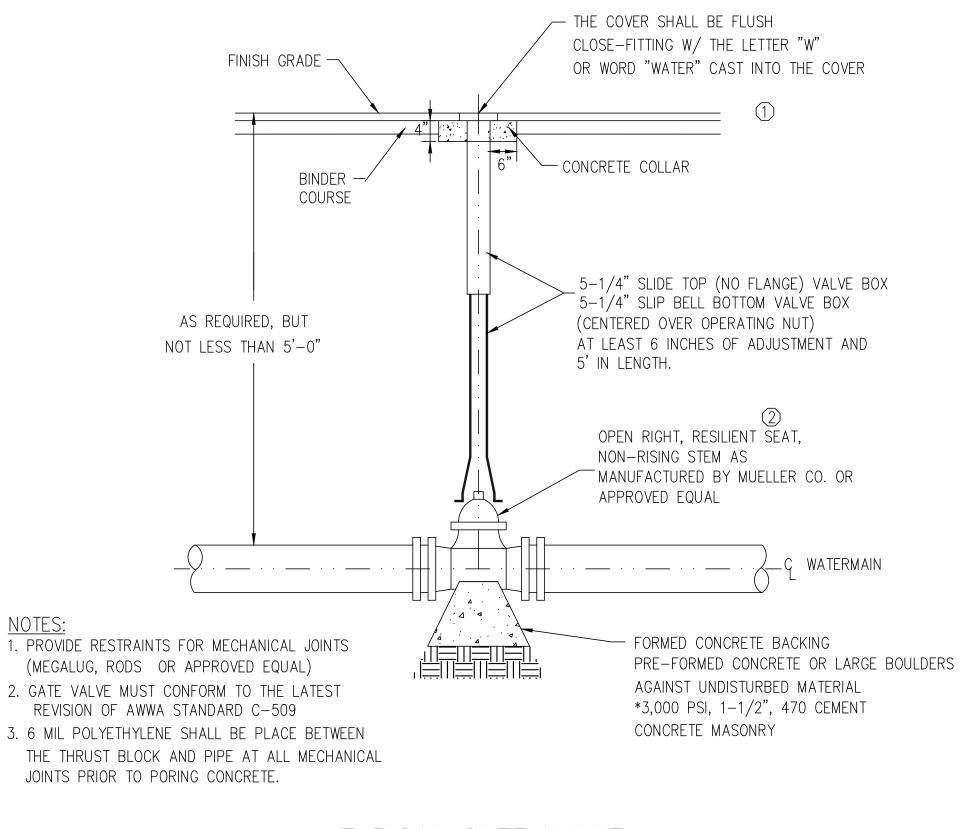


NOTES:

- 1. PROVIDE RESTRAINTS FOR MECHANICAL JOINTS (MEGALUGS OR FRICTION CLAMPS).
- 2. 6 MIL POLYETHYLENE SHALL BE PLACE BETWEEN THE THRUST BLOCK AND
- PIPE AT ALL MECHANICAL JOINTS PRIOR TO PORING CONCRETE.

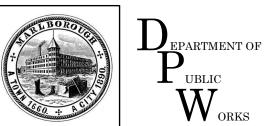
WATER NOTES

- 1. THE PROPOSED WATER MAINS ARE TO BE CONSTRUCTED IN THE SAME HORIZONTAL AND VERTICAL LOCATION AS THE EXISTING WATER MAIN, EXCEPT AS OTHERWISE SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER. REMOVE EXISTING WATER MAINS AND ASSOCIATED COMPONENTS AND SERVICES. THE CONTRACTOR IS TO DISPOSE OF THE EXISTING WATER MAINS AND ASSOCIATED COMPONENTS IN ACCORDANCE WITH STATE AND FEDERAL LAWS. THE CITY HAS THE FIRST RIGHT OF REFUSAL ON FITTINGS AND APPURTENANCES BEFORE DISPOSAL
- 2. THE CONTRACTOR IS TO PROVIDE TEMPORARY BY-PASS PIPING TO SUPPLY WATER TO RESIDENTS. IN ACCORDANCE WITH SPECIFICATION.
- 3. WHEN CROSSING EXISTING UTILITIES, THE CONTRACTOR SHALL DEFLECT THE PIPE WHERE POSSIBLE TO REDUCE THE AMOUNT OF BENDS REQUIRED
- 4. NEW WATER AND SEWER LINES SHALL MAINTAIN A 10 FT. SEPARATION TO THE EXTENT POSSIBLE
- 5. ALL WATER SERVICES SHALL BE TYPE 'K' COPPER WITH A MIN. DIAMETER OF 3". LARGER SERVICES SHALL BE REPLACED AS DIRECTED BY THE ENGINEER
- 6. ALL EXISTING WATER SERVICES SCHEDULED TO BE REMOVED AND REPLACED SHALL BE FROM THE MAIN TO THE CURB STOP/PROPERTY LINE IN THE SAME LOCATION OR AS DIRECTED BY THE ENGINEER.
- 7. THE EXISTING HYDRANTS TO BE REPLACED (AS NOTED ON THE PLAN) SHALL BE REPLACED IN THE LOCATIONS INDICATED ON THE PLANS. HYDRANTS REMOVED ARE TO BE RETURNED TO THE DEPARTMENT OF PUBLIC WORKS LOCATED AT 135 NEIL STREET, MARLBOROUGH, MA. REMOVAL AND DELIVERY OF HYDRANTS IS TO BE INCLUDED IN THE APPROPRIATE UNIT PRICE ITEM IN THE BID.
- 8. THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING ANY ABUTTERS AFFECTED BY A SHUTDOWN (48 HOURS IN ADVANCE)
- 9. TEMPORARY PIPING AND HOSE DISINFECTION MUST BE PERFORMED IN ACCORDANCE WITH AWWA STANDARDS AND MUST BE DESIGNATED FOR POTABLE WATER USE BY NSF.
- 10. ANALYTICAL TESTING OF WATER SHALL BE CONDUCTED BY A THIRD PARTY LABORATORY CERTIFIED IN THE STATE OF MASSACHUSETTS.
- 11. A NIGHT CAP/PLUG, PROVIDED BY THE PIPE SUPPLIER, SHALL BE USED TO CAP THE PIPE AT THE END OF EACH WORK DAY
- 12. WATER SERVICE CONNECTIONS ON THE EXISTING WATER MAINS ARE SHOWN ACCORDING TO THE BEST AVAILABLE INFORMATION. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION OF ALL EXISTING SERVICE CONNECTIONS PRIOR TO CONSTRUCTING THE NEW SERVICE CONNECTIONS.
- 13. WATER MAINS AND SERVICE CONNECTION TO BE INSTALLED TO A MINIMUM DEPTH OF 5 FEET TO TOP OF PIPE, UNLESS OTHERWISE INDICATED ON THE DRAWINGS.



TYPICAL GATE VALVE

CITYOF MĀRLBOROUGH



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SUDBURY STREET AREA SEWER PROJECT PHASE 4

Sheet Title:

WATER DETAILS

Contract No: ED-2019-01	Sheet No.:
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- PRECAST MANHOLE - STAINLESS STEEL PIPE "SEWER" W/ 3 INCH LETTERING CLAMPS AS SPECIFIED SHELF ELEVATION SAME AS CROWN OF HIGHEST PIPE SLOPE 1"/FT-FERROUS METALS TO BE - WALL OF MANHOLE PROTECTED WITH TWO BRICK, CONCRETE FILL BITUMINOUS COATS AS SPEC CRUSHED STONE 1/2" EXPANSION ANCHORS SHAPED INVERT WITH BRICK LINING COMPOSITE ADJUSTMENT RISERS (MANUFACTURED BY EAST JORDAN IRON WORKS' "INFRA-RISER" OR APPROVED EQUAL) (4" OF ADJUSTMENT MIN) SECTION A-A SECTION B-B FIBERGLASS INSIDE DROP BOWL (MANUFACTURED BY RELINER/DURAN, INC. - WALL OF MANHOLE "DROP BOWLS" OR APPROVED EQUAL) BRICK LINED SHAPED INVERT NOTE: MINIMUM 5'- 0" DIAMETER MANHOLES SHALL BE USED AT ALL DROP MANHOLE CONNECTIONS OPTIONAL HOOD-TYPE - A FRAME FIBERGLASS DROP BOWL MINIMUM WEIGHT - 265 LBS MATERIAL - CAST IRON INFLUENT PIPE FRAME & COVER N.T.S. P.V.C. DROP PIPE (SAME DIAMETER AS INFLUENT PIPE) LEBARON LK-110 FINISHED ROAD GRADE STAINLESS STEEL CLAMP FRAME & COVER OR APPROVED EQUAL SECURE TO WALL SEE DETAIL SECTION A-A OR GROUND SURFACE RED CLAY BRICK COMPOSITE ADJUSTMENT RISERS BRICK AS REQUIRED TO (MANUFACTURED BY EAST JORDAN IRON WORKS' ADJUST GRADE EFFLUENT PIPE MOTAR BED & -"INFRA-RISER" OR APPROVED EQUAL) (2 COURSES MIN) CONCRETE COLLAR 45° BELL × SPIGOT (4" OF ADJUSTMENT MIN) **ELBOW** PRECAST CONC. TRANSITION ECTIONS WITH PRECAST TOP SLAB DESIGNED FOR H-20 LOADING (MIN.) 12" MINIMUM UNDISTURBED EARTH -- JOINTS TO BE PREPARED SCREENED GRAVEL WITH BUTYL SEALENT GASKET PLAN MANHOLE STEPS -PVC INTERNAL DROP CONNECTION MANHOLE SECTIONS -PRECAST CONC. BARREL SECTIONS TO BE WATERPROOF N.T.S. SHELF ELEVATION SAME - NEOPRENE BOOT AS CROWN OF HIGHEST PIPE (SEE SEWER PIPE CONNECTION DETAIL) PRECAST CONC. BASE -BRICK OR CONCRETE FILL UNDISTURBED EARTH ~ └ 12" MIN. SCREENED GRAVEL OR LEDGE SECTION A-A 1. LANDING PLATFORMS SHALL BE INSTALLED IN MANHOLES THAT ARE OVER TWENTY FEET (20') PRECAST SEWER MANHOL DEEP TO THE INVERT. N.T.S. 26" DIA. SEWER FRAME & COVER DESIGNED FOR H-20 LOADING LK 110 BRICK AS REQUIRED TO OR CITY OF MARLBOROUGH STANDARD _ADJUST GRADE APPROXIMATE (2 COURSES MIN) OR EXISTING GRADE COMPOSITE ADJUSTMENT RISERS (MANUFACTURED BY EAST JORDAN IRON WORKS' "INFRA-RISER" OR APPROVED EQUAL) (4" OF ADJUSTMENT MIN) PRECAST REINFORCED CONCRETE BUILDING SERVICE CONNECTION DESIGNED FOR H-20 LOADING INVERT TO BE DETERMINED IN FIELD BY CONTRACTOR -5' DIA TO BE DETERMINED IN ∕6" PVC PIPE & FITTINGS FIELD BY CONTRACTOR 4000 PSI CONCRETE ENCASEMENT SAWCUT TOP OF EXIST. PIPE & REMOVE ALL CONNECT 6" PVC RISER PIECES FROM NEW MANHOLE TOP 1/3 OF PIPE 7 TO SANITARY SEWER WITH FLEXIBLE PIPE-TO-PIPE CONNECTOR 12" MIN. 1/2 PIPE DIAMETER (TYP) -24" CONCRETE BASE (3000 PSI) 12" COMPACTED CRUSHED STONE TYPICAL CHIMNEY DETAIL FOR SEWER CONNECTION N.T.S.

SEWER NOTES

THE FOLLOWING DESCRIBES MATERIALS AND METHODS OF INSTALLATION OF SEWER MAINS IN GENERAL. ALL WORK SHALL CONFORM TO THE 1988 STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, ALL SUBSEQUENT SUPPLEMENTAL SPECIFICATIONS IN THE PARTICULAR CONTRACT.

MAIN INSTALLATION

ALL GRAVITY MAINS WILL BE A MINIMUM OF EIGHT INCHES IN DIAMETER; ALL LATERALS, INTERCEPTORS, TRUNKLINES, ETC., WILL BE EITHER POLYVINYL CHLORIDE (PVC) OR CEMENT LINED DUCTILE IRON. THE CLASS OF PIPE WILL ACCOMMODATE THE FIELD CONDITIONS, I.E., PVC PIPE SHALL MEET OR EXCEED THE ASTM D-3034, SDR 35 REQUIREMENTS. PVC PIPE SHALL NOT BE USED FOR PIPES WITH DIAMETERS GREATER THAN 15 INCHES UNLESS EXPRESSLY APPROVED IN WRITING BY THE COMMISSIONER OF PUBLIC WORKS. PVC PIPE SHALL NOT BE USED FOR PIPES WHEN THE DEPTH EXCEEDS 10 FEET. FOR DEPTHS OF SEWERS EXCEEDING 10 FEET CLASS 52 CEMENT LINED DUCTILE IRON SHALL BE USED. WHEN THE COVER IS FIVE FEET OR LESS UNDER A ROADWAY, THE CLASS AND TYPE OF PIPE WILL BE SPECIFIED BY THE DEPARTMENT OF PUBLIC WORKS. THE SLOPE OF THE SEWER SHALL NOT BE LESS THAN 1% OR EXCEED 9%. ALL SIZES OF ALL PIPE WILL BE INSTALLED WITH A MINIMUM SLOPE WHICH YIELDS THE SCOURING VELOCITY FOR THE PARTICULAR DIAMETER PIPE. WARNING RIBBON SHALL BE USED IN THE INSTALLATION OF ANY SEWER MAIN. SAID RIBBON SHALL BE GREEN IN COLOR AND IMPRINTED WITH THE WORDS "CAUTION SEWER LINE BELOW", OR WORDS SIMILAR INTENT, AND SHALL BE METALLIC TO PROVIDE FOR FUTURE LOCATING WITH INDUCTIVE TAPE LOCATORS. DEPTH OF BURIAL SHALL BE 2' ABOVE THE TOP OF SAID PIPE.

MANHOLES

DISTANCE BETWEEN ANY TWO MANHOLES SHALL NOT EXCEED 300 FEET. ANY TWO SEWER LINES ENTERING A MANHOLE OR A STRUCTURE WITH A DIFFERENCE IN ELEVATION OF 18 INCHES AN INSIDE DROP SHALL BE PROVIDED. THE INSIDE DROP IN A MANHOLE SHALL NOT EXCEED 5 FEET IN CHANGE OF ELEVATION. ANY MANHOLE THAT IS REQUIRED TO HAVE AN INSIDE DROP SHALL BE A 5 FOOT INSIDE DIAMETER MANHOLE. MANHOLES SHALL BE PRECAST CONCRETE AND PRECAST SECTIONS WILL BE MADE WATERTIGHT BY O-RING JOINTS OR APPROVED EQUAL. CONNECTIONS TO MANHOLES SHALL BE CORED AND MADE WITH A FLEXIBLE MANHOLE BOOT. THE EXTERIOR OF ALL MANHOLES SHALL BE COMPLETELY COVERED WITH A BITUMINOUS WATERPROOFING. ALL SEWER MANHOLES WILL HAVE A BRICK TABLE CONSTRUCTED IN THEIR BASE TO MEET ALL INCOMING AND OUTGOING PIPES SO THAT THE FLOW IS CHANNELED SMOOTHLY FROM ONE POINT TO ANOTHER. ALL BRICKS USED FOR MANHOLE INVERTS WILL BE A HARD-BURNED SEWER BRICK TO MEET ASTM C32-69 GRADE SS. BRICKWORK OR COMPOSITE ADJUSTMENT RISERS WILL BE USED BETWEEN THE MANHOLE STRUCTURE AND RING AND RING COVER TO GIVE THE DESIRED GRADE. HOWEVER, THE BRICKWORK IN THIS AREA WILL NEVER EXCEED EIGHT INCHES AND THE COMPOSITE ADJUSTMENT RISERS SHALL CONISIT OF NO LESS THAN 4 INCHES. THIS BRICKWORK CAN BE WITH A COMMON BRICK. LANDING PLATFORMS SHALL BE INSTALLED IN MANHOLES THAT ARE OVER TWENTY FEET (20') DEEP TO THE INVERT.

THRUST BLOCKS

THRUST LOCKS WILL BE USED ON ANY FORCE MAIN SECTIONS WHERE CALLED FOR BY THE DEPARTMENT OF PUBLIC WORKS.

THE THRUST BLOCK SHALL CONSIST OF A FORMED CONCRETE BACKING AGAINST UNDISTURBED MATERIAL, POURED IN PLACE WITH 3,000 PSI, 1-1/2", 470 CEMENT CONCRETE MASONRY. THE CONTRACTOR IS TO INSTALL A 6MIL POLYETHYLENE BARRIER BETWEEN THE THRUST BLOCK AND DUCTILE IRON AT ALL MECHANICAL JOINTS PRIOR TO POURING CONCRETE.

INSPECTIONS

INSPECTION WILL BE PROVIDED BY THE CITY OF MARLBOROUGH ONLY ON A LIMITED OR PART-TIME BASIS. BEFORE ANY BACKFILLING IS DONE, THE DEPARTMENT OF PUBLIC WORKS' WATER & SEWER DIVISION WILL BE NOTIFIED 24 HOURS IN ADVANCE, A CITY REPRESENTATIVE WILL INSPECT THE COMPLETED WORK. IF THE DEPARTMENT OF PUBLIC WORKS FEELS THAT INSUFFICIENT WORKMANSHIP AND CARE IS BEING TAKEN IN THE INSTALLATION, A PERSON WILL BE ASSIGNED FROM THE DEPARTMENT OF PUBLIC WORKS ON A FULL-TIME BASIS. THE CONTRACTOR OR OWNER WILL BEAR THE COST OF THIS INSPECTOR.

CONNECTIONS

MAIN-TO-MAIN CONNECTIONS WILL ONLY BE MADE BY USE IF A MANHOLE AS SPECIFIED IN THE MARLBOROUGH CITY CODE \$ 510-19B(2). IN THE CASE OF A TAP OF A SERVICE-TO-MAIN THE USE OF A TAPPING SADDLE AS APPROVED BY THE DEPARTMENT OF PUBLIC WORKS. CHIMNEYS WILL BE EMPLOYED ON THE MAIN WHEREVER A SERVICE IS NEEDED WHEN THE DEPTH OF THE MAIN EXCEEDS EIGHT FEET. THIS SHALL BE EXCEPTED WHEN THE ELEVATION OF THE CONNECTION AT THE BUILDING DOES NOT ALLOW THE USE OF A CHIMNEY. ALL CHIMNEYS WILL BE PRECAST STRUCTURES. ALL WYE-BRANCHES WILL BE PROVIDED WITH THE PROPER END CAPS UNTIL SUCH TIME THE COMPLETED TIE-IN IS MADE. THE CONNECTIONS OF BUILDING SEWERS INTO PUBLIC SEWER SHALL BE MADE AT THE THE WYE OR AT BENCH LEVEL IN A MANHOLE. IF A WYE-BRANCH OR MANHOLE IS UNAVAILABLE, A CONNECTION MAY BE MADE BY TAPPING THE EXISTING SEWER BY AN APPROVED METHOD. THIS MAY CONSIST OF CUTTING OUT A PORTION OF THE SEWER MAIN AND INSTALLING A "WYE" AT THE MAIN AND RECONNECTION OF ROOF DRAINS, DOWNSPOUTS, FOUNDATION DRAINS, AREAWAY DRAINS, BASEMENT DRAINS, SUMP PUMPS OR OTHER SOURCES OF SURFACE RUNDEF OR GROUNDWATER TO A BUILDING SEWER OR BUILDING DRAIN WHICH IS DIRECTLY OR INDIRECTLY TO A PUBLIC SEWER. ALL SEWERS SHALL BE TESTED BEFORE ANY CONNECTIONS ARE MADE TO BUILDINGS.

BUILDING SEWERS

THE SIZE AND SLOPE OF THE BUILDING SEWER SHALL BE SUBJECT TO THE APPROVAL OF THE COMMISSIONER BUT IN EVENT SHALL THE DIAMETER LESS THAN SIX INCHES, THE SLOPE OF SUCH PIPE SHALL NOT BE LESS THAN 1% OR GREATER THAN 9%. THE BUILDING SEWER SHALL BE LAID AT THE UNIFORM GRADE AND IN A STRAIGHT LINE ALIGNMENT INSOFAR AS POSSIBLE. CHANGES IN DIRECTION SHALL BE MADE ONLY WITH BENDS, SWEEPS, MANHOLES APPROVED BY THE COMMISSIONER, CLEANOUTS SHALL BE LOCATED ON THE EXTERIOR OR PRECAST CLEANDUTS AS SHALL BE IN A PLACE THAT IS ACCESSIBLE FOR MAINTENANCE BY THE SIDE OF THE BUILDING SERVICE AND DEPARTMENT OF PUBLIC WORKS OR OTHERS. WARNING RIBBON SHALL BE USED IN THE INSTALLATION OF ANY SERVICE IMPRINTED WITH THE WORDS "CAUTION SEWER LINE PIPE. SAID RIBBON SHALL BE GREEN IN COLOR AND BELOW", OR WORDS SIMILAR INTENT, AND SHALL BE METALLIC TO PROVIDE FOR FUTURE LOCATING WITH INDUCTIVE TAPE LOCATORS, DEPTH OF BURIAL SHALL BE 2' ABOVE THE TOP OF SAID PIPE, THE SEWERS SHALL BE TESTED BEFORE ANY CONNECTIONS ARE MADE TO BUILDINGS. WHERE APPLICABLE ENTRANCE FEES IN ACCORDANCE WITH THE MARLBORDUGH CITY CODE SECTION 510-4 "BUILDING SEWER CONNECTIONS" SHALL BE PAID PRIOR TO ANY WORK.

SEQUENCE OF TESTING

THE SEQUENCE OF TESTING SHALL BE AS FOLLOWS: CONSTRUCTION COMPLETED AND ALL BACKFILL AND SUPERIMPOSED LOADS IN PLACE, LANDSCAPING OVER AND AROUND SEWER APPURTENANCE IS COMPLETED, MANHOLES COMPLETED, LINES THOROUGHLY CLEANED, VISUAL INSPECTION ('FLASHING"), MANDREL TESTING (ALL APPROVED PIPE TYPES), DETERMINATION OF GROUND WATER TABLE, AIR TESTING OR INFILTRATION TESTING (PIPE, MANHOLE).

TESTING

THE CONTRACTOR SHALL FURNISH A PRESSURE GAUGE, TESTING PLUGS, PUMPS, MANDREL, PIPE CONNECTIONS AND OTHER REQUIRED APPARATUS APPROVED BY THE CITY. THE SEWER LINE AND MANHOLE TESTING SHALL BE ACCOMPLISHED THROUGH THE COMBINATION OF VISUAL INSPECTIONS, DEFLECTION TESTS, LOW-PRESSURE AIR TESTS AND LEAKAGE TESTS METHODS. ACCEPTANCE TESTS SHALL ONLY BE PERFORMED AFTER ALL WORK ADJACENT TO AND OVER THE PIPE HAS BEEN COMPLETED. ALL TESTING SHALL BE PERFORMED IN THE PRESENCE OF THE CITY REPRESENTATIVE AND ANY TESTS PERFORMED IN THE ABSENCE OF THE CITY REPRESENTATIVE SHALL BE CONSIDERED INVALID AND SHALL BE REPEATED AT THE CONTRACTOR'S EXPENSE.

DEFLECTION TEST: A DEFLECTION TEST SHALL BE REQUIRED FOR ALL PLASTIC SEWER PIPING INSTALLED (DUCTILE IRON PIPING WILL BE TESTED AT THE DIRECTION OF THE INSPECTOR). A GO-NO-GO MANDREL SHALL BE PULLED THROUGH THE PIPE A MINIMUM OF 60 DAYS AFTER THE FINAL PLACEMENT OF BACKFILL AND SUPERIMPOSED LOADS. THE DEFLECTION OF THE SEWER PIPE SHALL NOT EXCEED 5% WHEN TESTED WITH A MANDREL SPECIFICALLY DESIGNED FOR THE TYPE AND SIZE OF PIPE INSTALLED. PIPE SEGMENTS FAILING THE MANDREL TEST SHALL BE REMOVED AND REPLACED.

LOW-PRESSURE AIR TEST: ON ALL SANITARY SEWER LINES (PLASTIC AND DUCTILE IRON), INCLUDING PRIVATE SEWER LINES, THE CONTRACTOR SHALL CONDUCT A LINE ACCEPTANCE TEST USING LOW-PRESSURE AIR TESTING. DUCTILE IRON PIPELINES SHALL BE TESTED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF ASTM C924. PVC PIPELINES SHAL BE TESTED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF ASTM F1417-98 AND UBPPA UNI-B-6. THE CONTRACTOR SHALL FURNISH ALL LABOR, EQUIPMENT AND ANY APPURTENANT ITEMS TO SATISFACTORILY PERFORM THE VACUUM TEST. ALL TESTING EQUIPMENT SHALL BE APPROVED FOR VACUUM TESTING MANHOLES.

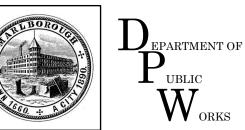
AIR TEST PROCEDURE (DRY CONDITIONS): THE FOLLOWING PROCEDURE SHALL BE USED DURING THE LOW-PRESSURE

OR OTHER SUITABLE TEST PLUGS/PLUG OR CAP THE ENDS OF ALL BRANCHES, LATERALS, TEES, WYES AND STUBS TO BE INCLUDED IN THE TEST. SECURELY BRACE ALL PLUGS OR CAPS TO PREVENT BLOW-OUT. ONE OF THE PLUGS OR CAPS SHOULD HAVE AN INLET TAP OR OTHER PROVISION FOR CONNECTING A HOSE TO A POTABLE AIR SOURCE. IF NOT PROPERLY SEALED, AIR CAN LEAK THROUGH THE POROUS MATERIAL IN THE PIPE'S ANNULUS. CONNECT THE AIRHOSE TO THE INLET TAP. ADD AIR SLOWLY THAT A PRESSURE OF 5.0 PSIG IS MAINTAINED FOR AT LEAST FIVE MINUTES. THE PRESSURE WILL NORMALLY DROP SLIGHTLY UNTIL EQUILIBRIUM IS OBTAINED; HOWEVER A MINIMUM OF 5.0 PSIG IS REQUIRED.

DISCONNECT THE AIR SUPPLY AND DECREASE THE PRESSURE TO 5.0 PSIG BEFORE STARTING THE TEST.

OF SEWER MAINS LOCATED ABOVE THE GROUND WATER TABLE; ISOLATE A SECTION OF SEWER BY INFLATING STOPPERS

CITY^{OF}
MARLBOROUGH



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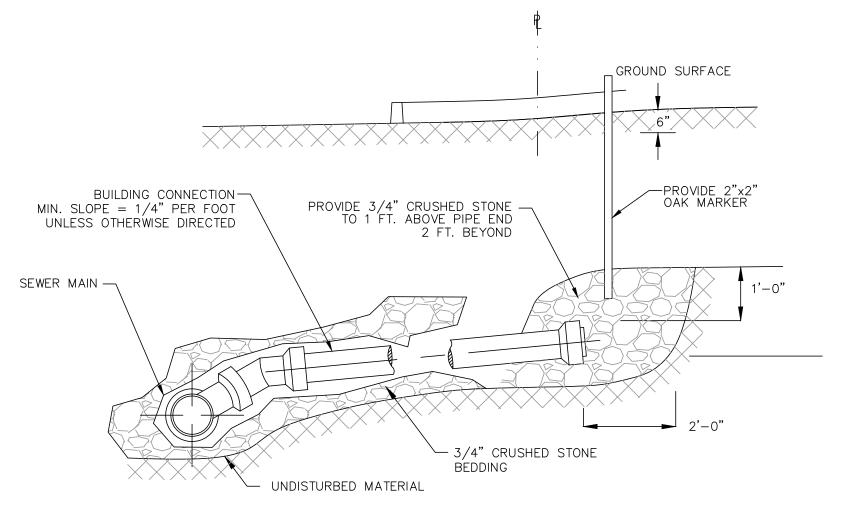
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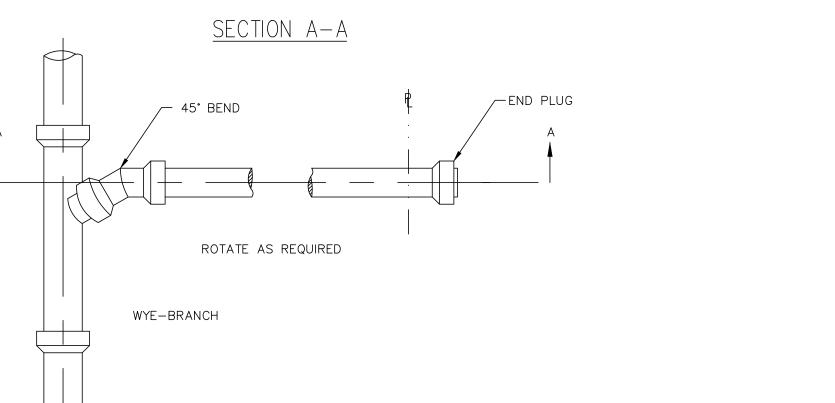
SUDBURY STREET AREA SEWER PROJECT PHASE 4

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SEWER DETAILS

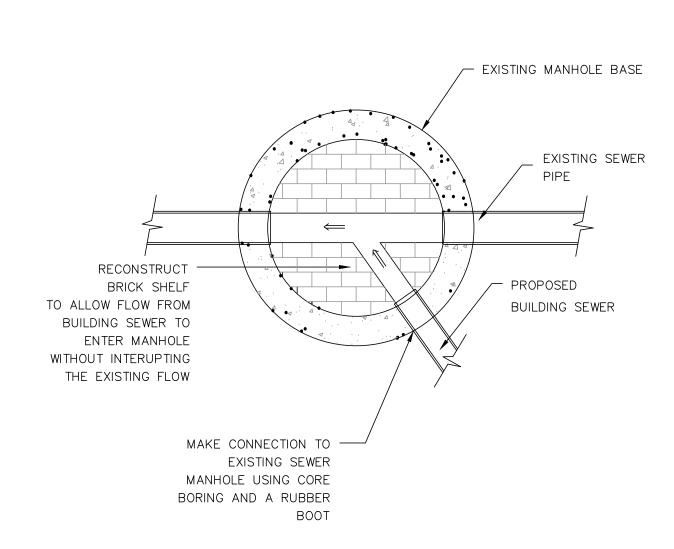
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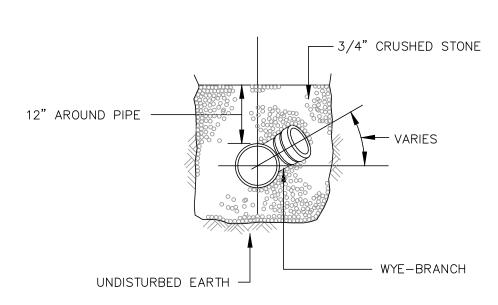
SEWER SERVICE CONNECTION

PLAN

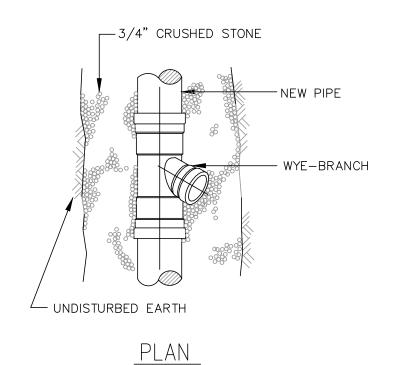


SEWER CONNECTION DETAIL

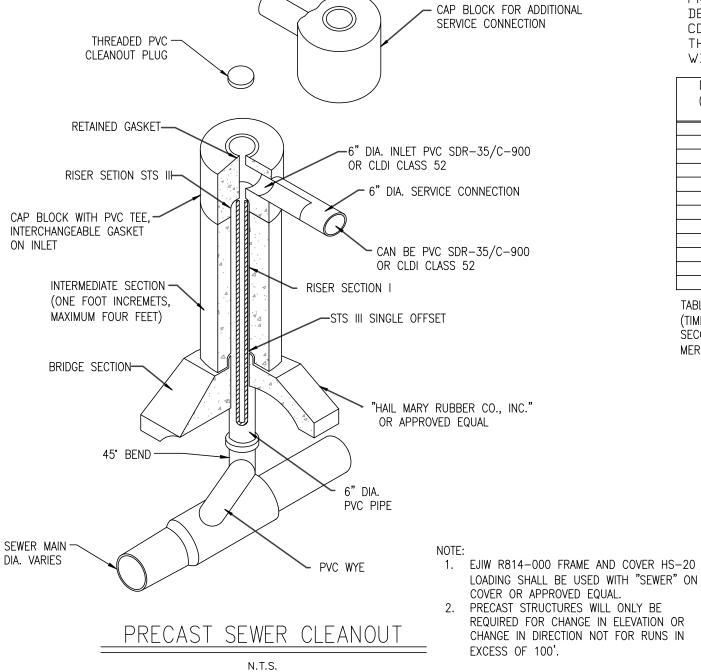
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<u>SECTION A-A</u>



WYE-BRANCH N.T.S.



SEWER NOTES

TESTING (CONTINUED)

AIR TEST PROCEDURE (WET CONDITIONS): ALL TEST PRESSURES ARE MEASURED AS GAGE PRESSURE, WHICH IS ANY PRESSURE GREATER THAN ATMOSPHERIC. SINCE WATER PRODUCES A PRESSURE OF 5 PSIG FOR EVERY FOOT OF DEPTH MAIN, AIR TEST PRESSURE MUST BE INCREASED TO OFFSET THE DEPTH OF GROUND WATER OVER THE SEWER LINE. IN AREAS WHERE THE GROUNDWATER IS KNOWN TO EXIST, THE CONTRACTOR SHALL INSTALL A PIPE NIPPLE, APPROXIMATELY 10" LONG, THROUGH THE MANHOLE WALL DNE-HALF INCH DIAMETER CAPPED PVC MANHOLE. THIS SHALL BE DONE AT THE TIME THE SEWER ON TOP OF ONE OF THE SEWER LINES ENTERING THE LINE IS INSTALLED. IMMEDIATELY PRIOR TO PERFORMING THE LINE ACCEPTANCE TEST, THE GROUND WATER ELEVATION SHALL BE DETERMINED BY REMOVING THE PIPE CAP, BLOWING AIR THROUGH THE PIPE NIPPLE INTO THE GROUND SO AS TO CLEAR IT, AND THEN CONNECTING A CLEAR PLASTIC TUBE TO THE NIPPLE. THE HOSE SHALL BE HELD VERTICALLY AND A MEASUREMENT OF THE HEIGHT IN FEET OF WATER OVER THE INVERT OF THE PIPE SHALL BE TAKEN AFTER THE WATER HAS STOPPED RISING IN THE PLASTIC TUBE. MULTIPLY THE HEIGHT IN FEET ABOVE THE PIPE INVERT TO THE GROUND WATER TABLE BY 0.43 PSIG/FT AND ADD IT TO THE REQUIRED 3.5 PSIG MINIMUM TEST PRESSURE. FOR EXAMPLE, IF THE HEIGHT OF WATER IS 11.5 FT, THEN THE ADDED PRESSURE WILL BE 0.43 PSIG/FT X 11.5 FT OR 4.9 PSIG. THIS INCREASES THE TEST PRESSURE FROM 3.5 PSIG TO 8.4 PSIG AND THE 2.5 PSIG TO 7.4 PSIG, RESPECTIVELY. ALLOWABLE DROP OF 1 PSIG FOR THE TIME ALLOWED AS OUTLINED IN TABLE 1 STILL REMAINS. IF HOWEVER, THE GROUND WATER LEVEL IS 2 FT OR MORE ABOVE THE TOP OF THE PIPE AT THE UPSTREAM ENDS, OR IF THE AIR PRESSURE REQUIRED FOR THE TEST CALCULATES OUT TO BE GREATER THAN THE 9 PSIG GAGE, THE AIR THIS CASE, A VISUAL INSPECTION FOR LEAKAGE WOULD PRODUCE A TEST METHODS SHOULD NOT BE USED. IN MORE CONSERVATIVE TEST. BEFORE THE AIR TEST METHOD IS USED, THE GROUND WATER LEVEL SHOULD BE LOWERED BY PUMPING OR DEWATERING.

VACUUM TESTING OF MANHOLES: ALL SANITARY SEWER MANHOLES CONSTRUCTED BY THE CONTRACTOR SHALL BE VACUUM TESTED FOR LEAKAGE IN THE PRESENCE THE CITY REPRESENTATIVE. VACUUM TESTING SHALL BE PERFORMED IN ACCORDANCE WITH ASTM C1244. THE VACUUM TEST REQUIREMENTS WILL NOT APPLY TO ANY EXISTING MANHOLE, OR ANY EXISTING MANHOLE THAT HAS BEEN CONVERTED TO A DROP MANHOLE BY THE CONTRACTOR.

VACUUM TESTING PROCEDURE: ALL LIFTING HOLES SHALL BE PLUGGED WITH AN APPROVED NON-SHRINKING GROUT INSIDE AND OUT. MANHOLE JOINTS SHALL BE GROUTED FROM THE OUTSIDE ONLY. ALL PIPES ENTERING THE MANHOLE SHALL BE PLUGGED. THE CONTRACTOR SHALL SECURELY BRACE THE PLUGS IN ORDER TO KEEP THEM FROM BEING DRAWN INTO THE MANHOLE. THE TEST HEAD SHALL BE PLACED AT THE INSIDE OF THE TOP OF THE CONE SECTION OF THE MANHOLE AND THE SEAL INFLATED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. A VACUUM OF 10 INCHES OF MERCURY SHALL BE DRAWN AND THE VACUUM PUMP SHUT OFF. WITH THE VALVES CLOSED, THE TIME FOR THE VACUUM TO DROP TO 9 INCHES SHALL NOT BE LESS THAN THAT SHOWN IN (TABLE 1) BELOW:

TEST FAILURE

SHOULD A LINE OR MANHOLE FAIL TO PASS ANY OF THE ACCEPTANCE TEST AS OUTLINED, THE CONTRACTOR SHALL AT HIS EXPENSE, DETERMINE THE SOURCE OF THE FAILURE, MAKE ANY REPAIRS AND RE-TEST THE SEGMENT OF PIPING OR MANHOLE IN QUESTION AT NO COST TO THE CITY.

MANDREL EQUIPMENT

EQUIPMENT SYSTEMS USE TO PERFORM MANDREL TESTS SHALL BE SPECIFICALLY DESIGNED FOR THE PIPE MATERIAL BEING TESTED. MANDRELS THAT DO NOT SPECIFICALLY STATE THE SIZE AND TYPE OF PIPING FOR WHICH IT IS APPLICABLE SHALL NOT BE ALLOWED.

AIR/VACUUM TEST EQUIPMENT

EQUIPMENT SYSTEMS USED TO PERFORM LOW-PRESSURE AIR TESTS SHALL BE SPECIFICALLY DESIGNED FOR THIS PURPOSE. SYSTEMS SHALL BE APPROVED BY THE CITY PRIOR TO THE TEST TAKING PLACE. ISOLATION OF PIPE SEGMENTS SHALL BE ACCOMPLISHED THROUGH THE USE OF PLUGS (MECHANICAL OR PNEUMATIC TYPE). PRESSURIZATION OF THE SEWER MAIN SHALL BE ACCOMPLISHED THROUGH THE USE OF AN AIR COMPRESSOR THAT HAS AN OIL FREE AIR SOURCE, SINGULAR CONTROL PANEL, MAIN SHUT-OFF VALVE, PRESSURE-REGULATING VALVE, 9 PSIG PRESSURE RELIEF VALVE, INPUT PRESSURE GAUGE AND A CONTINUOUS MONITORING PRESSURE GAUGE. THE CONTINUOUS MONITORING PRESSURE GAUGE SHALL HAVE A PRESSURE RANGE FROM 0 PSIG TO AT LEAST 10 PSIG WITH MINIMUM DIVISIONS OF .10 PSIG. THE GAUGE FACE SHALL HAVE A MINIMUM OF 4 INCHES IN DIAMETER AND HAVE AN ACCURACY OF ±.04 PSIG.

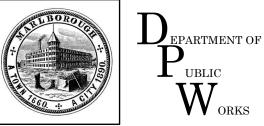
SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEER FOR ALL PRODUCTS SPECIFIED WITHIN THE BID/CONTRACT DOCUMENTS AND INDICATED OR IMPLIED ON THE DRAWINGS. THE SHOP DRAWINGS SHALL BE SUBMITTED AT LEAST (10) DAYS PRIOR TO SCHEDULED USE OF THE PRODUCT FOR REVIEW BY THE ENGINEER. EACH SHOP DRAWING SHALL INCLUDE THE SPECIFICATIONS OF THE PRODUCT, MATERIAL CONTENT, PHYSICAL AND CHEMICAL PERAMETERS, TESTING RESULTS, DIMENSIONS, QUALIFICATIONS, COLOR CHOICES, SAMPLES (IF SPECIFICALLY REQUIRED), AND DRAWINGS (IF SPECIFICALLY REQUIRED). EXACTLY FOUR (4) COPIES OF SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER OR DESIGNATED REPRESENTATIVE. THE SUBMITTED SHOP DRAWINGS SHALL BE STAMPED AND SIGNED BY THE CONTRACTOR WITH A STATEMENT INDICATING THAT THE CONTRACTOR HAS REVIEWED THE SHOP DRAWINGS AND ACCEPTED THE PRODUCT. UPON RECEIPT OF THE SHOP DRAWINGS, THE ENGINEER WILL REVIEW THE PRODUCT INFORMATION TO DETERMINE ACCEPTABILITY BASED ON THE CONTRACT DOCUMENTS. THE ENGINEER SHALL RETURN AT LEAST TWO (2) COPIES OF THE REVIEWED SHOP DRAWINGS TO THE CONTRACTOR WITH A MEMO DETAILING THE ENGINEER'S REVIEW. IN THE CASE THAT THE SHOP DRAWING IS REJECTED, THE ENGINEER WILL RETURN THREE (3) COPIES TO THE CONTRACTOR WITH A REASONABLE EXPLANATION AS TO WHY THE PRODUCT WAS REJECTED.

DEPTH (FEET) 0-8 10 12 14 16 18 20 22 24 26 28 30 TABLE 1 (TIMES SHOWN SECONDS, FOI MERCURY.)	48 66 SECO 20 2 25 3 30 35 40 5 45 50 55 7 59 7 64 8 69 59 74 9	METER (INCHES) 50 72 ONDS 26 33 53 41 59 49 66 57 52 67 59 73 55 81 72 89 78 97 85 105 61 113 68 121 ELAPSED TIMES, ACUUM OF 1 INCOME	IN CH OF	B •	JTILITY PIPE	A A		-UTILITY PIPE B	-UTILITY PIPE	
–20 " ON DR	FLOWABLE FILL	UTILITY PII		1'-0" MIN.	1'-0" MIN.	PLAN	1'-0" MIN	UTILIT	1'-0" MIN	
		R SOLID CONCRE		SECTION B-		DISTURBED MA	ATERIAL	SECTION	N A-A	

UTILITY CROSSING BRIDGE

MARLBOROUGH D



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Project Title:

SUDBURY STREET AREA SEWER PROJECT PHASE 4

Sheet Title:

SEWER DETAILS

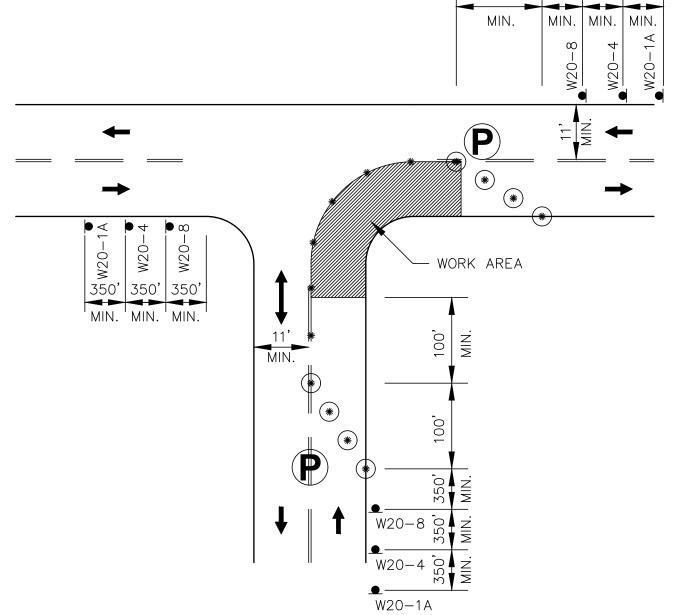
Contract No: ED-2019-01	Sheet No.:
Date: 2/02/2012	99 C-510
Scale: N.T.S.	

CONSTRUCTION SIGN LEGEND

IDENTIFICATION	SIZE	OF SIGN		TEXT DIMENSIONS	COLOR	UNIT AREA IN
NUMBER	WIDTH	HEIGHT	TEXT	LETTER VERTICAL ARROW HEIGHT SPACING	BACK- GROUND LEGEND BORDER	SQUARE FEET
W20-1D	48″	48"	STEEL PLATES 100 FT	MUTCD STANDARD DETAIL	MUTCD STANDARD DETAIL	16.0
W20-1A	48″	48″	ROAD WORK AHEAD	•	•	16.0
W20-1B	48″	48″	ROAD WORK 1000 FT			16.0
W20-1C	48″	48″	ROAD WORK 500 FT			16.0
W20-4	48″	48″	ONE LANE ROAD AHEAD			16.0
W20-7b	48″	48″	BE PREPARED TO STOP			16.0
W20-8	48″	48″	POLICE OFFICER AHEAD			16.0
G20-2	36″	18″	END ROAD WORK			4.5
R11-2	48″	30″	ROAD CLOSED			10.0
W5-1	48″	48″	ROAD			16.0
W1-4L	30″	30″				6.25
W1-4R	30″	30″				6.25
M4-8A	24"	18″	END DETOUR			3.0
M4-9L	30″	24″	DETOUR			5.0
M4-9R	30″	24"	DETOUR			5.0
M4-9∨	30″	24″	DETOUR •			5.0
W20-2	48″	48"	DETOUR AHEAD			16.0

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

100' | 350' | 350' | 350'



NOTE:

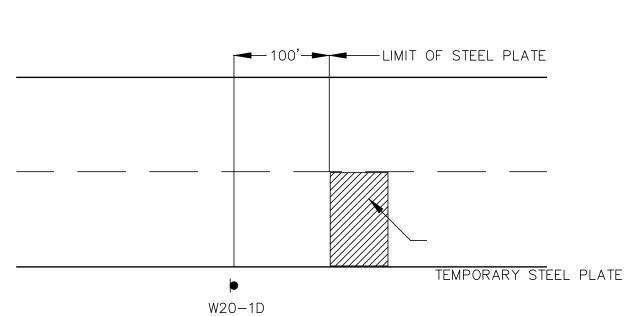
1. ADVANCE WARNING SIGN PLACEMENT TO BE ADJUSTED AS NECESSARY.

2. ALL DRUMS AND CONES TO BE SPACED

@ 20' O.C.

ONE LANE BI-DIRECTIONAL TRAFFIC AT INTERSECTIONS

N.T.S.



TRENCH PLATE SIGNING

N.T.S.

GENERAL NOTES

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.

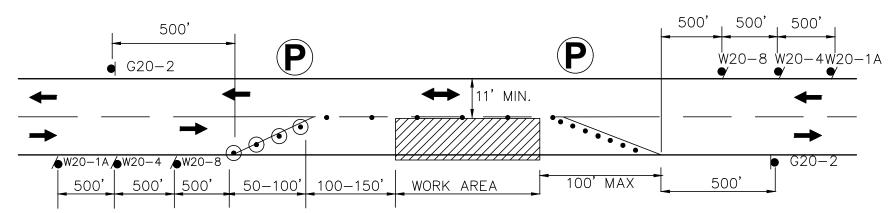
11. SPECIFIC SIGNAGE SHALL BE USED WHEN TEMPORARY TRENCH PLATES ARE INSTALLED. (SEE DETAIL ON THIS SHEET).

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 PLACEMENT OF THE VARIABLE MESSAGE BOARDS SHALL BE IN PLACE TWO WEEKS PRIOR TO THE START OF CONSTRUCTION. THE MESSAGE BOARDS SHALL READ "WATER MAIN REPLACEMENT APRIL THRU JUNE EXPECT DELAYS". THESE BOARDS ARE TO BE PAID FOR UNDER ITEM NO. 851 SAFETY CONTROLS FOR CONSTRUCTION OPERATIONS.

14. HOURS OF WORK SHALL BE MONDAY-FRIDAY 7:00 A.M. - 3:30 P.M. THERE WILL BE NO WORK PERFORMED ON APRIL 18, 2011, MAY 30, 2011 AND JULY 4, 2011 DUE TO HOLIDAY CLOSINGS.

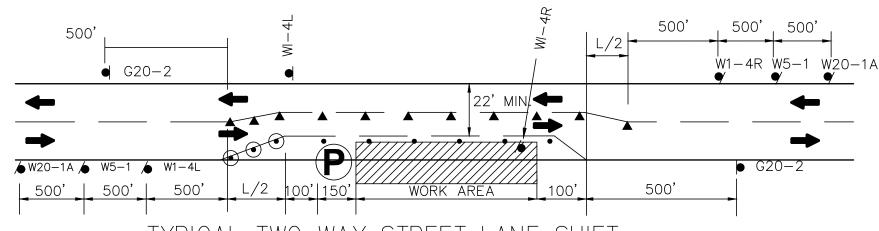
15. THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING THE RESPECTIVE PUBLIC SERVICE CORPORATIONS OR OFFICIALS OF THEIR INTENTIONS AT LEAST ONE WEEK IN ADVANCE OF THE COMMENCEMENT OF OPERATIONS. THE CONTRACTOR MAY HAVE TO COORDINATE ON A DAILY BASIS IF THE DETOUR OR WORK ZONES HAVE CHANGED. FOR A LIST OF SAID CORPORATIONS PLEASE SEE THE CONTRACT DOCUMENTS "GENERAL CONDITIONS".



TYPICAL TWO WAY ALTERNATING TRAFFIC

N.T.S.

NDTE: 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.



TYPICAL TWO WAY STREET LANE SHIFT

N.T.S.

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.

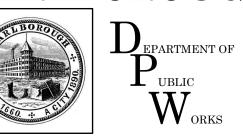
L=WS²/60 (FEET) FOR 40 MPH OR LESS W=WIDTH OF OFFSET (FT)
L=WS FOR 45 MPH OR MORE S= POSTED SPEED LIMIT (MPH)

OPERATIONAL SIGNING

N.T.S.

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

CITY_{OF} MARLBOROUGH



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Project Title:

SUDBURY STREET AREA SEWER PROJECT PHASE 4

Sheet Title:

TRAFFIC MANAGEMENT

Contract No: ED-2019-01	Sheet No.:
Date: 8/30/2010	99 C-51
Scale: N.T.S.	