

NO.	REVISIONS	DATE	INT.
1.	REVISED PER ENGINEERING REVIEW	4/20/21	MCS
0.	INITIAL SUBMISSION TO DURHAM PLANNING BOARD	4/30/20	MCS

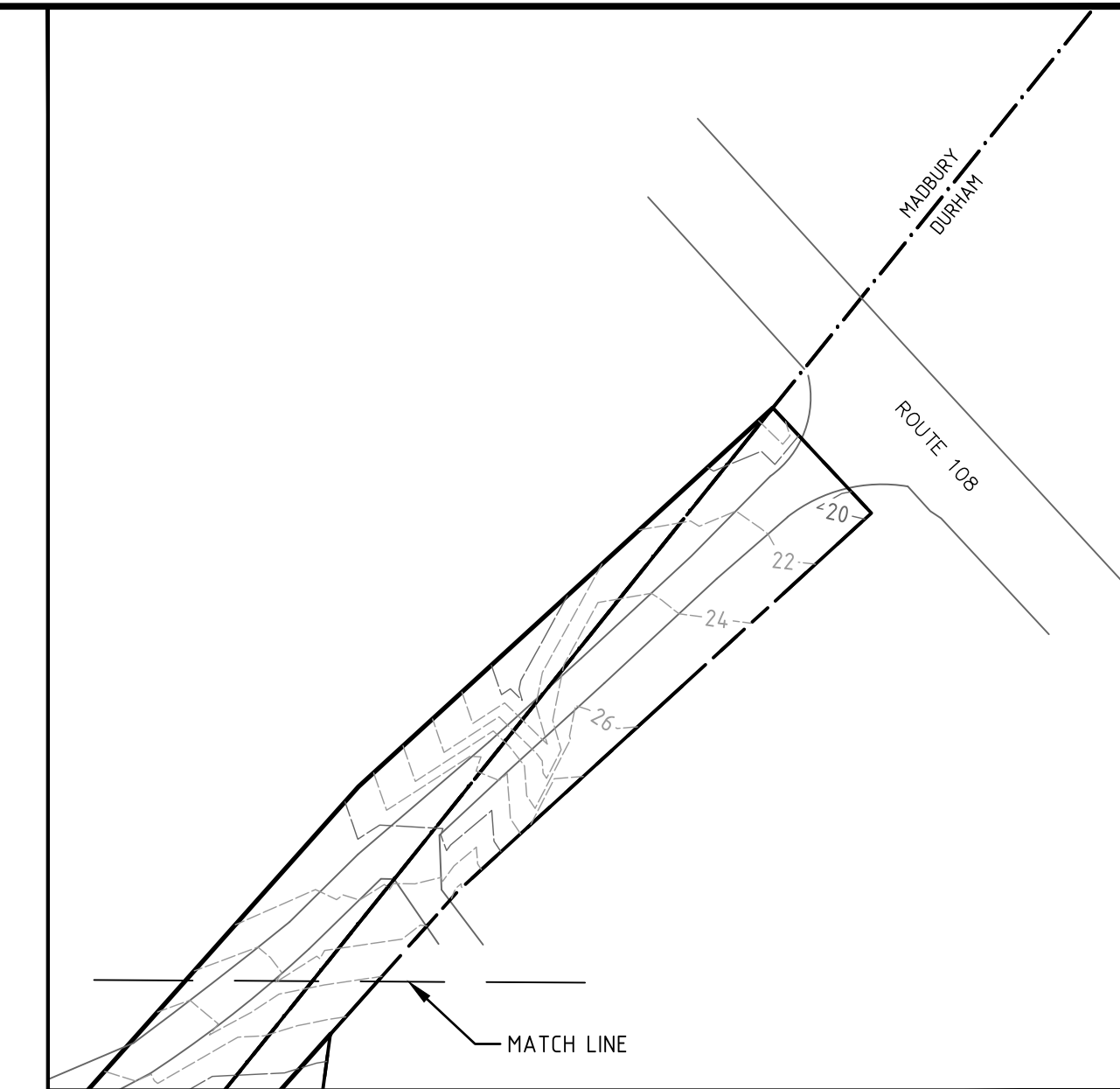
SEAL

DATE ISSUED:	4/17/20
SCALE:	1"=60'
DESIGNED BY:	MJS
DRAWN BY:	MCS
APPROVED BY:	MJS
DWG FILE:	

EXISTING CONDITIONS PLAN  
prepared for  
**MULHERN**  
MAP 10, LOT 8-6  
93 BAGDAD ROAD  
DURHAM, NH 03824

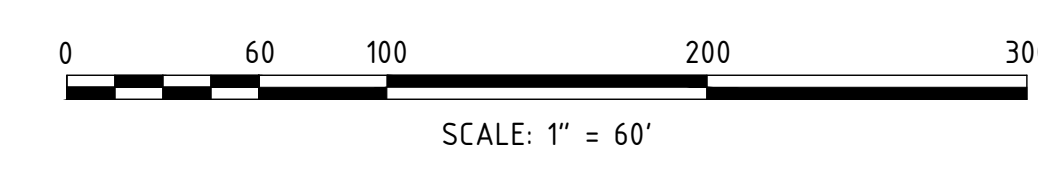
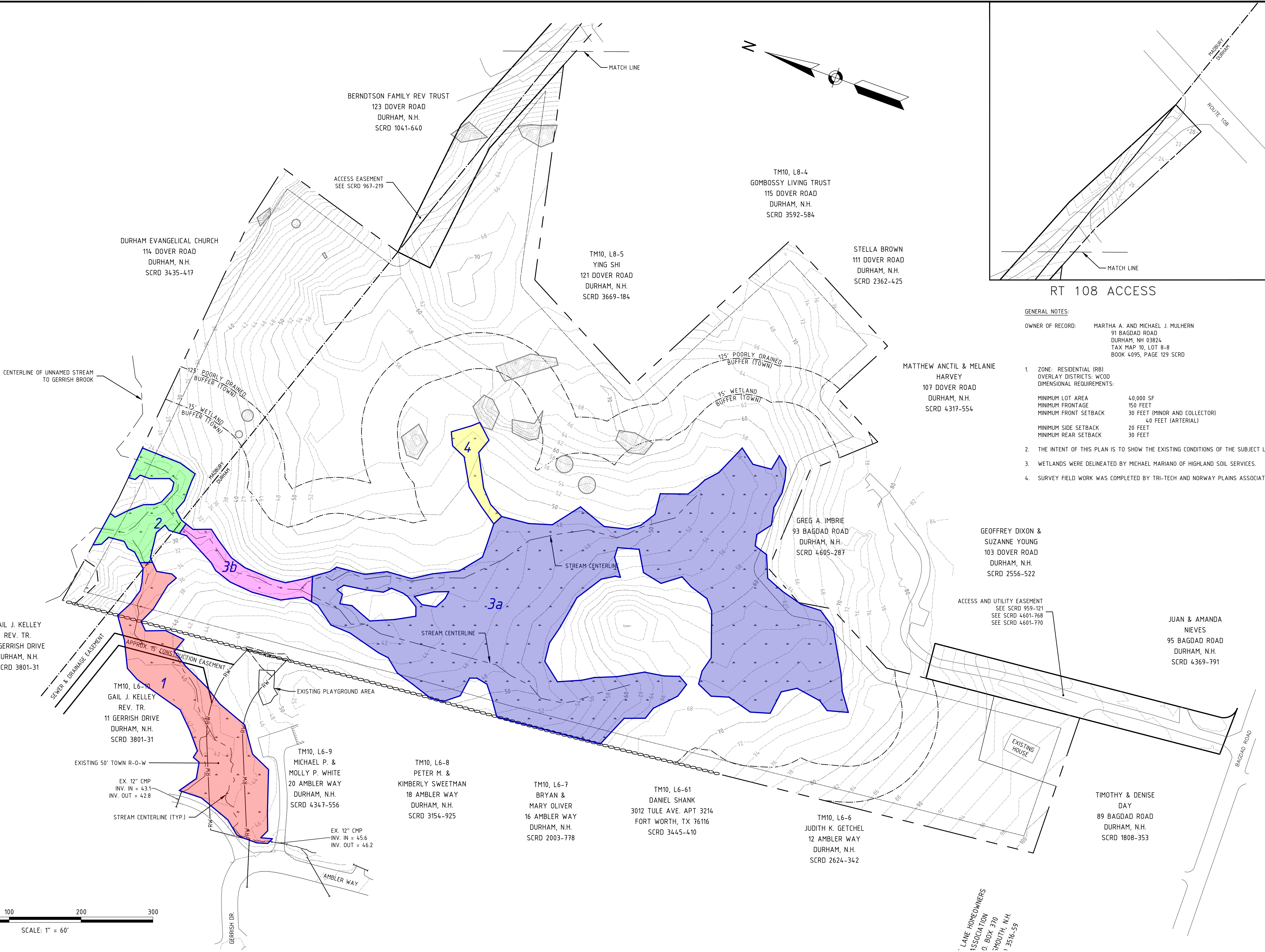
**MJS ENGINEERING, P.C.**  
CIVIL • STRUCTURAL • ENVIRONMENTAL  
5 Railroad St., P.O. Box 359  
Newmarket, NH 03857  
Phone: (603) 659-4979 Fax: (603) 659-4427  
E-mail: mjs@engr-mjs.com

JOB: 19-063  
**C100**

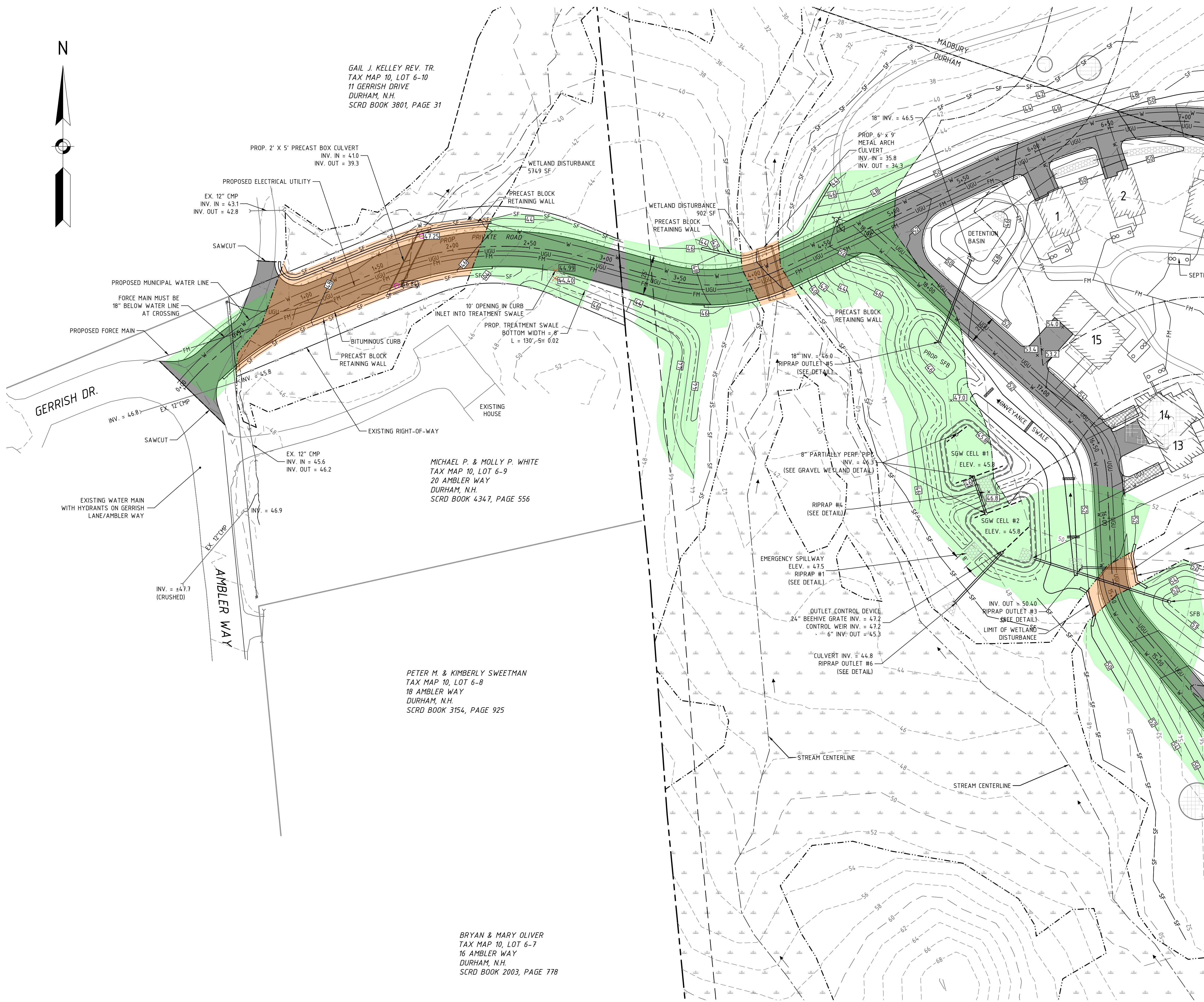
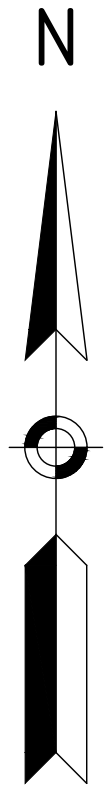


RT 108 ACCESS

- GENERAL NOTES:**
- OWNER OF RECORD: MARTHA A. AND MICHAEL J. MULHERN  
91 BAGDAD ROAD  
DURHAM, NH 03824  
TAX MAP 10, LOT 8-8  
BOOK 4095, PAGE 129 SCR D
- ZONE: RESIDENTIAL (RB)  
OVERLAY DISTRICTS: WOOD  
DIMENSIONAL REQUIREMENTS:  
MINIMUM LOT AREA 4,000 SF  
MINIMUM FRONTAGE 150 FEET  
MINIMUM FRONT SETBACK 30 FEET (MINOR AND COLLECTOR)  
MINIMUM SIDE SETBACK 20 FEET  
MINIMUM REAR SETBACK 30 FEET
  - THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING CONDITIONS OF THE SUBJECT LOT.
  - WETLANDS WERE DELINEATED BY MICHAEL MARIANO OF HIGHLAND SOIL SERVICES.
  - SURVEY FIELD WORK WAS COMPLETED BY TRI-TECH AND NORWAY PLAINS ASSOCIATES.



LANE HOMEOWNERS  
ASSOCIATION  
P.O. BOX 370  
MOUTH, N.H.  
1 3516-59



GAIL J. KELLEY REV. TR.  
TAX MAP 10, LOT 6-10  
11 GERRISH DRIVE  
DURHAM, N.H.  
SCRD BOOK 3801, PAGE 31

MICHAEL P. & MOLLY P. WHITE  
TAX MAP 10, LOT 6-9  
20 AMBLER WAY  
DURHAM, N.H.  
SCRD BOOK 4347, PAGE 556

PETER M. & KIMBERLY SWEETMAN  
TAX MAP 10, LOT 6-8  
18 AMBLER WAY  
DURHAM, N.H.  
SCRD BOOK 3154, PAGE 925

BRYAN & MARY OLIVER  
TAX MAP 10, LOT 6-7  
16 AMBLER WAY  
DURHAM, N.H.  
SCRD BOOK 2003, PAGE 778

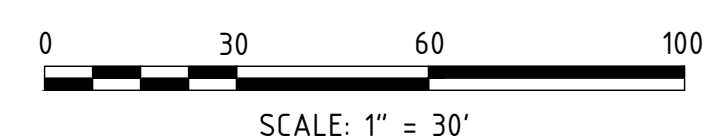
**GENERAL NOTES:**

- OWNER OF RECORD: MARTHA A. AND MICHAEL J. MULHERN  
91 BAGDAD ROAD  
DURHAM, NH 03824  
TAX MAP 10, LOT 8-8  
BOOK 4095, PAGE 129 SCRD
- ZONE: RESIDENTIAL (RB)  
OVERLAY DISTRICTS: WOOD  
DIMENSIONAL REQUIREMENTS:  
MINIMUM LOT AREA 40 000 SF  
MINIMUM FRONTAGE 150 FEET  
MINIMUM FRONT SETBACK 30 FEET (MINOR AND COLLECTOR)  
MINIMUM SIDE SETBACK 40 FEET (ARTERIAL)  
MINIMUM REAR SETBACK 20 FEET  
MINIMUM REAR SETBACK 30 FEET
  - THE INTENT OF THIS PLAN IS TO SHOW THE GRADING OF THE PROPOSED DEVELOPMENT.
  - WETLANDS WERE DELINEATED BY MICHAEL MARIANO OF HIGHLAND SOIL SERVICES.
  - SURVEY FIELD WORK WAS COMPLETED BY TRI-TECH AND NORWAY PLAINS ASSOCIATES.
  - TOTAL WETLAND DISTURBANCE AREA = 7408 SF (0.17 AC)
  - TOTAL BUFFER DISTURBANCE AREA = 42 628 SF (0.98 AC)
  - TOTAL AREA OF DISTURBANCE = 195 821 SF (4.50 AC)

**LEGEND:**

- CB CATCH BASIN
- CPP CORRUGATED PLASTIC PIPE
- DMH STORM DRAIN MANHOLE
- EX. EXISTING
- HW HEADWALL
- PROP. PROPOSED
- SFB SEDIMENT FOREBAY
- SGW SUBSURFACE GRAVEL WETLAND
- SMH SANITARY MANHOLE

FINAL APPROVAL BY DURHAM PLANNING BOARD.  
CERTIFIED BY MICHAEL BEHRENDT, TOWN PLANNER  
CERTIFIED \_\_\_\_\_  
DATE \_\_\_\_\_

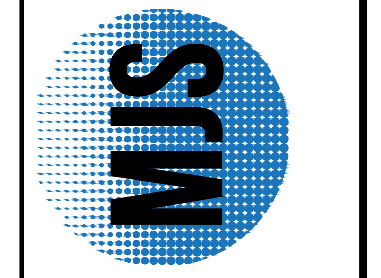


NO.	REVISIONS	DATE
5	REVISED PER ENGINEERING REVIEW	4/20/21
4	REVISED SUBMISSION TO THE DURHAM PLANNING BOARD	2/4/21
3	REVISED SUBMISSION TO THE DURHAM CONSERVATION COMMISSION	1/20/21
2	REVISED SUBMISSION TO THE DURHAM CONSERVATION COMMISSION	12/23/20
1	REVISED SUBMISSION TO THE DURHAM PLANNING BOARD	12/18/20
0	INITIAL SUBMISSION TO THE DURHAM PLANNING BOARD	10/28/20

DATE ISSUED:	SCALE:	DESIGNED BY:	DRAWN BY:	APPROVED BY:	DWG FILE:
10/28/20	1"=30'	MCS	MCS	MCS	19-063_C1101.dwg

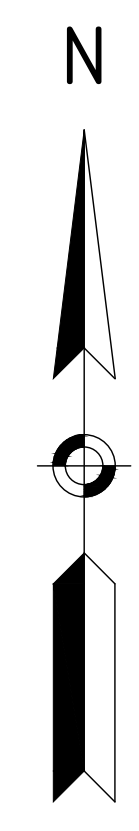
**GRADING AND DRAINAGE PLAN**  
**ENTRANCE**  
prepared for  
MULHERN  
TAX MAP 10, LOT 8-6  
93 BAGDAD ROAD, DURHAM, NH 03824

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E-mail: mjs@mjs-engineering.com



JOB: 19-063

**C104**



**GENERAL NOTES:**

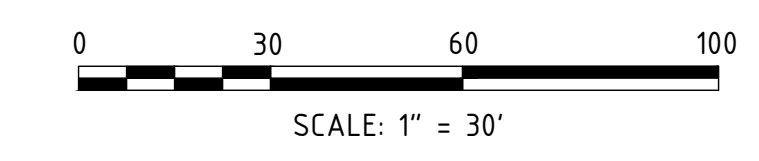
- OWNER OF RECORD: MARTHA A. AND MICHAEL J. MULHERN  
91 BAGDAD ROAD  
DURHAM, NH 03824  
TAX MAP 10, LOT 8-8  
BOOK 4095, PAGE 129 SCRD
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MINIMUM FRONTAGE 150 FEET  
MINIMUM FRONT SETBACK 30 FEET (MINOR AND COLLECTOR)  
40 FEET (ARTERIAL)  
MINIMUM SIDE SETBACK 20 FEET  
MINIMUM REAR SETBACK 30 FEET
  2. THE INTENT OF THIS PLAN IS TO SHOW THE GRADING OF THE PROPOSED DEVELOPMENT.
  3. WETLANDS WERE DELINEATED BY MICHAEL MARIANO OF HIGHLAND SOIL SERVICES.
  4. SURVEY FIELD WORK WAS COMPLETED BY TRI-TECH AND NORWAY PLAINS ASSOCIATES.
  5. TOTAL WETLAND DISTURBANCE AREA = 7408 SF (0.17 AC)
  6. TOTAL BUFFER DISTURBANCE AREA = 42 628 SF (0.98 AC)
  7. TOTAL AREA OF DISTURBANCE = 195 821 SF (4.50 AC)

LOCATION	INV. IN	INV. OUT	DIAMETER
UNIT 1	47.0	47.5	12"
UNIT 2	48.0	48.2	12"
UNIT 3	53.5	53.7	12"
UNIT 4	57.0	57.2	12"
UNIT 5	58.1	58.5	12"

**LEGEND:**

- CB CATCH BASIN
- CPP CORRUGATED PLASTIC PIPE
- DMH STORM DRAIN MANHOLE
- EX EXISTING
- HW HEADWALL
- PROP. PROPOSED
- SFB SEDIMENT FOREBAY
- SGW SUBSURFACE GRAVEL WETLAND
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FINAL APPROVAL BY DURHAM PLANNING BOARD.  
CERTIFIED BY MICHAEL BEHRENDT, TOWN PLANNER  
CERTIFIED \_\_\_\_\_  
DATE \_\_\_\_\_

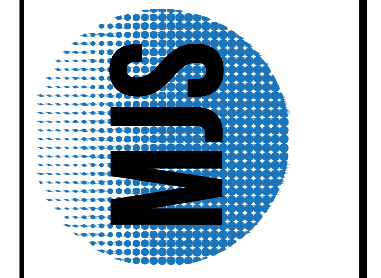


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2	REVISED SUBMISSION TO THE DURHAM CONSERVATION COMMISSION	12/23/20	MCS
1	REVISED SUBMISSION TO THE DURHAM PLANNING BOARD	12/18/20	MCS
0	INITIAL SUBMISSION TO THE DURHAM PLANNING BOARD	10/28/20	MCS

DATE ISSUED: 10/28/20  
SCALE: 1"=30'  
DESIGNED BY: MCS  
DRAWN BY: MCS  
APPROVED BY: MJS  
DWG FILE: NH19063\_CIVIL01.dwg

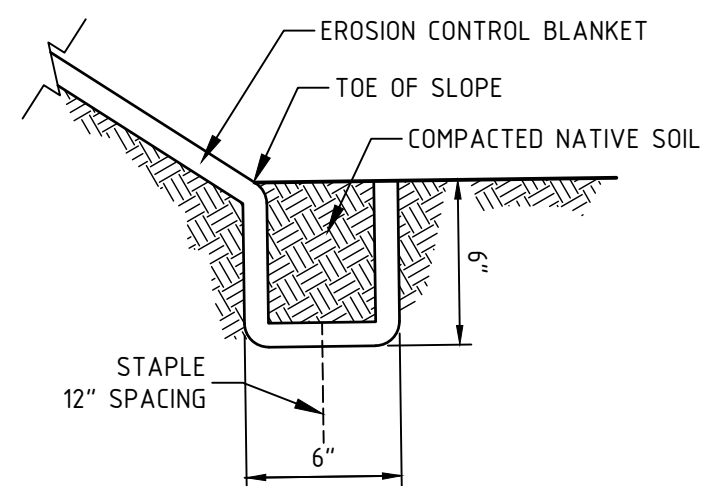
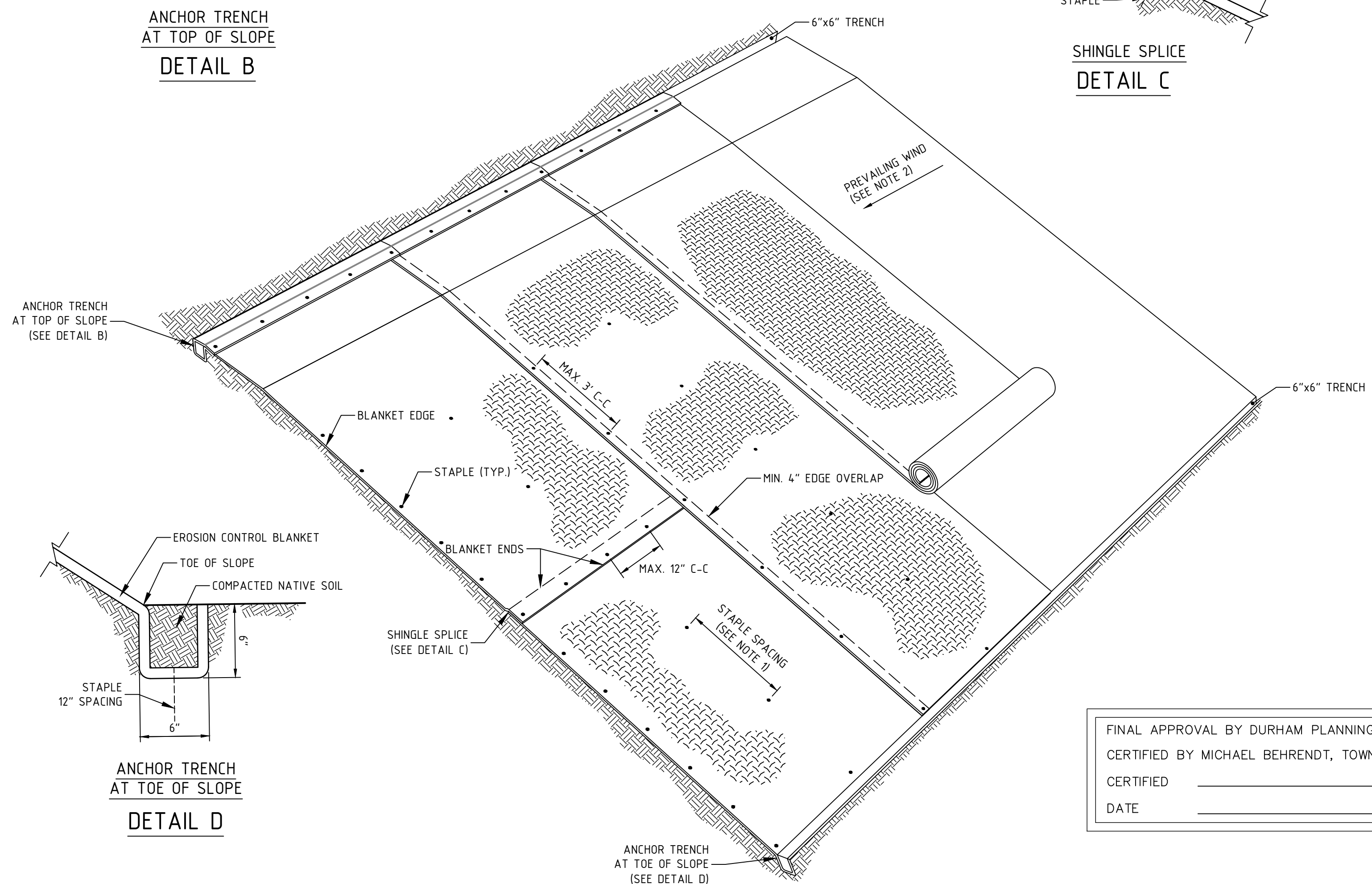
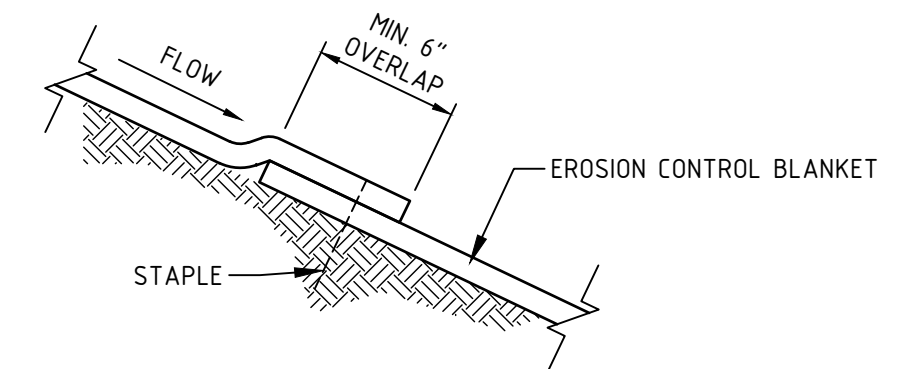
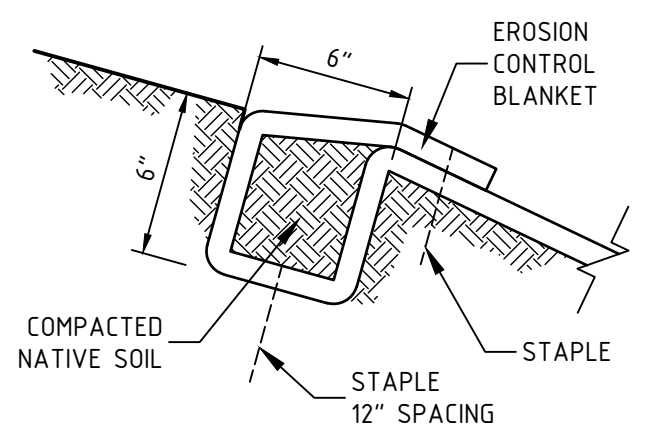
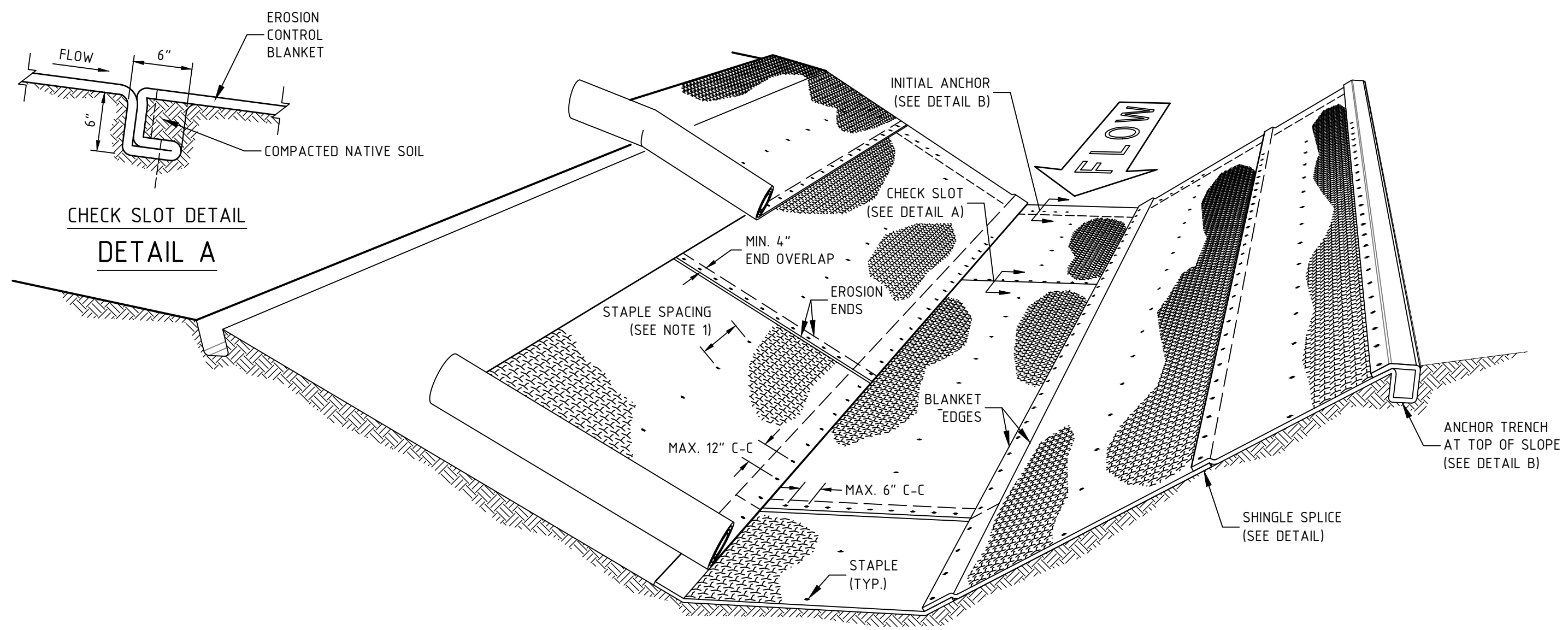
**GRADING AND DRAINAGE PLAN  
CLUSTER**  
prepared for  
MULHERN  
TAX MAP 10, LOT 8-6  
93 BAGDAD ROAD, DURHAM, NH 03824

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JOB: 19-063

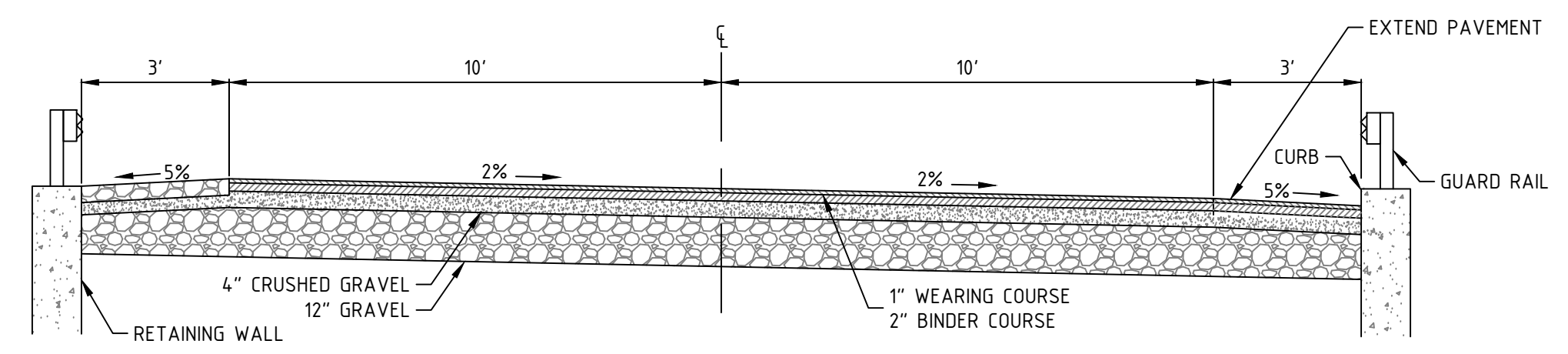
C105



- NOTES:**
1. INSTALL STAPLES ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
  2. OVERLAP IN THE DIRECTION OF THE PREVAILING WIND.
  3. INSTALL STAPLES ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
  4. PROVIDE CHECK SLOTS ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
  5. ROLL ENDS MAY BE SPLICED IN A CHECK SLOT.
  6. TRAPEZOIDAL DITCH SHOWN. SIMILAR DETAILS FOR A V-DITCH.

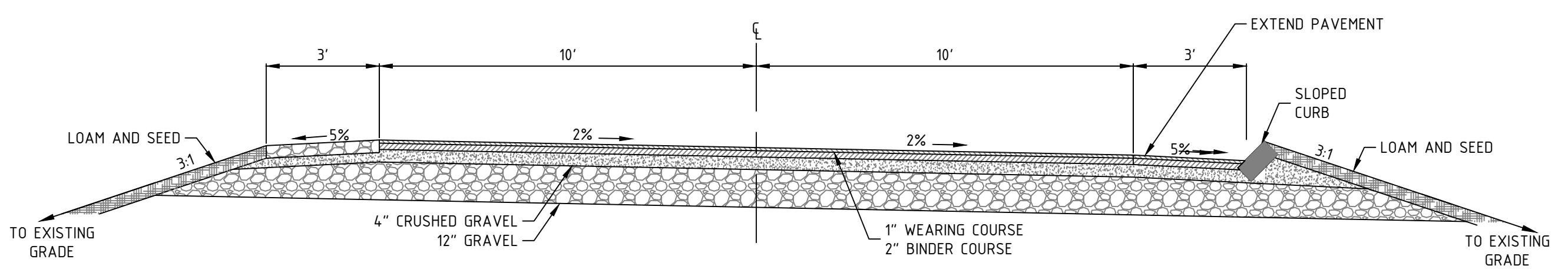
**ROLLED EROSION CONTROL DETAIL**  
NTS

FINAL APPROVAL BY DURHAM PLANNING BOARD.  
CERTIFIED BY MICHAEL BEHRENDT, TOWN PLANNER  
CERTIFIED \_\_\_\_\_  
DATE \_\_\_\_\_

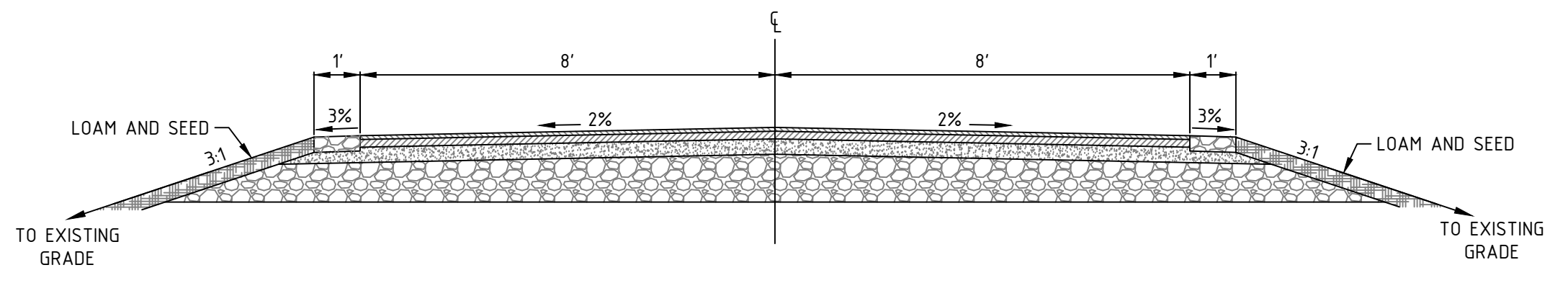


**TYPICAL ACCESS ROAD WITH RETAINING WALLS CROSS-SECTION**  
NTS

- NOTE:**
1. STA. RT 0+25 TO 2+25
  2. STA. LT 0+98 TO 2+20

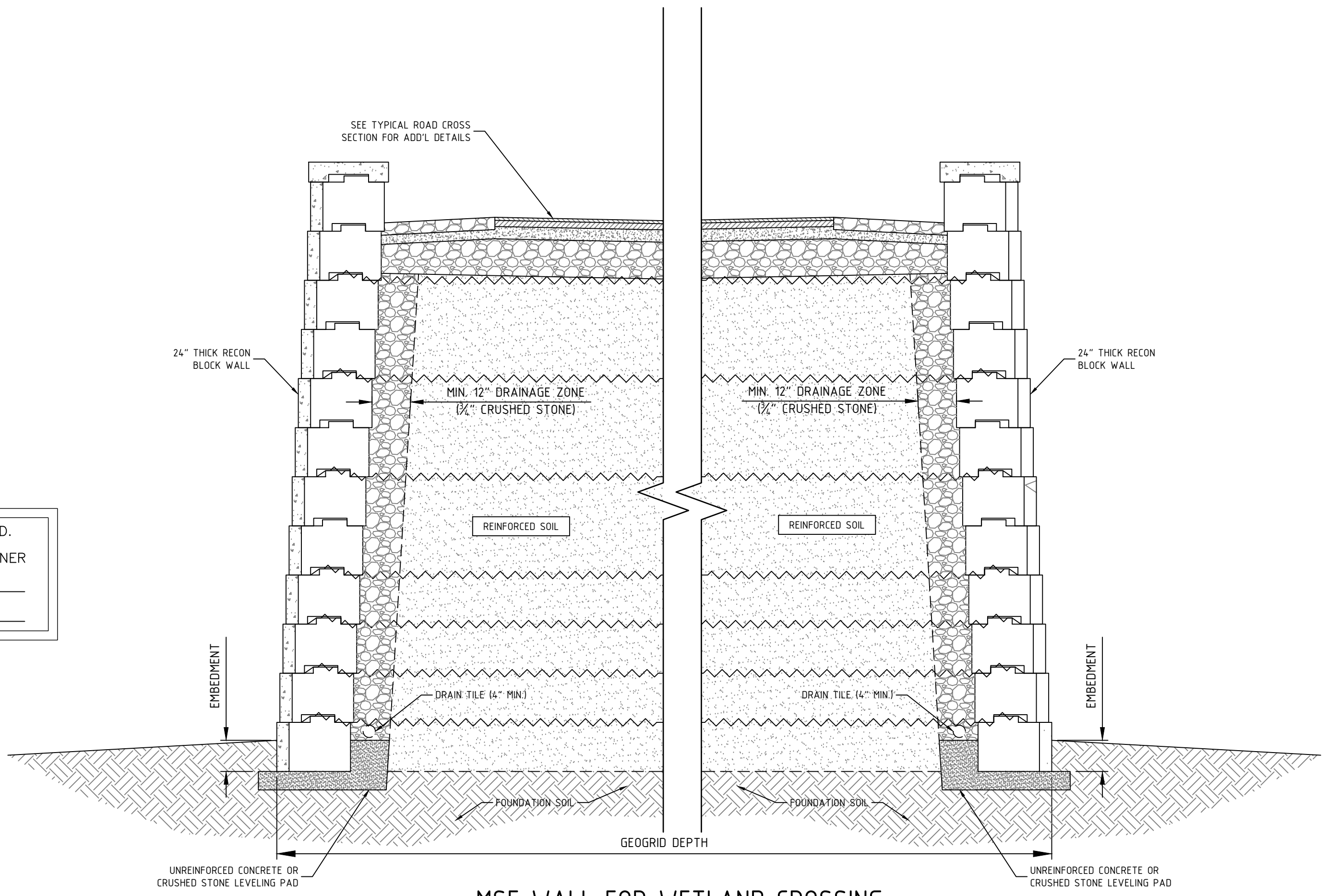


**TYPICAL ACCESS ROAD CROSS-SECTION**  
NTS



**TYPICAL LOOP ROAD CROSS-SECTION**  
NTS

- NOTE:**
1. SOME SECTION OF LOOP ROAD ARE SUPERELEVATED. (SEE GRADING PLAN)



**MSE WALL FOR WETLAND CROSSING**  
NTS

NO.	REVISIONS	DATE
0.	INITIAL SUBMISSION TO DURHAM	10/28/20
1.	REVISED SUBMISSION TO DURHAM	11/14/20
2.	REVISED SUBMISSION TO THE DURHAM PLANNING BOARD	2/17/21
3.	REVISED PER ENGINEERING REVIEW	4/20/21

DATE ISSUED:	SCALE:	DESIGNED BY:	DRAWN BY:	APPROVED BY:	DWG FILE:
11/14/20	N/A	MCS	MCS	MJS	1919063_DET101.dwg

CONSTRUCTION DETAILS	
prepared for	MULHERN
TAX MAP 10, LOT 8-6	93 BAGDAD ROAD, DURHAM, NH 03824

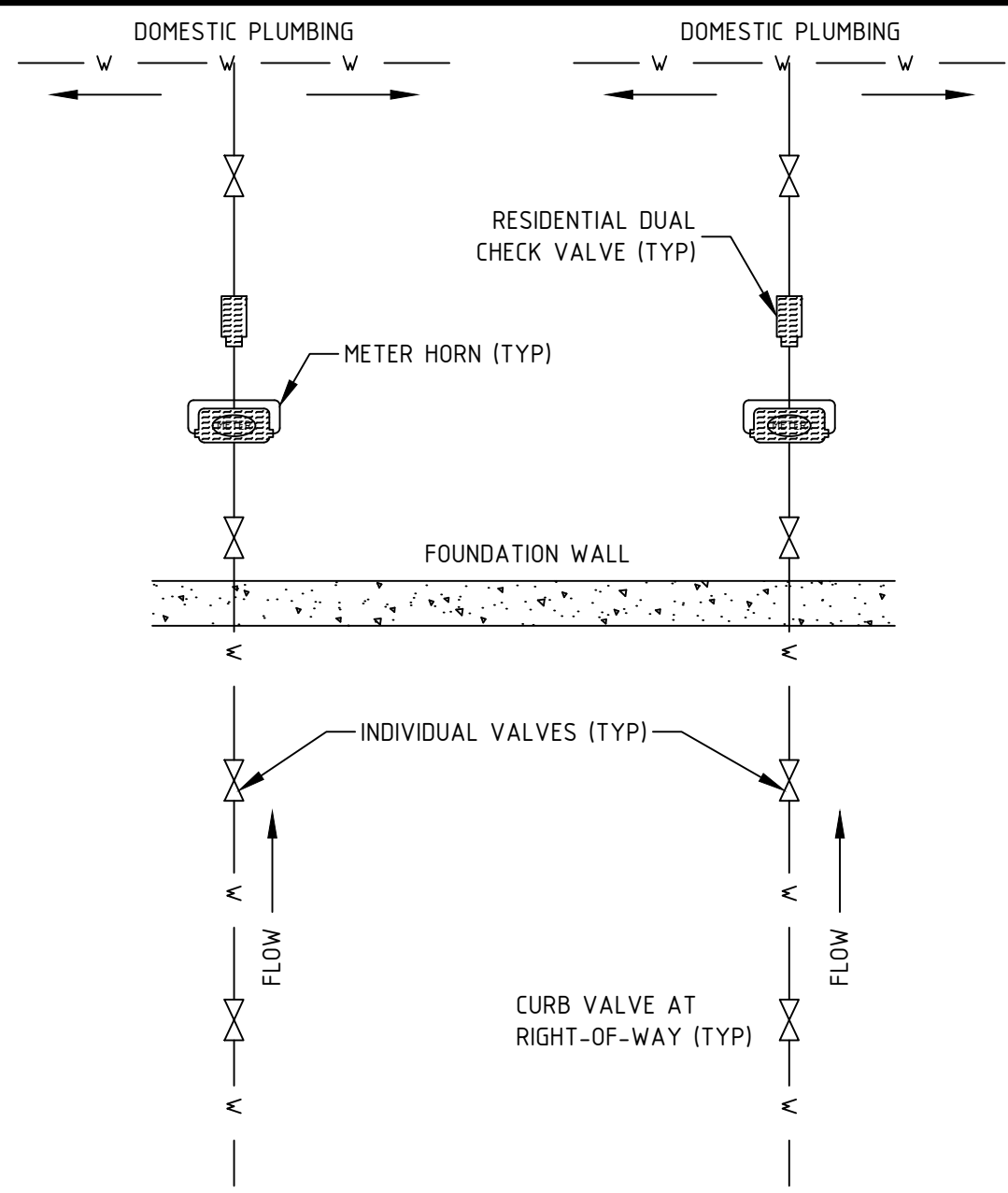
  

<b>MJS ENGINEERING, P.C.</b> CIVIL • STRUCTURAL • ENVIRONMENTAL	5 RAILROAD ST., P.O. BOX 359 NORTHAMPTON, NH 03857 PHONE: (603) 659-4079 FAX: (603) 659-4627 E-MAIL: mjs@engineeringmjs.com
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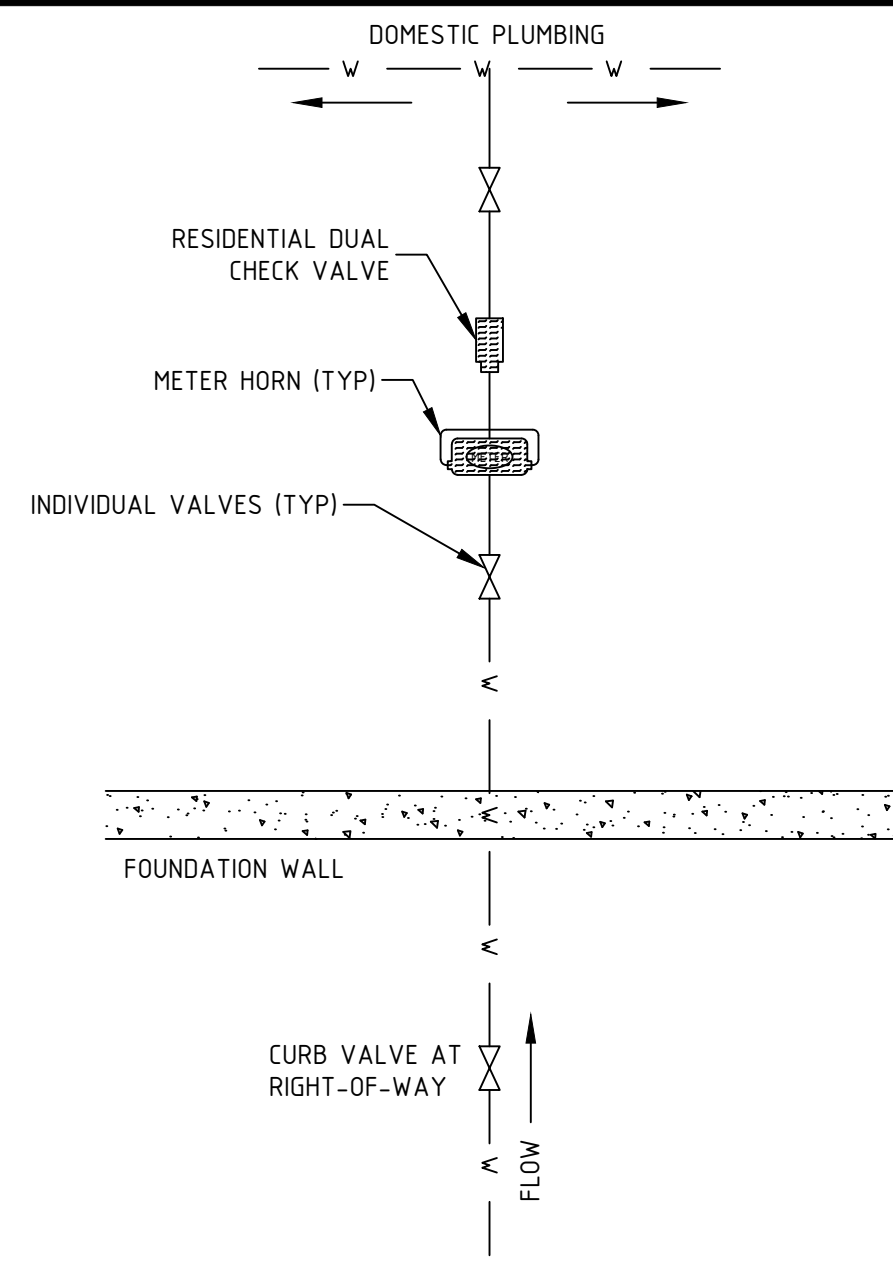
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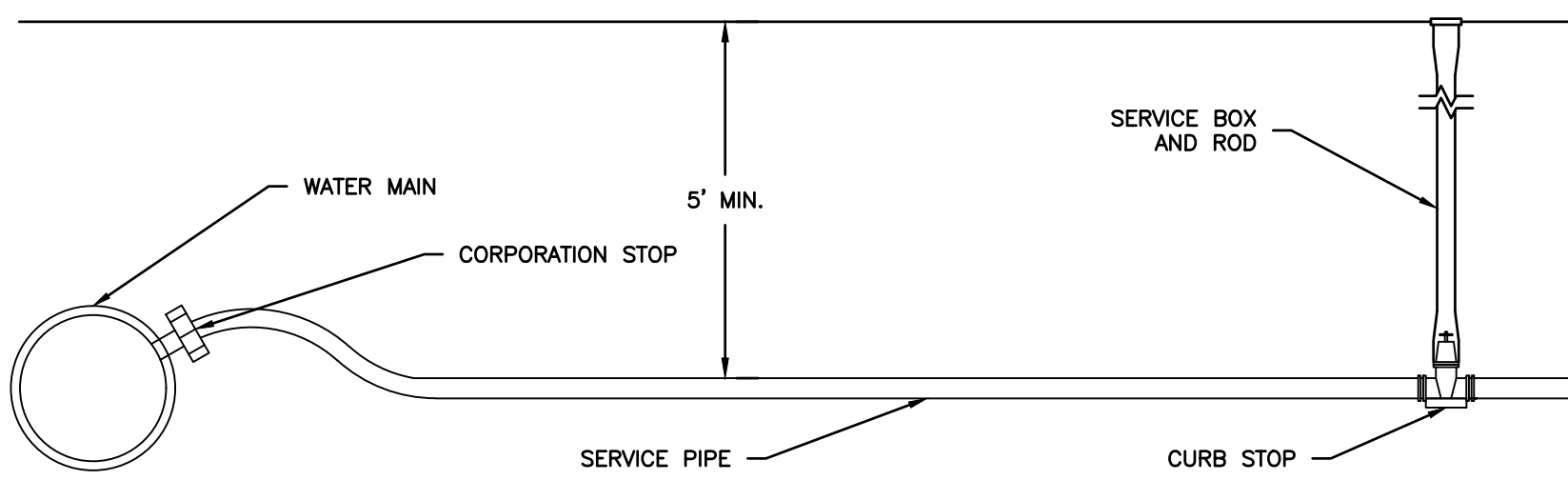
NOTE: ALL METERS SUPPLIED BY TOWN OF DURHAM GENERAL SERVICES DEPARTMENT

**DUAL RESIDENTIAL WATER METER INSTALLATION**  
NTS

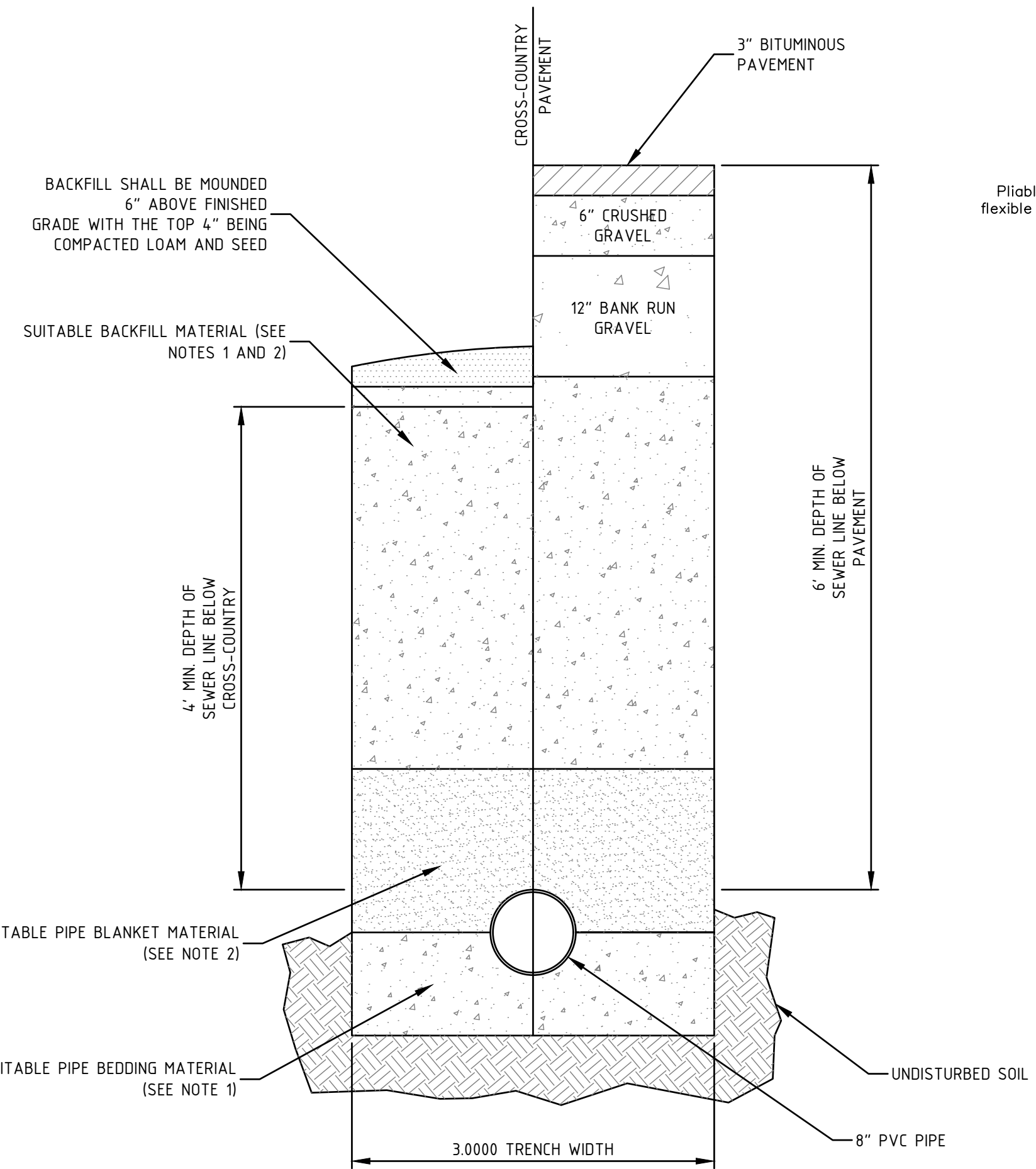


NOTE: ALL METERS SUPPLIED BY TOWN OF DURHAM GENERAL SERVICES DEPARTMENT

**SINGLE FAMILY WATER METER INSTALLATION**  
NTS



**TYPICAL WATER SERVICE CONNECTION**  
NTS



**STANDARD SEWER PIPE TRENCH**  
NTS

NOTES (IN ACCORDANCE WITH Env-Ws 706.05)

- PIPE TRENCH BEDDING MATERIAL AND FILL MATERIAL FOR ORDERED EXCAVATION BELOW GRADE SHALL BE SCREENED GRAVEL OR CRUSHED STONE TO ASTM C33 STONE SIZE NO. 67. THE PIPE BEDDING MATERIAL SHALL BE PLACED 6 INCHES BELOW THE BOTTOM OF THE PIPE. THE FILL MATERIAL SHALL BE PLACED ABOVE THE PIPE SAND BLANKET MATERIAL AND EXTEND TO THE FINISHED GRADE OR TO THE BOTTOM OF THE SELECT MATERIALS FOR A PAVED AREA.
- PIPE SAND BLANKET MATERIAL SHALL BE GRADED SAND, FREE FROM ORGANIC MATERIALS, 100% OF WHICH SHALL PASS THROUGH A 1/2 INCH SIEVE AND A MAXIMUM OF 15% OF WHICH SHALL PASS THROUGH A #200 SIEVE. THE SAND BLANKET SHALL COVER THE PIPE TO A DEPTH OF 12 INCHES.
- BEDDING AND BLANKET MATERIALS SHALL BE COMPACTED IN 12 INCH LAYERS. BACKFILL MATERIAL SHALL BE COMPACTED IN 3 FOOT LAYERS TO THE FINISHED SURFACE EXCEPT FOR PAVED AREAS WHERE THE DEPTH BELOW PAVEMENT CONSISTING OF THE SELECT MATERIALS SHALL BE COMPACTED PER THE APPLICABLE PAVEMENT CONSTRUCTION GUIDELINES.
- TRENCH BACKFILL MATERIAL FOR PAVED AREAS SHALL CONSIST OF THE NATURAL MATERIAL EXCAVATED FOR THE TRENCH WITH THE EXCEPTION OF DEBRIS, PIECES OF PAVEMENT, ORGANIC MATTER, TOP SOIL, WET OR SOFT MUCK, PEAT OF CLAY, EXCAVATED LEDGE MATERIAL, ROCKS OVER 6 INCHES IN THE LARGEST DIMENSION, AND ANY MATERIAL NOT APPROVED BY THE ENGINEER. TRENCH BACKFILL FOR CROSS-COUNTRY SHALL BE AS DESCRIBED ABOVE WITH THE EXCEPTION THAT TOP SOIL, LOAM, AND MUCK OR PEAT MAY BE USED AS LONG AS SUCH MATERIAL PROVIDES STABLE CONSTRUCTION.
- ADDITIONAL REQUIREMENTS MAY BE FOUND IN Env-Ws 706.05.

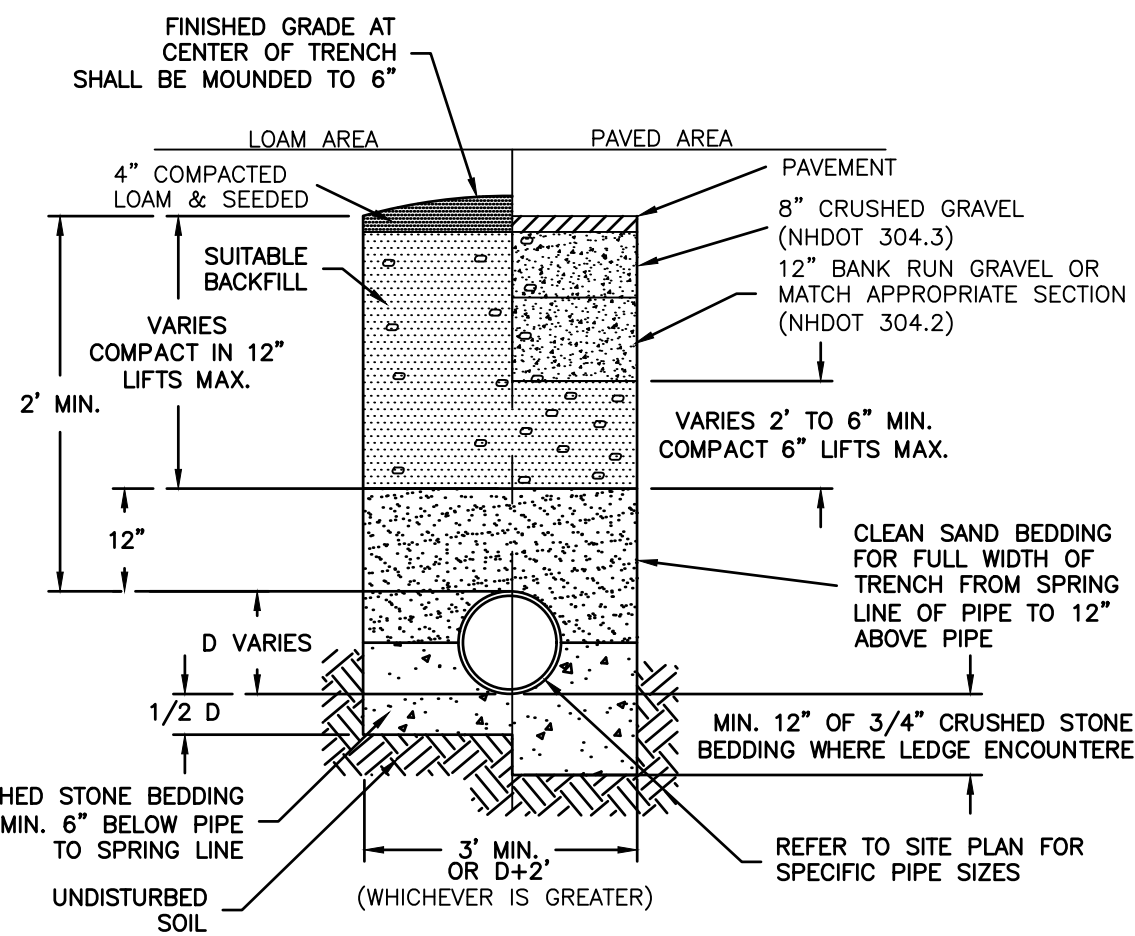
**SEWER NOTES:**  
PER THE REQUIREMENTS OF "STANDARDS OF DESIGN AND CONSTRUCTION FOR SEWERAGE AND WASTEWATER TREATMENT FACILITIES."

**GRAVITY SEWER CONSTRUCTION MATERIALS (Env-Wq 704.05)**

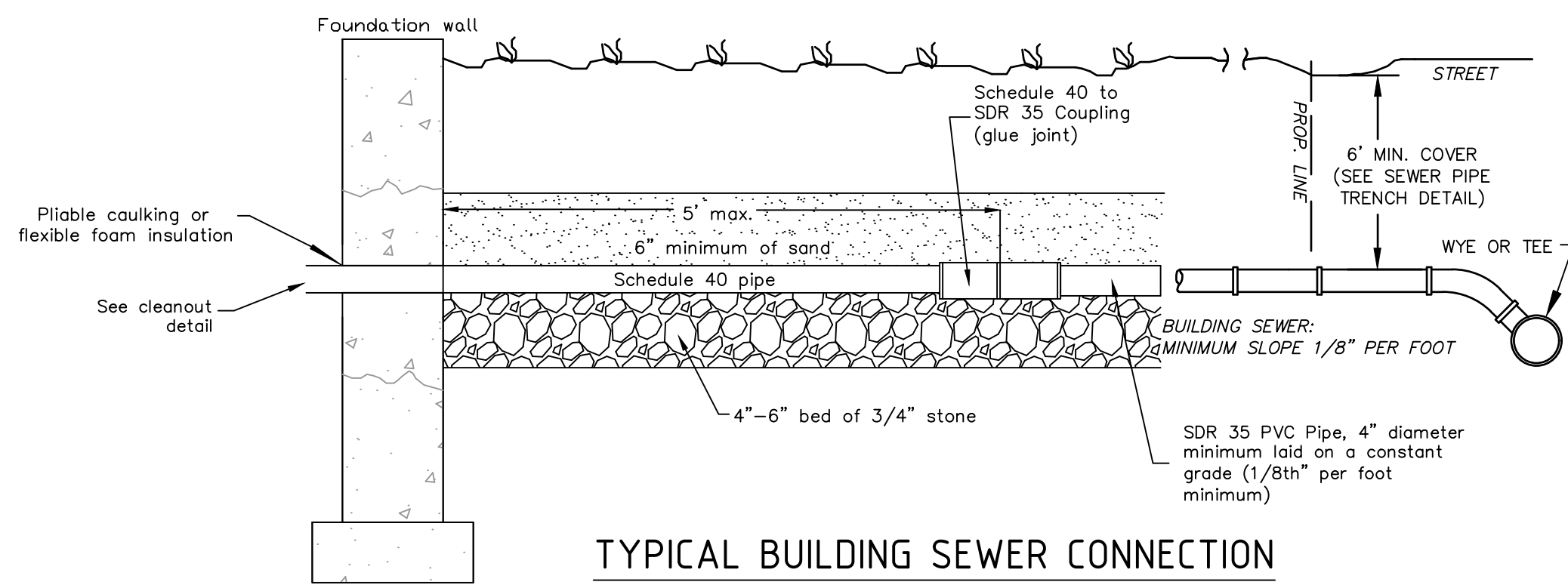
- PLASTIC GRAVITY SEWER PIPE AND FITTINGS SHALL BE 8 INCH PVC SDR 35 SEWER PIPE (EXCEPT SEWER SERVICE SHALL BE 6" SRD 35 PVC) AND SHALL COMPLY WITH ASTM D3034-04g.
- PLASTIC SEWER PIPE SHALL HAVE A PIPE STIFFNESS RATING OF AT LEAST 46 PSI AT 5 PERCENT PIPE DIAMETER DEFLECTION, AS MEASURED IN ACCORDANCE WITH ASTM D2412-02 DURING MANUFACTURE.
- JOINT SEALS FOR PVC PIPE SHALL BE OIL RESISTANT COMPRESSION RINGS OF ELASTOMERIC MATERIAL CONFORMING TO ASTM D3212-96(a)(2003)1 AND SHALL BE PUSH-ON, BELL AND SPIGOT TYPE.

**GRAVITY SEWER PIPE TESTING REQUIREMENTS (Env-Wq 704.07)**

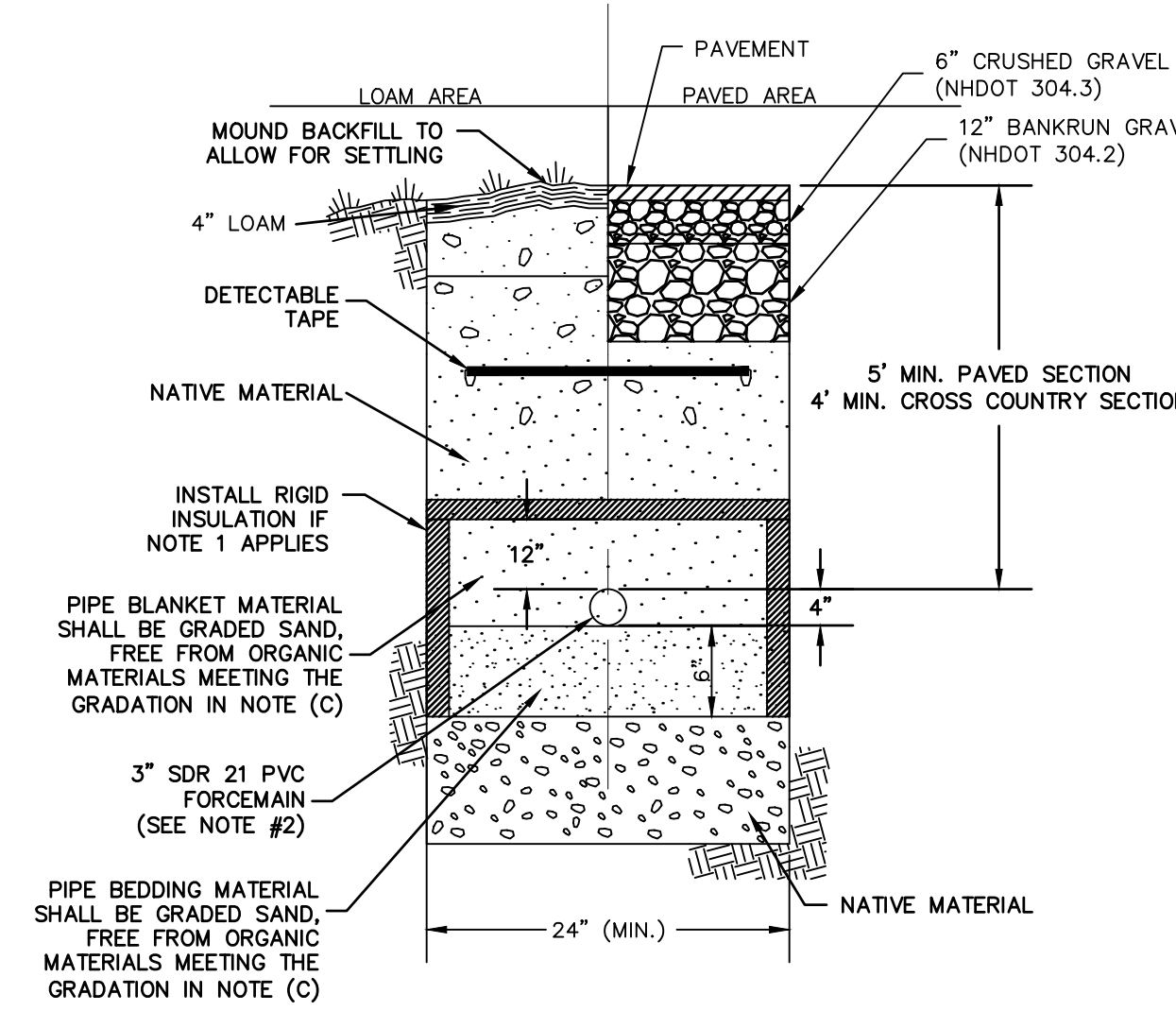
- ALL NEW SEWERS SHALL BE TESTED FOR WATER TIGHTNESS BY THE USE OF LOW-PRESSURE AIR TESTS.
- LOW-PRESSURE AIR TESTING SHALL BE IN CONFORMANCE WITH:
  - ASTM F1417-92(2005) "STANDARD TEST METHOD FOR INSTALLATION ACCEPTANCE OF PLASTIC GRAVITY SEWER LINES USING LOW-PRESSURE AIR"; OR
  - UNI-BELL PVC PIPE ASSOCIATION UNI-B-6, "LOW-PRESSURE AIR TESTING OF INSTALLED SEWER PIPE" (1998).
- ALL NEW GRAVITY SEWERS SHALL BE CLEANED AND VISUALLY INSPECTED AND SHALL BE TRUE TO LINE AND GRADE FOLLOWING INSTALLATION AND PRIOR TO USE.
- ALL PLASTIC SEWER PIPE SHALL BE DEFLECTION TESTED NOT LESS THAN 30 DAYS FOLLOWING INSTALLATION.
- THE MAXIMUM ALLOWABLE DEFLECTION OF FLEXIBLE SEWER PIPE SHALL BE 7/8 PERCENT OF AVERAGE INSIDE DIAMETER.



**STANDARD DRAINAGE PIPE TRENCH**  
NTS

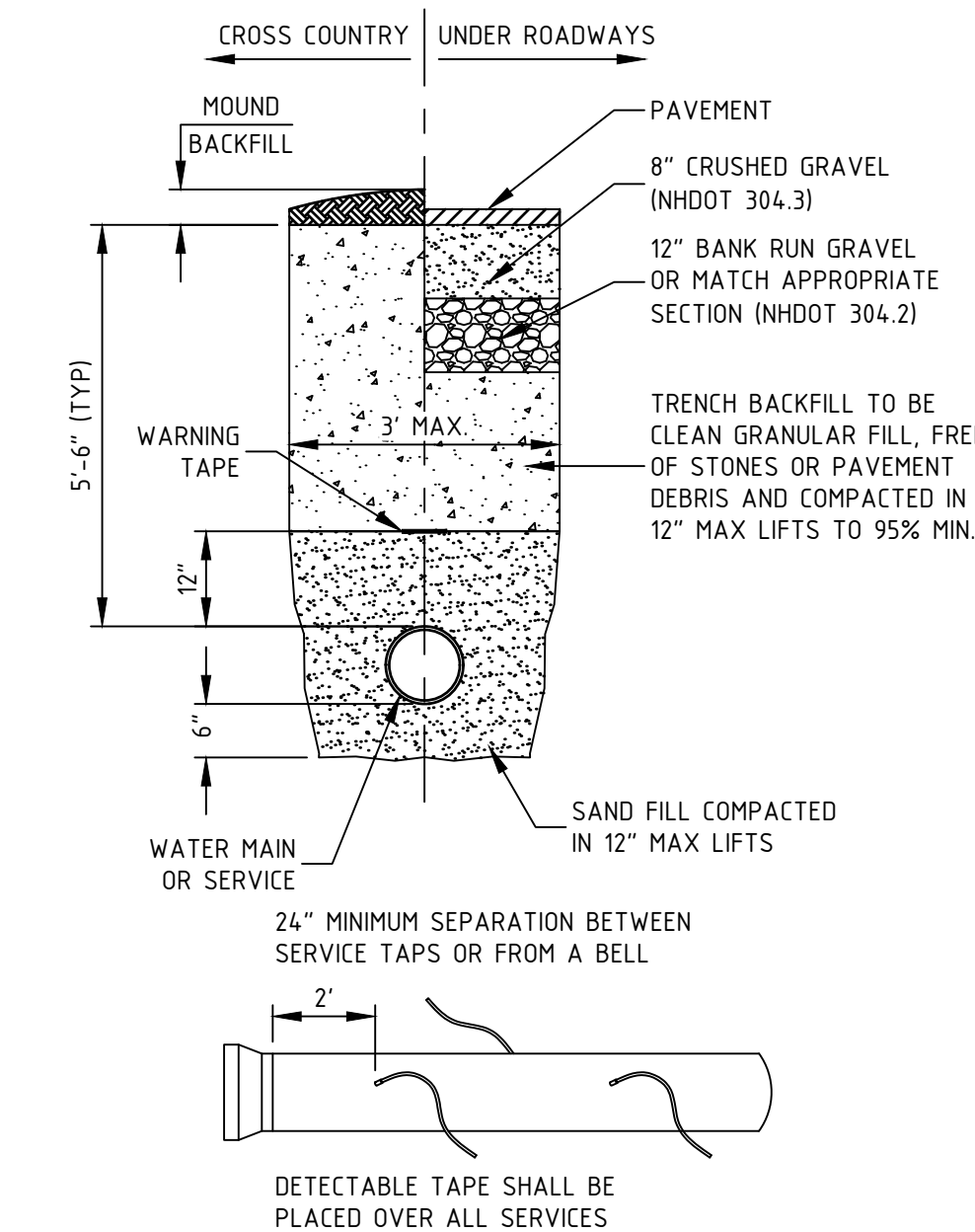


**TYPICAL BUILDING SEWER CONNECTION**  
NTS



**SEWER FORCE MAIN TRENCH**  
NTS

- NOTES
- USE RIGID INSULATION AS SHOWN IF PIPE COVER IS LESS THAN 4" UNDER PAVED SECTION OR 5" UNDER CROSS COUNTRY SECTION.
  - THERE SHALL BE NO GLUE JOINTS ON THE FORCEMAIN.



**WATER MAIN TRENCH**  
NTS

**TRENCH CONSTRUCTION (PER Env-Wq 704.09 NUMERATION)**

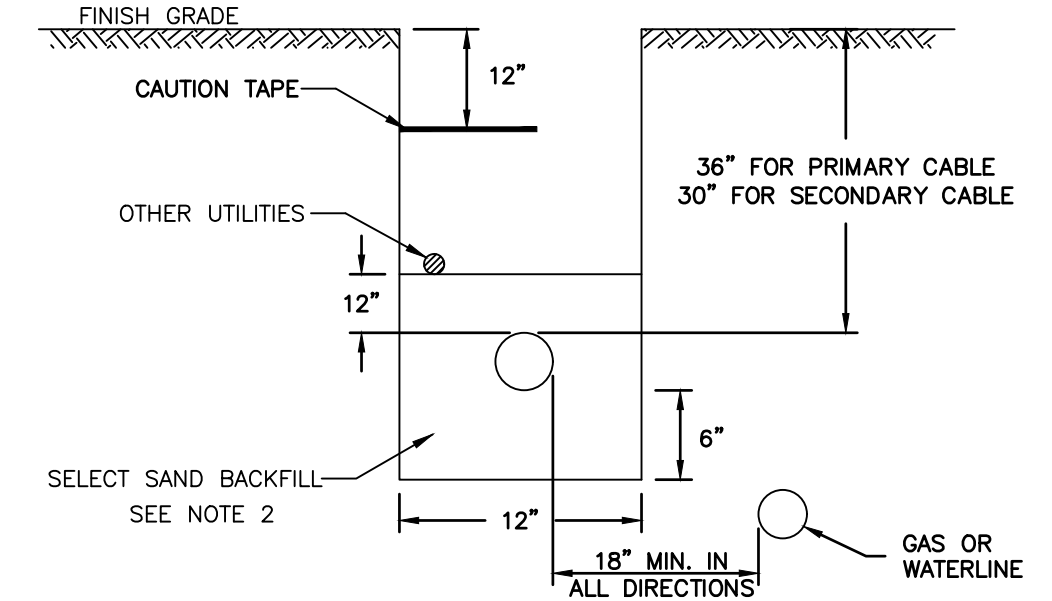
- TRENCH DIMENSIONS SHALL BE AS FOLLOWS:
  - FOR SEWER PIPE LESS THAN 18" IN DIAMETER, THE ALLOWABLE TRENCH WIDTH AT A PLANE 12 INCHES ABOVE THE PIPE SHALL BE NO MORE THAN 36".
- PIPE TRENCH BEDDING MATERIAL AND FILL MATERIAL FOR EXCAVATION BELOW GRADE SHALL BE SCREENED GRAVEL OR CRUSHED STONE TO ASTM C33-03 STONE SIZE NO. 67.
- THE PIPE SAND BLANKET MATERIAL SHALL BE GRADED SAND, FREE FROM ORGANIC MATERIALS, GRADED SUCH THAT 100% PASSES THROUGH A 1/2 INCH SIEVE AND A MAXIMUM OF 15% PASSES THROUGH A #200 SIEVE.
- PIPE BEDDING MATERIAL SHALL EXTEND FROM A HORIZONTAL PLANE THROUGH THE PIPE AXIS TO 6 INCHES BELOW THE BOTTOM OF THE OUTSIDE SURFACE OF THE PIPE.
- PIPE SAND MATERIAL SHALL COVER THE PIPE A MINIMUM OF 12 INCHES ABOVE THE CROWN OF THE OUTSIDE SURFACE.
- COMPACTION SHALL BE IN 12 INCH LAYERS FOR BEDDING AND BLANKET MATERIALS.
- BACKFILL MATERIALS SHALL BE COMPACTED IN 3-FOOT LAYERS TO THE GROUND SURFACE EXCEPT FOR ROAD CONSTRUCTION (OR OTHER PAVED AREAS) WHERE THE FINAL 3 FEET SHALL BE COMPACTED IN 12-INCH LAYERS TO THE ROAD BASE SURFACE.
- TRENCH BACKFILL MATERIAL IN ROADWAY LOCATIONS SHALL BE NATURAL MATERIALS EXCAVATED FROM THE TRENCH DURING CONSTRUCTION, EXCLUDING: DEBRIS, PIECES OF PAVEMENT, ORGANIC MATTER, TOP SOIL, ALL WET OR SOFT MUCK, PEAT OR CLAY, ALL EXCAVATED LEDGE MATERIAL, AND ALL ROCKS OVER SIX INCHES IN LARGEST DIMENSION, OR ANY MATERIAL WHICH AS DETERMINED BY THE ENGINEER, WILL NOT PROVIDE SUFFICIENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION.
- TRENCH BACKFILL AT CROSS-COUNTRY LOCATIONS SHALL BE AS DESCRIBED IN (I) ABOVE, EXCEPT THAT TOP SOIL, LOAM, MUCK OR PEAT, MAY BE USED PROVIDED THE COMPLETED CONSTRUCTION WILL BE STABLE, AND PROVIDED THAT ACCESS TO THE SEWER FOR MAINTENANCE AND RECONSTRUCTION IS PRESERVED.
- BACKFILL SHALL BE MOUNDED 6 INCHES ABOVE ORIGINAL GROUND AT CROSS-COUNTRY LOCATIONS.
- BASE COURSE FOR TRENCH REPAIR SHALL MEET THE REQUIREMENTS OF DIVISION 300 OF THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" OF THE NH DOT.
- PRECAUTIONS SHALL BE TAKEN TO AVOID GROUNDWATER POOLING AT THE SURFACE BY PROVIDING DRAINAGE TO A SUITABLE OUTLET AT CATCH BASINS OR RUNOFF SWALES.

**FORCE MAIN AND LOW PRESSURE SEWER CONSTRUCTION MATERIALS (PER Env-Wq 704.06 NUMERATION)**

- THIS SECTION REQUIRED TO MEET REQUIREMENTS OF Env-Wq 704.12 (2):
- FORCE MAINS SHALL BE CONSTRUCTED OF SDR 21 PVC MATERIAL.
  - FORCE MAINS SHALL BE TREATED AS GRAVITY SEWERS FOR PURPOSES OF FOUNDATION BEDDING AND BACKFILL REQUIREMENTS.
  - PVC PIPE USED FOR FORCE MAINS SHALL CONFORM TO ASTM D2241-05 OR ASTM D1785-05.

**FORCE MAIN AND LOW PRESSURE SEWER TESTING (PER Env-Wq 704.08 NUMERATION)**

FORCE MAINS SHALL BE TESTED IN ACCORDANCE WITH SECTION 4 OF AWWA C600-05 "INSTALLATION OF CAST IRON WATER MAINS AND THEIR APPURTENANCES", AT A PRESSURE EQUAL TO THE GREATER OF 150 PERCENT OF THE DESIGN OPERATING TOTAL DYNAMIC HEAD OR AT LEAST 100 PSI.



**TELEPHONE & ELECTRICAL TRENCH**  
NTS

- NOTES:
- CONSTRUCTION TO BE IN ACCORDANCE WITH PSNH CONSTRUCTION STANDARDS FOR NEW ELECTRICAL SERVICE WORK BY CONTRACTORS, MOST RECENT EDITION.
  - SELECT SAND BACKFILL SHALL CONSIST OF A FINE GRANULAR MATERIAL OF WHICH 100% SHALL PASS THROUGH A 1/4" SIEVE, EXCEPT NATURALLY OCCURRING SMOOTH ROUND PEBBLES NO GREATER THAN 3/8" IN DIAMETER ARE PERMITTED AS LONG AS THEIR TOTAL VOLUME PER CUBIC FOOT OF SAND DOES NOT EXCEED 1%. THE SAND SHALL BE COMPLETELY FREE OF FROZEN LUMPS, ROCKS, STONES, DEBRIS AND RUBBISH. BACKFILL SHALL BE THOROUGHLY COMPACTED IN 6" LIFTS.
  - CONDUIT SIZES TO BE 5" 3-PHASE PRIMARY AND 4" 3-PHASE SECONDARY. ALL CONDUIT SIZES TO BE VERIFIED BY PSNH.
  - ALL CONDUIT INSTALLATIONS MUST CONFORM TO THE CURRENT EDITION OF THE NATIONAL ELECTRIC SAFETY CODE, STATE AND LOCAL CODES AND ORDINANCES, AND WHERE APPLICABLE THE NATIONAL ELECTRIC CODE.

- DRAINAGE STRUCTURE NOTES:**
- DRAINAGE STRUCTURE MATERIALS SHALL COMPLY WITH NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION, DIVISION 600, SECTION 604.
  - SITE CONTRACTOR SHALL BACKFILL AROUND DRAINAGE STRUCTURES IN 6 TO 8 INCH LIFTS, ATTAINING 95% MAXIMUM PROCTOR DENSITY FOR EACH LIFT.
  - PIPE OPENINGS SHALL BE FULLY MORTARED ON OUTSIDE PRIOR TO BACK FILLING. INSIDE OF PIPE OPENINGS SHALL BE MORTARED AND ALLOWED TO CURE PER MANUFACTURERS REQUIREMENTS PRIOR TO RECEIVING RUNOFF.
  - JOINTS BETWEEN ADJACENT RISERS SHALL BE FULLY SEALED WITH ELASTOMERIC SEALANT PER MANUFACTURERS REQUIREMENTS.
  - WHEN FRAME/GRATE ARE LOCATED IN A PAVED AREA, THEY SHALL BE BROUGHT TO FINISH GRADE AFTER BINDER COURSE PAVEMENT IS PLACED. THE EXCAVATION REQUIRED AROUND THE GRATE AND FRAME SHALL BE BACKFILLED FLUSH WITH THE TOP OF BINDER COURSE WITH NHDOT CLASS B CONCRETE.
  - FRAME AND GRATE: CATCH BASINS: NEENAH LIFMATE OR PAMREX

FINAL APPROVAL BY DURHAM PLANNING BOARD.  
 CERTIFIED BY MICHAEL BEHRENDT, TOWN PLANNER  
 CERTIFIED \_\_\_\_\_  
 DATE \_\_\_\_\_

NO.	REVISIONS	DATE	INT.
1	INITIAL SUBMISSION TO DURHAM	10/28/20	MCS
2	REVISED SUBMISSION TO DURHAM	11/4/20	MCS
3	REVISED SUBMISSION TO DURHAM PLANNING BOARD	4/7/21	MCS
4	REVISED PER ENGINEERING REVIEW	4/7/21	MCS

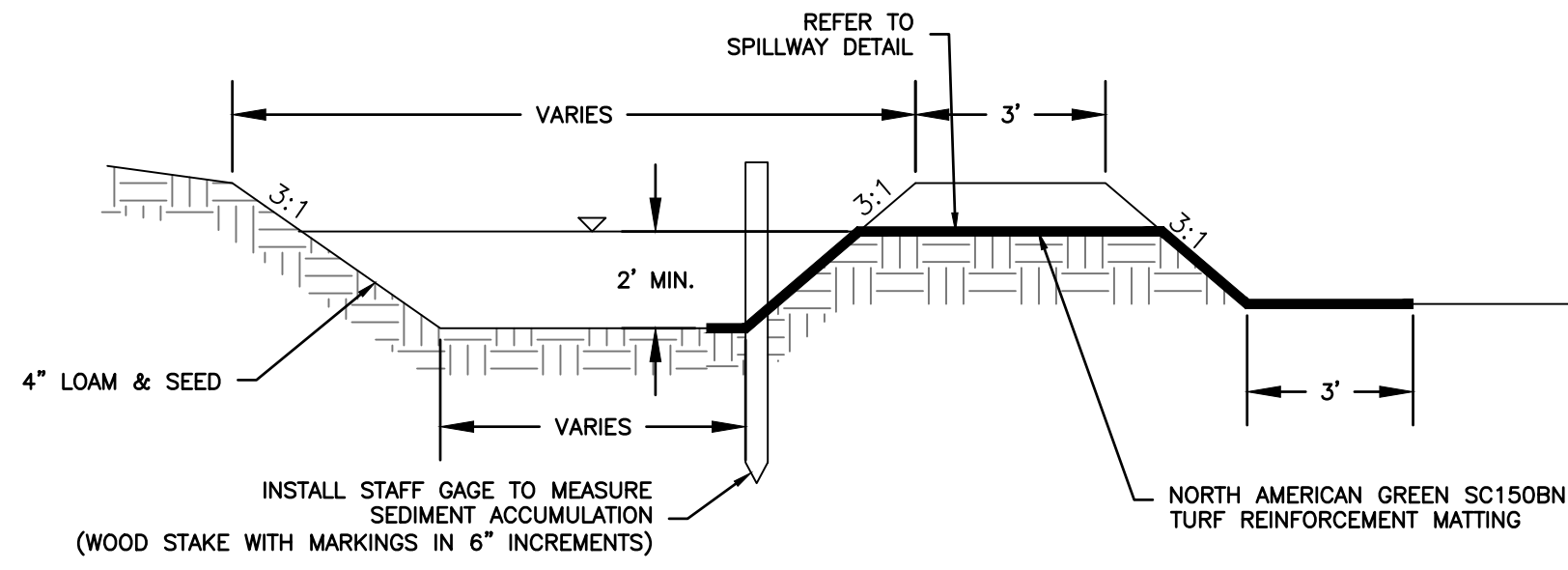
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11/4/20	N/A	MCS	MCS	MCS	NH9003_DET101.dwg

**CONSTRUCTION DETAILS**  
 prepared for  
 MULHERN  
 TAX MAP 10, LOT 8-6  
 93 BAGDAD ROAD, DURHAM, NH 03824

**MJS ENGINEERING, P.C.**  
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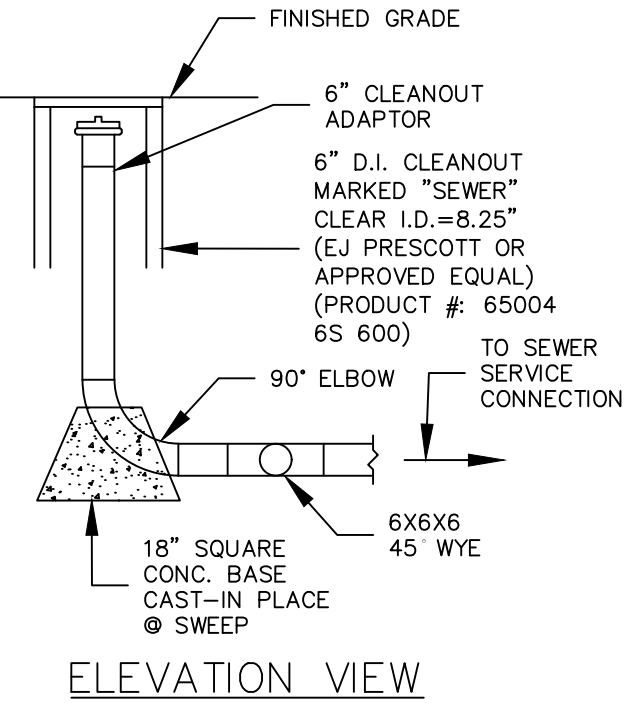
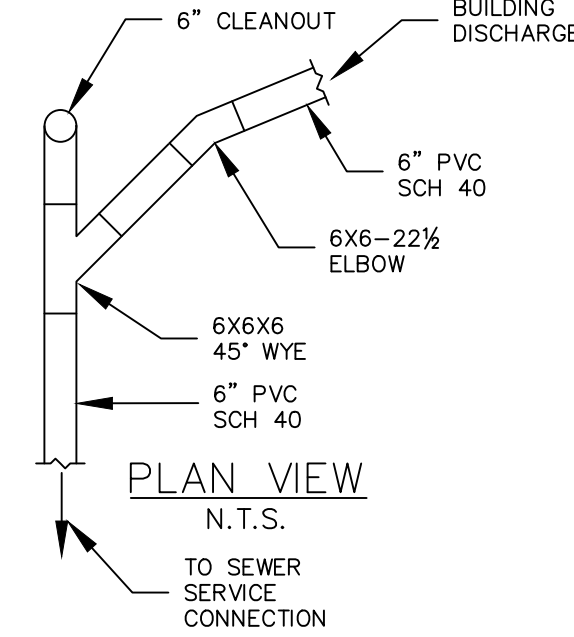
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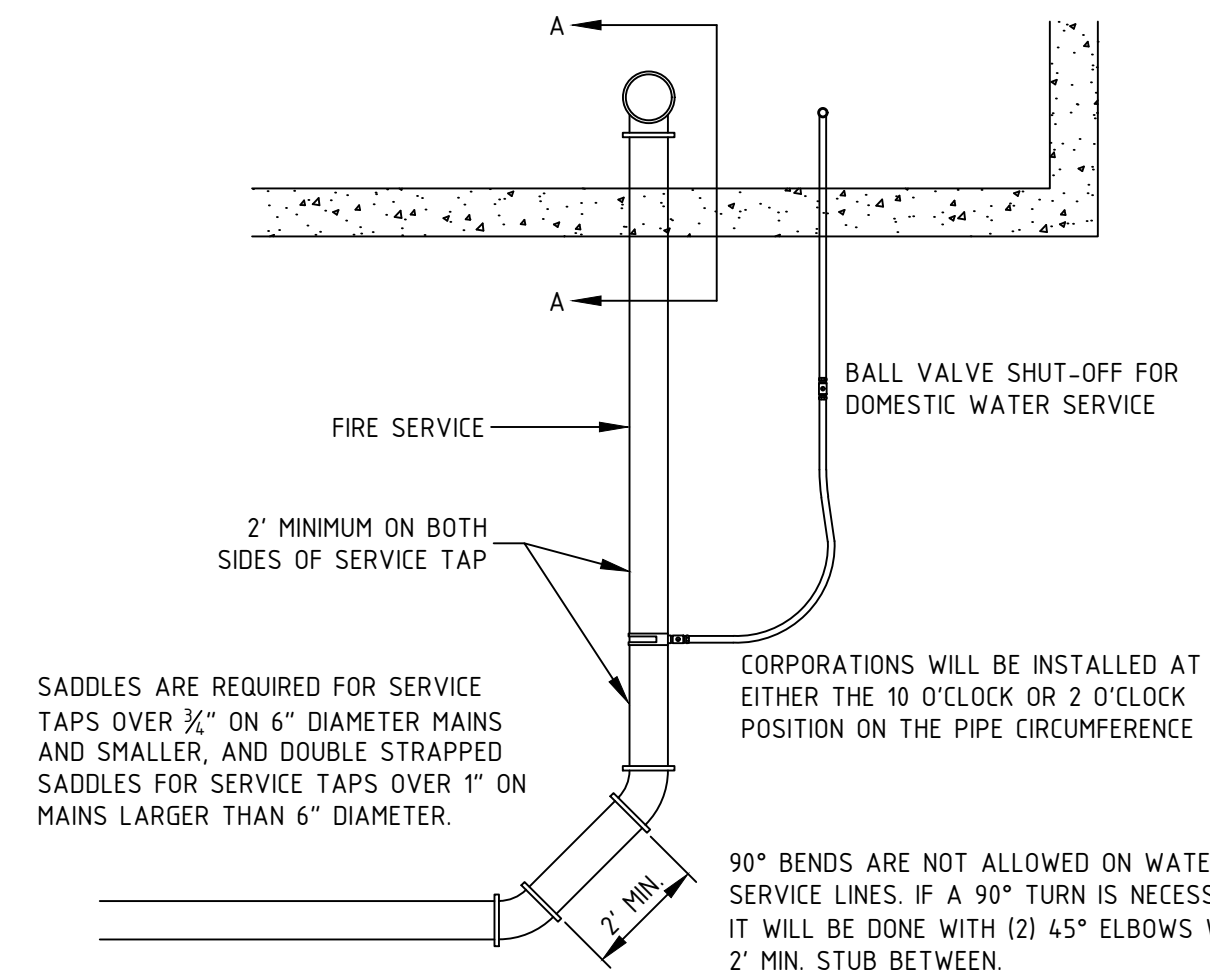


**SEDIMENT FOREBAY TYPICAL CROSS SECTION DETAIL**  
NTS

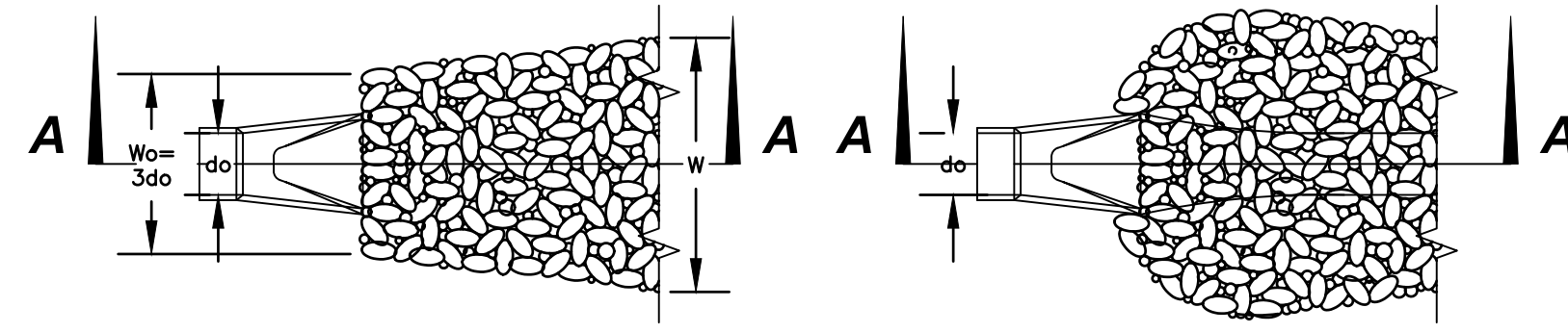
- NOTES:**
- REFER TO BERM CONSTRUCTION NOTES IN BIORETENTION SYSTEM DETAIL FOR BERM CONSTRUCTION REQUIREMENTS.
  - REFER TO SPILLWAY CROSS SECTION DETAIL FOR SPILLWAY CONSTRUCTION REQUIREMENTS.
  - THE SEDIMENT FOREBAY SHALL BE MOWED WITH THE REST OF THE SITES LAWN AREAS TO PROMOTE HEALTHY GROWTH AND PREVENT THE ENCROACHMENT OF WEEDS AND WOODY VEGETATION.
  - INSTALL STAFF GAGE TO MEASURE SEDIMENT ACCUMULATION. SEDIMENT SHALL BE REMOVED AFTER SEDIMENT ACCUMULATES TO A DEPTH OF 1 FOOT.



**CLEANOUT DETAIL**  
NTS



**WATER SERVICE THROUGH FOUNDATION**  
NTS



**SECTION A-A**  
(PIPE OUTLET TO FLAT AREA NO WELL DEFINED CHANNEL)

**SECTION A-A**  
(PIPE OUTLET TO WELL DEFINED CHANNEL)

**RIP-RAP GRADATION**

% OF WEIGHT SMALLER THAN THE GIVEN SIZE	SIZE OF STONE (INCHES)
100	9 TO 12
85	7.8 TO 10.8
50	6 TO 9
15	1.8 TO 3

% OF WEIGHT SMALLER THAN THE GIVEN SIZE	SIZE OF STONE (INCHES)
100	12 TO 16
85	10.4 TO 14.4
50	8 TO 12
15	2.4 TO 4

**RIP-RAP APRON DIMENSION TABLE**

LOCATION	W <sub>0</sub>	W	L <sub>a</sub>	T	Ø50	
RIPRAP #1 - GRAVEL WETLAND EMERGENCY SPILLWAY	VARIES SEE PLAN	2.5	16	13	18'	24'
RIPRAP #2 - 12" CPP OUTLET @ STA. 15+57	3.75	4.7	16	18'	6"	
RIPRAP #3 - 18" CPP OUTLET @ STA. 15+66	3.75	8.1	18	24'	8"	
RIPRAP #4 - GRAVEL WETLAND MID-SPILLWAY	VARIES SEE PLAN					
RIPRAP #5 - 18" CPP OUTLET @ STA. 17+80	1.25	9	8	18'	6"	
RIPRAP #6 - 6" CPP GRAVEL WETLAND OUTLET						

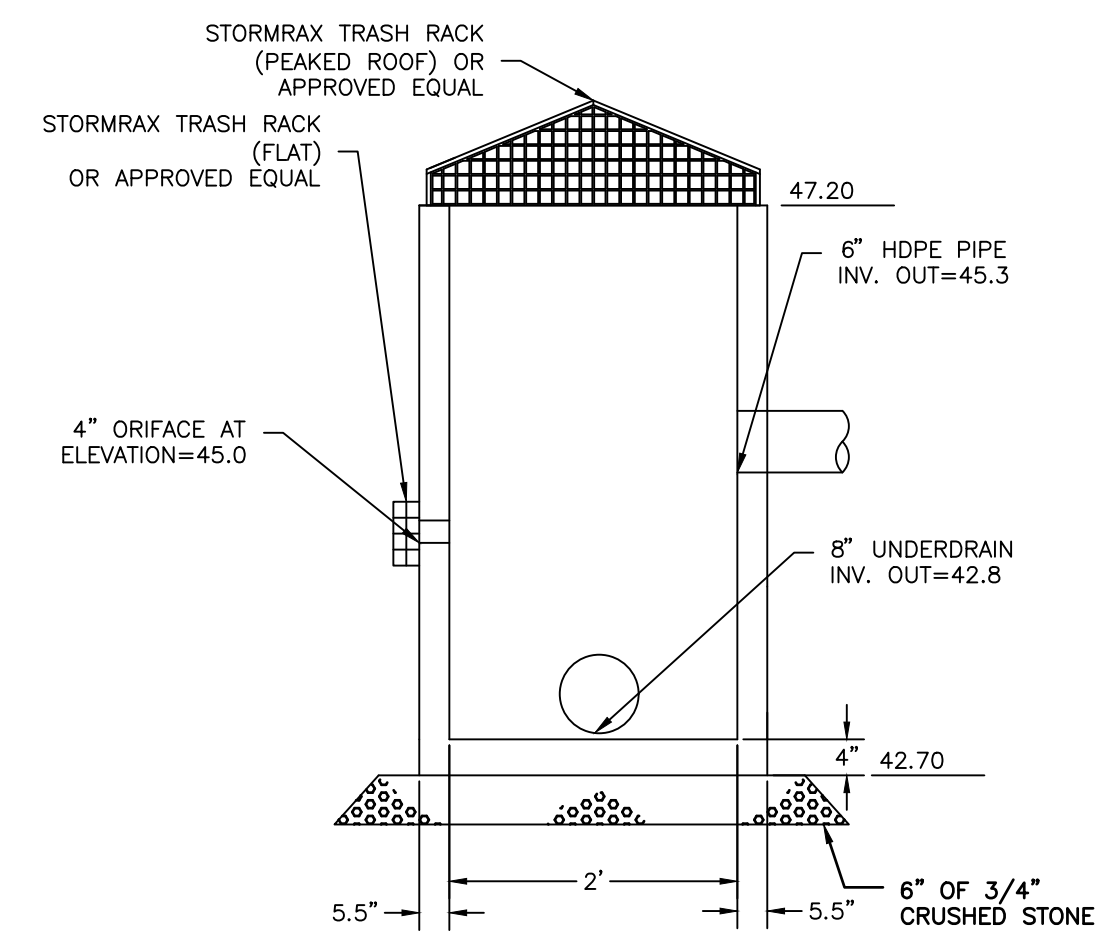
**CONSTRUCTION SPECIFICATIONS:**

- PREPARE THE SUB-GRADE FOR THE FILTER MATERIAL, GEOTEXTILE FABRIC, AND RIP-RAP TO THE GRADES SHOWN ON THE PLANS.
- MINIMUM 6" SAND/GRAVEL BEDDING OR GEOTEXTILE FABRIC (MIRAFI 140N OR EQUAL) REQUIRED UNDER ALL ROCK RIP-RAP.
- THE ROCK OR GRAVEL USED FOR FILTER OR RIP-RAP SHALL CONFORM TO THE SPECIFIED GRADATION.
- GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF ROCK RIP-RAP. DAMAGED AREAS IN THE FABRIC SHALL BE REPAIRED BY PLACING A PIECE OF FABRIC OVER THE DAMAGED AREA OR BY COMPLETE REPLACEMENT OF THE FABRIC. ALL OVERLAPS REQUIRED FOR REPAIRS OR JOINING TWO (2) PIECES OF FABRIC SHALL BE A MINIMUM OF 12 INCHES.
- STONE FOR THE RIP-RAP MAY BE PLACED BY EQUIPMENT AND SHALL BE CONSTRUCTED TO THE FULL LAYER THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO PREVENT SEGREGATION OF THE STONE SIZES.

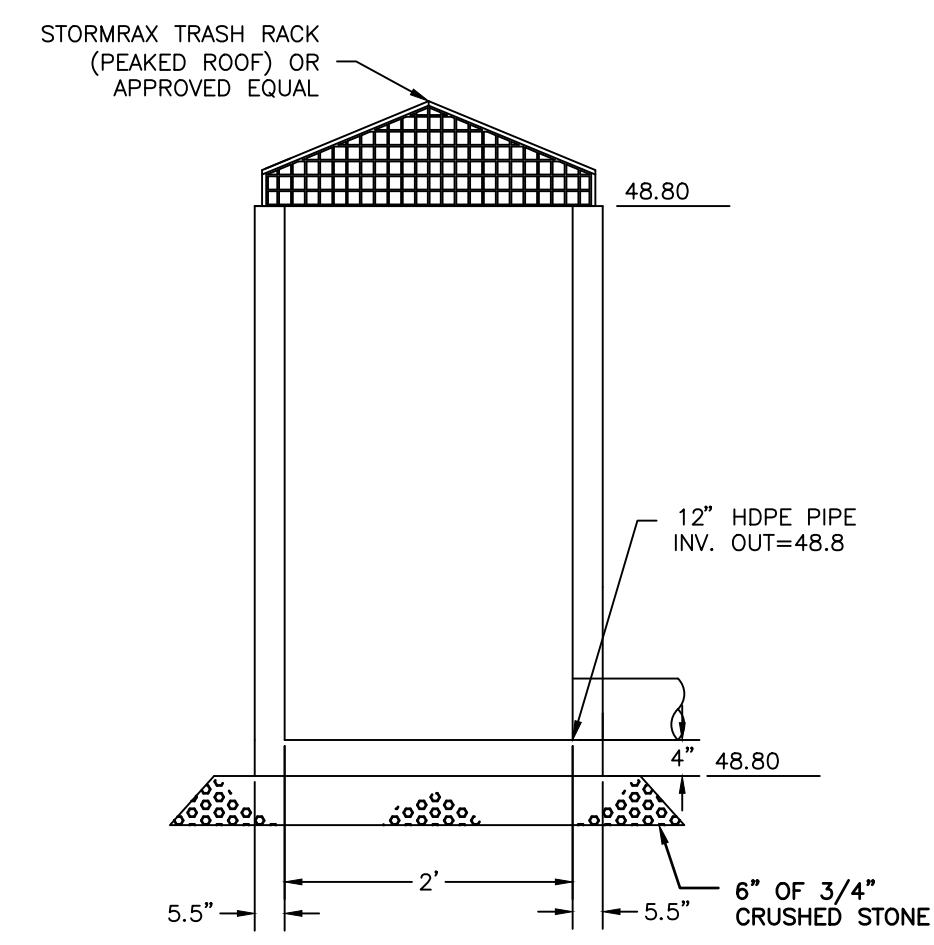
**MAINTENANCE NOTES:**

- OUTLETS SHALL BE INSPECTED AND CLEANED ANNUALLY AND AFTER ANY MAJOR STORM EVENT. ANY EROSION OR DAMAGE TO THE RIP-RAP SHALL BE REPAIRED IMMEDIATELY.
- THE CHANNEL IMMEDIATELY DOWNSTREAM FROM THE OUTLET SHOULD BE CHECKED TO SEE THAT NO EROSION IS OCCURRING.
- THE DOWNSTREAM CHANNEL SHOULD BE KEPT CLEAR OF OBSTRUCTIONS SUCH AS FALLEN TREES, DEBRIS, AND SEDIMENT THAT COULD CHANGE FLOW PATTERNS AND/OR TAILWATER DEPTHS ON THE PIPES. REPAIRS MUST BE CARRIED OUT IMMEDIATELY TO AVOID ADDITIONAL DAMAGE TO THE OUTLET PROTECTION APRON.

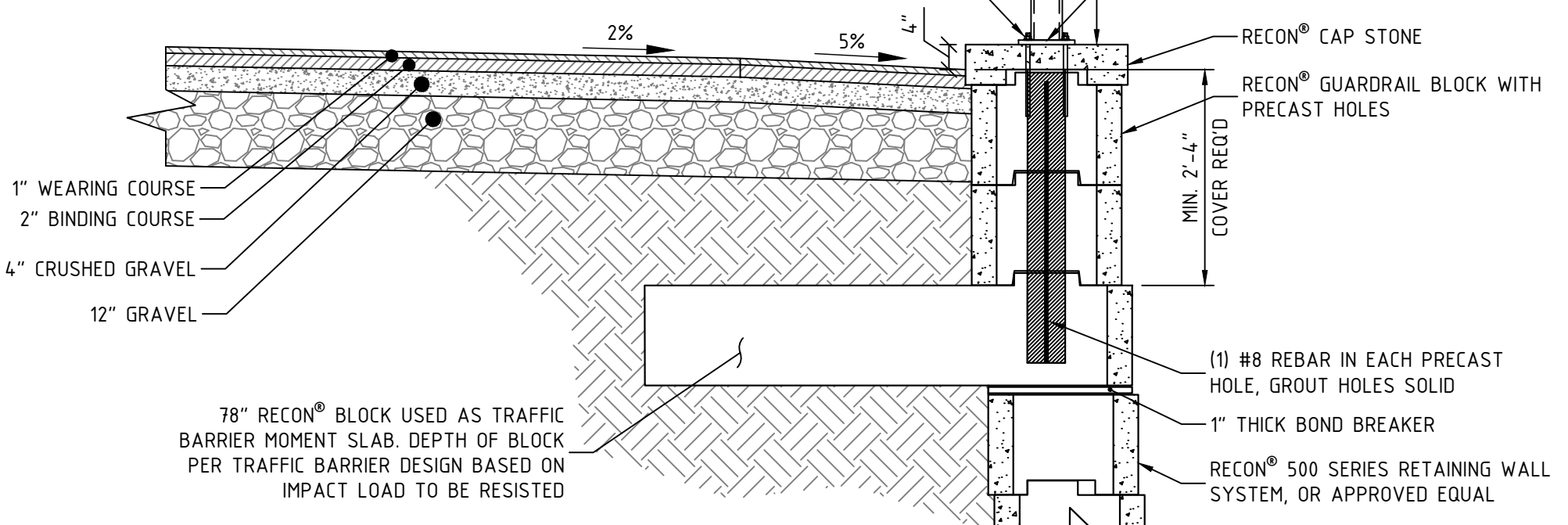
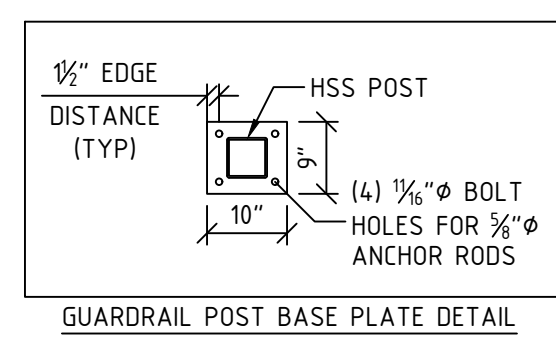
FINAL APPROVAL BY DURHAM PLANNING BOARD.  
CERTIFIED BY MICHAEL BEHRENDT, TOWN PLANNER  
DATE \_\_\_\_\_



**MODIFIED OUTLET CONTROL STRUCTURE FOR GRAVEL WETLAND**  
NTS

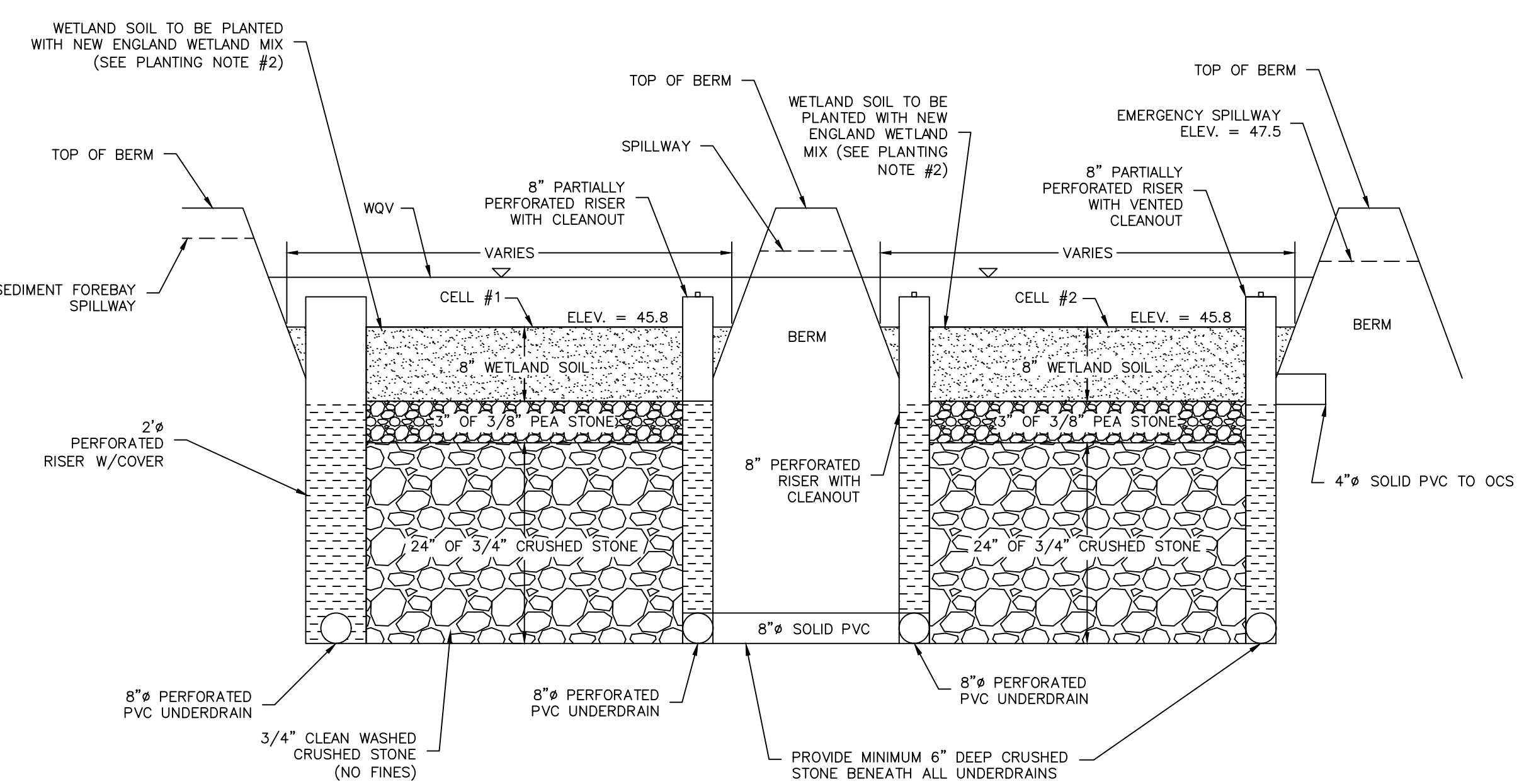


**MODIFIED OUTLET CONTROL STRUCTURE FOR SEDIMENT FOREBAY**  
NTS



- NOTES:**
- DELETERIOUS MATERIALS ENCOUNTERED BELOW ROAD SHALL BE COMPLETELY REMOVED.
  - COMPACT SUBGRADE TO 95% OF STANDARD PROCTOR.

**RETAINING WALL AND GUARDRAIL DETAIL**  
NTS



**GRAVEL WETLAND SECTION**  
NTS

**GRAVEL WETLAND CONSTRUCTION NOTES:**

- DO NOT PLACE GRAVEL WETLANDS INTO SERVICE UNTIL EACH BMP HAS BEEN PLANTED AND ITS CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.
- DO NOT DISCHARGE SEDIMENT-LADEN WATERS FROM CONSTRUCTION ACTIVITIES (RUNOFF, WATER FROM EXCAVATIONS) TO THE GRAVEL WETLAND OR DURING ANY STAGE OF CONSTRUCTION.
- CLEAR AND GRUB THE AREA WHERE THE GRAVEL WETLAND IS TO BE LOCATED. STOCKPILE LOAM FOR REUSE LATER.
- THE FOUNDATION AREA SHALL BE SCARIFIED PRIOR TO PLACING FILL. ALL UNSUITABLE MATERIAL UNDER THE BERM SHALL BE REMOVED AND REPLACED WITH SUITABLE FOUNDATION MATERIAL.
- THE BERM SHALL BE CONSTRUCTED BEGINNING FROM THE LOWEST POINT UNIFORMLY ALONG ITS ENTIRE LENGTH. PLACE MATERIALS IN MAXIMUM 12" LOOSE LIFTS COMPACTED TO 95% MAXIMUM MODIFIED PROCTOR DENSITY. EMBANKMENT SOIL SHALL HAVE NO ORGANIC MATTER OR FROZEN MATERIAL AND NO STONES LARGER THAN 2/3 OF THE MAXIMUM LOOSE LIFT THICKNESS. STONES AROUND ANY STRUCTURES AND/OR CONDUITS SHALL NOT EXCEED 3 INCHES. EMBANKMENT FILL MATERIAL SHALL HAVE THE FOLLOWING GRADATION:

SIEVE SIZE:	% PASSING:
#4	60-90
#10	50-80
#20	30-45
#40	15-30

- ALL PIPE TO PIPE CONNECTIONS SHALL BE WATER-TIGHT.
  - ALL DISTURBED AREAS NOT OTHERWISE PLANTED SHALL RECEIVE FOUR INCHES OF LOAM AND SEEDED PER THE CONSTRUCTION SEQUENCING AND EROSION CONTROL NOTES ON SHEET D101.
- GRAVEL WETLAND MAINTENANCE:**
- SYSTEMS SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND FOLLOWING ANY RAINFALL EVENT EXCEEDING 2.5 INCHES IN A 24 HOUR PERIOD, WITH MAINTENANCE OR REHABILITATION CONDUCTED AS WARRANTED BY SUCH INSPECTION.
  - TRASH AND DEBRIS SHOULD BE REMOVED AT EACH INSPECTION.
  - AT LEAST ONCE ANNUALLY, SYSTEM SHOULD BE INSPECTED FOR DRAINAGE TIME. IF GRAVEL WETLAND DOES NOT DRAIN WITHIN 72-HOURS FOLLOWING A RAINFALL EVENT, THEN A QUALIFIED PROFESSIONAL SHOULD ASSESS THE CONDITION OF THE FACILITY TO DETERMINE MEASURES REQUIRED TO RESTORE FILTRATION FUNCTION INCLUDING BUT NOT LIMITED TO REMOVAL AND REPLACEMENT OF WETLAND SOIL AND REPLANTING.
  - VEGETATION SHOULD BE INSPECTED AT LEAST ANNUALLY, AND MAINTAINED IN HEALTHY CONDITION, INCLUDING PRUNING, REMOVAL AND REPLACEMENT OF DEAD OR DISEASED VEGETATION, AND REMOVAL OF INVASIVE SPECIES.

**PLANTING NOTES:**

- WETLAND SOIL MIX FOR GRAVEL WETLAND SHALL BE A SILT LOAM WITH A MINIMUM OF 15-20% ORGANIC CONTENT BY MASS. THE CLAY CONTENT SHALL NOT EXCEED 15% BY VOLUME. THE ORGANIC MATTER SHALL CONSIST OF DECIDUOUS LEAF COMPOST PROPERLY MATURED AND AT LEAST ONE YEAR OLD. THERE SHALL BE NO LEAF MULCH, COMPOSTED MIXED YARD DEBRIS, OR WOOD CHIPS.
- GRAVEL WETLAND BOTTOM TO BE PLANTED WITH NEW ENGLAND WETLAND MIX AVAILABLE FROM: PERSON NURSERY INC. 24 BUZZELL ROAD BIDDEFORD, ME 04005 (207)-499-4992
- GRAVEL WETLAND SLOPES AND BERM TO BE PLANTED WITH SEED MIX 'C' LISTED ON SHEET D101.

NO.	REVISIONS	DATE	INT.
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3	REVISED PER ENGINEERING REVIEW	1/20/21	MCS
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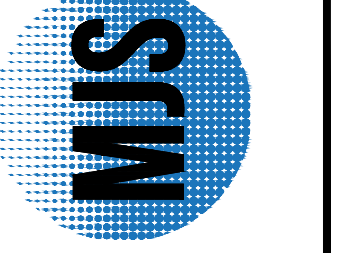
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DESIGNED BY: MCS  
DRAWN BY: MCS  
APPROVED BY: MCS  
DWG FILE: NH9003\_DET101.dwg

**CONSTRUCTION DETAILS**

prepared for  
MULHERN  
TAX MAP 10, LOT 8-6  
93 BAGDAD ROAD, DURHAM, NH 03824

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JOB: 19-063

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