



August 5, 2024

Electronic Submittal (swillard@carlislema.gov)

Sylvia Willard, Conservation Administrator
Carlisle Conservation Commission
66 Westford Street
Carlisle, MA 01741

**Re: Request for Emergency Certification
Culvert Repair
Westford Street (225)
Carlisle, Massachusetts**

[LEC File #: NEI\24-191.02]

Dear Ms. Willard:

On behalf of the Town of Carlisle, LEC Environmental Consultants, Inc., (LEC) has prepared this request for Emergency Certification to temporarily replace a collapsing 30-inch corrugated metal pipe (CMP) beneath Westford Street located 1,000± linear feet west of the Carlisle Fire Department Headquarters. This request is being filed in accordance with 310 CMR 10.06 Emergencies.

On or about May 30, 2024 a portion of the pipe collapsed within the roadway resulting in a “sink hole” that was repaired by installing a temporary steel plate and repaving. The attached plan set entitled Carlisle Westford Street (Route 225) Culvert Replacement (Sheets 1-9) prepared by Nitsch Engineering dated June 10, 2024 removes the crushed CMP and replaces it with a 30-inch Reinforced Concrete Pipe, Flared End Sections, and modified rockfill to reinforce the steep roadway side slopes.

R. Bates & Sons, Inc. has been contracted to perform this work and has prepared the attached very detailed Water Management Plan for isolating the work footprint with sandbag coffer dams and dewatering to a filter bag, bypass pumping base flows and installing a turbidity curtain downstream of the work footprint, and accounting for an emergency flood contingency plan.

Bates anticipates the work will take 1 week to complete and would like to install erosion controls and detour signage the week of August 5 and perform the work the week of August 12 with a complete road closure while they perform the work. We request that you issue an Emergency Certificate ASAP to facilitate this schedule.

Should you have any questions, please do not hesitate to contact me in the Wakefield Office or via email at amarton@lecenvironmental.com.

Sincerely,

LEC Environmental Consultants, Inc.



Ann M. Marton, President
Director of Ecological Services

cc: Ryan McLane, Town Administrator; Matthew Soltys, Nitsch Engineering

LEC Environmental Consultants, Inc.					www.lecenvironmental.com
12 Resnik Road Suite 1 Plymouth, MA 02360 508.746.9491	380 Lowell Street Suite 101 Wakefield, MA 01880 781.245.2500	100 Grove Street Suite 310 Worcester, MA 01605 508.753.3077	P. O. Box 590 Rindge, NH 03461 603.899.6726	680 Warren Avenue Suite 3 East Providence, RI 02914 401.685.3109	
PLYMOUTH, MA	WAKEFIELD, MA	WORCESTER, MA	RINDGE, NH	EAST PROVIDENCE, RI	

Attachment A

Carlisle Westford Street (Route 225) Culvert Replacement (Sheets 1-9)
prepared by Nitsch Engineering
dated June 10, 2024

TOWN OF CARLISLE

PLAN AND PROFILE OF

WESTFORD STREET (ROUTE 225)

EMERGENCY CULVERT REPAIR

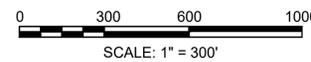
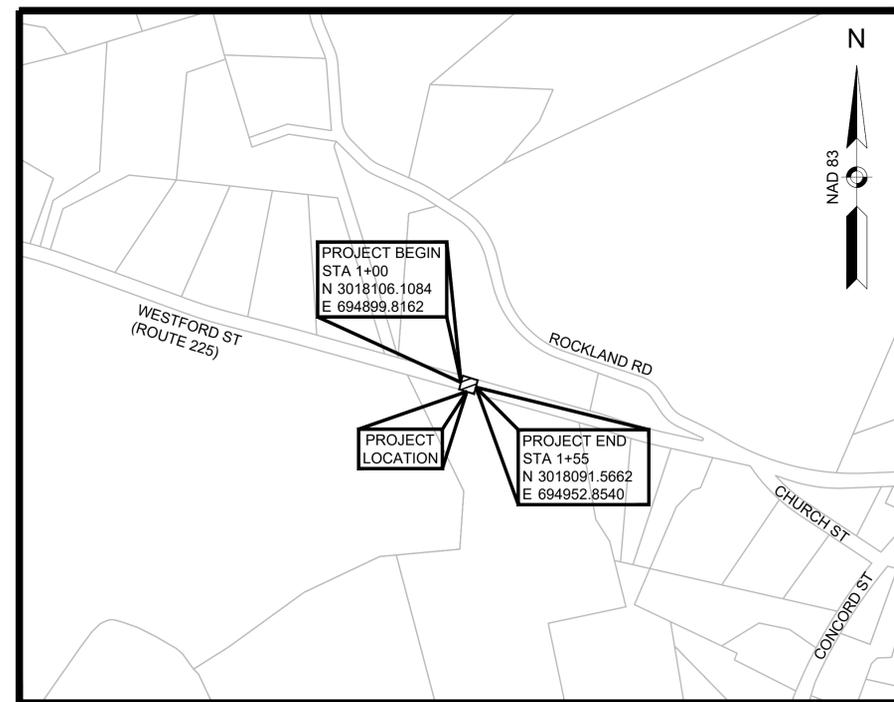
IN THE TOWN OF

CARLISLE

MIDDLESEX COUNTY

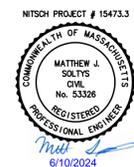
THESE PLANS ARE SUPPLEMENTED BY THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK.

INDEX	
SHEET NO.	DESCRIPTION
1	TITLE SHEET & INDEX
2	LEGEND & ABBREVIATIONS
3	GENERAL NOTES
4	CONSTRUCTION PLANS
5 - 8	TEMPORARY TRAFFIC CONTROL PLANS
9	CONSTRUCTION DETAILS



LENGTH OF PROJECT = 55 FEET = 0.010 MILES

DESIGN DESIGNATION (WESTFORD STREET/ROUTE 225)	
DESIGN SPEED	40 MPH
FUNCTIONAL CLASSIFICATION	MINOR URBAN ARTERIAL



DATE	DESCRIPTION	REV #

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		JERSEY BARRIER
		CATCH BASIN
		CATCH BASIN CURB INLET
		FLAG POLE
		GAS PUMP
		MAIL BOX
		POST SQUARE
		POST CIRCULAR
		WELL
		ELECTRIC HANDHOLE
		FENCE GATE POST
		GAS GATE
		BORING HOLE
		MONITORING WELL
		TEST PIT
		HYDRANT
		LIGHT POLE
		COUNTY BOUND
		GPS POINT
		CABLE MANHOLE
		DRAINAGE MANHOLE
		ELECTRIC MANHOLE
		GAS MANHOLE
		MISC MANHOLE
		SEWER MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
		MASSACHUSETTS HIGHWAY BOUND
		MONUMENT
		STONE BOUND
		TOWN OR CITY BOUND
		TRAVERSE OR TRIANGULATION STATION
		TROLLEY POLE OR GUY POLE
		TRANSMISSION POLE
		UTILITY POLE W/ FIREBOX
		UTILITY POLE WITH DOUBLE LIGHT
		UTILITY POLE W / 1 LIGHT
		UTILITY POLE
		BUSH
		TREE
		STUMP
		SWAMP / MARSH
		WATER GATE
		PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING
		CONTOURS (ON-THE-GROUND SURVEY DATA)
		CONTOURS (PHOTOGRAMMETRIC DATA)
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
		GUARD RAIL - DOUBLE FACE - STEEL POSTS
		GUARD RAIL - DOUBLE FACE - WOOD POSTS
		CHAIN LINK OR METAL FENCE
		WOOD FENCE
		SEDIMENT BARRIER
		COIR LOG SEDIMENT BARRIER
		TREE LINE
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE
		LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT

TRAFFIC SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		CONTROLLER PHASE ACTUATED
		TRAFFIC SIGNAL HEAD (SIZE AS NOTED)
		WIRE LOOP DETECTOR (6' x 6' TYP UNLESS OTHERWISE SPECIFIED)
		VIDEO DETECTION CAMERA
		MICROWAVE DETECTOR
		PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE
		EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
		VEHICULAR SIGNAL HEAD
		VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED
		FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)
		RAILROAD SIGNAL
		SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)
		MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)
		HIGH MAST POLE OR TOWER
		SIGN AND POST
		SIGN AND POST (2 POSTS)
		MAST ARM WITH LUMINAIRE
		OPTICAL PRE-EMPTION DETECTOR
		CONTROL CABINET, GROUND MOUNTED
		CONTROL CABINET, POLE MOUNTED
		FLASHING BEACON CONTROL AND METER PEDESTAL
		LOAD CENTER ASSEMBLY
		PULL BOX 12"x12" (OR AS NOTED)
		ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT

PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
		LEGEND "ONLY" - WHITE
		STOP LINE
		CROSSWALK
		SOLID WHITE LINE
		SOLID YELLOW LINE
		BROKEN WHITE LINE
		BROKEN YELLOW LINE
		DOTTED WHITE LINE
		DOTTED YELLOW LINE
		DOTTED WHITE LINE EXTENSION
		DOTTED YELLOW LINE EXTENSION
		DOUBLE WHITE LINE
		DOUBLE YELLOW LINE

ABBREVIATIONS

GENERAL	
AADT	ANNUAL AVERAGE DAILY TRAFFIC
ABAN	ABANDON
ADJ	ADJUST
APPROX.	APPROXIMATE
A.C.	ASPHALT CONCRETE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
BIT.	BITUMINOUS
BC	BOTTOM OF CURB
BD.	BOUND
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BR.	BRIDGE
CB	CATCH BASIN
CB CI	CATCH BASIN WITH CURB INLET
CC	CEMENT CONCRETE
CCM	CEMENT CONCRETE MASONRY
CEM	CEMENT
CI	CURB INLET
CIP	CAST IRON PIPE
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CSP	CORRUGATED STEEL PIPE
CO.	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DHV	DESIGN HOURLY VOLUME
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DW	STEADY DON'T WALK - PORTLAND ORANGE
DWY	DRIVEWAY
ELEV (or EL.)	ELEVATION
EMB	EMBANKMENT
EOP	EDGE OF PAVEMENT
EXIST (or EX)	EXISTING
EXC	EXCAVATION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN.	FOUNDATION
FLDSTN	FIELDSTONE
GAR	GARAGE
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
GRAN	GRANITE
GRAV	GRAVEL
GRD	GUARD
HDW	HEADWALL
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HYD	HYDRANT
INV	INVERT
JCT	JUNCTION
L	LENGTH OF CURVE
LB	LEACH BASIN
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MB	MAILBOX
MH	MANHOLE
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
M&O	MILL & OVERLAY
NIC	NOT IN CONTRACT
NO.	NUMBER
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PCR	PEDESTRIAN CURB RAMP
P.G.L.	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
POC	POINT ON CURVE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PROJ	PROJECT
PROP	PROPOSED
PSB	PLANTABLE SOIL BORROW
PT	POINT OF TANGENCY

**CARLISLE
WESTFORD STREET (ROUTE 225)
CULVERT REPLACEMENT
SHEET 2 OF 9
LEGEND & ABBREVIATIONS**

ABBREVIATIONS (cont.)

GENERAL	
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT
PWW	PAVED WATER WAY
R	RADIUS OF CURVATURE
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REM	REMOVE
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SHLD	SHOULDER
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
X-SECT	CROSS SECTION

TRAFFIC SIGNAL ABBREVIATIONS

CAB	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY UPRAISED HAND
FDW	FLASHING UPRAISED HAND
FR	FLASHING CIRCULAR RED
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR YELLOW
FYL	FLASHING YELLOW LEFT ARROW
FYR	FLASHING YELLOW RIGHT ARROW
G	STEADY CIRCULAR GREEN
GL	STEADY GREEN LEFT ARROW
GR	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
GV	STEADY GREEN VERTICAL ARROW
OL	OVERLAP
PED	PEDESTRIAN
PTZ	PAN, TILT, ZOOM
R	STEADY CIRCULAR RED
RL	STEADY RED LEFT ARROW
RR	STEADY RED RIGHT ARROW
TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALKING PERSON
Y	STEADY CIRCULAR YELLOW
YL	STEADY YELLOW LEFT ARROW

GENERAL NOTES

1. THE EXISTING CONDITIONS INFORMATION SHOWN HEREON IS THE RESULT OF AN ON-THE-GROUND SURVEY PERFORMED BY NITSCH ENGINEERING IN JUNE 2024.
2. VERTICAL CONTROL IS BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 AS PROVIDED BY MASSDOT GEODETIC SURVEY SECTION.
3. HORIZONTAL DATUM - NAD 83 (2011) EPOCH 2010.00 STATE SET/DETERMINED BY MASSDOT GEODETIC SURVEY THE COORDINATE SYSTEM WHICH IS MASS STATE PLANE MAINLAND US FEET.
4. PHYSICAL FEATURES AND STRUCTURES SHOWN WITH ELEVATIONS HAVE BEEN ESTABLISHED FOR DESIGN PURPOSES ONLY. ONLY ELEVATIONS LABELED AND IDENTIFIED AS BENCHMARKS ON THIS PLAN CAN BE RELIED UPON FOR FUTURE CONSTRUCTION EFFORTS.
5. IN THE EVENT THAT BENCHMARKS ESTABLISHED FOR THIS PROJECT AND PUBLISHED ON THIS SURVEY ARE DESTROYED, NOT RECOVERABLE OR A DISCREPANCY IS FOUND, THE USER SHALL NOTIFY THIS FIRM IN WRITING PRIOR TO COMMENCING OR CONTINUING ANY WORK.
6. SIDELINES OF ROAD RIGHT OF WAYS AND PROPERTY LINES/OWNERSHIP WERE NOT COMPILED FOR THIS PROJECT GIVEN THE EMERGENCY NATURE OF THE REPAIRS. THE TOWN SHALL BE RESPONSIBLE FOR COORDINATION WITH ABUTTERS AND ACQUIRING ANY RIGHTS/EASEMENTS TO CONSTRUCT THE EMERGENCY REPAIRS SHOWN HEREON.
7. THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY EXISTING GRADES AND ELEVATIONS AT THE LOCATIONS WHERE PROPOSED WORK MEETS EXISTING CONDITIONS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE TO MAKE HIS OWN DETERMINATION OF SUBSURFACE CONDITIONS INCLUDING THE LOCATION OF ROCK AND THE ACTUAL LOCATION OF UTILITIES OR OTHER FEATURES WHICH MAY AFFECT HIS WORK.
9. EXISTING UTILITIES SHOWN ON THESE PLANS WERE COMPILED FROM DIGSAFE MARKINGS. LOCATIONS ARE NOT GUARANTEED TO BE ACCURATE NOR IS IT GUARANTEED THAT ALL UTILITIES ARE SHOWN. NO SEPARATE OR ADDITIONAL COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR DUE TO ANY VARIANCE BETWEEN THE DATA SHOWN ON THE PLANS AND ACTUAL FIELD CONDITIONS ENCOUNTERED. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THIS INFORMATION FURNISHED TO THE ENGINEER.
10. THE RELOCATION, INSTALLATION OR REMOVAL OF PRIVATE UTILITIES SHALL BE ACCOMPLISHED BY THEIR OWNERS, EXCEPT AS OTHERWISE NOTED. THE CONTRACTOR WILL BE REQUIRED TO COOPERATE WITH THE PRIVATE UTILITY COMPANIES AND ALLOW THEM ADEQUATE TIME TO COMPLETE THEIR WORK IN ADVANCE OF PERFORMING ANY PAVING OPERATIONS OR OTHER FINISHED WORK.
11. AREAS OUTSIDE OF THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE TO THEIR ORIGINAL CONDITION AND TO THE SATISFACTION OF THE ENGINEER.
12. THE CONTRACTOR SHALL CONTACT "DIG SAFE" AT 1-888-DIG-SAFE AT LEAST 72 HOURS PRIOR TO COMMENCING WORK ON THE PROJECT.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND FOR MAINTAINING SEDIMENT CONTROL BARRIER, SILT FENCE(S), AND OTHER EROSION CONTROL MEASURES THROUGHOUT THE DURATION OF THE CONTRACT, IF REQUIRED, AS SHOWN ON THE PLANS AND AS REQUIRED BY THE ENGINEER.
14. NO EXISTING DRAINAGE SYSTEMS SHALL BE ABANDONED, PLUGGED OR REMOVED WITHOUT PRIOR APPROVAL OF THE ENGINEER.
15. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL SAFETY CODES AND LEGAL REQUIREMENTS, IN THE CONSTRUCTION OF IMPROVEMENTS.
16. ALL EXISTING PIPING AND STRUCTURES EXPOSED DURING EXCAVATION SHALL BE ADEQUATELY SUPPORTED, BRACED OR OTHERWISE PROTECTED DURING CONSTRUCTION ACTIVITIES. EXCAVATIONS SHALL BE BACK FILLED DAILY AT THE COMPLETION OF WORK.
17. UNLESS OTHERWISE NOTED OR APPROVED BY THE ENGINEER, THE CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES IN SERVICE AT ALL TIMES. IF THE CONTRACTOR DAMAGES UTILITY SYSTEMS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE RESPECTIVE UTILITY COMPANY AND SHALL REPAIR/REPLACE THE AFFECTED SYSTEM AT HIS OWN EXPENSE.
18. ALL MATERIALS TO BE REMOVED AND DISCARDED SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS.
19. CONTRACTOR SHALL PROVIDE ADEQUATE BRACING AND SHORING OF ALL EXCAVATIONS IN ACCORDANCE WITH THE REQUIREMENTS OF ALL GOVERNING CODES AND REGULATIONS.
20. THE TEMPORARY TRAFFIC CONTROL PLANS INDICATE THE GENERAL REQUIREMENTS FOR THE VARIOUS PHASES OF WORK. THE CONTRACTOR SHALL SUBMIT DETAILED TRAFFIC MANAGEMENT PLANS TO THE ENGINEER FOR APPROVAL.
21. ALL PROPOSED EXCAVATION SUPPORT SYSTEMS SHALL BE CONSIDERED INCIDENTAL TO THE APPLICABLE ITEMS.
22. THE FLOW OF TRAFFIC THROUGH THE SITE MUST BE MAINTAINED AS SHOWN ON THE TRAFFIC CONTROL PLANS AND SPECIFIED IN THE SPECIAL PROVISIONS. CONSTRUCTION EQUIPMENT AND MATERIALS SHALL NOT BE PARKED OR STOCKPILED SO AS TO OBSTRUCT THE FLOW OF VEHICLES.
23. ALL PROPOSED CATCH BASINS, UNLESS NOTED OTHERWISE, SHALL HAVE A 4' DEEP SUMP.
24. DRAINAGE ELEVATIONS ARE PROVIDED FOR DESIGN PURPOSES ONLY. ANY FIELD ADJUSTMENTS REQUIRED SHALL BE MADE AS APPROVED OR REQUIRED BY THE ENGINEER. ONLY AFTER THE CONTRACTOR VERIFIES ELEVATIONS FOR THE CONSTRUCTABILITY OF THE DRAINAGE SYSTEM SHALL ANY STRUCTURES BE ORDERED. ANY FIELD ADJUSTMENTS TO LINE & GRADE SHALL BE INCLUDED IN THE COST OF THE PIPE.
25. THE TERM "PROPOSED" (PROP) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IN SUITABLE CONDITION IDENTIFIED AS "REMOVE AND RESET" (R&R).
26. ALL LATERAL DRAIN PIPES SHALL BE INSTALLED WITH A PITCH OF 0.01 FOOT PER FOOT (MINIMUM) UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
27. IN AREAS OF FULL DEPTH PAVEMENT AND SIDEWALK RECONSTRUCTION WHERE PROPOSED MEETS EXISTING PAVEMENT, THE EXISTING PAVEMENT SHALL BE SAWCUT TO OBTAIN A CLEAN VERTICAL FACE.
28. ALL UTILITY AND DRAINAGE FRAMES, GRATES, AND COVERS SHALL BE INSTALLED FLUSH WITH SURROUNDING PAVEMENT.

CARLISLE
WESTFORD STREET (ROUTE 225)
CULVERT REPLACEMENT
SHEET 3 OF 9
GENERAL NOTES

HIGHWAY GUARD DETAILS
 MEET EXIST 0+88 LT
 PROP CC POST & STEEL CABLE 0+88 TO 1+81 LT
 MEET EXIST 1+81 LT
 BEGIN CC POST AND STEEL CABLE 1+15 RT
 PROP CC POST & STEEL CABLE 0+88 TO 1+62 RT
 MEET EXIST 1+62 RT

TRAFFIC SIGNAL CONDUIT
 NONE

WATER SUPPLY ALTERATIONS
 NONE

DRAINAGE DETAILS
 SEE BELOW

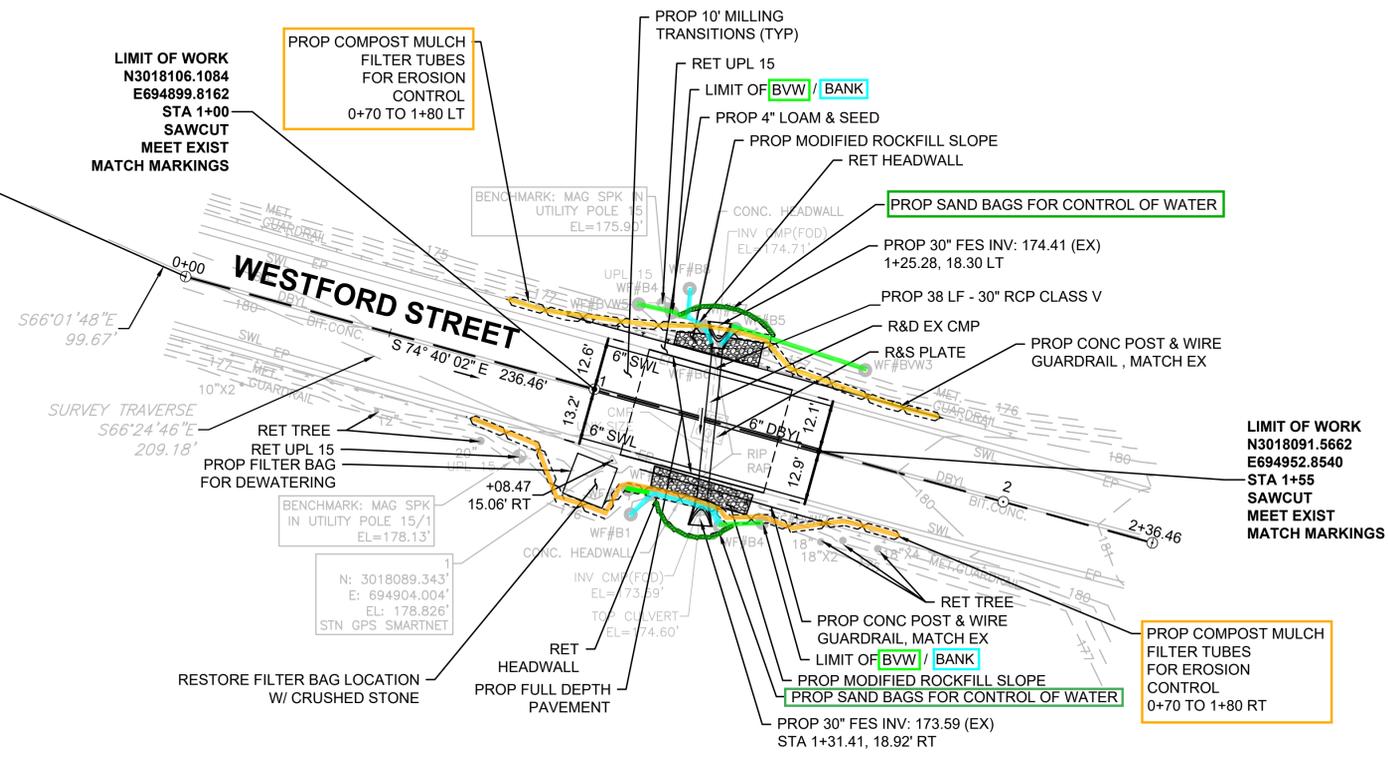
**CARLISLE
 WESTFORD STREET (ROUTE 225)
 CULVERT REPLACEMENT
 SHEET 4 OF 9
 CONSTRUCTION PLANS**



2
 N: 3018173.043'
 E: 694712.302'
 EL: 180.552'
 STN GPS SMARTNET

LIMIT OF WORK
 N3018106.1084
 E694899.8162
 STA 1+00
 SAWCUT
 MEET EXIST
 MATCH MARKINGS

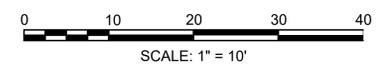
PROP COMPOST MULCH
 FILTER TUBES
 FOR EROSION
 CONTROL
 0+70 TO 1+80 LT



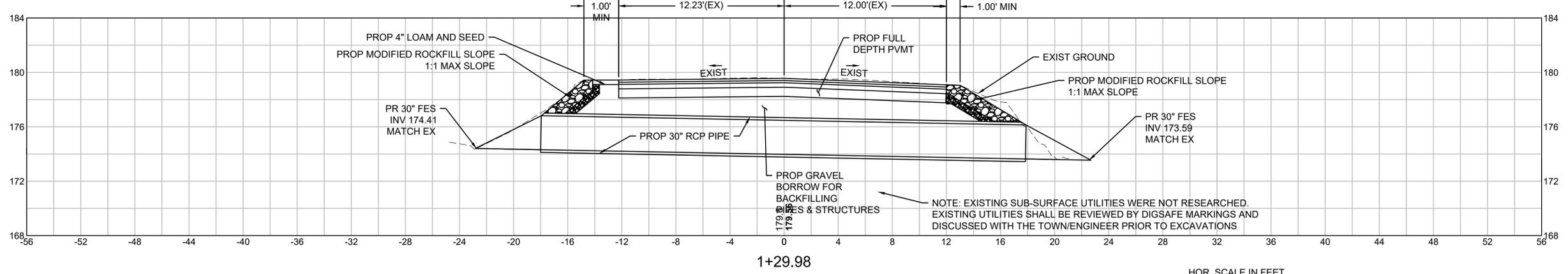
NOTE: CONTRACTOR SHALL
 REBUILD THE ROADWAY TO
 THE EXISTING ROADWAY
 ELEVATIONS. GRADES ARE
 NOT PROVIDED AS NO GRADE
 CHANGES ARE PROPOSED.

LIMIT OF WORK
 N3018091.5662
 E694952.8540
 STA 1+55
 SAWCUT
 MEET EXIST
 MATCH MARKINGS

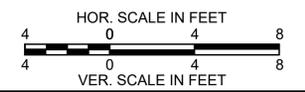
PROP COMPOST MULCH
 FILTER TUBES
 FOR EROSION
 CONTROL
 0+70 TO 1+80 RT



CRITICAL CROSS SECTION AT CROSSING



NOTE: EXISTING SUB-SURFACE UTILITIES WERE NOT RESEARCHED.
 EXISTING UTILITIES SHALL BE REVIEWED BY DIGSAFE MARKINGS AND
 DISCUSSED WITH THE TOWN/ENGINEER PRIOR TO EXCAVATIONS



GENERAL NOTES:

- ALL TRAFFIC MANAGEMENT AND WORK ZONE TRAFFIC CONTROL MEASURES SHALL CONFORM TO THE REQUIREMENTS OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) CURRENT EDITION WITH MASSACHUSETTS AMMENDMENTS, THE STANDARD SPECIFICATIONS, THE PROJECT SPECIAL PROVISIONS, AND THE FOLLOWING NOTES.
- THE TRAFFIC MANAGEMENT PLANS CONTAINED HEREIN ARE GIVEN AS A GUIDE FOR TYPICAL WORK ZONE TRAFFIC CONTROL APPLICATIONS FOR THE TYPES OF WORK ANTICIPATED FOR THIS PROJECT. THEY ARE NOT INTENDED TO COVER ALL POSSIBLE CONSTRUCTION OPERATIONS WHICH THE CONTRACTOR MAY CHOOSE TO EMPLOY. WORK ZONE TRAFFIC CONTROL FOR OTHER CONSTRUCTION OPERATIONS OR OTHER TRAFFIC SITUATIONS IF APPLICABLE SHALL BE IN ACCORDANCE WITH THE MUTCD AND AS APPROVED OR DIRECTED BY THE ENGINEER.
- NO CONSTRUCTION VEHICLES SHALL BE PARKED WITHIN THE TRAVEL WAY WITHOUT PROPER PROTECTION AND APPROVAL OF THE ENGINEER.
- TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
- ALL WARNING SIGNS SHALL BE BLACK LEGEND ON A REFLECTIVE ORANGE BACKGROUND AND IN ACCORDANCE WITH THE MUTCD. ALL REGULATORY SIGNS SHALL BE BLACK LEGEND ON A WHITE REFLECTIVE BACKGROUND. ALL CONSTRUCTION SIGNS SHALL BE ATTACHED TO THEIR OWN INDEPENDENT SUPPORTS UNLESS SHOWN OTHERWISE.
- THE CONTRACTOR SHALL MAKE EVERY EFFORT TO AVOID PLACING TEMPORARY TRAFFIC CONTROL DEVICES ON PRIVATE PROPERTY. IF SUCH PLACEMENT ON PRIVATE PROPERTY IS UNAVOIDABLE, IT SHALL BE DONE WITH THE EXPLICIT APPROVAL OF THE PROPERTY OWNER AND THE ENGINEER.
- ABUTTER ACCESS SHALL NOT BE CLOSED EXCEPT FOR SHORT PERIODS AND ONLY WITH THE APPROVAL OF THE ENGINEER. 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 CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT AND SIMILAR OPERATIONS.
- THE CONTRACTOR SHALL PROVIDE IMMEDIATE ACCESS TO EMERGENCY VEHICLES AT ALL TIMES.
- GRADE DIFFERENCES IN EXCESS OF 2" DURING NON-WORKING HOURS WILL REQUIRE DELINEATION BY USE OF DRUMS.
- GRADE DIFFERENCES IN EXCESS OF 4" DURING NON-WORKING HOURS SHALL BE PROTECTED BY BACKFILLING WITH A TRANSITION OF GRAVEL OR OTHER MATERIAL TO BE COMPACTED AT A 4:1 SLOPE, AND DELINEATED BY DRUMS.
- CONSTRUCTION SIGNS NOT APPLICABLE TO VARIOUS STAGES OF CONSTRUCTION SHALL BE REMOVED OR COVERED.
- USE MA-W20-7b SIGNS ONLY WHEN POLICE OFFICER IS DIRECTING TRAFFIC. THEY SHALL BE TAKEN DOWN OR COVERED AT THE CLOSE OF EACH OPERATION.
- MAINTAIN PEDESTRIAN ACCESS THROUGH THE WORK AREA AT ALL TIMES. THE POLICE DETAIL SHALL PROVIDE CONTROL TO CROSS PEDESTRIANS ON ROADWAY TO SIDEWALK. PROVIDE TEMPORARY CROSSWALKS AND RAMPS AS NEEDED AND AS DIRECTED BY THE ENGINEER.
- ALL CONSTRUCTION SIGNING AND OTHER TRAFFIC MAINTENANCE DEVICES SHALL CONFORM WITH THE 2009 MUTCD AS AMENDED, MASH, AND MASSDOT STANDARDS.
- ADVANCE WARNING SIGNS NO LONGER APPLICABLE, WHICH MIGHT CREATE CONFUSION IN THE MINDS OF VEHICLE OPERATORS, SHALL EITHER BE COVERED OR REMOVED AS SOON AS POSSIBLE. NO SIGN SHALL BE VISIBLE TO TRAFFIC THAT MAY CONFLICT WITH ACTUAL ROADWAY CONDITIONS.
- ALL DISTANCES MAY BE ADJUSTED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER. HOWEVER, MINIMUM DISTANCES, WHERE INDICATED, SHOULD BE MAINTAINED.
- THE CONTRACTOR SHALL USE TEMPORARY PATCHING OR BEVELED STEEL PLATES TO COVER PIPE TRENCHES AND OTHER EXCAVATED HOLES NOT COMPLETED BY THE END OF EACH WORK DAY.
- SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, CHANNELIZING DEVICES, BARRIERS, AND CRASH ATTENUATORS MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES" AND/OR "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH).
- MINIMUM LANE WIDTH IS TO BE 11 FEET UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH WILL BE MEASURED FROM THE EDGE OF DRUMS OR CONES OR MEDIAN BARRIER.
- ORANGE CONSTRUCTION FLAGS MAY BE USED ON ADVANCE WARNING SIGNS AS DIRECTED BY THE ENGINEER. FLAGS SHALL BE A MINIMUM OF 16" X 16".
- MAINTAIN EXISTING PAVEMENT MARKINGS WHERE APPLICABLE. WHEN LANES SHIFT, IF NECESSARY, EXISTING MARKINGS SHALL BE REMOVED AND TEMPORARY PAVEMENT MARKING SHALL BE PROVIDED.
- AT THE END OF EACH WORK DAY, NO TRAFFIC CONTROL DEVICES SHALL REMAIN IN THE ROADWAY AND ALL LANES SHALL BE OPEN FOR TRAFFIC FLOW.
- THE CONTRACTOR MAY PROPOSE TO USE A DIFFERENT SEQUENCE OF WORK AREAS THAN WHAT IS BEING PROPOSED IN THESE DOCUMENTS. THE CONTRACTOR SHALL SUBMIT PHASING AND TRAFFIC MANAGEMENT PLANS FOR APPROVAL BY THE ENGINEER.
- DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
- MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH. (20' SPACING TYPICAL ON TAPER, 35' SPACING TYPICAL ON TANGENTS.)
- CHANNELIZATION WILL BE ACCOMPLISHED THROUGH THE USE OF REFLECTORIZED PLASTIC DRUMS WITH SEQUENTIAL FLASHING WARNING LIGHTS.
- THE FIRST TEN PLASTIC DRUMS OF A TAPER SHALL BE MOUNTED WITH SEQUENTIAL FLASHING WARNING LIGHTS.
- ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.
- POLICE DETAIL SHALL BE USED WHILE SETTING UP THE TEMPORARY TRAFFIC CONTROL DEVICES ON THE ROADWAY.
- EACH WORK ZONE SHALL HAVE MA-R2-10a, MA-R2-10e, AND W-20 SERIES SIGNS WHERE APPLICABLE.
- POLICE DETAILS SHALL BE EMPLOYED AND SHALL BE SUBSTITUTED WITH CERTIFIED ROADWAY FLAGGERS AS DIRECTED BY THE ENGINEER AND PER SECTION 850 "TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE OPERATIONS" IN THE MASSDOT STANDARD SPECIFICATIONS, 2020 EDITION.
- THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE ENGINEER.
- ALL DRIVEWAYS AND STREETS SHALL REMAIN OPEN AT ALL TIMES EXCEPT FOR SHORT PERIODS AS APPROVED BY THE ENGINEER.

SUGGESTED WORK ZONE WARNING SIGN SPACING

ROAD TYPE	DISTANCE BETWEEN SIGNS **			
	A	B	C	D
URBAN (30 MPH OR LESS)*	100 (30)	100 (30)	100 (30)	100 (30)
URBAN (35 MPH OR GREATER)*	350 (100)	350 (100)	350 (100)	350 (100)
RURAL*	500 (150)	500 (150)	500 (150)	500 (150)
EXPRESSWAY/FREEWAY*	1,000 (300)	1,500 (450)	2,640 (800)	500 (150)

* ROAD TYPE TO BE DETERMINED BY MASSDOT OFFICE OF TRANSPORTATION PLANNING.

** DISTANCES ARE SHOWN IN FEET (METERS). THE COLUMN HEADINGS A, B, AND C ARE THE DIMENSIONS SHOWN IN THE DETAIL/ TYPICAL SETUP FIGURES. THE A DIMENSION IS THE DISTANCE FROM THE TRANSITION OR POINT OF RESTRICTION TO THE FIRST SIGN. THE B DIMENSION IS THE DISTANCE BETWEEN THE FIRST AND SECOND SIGNS. THE C DIMENSION IS THE DISTANCE BETWEEN THE SECOND AND THIRD SIGNS. (THE "THIRD" SIGN IS THE FIRST ONE TYPICALLY ENCOUNTERED BY A DRIVER APPROACHING A TEMPORARY TRAFFIC CONTROL (TTC) ZONE.)

THE "THIRD" SIGN ABOVE IS TYPICALLY REFERRED TO AS AN "ADVANCE WARNING" SIGN ON THE TTC SETUPS. THESE ADVANCE WARNING SIGNS ARE LOCATED PRIOR TO THE PROJECT LIMITS ON ALL APPROACHES (I.E. THE W20-1 SERIES (ROAD WORK XX FT) SIGNS), AND USUALLY REMAIN FOR THE DURATION OF THE PROJECT. ADDITIONAL SIGNS (I.E. "RIGHT LANE CLOSED 1 MILE" AND "LEFT LANE CLOSED 1 MILE") HAVE BEEN SHOWN IN SOME FIGURES AS EXAMPLES OF REINFORCEMENT SIGN PLACEMENT BUT ARE USED IN RARE OCCASIONS.

THE FIRST AND SECOND WARNING SIGNS ABOVE ARE REFERRED TO AS THE OPERATIONAL (DAY-TO-DAY) WORK ZONE SIGNS AND MAY BE MOVED DEPENDING ON WHERE THE SPECIFIC ROADWAY WORK FOR THAT DAY IS LOCATED.

MA-R2-10a SIGNS SHALL BE PLACED BETWEEN THE SECOND AND THIRD SIGNS AS DESCRIBED ABOVE.

MA-R2-10a, R2-10e, AND W20-1 SERIES SIGNS ARE TO BE INCLUDED ON ALL DETAILS/TYPICAL SETUPS.

TAPER LENGTH CRITERIA FOR TEMPORARY TRAFFIC CONTROL ZONES

TYPE OF TAPER	TAPER LENGTH (L)
MERGING TAPER	AT LEAST L
SHIFTING TAPER	AT LEAST 0.5L
SHOULDER TAPER	AT LEAST 0.33L
ONE-LANE, TWO-WAY TRAFFIC TAPER	50 FT MIN. 100 FT MAX.
DOWNSTREAM TAPER	50 FT MIN. 100 FT MAX. PER LANE
TANGENT LENGTH	AT LEAST 2L

FORMULAS FOR DETERMINING TAPER LENGTHS

SPEED LIMIT (S)	TAPER LENGTH (L) FEET
40 MPH OR LESS	$L = \frac{WS^2}{60}$
45 MPH OR MORE	$L = WS$

WHERE: L = TAPER LENGTH IN FEET

W = WIDTH OF OFFSET IN FEET

S = POSTED SPEED LIMIT, OR OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED IN MPH (KM/H)

**CARLISLE
WESTFORD STREET (ROUTE 225)
CULVERT REPLACEMENT
SHEET 5 OF 9
TEMPORARY TRAFFIC CONTROL PLANS**

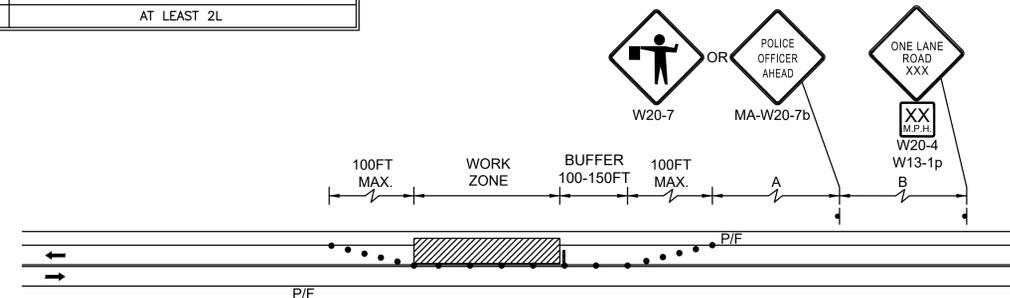
STOPPING SIGHT DISTANCE AS A FUNCTION OF SPEED

SPEED* (mph)	DISTANCE (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

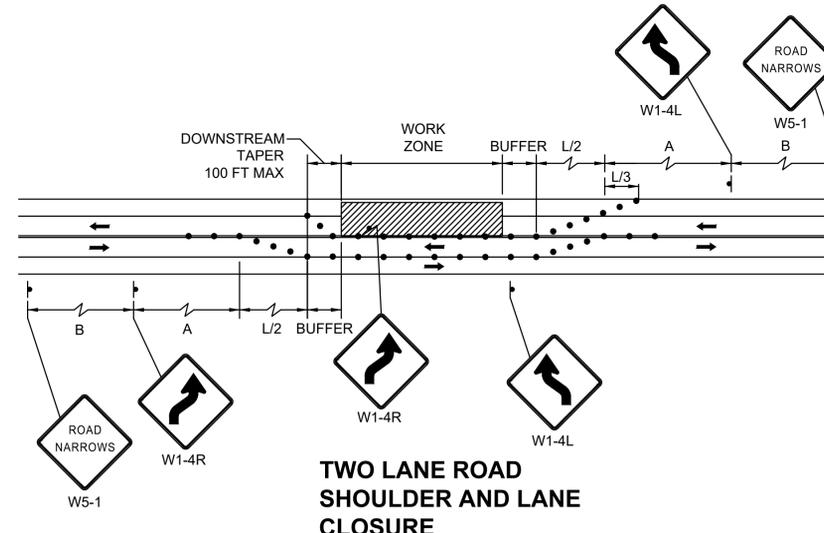
*POSTED SPEED, OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED

THESE VALUES MAY BE USED TO DETERMINE THE LENGTH OF LONGITUDINAL BUFFER SPACES.

THE DISTANCES IN THE ABOVE CHART REPRESENT THE MINIMAL VALUES FOR BUFFER SPACING.



TWO LANE ROAD ALTERNATING TRAFFIC



TWO LANE ROAD SHOULDER AND LANE CLOSURE

LEGEND:

- REFLECTORIZED PLASTIC DRUM OR 36" CONE
- P/F POLICE/FLAGGER DETAIL
- ▨ TYPE III BARRICADE
- CHANGEABLE MESSAGE SIGN
- ➡ ARROW BOARD
- ▨ WORK ZONE
- ➡ DIRECTION OF TRAFFIC
- ▨ IMPACT ATTENUATOR
- ▨ MEDIAN BARRIER
- ▨ MEDIAN BARRIER WITH WARNING LIGHTS
- ▨ WORK VEHICLE
- ▨ TRUCK MOUNTED ATTENUATOR
- ➡ TRAFFIC OR PEDESTRIAN SIGNAL
- SIGN

ADVANCED SIGN PLAN

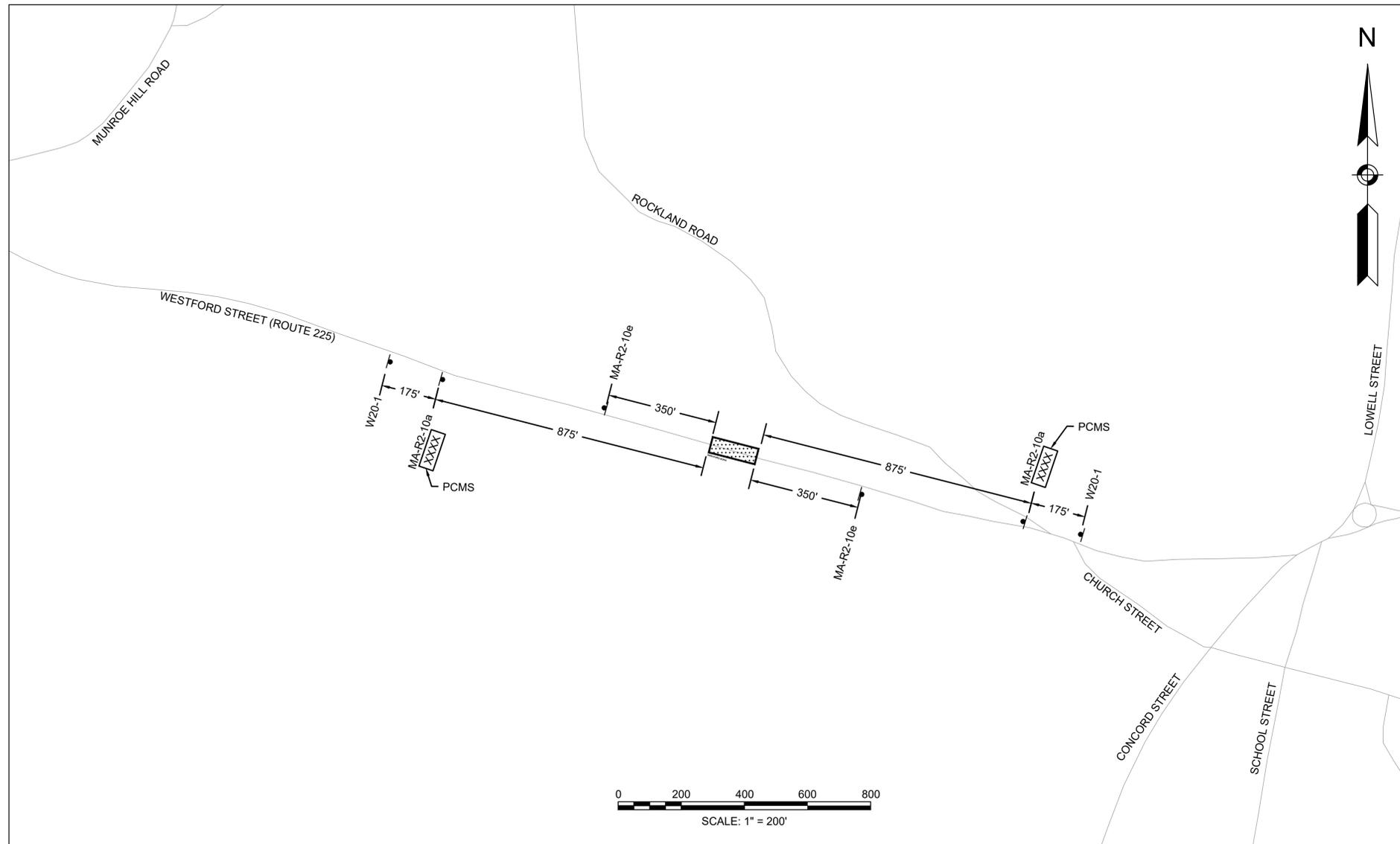
NTS

NOTES:

1. PCMS SHALL BE INSTALLED AT LEAST 2 WEEKS PRIOR TO THE START OF WORK. WITH THE WORD MESSAGE "CONSTRUCTION TO BEGIN MM-DD THROUGH MM-DD SEEK ALT ROUTE"
2. THE CONTRACTOR SHALL CONFIRM THE EXACT LOCATION OF THE PCMS WITH THE ENGINEER AND THE TOWN OF CARLISLE.
3. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO CONTINUALLY UPDATE THE PCMS BASED UPON ON-GOING WORK. ABBREVIATIONS SHALL BE IN ACCORDANCE WITH THE MUTCD.
4. PLACEMENT OF ADVANCE WARNING SIGN SHALL BE ADJUSTED BASED ON THE ACTUAL FIELD CONDITIONS.

LEGEND

- SIGN
- ▨ WORK ZONE



CONSTRUCTION STAGING PLAN

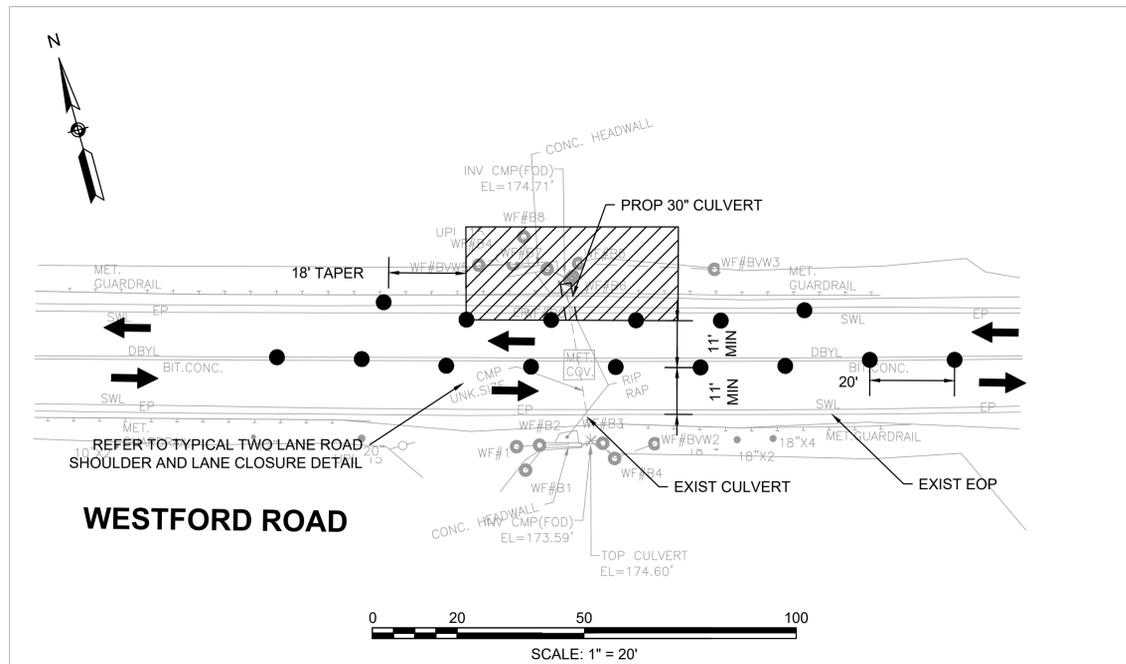
GENERAL NOTES:

1. THIS CONSTRUCTION STAGING PLAN HAS BEEN PROVIDED AS A GUIDE TO CONVEY THE INTENDED CONSTRUCTION STAGING TO COMPLETE THE WORK REQUIRED TO INSTALL THE PROPOSED 30" CULVERT.
2. ALL WORK SHALL BE PROPERLY COORDINATED WITH OTHER PRIVATE AND PUBLIC UTILITIES, INCLUDING THE WATER DEPARTMENT.
3. WORK WITHIN THE PUBLIC WAY IN ALL PHASES SHALL BE COMPLETED USING TEMPORARY TRAFFIC CONTROL AS NECESSARY AND APPROVED BY THE ENGINEER (SEE TEMPORARY TRAFFIC CONTROL PLAN TYPICAL DETAILS).
4. CONTRACTOR SHALL MAINTAIN (2) - 11 FOOT LANES IN EACH DIRECTION DURING PEAK AND NON-WORKING HOURS. SEE TEMPORARY TRAFFIC CONTROL PLAN GENERAL NOTES FOR ADDITIONAL INFORMATION. PEAK HOURS SHALL BE DEFINED AS MONDAY THRU FRIDAY 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM.
5. THE CONTRACTOR SHALL SECURE ALL WORK AREAS TO PREVENT UNAUTHORIZED ACCESS AT ALL TIMES.

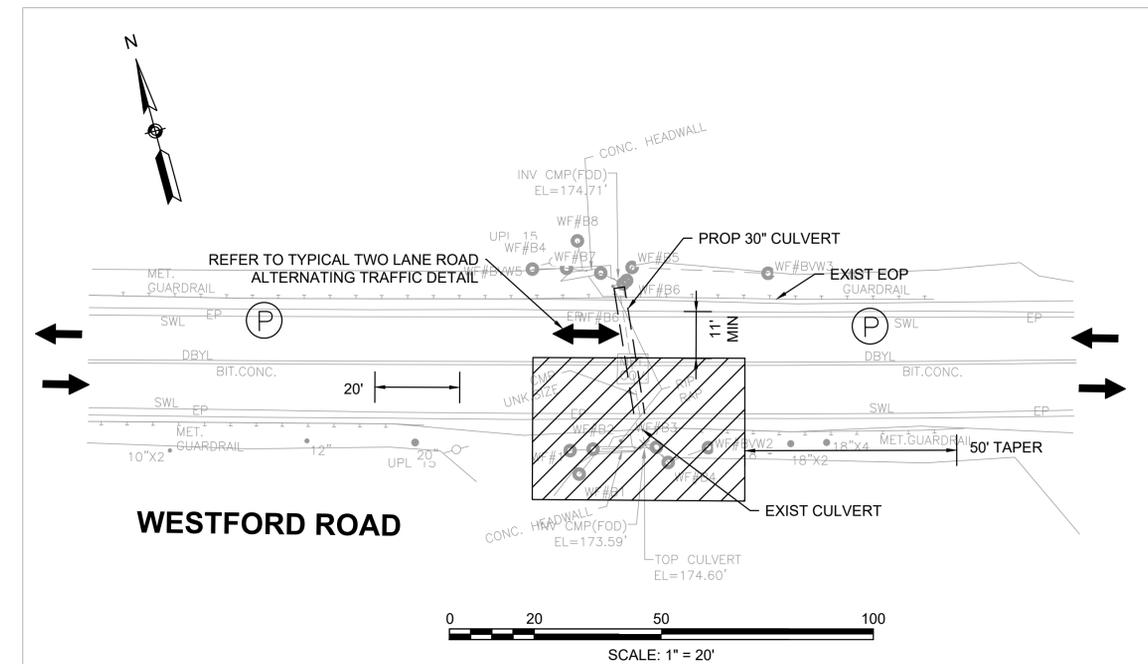
LEGEND

- ← DIRECTION OF TRAFFIC
- ▨ WORK ZONE
- REFLECTORIZED PLASTIC DRUM
- Ⓟ POLICE OFFICER

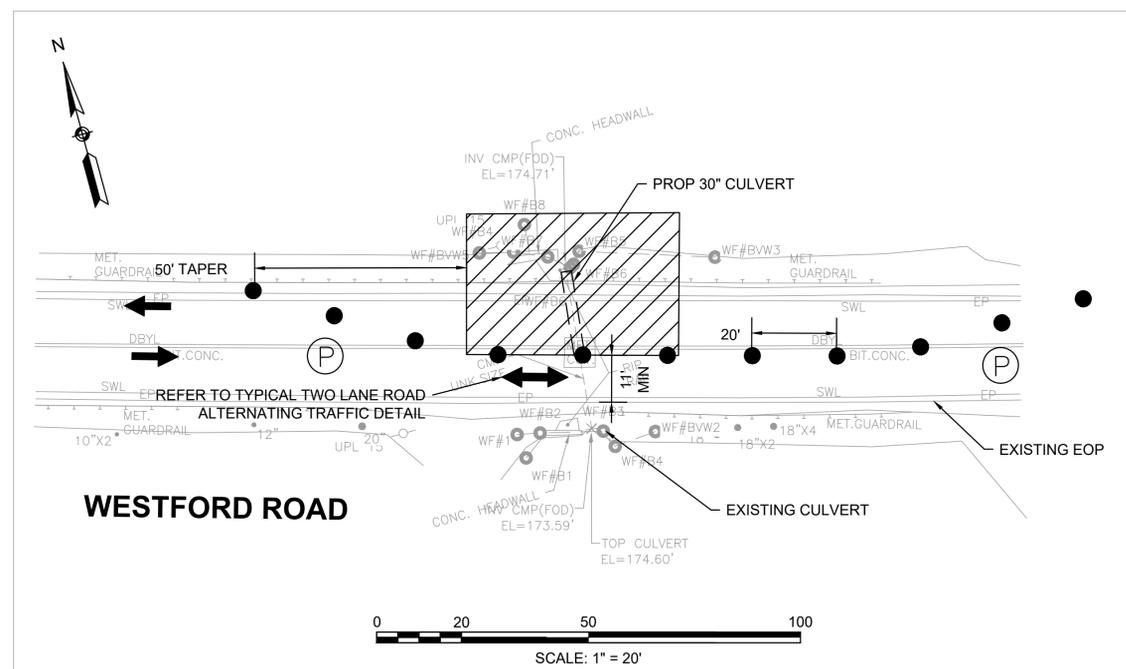
PHASE 1A - LANE SHIFT



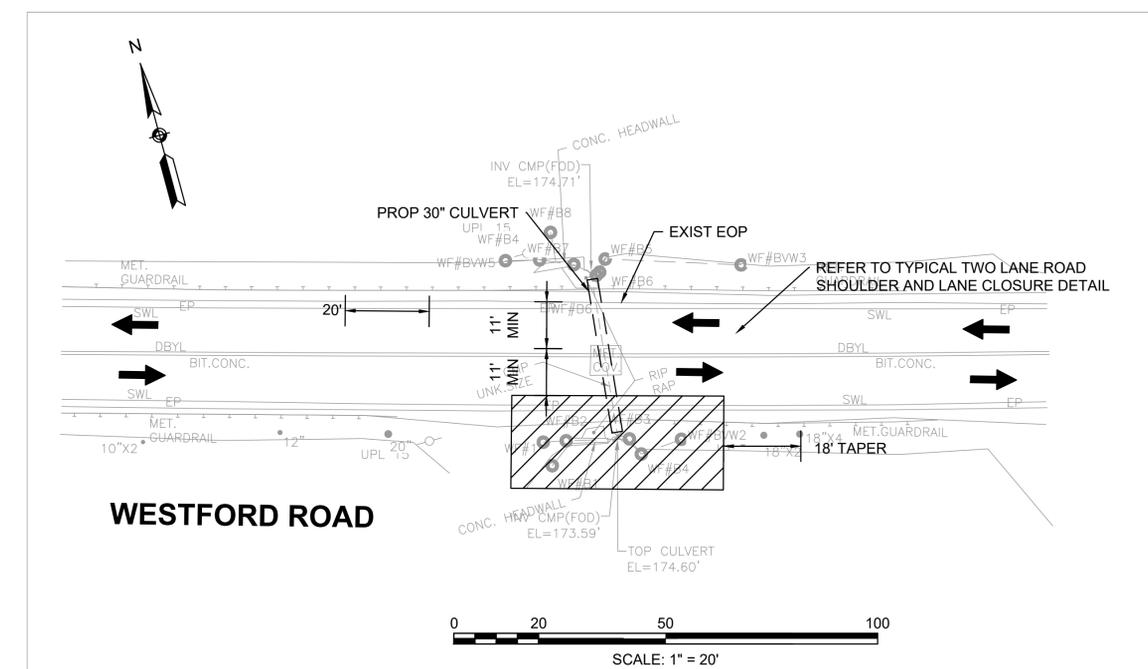
PHASE 2A - ALTERNATING ONE-WAY



PHASE 1B - ALTERNATING ONE-WAY



PHASE 2B - LANE SHIFT



DETOUR ROUTE

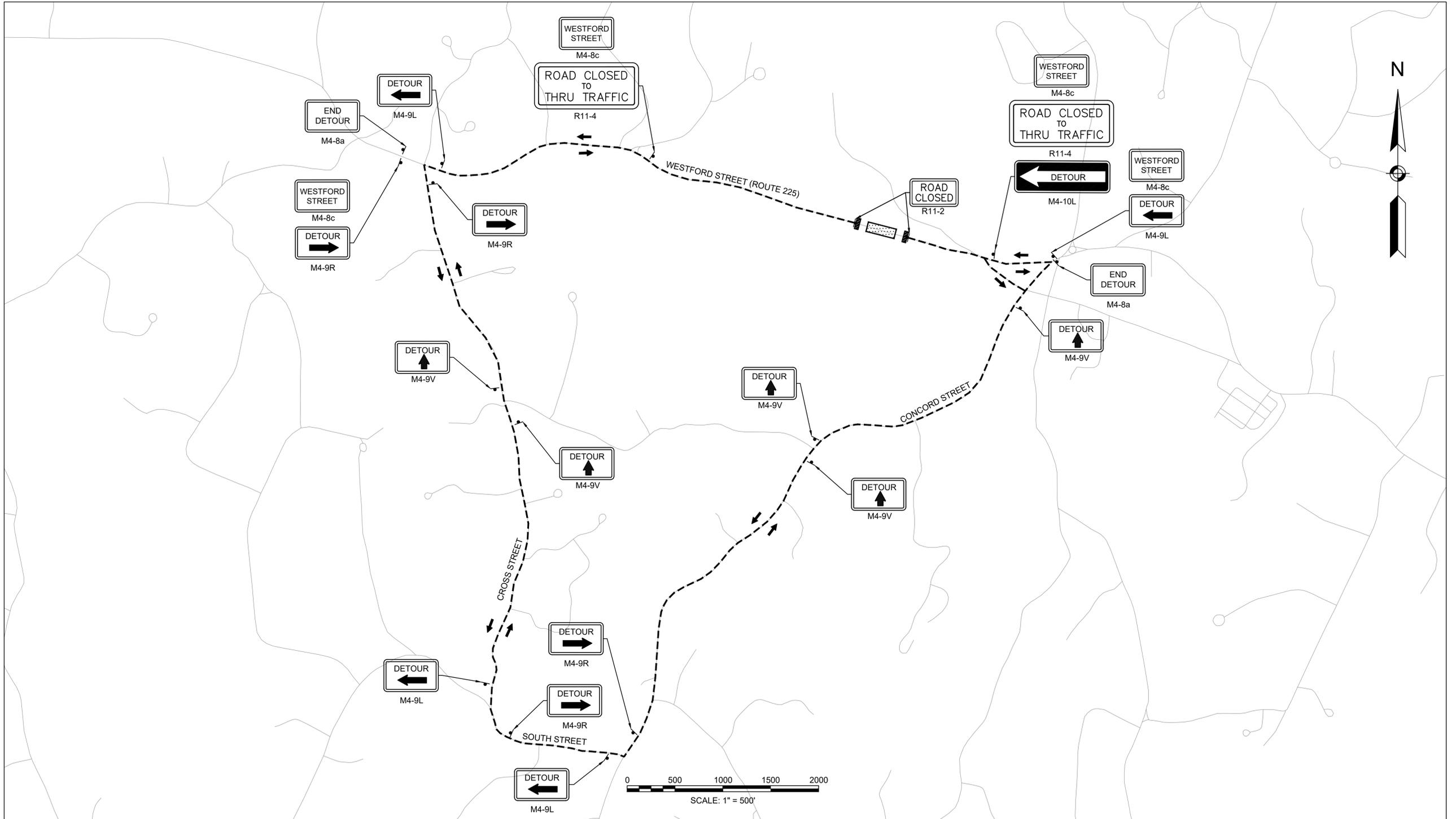
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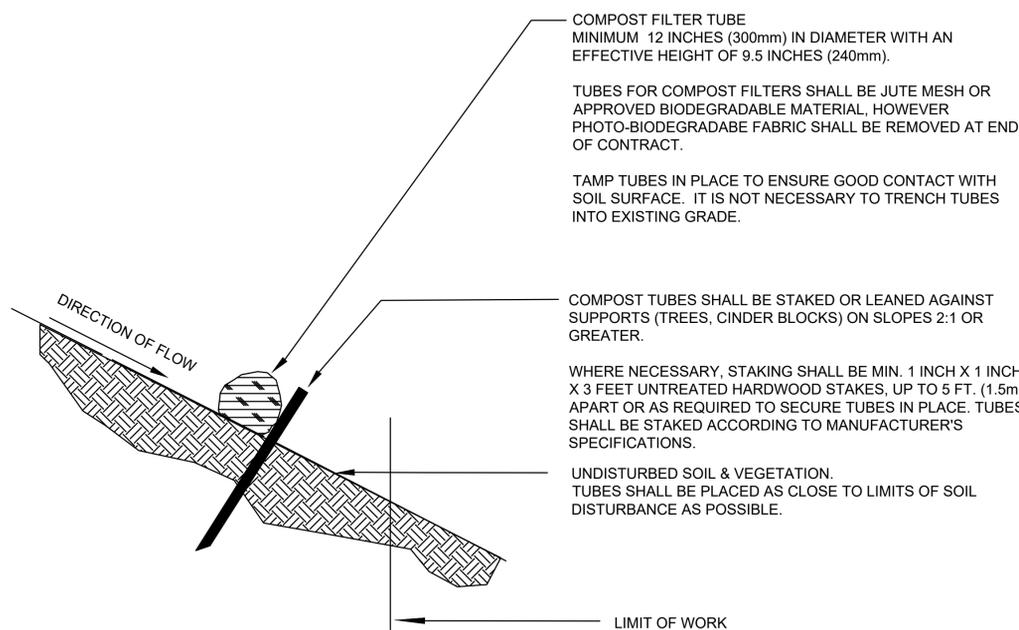
- NOTES:
1. PCMS SHALL BE INSTALLED AT LEAST 2 WEEKS PRIOR TO THE START OF WORK. WITH THE WORD MESSAGE "CONSTRUCTION TO BEGIN MM-DD THROUGH MM-DD SEEK ALT ROUTE"
 2. THE CONTRACTOR SHALL CONFIRM THE EXACT LOCATION OF THE PCMS WITH THE ENGINEER AND THE TOWN OF CARLISLE.
 3. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO CONTINUALLY UPDATE THE PCMS BASED UPON ON-GOING WORK. ABBREVIATIONS SHALL BE IN ACCORDANCE WITH THE MUTCD.
 4. PLACEMENT OF ADVANCE WARNING SIGN SHALL BE ADJUSTED BASED ON THE ACTUAL FIELD CONDITIONS.

LEGEND

- SIGN
- DIRECTION OF TRAFFIC
- WORK ZONE
- TYPE III BARRICADE
- PROPOSED DETOUR ROUTE

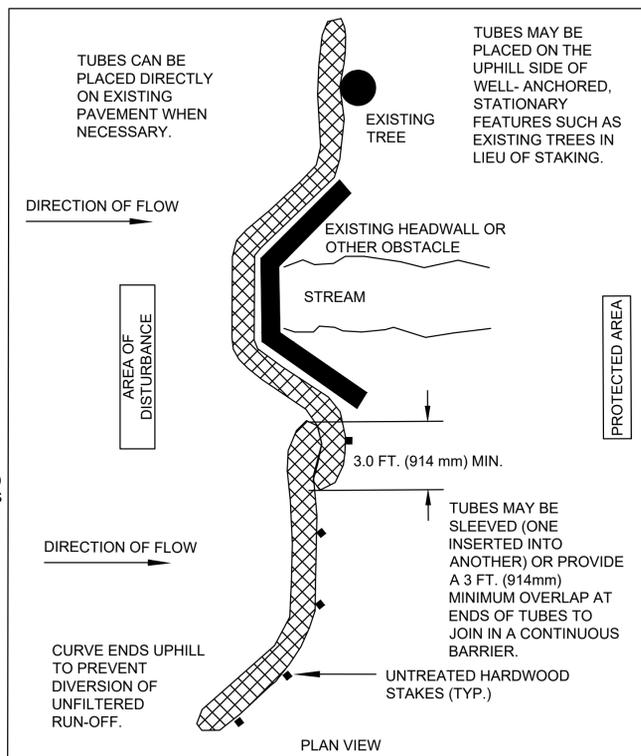
CARLISLE
WESTFORD STREET (ROUTE 225)
CULVERT REPLACEMENT
SHEET 8 OF 9
TEMPORARY TRAFFIC CONTROL PLANS





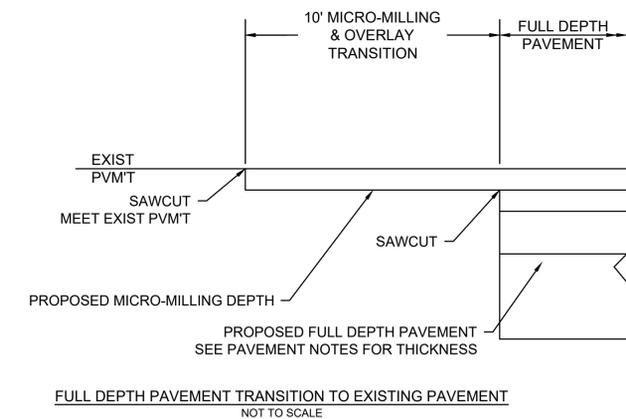
COMPOST FILTER TUBE DETAIL

NOT TO SCALE

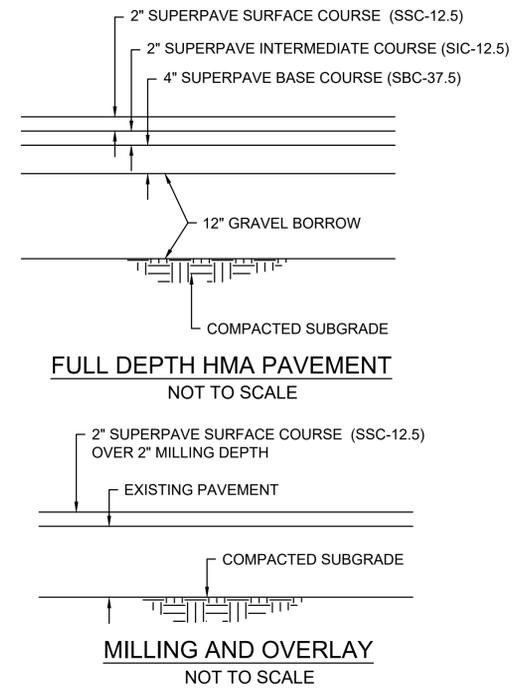
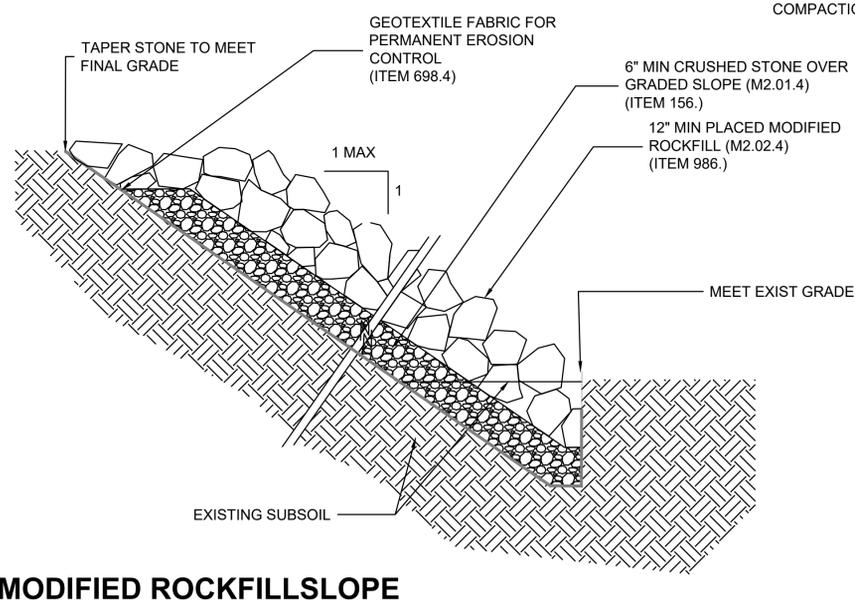
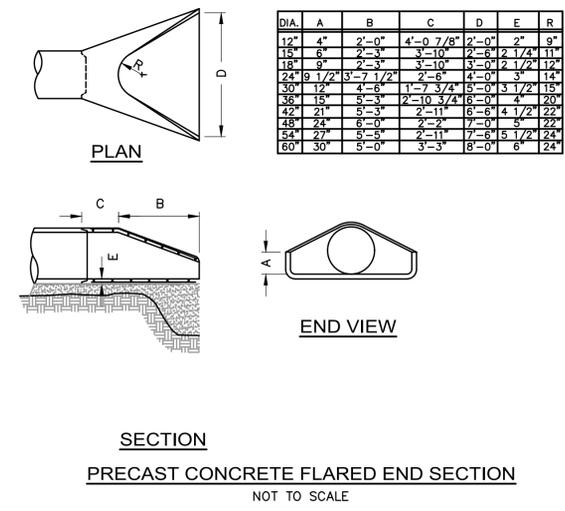
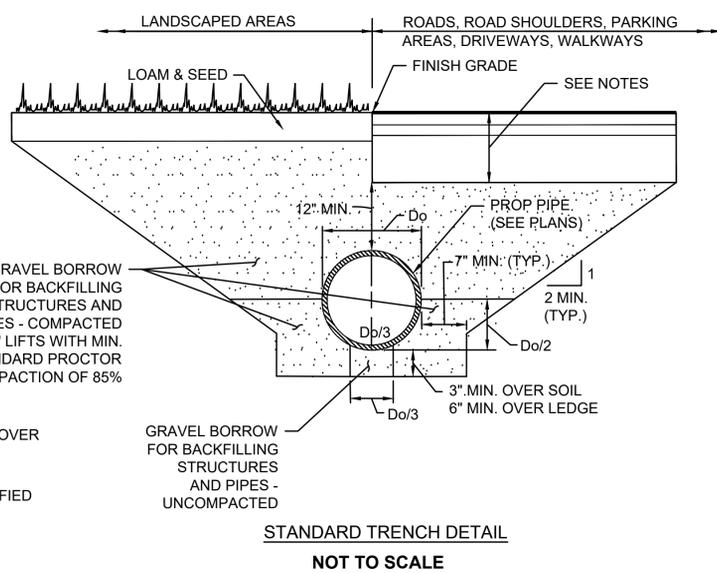


GENERAL NOTES:

1. PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES (300mm) FOR SLOPES UP TO 50 FEET (15.24m) IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
3. TUBE LOCATION MAY BE SHIFTED TO ADJUST TO LANDSCAPE FEATURES, BUT SHALL PROTECT UNDISTURBED AREA AND VEGETATION TO MAXIMUM EXTENT POSSIBLE.
4. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
5. ADDITIONAL TUBES SHALL BE USED AT THE DIRECTION OF THE ENGINEER.
6. ADDITIONAL STAKING SHALL BE USED AT THE DIRECTION OF THE ENGINEER.



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- NOTES:**
1. ASPHALT EMULSION FOR TACK COAT (ITEM 452.) SHALL BE APPLIED AT A RATE OF 0.07 GAL/SY OVER MILLED SURFACES AND 0.05 GAL/SY OVER SMOOTH SURFACES.

Attachment B

Water Management Plan
Prepared by R. Bates & Sons, Inc.
dated July 30, 2024

R. Bates & Sons, Inc. : SUBMITTAL

DATE: 7/30/2024

TO: Ryan McLane
Carlisle Town Administrator
ADDRESS: 66 Westford Street
Carlisle Ma. 01741
PHONE: 978-369-6155
FAX:
EMAIL: rmclane@carlislema.gov

FROM: Jason Houle
R. Bates & Sons, Inc
140 Pratts Junction Rd.
Suite 101
Sterling, MA 01564
(978) 563.1390 phone
(978) 563.1393 - fax
jhoule@rbatesconstrutor

PROJECT: Westford St Temporary Culvert Repair

RE: Submittals

SENDING: Plan

Submittal #	Copies	Date	# Pages	Description
991-A-0	E	30-Jul		Water Control Plan

TRANSMITTED: For Approval For Review Request for Pricing
 For Use As Requested For Record
 URGENT
 OTHER: _____

COMMENTS:

THANK YOU

SIGNED: Jason Houle, R. Bates & Sons Inc.

CONTROL OF WATER

**WESTFORD STREET CULVERT REPLACEMENT
CARLISLE, MA**

BY:

R. Bates & Sons Inc.
140 Pratts Jct. Rd., Suite 101
Sterling, MA 01564



TO:

TOWN OF CARLISLE, MA
66 Westford Street
Carlisle, MA 01741

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• B – Sandbag Cofferdam Detail, Typical Sump Detail & Sedimentation Filtering Details	
• C – Product Data	
○ Bulk Bag 3000	
○ Poly Sand Bag	
○ 3” Submersible Sump Pumps	
○ Filter Bag	
○ Filter Fabric	
○ Silt Curtain	

PROJECT SUMMARY

- Site prep and detour set up.
- Installation of erosion controls.
- Set up cofferdam and bypass equipment.
- Excavation & demolition of existing culvert structure.
- Furnish culvert
- Backfill culvert.
- Stream and bank restoration.
- Road Improvements.
- Site restoration.
- Cleanup and demobilization.

ESTIMATED SCHEDULE OF OPERATIONS

Mobilization, (August 2024)

Construction (August 2024)

Demobilization (August 2024)

UPSTREAM COFFERDAM SYSTEM

Install Single High Bulk Bag Cofferdam System on the upstream side of the project See ATTACHMEMNT 'A' – Water Control Plan.

- Setup single high bulk bags along stream bottom elevation of approx. 174.5 (min).
- Top of Cofferdam elevation will be at approx. 177.5. Tie cofferdam into slope at elevation 177.5.
- Install 6mil poly liner extending out from bulk bags to cut off seepage. Anchor liner with traditional sand bags. See Attachment B – Typical Sandbag Cofferdam Detail.

DOWNSTREAM COFFERDAM SYSTEM

Install Single High Bulk Bag Cofferdam System on the downstream side of the project See ATTACHMEMNT 'A' – Water Control Plan.

- Setup single high bulk bags along river bottom elevation of approx. 173.0 (min).
- Top of Cofferdam elevation will be at approx. 176.0. Tie cofferdam into slope at elevation 176.0.
- Install 6mil poly liner extending out from bulk bags to cut off seepage. Anchor liner with traditional sand bags. See Attachment B – Typical Sandbag Cofferdam Detail.

- A silt curtain will be deployed downstream of bypass pumping.

STREAM BYPASS

The primary method of stream bypass will be pumping. With the cofferdam in place the stream will bypass the work area via two 3" electric submersible pumps. In addition to pumping,

- Install two 3" electric submersible pumps drawing water from upstream of the cofferdam and discharging it beyond the work area (See Attachment 'C' – Product Data).
- Bates will ensure pumping will not cause erosion. The bypass pumps will discharge downstream of the work area. A rip rap scour pad and check dams can be used to protect against erosion and filter discharge on the downstream side of the bypass.
- Higher volume bypass pumping would pass discharge through rip rap check dams and a silt curtain for filtering if necessary (See Attachment 'B' – Sediment Filtering Details).

LOCALIZED DEWATERING OF WORK AREAS

- Inside of the cofferdam, multiple 2" electric submersible pumps will be setup within the work area to maintain a dry subgrade. See Attachment C – Product Data.
- Seepage or leakage into the area between the cofferdams will be collected at sump(s) and pumped out of the excavation via electric pumps. The number of pumps and locations will need to be adjusted during the progression of the work, based on size of open excavation and to account for as-observed soil conditions.
- Sumps will be dug into subgrade. A typical sump will consist of a perforated pipe wrapped in filter fabric and filled with washed stone to filter intake. See Attachment 'B' – Typical Sump Detail.
- Pumps will discharge through the necessary filters (filter basin, stone check dams, filter bags, or silt curtains).
- Sump pumps with lower volume discharge will pass through a sediment filter bag (See Attachment 'C' – Product Data).
- Sump pumps with higher volume discharge will be passed through a filter basin consisting of a straw bale basin lined with filter fabric. See Attachment C – Product Data.

For this project it is anticipated that all work area sumps will be passed through sedimentation **filter bags. Typically the filter bag will sit on a bed of ¾" crushed stone and the perimeter will be enclosed with staked straw wattles. The bag will likely be placed on the downstream side of the project beyond the limit of excavation.

EMERGENCY / FLOOD CONTINGENCY PLAN

The intent of this plan is to address floods of higher intensity. Monitoring forecasts and water levels will facilitate planning for storm events. The existing condition of the cofferdam and dam structure will be analyzed on a daily basis. Performance of the cofferdam, bypass and condition of existing roadway is monitored throughout the life of project.

In the event of a historic storm event the following contingency actions would be taken.

- Prior to the event, the upstream impoundment will be lowered as much as possible to allow for greater storage capacity.
- Additional pumping equipment will be mobilized.
- The height of the cofferdam can be adjusted with additional sand bags and bulk bags.
- Liner and Rip Rap would be deployed to protect the upstream and downstream slopes

Depending upon the stage of the project, the site can be modified to allow for a controlled overflow to pass through the work area.

- All materials and equipment will be removed from the work area.
- All open cuts and excavations would be backfilled and stabilized.
- Select upstream & downstream cofferdam bags will be removed to pass a controlled volume of water through the work area.

****For this project, the short duration will allow us to schedule the culvert work during a dry period and around any significant storm event.**

ATTACHMENTS

Attachment A – Water Control Plan

**Attachment B – Sandbag Cofferdam Detail, Typical Work Area Sump Detail & Sedimentation
Filtering Details**

Attachment C – Product Data

Attachment A – Water Control Plan.

HIGHWAY GUARD DETAILS

MEET EXIST 0+88 LT
PROP CC POST & STEEL CABLE 0+88 TO 1+81 LT
MEET EXIST 1+81 LT

BEGIN CC POST AND STEEL CABLE 1+15 RT
PROP CC POST & STEEL CABLE 0+88 TO 1+62 RT
MEET EXIST 1+62 RT

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

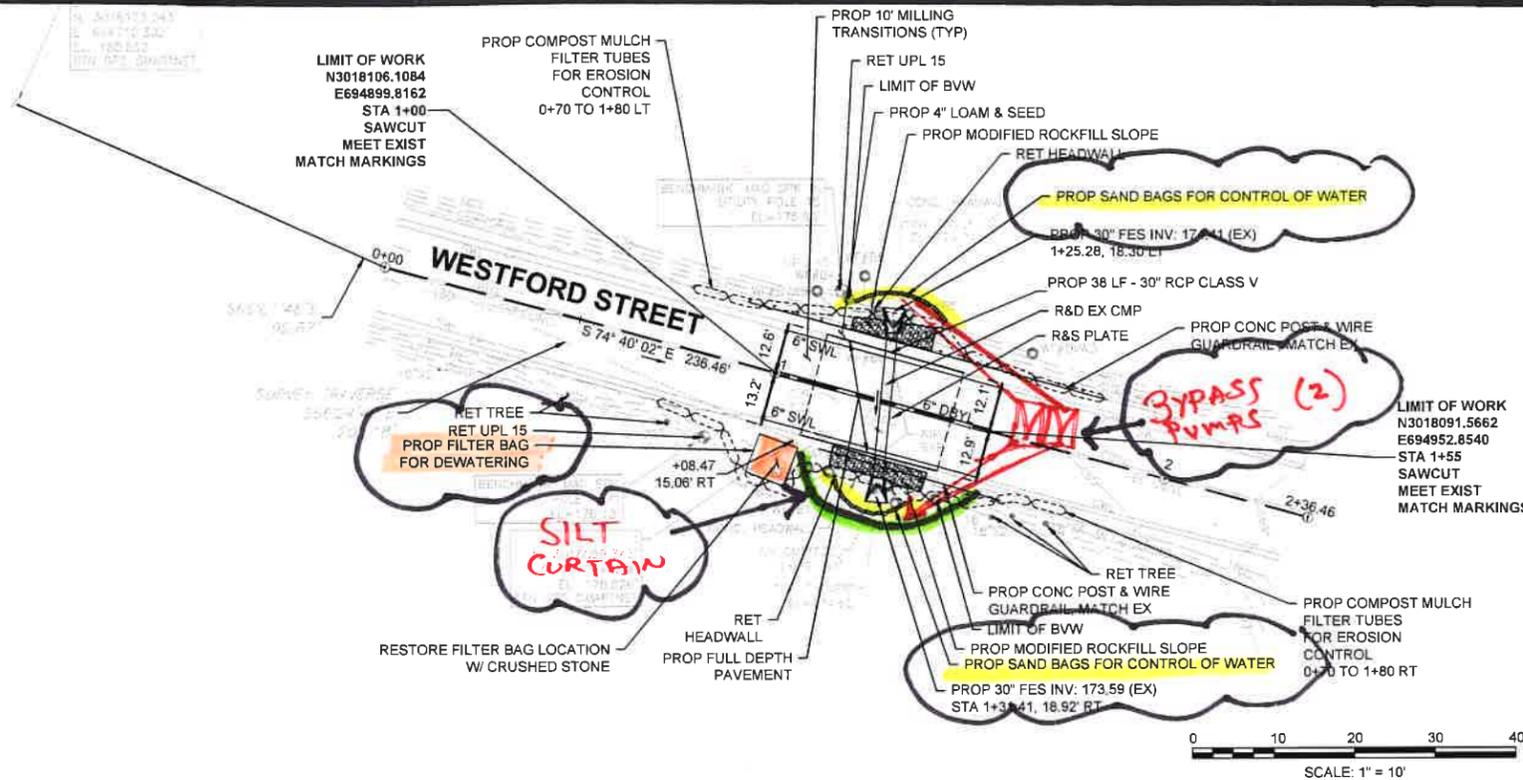
NONE

DRAINAGE DETAILS

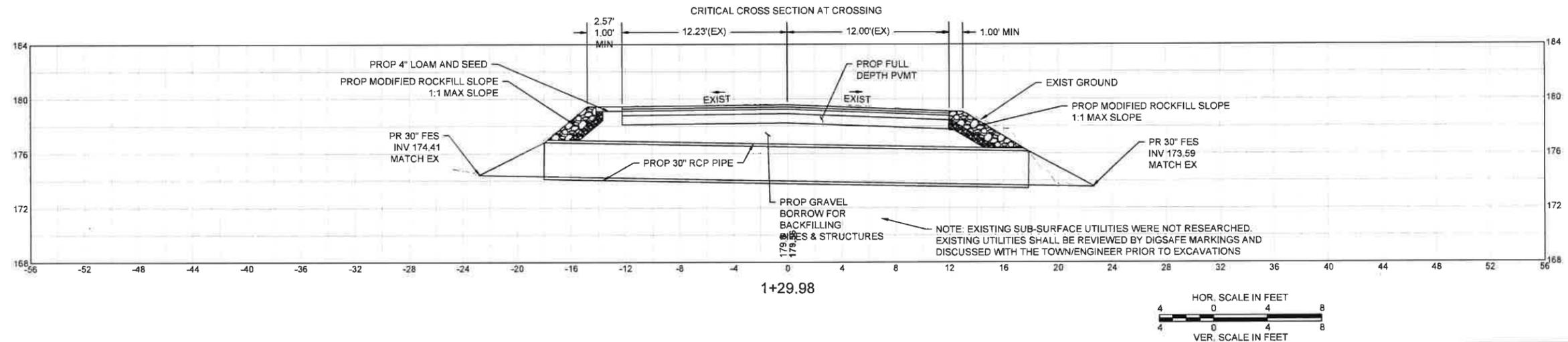
SEE BELOW

CARLISLE
WESTFORD STREET (ROUTE 225)
CULVERT REPLACEMENT
SHEET 4 OF 9
CONSTRUCTION PLANS

A. WATER CONTROL PLAN



NOTE: CONTRACTOR SHALL REBUILD THE ROADWAY TO THE EXISTING ROADWAY ELEVATIONS. GRADES ARE NOT PROVIDED AS NO GRADE CHANGES ARE PROPOSED.



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Attachment B – Sandbag Cofferdam Detail, Typical Work Area Sump Detail & Sedimentation

Filtering Details



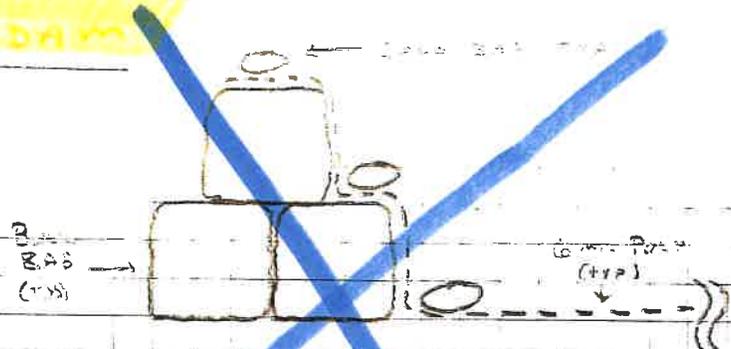
R. BATES & SONS, INC.
140 Pratts Junction Rd. - Ste. 101
Sterling, MA 01564
(978) 563-1390

Job _____
Sheet No _____
Drawn By J. Learned

SAND BAG COFFERDAM



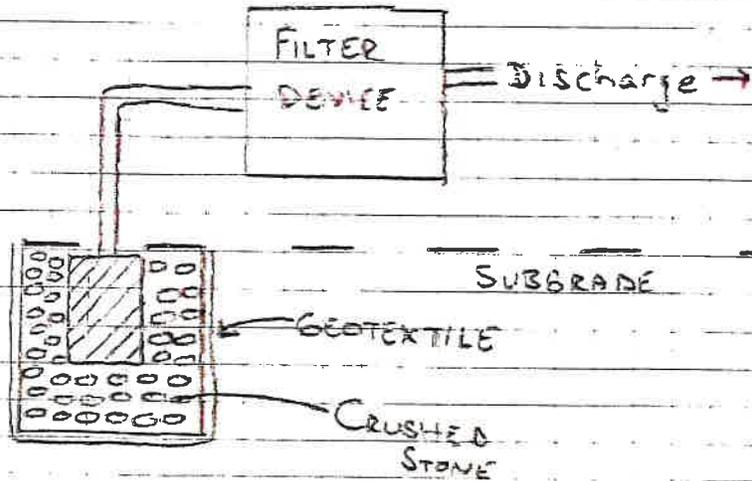
SINGLE
COFFERDAM HEIGHT /
WATER DEPTH
≤ 3'



DOUBLE
COFFERDAM HEIGHT /
WATER DEPTH
≤ 6'

Sump (typical)

± 3" Sump Pump

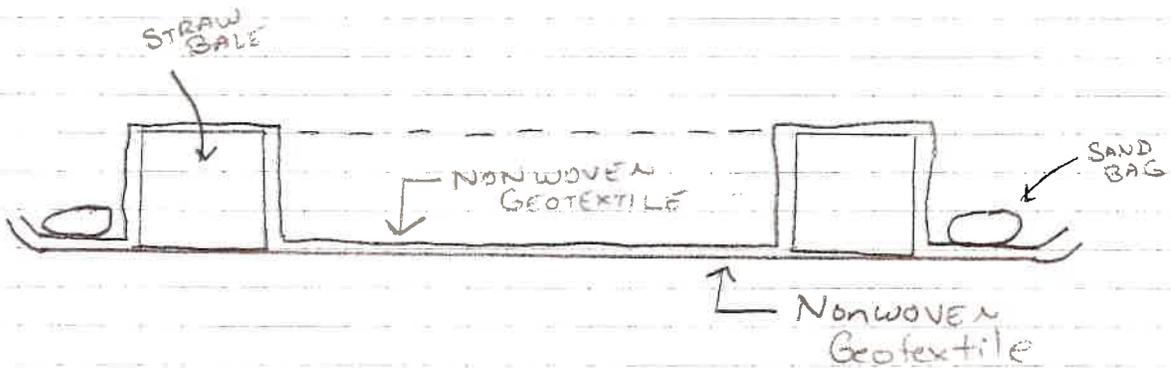
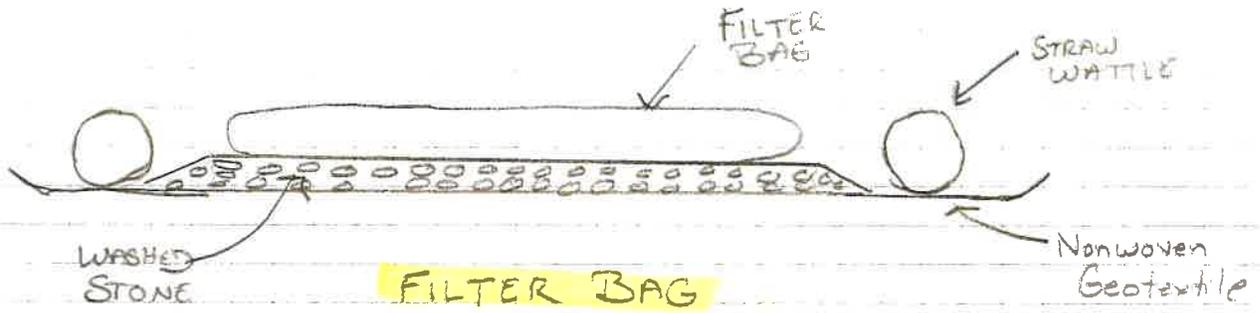




R. BATES & SONS, INC.
140 Pratts Junction Rd. - Ste. 101
Sterling, MA 01564
(978) 563-1390

Job _____
Sheet No. _____
Drawn By J. Learned

FILTERING DEVICES



SETTLING BASIN

Attachment C – Product Data

US Construction Fabrics LLC

CONSTRUCTION FABRICS, LINERS & ENVIRONMENTAL PRODUCTS

Serving the Industry Since 1991

P.O. Box 505 Windham, NH 03087 · TEL (603) 893-5480 · FAX (603) 893-2154

Bulk Sand Bags 3000 **BSB109**

<u>PHYSICAL PROPERTIES</u>	<u>MINIMUM VALUE</u>
SIZE	35" x 35" x 44"
MATERIAL	2100D / 10X10 Coated
SWL	3,000 lbs.
FILLING OPTION	Duffle Top + Rain Hood 900D/12x12/Coated Width: 35" Height: 33"
DISCHARGE OPTION	Spout with Petal Cover Diameter: 14" Long: 18"
LIFTING OPTION	Cross Corner Loops Width: 4" Height: 12" – Sewing: 14"
SAFETY BAND	Yes – 2" Wide
DOCUMENT POUCH	Yes – 12" x 12"
OTHER	Rain Hood 40" X 40" with Tie Straps

GEOTEXTILES · GEOGRIDS · GEOCELLS · GEOCOMPOSITES · SILT FENCE
EROSION CONTROL PRODUCTS · FLOATING SILT AND TURBIDITY CURTAINS
CONTAINMENT TARPS AND SYSTEMS · BARRIER WARNING FENCE
FLOATING OIL CONTAINMENT BOOMS · ABSORBENTS

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BULK BAG 3000

Fabric:

Our BULK bags are constructed using heavy-duty, UV treated woven polypropylene. The fabric weight (6.5 oz.) is tailored to meet required tensile strength and Safe Working Load (SWL) requirements up to 3,000 lbs with a Safety Factor of 5-1. To prevent material escape, extrusion coating and seam dust-proofing options are available upon request.

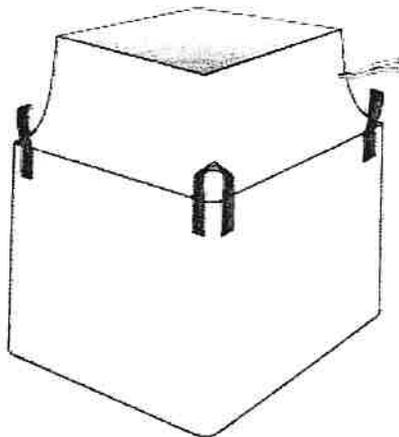
Design:

FIBCs (Flexible Intermediate Bulk Containers) are assembled in three standard construction styles:

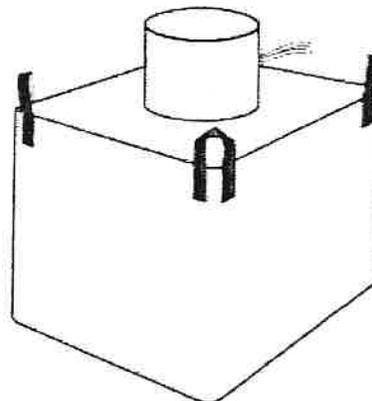
- U-panel [one long "U" shaped panel with two side panels attached]
- Circular Woven [tubular bag, loom-woven, with bottom panel attached-fewer seams mean less particle entrapment]
- Baffle [polypropylene corner baffles sewn across inside corners of bag to maintain shape rigidity-takes up less volume/easier to stack]

Filling Options:

Duffle Top Spout



Duffle Top



Spout Top

Discharge Options:

Bottom Spout-Single Closure

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US CONSTRUCTION FABRICS LLC

8 Ledge Rd, Windham, NH 03087

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www.usconstructionfabrics.com

Wholesale Distribution

CONSTRUCTION FABRICS, LINERS, & ENVIRONMENTAL PRODUCTS

SAND BAGS

PART #: 14981

SIZES: 14" X 26" (Hold 50 lbs)
18" X 27" (Hold 75 lbs)

COLORS: WHITE, ORANGE & GREEN

MATERIAL: 850 DENIER NYLON POLYPROPYLENE

UV STABILIZED: 1600 HOURS

THREAD COUNT: 9" X 10"

TOP OF BAG: HEAT CUT AND HEMMED

BOTTOM OF BAG: HEMMED, FOLDED AND SEWN

NUMBER PER BAIL: 1000 BAGS

TIE: POLYTIE

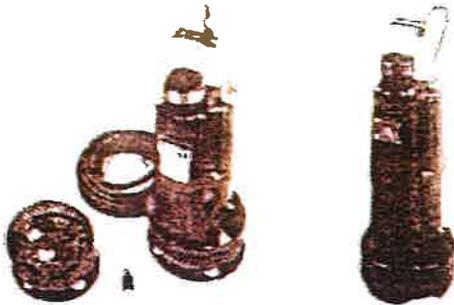


3" Submersible Pumps

Tsurumi Pump - Products - NK Series Pumps - Tsurumi Pump



Search



NK Series

Heavy duty high head single-phase pumps available in 110v or 220v. Optional agitator kits allow continuous duty when pumping abrasive materials.



NK Series Features

- Synthetic Rubber Wear Parts for maximum durability and pump performance.
- Continuous duty air-filled motor
- Ductile iron semi-vortex impeller
- Dual voltage available on NK2-15 model
- OPTIONAL ACCESSORIES**
- TS-303 Float Switch for automatic operation (220V only)
- Agitator kit to suspend solids and prevent clogging
- 2-inch NPT coupling available.

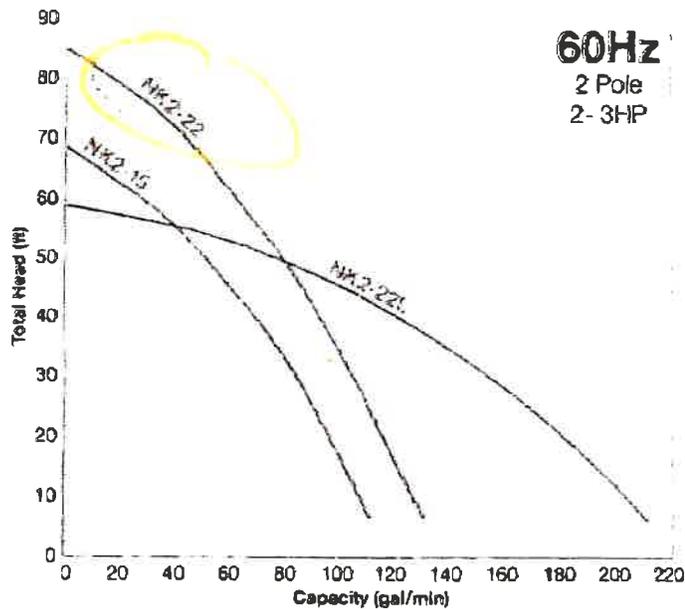


NK Series Features

NK2-22L Features:

New high volume NK2-22L series pump produces 35% more volume than our standard NK2-22 series. Available in 220v single-phase only.

Performance Range

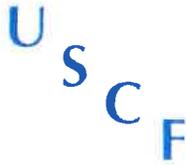


Model	Voltage (V)	Capacity (gal/min)	Total Head (ft)	Flow Rate (gpm)	Efficiency (%)
2	110 or 220	32	37 1/2	24 1/2	53.5
3	220	32	37 1/2	24 1/2	64
3	220	32	37 1/4	26 1/2	68

Tsurumi (America), Inc.

1625 Fullerton Court
Glandale Heights, IL 60139

Phone: (630) 793-0127
Fax: (630) 793-0146



US CONSTRUCTION FABRICS LLC

8 Ledge Rd, Windham, NH 03087

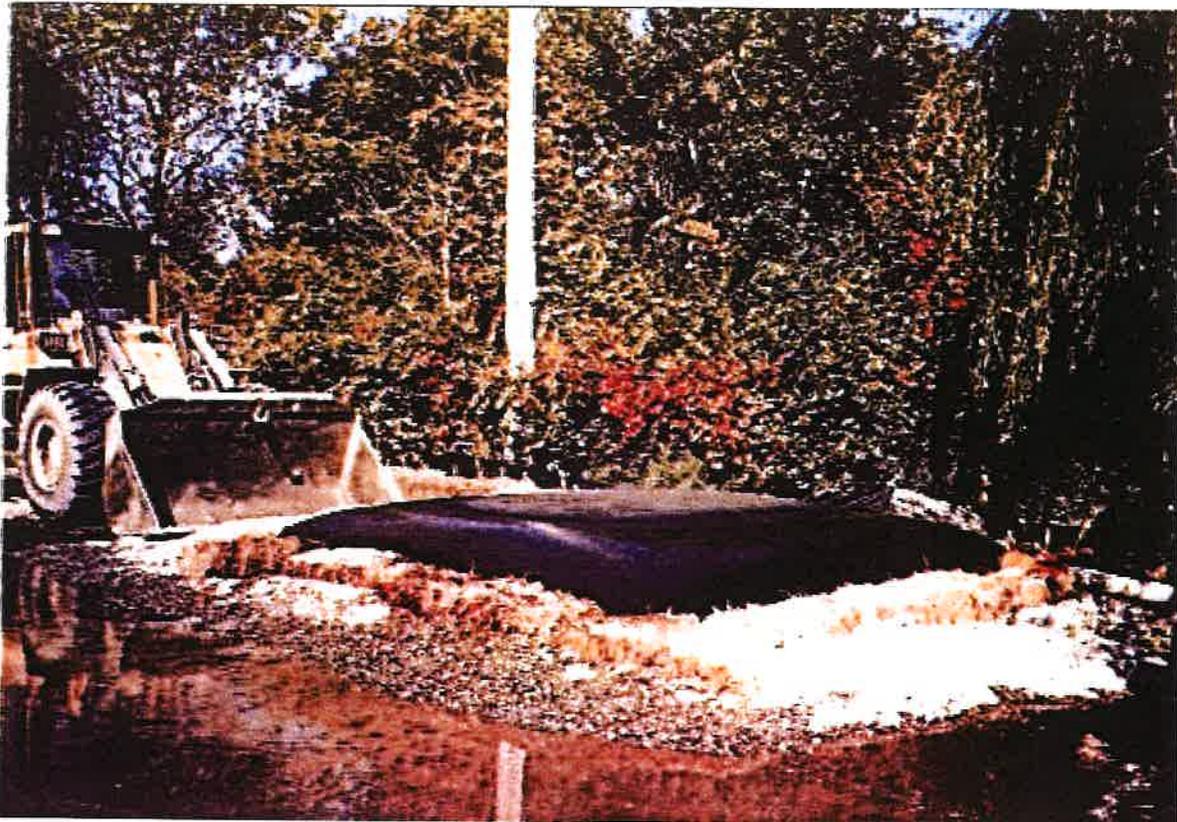
(603) 893-5480, Fax (603) 893-2154

www.usconstructionfabrics.com

Wholesale Distribution CONSTRUCTION FABRICS, LINERS, & ENVIRONMENTAL PRODUCTS

PUMPED WATER FILTRATION BAG

USED TO CONFINE AND CONSOLIDATE SEDIMENTS DURING PUMPING OPERATIONS.



Flow Rates:

Maximum flow rate for a 15 ft x 15 ft filtration bag, single sided flow: 19,125 gal/min.

Maximum flow rate for a 15 ft x 15 ft filtration bag on a gravel bed (two sides): 38,250 gal/min.

* Flow rates are based on initial inflows. As sedimentation occurs within the filtration bag, flow rates will diminish.

Construction:

Filtration bag fitted with a 36" by 8" dia. inlet. All seams double stitched with heavy duty, marine quality thread.

Installation:

1 Select location

Location of the filtration bag should have a slight down grade, away from the work zone. A gravel bed can be prepared prior to deploying the filtration bag to permit the full surface area of the bag to be utilized (top and bottom). Otherwise the filtration bag can be laid out on the ground or on top of an impermeable membrane to reduce further erosion.

Lifting slings or ropes should be laid under the filtration bag if it is going to be removed from the site when full.

2 Pumping of Turbid Water

The discharge hose is inserted into the fill tube and the tube tied tightly around the hose to prevent back flow. It is advisable to insert the hose deeply into the bag initially, and slowly draw the hose backwards as the sediments collect within the filtration bag to get the maximum volume from the filtration bags.

Do not leave unattended. The top of the bag should maintain a flat profile. A doming condition indicates that the bag has reached maximum capacity or the fabric is clogged. If the filter fabric appears to be clogged (ie minimal flow through the fabric) a gentle beating with a shovel or board should break up any accumulated filter cake on the interior surface of the bag.

3 Disposal

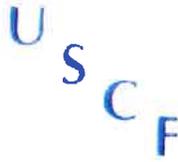
The filtration bag is considered full when water flow is substantially diminished and it is impractical for the filtration bag to properly filter the sediments.

The bags may be buried in place or off site covered with top soil and seeded. Or cut open and the sediments removed for transportation to the appropriate facility.

Specifications:

Constructed from a 10 oz Non-Woven geotextile filtration fabric having the following properties:

Property	Test Method	Average Results
Weight	ASTM D-3776	10 oz/yd ²
Tensile Strength	ASTM D-4632	250 lbs
Elongation	ASTM D-4632	50%
Mullen Burst	ASTM D-3786	460 psi
Puncture Strength	ASTM D-4533	150 lbs
Trapezoidal Tear	ASTM-D4533	100 lbs
AOS - US Sieve	ASTM D-4751	100
Flow Rate	ASTM D-4491	85 gal/min/ft ²
Permittivity	ASTM D-4491	1.2 sec ⁻¹



US CONSTRUCTION FABRICS LLC

8 Ledge Rd, Windham, NH 03087

(603) 893-5480, Fax (603) 893-2154

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Wholesale Distribution CONSTRUCTION FABRICS, LINERS, & ENVIRONMENTAL PRODUCTS



Geotextile Product Description Sheet

SKAPS GT-160 Nonwoven Geotextile

SKAPS GT-160 is a needle-punched nonwoven geotextile made of 100% polypropylene staple fibers, which are formed into a random network for dimensional stability. SKAPS GT-160 resists ultraviolet deterioration, rotting, biological degradation, naturally encountered basics and acids. Polypropylene is stable within a pH range of 2 to 13. SKAPS GT-160 conforms to the physical property values listed below:

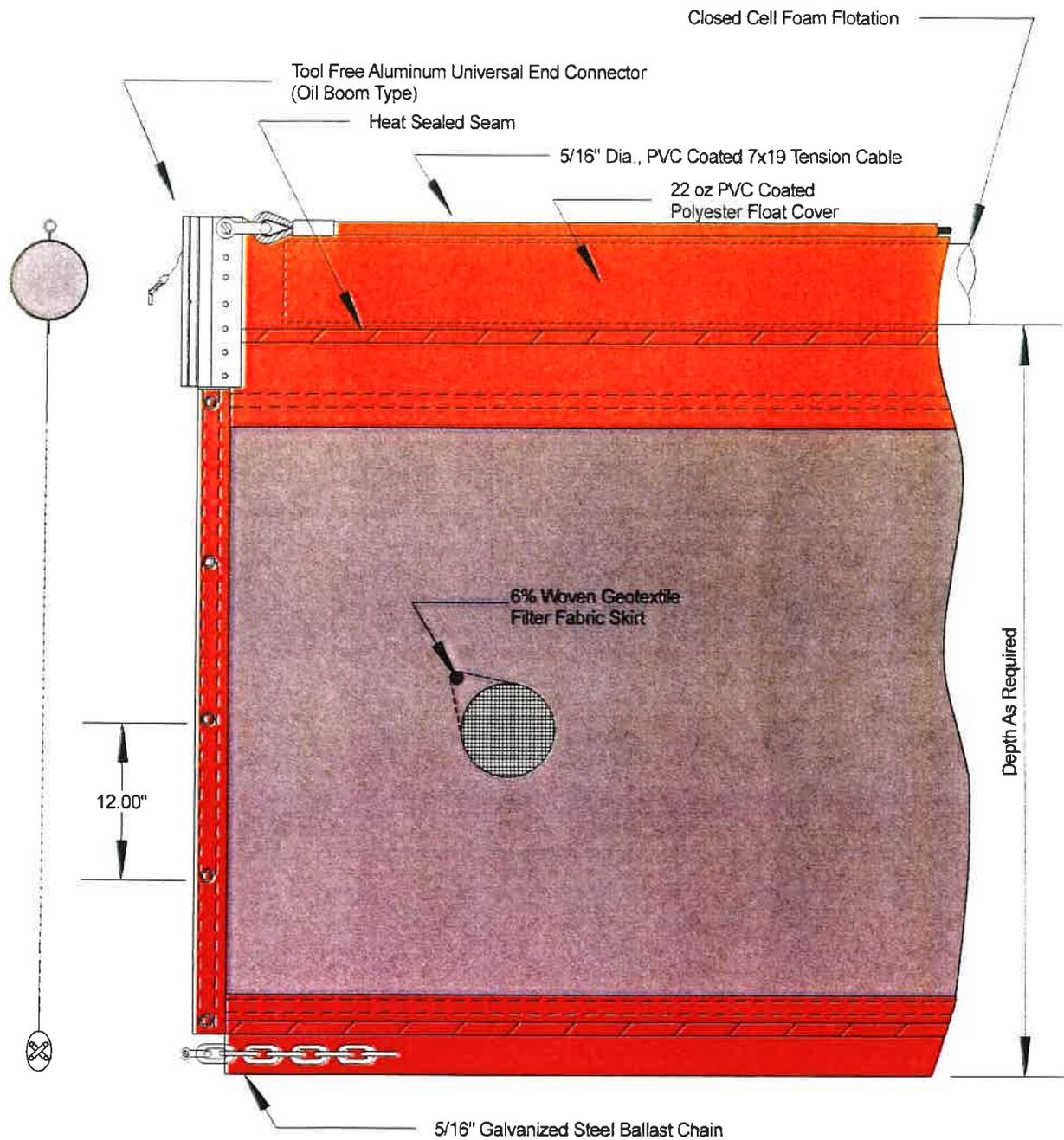
PROPERTY	TEST METHOD	UNIT	M.A.R.V. (Minimum Average Roll Value)
Weight (Typical)	ASTM D 5261	oz/yd ² (g/m ²)	6.0 (203)
Grab Tensile	ASTM D 4632	lbs (kN)	160 (0.711)
Grab Elongation	ASTM D 4632	%	50
Trapezoid Tear Strength	ASTM D 4533	lbs (kN)	60 (0.267)
CBR Puncture Resistance	ASTM D 6241	lbs (kN)	410 (1.82)
Permittivity*	ASTM D 4491	sec ⁻¹	1.5
Water Flow*	ASTM D 4491	gpm/ft ² (l/min/m ²)	110 (4480)
AOS*	ASTM D 4751	US Sieve (mm)	70 (0.212)
UV Resistance	ASTM D 4355	%/hrs	70/500

PACKAGING	
Roll Dimensions (W x L) – ft	12.5 x 360 / 15 x 300
Square Yards Per Roll	500
Estimated Roll Weight – lbs	195

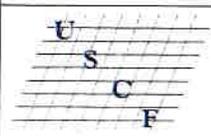
* At the time of manufacturing. Handling may change these properties.

This information is provided for reference purposes only and is not intended as a warranty or guarantee. SKAPS assumes no liability in connection with the use of this information.

Made in U.S.A.



SILTDAM TYPE II FLOATING TURBIDITY BARRIERS
Semi-Permeable Turbidity Barrier
With Aluminum Universal End Connectors



US Construction Fabrics, LLC
 PO Box 505
 Windham, NH 03087
 603-893-5480 Fax 603-893-2154

Construction Fabrics, Liners & Environmental Products

PROJECT:

LOCATION:

SHEET NO.: 1 of 1

SCALE: Not To Scale

DATE:

DRAWN BY: TJP

Boom Length	50 ft. or 100 ft. sections Other Lengths Available.
Net Buoyancy	12 in dia. -50/lbs/ft 6 in dia. -12/lbs/ft 8 in dia. -21/lbs/ft
Floatation Cover	22 oz/yd ² PVC coated polyester Other coatings available
Ballast	5/16 in galvanized chain standard 1.1 lbs/ft. Other ballast weights available
Tension	5/16 in PVC coated, galvanized aircraft cable top tension. (Optional)
End Connectors	Grommets end/tow plates and lacing grommets (Standard) Tool free aluminum universal slide connectors and lacing grommets (Optional)
Curtain Depth	3 ft. to 75 ft.
Floatation Element	Cylindrical, internal closed cell foam.

Skirt Material Specifications

Weight	6.2 oz/yd ²
Elongation @ Break	25 %
Mullen Burst	530 psi
Puncture Strength	140 lb
Tear Strength	80-100 lb
EOS US Std. Sieve	70 μ 210 μ
Flow Rate	18 gpm/ft ²
Tensile Strength	280-390 lb