

# STRAFFORD REGIONAL PLANNING COMMISSION

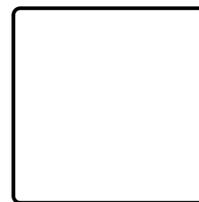
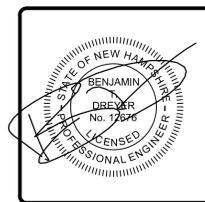
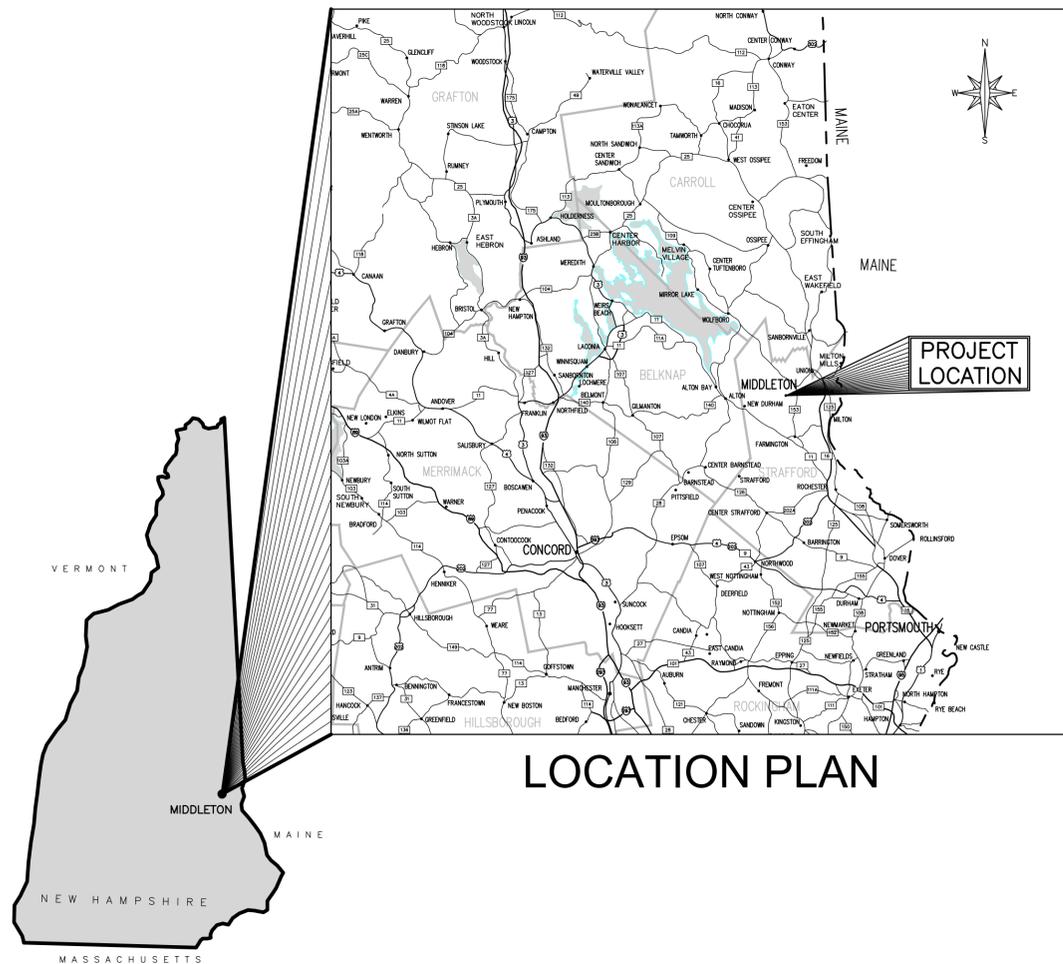
FOR APPROVAL - NHDES WETLANDS PERMITTING

## SUNRISE LAKE STORMWATER CONTROL MEASURES LAKE SHORE DRIVE CULVERT IMPROVEMENTS MIDDLETON, NEW HAMPSHIRE

PREPARED BY

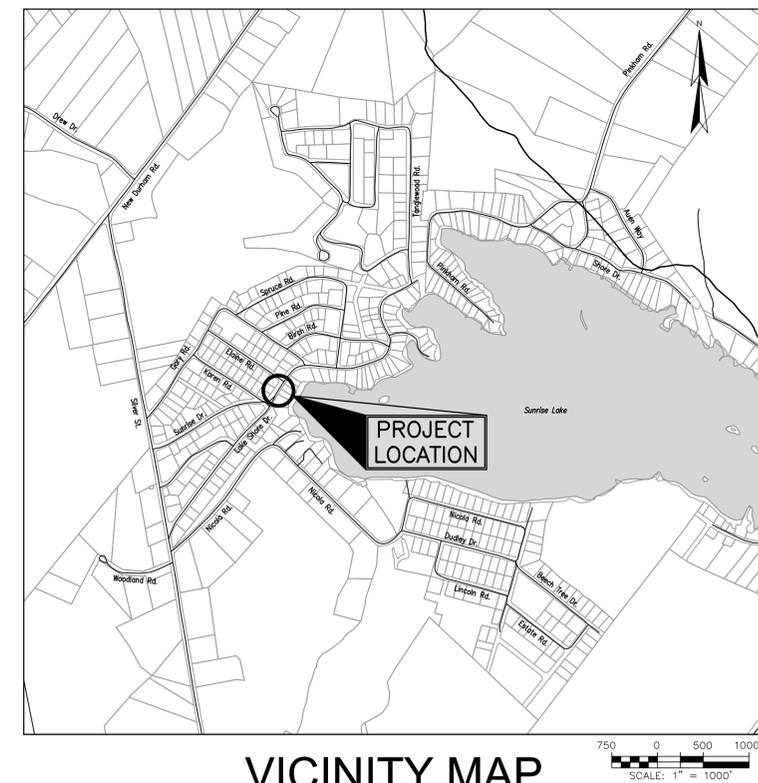
UNDERWOOD ENGINEERS  
PORTSMOUTH, NEW HAMPSHIRE

AUGUST 27, 2025



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UE #3136

**LEGEND:**

<b>EXISTING</b>	<b>PROPOSED</b>	
		STRUCTURES/BUILDINGS
		APPROXIMATE GIS LOT LINE
		PAVED ROAD/DRIVE/PATH
		MAJOR CONTOUR LINE
		MINOR CONTOUR LINE
		SPOT ELEVATION
		DRAIN LINE
		SILT FENCE
		OVERHEAD WIRE
		TREE LINE
		EDGE OF DELINEATED WETLAND
		EDGE OF WATER
		WETLAND AREA
		WETLAND FLAG
		CULVERT
		PILE
		UTILITY POLE
		UTILITY POLE & GUY WIRE
		CONTROL POINT
		MANHOLE
		ROCK/BOULDER
		DRAINAGE FLOW DIRECTION

**ABBREVIATIONS:**

AB	ABANDONED	PL	PROPERTY LINE
AIR	AIR	PSF	POUNDS PER SQUARE FOOT
APPROX	APPROXIMATE	PSI	POUNDS PER SQUARE INCH
ARCH	ARCHITECTURAL	PSNH	PUBLIC SERVICE COMPANY OF N.H.
AVG	AVERAGE	PT	PRESSURE TREATED
B	BORING	PVC	POLYVINYL CHLORIDE SDR 35
B	BASELINE	PVCU	PVC UNDERDRAIN
BLDG	BUILDING	PVDR	PVC DRAIN RETURN
CB	CATCH BASIN	PVMT	PAVEMENT
CFS	CUBIC FEET PER SECOND	PVSA	PVC SAMPLE LINE
CI	CAST IRON PIPE	PVSL	PVC SUCTION LINE
CL	CENTERLINE	R	REFUSAL
CMP	CORRUGATED METAL PIPE	R (RAD)	RADIUS
CONST	CONSTRUCT	RCP	REINFORCED CONCRETE PIPE
CONT	CONTINUOUS, CONTINUATION	RD	ROOF DRAIN
CPE	CORRUGATED POLYETHYLENE	RD	ROAD
D	DRAIN	REF	REFER OR REFERENCE
DI	DUCTILE IRON	REQD	REQUIRED
DIA	DIAMETER	RS	RAW SEWAGE
DIP	DUCTILE IRON PIPE	ROW	RIGHT OF WAY
DMH	DRAINAGE MANHOLE	S	MUNICIPAL SEWER OR SEPTIC TANK
DN	DOWN	S	SLOPE (I.E., FT. PER FT.) IN PROFILES
EL	ELEVATION	SA	SAMPLE LINE
EMER	EMERGENCY	SCH	SCHEDULE
ENGR	ENGINEER	SD	SUMP DISCHARGE
EOP	EDGE OF PAVEMENT	SED	SEDIMENTATION
EXIST	EXISTING	SEW	SEWAGE
FDN	FOUNDATION	SF	SQUARE FEET
FF	FINISHED FLOOR	SHT	SHEET
FM	FORCE MAIN	SMH	SEWER MANHOLE
FT	FOOT OR FEET	ST	STEEL
GAS	PROPANE GAS	STA	STATION
GEN	GENERATOR	STD	STANDARD
GHWC	GAS & HOT WATER CONDUIT	STRL	STRUCTURAL
GND	GROUND	STRS	STAIRS
GPM	GALLONS PER MINUTE	SW	SEAL WATER
FM	FORCE MAIN	SYMM	SYMMETRICAL
HW	HEADWATER	TBM	TEMPORARY BENCH MARK
HWR	HOT WATER RETURN	TD	TANK DRAIN
HWS	HOT WATER SUPPLY	THK	THICKNESS
IN	INCH	TRANS	TRANSFORMER
INV	INVERT ELEVATION	TYP	TYPICAL
LB	POUND	U/P	UTILITY POLE
LF	LINEAR FEET	V	VENT
LGT	LIGHT	VCD	VC DRAIN
LP	LIGHT POLE	VCP	VITRIFIED CLAY PIPE
LPA	LOW PRESSURE AIR	VERT	VERTICAL
MJ	MECHANICAL JOINT	W	WATER
MON	MONUMENT	W	WALL
MW	MUNICIPAL WATER	WD	WOOD
NA OR N/A	NOT APPLICABLE	W/	WITH
NET	NEW ENGLAND TELEPHONE COMPANY		
NGVD	NATIONAL GEODETIC VERTICAL DATUM		
N/F	NOW OR FORMERLY		
N/R	NO REFUSAL		
OD	OUTSIDE DIAMETER		
OS	OUTLET STRUCTURE		
PCF	POUNDS PER CUBIC FOOT		
PK	SURVEYOR'S NAIL		

1. THIS IS A STANDARD LEGEND SHEET, THEREFORE SOME ABBREVIATIONS MAY APPEAR ON THIS SHEET AND NOT ON THE DRAWINGS.
2. CONTACT ENGINEER FOR ABBREVIATIONS USED BUT NOT SHOWN ON THESE DRAWINGS.

**CONSTRUCTION SEQUENCE:**

PERFORM WORK IN ACCORDANCE WITH GENERALLY ACCEPTED INDUSTRY ORDER OF OPERATIONS:

1. PRIOR TO THE START OF CONSTRUCTION, PROVIDE A SCHEDULE IDENTIFYING KEY MILESTONES AND A WRITTEN NARRATIVE OF THE CONSTRUCTION METHODS TO BE USED, INCLUDING TEMPORARY FLOW DIVERSION AND COMPACTION OPERATIONS.
2. INSTALL AND MAINTAIN TEMPORARY AND PERMANENT EROSION CONTROL DEVICES THROUGHOUT CONSTRUCTION AS SHOWN ON THE DRAWINGS OR AS NECESSARY TO PREVENT SILTATION OF DOWNSTREAM DRAINAGE.
3. PREPARE SHEETING AND/OR FLOW DIVERSION AREAS TO FACILITATE CULVERT REMOVAL (EXISTING) AND CONSTRUCTION (PROPOSED) IN DRY CONDITIONS.
4. DISPOSE OF EXCESS AND UNSUITABLE MATERIALS AS THE WORK PROGRESSES. DO NOT STOCK PILE SURPLUS MATERIALS AT THE SITE.
5. INSTALL DRAINAGE STRUCTURES IN DRY CONDITIONS TO THE ELEVATIONS SHOWN ON DRAWINGS STARTING AT THE LOWEST ELEVATION. SPECIAL WORK IN WETLAND AREAS (I.E. CULVERT CONSTRUCTION) SHALL BE CONSTRUCTED PER WETLANDS CONSTRUCTION NOTES THIS SHEET.
6. IMMEDIATELY STABILIZE DISTURBED AREAS AFTER PIPE AND CULVERT INSTALLATION AND RE-ESTABLISH TEMPORARY EROSION CONTROL DEVICES MOVED DURING CONSTRUCTION.
7. RESTORE ALL DRAINAGE SWALES AND CULVERT PIPES IMMEDIATELY AFTER INSTALLATION.
8. CONSTRUCT SITE RESTORATION AS SHOWN.
9. REMOVE ALL TEMPORARY EROSION CONTROL DEVICES AS SOON AS VEGETATION IS ESTABLISHED AND DISTURBED AREAS ARE STABILIZED.

**GENERAL NOTES**

1. THE CONTRACTOR IS RESPONSIBLE FOR THE LOCATION, PROTECTION AND REPAIR (IF DAMAGED) OF ALL EXISTING UTILITY MAINS AND SERVICES. NOTIFY DIG-SAFE PRIOR TO COMMENCING CONSTRUCTION. (1-888-344-7233). CONTRACTOR SHALL GIVE ADEQUATE NOTICE TO THE ENGINEER OF CONFLICTS OF PROPOSED WORK WITH MARKED UTILITIES PRIOR TO CONSTRUCTION.
2. ALL EXCAVATION SHALL BE COVERED AT THE END OF EACH DAYS OPERATIONS TO ENSURE SAFE VEHICULAR AND PEDESTRIAN TRAFFIC.
3. THE CONTRACTOR IS REQUIRED TO PREPARE A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) IN ACCORDANCE WITH EPA REQUIREMENTS. NO WORK IS TO PROCEED UNTIL THE SWPPP IS SUBMITTED TO AND APPROVED BY THE ENGINEER. SEE SPECIFICATION SECTION 645 – EROSION & SEDIMENT CONTROL.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PROPERTY RESTORATION BOTH PUBLIC AND PRIVATE. UTILITIES DAMAGED AS A RESULT OF THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
5. THE PLAN LINE WORK REPRESENTING THE EXISTING UTILITIES IS BASED ON A FIELD SURVEY. THE ENGINEER/SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN ON THE PLANS COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE ENGINEER/SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE THE EXACT LOCATION INDICATED.
6. ROAD CENTER LINE GEOMETRY APPROXIMATELY RESEMBLES THE EXISTING ROAD CENTERLINE AND DOES NOT NECESSARILY REPRESENT THE CENTER OF THE R.O.W..

**SURVEY NOTES:**

1. REFERENCE: SUNRISE LAKE STORMWATER PROJECT  
LAKE SHORE DRIVE  
MIDDLETON DRIVE, NH
2. FIELD SURVEY PERFORMED BY A.E.K. & M.A.W. (DOUCET SURVEY) DURING APRIL 2025 USING A TOTAL STATION AND A SURVEY GRADE GPS WITH A DATA COLLECTOR AND A DIGITAL LEVEL. TRAVERSE ADJUSTMENT BASED ON LEAST SQUARE ANALYSIS.
3. HORIZONTAL DATUM BASED ON NAD83(2011) NEW HAMPSHIRE STATE PLANE COORDINATE ZONE (2800) DERIVED FROM REDUNDANT GPS OBSERVATIONS UTILIZING THE KEYNET GPS VRS NETWORK.
4. VERTICAL DATUM IS BASED ON APPROXIMATE NAVD88(GEOD12A) (±.2') DERIVED FROM REDUNDANT GPS OBSERVATIONS UTILIZING THE KEYNET GPS VRS NETWORK.
5. JURISDICTIONAL WETLANDS DELINEATED BY GOVE ENVIRONMENTAL SERVICES, INC. DURING APRIL 2025 USING THE FOLLOWING STANDARDS:
  - REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION, (VERSION 2.0) JANUARY 2012, U.S. ARMY CORPS OF ENGINEERS.
  - FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, A GUIDE FOR IDENTIFYING AND DELINEATING HYDRIC SOILS, VERSION 8.2. UNITED STATES DEPARTMENT OF AGRICULTURE (2018).
  - NEW ENGLAND HYDRIC SOILS TECHNICAL COMMITTEE. 2020 VERSION 4, FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION, LOWELL, MA.
  - U.S. ARMY CORPS OF ENGINEERS NATIONAL WETLAND PLANT LIST, VERSION 3.5. (2020)
6. PROPER FIELD PROCEDURES WERE FOLLOWED IN ORDER TO GENERATE CONTOURS AT 2' INTERVALS. ANY MODIFICATION OF THIS INTERVAL WILL DIMINISH THE INTEGRITY OF THE DATA, AND DOUCET SURVEY WILL NOT BE RESPONSIBLE FOR ANY SUCH ALTERATION PERFORMED BY THE USER.
7. THE ACCURACY OF MEASURED UTILITY INVERTS AND PIPE SIZES/TYPES IS SUBJECT TO NUMEROUS FIELD CONDITIONS, INCLUDING; THE ABILITY TO MAKE VISUAL OBSERVATIONS, DIRECT ACCESS TO THE VARIOUS ELEMENTS, MANHOLE CONFIGURATION, ETC.
8. ALL UNDERGROUND UTILITIES (ELECTRIC, GAS, TEL. WATER, SEWER DRAIN SERVICES) ARE SHOWN IN SCHEMATIC FASHION, THEIR LOCATIONS ARE NOT PRECISE OR NECESSARILY ACCURATE. NO WORK WHATSOEVER SHALL BE UNDERTAKEN USING THIS PLAN TO LOCATE THE ABOVE SERVICES. CONSULT WITH THE PROPER AUTHORITIES CONCERNED WITH THE SUBJECT SERVICE LOCATIONS FOR INFORMATION REGARDING SUCH. CALL DIG-SAFE AT 1-888-DIG-SAFE.
9. OVERALL PARCEL BOUNDARIES AS SHOWN HEREON ARE BASED ON NH GRANIT GIS DATA AND ARE IN THEIR ORIGINAL LOCATION.

**WETLAND CONSTRUCTION NOTES:**

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  - U.S. ARMY CORPS OF ENGINEERS NATIONAL WETLAND PLANT LIST, VERSION 3.5. (2020)
2. WETLAND CLASSIFICATION:
  - LACUSTRINE, LIMNETIC, UNCONSOLIDATED BOTTOM, PERMANENTLY FLOODED, DIKE/IMPOUNDED.
3. CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE NHDES WETLANDS PERMIT #-----.
4. SPECIAL WORK IN WETLAND AREAS (I.E. CULVERT CONSTRUCTION) SHALL BE AS FOLLOWS:
  - A. PERFORM CONSTRUCTION DURING LOW FLOW CONDITIONS.
  - B. INSTALL NEW DRAINAGE STRUCTURES (I.E. DMH AND PE PIPE).
  - C. GRADE AND PREPARE OUTLET AS SHOWN ON THE DRAWINGS.
  - D. LOAM & SEED DISTURBED AREAS.

**CULVERT INSTALLATION NOTES:**

THE INTENT FOR CULVERT INSTALLATION IS TO MAINTAIN THE INLET AND A PORTION OF THE EXISTING 24" PE/CMP CULVERT AND RELOCATE THE OUTLET UPSTREAM USING A SHORTER LENGTH OF 24" PE PIPE.

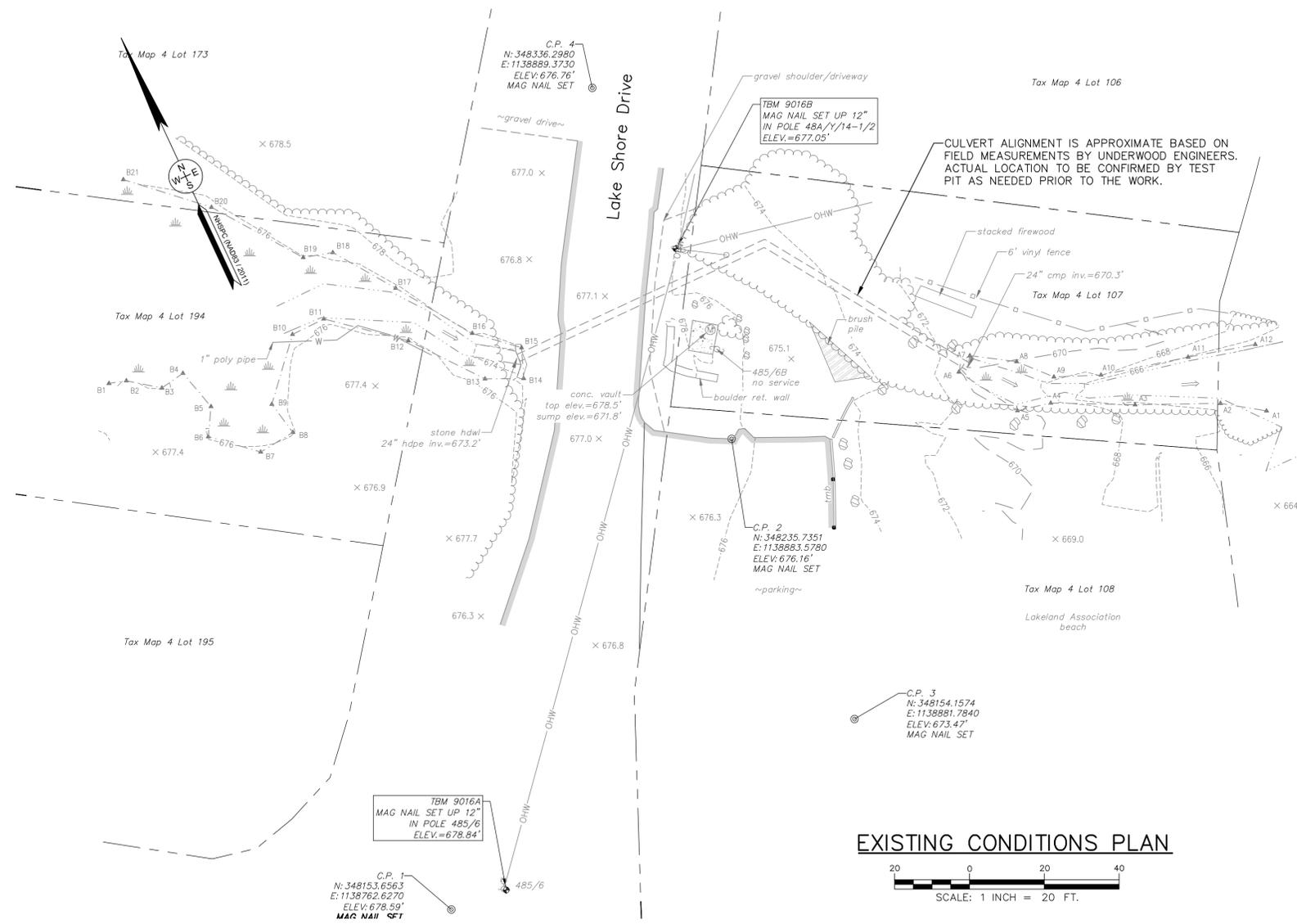
1. CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE NHDES WETLANDS PERMIT #-----.
2. THE CONTRACTOR MUST PERFORM THE CULVERT WORK IN DRY CONDITIONS. THE CONTRACTOR WILL BE RESPONSIBLE FOR WATER DIVERSION METHODS. THE FOLLOWING INFORMATION IS PROVIDED FOR CONSIDERATION WHEN PREPARING THE FLOW DIVERSION PLAN. CONTRACTOR'S WATER DIVERSION, BY-PASS PUMPING OR BOTH, SHALL BE EMPLOYED BASED ON THE TIMING OF THE WORK AND SHALL ACCOMMODATE POTENTIAL INCREASES IN WATER LEVELS FROM STORM EVENTS.
  - A. EXISTING WATER LEVEL AT TIME OF SURVEY IS SHOWN AT ELEVATION 664'±.
  - B. GEOTECHNICAL INFORMATION:
    1. DRAINAGE AREA: 70 AC.
    2. DESIGN FLOOD: Q100 = 40 CFS
    3. DESIGN VELOCITY: 13.6 FPS
  - C. MODEL PREDICTIONS FOR A 48" CMP BYPASS PIPE (I.E. EXISTING CONDITIONS) INDICATE A POTENTIAL WATER INCREASE OF 0.5 FEET DURING A 100 YEAR STORM EVENT AND A FLOW OF 30 CFS THROUGH THE 48" CULVERT.
  - D. BYPASSING FLOW FOR STORM EVENTS IS THE CONTRACTORS OPTION.
  - E. FREEBOARD REQUIREMENTS ARE NOTED ON DWG NO. D-2.
3. INSTALL PROPOSED DRAINAGE STARTING FROM THE SOUTHEAST (DOWNSTREAM) END FIRST.
4. CONSTRUCT MORTAR RUBBLE MASONRY HEADWALL AS SHOWN ON THE DRAWINGS. PRE-CAST HEADWALLS MAY BE SUBSTITUTED AT THE CONTRACTOR'S OPTION.
5. PERFORM NECESSARY GRADING TO ESTABLISH A "NATURAL" CHANNEL AT THE OUTLET APPROACHES TO THE CULVERT. USE NATIVE MATERIAL ONLY.
6. REMOVE TEMPORARY SHEETING OR SAND BAG DIVERSION STRUCTURES. (WOOD SHEETING MAY BE CUT 1' BELOW GRADE AND LEFT IN PLACE.)

<p>25 Vaughan Mall, Portsmouth, N.H. 03801 Tel. 603-436-6192 Fax. 603-431-4733</p>	ISSUE FOR APPROVAL Date _____ By _____ CONSTRUCTION Date _____ By _____ RECORD DRAWING Date _____ By _____
	REVISIONS NO. _____
Drawn/Chk. _____ Designed _____ Checked _____ Approved _____ Date: 8/28/2025 Book No. _____ Project No. 3136 Dwg. ID 3136-Sites Scale AS SHOWN	NO. _____
<b>GENERAL NOTES &amp; LEGEND</b> SUNRISE LAKE STORMWATER CONTROL MEASURES STRAFFORD REGIONAL PLANNING COMMISSION MIDDLETON, NEW HAMPSHIRE	
DWG NO G1	SHEET X OF X

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NOTES:

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MIDDLETON DRIVE, NH
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EXISTING CONDITIONS PLAN



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ISSUE FOR	DATE	BY
APPROVAL		
CONSTRUCTION		
RECORD DRAWING		

NO.	REVISIONS	APP'D

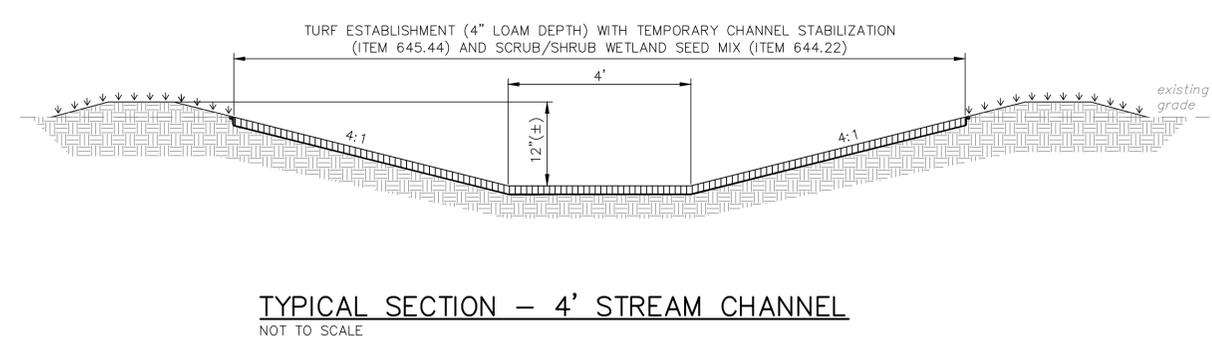
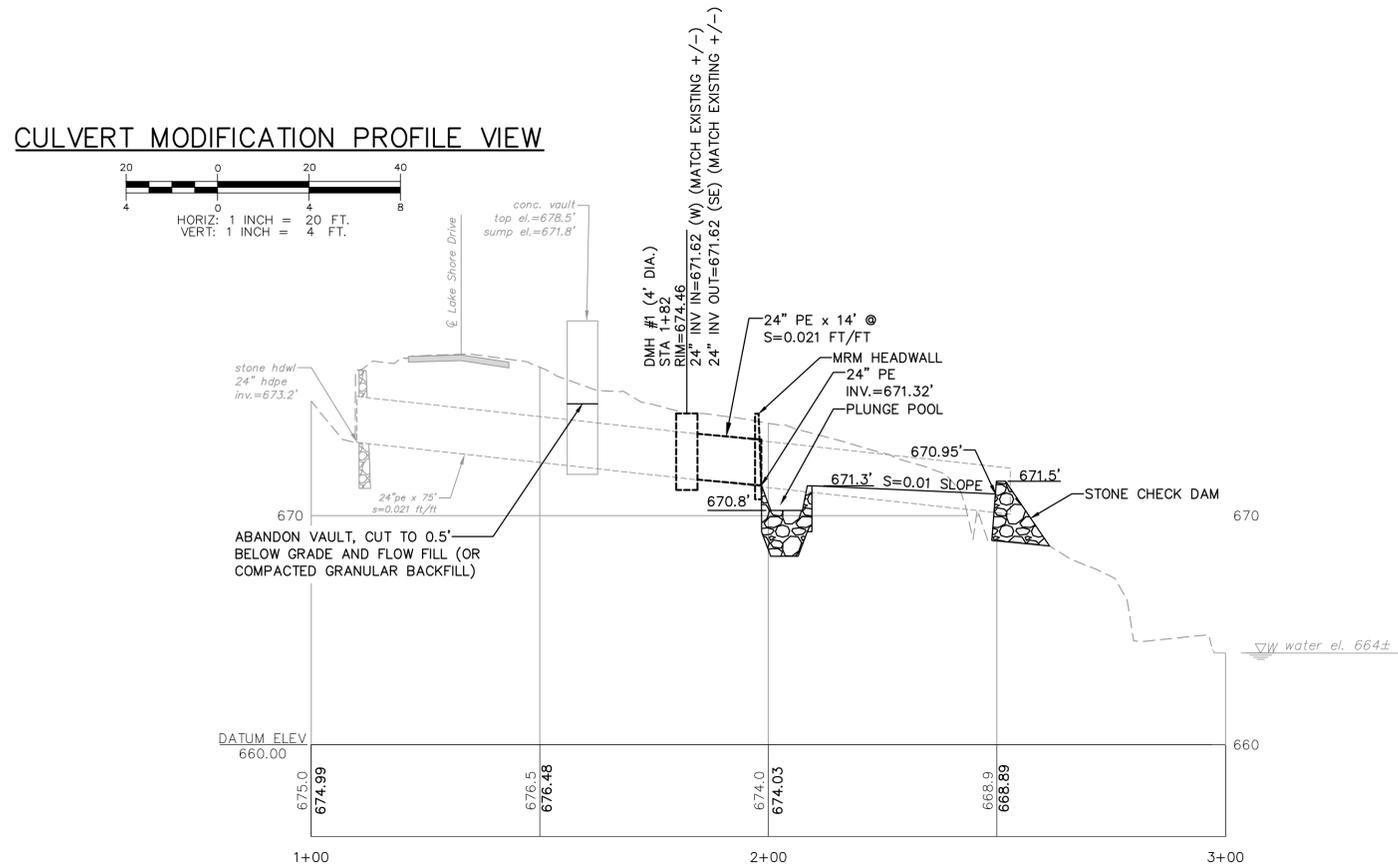
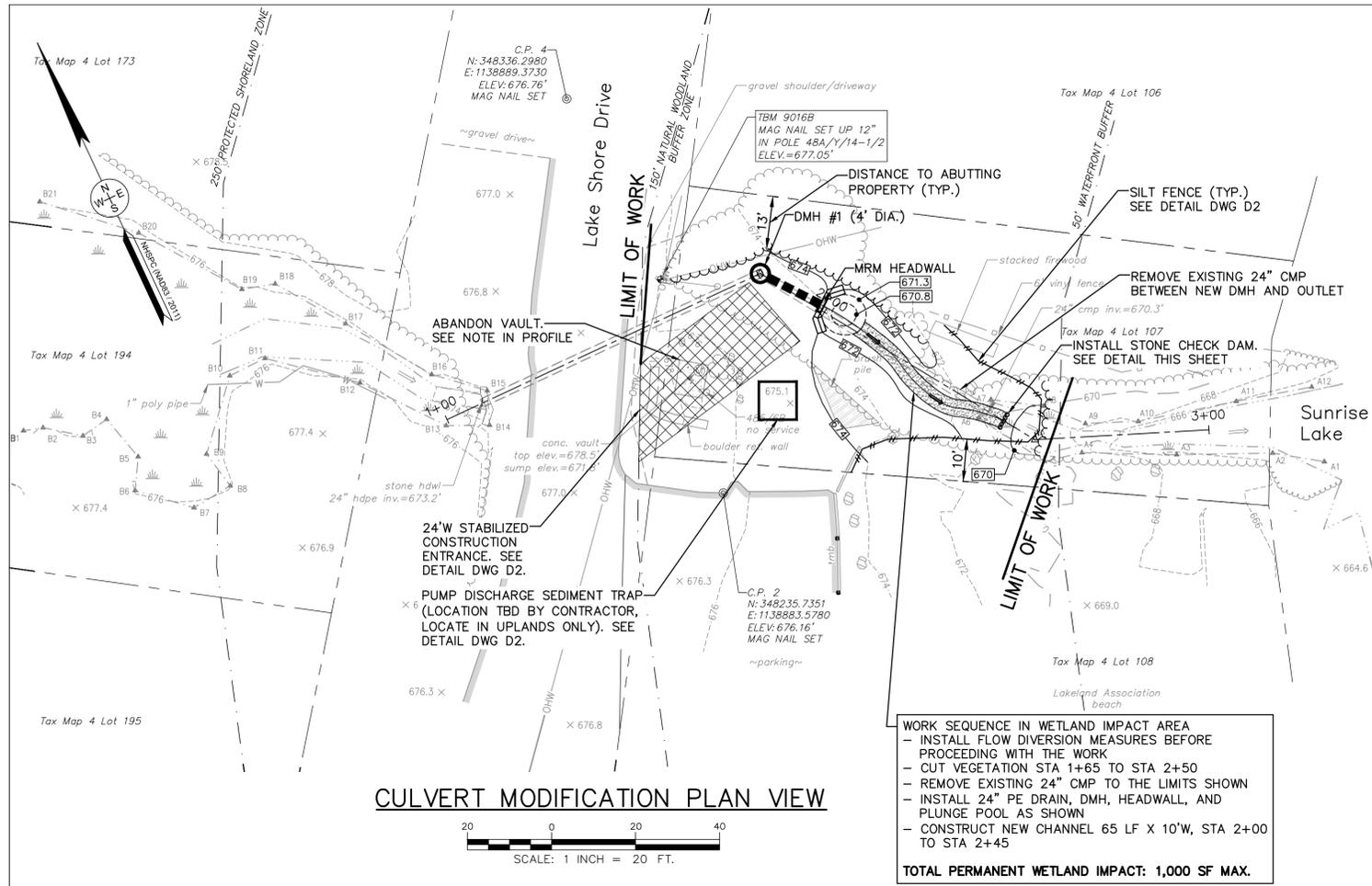
Drawn/Chk. — RMG	Designed — WRF	Checked — BID	Approved —	Date — 8/28/2025	Book No. —	Project No. — 3138	Dwg. ID — 318_Phas	Scale — AS SHOWN
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**Underwood Engineers**  
 25 Vaughan Mall, Portsmouth, N.H. 03801  
 Tel. 603-436-6192 Fax. 603-431-4733

EXISTING CONDITIONS PLAN  
 SUNRISE LAKE STORMWATER CONTROL MEASURES  
 STRAFFORD REGIONAL PLANNING COMMISSION  
 MIDDLETON, NEW HAMPSHIRE

DWG NO C1	SHEET X OF X
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**DOUCET SURVEY** | A **SAM** Company  
 102 Kent Place, Newmarket, NH 03857 (603) 659-6560  
 Offices in Bedford & Keene, NH and Kennebunk, ME  
 Locations Nationwide | <http://www.sam.biz>



DRAWN/CHK		ISSUE FOR	
Designed	WRF	APPROVAL	
Checked	BTJ	Date	
Approved		By	
Date	8/28/2025	CONSTRUCTION	
Book No.		Date	
Project No.	316	RECORD DRAWING	
Dwg. ID	316_Phase	Date	
Scale	AS SHOWN	REVISIONS	APP'D
		NO.	

**Underwood Engineers**

25 Vaughan Mall, Portsmouth, N.H. 03801  
Tel. 603-436-6192 Fax. 603-431-4733

**CULVERT MODIFICATIONS PLAN & PROFILE**

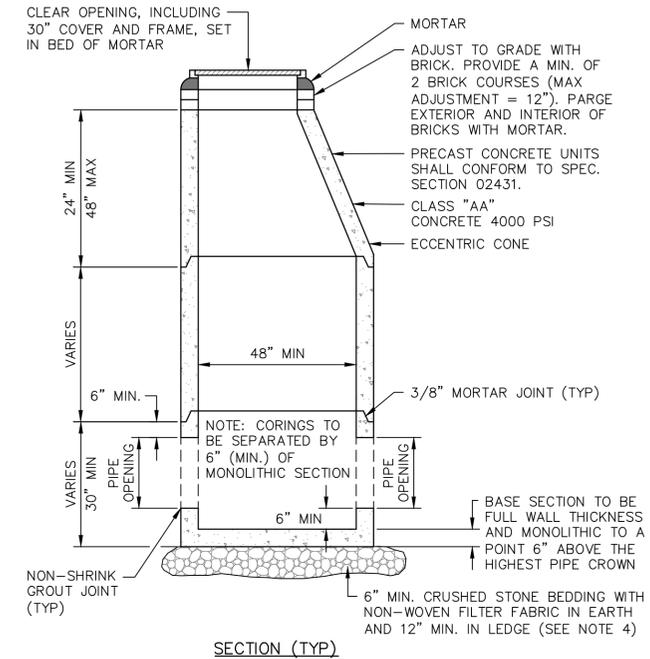
**SUNRISE LAKE STORMWATER CONTROL MEASURES**

**STRAFFORD REGIONAL PLANNING COMMISSION MIDDLETON, NEW HAMPSHIRE**

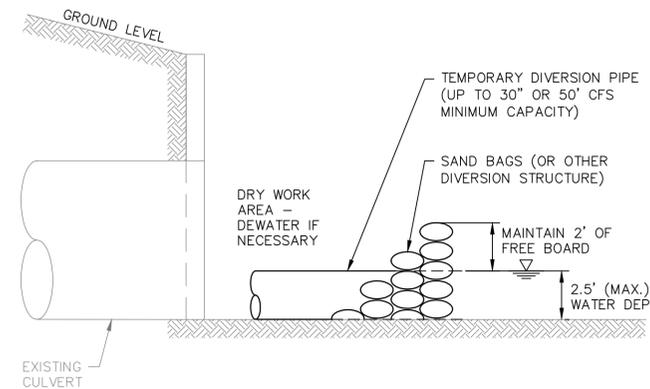
DWG NO: C2  
SHEET: X OF X

**STANDARD DRAIN MANHOLE NOTES:**

- IT IS THE INTENTION THAT THE MANHOLE, INCLUDING ALL COMPONENT PARTS, HAVE ADEQUATE SPACE AND STRENGTH CONSIDERED NECESSARY BY THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION (NHDT) FOR THE INTENDED SERVICE. SPACE REQUIREMENTS AND CONFIGURATIONS SHALL BE AS SHOWN ON THE DRAWING. MANHOLES MAY BE AN ASSEMBLY OF PRECAST SECTIONS WITH STEEL REINFORCEMENT, AS SPECIFIED IN SPECIFICATION SECTION 02431. THE COMPLETE STRUCTURE SHALL BE OF SUCH MATERIAL AND QUALITY AS TO WITHSTAND LOADS OF 8 TONS (H-20 LOADING) WITHOUT FAILURE.
- PRECAST CONCRETE:** BARREL SECTIONS, CONES, AND BASES SHALL CONFORM TO SPECIFICATION SECTION 02431.
- FRAMES AND COVERS:** DRAIN MANHOLE FRAMES AND COVERS SHALL BE OF HEAVY DUTY DESIGN AND PROVIDE A 30-INCH CLEAR OPENING. 3-INCH (MINIMUM HEIGHT) LETTERS STATING "DRAIN" SHALL BE PLAINLY CAST INTO THE CENTER OF EACH COVER.
- BEDDING:** SEE DETAIL AND SPECIFICATION SECTION 02229. WHERE ORDERED BY THE ENGINEER TO STABILIZE THE BASE, CRUSHED STONE 1-1/2 INCH TO 1/2 INCH SHALL BE USED.
- SHALLOW MANHOLE:** IN LIEU OF A CONE SECTION, WHEN MANHOLE IS LESS THAN 6 FEET, A REINFORCED CONCRETE SLAB COVER HAVING AN ECCENTRIC ENTRANCE AND CAPABLE OF SUPPORTING H-20 LOADS MAY BE USED, AS APPROVED BY THE ENGINEER.
- SPECIFICATIONS:** ADDITIONAL CONSTRUCTION SPECIFICATIONS ARE INCLUDED IN THE PROJECT MANUAL. THESE STANDARD MANHOLE DRAWINGS ARE NOT COMPLETE WITHOUT THESE SPECIFICATIONS.



**TYPICAL DRAIN MANHOLE**  
NOT TO SCALE



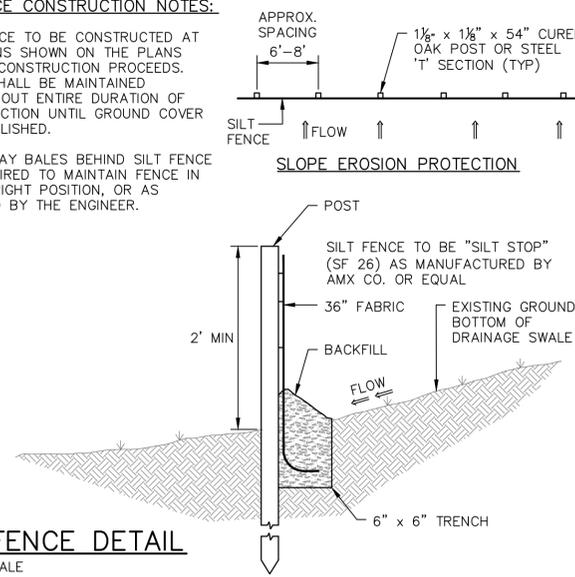
**FLOW DIVERSION**  
NOT TO SCALE

**STORMWATER MANAGEMENT, EROSION & SEDIMENT CONTROL NOTES:**

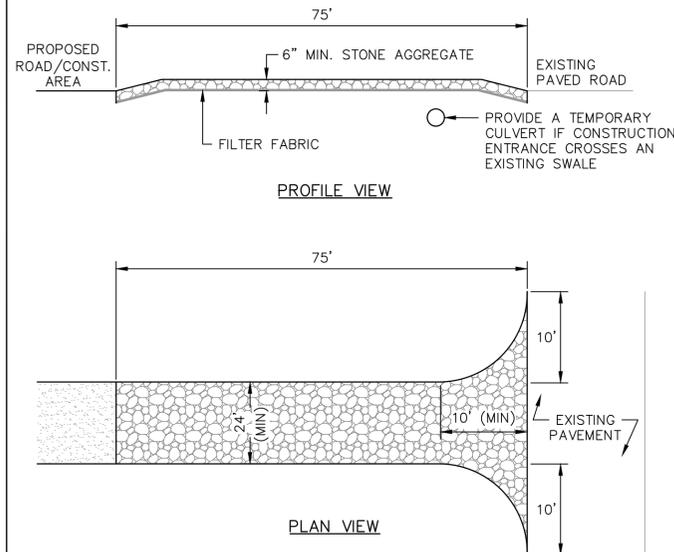
- THE CONTRACTOR MUST SUBMIT A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) TO THE OWNER AND A NOTICE OF INTENT (NOI) TO THE USEPA REGION ONE FOR CONSTRUCTION ACTIVITY IF GREATER THAN 1 ACRE IS DISTURBED AT ANY TIME. THE SWPPP IS TO BE PREPARED IN ACCORDANCE WITH USEPA REQUIREMENTS.
- THE CONTRACTOR SHALL SUBMIT, FOR REVIEW AND APPROVAL, A SCHEDULE TO INCLUDE ALL EARTHWORK ACTIVITIES.
- EXCAVATION AND EARTHWORK SHALL BE CONDUCTED IN A MANNER THAT WILL MINIMIZE EFFECTS OF EROSION THROUGHOUT CONSTRUCTION.
- THE CONTRACTOR SHALL, TO THE EXTENT POSSIBLE, PHASE EARTHWORK ACTIVITIES SO THAT THE SMALLEST PRACTICAL LAND AREA IS EXPOSED AT ANY GIVEN TIME, FOR THE SHORTEST PRACTICAL PERIOD OF TIME.
- THE CONTRACTOR SHALL LOAM, SEED, AND MULCH ALL CUT SLOPES IMMEDIATELY FOLLOWING FINAL GRADING. TEMPORARY SEEDING AND MULCH SHALL BE APPLIED AT ALL UNVEGETATED AREAS THAT WILL BE EXPOSED FOR A PERIOD EXCEEDING TWENTY (20) DAYS. AREAS TO BE SEEDDED SHALL BE ROUGH GRADED AND COVERED WITH LOAM 4 INCHES DEEP AFTER LIGHT ROLLING AND CONFORMING WITH EXISTING LINE AND GRADES.
- SHALLOW SLOPES (SHALLOWER THAN 3:1) NOT SHOWN TO BE OTHERWISE COVERED SHALL BE SEEDDED WITH PARK MIXTURE, SECTION 02935.
- STEEP SLOPES (STEEPER THAN 3:1) NOT SHOWN TO BE OTHERWISE COVERED SHALL BE EITHER SODDED OR SEEDDED WITH A SLOPE MIXTURE, SECTION 02935. AFTER SEEDING, STEEP SLOPES SHALL BE MULCHED WITH EXCELSIOR OR EQUAL AND A CHEMICAL TACKIFIER SHALL BE APPLIED TO ALL SIDE SLOPES STEEPER THAN 3:1. RATE OF APPLICATION SHALL BE AS RECOMMENDED BY THE MANUFACTURER.
- HAY BALES, SILT FENCING, AND EROSION STONE SHALL BE INSTALLED WHERE NECESSARY TO MINIMIZE THE EFFECTS OF EROSION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ANY ADDITIONAL MEASURES WHICH MAY BE REQUIRED WHERE NECESSARY TO OBTAIN THE OBJECTIVES DESCRIBED HEREIN. ALL WORK SHALL BE COMPLETED IN CONFORMANCE WITH THE LATEST EDITION OF "STORMWATER MANAGEMENT AND EROSION AND SEDIMENT CONTROL HANDBOOK FOR URBAN AND DEVELOPING AREAS IN NEW HAMPSHIRE". PREVENT THE DEGRADATION OF DOWNSTREAM PROPERTIES AND DRAINAGE.
- DRAINAGE SWALES SHALL BE MONITORED AND MAINTAINED THROUGHOUT CONSTRUCTION. SILT SHALL BE PERIODICALLY REMOVED FROM SWALES AS NECESSARY TO PREVENT MIGRATION.
- HAY BALE BARRIERS SHALL BE INSTALLED ALONG SWALES AT 100 FOOT INTERVALS, AROUND CATCH BASINS, AND AT ALL AREAS WHERE STORMWATER OR TRENCHWATER IS CONCENTRATED.
- HAY BALE BARRIERS AND SEDIMENT TRAPS ARE TO BE MAINTAINED AND KEPT CLEAN UNTIL ALL EXPOSED AREAS HAVE A HEALTHY STAND OF GROUND COVER, AT WHICH TIME TEMPORARY MEASURES ARE TO BE REMOVED. CONTRACTOR IS RESPONSIBLE FOR PROPER DISPOSAL OF TEMPORARY MATERIALS REMOVED AND SILT.
- DISTURBED AREAS SHALL BE LOAMED AND SEEDDED. MINIMUM DEPTH OF LOAM SHALL BE FOUR (4) INCHES.
- PROVIDE SEED (PARK MIXTURE), LIME, FERTILIZER, AND MULCH PER SECTION 644 OF THE SPECIFICATIONS.

**SILT FENCE CONSTRUCTION NOTES:**

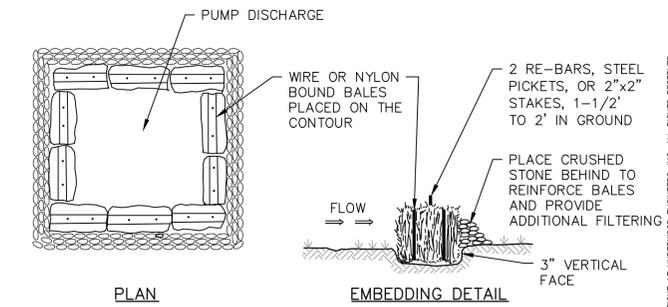
- SILT FENCE TO BE CONSTRUCTED AT LOCATIONS SHOWN ON THE PLANS BEFORE CONSTRUCTION PROCEEDS. FENCE SHALL BE MAINTAINED THROUGHOUT ENTIRE DURATION OF CONSTRUCTION UNTIL GROUND COVER IS ESTABLISHED.
- PLACE HAY BALES BEHIND SILT FENCE AS REQUIRED TO MAINTAIN FENCE IN AND UPRIGHT POSITION, OR AS DIRECTED BY THE ENGINEER.



**SILT FENCE DETAIL**  
NOT TO SCALE



**STABILIZED CONSTRUCTION ENTRANCE**  
NOT TO SCALE



**HAY BALE BARRIER CONSTRUCTION SPECIFICATIONS:**

- BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY BUTTED.
- EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 3".
- BALES SHALL BE SECURELY ANCHORED IN PLACE BY STAKES OR RE-BARS DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVIOUSLY LAID BALE TO FORCE BALES TOGETHER.
- INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.

**PUMP DISCHARGE SEDIMENT TRAP**  
NOT TO SCALE

**STABILIZED CONSTRUCTION ENTRANCE SPECIFICATIONS:**

- THE TEMPORARY STABILIZED CONSTRUCTION ENTRANCE SHALL CONSIST OF PLACING 1"-2" STONE, RECLAIMED STONE OR RECYCLED CONCRETE EQUIVALENT, AT THE LOCATION WHERE CONSTRUCTION VEHICLES EXIT THE SITE IN ORDER TO MINIMIZE MIGRATION OF DIRT ONTO THE ADJOINING PAVED ROADS.
- STONE SHALL BE 1" TO 2" FRACTURED ROCK.
- STONE SHALL BE PLACED OVER GEOTEXTILE FABRIC.
- THE MINIMUM STONE DEPTH SHALL BE 6 INCHES.
- THE MIN. DIMENSIONS OF THE STABILIZED ENTRANCE SHALL BE 24 FEET WIDE BY 75 FEET LONG.
- SURFACE WATER RUNOFF FROM THE PAVED ROAD SHALL NOT BE PERMITTED TO COME IN CONTACT WITH THE STONE ENTRANCE. USE A CROSS CULVERT UNDER THE NEW ENTRANCE OR CONSTRUCT A BERM ALONG THE EDGE OF EXISTING PAVEMENT TO DIVERT WATER AWAY FROM THE STONE.
- THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OF SEDIMENT ONTO PUBLIC ROADWAYS. TOP DRESS OR REPLACE STONE AS NEEDED. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC ROADWAYS SHALL BE IMMEDIATELY REMOVED.
- THE ENTRANCE SHALL BE MAINTAINED UNTIL THE SITE CONDITIONS WARRANT ITS REMOVAL.

Drawn/Chk. <u>RMG</u>	Designed <u>WRF</u>	Checked <u>BTD</u>	Approved <u>8/28/2025</u>	Book No. <u>3136</u>	Project No. <u>JIS-P088</u>	Dwg. ID <u>AS-SHOW</u>	Scale <u>AS SHOWN</u>
ISSUE FOR APPROVAL	Date	By	CONSTRUCTION	Date	By	RECORD DRAWING	Date
NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.
REVISIONS	NO.	NO.	NO.	NO.	NO.	NO.	NO.

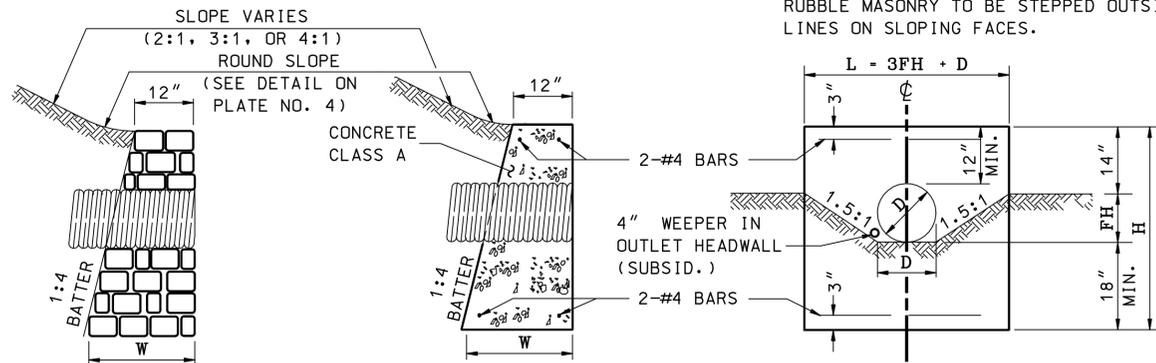
APPROVAL	Date	By
CONSTRUCTION	Date	By
RECORD DRAWING	Date	By

APPROVAL	Date	By
CONSTRUCTION	Date	By
RECORD DRAWING	Date	By

**Underwood Engineers**

25 Vaughan Mall, Portsmouth, N.H. 03801  
Tel. 603-436-6192 Fax. 603-431-4733

STANDARD DETAILS	SUNRISE LAKE STORMWATER CONTROL MEASURES	STRAFFORD REGIONAL PLANNING COMMISSION MIDDLETON, NEW HAMPSHIRE
DWG NO D1	SHEET X OF X	



SECTION ON CENTERLINE

ELEVATION

NOTE: STEEL QUANTITIES ARE FOR CONCRETE HEADWALLS ONLY.

DIAMETER D INCHES	MASONRY PER FOOT OF WALL CU. YD.	MASONRY PER STANDARD HEADER CU. YD.	STEEL PER STANDARD HEADER LB.	LENGTH OF BARS	EXC. FOR 1' DEPTH CU. YD.	HEADER LENGTH L	HEADER HEIGHT H	FILL HEIGHT FH	WIDTH AT BOTTOM OF HEADER W	"L" HEADWALL	
										MASONRY IN CORNER FRUSTUM CU. YD.	EXC. FOR 1' DEPTH CU. YD.
12	0.186	0.61	9	3'-2"	0.789	3'-6"	3'-6"	0'-10"	0'-10 1/2"	0.28	1.057
15	0.202	0.85	11	3-10	0.947	4-6	3-9	1-1	1-11 1/4	0.31	1.232
18	0.222	1.13	14	5-2	1.111	5-6	4-0	1-4	2-0	0.35	1.406
24	0.260	1.78	20	7-2	1.451	7-6	4-6	1-10	2-1 1/2	0.42	1.776
30	0.301	2.58	25	9-2	1.810	9-6	5-0	2-4	2-3	0.51	2.164
36	0.344	3.53	31	11-2	2.187	11-6	5-6	2-10	2-4 1/2	0.61	2.572
42	0.389	4.65	36	13-2	2.581	13-6	6-0	3-4	2-6	0.72	3.000
48	0.436	5.95	42	15-2	3.000	15-6	6-6	3-10	2-7 1/2	0.84	3.447
54	0.486	7.44	47	17-2	3.432	17-6	7-0	4-4	2-9	0.98	3.914
60	0.538	9.13	52	19-2	3.882	19-6	7-6	4-10	2-10 1/2	1.12	4.401
66	0.593	11.04	58	21-2	4.350	21-6	8-0	5-4	3-0	1.28	4.907
72	0.649	13.17	63	23'-2"	4.638	23'-6"	8'-6"	5'-10"	3'-1 1/2"	1.46	5.433

NOTE: FOR PLAN OF "L" HEADWALL SEE PLATE NO. 1 OF STD. NO. HW-2

NHDOT STANDARD PLANS		REV. DATE	PLATE
HEADWALLS FOR PIPES OTHER THAN R.C.: CONCRETE	P.C.-1	06-16-2010	1
MORTAR RUBBLE MASONRY	P.C.-2		STANDARD
			HW-1

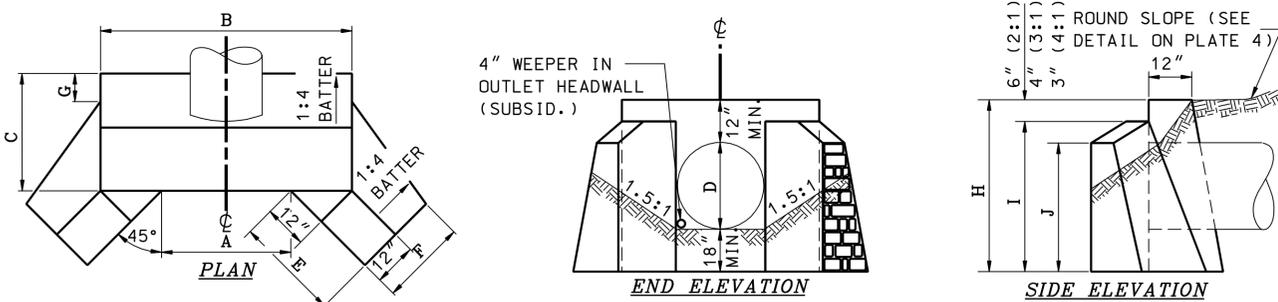
DIMENSIONS SHOWN ARE TO PAYMENT LINES. MORTAR RUBBLE MASONRY TO BE STEPPED OUTSIDE PAYMENT LINES ON SLOPING FACES.

DIAMETER D INCHES	QUANTITIES PER HEADER		DIMENSIONS										
	M.R.M. CU. YD.	EXC. FOR 1' DEPTH CU. YD.	A	B	C	E	F	G	H	I	J	K	
24	2.45	1.89	2'-6"	5'-4"	2'-3"	2'-11"	1'-11"	0'-6"	5'-0"	4'-6"	3'-10"	1'-6"	
30	3.19	2.28	3-1	5-11	2-5	3-6	2-0	0-5	5-6	5-0	4-1	1-6	
36	4.03	2.57	3-8	6-6	2-6	4-1	2-1	0-4	6-0	5-6	4-4	1-6	
42	5.50	3.09	4-3	7-1	2-8	5-0	2-2	0-3	6-9	6-3	4-10	1-9	
48	6.68	3.53	4-10	7-8	2-10	5-8	2-3	0-2	7-3	6-9	5-1	1-9	
54	7.92	3.95	5-5	8-3	2-11	6-3	2-4	0-1	7-9	7-3	5-4	1-9	
60	9.39	4.40	6-0	8-10	3-1	6-10	2-5	0-1	8-3	7-9	5-8	1-9	
66	10.90	4.81	6-7	9-5	3-2	7-5	2-6	0-0	8-9	8-3	5-11	1-9	
72	12.66	5.22	7'-2"	10'-0"	3'-4"	8'-1"	2'-7"	0'-1"	9'-3"	8'-9"	6'-3"	1'-9"	

DIAMETER D INCHES	QUANTITIES PER HEADER		DIMENSIONS										
	M.R.M. CU. YD.	EXC. FOR 1' DEPTH CU. YD.	A	B	C	E	F	G	H	I	J	K	
24	2.81	2.09	2'-6"	5'-4"	2'-3"	3'-6"	2'-0"	0'-6"	5'-0"	4'-8"	4'-1"	1'-6"	
30	3.73	2.51	3-1	5-11	2-5	4-3	2-1	0-6	5-6	5-2	4-5	1-6	
36	4.69	2.90	3-8	6-6	2-6	4-11	2-2	0-4	6-0	5-8	4-9	1-6	
42	6.47	3.46	4-3	7-1	2-8	6-0	2-4	0-3	6-9	6-5	5-3	1-9	
48	7.85	3.93	4-10	7-8	2-10	6-8	2-5	0-3	7-3	6-11	5-7	1-9	
54	9.37	4.37	5-5	8-3	2-11	7-5	2-6	0-2	7-9	7-5	5-11	1-9	
60	11.10	4.85	6-0	8-10	3-1	8-1	2-7	0-1	8-3	7-11	6-3	1-9	
66	12.95	5.36	6-7	9-5	3-2	8-10	2-8	0-0	8-9	8-5	6-7	1-9	
72	15.03	5.86	7'-2"	10'-0"	3'-4"	9'-6"	2'-9"	0'-0"	9'-3"	8'-11"	6'-11"	1'-9"	

DIAMETER D INCHES	QUANTITIES PER HEADER		DIMENSIONS										
	M.R.M. CU. YD.	EXC. FOR 1' DEPTH CU. YD.	A	B	C	E	F	G	H	I	J	K	
24	3.05	2.21	2'-6"	5'-4"	2'-3"	3'-10"	2'-1"	0'-6"	5'-0"	4'-9"	4'-3"	1'-6"	
30	4.02	2.62	3-1	5-11	2-5	4-7	2-2	0-6	5-6	5-3	4-7	1-6	
36	5.10	3.03	3-8	6-6	2-6	5-4	2-3	0-4	6-0	5-9	5-0	1-6	
42	7.03	3.65	4-3	7-1	2-8	6-6	2-5	0-3	6-9	6-6	5-6	1-9	
48	8.60	4.14	4-10	7-8	2-10	7-3	2-6	0-3	7-3	7-0	5-11	1-9	
54	10.28	4.62	5-5	8-3	2-11	8-1	2-7	0-2	7-9	7-6	6-3	1-9	
60	12.18	5.16	6-0	8-10	3-1	8-10	2-8	0-1	8-3	8-0	6-7	1-9	
66	14.24	5.67	6-7	9-5	3-2	9-7	2-9	0-1	8-9	8-6	7-0	1-9	
72	16.54	6.21	7'-2"	10'-0"	3'-4"	10'-5"	2'-10"	0'-0"	9'-3"	9'-0"	7'-4"	1'-9"	

NHDOT STANDARD PLANS		REV. DATE	PLATE
MORTAR RUBBLE MASONRY HEADWALLS WITH 45° WINGS FOR R.C. PIPE	P.C.-8	06-16-2010	2
			STANDARD
			HW-1



2:1 SLOPE

DIAMETER D INCHES	QUANTITIES PER HEADER		DIMENSIONS									
	M.R.M. CU. YD.	EXC. FOR 1' DEPTH CU. YD.	A	B	C	E	F	G	H	I	J	
24	1.89	1.65	2'-3"	5'-1"	2'-2"	2'-4"	1'-11"	0'-7"	4'-6"	4'-0"	3'-6"	
30	2.54	1.94	2-9	5-7	2-3	2-11	1-11	0-6	5-0	4-6	3-10	
36	3.31	2.29	3-3	6-1	2-5	3-7	2-0	0-6	5-6	5-0	4-1	
42	4.17	2.63	3-9	6-7	2-6	4-2	2-1	0-5	6-0	5-6	4-5	
48	5.33	3.00	4-4	7-2	2-8	4-9	2-2	0-4	6-6	6-0	4-8	
60	7.63	3.76	5-4	8-2	2-11	6-0	2-4	0-2	7-6	7-0	5-3	
72	10.59	4.60	6'-5"	9'-3"	3'-2"	7'-2"	2'-5"	0'-1"	8'-6"	8'-0"	5'-10"	

3:1 SLOPE

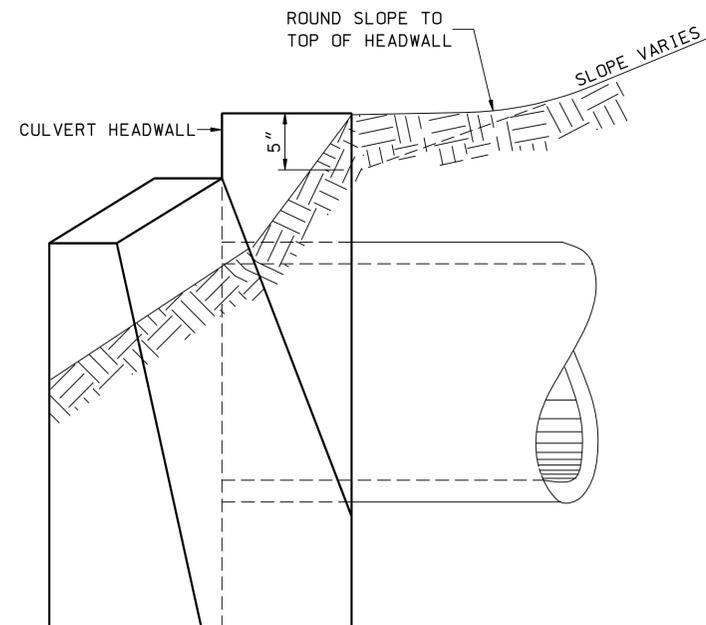
24	2.18	1.79	2'-3"	5'-1"	2'-2"	2'-10"	1'-11"	0'-7"	4'-6"	4'-2"	3'-9"
30	2.94	2.18	2-9	5-7	2-3	3-7	2-0	0-6	5-0	4-8	4-1
36	3.81	2.55	3-3	6-1	2-5	4-3	2-1	0-6	5-6	5-2	4-5
42	4.86	2.93	3-9	6-7	2-6	5-0	2-2	0-4	6-0	5-8	4-9
48	6.04	3.36	4-4	7-2	2-8	5-8	2-3	0-4	6-6	6-2	5-1
60	8.90	4.24	5-4	8-2	2-11	7-1	2-5	0-3	7-6	7-2	5-9
72	12.46	5.13	6'-5"	9'-3"	3'-2"	8'-6"	2'-7"	0'-1"	8'-6"	8'-2"	6'-5"

4:1 SLOPE

24	2.36	1.91	2'-3"	5'-1"	2'-2"	3'-2"	2'-0"	0'-7"	4'-6"	4'-3"	3'-10"
30	3.18	2.27	2-9	5-7	2-3	3-11	2-1	0-6	5-0	4-9	4-3
36	4.18	2.67	3-3	6-1	2-5	4-8	2-2	0-6	5-6	5-3	4-7
42	5.28	3.08	3-9	6-7	2-6	5-6	2-3	0-4	6-0	5-9	5-0
48	6.65	3.55	4-4	7-2	2-8	6-3	2-4	0-4	6-6	6-3	5-4
60	9.78	4.46	5-4	8-2	2-11	7-9	2-6	0-3	7-6	7-3	6-1
72	14.81	5.86	6'-5"	9'-3"	3'-2"	9'-4"	2'-8"	0'-1"	8'-6"	8'-3"	6'-9"

DIMENSIONS SHOWN ARE TO PAYMENT LINES. MORTAR RUBBLE MASONRY TO BE STEPPED OUTSIDE PAYMENT LINES ON SLOPING FACES.

NHDOT STANDARD PLANS		REV. DATE	PLATE
MORTAR RUBBLE MASONRY HEADWALLS WITH 45° WINGS FOR PIPES OTHER THAN R.C.	P.C.-6	06-16-2010	3
			STANDARD
			HW-1



SIDE ELEVATION

NHDOT STANDARD PLANS		REV. DATE	PLATE
SLOPE ROUNDING AT TOP OF CULVERT HEADWALL		06-16-2010	4
			STANDARD
			HW-1

STANDARD NO.	HW-1
REVISION DATE	07-13-2001
	06-16-2010
DGN FILE NAME	HW-1