


**STATE OF NEW HAMPSHIRE  
INTER-DEPARTMENT COMMUNICATION**

**FROM:**  Andrew O'Sullivan  
Wetlands Program Manager

**DATE:** May 18, 2020  
**AT (OFFICE):** Department of  
Transportation

**SUBJECT** Dredge & Fill Application  
Amendment  
Stratford, 41788  
**(DES#2019-03673)**

Bureau of  
Environment

**TO** Karl Benedict, Public Works Permitting Officer  
New Hampshire Wetlands Bureau  
29 Hazen Drive, P.O. Box 95  
Concord, NH 03302-0095

Forwarded herewith is a permit amendment request prepared by NH DOT for the Stratford 41788, (DES #2019-03673) project.

As District forces prepare to mobilize the project they determined that more space is need to facilitate two lane traffic along US Route 3 in Stratford, rather than the originally proposed alternating one-way traffic as US Route 3 is the primary travel ways in this area of the state. Therefore, NHDOT proposed to widen US Route 3 temporarily to the east, at the inlet of the culvert, which would temporarily impact an additional 373 SF of cumulative jurisdictional channel and bank at the inlet of the crossing to facilitate travel through this area during construction.

The previous permit impacted a total of 3,710 SF (3,540 SF permanent and 170 SF temporary). The amended design (see the purple shading on page 1 of the attached plans) impacts an additional 373 SF of temporary impact to stream channel and bank.

A payment voucher was originally processed for this application (Voucher #589163) in the amount of \$1,484. Another voucher (Voucher #609651) in the amount of \$149.20 has been processed for the additional 373 SF of impact.

Mitigation was not required for this project at the time of permitting; please reference the mitigation narrative submitted with the original application and the permit for additional details. Since the proposed additional impacts are temporary and the site will be restored to its existing conditions, it is the Departments assumption that no mitigation is required. Please reach out to Sarah Large, Wetlands Program Analyst to discuss further if need be.

The lead people to contact for this project are Philip Beaulieu, District 1 (788-4641) or Philip.Beaulieu@dot.nh.gov) or Sarah Large, Wetlands Program Analyst, Bureau of Environment (271-3226 or sarah.large@dot.nh.gov). If and when this amendment request meets with the approval of the Bureau, please send the amended permit directly to Andrew O'Sullivan, Wetlands Program Manager, Bureau of Environment.

AMO:sel  
Enclosures  
Additional Construction Sequence Information  
Stratford, #4178 Wetland Impact Plan

cc:  
BOE Original  
Town of Stratford  
David Trubey, NH Division of Historic Resources (Cultural Review within original application)  
Michael Hicks, US Army Corp of Engineers



Carol Henderson, NH Fish & Game (via electronic notification)  
Maria Tur, US Fish & Wildlife (via electronic notification)  
Jeannie Brochi & Beth Alafat, Environmental Protection Agency (via electronic notification)  
Kevin Nyhan, NHDOT BOE (via electronic notification)

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The State of New Hampshire  
**Department of Environmental Services**



Robert R. Scott, Commissioner

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**WETLANDS AND NON-SITE SPECIFIC PERMIT 2019-03673**

**NOTE CONDITIONS**

**PERMITTEE:** NH DEPARTMENT OF TRANSPORTATION  
PO BOX 483  
CONCORD NH 03302

**PROJECT LOCATION:** US ROUTE 3, STRATFORD  
TAX MAP #ROW, LOT #ROW

**WATERBODY:** UNNAMED STREAM

**APPROVAL DATE:** JANUARY 09, 2020

**EXPIRATION DATE:** JANUARY 09, 2025

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Based upon review of the above referenced application, in accordance with RSA 482-A and RSA 485-A:17, a Wetlands Permit and Non-Site Specific Permit was issued by the New Hampshire Department of Environmental Services (NHDES). This permit shall not be considered valid unless signed as specified below.

**PERMIT DESCRIPTION:** Dredge and fill a total of 3,710 square feet (SF), including 3,540 SF permanent and 170 SF temporary, within palustrine emergent wetland and the bed and banks of an unnamed stream (impacting 350 linear feet) to replace an existing 4.2 foot high x 4 foot wide x 20 foot long concrete box culvert with a 5 foot high x 7 foot wide x 24 foot long concrete box culvert embedded 24 inches with stream simulation and precast headwalls and wingwalls. In addition, construct a 3 foot wide wildlife passage shelf within the box culvert and restore the ditchline/channel adjacent to the stream.

**THIS APPROVAL IS SUBJECT TO THE FOLLOWING PROJECT SPECIFIC CONDITIONS:**

1. All work shall be in accordance with plans by NH Department of Transportation (NHDOT) dated October 27, 2018 as received by the NH Department of Environmental Services (NHDES) on November 22, 2019.
2. This permit is not valid until the applicant/owner obtains construction easements on abutting parcels or written permission from abutting property owners if work is beyond the ROW. The permittee shall submit a copy of each recorded easement to the NHDES Wetlands Bureau prior to construction.
3. There shall be no use of riprap or retention sills (baffles) within the culvert and in the streambed.
4. Materials used to emulate the natural stream bed shall be consistent with the bed materials identified in the reference reach, and shall be well-mixed with cobbles, gravels and fines that are washed in during installation to prevent subsurface stream flow (hyporheic). Stream bed materials shall not include angular riprap.
5. NHDOT shall submit to NHDES Wetlands Bureau photographic documentation of the streambed material within sixty (60) days post-construction.
6. NHDOT shall monitor this project post-construction through NHDOT's mitigation database.
7. Within sixty (60) days of completing the project, the applicant shall submit a post-construction monitoring report, documenting the conditions of enhanced stream. The submitted monitoring report shall identify the problem(s) limiting the success of the stream channel, measures which need to be taken to address the problem(s), and a time schedule on which the permittee will implement the corrective measures. NHDES Wetlands Bureau may require subsequent monitoring and corrective measures if NHDES deemed the area inadequately stabilized or restored.

8. Any further alteration of areas on this property that are subject to RSA 482-A jurisdiction will require a new application and further permitting.
9. No person undertaking any activity shall cause or contribute to, or allow the activity to cause or contribute to, any violations of the surface water quality standards in RSA 485-A and Env-Wq 1700.
10. Work shall be done during low flow.
11. The use of welded plastic or 'biodegradable plastic' erosion control netting shall not be used on the project. Any slope stabilizing materials must be free from plastic or other non-biodegradable materials that create a mesh that can impact wildlife. Coco matting and other natural fibers are acceptable.
12. Appropriate siltation and erosion controls shall be in place prior to construction, shall be maintained during construction, and shall remain until the area is stabilized. Temporary controls shall be removed once the area has been stabilized.
13. Appropriate turbidity controls shall be installed prior to construction, shall be maintained during construction such that no turbidity escapes the immediate dredge area and shall remain until suspended particles have settled and water at the work site has returned to normal clarity.
14. The contractor responsible for completion of the work shall use techniques described in the New Hampshire Stormwater Manual, Volume 3, Erosion and Sediment Controls During Construction (December 2008).
15. Extreme precautions shall be taken within riparian areas to prevent unnecessary removal of vegetation during construction. Areas cleared of vegetation must be revegetated with like native species within three days of the completion of the disturbance.
16. Prior to commencing work on a substructure located within surface waters, the permittee or permittee's contractors shall construct a cofferdam to isolate the substructure work area from the surface waters.
17. Discharge from dewatering of work areas shall be to sediment basins that are: a) located in uplands; b) lined with hay bales or other acceptable sediment trapping liners; c) set back as far as possible from wetlands and surface waters, with a preferred undisturbed vegetated buffer of at least 50 feet and a minimum undisturbed vegetative buffer of 20 feet.
18. Dredged materials, whether to be stockpiled or disposed of, shall be dewatered in sedimentation basins lined with siltation and erosion controls, and located outside of areas subject to RSA 482-A jurisdiction.
19. The channel at the culvert inlet and outlet/recreated stream channel bed and box culvert must maintain the natural and a consistent streambed elevation and not impede stream flow.
20. Proper headwalls shall be constructed within seven days of culvert installation.
21. Construction equipment shall be inspected daily for leaking fuel, oil, and hydraulic fluid prior to entering surface waters or wetlands or operating in an area where such fluids could reach groundwater, surface waters, or wetlands.
22. The permittee's contractor shall maintain appropriate oil/diesel fuel spill kits on site that are readily accessible at all times during construction, and shall train each operator in the use of the kits.
23. All refueling of equipment shall occur outside of surface waters or wetlands during construction. Machinery shall be staged and refueled in upland areas only.
24. Within three days of final grading or temporary suspension of work in an area that is in or adjacent to wetlands or surface waters, all exposed soil areas shall be stabilized by seeding and mulching during the growing season, or if not within the growing season, by mulching with tackifiers on slopes less than 3:1 or netting and pinning on slopes steeper than 3:1.

**GENERAL CONDITIONS THAT APPLY TO ALL NHDES WETLANDS PERMITS:**

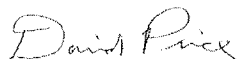
1. A copy of this permit shall be posted on site during construction in a prominent location visible to inspecting personnel;
2. This permit does not convey a property right, nor authorize any injury to property of others, nor invasion of rights of others;
3. The NHDES Wetlands Bureau shall be notified upon completion of work;
4. This permit does not relieve the applicant from the obligation to obtain other local, state or federal permits, and/or consult with other agencies as may be required (including US EPA, US Army Corps of Engineers, NH Department of



Transportation, NH Division of Historical Resources (NH Department of Cultural Resources), NHDES Alteration of Terrain, etc.);

- 5. Transfer of this permit to a new owner shall require notification to and approval by NHDES;
- 6. This project has been screened for potential impacts to **known** occurrences of protected species and exemplary natural communities in the immediate area. Since many areas have never been surveyed, or have only received cursory inventories, unidentified sensitive species or communities may be present. This permit does not absolve the permittee from due diligence in regard to state, local or federal laws regarding such communities or species;
- 7. Review enclosed sheet for status of the US Army Corps of Engineers' federal wetlands permit.

APPROVED:



David Price  
Wetlands Bureau  
Land Resources Management

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**BY SIGNING BELOW, I HEREBY CERTIFY THAT I HAVE FULLY READ THIS PERMIT AND AGREE TO ABIDE BY ALL PERMIT CONDITIONS.**

\_\_\_\_\_  
OWNER'S SIGNATURE (required)

\_\_\_\_\_  
CONTRACTOR'S SIGNATURE (required)

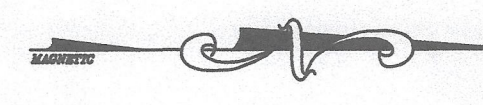
### **Supplemental Construction Sequencing**

The proposed culvert replacement will be completed in two phases in order to allow for two-way traffic along US Route 3. The work is scheduled and proposed to begin at the end of July 2020 and will be conducted during low flow conditions. The work is scheduled to be done within one construction season. Phase 1 of the work is to replace the outlet section of the crossing and the downstream channel restoration; traffic will be shifted to the east during this phase. Phase 2 of the work is to replace the inlet of the crossing; traffic will be shifted to the west over the newly constructed outlet during this phase.

During phase 1 additional road width is required to facilitate two-way traffic as well as adequate safe work limits at the outlet. During phase 1 a temporary pipe (24") will be installed to carry flow to the crossing and the bypass pipe, as proposed in the original application submittal (see sheet 3 of the original impact plans submitted with the application for the construction sequence and clean water bypass & diversion notes). Temporary fill will be placed over top of the temporary pipe to facilitate the construction of a temporary road in order to support traffic.

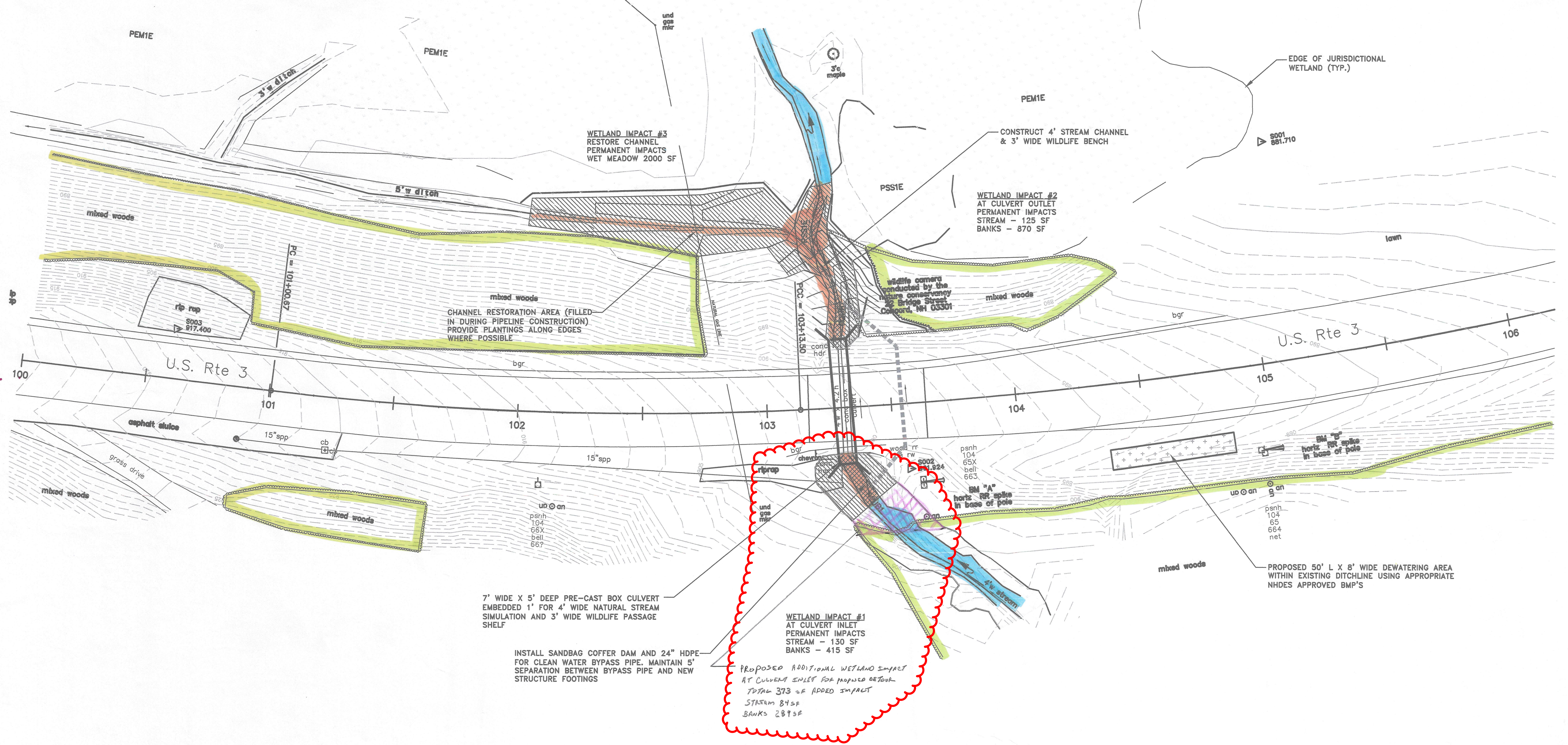
During phase 2 the proposed temporary road and temporary pipe will be removed. The banks and channel will be restored to their original condition in conjunction with the replacement and construction of the inlet section of the box culvert.





**GAS UTILITY NOTE**  
GAS UTILITY SHOULD BE CONTACTED IN ADVANCE OF CONSTRUCTION FOR WORK WITHIN 20 FEET OF GAS MAIN

**DESCRIPTION OF WORK:**  
THE PURPOSE OF THIS PROJECT IS TO REMOVE THE EXISTING CULVERT AND REPLACE IT WITH AN EMBEDDED PRE-CAST BOX CULVERT TO RESTORE AQUATIC CONNECTIVITY (BROOK TROUT) AND ENHANCE WILDLIFE CONNECTIVITY FOR MULTIPLE TERRESTRIAL MAMMAL SPECIES (FISHER, MINK AND BOBCAT) UNDER US ROUTE 3 IN STRATFORD, NEW HAMPSHIRE.



7' WIDE X 5' DEEP PRE-CAST BOX CULVERT EMBEDDED 1' FOR 4' WIDE NATURAL STREAM SIMULATION AND 3' WIDE WILDLIFE PASSAGE SHELF

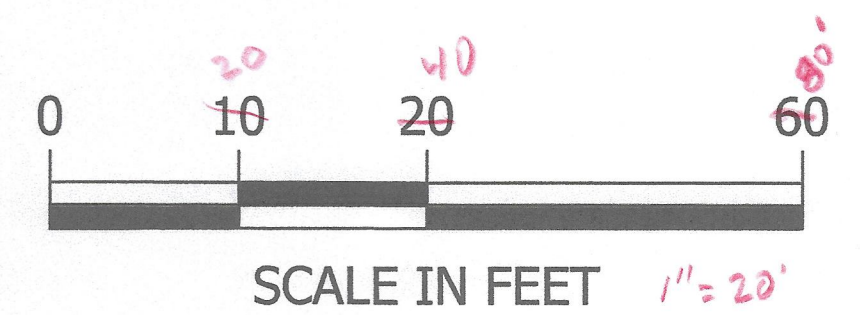
INSTALL SANDBAG COFFER DAM AND 24" HDPE FOR CLEAN WATER BYPASS PIPE. MAINTAIN 5' SEPARATION BETWEEN BYPASS PIPE AND NEW STRUCTURE FOOTINGS

**WETLAND IMPACT #1**  
AT CULVERT INLET  
PERMANENT IMPACTS  
STREAM - 130 SF  
BANKS - 415 SF

**PROPOSED ADDITIONAL WETLAND IMPACT AT CULVERT INLET FOR PROPOSED DETOUR**  
TOTAL 373 SF ADDED IMPACT  
STREAM 84 SF  
BANKS 289 SF

**WETLAND IMPACT #2**  
AT CULVERT OUTLET  
PERMANENT IMPACTS  
STREAM - 125 SF  
BANKS - 870 SF

**WETLAND IMPACT #3**  
RESTORE CHANNEL  
PERMANENT IMPACTS  
WET MEADOW 2000 SF



PLAN REFERENCE:  
SURVEY COMPLETED BY NHDOT ON JUNE 26, 2018 FOR NHDOT PROJECT NO. 41788.

PROJECT CONTACT:  
JAMES MCMAHON III, P.E.  
ASSISTANT DISTRICT ENGINEER  
DISTRICT 1 MAINTENANCE  
(603) 788-4641

STATE OF NEW HAMPSHIRE  
DEPARTMENT OF TRANSPORTATION  
BUREAU OF HIGHWAY MAINTENANCE  
DISTRICT ONE  
641 MAIN STREET, LANCASTER, NEW HAMPSHIRE 03584  
TEL: (603)788-4641 FAX: (603)788-4260

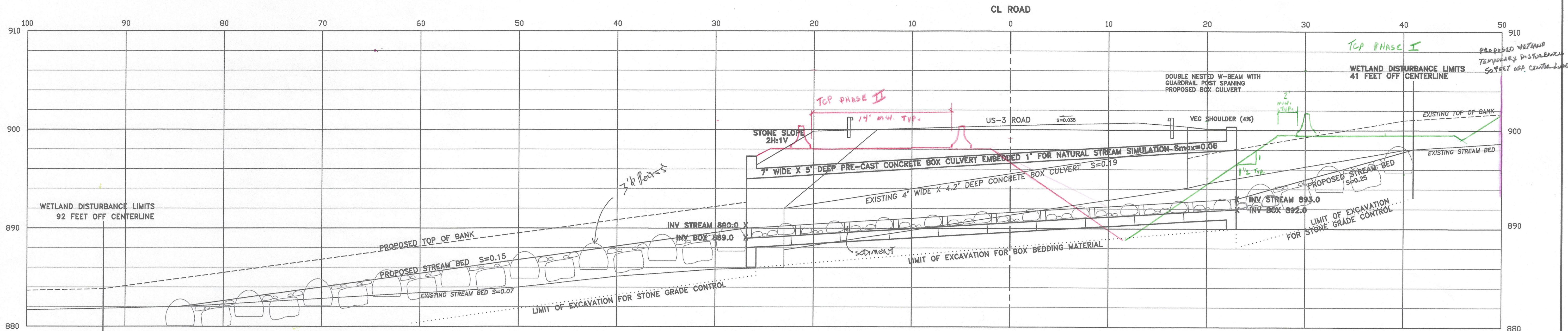
DRAFT - FOR DISCUSSION 11/2/18

**41788 STRATFORD**  
**NFWF US-3 CULVERT REPLACEMENT**

STRATFORD, NEW HAMPSHIRE  
OVERALL SITE PLAN

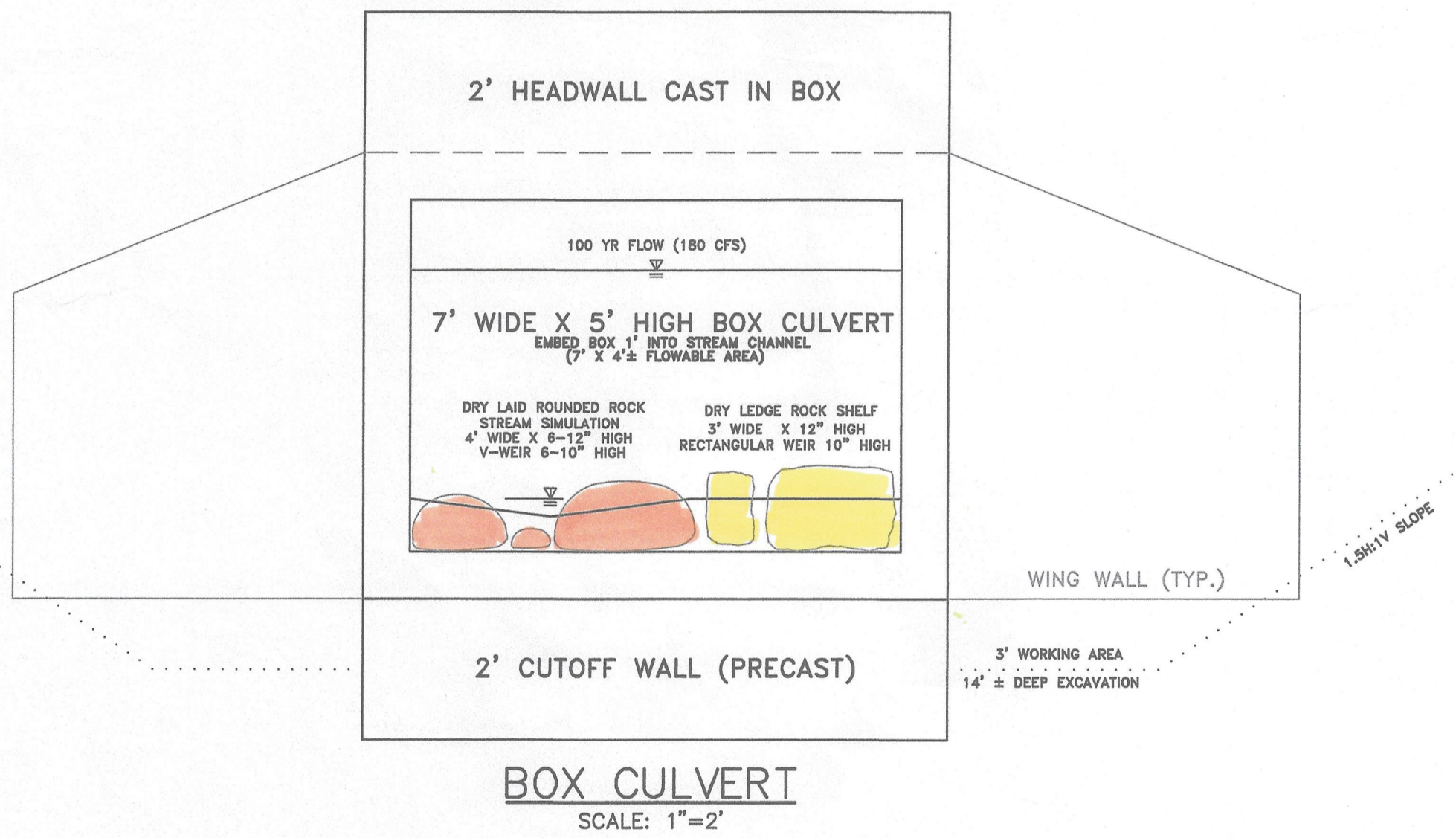
SURVEYED BY:	NHDOT
WETLANDS BY:	NHDOT
DRAWN BY:	JFM
CHECKED BY:	PLB
SCALE:	AS NOTED
DATE:	10/27/18
OVERALL SITE PLAN	
SHEET 1 OF 3	



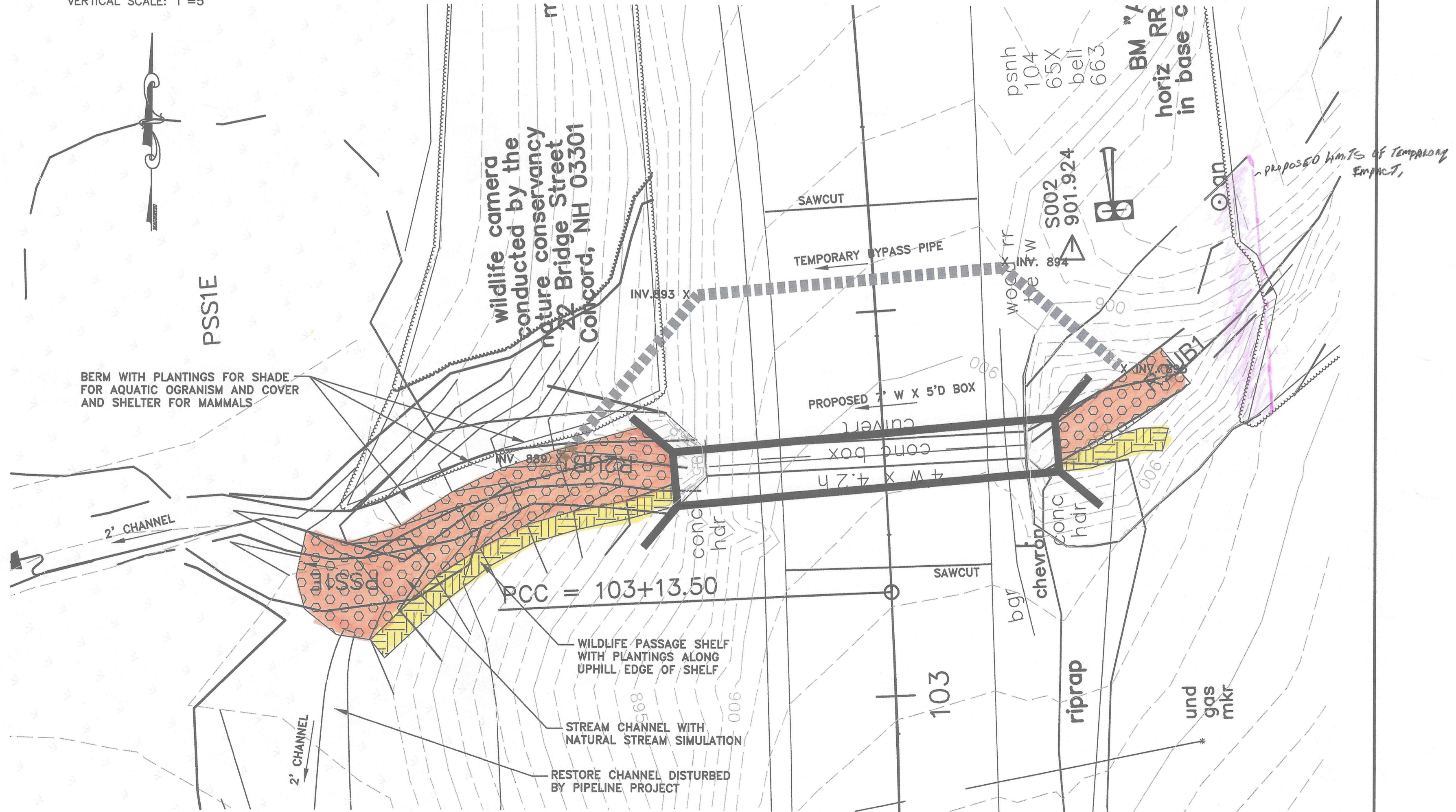


**CULVERT & STREAM RESTORATION PROFILE**

HORIZONTAL SCALE: 1"=50'  
VERTICAL SCALE: 1"=5'



**BOX CULVERT**  
SCALE: 1"=2'



**BOX CULVERT**  
SCALE: 1"=10'

DRAFT - FOR DISCUSSION 11/2/18

**CULVERT INSTALLATION NOTES:**

1. NO VEHICLES INCLUDING CONSTRUCTION EQUIPMENT SHALL BE DRIVEN OVER THE PIPE UNTIL THE MINIMUM DEPTH OF COVER HAS BEEN PLACED.
2. THE CONTRACTOR SHALL NOT PLACE BEDDING MATERIAL UNTIL THE ENGINEER HAS INSPECTED THE FOUNDATION/UNDISTURBED EARTH. REMOVE ROCK OR OTHER UNYIELDING FOUNDATIONS MATERIAL AS NECESSARY TO PLACE BEDDING TO MINIMUM THICKNESS. OVER-EXCAVATE UNSUITABLE FOUNDATION MATERIAL SUCH AS SOFT, SPRINGY, ORGANIC, OR OTHERWISE EXCESSIVELY YIELDING MATERIAL TO A DEPTH OF AT LEAST 12" BELOW BOTTOM OF BEDDING AND REPLACE WITH SUITABLE MATERIAL PRIOR TO PLACEMENT OF BEDDING.
3. PLACE & COMPACT CULVERT BEDDING MATERIAL. BEDDING MATERIAL SHALL MEET NHDOT STRUCTURAL FILL ITEM NO. 508. PEA GRAVEL (3/8") MAY BE USED FOR THE TOP 2" OF CONSOLIDATED STONE TO ASSIST FINISH GRADING OF BEDDING MATERIAL.
4. SET BOX CULVERT SECTIONS AND WING WALLS AT THE DOWNSTREAM END OF THE CULVERT AND WORK TOWARDS THE UPSTREAM END OF THE CULVERT.
5. PIPE BACKFILL MATERIAL SHALL MEET THE REQUIREMENT FOR PIPE BEDDING MATERIAL WITHIN 2 FEET OF THE CULVERT, INCLUDING ON TOP OF THE PIPE. THE REMAINDER OF THE TRENCH SHALL BE FILLED AND COMPACTED WITH THE EXISTING STOCKPILED ROAD BASE MATERIALS REMOVED FROM THE EXCAVATION, EXCLUDING ANY UNSUITABLE MATERIALS.
6. PLACE PIPE BACKFILL EQUALLY ON BOTH SIDES OF CULVERT AND UP TO THE ELEVATION OF THE CULVERT SPAN, PLACE BACKFILL MATERIAL IN 6-8" LIFTS COMPACTED WITH A VIBRATORY PLATE COMPACTOR TO 95% STANDARD PROCTOR DENSITY. HAND TAMP OR USE VIBRATORY 'JUMPING JACK' IN AREAS WHERE THE COMPACTION EQUIPMENT CANNOT REACH.
7. UNSUITABLE MATERIAL INCLUDES, BUT NOT LIMITED TO, ORGANIC MATERIAL, FROZEN LUMPS, SOILS SUCH AS PEAT OR BOG, OVERSATURATED SILTS, CLAYS OR SANDS WHOSE WATER CONTENT PREVENTS SPECIFIED COMPACTION, AND STONE OR ROCK FRAGMENTS GREATER THAN 3 INCHES.

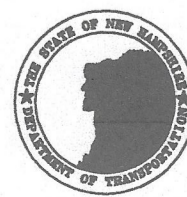
**DRAINAGE CALCULATIONS:**

CULVERT DRAINAGE AREA: 231 ACRES  
TIER 2 CROSSING PER NHDES STREAM CROSSING RULES  
DESIGN FOR 100-YEAR FLOOD EVENT FLOOD:

METHOD	2-YR	50-YR	100-YR
#1 USGS STREAMSTATS	17	67	82 CFS
#2 TR-55 (SFS)	10	140	180 CFS ←--USE
#3 RATIONAL METHOD*	N/A	140	N/A CFS

\*NOTE: DRAINAGE AREA EXCEEDS METHOD LIMITATION  
NO HISTORY OF FLOODING OVER ROAD (US-3) AT THIS LOCATION.  
OVERTOPPING FLOW FOR EXISTING 4'W X 4.2'H BOX CULVERT: 183 CFS  
OVERTOPPING FLOW FOR PROPOSED 7'WX5'H BOX CULVERT: 305 CFS

PROJECT CONTACT:  
JAMES MCMAHON III, P.E.  
ASSISTANT DISTRICT ENGINEER  
DISTRICT 1 MAINTENANCE  
(603) 788-4641



STATE OF NEW HAMPSHIRE  
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**41788 STRATFORD**  
**NFWF US-3 CULVERT REPLACEMENT**

STRATFORD, NEW HAMPSHIRE  
CULVERT & STREAM RESTORATION PROFILE

SURVEYED BY:	NHDOT
WETLANDS BY:	NHDOT
DRAWN BY:	JFM
CHECKED BY:	PLB
SCALE:	AS NOTED
DATE:	10/27/18
CULVERT & STREAM RESTORATION PROFILE	
SHEET 2 OF 3	



## CONSTRUCTION SEQUENCE:

1. CONTACT DIGSAFE AND UTILITY COMPANIES FOR MARKING ANY UTILITIES WITHIN THE WORK AREA.
2. INSTALL DEMARCATION FOR TREE CLEARING AND CONSTRUCTION LIMITS.
3. PROVIDE PUBLIC NOTICE AND SIGNAGE. SAWCUT PAVEMENT AT EXCAVATION LIMITS.
4. INSTALL DEWATERING AREA, DOWNSTREAM PERMITTER CONTROL, AND ADDITIONAL EROSION CONTROLS MEETING NHDES AND NHDOT REQUIREMENTS, AS DIRECTED BY THE ENGINEER.
5. EXCAVATE/SHAPE STREAM CHANNELS AT CULVERT OUTLET. USE CAUTION WHEN EXCAVATING NEAR THE PROPANE LINE. UTILITY COMPANY SHALL BE ON SITE TO LOCATE AND EXPOSE PIPE.
6. INSTALL STREAM CHANNEL STONES AND STABILIZE OUTLET CHANNEL AS INDICATED ON THE PLAN.
7. INSTALL TEMPORARY BYPASS/DIVERSION MEASURES, STARTING AT OUTLET AND WORKING UPSTREAM.
8. REMOVE GUARDRAIL & INSTALL CONCRETE BARRIERS ALONG TOP OF FILL SLOPE MEETING NHDOT REQUIREMENTS.
9. INSTALL TEMPORARY ONE-WAY BYPASS ON THE SOUTHBOUND SIDE OF US-3. PROVIDE ONE-WAY ALTERNATING TRAFFIC WITH CONCRETE BARRIERS, PORTABLE TRAFFIC SIGNALS, PORTABLE LIGHTING AND APPROPRIATE SIGNAGE IN ADVANCE OF THE PROJECT AREA.
10. REMOVE THE LOWER HALF OF THE EXISTING CULVERT, WHILE PROVIDING ENOUGH ROOM FOR DETOUR ON UPPER HALF. EXCAVATE A MINIMUM OF 3' BEYOND NEW CULVERT DIMENSION WITH 1.5H:1V SLOPE.
11. PREPARE CULVERT BEDDING MATERIAL TO LIMITS OF EXCAVATION. EXCAVATE FOR CUTOFF WALLS AND INSTALL PRE-CAST CUTOFF WALL.
12. SET WING WALLS AND BOX CULVERT SECTION(S). PLACE CULVERT INFILL MATERIAL (NATURAL STREAM SIMULATION) INSIDE EACH SET SECTION BEFORE PROCEEDING TO THE NEXT UPSTREAM SECTION. CARE SHOULD BE TAKEN NOT TO DAMAGE THE CULVERT OR WEIRS DURING PLACEMENT.
13. BACKFILL SIDES AND TOP OF CULVERT. INSTALL 12" CRUSHED MILLINGS ON TOP OF STRUCTURAL FILL FOR TRAFFIC DETOUR.
14. DETOUR TRAFFIC ONTO NEW CULVERT SECTION. REMOVE UPPER HALF OF EXISTING CULVERT, AND INSTALL UPPER CULVERT SECTIONS WITH CULVERT INFILL (NATURAL STREAM SIMULATION) MATERIAL.
15. RESTORE USTREAM AND DOWNSTREAM CHANNELS.
16. REMOVE TEMPORARY DIVERSION/BYPASS PIPE.
17. INSTALL ROAD BASE MATERIALS AND SELECT MATERIALS TO FINISH GRADE. SEE PAVEMENT PATCH FOR PAVEMENT REQUIREMENTS.
18. SEED AND MULCH ANY AREAS DISTURBED DURING FINISH GRADING.

## CONSTRUCTION NOTES:

1. THE NHDOT DISTRICT ONE ENGINEER, OR HIS REPRESENTATIVE, MAY MODIFY THE PROPOSED GRADING IF EXISTING FIELD CONDITIONS HAVE SIGNIFICANTLY CHANGED OR UNEXPECTED CONDITIONS ARISE (I.E. BEDROCK, LEDGE, OTHER OBSTRUCTIONS, ETC).
2. ALL WORK MUST BE DONE OUTSIDE OF FLOWING WATER TO MINIMIZE THE POTENTIAL FOR THE RELEASE OR DISCHARGE OF TURBID OR SEDIMENT LADEN WATER. TO THE EXTENT PRACTICAL, CONSTRUCTION ACTIVITIES SHALL BE DONE IN THE DRY OR ISOLATED FROM THE FLOWING WATER.
3. THE TEMPORARY BYPASS/DIVERSION DETAIL PROVIDES A GENERAL DESCRIPTION FOR A SUITABLE METHOD OF CONTROLLING WATER DURING CONSTRUCTION.
4. SITE CONDITIONS MAY DIFFER FROM THOSE SHOWN ON THE DRAWINGS DUE TO SEASONAL WATER LEVELS, SEDIMENT DEPOSITION, AND EROSION SINCE THE TIME OF THE SURVEY.
5. LOCATE STAGING AREAS AND WORKING PLATFORMS AWAY FROM SENSITIVE AREAS INCLUDING WETLANDS AND STREAM BUFFERS.
6. ANY TREES CUT OUTSIDE THE DISTURBED AREA AND WITHIN 50 FEET OF THE STREAM, SHALL BE CUT AS FLUSH AS POSSIBLE TO THE EXISTING GRADE. ANY STUMPS WITHIN 20 FEET OF THE EDGE OF PAVEMENT SHALL BE REMOVED.
7. CONTRACTOR SHALL LAY OUT THE CONSTRUCTION BASELINE AND STAKE OUT THE CLEARING LIMITS AND DISTURBANCE LIMITS OF PROPOSED WORK PRIOR TO CONSTRUCTION.
8. NO CHANNEL DISTURBANCE, INCLUDING MOVEMENT OF EQUIPMENT, WILL BE ALLOWED OUTSIDE THE CONSTRUCTION LIMITS IDENTIFIED ON THE PLAN. WORKING OUTSIDE THESE LIMITS MAY REQUIRE ADDITIONAL PERMITTING REQUIREMENTS AND/OR LANDOWNER PERMISSION.

## CLEAN WATER BYPASS & DIVERSION NOTES:

1. INSTALL THE TEMPORARY BYPASS PIPE AT LEAST 20 FEET FROM THE OUTER EDGE OF THE PROPOSED CULVERT OR WING WALL, OR 1.5H:1V FROM THE BOTTOM OF THE CULVERT EXCAVATION.
2. TEMPORARILY STABILIZE ANY DISTURBED AREAS AND INSTALL SILT FENCE OR OTHER APPROVED PERIMETER CONTROL ALONG THE DOWNSTREAM EDGES. PROVIDE TWO LAYERS OF PERIMETER CONTROL ALONG STREAM BANKS AND/OR JURISDICTIONAL WETLAND BOUNDARY.
3. INSTALL A SANDBAG COFFER DAM UPSTREAM OF THE EXISTING CULVERT.
4. PIPE OR PUMP WATER FROM THE COFFER DAM TO THE TEMPORARY BYPASS PIPE LOCATED DOWNGRADIENT.
5. INSPECT DIVERSION PIPE AND COFFER DAM DAILY AND AFTER RAIN EVENTS GREATER THAN 1".
6. AFTER THE NEW CULVERT IS INSTALLED AND THE STREAM AND BANKS RESTORED, REMOVE THE COFFER DAM AND TEMPORARY BYPASS PIPE.
7. REMOVE SILT FENCE OR OTHER APPROVED PERIMETER CONTROL WHEN THE DISTURBED AREAS ARE STABILIZED TO THE SATISFACTION OF THE ENGINEER.

## EROSION & SEDIMENT CONTROL NOTES:

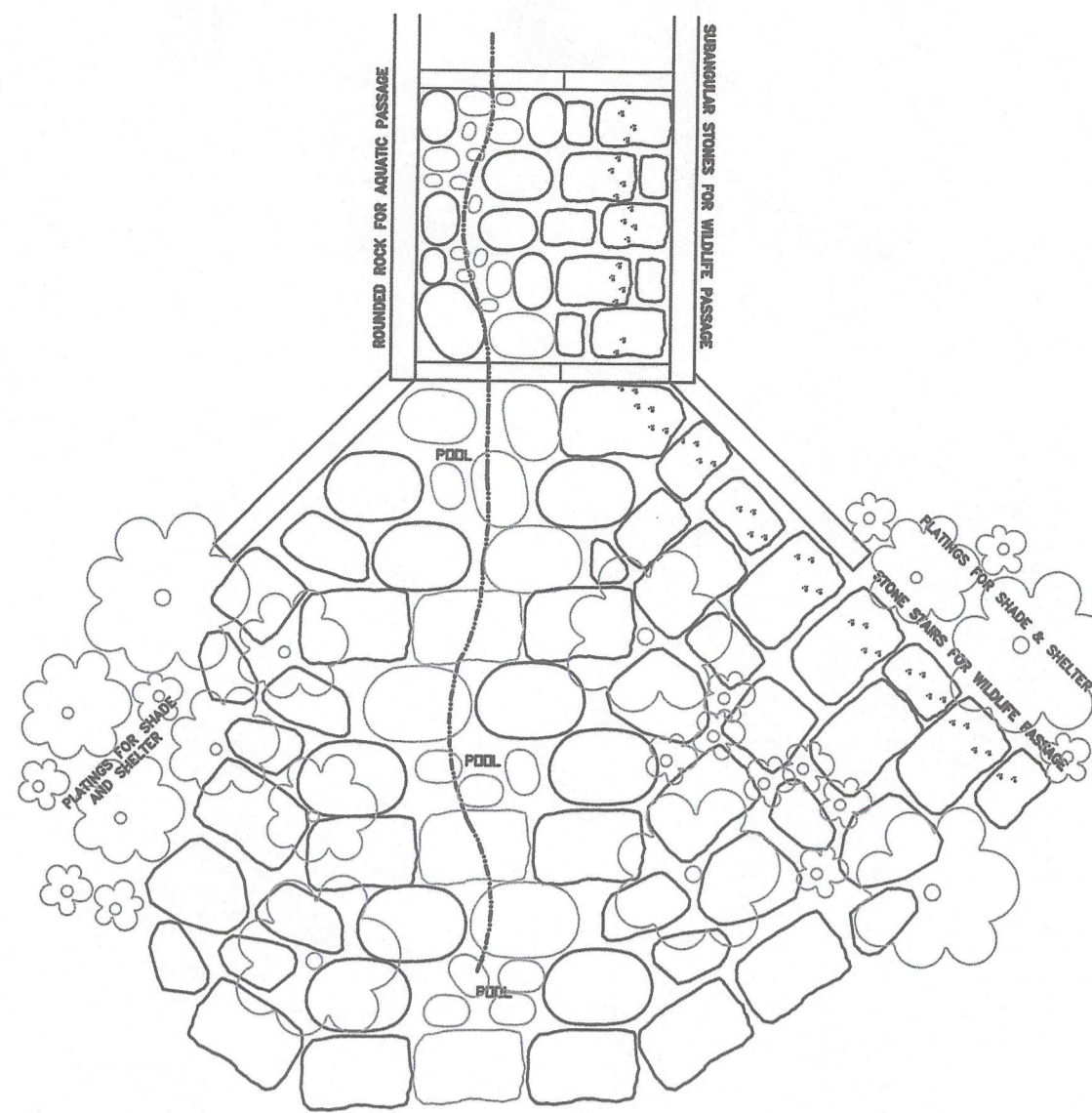
1. EROSION AND SEDIMENT CONTROL MEASURES MEETING NHDES AND NHDOT REQUIREMENTS ARE REQUIRED THROUGH THE CONSTRUCTION PERIOD AND UNTIL THE PROJECT IS COMPLETE AND THE DISTURBED AREAS ARE STABILIZED TO THE SATISFACTION OF THE ENGINEER.
2. THE CONTRACTOR SHOULD REVIEW THE WEATHER FORECAST CLOSELY PRIOR TO SCHEDULING WORK ACTIVITIES TO PREVENT WORKING IN THE RAIN.
3. DISTURBED AREAS WITH THE POTENTIAL TO DISCHARGE SEDIMENT LADEN WATER INTO STREAM, JURISDICTIONAL WETLANDS OR OFF THE SITE MUST BE PROTECTED WITH TEMPORARY EROSION CONTROL MEASURES, SUCH AS SILT FENCE OR OTHER APPROVED PERIMETER CONTROL AT THE END OF EACH WORK DAY.
4. ALL MATERIAL STOCKPILE AREAS SHALL BE SURROUNDED BY SILT FENCE AT THE END OF EACH DAY AND PRIOR TO A FORCASTED PRECIPITATION EVENT.
5. THE EXISTING VEGETATION IS TO REMAIN UNDISTURBED TO THE EXTENT POSSIBLE. NO TREES ARE TO BE REMOVED FROM AREAS OUTSIDE THE CONSTRUCTION LIMITS. STUMPS SHALL BE CUT FLUSH WITHIN 50 FEET OF THE STREAM OR WETLAND, UNLESS WITHIN CULVERT REPLACEMENT OR STREAM CHANNEL RESTORATION LIMITS IN WHICH CASE STUMPS AND ROOT MASS SHALL BE REMOVED COMPLETELY.
6. ALL SLOPES AND DISTURBED AREAS SHALL BE SCARIFIED TO A DEPTH OF 1-2 INCHES PARALLEL TO CONTOURS. DO NOT SMOOTH FINISHED SURFACE PRIOR TO SEEDING AND MULCHING.
7. INSTALLATION OF SILT FENCE, OR OTHER ENGINEER APPROVED PERIMETER CONTROL, SHALL BE COMPLETED PRIOR TO THE START OF ANY EARTH WORK IN ANY GIVEN AREA. SILT FENCE SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
8. SILT FENCES SHALL BE KEPT CLEAN DURING CONSTRUCTION AND REMOVE WHEN ALL SLOPES HAVE MORE THAN 85% COVERAGE BY HEALTHY VEGETATION. EROSION CONTROL MEASURES MUST BE INSPECTED ON A WEEKLY BASIS AND AFTER EVERY RAINFALL.

## RESTORATION OF SURFACES:

1. AFTER WORK IS COMPLETE, THE CONSTRUCTION/SITE ACCESS, CONSTRUCTION VEHICLE PARKING, STOCKPILE AND STAGING AREAS SHALL BE STABILIZED AND RESTORED TO PRE-CONSTRUCTION CONDITION. RESTORATION MAY INCLUDE INSTALLING TOPSOIL, GRASS SEED, FERTILIZER AND MULCH TO AFFECTED AREA.
2. ALL DISTURBED AREAS TO BE REVEGETATED MUST BE SEEDING AND PROTECTED FROM EROSION AS SOON AS PRACTICAL AFTER ACHIEVING FINISH GRADE.
3. INVASIVE OR NOXIOUS SPECIES SHOULD NOT BE USED AND SHOULD BE DISPOSED OF AS REQUIRED BY NHDES REQUIREMENTS.
4. PROTECT ALL DISTURBED AREAS SEEDED (OR HYDROSEEDED, USING ENGINEER APPROVED METHOD AND MIX) WITH EROSION CONTROL FABRIC OR BLANKETS ON SLOPES GREATER THAN 3H:1V. LOOSE MULCH IS ACCEPTABLE ON DISTURBED SLOPES FLATTER THAN 3H:1V.

## DEWATERING NOTES:

1. AREAS REQUIRING DEWATERING WITHIN THE CULVERT TRENCH EXCAVATION SHALL BE DISCHARGED TO THE DEWATERING PAD LOCATION SHOWN ON THE SITE PLAN.
2. THE DEWATERING AREA SHOULD BE NO CLOSER THAN 50 FEET FROM A JURISDICTIONAL WETLAND OR SURFACE WATER WITHOUT ENGINEER AND NHDES APPROVAL. ALL DOWNSTREAM SURFACE WATERS AND WETLANDS SHALL BE PROTECTED.
3. A STONE SUMP INTAKE SHALL BE CONSTRUCTED IN AREAS WHERE THE WATER TABLE MUST BE LOWERED TO INSTALL PIPE BEDDING OR STREAMBED GRADE CONTROL STRUCTURES.
4. NO SEDIMENT LADEN WATERS SHOULD BE DISCHARGED TO THE TEMPORARY WATER BYPASS PIPE OR TO THE STABILIZED DOWNSTREAM CHANNEL.
5. EXISTING STREAMBANK MATERIALS EXCAVATED FOR REUSE WITHIN THE CONSTRUCTED CHANNEL OR TO BE USED FOR CULVERT INFILL SHALL BE SET ON A DEWATERING PAD AND



SIMULATED STREAM BED & DRY SHELF DETAIL

## STREAMBED MATERIAL NOTES:

1. THE STREAMBED MATERIAL IS TO BE PLACED IMMEDIATELY UPSTREAM AND DOWNSTREAM OF CULVERT, AS SHOWN ON THE DESIGN PLANS. ALL EFFORTS SHALL BE MADE TO REPLICATE THE EXISTING STREAM WITHIN THE CULVERT AND ADJACENT TO THE WORK AREA.

2. THE STREAMBED MATERIAL SHALL CONSIST OF NATIVE COBBLES, BOULDERS AND STONES MIXED WITH EXISTING STREAM BED MATERIAL. ANGULAR, SUBANGULAR, OR SUB-ROUNDED ROCK (FLAT-BOTTOMED ROCK) IS PREFERRED OVER ROUND ROCK, MEETING THE FOLLOWING SPECIFICATIONS:

- 2.1. BOULDERS AND STONES 1.5' TO 3' DIAMETER ROCKS SHALL BE PLACED AS SHOWN ON PLANS AND DETAILS.

- 2.2. COBBLES, BOULDERS AND STONES 3" TO 18" DIAMETER.

STONE SIZE	%PASSING BY WEIGHT
18"	80%
6"	30%
4"	5%

- 2.3. COBBLES AND GRAVEL 2" AND UNDER.

STONE SIZE	%PASSING BY WEIGHT
2"	95%
3/4"	20-25%
#4	10-15%
#8	0-5%

- 2.4. CRUSHED OR PROCESSED STONE SHALL NOT BE USED WITHIN THE STREAM CHANNEL UNDER BANK FULL CONDITIONS (2-YR RECURRENT FLOWS).

3. THE EXISTING STREAM BED MATERIAL SHALL BE REMOVED, DRAINED AND STOCKPILED FOR REUSE.

4. STONE MATERIALS UNDER 18" SHALL BE PRE-BLENDED OUTSIDE THE PROJECT AREA AND MIXED AT A RATIO OF 3" TO 18" AT 55% AND LESS THAN 2" AT 45% RESPECTIVELY. THE PRE-BLENDING SHALL BE DONE IN A WAY THAT WILL PREVENT THE STREAMBED MIX FROM BEING CONTAMINATED BY WORK SITE OR SELECT ROAD BASE & CULVERT BEDDING MATERIALS.

5. STONE MATERIALS OVER 18" SHALL BE PLACED DURING THE PLACEMENT OF THE BLENDED MATERIALS UNDER 18". THE LARGER STONES SHALL BE PLACED FIRST IN A RANDOM FASHION WITHIN THE LIMITS SHOWN ON THE PLAN AND WITHIN THE CROSS SECTION SHOWN ON THE PLANS.

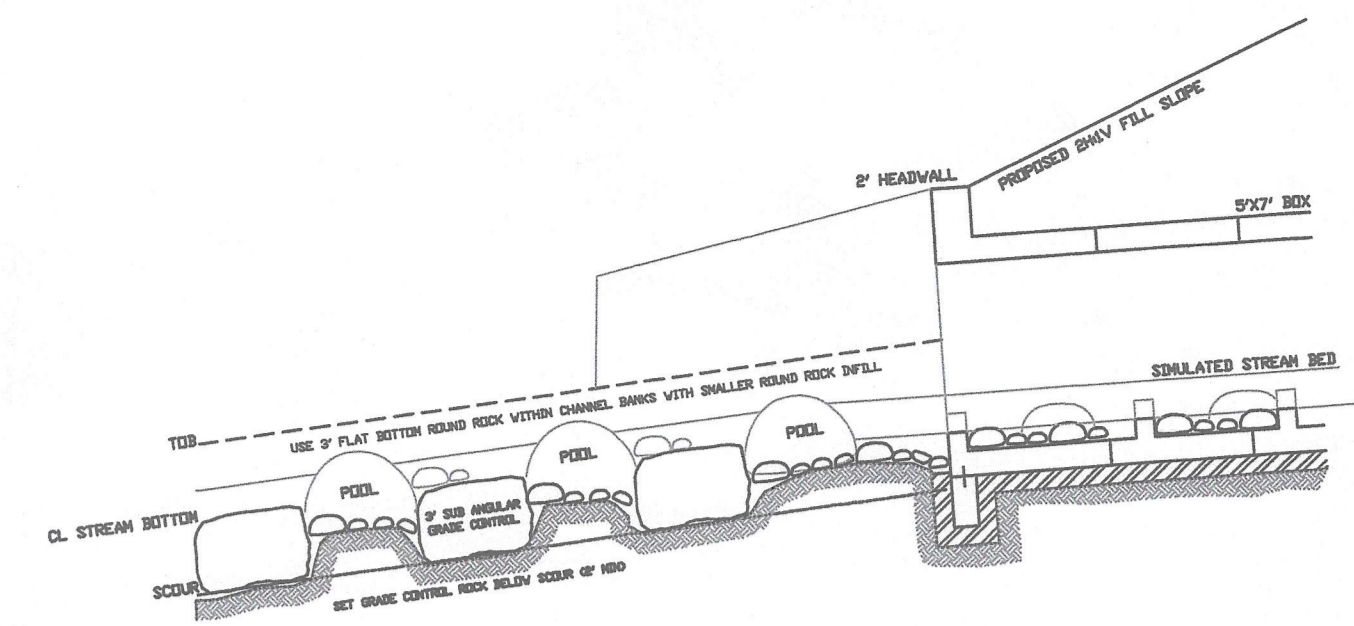
6. ALL STREAMBED MATERIAL SHALL BE PLACED AND LOCKED TIGHTLY TOGETHER TO PREVENT MOVEMENT DURING HIGH FLOWS.

7. STONES WITHIN THE DOWNSTREAM END OF THE CULVERT SHALL BE PLACED RANDOMLY BUT WITH A MINIMUM DISTANCE OF 5 FEET AND MAXIMUM DISTANCE OF 15 FEET APART. THE LARGER STONES SHALL BE SET WITHIN THE STREAM CHANNEL AT LEAST 1' EXPOSED ABOVE THE FINISHED STREAM PROFILE.

8. THE LARGER STONES SET WITHIN 10' OF THE CULVERT SHALL BE SET AS FLUSH AS POSSIBLE WITH THE STREAM PROFILE AND IN NO HIGHER THAN 6" ABOVE THE FINISHED STREAM PROFILE.

9. NHDOT RIPRAP CLASS V (18" NOMINAL, 24" MAX) SHALL BE USED FOR SLOPE STABILIZATION AT THE CORNER OF THE CULVERTS AND OTHER AREAS OUTSIDE THE STREAM CHANNEL. SEE PLANS FOR STONE SIZING.

10. SMALL NATIVE TREES (20%), SHRUBS (40%), AND WILDFLOWERS (20%) SHALL BE PLANTED ALONG THE EDGES OF THE CONSTRUCTED STREAM BED AND BETWEEN STONES WHERE POSSIBLE TO PROVIDE SHADING FOR STREAMBED AND COVER FOR WILDLIFE PASSAGE.



SIMULATED STREAM BED WITHIN BOX CULVERT DETAIL

## CULVERT INFILL MATERIAL NOTES:

1. THE INTENT OF THE CULVERT INFILL/EMBEDMENT MATERIAL IS TO CREATE A NATURAL STREAM CHANNEL WITHIN THE CULVERT THAT SIMULATES THE NEARBY CHANNEL TO ENCOURAGE FISH PASSAGE AND RESIST SCOUR DURING LARGER SEASONAL RAIN EVENTS.

2. CONTRACTOR SHALL TAKE PRECAUTIONS DURING PLACEMENT OF EMBEDMENT MATERIAL TO AVOID DAMAGE OR DEFORMATION TO THE CULVERT.

3. CONTRACTOR SHALL BALANCE THE ELEVATION OF THE PRECAST WEIR OF THE PIPE WITH THE ELEVATION OF EMBEDMENT MATERIAL PLACED INSIDE AS NEEDED TO PREVENT DAMAGE.

4. A 3-INCH CUSHION OF EXISTING STREAMBED MATERIAL IS RECOMMENDED TO PROTECT THE PIPE FROM DAMAGE DUE TO PLACEMENT OF COBBLES AND SMALL BOULDERS.

5. EMBEDMENT MATERIAL SHALL CONSIST OF WELL-GRADED, 12" MINUS, FLAT BOTTOM, NATURAL RIVER MATERIAL.

COBBLES, BOULDERS AND SMALL STONES 3" TO 12" DIAMETER.

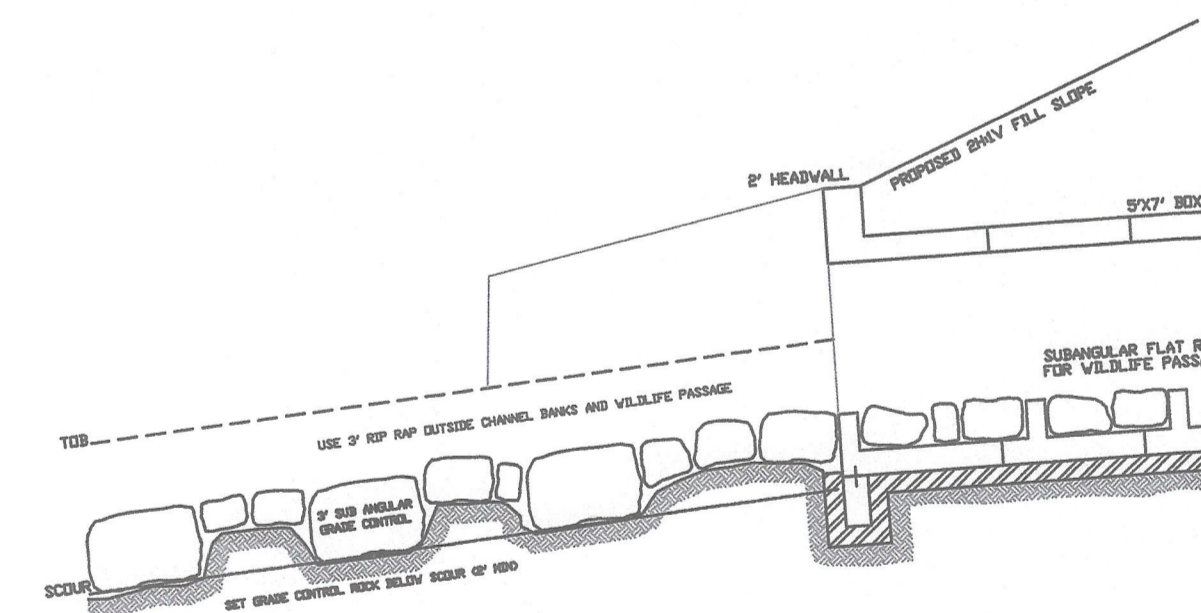
STONE SIZE	%PASSING BY WEIGHT
12"	80%
6"	30%
4"	5%

2.3. COBBLES AND GRAVEL 2" AND UNDER.

STONE SIZE	%PASSING BY WEIGHT
2"	95%
3/4"	20-25%
#4	10-15%
#8	0-5%

6. COBBLES, BOULDERS & SMALL STONES MEASURING LESS THAN 12" SHALL BE DISTRIBUTED THROUGHOUT THE CULVERT LENGTH, FLAT SIDE DOWN, WITH THE REMAINING EMBEDMENT MATERIAL PLACED AROUND THEM. THE LOWEST POINT OF THE CONSTRUCTED STREAM BED SHALL BE OFFSET BETWEEN THE WEIRS 12-18" EITHER SIDE OF THE BOX AND BETWEEN THE SMALL POOLS (6" POOL) TO CREATE A SINUOUS (CURVE-LIKE) ALIGNMENT BETWEEN THE V-NOTCH WEIRS CAST INTO THE BOTTOM OF THE CULVERT.

7. THE EMBEDMENT MATERIAL SHALL BE PLACED SUCH THAT THERE ARE NO ABRUPT VERTICAL DROPS IN EXCESS OF 3 INCHES, AND SO THAT THE FLOW OF WATER IS GENERAL CONCENTRATED IN THE CENTER OF THE CONSTRUCTED CHANNEL RATHER THAN DISPERSED ACROSS THE ENTIRE WIDTH OF THE CHANNEL.



TERRESTRIAL PASSAGE DETAIL

## WILDLIFE PASSAGE NOTES:

1. THE MATERIALS USED FOR THE DRY LEDGE PASSAGE IS TO BE PLACED WITHIN THE CULVERT AND IMMEDIATELY UPSTREAM AND DOWNSTREAM OF CULVERT, AS SHOWN ON THE DESIGN PLANS. ALL EFFORTS SHALL BE MADE TO PROVIDE A SAFE & TRAVERSABLE CROSSING WITHIN THE CULVERT AND ADJACENT TO THE WORK AREA FOR TERRESTRIAL MAMMALS SUCH AS FISHER, MINK AND BOBCAT.

2. THE DRY LEDGE/STONE MATERIAL SHALL CONSIST OF RELATIVELY FLAT ROCK MEASURING 12" H X 18" W X 24" L IN SIZE. STONE SHALL HAVE A TOLERANCE OF 3" IN HEIGHT, BUT CAN VARY IN 12" IN WIDTH AND LENGTH ONLY IN SIZE WITHIN THE CHANNEL. NATIVE SUBANGULAR ROCK IS PREFERRED OVER ROUND ROCK TO IMPROVE GRIPPING FOR MAMMALS.

3. ALL ROCK SHELF MATERIAL SHALL BE PLACED AND LOCKED TIGHTLY TOGETHER TO PREVENT MOVEMENT DURING HIGH FLOWS. THERE SHOULD BE NO MORE THAN A 12" DROP BETWEEN STONES.

4. THE LARGER STONES SET WITHIN THE CULVERT SHALL BE SET AS FLUSH AS POSSIBLE WITH THE STREAM PROFILE AND IN NO HIGHER THAN 6" ABOVE THE FINISHED STREAM PROFILE.

5. NHDOT RIPRAP SHALL BE USED FOR SLOPE STABILIZATION AT THE CORNER OF THE CULVERTS AND OTHER AREAS OUTSIDE THE STREAM CHANNEL. SEE PLANS FOR STONE SIZING.

DRAFT - FOR DISCUSSION 11/2/18

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41788 STRATFORD  
NFWF US-3 CULVERT REPLACEMENT

STRATFORD, NEW HAMPSHIRE  
MISCELLANEOUS NOTES & DETAILS

SURVEYED BY: NHDOT  
WETLANDS BY: NHDOT  
DRAWN BY: JFM  
CHECKED BY: PLB  
SCALE: AS NOTED  
DATE: 10/27/18  
MISCELLANEOUS  
NOTES & DETAILS  
SHEET 3 OF 3