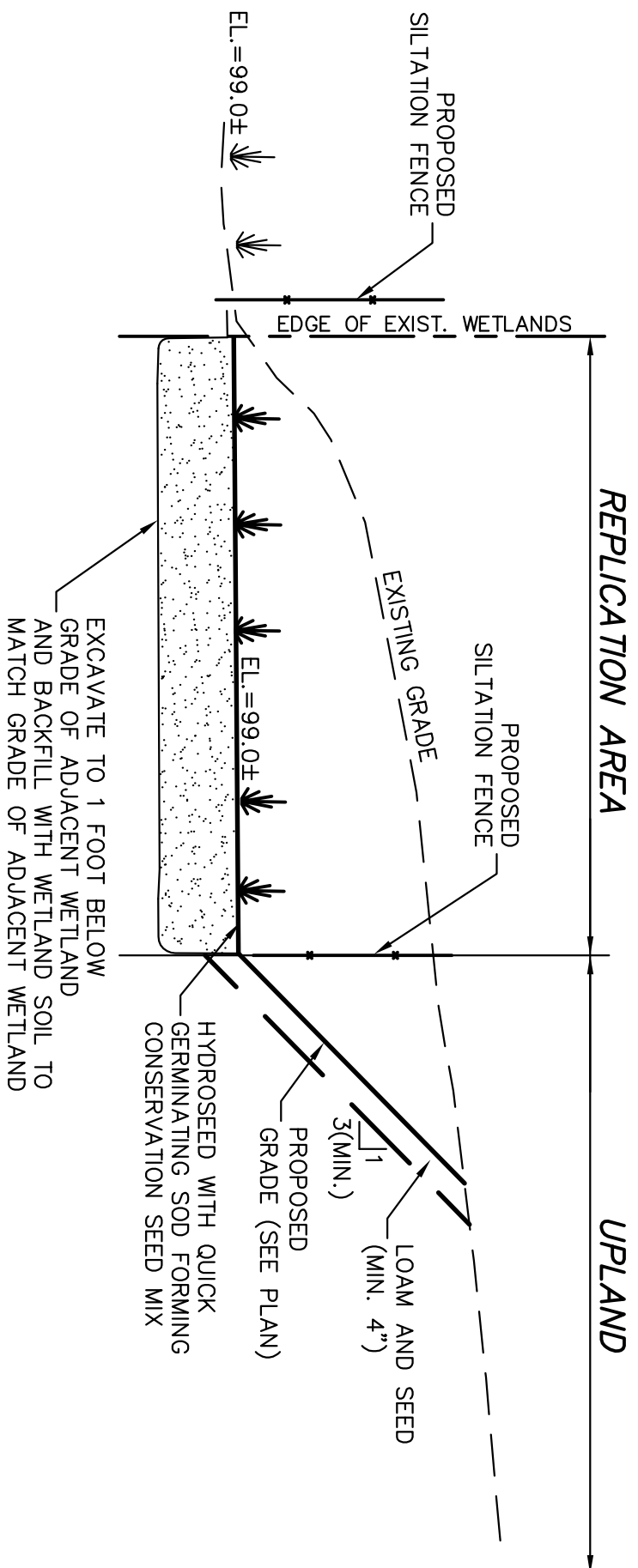


RESOURCE IMPACTS		PRE-DEVELOPMENT	POST DEVELOPMENT
<b>BORDERING VEGETATED WETLANDS (B/W)</b>			
LOST UPSTREAM	13 SF		
LOST DOWNSTREAM	77 SF		
NET LOSS		77 SF REPLICATION	
<b>BANK</b>			
UPSTREAM	53 LF	NEW UPSTREAM OUTSIDE CULVERT LIMIT	37 LF
DOWNSTREAM	156 LF	DOWNSTREAM OUTSIDE CULVERT LIMIT	12 LF
TOTAL	69 LF	NEW BANK WITHIN CULVERT, ENTRANCE & EXIT	154 LF
NET GAIN	134 LF		203 LF
<b>LAND UNDER WATER (L/UW)</b>			
UPSTREAM	178 SF		140 SF
DOWNSTREAM	1,142 SF		1,157 SF
TOTAL	1,320 SF	WITHIN CULVERT	308 SF
NET GAIN	285 SF		1,605 SF

**PAVEMENT NOTES:**

**ROADWAY PAVEMENT: (FULL DEPTH RECONSTRUCTION)**

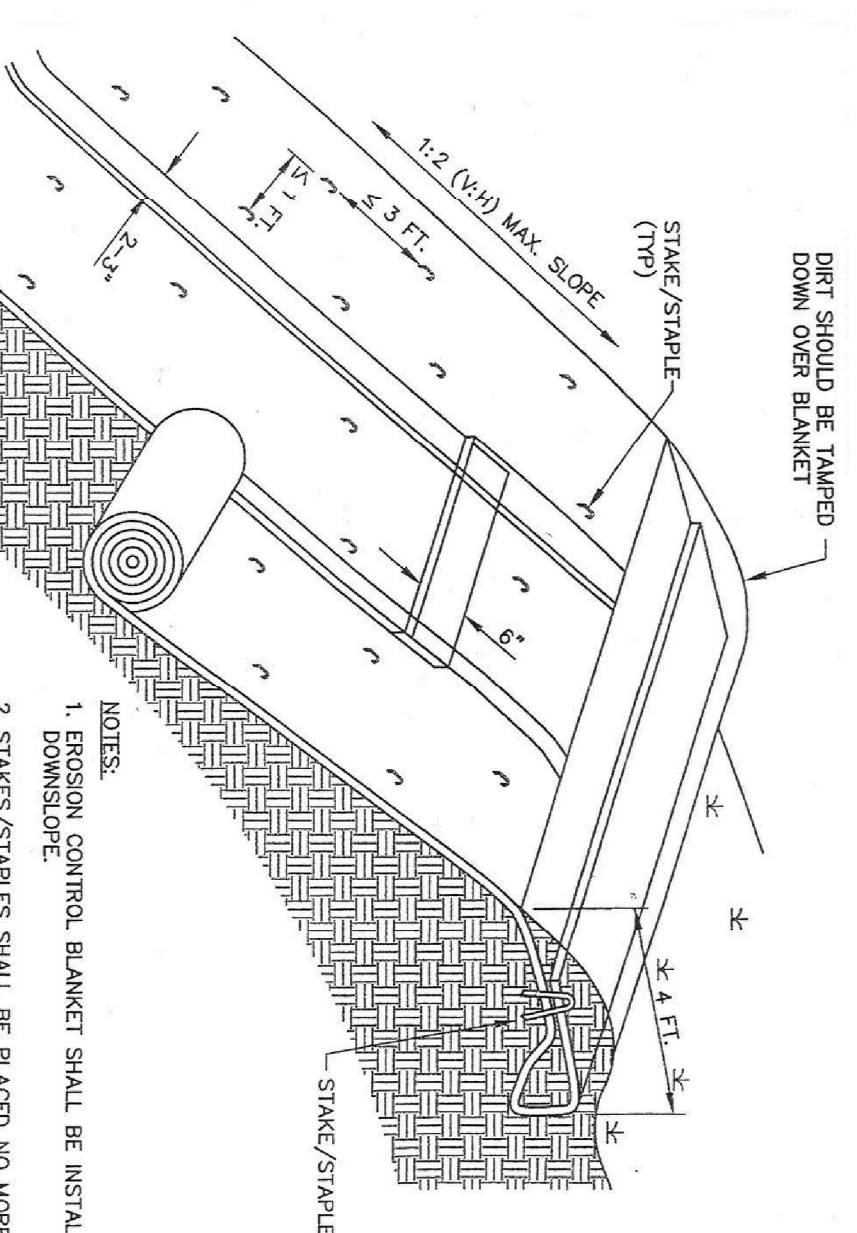
- SUBSURFACE COURSE:** 3-1/2" HOT MIX ASPHALT PAVEMENT PLACED IN TWO LAYERS, 1-1/2" TOP COURSE MATERIAL OVER 2" BINDER COURSE MATERIAL.
- BASE COURSE:** 3" HOT MIX ASPHALT BASE COURSE MATERIAL, PLACED IN ONE LAYER.
- SUBBASE:** 12" GRAVEL BURROW
- ROADWAY PAVEMENT: (COLD PLACING/RESURFACING)**
- SURFACE COURSE:** 1-1/2" MIN. HOT MIX ASPHALT PAVEMENT PLACED IN ONE LAYER, TOP COURSE MILLED PAVED SURFACE TREATED WITH BITUMEN FOR TACK COAT, 0.07 GAL. PER SQ. YD.
- TEMPORARY PATCH:**
- SURFACE COURSE:** 1-1/2" MIN. ASPHALT BASE COURSE MATERIAL PLACED IN ONE LAYER.
- SUBBASE:** GRAVEL BORROW



**WETLAND REPLICATION SECTION**  
NOT TO SCALE

**WORK IN VEGETATED WETLAND AREAS**

1. WETLAND SOIL SHALL BE EXCAVATED TO A DEPTH OF 12 INCHES, AND STOCKPILED AND COVERED WITH BURLAP OR STRAW MULCH. PERIODIC LIGHT APPLICATION OF WATER MAY BE REQUIRED TO MAINTAIN MOISTURE.
2. WETLAND SOIL SHALL BE RESPREAD 12 INCHES DEEP AND LIGHTLY COMPACTED BY HAND.
3. WETLAND SEED MIX SHALL BE APPLIED AT A RATE OF 1/2 LB./1000 SQUARE FEET AND LIGHTLY RAKED TO ENSURE SOIL/SEED CONTACT.
4. WETLAND SEED MIX SHALL BE PURE LIVE SEED AND CONTAIN NATIVE NON-HYBRIDIZED SPECIES. SEED MIX SPECIES LIST SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO APPLICATION.



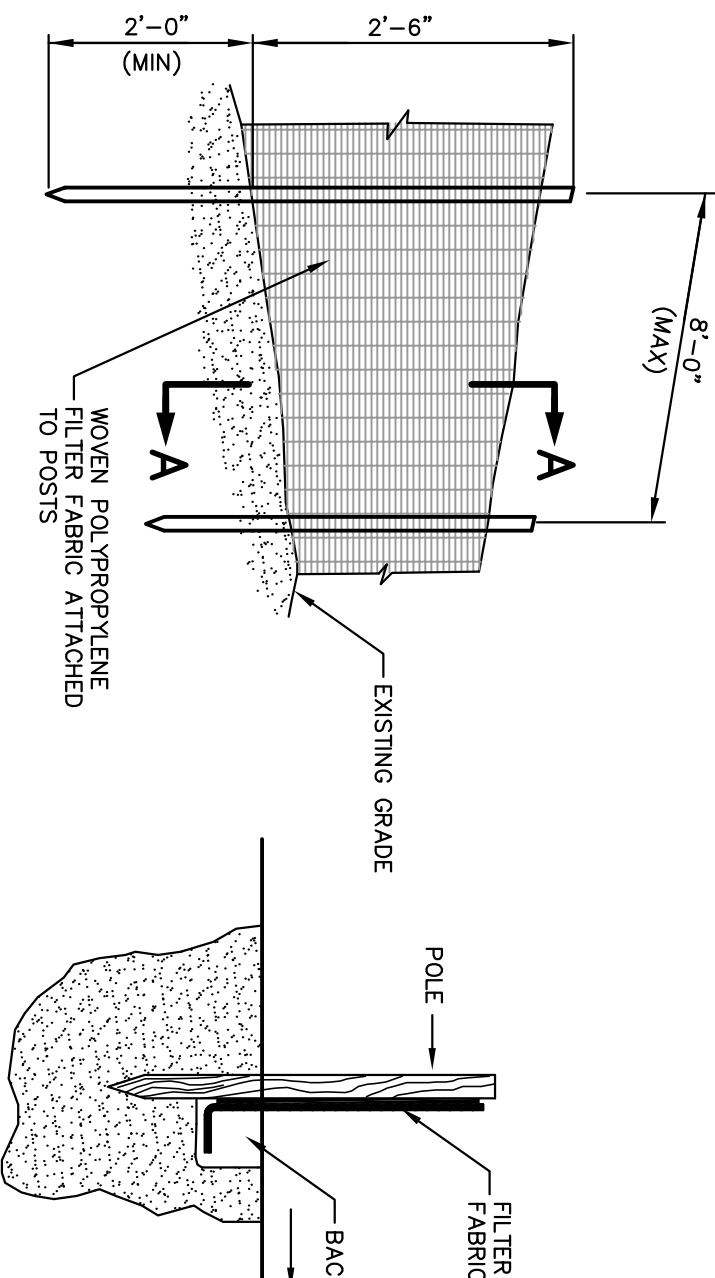
**EROSION CONTROL BLANKET**  
NOT TO SCALE

**VEGETATED AREAS/SLOPES:**

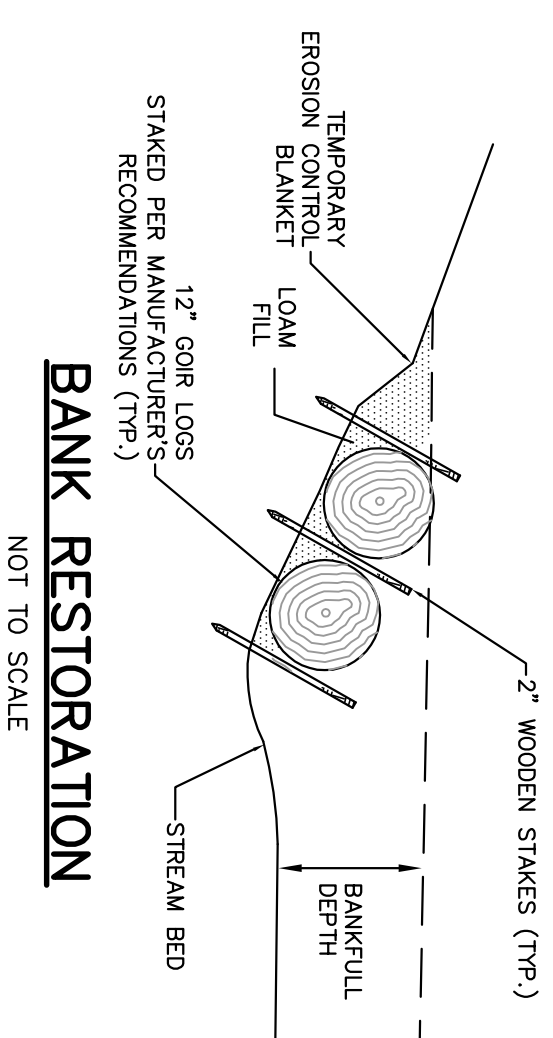
- 4" LOAM AND SEED WITH EROSION CONTROL BLANKET (ON 3:1 SLOPE OR LESS USE 3\"/>

**CONSTRUCTION NOTES (SEE CONSTRUCTION SEQUENCE)**

1. INSTALL SEDIMENTATION AND EROSION CONTROLS PRIOR TO BEGINNING WORK.
2. ALL WORK SHALL BE CLOSELY COORDINATED WITH THE BOXFORD CONSERVATION COMMISSION OR THEIR DESIGNER.
3. ALL IN-STREAM WORK SHALL BE COORDINATED SO THAT THE CULVERT REMOVAL AND NEW CULVERT INSTALLATION BEGINS AND IS COMPLETED DURING A PERIOD OF LOW FLOW. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER ORDER OF CONDITIONS, CONTRACTOR'S PROPOSED WORK SCHEDULE AND THE VERIFICATION OF WEATHER CONDITIONS SHALL BE SUBMITTED TO THE BOXFORD CONSERVATION COMMISSION FOR REVIEW AND APPROVAL PRIOR TO COMMENCING WORK.
4. EXISTING STREAMBED MATERIAL SHALL BE STOCKPILED SEPARATELY FOR REUSE. ADDITIONAL STREAMBED MATERIAL SHALL CONSIST OF CLEAN GRANULAR MATERIAL WITH THE SAME GRAVITATION AS THE EXISTING STREAM CHANNEL. STREAMBED ORGANIC AND DELICIOUS MATERIALS FIELD CONCRETE BRICK AND OTHER CONSTRUCTION DEBRIS IS PROHIBITED. THE ENGINEER SHALL APPROVE MATERIAL PRIOR TO PLACEMENT.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTROL OF WATER AND SEDIMENTATION. ALL TIMES INCLUDING BUT NOT LIMITED TO MAINTAINING ACCESS TO ADJACENT PROPERTIES SHALL BE THE CONTRACTOR'S RESPONSIBILITY. ACCESS AS NEEDED TO PREVENT SEDIMENT FROM LEAVING THE SITE AND EXTENDING WETLAND RESOURCE AREAS.
6. THE REFUELING OF VEHICLES AND/OR THE STOCKPILING OF NEW OR EXCAVATED FILL MATERIALS WITHIN 100 FEET OF THE STREAM NOT BE PERMITTED.
7. THE CONTRACTOR SHALL COORDINATE ROAD CLOSURE CLOSELY WITH THE TOWN OF BOXFORD DEPARTMENT OF PUBLIC WORKS, TOWN MANAGER, POLICE FIRE AND PUBLIC SAFETY DEPARTMENT. THE BASE MATERIAL WILL BE LINED WITH 8\"/>



**SILATION FENCE DETAIL**



**BANK RESTORATION**  
NOT TO SCALE

**CONSTRUCTION SEQUENCE**

1. WORK TO BE CONDUCTED DURING AND TO LATE SUMMER BEFORE THE START OF THE RAIN SEASON. THE ROAD SHALL BE BLOCKED OFF DURING THIS TIME. TRAFFIC WILL BE DETOURLED EACH DAY (IF NEEDED) UNTIL CONSTRUCTION IS COMPLETE. CONSTRUCTION TO TAKE AT LEAST 7 TO 10 DAYS. START OF CONSTRUCTION SHALL BE COORDINATED WITH THE BOXFORD CONSERVATION COMMISSION. CERTAIN ITEMS MAY BE INITIATED PRIOR TO THE START OF CONSTRUCTION INCLUDING:
  - A-REMOVE EXISTING GUARD RAIL WITHIN WORK AREA.
  - B-INSTALL EROSION CONTROL (SILT SOCK OR STRAW MATTES) ALONG THE CULVERT ENDS.
  - C-INSTALL EROSION CONTROL (SILT SOCK OR STRAW MATTES) ALONG THE CULVERT ENDS.
2. AT THE START OF CONSTRUCTION, INSTALL SANDBAG DAM AND SUMP IN STREAM CHANNEL ON INLET SIDE OF CULVERT AS SHOWN ON PLAN. PLACE WATER PUMP BEHIND SANDBAG DAM AND EXTEND WATER PUMP HOSE 50 FT OR MORE INTO STREAM CHANNEL.
3. REMOVE TOP ASPHALT AND EXCAVATE ROAD BASE MATERIAL TO REMOVE AND BE REMOVED FROM SITE. CONTRACTOR TO BE RESPONSIBLE FOR THE PROPER DISPOSAL OF MATERIAL. EXCAVATED MATERIAL MAY BE TEMPORARILY STOCKPILED ALONG EDGE OF ROAD AND/OR ROAD.
4. WORK AND DEEPEN EXCAVATED TRENCH TO ACCOMMODATE NEW BOX CULVERT. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER ORDER OF CONDITIONS AND VERIFICATION OF WEATHER CONDITIONS SHALL BE SUBMITTED TO THE BOXFORD CONSERVATION COMMISSION FOR REVIEW AND APPROVAL PRIOR TO COMMENCING WORK.
5. INSTALL ADDITIONAL SUMPS IN EXCAVATED TRENCH (AS NEEDED) AND SET UP SANDBAG DAM AND SUMP IN STREAM CHANNEL ON INLET SIDE OF CULVERT AS SHOWN ON PLAN. PLACE WATER PUMP BEHIND SANDBAG DAM AND EXTEND WATER PUMP HOSE 50 FT OR MORE INTO STREAM CHANNEL.
6. BOX CULVERT WILL BE INSTALLED IN SEVEN 8' SECTIONS BEGINNING WITH THE INLET ENTRANCE SECTION UPSTREAM AND ENDING WITH THE OUTLET SECTION.
7. PREPARE AND COMPACT BASE MATERIAL PRIOR TO INSTALLATION OF NEW BOX SECTIONS OF NEW CULVERT AT A TIME.
8. PLACE STREAMBED MATERIAL INTO INSTALLED CULVERT SECTIONS. STREAMBED MATERIAL TO CONSIST OF A BASE OF WASHED AND COMPACTED CORAS SAND AND ONCE INSTALLED, THE BASE MATERIAL WILL BE LINED WITH 8\"/>

**DEWATERING NOTES**

1. INSTALL SEDIMENTATION AND EROSION CONTROLS PRIOR TO BEGINNING WORK.
2. ALL WORK SHALL BE CLOSELY COORDINATED WITH THE BOXFORD CONSERVATION COMMISSION OR THEIR DESIGNER.
3. ALL IN-STREAM WORK SHALL BE COORDINATED SO THAT CULVERT REMOVAL AND NEW CULVERT INSTALLATION BEGINS AND IS COMPLETED DURING A PERIOD OF LOW FLOW. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER ORDER OF CONDITIONS, CONTRACTOR'S WORK SCHEDULE AND VERIFICATION OF WEATHER CONDITIONS SHALL BE SUBMITTED TO THE BOXFORD DEPARTMENT OF PUBLIC WORKS FOR REVIEW AND APPROVAL PRIOR TO COMMENCING WORK.
4. DEWATERING SHALL BE USED IF NECESSARY TO ENSURE SOIL COMPACTION AND CULVERT INSTALLATION IS PERFORMED IN THE DRY.
5. DIRECT DEWATERING DISCHARGE TO CROOKED POND STREAM IS PROHIBITED.
6. DEWATERING EFFLUENT SHALL BE DISCHARGED INTO A WATER FILTRATION BAG SUITABLE FOR THE REQUIRED FLOW AND LOCATED WITHIN A SETBACK BASIN SURROUNDED BY SILT FENCE, AT LOCATIONS APPROVED BY THE ENGINEER.
7. THE DEWATERING BASIN SHOULD BE PLACED ON A REASONABLY LEVEL, STABLE SOIL.
8. PUMPS AND HOSES SHALL BE IN GOOD WORKING CONDITION AND OF ADEQUATE CAPACITY FOR THE REQUIRED FLOW.
9. ALL EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO COMMENCING DEWATERING OPERATIONS.

**STREAMBED NOTES**

1. EXISTING STREAMBED MATERIAL SHALL BE EXCAVATED AND STOCKPILED FOR REUSE.
2. STREAMBED AGGREGATE MATERIAL, SHAPE AND GRAVITATION SHALL BE AS SPECIFIED IN THE CONTRACT SPECIFICATIONS. IT IS THE INTENT TO GRADE THE STREAMBED TO MATCH THE GRADE OF THE EXISTING STREAMBED MATERIAL WITHIN THE BOUNDS OF THE CULVERT TO APPROXIMATE UPSTREAM CHANNEL BOTTOM WIDTHS AND CAPACITY FOR THE REQUIRED FLOW.

**PREPARED FOR:**

TOWN OF BOXFORD DEPARTMENT OF PUBLIC WORKS

REVISED: 12/30/16 CULVERT ELEVATION LOWERED  
REVISED: 1/27/16 DEP COMMENTS ADDRESSSED

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**CULVERT REPLACEMENT**  
CROOKED POND STREAM CROSSING  
MIDDLETON ROAD  
BOXFORD, MASSACHUSETTS