WORKING AREA

SIDESLOPE WITH COUNTERWEIGHT EXTENDED

DITCH SPOIL STORAGE

6' (MAXIMUM)

12" TOPSOIL (MAXIMUM)

4'

10' (MAXIMUM)

* CONSTRUCTION MATS

* MATING WILL OCCUR IN WORKING LANE. OPTIONAL UNDER SKIDS AND PIPE

GENERAL NOTES:

1. EXTRA DEPTH MAY BE REQUIRED FOR CONCRETE COATED PIPE OR WEIGHTS
METHOD I
DITCH LINE ONLY

METHOD II
DITCH PLUS SPOIL SIDE

METHOD III
FULL RIGHT-OF-WAY WIDTH

NOTES

1. STORE TOPSOIL ON ONE OR BOTH SIDES OF THE RIGHT-OF-WAY ADJACENT TO STRIPPED AREAS AS SHOWN ABOVE.

2. MAINTAIN A MINIMUM 3 FEET SEPARATION BETWEEN THE TOPSOIL AND THE TRENCH SPOIL PILES.

3. RETURN TOPSOIL EVENLY OVER STRIPPED AREA AFTER TRENCH BACKFILL HAS SUFFICIENTLY SETTLED OR HAS BEEN COMPACTED.

4. REMOVE ALL ROCKS GREATER THAN 4 INCHES IN DIAMETER FROM STRIPPED TOPSOIL.
NOTES:

1. FOR A TYPE 1, THE PIPE SHALL BE INSTALLED DIRECTLY ON THE UNDISTURBED EARTH AT THE BOTTOM OF THE TRENCH AND BACKFILLED PER THE SPECIFICATIONS.

2. FOR A TYPE 2, THE TRENCH IS IDENTICAL TO A TYPE 1 EXCEPT THAT THE DEPTH FROM THE BOTTOM OF THE TRENCH TO THE CENTERLINE OF THE DUCTILE IRON PIPE IS BACKFILLED WITH LIGHTLY CONSOLIDATED EXCAVATION MATERIAL.

3. FOR TYPE 3, THE TRENCH SHALL HAVE A 4 INCH MINIMUM PIPE BEDDING MATERIAL INSTALLED. THE BEDDING MATERIAL SHALL BE LOOSE SOIL OR SELECT MATERIAL. LOOSE SOIL OR SELECT MATERIAL IS DEFINED AS SAND OR NATIVE SOIL EXCAVATED FROM THE TRENCH FREE OF ROCKS, FOREIGN MATERIAL AND FROZEN MATERIAL. FROM PIPE BEDDING ELEVATION TO THE TOP OF THE PIPE ELEVATION, THE BACKFILL MATERIAL SHALL BE LIGHTLY CONSOLIDATED MATERIAL.

4. FOR TYPE 4, THE TRENCH SHALL HAVE A MINIMUM DEPTH EQUAL TO WHICHEVER IS THE GREATER DEPTH OF 4 INCHES PIPE BEDDING OR 3/8 OF THE PIPE DIAMETER AND SHALL BE COMPOSED OF SAND, GRAVEL OR CRUSHED ROCK. FROM THE PIPE BEDDING ELEVATION TO THE TOP OF PIPE ELEVATION THE BACKFILL SHALL BE COMPACTED IN 6-INCH MAXIMUM LIFTS TO 80 PERCENT MODIFIED PROCTOR AS DETERMINED BY ASTM D698.


6. ALL OF THE BACKFILL FOR TYPE 1, FROM CENTERLINE OF PIPE FOR TYPE 2 AND FROM THE TOP OF PIPE ELEVATION FOR TYPE 3, 4, AND 5, TO GRADE ELEVATION THE BACKFILL SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.

7. FOR ALL TRENCH TYPES, THE BODY OF THE DUCTILE IRON PIPE SHALL BE COMPLETELY SUPPORTED BY THE BODY OF THE PIPE. THE BELL PORTION SHALL NOT SUPPORT THE PIPE WEIGHT DURING INSTALLATION WHICH WILL REQUIRE HAND EXCAVATION AT THE BELL END AREAS.


9. THE TRENCH WALLS ABOVE THE TOP OF PIPE ELEVATION SHALL BE SHORED OR SLOPED FOR STABILITY AS REQUIRED TO PROVIDE A SAFE WORK ENVIRONMENT.

10. MINIMUM COVER IS 4'-0". THIS REQUIRED DEPTH IS MEASURED FROM THE TOP OF BELL JOINT AREA AND WHEN APPLICABLE FROM THE TOP OF CONCRETE WEIGHT OR THE REQUIRED RIP-RAP HEIGHT PER STANDARD DRAWING STD-A-010 TO THE TOP OF ORIGINAL GRADE.
DAM AND PUMP CROSSING

THE FOLLOWING IS A SEQUENCE OF CONSTRUCTION AND MITIGATION MEASURES TO BE FOLLOWED AT ALL "DAM AND PUMP" TYPE CROSSINGS.

SEQUENCE OF ACTIVITIES

STEP 1. CLEAR AND GRADE CERTIFICATED RIGHT-OF-WAY AS NECESSARY.
STEP 2. IMPLEMENT THE TEMPORARY EROSION AND SEDIMENT CONTROLS.
STEP 3. FABRICATE PIPE.
STEP 4. INSTALL DRY STREAM CROSSING MATERIALS.
STEP 5. EXCAVATE TRENCH AND INSTALL PIPE.
STEP 6. BACKFILL AND RESTORE STREAM BANKS.
STEP 7. REMOVE DAMS.
STEP 8. IMPLEMENT THE PERMANENT EROSION AND SEDIMENTATION CONTROLS.

NOTES:

1. WHERE NECESSARY, OBTAIN PRIOR APPROVAL BEFORE USING THE DAM AND PUMP METHOD.
2. SCHEDULE INSTREAM ACTIVITY FOR LOW FLOW PERIODS AND FOR THE APPROPRIATE TIMING WINDOW.
3. MARK OUT AND MAINTAIN LIMITS OF AUTHORIZED WORK AREAS WITH FENCING OR FLAGGING TAPE TO AVOID UNNECESSARY DISTURBANCE OF VEGETATION. ENSURE EQUIPMENT OPERATORS WORKING ON THE CROSSING HAVE BEEN BRIEFED ABOUT THIS PLAN AND THE MEASURES NEEDED TO PROTECT WATER QUALITY. INSTALL PRE-WORK SEDIMENT CONTROL MEASURES AS SPECIFIED IN THE PLAN. ALL NEEDED EQUIPMENT AND MATERIALS TO BUILD THE DAMS AND TO PUMP WATER MUST BE ON SITE OR READILY AVAILABLE PRIOR TO COMMENCING IN-WATER CONSTRUCTION. PIPE SHOULD BE STRUNG, WELDED AND COATED AND READY FOR INSTALLATION PRIOR TO INWATER TRENCHING.

4. CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES, AS DEPICTED OR ALONG GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVILY SILTladen WATER ENTERS STREAM.
   a. NO HEAVILY SILT laden WATER SHALL BE DISCHARGED DIRECTLY OR INDIRECTLY INTO THE STREAM.
   b. EROSION AND SEDIMENT CONTROL STRUCTURES LOCATIONS AS DEPICTED ARE APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED BY THE COMPANY INSPECTOR TO ACTUAL SITE CONDITIONS.
   c. SILT FENCE OR STRAW BALE INSTALLATIONS SHALL INCLUDE REMOVABLE SECTIONS TO FACILITATE ACCESS DURING CONSTRUCTION. UTILIZE STRAW BALE BARRIERS ONLY IN LIEU OF A SILT FENCE WHERE FREQUENT ACCESS IS REQUIRED.
   d. SEDIMENT LADEN WATER FROM TRENCH DEWATERING SHALL BE DISCHARGED TO A WELL VEGETATED UPLAND AREA INTO A STRAW BALE DEWATERING STRUCTURE OR GEOTEXTILE FILTER BAG.
   e. SEDIMENT CONTROL STRUCTURES MUST BE IN PLACE AT ALL TIMES ACROSS THE DISTURBED PORTION OF THE RIGHT-OF-WAY EXCEPT DURING EXCAVATION/INSTALLATION OF THE CROSSING PIPE.
   f. SOFT DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE RIVER CROSSING UNTIL THE RIVER CROSSING IS INSTALLED AND BACKFILLED.

5. TO THE EXTENT POSSIBLE, MAINTAIN A MINIMUM 10 FEET VEGETATIVE BUFFER STRIP BETWEEN DISTURBED AREAS AND THE WATERCOURSE. INSTALL AND MAINTAIN SILT BARRIERS TO ATTACH THE BUFFER STRIP ON EACH SIDE OF THE WATERCOURSE. THE SILT FENCE SHOULD INCORPORATE REMOVABLE "GATES" AS REQUIRED TO ALLOW ACCESS WHILE MAINTAINING CASE OF REPLACEMENT FOR OVERNIGHT OR DURING PERIODS OF RAINFALL.

6. CONSTRUCT A TEMPORARY SLUMP UPSTREAM OF THE DAM AND LINE WITH ROCKFILL IF A NATURAL POOL DOES NOT EXIST. INSTALL THE PUMP OR PUMP INTAKE IN THE POOL OR SLUMP, DISCHARGE WATER INTO AN ENERGY DISSIPATOR DOWNSTREAM OF THE WORK AREA.

7. EXCAVATED MATERIAL MUST NOT BE STOCKPILED WITHIN 10 FT. OF THE WATERCOURSE. THIS MATERIAL MUST BE CONTAINED WITHIN BERM CONTAINMENT WITH SECONDARY SILT FENCE PROTECTION TO PREVENT SATURATED SOIL FROM FLOWING BACK INTO THE WATERCOURSE.

8. CHEMICALS, FUELS, LUBRICATING OILS SHALL NOT BE STORED AND EQUIPMENT REFUELED WITHIN 100 FT. OF THE WATERBODY. PUMPS ARE TO BE REFUELED AS PER THE SPCC PLANS.

REFER TO SHEET 1

MAINTENANCE OF STREAMFLOW

IF THERE IS ANY FLOW IN THE WATERCOURSE, INSTALL PUMPS TO INCREASE STREAMFLOWS AND CLEAR THE BLOCKED OFF SECTIONS OF CHANNEL. THE PUMP IS TO HAVE 1.5 TO 2 TIMES THE PUMPING CAPACITY OF AN ANTICIPATED FLOW. A SECOND STANDBY PUMP IS QUADRUPLES THE CAPACITY TO BE READILY AVAILABLE AT ALL TIMES. AN ENERGY DISSIPATOR IS TO BE PLACED TO ACCEPT DISCHARGE WITHOUT STREAMFLOWS OR STREAM FLOW EROSION. IF THE CROSSING IS PROLONGED BEYOND ONE DAY THE OPERATIONS NEED TO BE MONITORED OVERNIGHT.

9. STAGING AREAS ARE TO BE LOCATED AT LEAST 50 FT. FROM THE WATER'S EDGE WHERE TOPOGRAPHIC CONDITIONS PERMIT AND SHALL BE THE MINIMUM SIZE NEEDED.

10. DAMS ARE TO BE MADE OF STEEL PLATE, INFLATABLE PLASTIC DAMS, SAND BAGS, COBBLES, WELL GRADED COARSE GRAVEL, FILTER FILL; DAMS MAY NEED KEYING INTO THE BANKS AND STREAMBED. ENSURE THAT THE DAM AND VEHICLE CROSSING ARE LOCATED FAR ENOUGH APART TO ALLOW FOR A WIDE EXCAVATION. CAP PLACES USED UNDER VEHICLE CROSSING DURING DRY CROSSING.

11. DEWATER AREA BETWEEN DAMS IF POSSIBLE. DEWATERING SHOULD OCCUR IN A STABLE VEGETATIVE AREA A MINIMUM OF 50 FT. FROM ANY WATERBODY. THE PUMP DISCHARGE SHOULD BE DISCHARGED TO DRAINAGE SYSTEMS OR DRAINAGE CHANNELS, FILTER BAGS, OR TIMBERS TO PREVENT LOCALIZED EROSION. THE DISCHARGE WATER SHOULD ALSO BE FORCED INTO A SHEET FLOW, THE SPRING PLACEMENT IS TO BE USING STRAW BALE AND THE NATURAL TOPOGRAPHY. IF IT IS NOT POSSIBLE TO DEWATER THE EXCAVATION DUE TO SOILS WITH A HIGH GROUND WATER LEVEL, THE EXCAVATION AND PIPE PLACEMENT IS TO BE CARRIED OUT IN THE STANDING WATER. PUMP ANY DISPLACED WATER AS DESCRIBED ABOVE TO PREVENT OVERFLOW OF DAMS.

12. EXCAVATE TRENCH THROUGH PLUGS AND STREAMBED FROM BOTH SIDES, RE-POSITIONING DISCHARGE MODEL AS NECESSARY. LOWER THE PIPE IN THE TRENCH AND BACKFILL IMMEDIATELY. DURING THIS OPERATION WORK IS TO BE COMPLETED AS QUICKLY AS POSSIBLE.

13. CONTRACTOR SHALL RESTORE THE STREAM BED AND BANKS TO PRE-ECONSTRUCTION CONTOURS, BUT NOT TO EXCEED 2 HORIZONTAL TO 1 VERTICAL.
   a. CONTRACTOR SHALL INSTALL PERMANENT EROSION AND SEDIMENT CONTROL STRUCTURES OR OTHER RECOVERY METHODS TO ENSURE THE CROSSING IS COMPLETED AS A SITE SPECIFIC BASIS.
   b. IN THE ABSENCE OF SPECIFIC INFORMATION, A FLEXIBLE CHANNEL LINER SUCH AS NAC C215 OR CHAIR WITH A MAINTAINED GRADING. THE CROSSING FLAT SHALL BE INSTALLED. ALTERNATELY, ROCK RIP-RAP SHALL BE INSTALLED.
   c. ALL MATERIALS PLACED IN THE CROSSING TO FACILITATE CONSTRUCTION SHALL BE REMOVED DURING RESTORATION.

14. WHEN THE CROSSING HAS BEEN RESTORED, THE CREEK BANKS ARE TO BE CONTIGUOUS TO A STABLE ANGLE AND PROTECTED WITH EROSION RESISTANT MATERIAL COMPATIBLE WITH FLOW VELOCITY BETWEEN BANKS (E.G., ROCKS, CONTROL BLANKETS, CREEPING, ROCK RIP-RAP, ETC.). THE DAMS ARE TO BE REMOVED DOWNSTREAM FIRST. KEEP PUMP RUNNING UNTIL OPERATIONAL FLOW IS RESTORED. COMPLETE BANK TRIMMING AND EROSION PROTECTION. IF SAND BAGS ARE USED FOR THE DAMS, PLACE AND REMOVE BY HAND TO AVOID EQUIPMENT BREAKING BAGS.

TYPICAL

DAM AND PUMP CROSSING

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IF TRENCH SIDES BECOME UNSTABLE AND COULD COLLAPSE, ALLOW TRENCH TO REFILL WITH WATER AND PLACE PIPE UNDERWATER.

SEE SHEET 2 FOR NOTES.
THE FOLLOWING IS A SEQUENCE OF CONSTRUCTION AND MITIGATION MEASURES TO BE FOLLOWED AT ALL "DRY FLUME" TYPE CROSSINGS.

SEQUENCE OF ACTIVITIES

STEP 1. CLEAR AND GRADE CERTIFICATED RIGHT-OF-WAY AS NECESSARY.
STEP 2. IMPLEMENT THE TEMPORARY EROSION AND SEDIMENT CONTROLS.
STEP 3. FABRICATE PIPE.
STEP 4. INSTALL DRY STREAM CROSSING MATERIALS.
STEP 5. EXCAVATE TRENCH AND INSTALL PIPE.
STEP 6. BACKFILL AND RESTORE STREAM BANKS.
STEP 7. REMOVE FLUME CROSSING.
STEP 8. IMPLEMENT THE PERMANENT EROSION AND SEDIMENTATION CONTROLS.

NOTES:

1. MARK OUT AND MAINTAIN LIMITS OF AUTHORIZED WORK AREAS WITH FENCING OR FLAGGING TAPE TO AVOID UNNECESSARY DISTURBANCE OF VEGETATION. ENSURE EQUIPMENT OPERATORS WORKING ON THE CROSSING HAVE BEEN BRIEFED ABOUT THIS PLAN AND THE MEASURES NEEDED TO PROTECT WATER QUALITY.

2. ALL NECESSARY EQUIPMENT AND MATERIALS TO BUILD THE FLUME MUST BE ON SITE OR READILY AVAILABLE PRIOR TO COMMENCING IN-WATER WORK.

3. TO THE EXTENT POSSIBLE, MAINTAIN A MINIMUM 10 FT. VEGETATIVE BUFFER STRIP BETWEEN DISTURBED AREAS AND THE WATERCOURSE. INSTALL AND MAINTAIN A SILT FENCE OR STRAW BALE BARRIER UNEPEL THE BUFFER STRIP ON EACH SIDE OF THE WATERCOURSE.

4. CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES AT BASED OR APPLICATIONS, AND ELSEWHERE ON STREAM SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVY SILT LADEN WATER ENTERS STREAM.

a. NO HEAVILY SILT LAHEN WATER SHALL BE DISCHARGED DIRECTLY OR INDIRECTLY INTO THE STREAM.

b. EROSION AND SEDIMENT CONTROL STRUCTURE LOCATIONS AS DEPICTED ARE APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED BY THE COMPANY INSPECTOR TO ACTUAL SITE CONDITIONS.

c. SILT FENCE OR STREAM BALE INSTALLATIONS SHALL INCLUDE REMOVABLE SECTIONS TO FACILITATE ACCESS DURING CONSTRUCTION. UTILIZE STRAW BALE BARRIERS ONLY IN LIEU OF A SILT FENCE WHERE FREQUENT ACCESS IS REQUIRED.

d. SEDIMENT LAHEN WATER FROM TRENCH Dewatering shall be discharged to a well vegetated upland area into a straw bale dewatering structure or geotextile filter bag.

5. PIPE SHALL BE STRUNG AND WELDED FOR READY INSTALLATION PRIOR TO WATERCOURSE TRENCHING.

6. FLUME CAPACITY DURING DRY CROSSING SHALL BE SUFFICIENT TO ACOOMODATE 1.5 TIMES THE FLOW MEASURED AT THE TIME OF CONSTRUCTION PROVIDED THAT THE FLUMES WILL BE IN PLACE NOT MORE THAN 96 HOURS AND NO PRECIPITATION IS FORECAST.

FLUME RATES FOR VEHICLE ACCESS SHALL BE SUFFICIENT TO PASS THE 2 YEAR DESIGN FLOW OR THE FLOW REASONABLY EXPECTED TO OCCUR DURING THE INSTALLATION. EXCESS FLUMES REQUIRED FOR LONGER TERM ACCESS SHALL BE GAPPED DURING DRY CROSSING PROCEDURES.

7. ENSURE THAT THE DAMS AND VEHICLE-CROSSING ARE LOCATED FAR ENOUGH APART TO ALLOW FOR A WIDE EROSION. FLUMES ARE TO BE SET WITH 10 PERCENT OF THEIR DIAMETER BELOW STREAMBED LEVEL SOIL CONDITIONS PERMIT (OTHERWISE INSTALLED AT STREAM GRADE AND SLOPE).

8. PLACE IMPERVIOUS DAMS AT EACH END OF THE FLUME, UPESTEEM FIRST, THEN DOWNSLOPE. ACCEPTABLE ALTERNATIVES INCLUDE GRAVEL WITH RIP-RAP PROTECTION, SAND BAGS, STEEL PLATE AND ROCKFILL. DURING INSTALLATION, INSTALL AN IMPERVIOUS MEMBRANE, IF NECESSARY, TO LIMIT LEAKAGE, DAMS MAY NEED KEYING INTO THE BANK AND STREAMBED.

9. EXCAVATE TRENCH THROUGH PLUGS AND UNDER FLUME FROM BOTH SIDES. WORK IS TO BE COMPLETED AS QUICKLY AS POSSIBLE.

a. LOWER IN PIPE BY PASSING UNDER FLUME AND BACKFILL IMMEDIATELY WITH SOIL MATERIAL.

b. IT IS NOT NECESSARY TO Dewater THE IN-STREAM TRENCH. HOWEVER, DISPLACED WATER SHALL BE PUMPED TO A STABLE UPLAND AREA TO AVOID OVERTOPPING OF DAMS DURING PIPE PLACEMENT.

c. IF THE SPOIL MATERIAL IS NOT SUITABLE, USE IMPORTED CLEAN GRANULAR MATERIAL.

d. IF BLASTING IS REQUIRED, USE CONTROLLED BLASTING TECHNIQUES TO PREVENT DAMAGE TO THE FLOW CONVEYANCE SYSTEM. ALTERNATIVELY, BLASTING MAY BE ACCOMPLISHED PRIOR TO FLUME INSTALLATION BY DRILLING THROUGH THE OVERBURDEN.

10. EXCAVATED MATERIAL MUST NOT BE STOCKPILED WITHIN 10 FT. OF THE WATERCOURSE. THIS MATERIAL MUST BE CONTAINED WITHIN BERM CONTAINMENT WITH SECONDARY SILT FENCE PROTECTION TO PREVENT SATURATED SOIL FROM FLOWING BACK INTO THE WATERCOURSE.

11. Dewatering of the onland trench should occur in a stable vegetated area a minimum of 50 ft. from any waterbody. The pump discharge should be directed onto a stable spill pad constructed of rockfill or timber to prevent localized erosion. The discharge water should also be forced into sheet flow immediately beyond the spill pad by using straw bales and the natural topography.

FLUMES SHOULD BE REMOVED AS SOON AS POSSIBLE, WHEN NO LONGER REQUIRED FOR PIPE LAYING OR FOR ROAD ACCESS, IN THE FOLLOWING MANNER:

a. REMOVE THE VEHICLE CROSSING RAMP. BANKS ARE TO BE RESTORED TO A STABLE ANGLE AND PROTECTED WITH EROSION MATERIAL AT CONVIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE RIVER CROSSING UNTIL THE RIVER CROSSING IS INSTALLED AND BACKFILLED.

b. REMOVE DOWNSLOPE DAM.

c. REMOVE UPSTREAM DAM.

d. REMOVE FLUME.

e. COMPLETE BANK TRIMMING AND EROSION PROTECTION, IF SANDBAGS ARE USED FOR THE DAMS, PLACE AND REMOVE BY HAND TO AVOID EQUIPMENT BREAKING BAGS.

12. CONTRACTOR SHALL RESTORE THE STREAM BED AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONTOURS, BUT NOT TO EXCEED 2 HORIZONTAL TO 1 VERTICAL.

13. CONTRACTOR SHALL INSTALL PERMANENT EROSION AND SEDIMENT CONTROL STRUCTURES AS INDICATED ON A SITE-SPECIFIC BASIS. IN THE ABSENCE OF SITE SPECIFIC INFORMATION, A FLEXIBLE CHANNEL DESIGN SUCH AS NAS 1215 OR CDX WHICH IS CAPABLE OF WITHSTANDING THE FLOW CONDITIONS (E.G., EROSION CONTROL BLANKETS, CRIBBING, ROCK RIP-RAP, ETC.) TO THE MAXIMUM EXTENT POSSIBLE BEFORE REMOVING THE DAMS.

14. CONTRACTOR SHALL RESTORE THE STREAM BED AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONTOURS, BUT NOT TO EXCEED 2 HORIZONTAL TO 1 VERTICAL.

a. CONTRACTOR SHALL INSTALL PERMANENT EROSION AND SEDIMENT CONTROL STRUCTURES AS INDICATED ON A SITE-SPECIFIC BASIS. IN THE ABSENCE OF SITE SPECIFIC INFORMATION, A FLEXIBLE CHANNEL DESIGN SUCH AS NAS 1215 OR CDX WHICH IS CAPABLE OF WITHSTANDING THE FLOW CONDITIONS (E.G., EROSION CONTROL BLANKETS, CRIBBING, ROCK RIP-RAP, ETC.) TO THE MAXIMUM EXTENT POSSIBLE BEFORE REMOVING THE DAMS.

b. ALTERNATIVELY, ROCK RIP-RAP SHALL BE INSTALLED.

C. MAINTAIN A SILT FENCE OR STRAW BALE BARRIER ALONG THE WATER COURSE, UNTIL VEGETATION IS ESTABLISHED IN ADJACENT DISTURBED AREAS.

REVIEW SHEET 1

TYPICAL DRY FLUME CROSSING
NOTES

1. USE PUMP AROUND METHOD FOR SMALL STREAMS SUPPORTING WARM OR COLD WATER FISHERIES WHERE FISH PASSAGE IS NOT A CONCERN.

2. AFTER INSTALLING PIPE AND BACKFILLING, DISMANTLE DOWNSTREAM THEN UPSTREAM DAMS WHILE KEEPING PUMP RUNNING TO MAINTAIN STREAM FLOW.

3. PUMPS SHALL HAVE A CAPACITY AT LEAST TWICE THAT OF THE MAXIMUM ANTICIPATED STREAM FLOW AS DETERMINED BY THE RATIONAL METHOD.

4. ACTUAL NUMBER OF FLUME PIPES (MIN. 20" DIA.) REQUIRED DETERMINED BY STREAM FLOW AS DETERMINED BY MANNING'S FORMULA.

5. STRAW BALES TO BE IN PLACE ACROSS TRAVEL LANE DURING PERIODS OF NO CONSTRUCTION ACTIVITY.
NOTES:

1. USE FLUME TRENCH METHOD FOR SMALL STREAMS SUPPORTING COLD OR WARM WATER FISHERIES.

2. LOWER PIPE INTO TRENCH BY PASSING UNDER THE FLUME PIPES.

3. USE AS MANY FLUME PIPES (MIN. 20" DIA.) AS REQUIRED TO INSURE FLOW IS NOT OBSTRUCTED BY BRIDGE.

4. WHEN MORE THAN ONE FLUME PIPE IS REQUIRED, MINIMUM SPACING BETWEEN FLUME PIPES IS 0.5 TIMES THE NOMINAL DIAMETER OF THE FLUME PIPE.

5. STRAW BALES TO BE IN PLACE ACROSS TRAVEL LANE DURING PERIODS OF NO CONSTRUCTION ACTIVITY.

6. MINIMUM CLEAN ROCK COVER OVER FLUME PIPE(S) IS 1.0’ – 0.0’.
THE FOLLOWING IS A SEQUENCE OF CONSTRUCTION AND MITIGATION MEASURES TO BE FOLLOWED AT ALL TEMPORARY FLUME VEHICLE CROSSINGS.

1. A PORTABLE FLEXI–FLOAT, OR TEMPORARY BRIDGE MAY BE SUBSTITUTED FOR THE TEMPORARY FLUME CROSSING.

2. THE LENGTH OF THE FLUME SHALL BE SUFFICIENT TO SPAN THE ENTIRE AREA REQUIRED FOR VEHICULAR ACCESS, EXTENDING 4 FT. BEYOND TOE OF FILL MATERIAL, SO TRENCHING WILL NOT AFFECT THE ROAD CROSSING. A LONGER PIPE IS TO BE USED, IF NEEDED, TO MAINTAIN STABLE SIDE SLOPES. FLUME CAPACITY TO BE BASED ON THE 2-YEAR DESIGN FLOW OR MAXIMUM FLOW ANTICIPATED TO OCCUR DURING INSTALLATION, AS SPECIFIED IN CONSTRUCTION DOCUMENTS.

3. WHERE PRACTICAL, BACKFILL AROUND THE PIPES AT THE ROAD WITH CLEAN, COARSE ROCK FILL MATERIAL. IF SCOUR IS POSSIBLE, RIP–RAP IS TO BE PLACED ON THE STREAM BED DOWN–STREAM OF THE PIPE OUTLET EXTENDING A MINIMUM OF TWO PIPE DIAMETERS. ALTERNATIVELY, TIMBER EQUIPMENT MATS, SAND BAGS OR TIMBER CORDUROY MAY BE USED TO FORM THE TRAVEL SURFACE.

4. TO REDUCE MUD ENTERING THE WATER FROM EQUIPMENT TRACKS, THE APPROACH ROAD LEADING TO THE CULVERT CROSSING MUST BE RAISED AND STABLE SO EQUIPMENT LOADS ARE SUPPORTED A SUFFICIENT DISTANCE BACK FROM THE WATER. IF CUTS ARE NEEDED TO OBTAIN A SATISFACTORY GRADE, THEY ARE TO BE DUG WITH SIDE DITCHES AND STABLE SLOPES. EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED TO LIMIT THE POTENTIAL FOR SEDIMENT TO ENTER THE WATERBED (E.G., CHECK DAMS, SILT FENCE, RIP–RAP, SEED AND MULCH, SEDIMENT TRAPS, ETC.).

5. PERIODICALLY CHECK THE TEMPORARY CROSSING INSTALLATION AND REMOVE ANY BUILD–UP OF SEDIMENT OR DEBRIS ON THE BRIDGE. DISPOSE OF THIS MATERIAL AT LEAST 100 FT. FROM THE WATERCOURSE AND ABOVE THE HIGH WATER LEVEL.
NOTES:

1. APPLICABLE TO MINOR (<10') WATERBODIES THAT ARE NOT FLOWING AT THE TIME OF CONSTRUCTION, OR DO NOT SUPPORT A SIGNIFICANT FISHERY.
2. VEHICLE ACCESS IS ONLY REQUIRED WHERE NECESSARY TO FACILITATE EQUIPMENT MOVEMENT AND MAY CONSIST OF TIMBER MATS, TEMPORARY BRIDGES, RAIL FLATCARS OR FLUME CROSSINGS.
3. INSTALL SOFT PLUGS FOLLOWING EXCAVATION OF MAINLINE DITCH THROUGH CROSSING.
4. INSTALL SEDIMENT BARRIERS AS INDICATED. PROTECT ACCESS WITH SILT FENCE GATES OR STRAW BALE BARRIERS.
5. MAINLINE PIPE SECTION MAY SPAN CROSSING IN PREPARATION FOR LOWER IN.
6. SILT FENCE OR STRAW BALE "GATE" TO BE CLOSED AT NIGHT OR DURING RAINFALL.
DITCH (BOTTOM WIDTH OF PIPE PLUS 2')

LEVEE

CANAL

SACK BREAKER

CARRIER PIPE

PLAN

NATURAL GROUND

BENTONITE FACE OF LEVEE & BOTTOM OF CANAL

SACK BREAKER (3 BAGS WIDE)

CARRIER PIPE

WATER LEVEL

2'

5' MIN

COMPACTION AREA

ELEVATION

NOTE:
EARTH LINED CANAL CROSSING
ONLY WHEN CANAL IS DRY

LEGEND
TO BE COMPACTED

PIPELINE STANDARD
LEVEE REPAIR ON CANAL CROSSING PIPE INSTALLED BY OPEN CUTTING

TRC
16350 PARK TEN PLACE, SUITE 101
HOUSTON, TX 77084
PHONE (281) 616-0150
PRL NO. 28500, LIC. NO. ET 4586

STD-A-029

1 OF 1
NOTES:

1. CROSSING INSTALLATION SHALL BE IN ACCORDANCE WITH APPLICABLE PERMITS.
3. CONTINUOUS CONCRETE COATING MATERIALS FOR PIPE WILL BE FURNISHED AND INSTALLED BY CONTRACTOR.
4. INSTALL TRANSITION PIECE AS REQUIRED FOR DIFFERENT WALL THICKNESS PIPE AT CROSSING PER ALIGNMENT SHEETS.
5. THIS STANDARD DRAWING IS APPLICABLE TO ALL FABRICATED CANAL/STREAM CROSSINGS UNLESS NOTED OTHERWISE IN THE CONSTRUCTION DRAWINGS OR SPECIFICATIONS.
6. CONCRETE-LINED AND ABOVE-GROUND CANAL CROSSINGS SHALL BE INSTALLED BY BORING RIGHT-OF-WAY TO RIGHT-OF-WAY. BELOW GROUND CANALS/STREAMS MAY BE INSTALLED BY OPEN CUT IF ALLOWED BY THE PERMIT.
7. OPEN CUT CANAL CROSSING BACKFILL SHALL BE OF SELECT MOIST BACKFILL MATERIAL, PLACED IN LAYERS AND THOROUGHLY COMPACTED BY MECHANICAL TAMPING TO 95% OF COMPACTION, AS PER ASTM D-1557-70, OR AS REQUIRED BY CANAL OWNER.
NOTES:

1. CROSSING INSTALLATION SHALL BE IN ACCORDANCE WITH APPLICABLE PERMITS.
2. PIPE SHALL BE LEVEL UNDER CROSSING TO THE LENGTH AND DEPTH SHOWN.
3. PIPE SHALL BE LAID TO EXTRAS DEPTH AT THESE LOCATIONS TO ACCOMMODATE FREE-STRESS BINDING.
4. THIS STANDARD DRAWING IS APPLICABLE TO ALL FREE-STRESS CANAL/STREAM CROSSINGS UNLESS NOTED OTHERWISE IN THE CONSTRUCTION DRAWINGS OR SPECIFICATIONS.
5. ABOVE-GROUND CANAL CROSSINGS SHALL BE INSTALLED BY BORING RIGHT-OF-WAY TO RIGHT-OF-WAY. BELOW-GROUND CANALS/STREAMS MAY BE INSTALLED BY OPEN CUT.
6. OPEN CUT CANAL CROSSINGS BACKFILL SHALL BE OF SELECT LOOSE BACKFILL MATERIAL, PLACED IN LAYERS AND THOROUGHLY COMPACTED BY MECHANICAL TAMPER TO 95% OF COMPACTION, AS PER ASTM D-1557-70, OR AS REQUIRED BY CANAL OWNER.
7. 3" FT COVER ON MAINLINE; 4" FT COVER ON AGRICULTURAL LANDS.
ALL BRIDGES TO HAVE CURBS 6" OR HIGHER TO CONTAIN SEDIMENT OR DEBRIS.

SECTION ‘A–A’

FOR INFORMATION ON BUILDING CRIBS REFER TO FERIC "LOG BRIDGE HANDBOOK", 1980

POSSIBLE CONFIGURATION FOR TEMPORARY CRIB ABUTMENT

THE FOLLOWING IS A SEQUENCE OF CONSTRUCTION AND MITIGATION MEASURES TO BE FOLLOWED AT ALL TEMPORARY BRIDGE CROSSINGS.

1. A PRE-FABRICATED BRIDGE OR FLATBED RAILCAR, FLEXI-FLOAT OR FLUMED VEHICLE CROSSING MAY BE SUBSTITUTED FOR THE TEMPORARY BRIDGE.

2. INSTALL THE BRIDGE IN A MANNER THAT WILL MINIMIZE SEDIMENT ENTERING THE WATER. STRINGERS MUST BE DESIGNED TO SUPPORT THE LOADS EXPECTED ON THE BRIDGE. CURBS AT LEAST 6 IN. HIGH MUST BE INSTALLED ALONG THE EDGE OF THE DECK TO CONTAIN SEDIMENT AND DEBRIS ON THE BRIDGE. FASTENERS CONNECTING COMPONENTS MUST BE STRONG ENOUGH TO HOLD THEM IN POSITION DURING THE LIFE OF THE BRIDGE. CRIBS ARE TO BE FILLED WITH ROCK OR COBBLE. RIP-RAP EROSION PROTECTION IS TO BE PLACED AROUND THE CRIBS AND ON ANY FILL SLOPES PROJECTING INTO THE WATER.

ROAD APPROACHES LEADING TO THE BRIDGE MUST BE RAISED AND STABLE SO EQUIPMENT LOADS ARE SUPPORTED A SUFFICIENT DISTANCE BACK FROM THE WATER TO REDUCE SEDIMENT AND DEBRIS ENTERING THE STREAM FROM EQUIPMENT TRACKS. DO NOT USE SOIL TO CONSTRUCT OR STABILIZE EQUIPMENT BRIDGES. IF CUTS ARE NEEDED TO OBTAIN A SATISFACTORY GRADE, THEY ARE TO BE DUG WITH SIDE DITCHES AND STABLE SLOPES. EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED TO KEEP SEDIMENT ON LAND (E.G., SILT FENCING, FILTER CLOTH, RIP-RAP, SEED AND MULCH, ETC.). PERIODICALLY CHECK BRIDGE INSTALLATION AND REMOVE ANY BUILD-UP OF SEDIMENT OR DEBRIS ON THE BRIDGE.
SEQUENCE OF ACTIVITIES

STEP 1. CLEAR AND GRADE.

STEP 2. IMPLEMENT THE TEMPORARY EROSION AND SEDIMENT CONTROLS.

STEP 3. FABRICATE PIPE.

STEP 4. EXCAVATE TRENCH AND INSTALL PIPE.

STEP 5. BACKFILL AND RESTORE STREAM BANKS.

STEP 6. IMPLEMENT THE PERMANENT EROSION AND SEDIMENT CONTROLS.

SEE SHEET 2 FOR NOTES.
NOTES:

1— WORK SPACE  maximum limits are depicted. Staging for Makeup located a minimum of 50 feet from waterbody.

2— CLEARING  mark clearing limits and minimize clearing of riparian vegetation. Woody vegetation shall be cut at ground level and the stumps/roots left in place to the extent possible.

3— TOPSOIL STRIPPING  topsoil shall be stripped from all wetland areas over the ditch line and spoil areas.

4— SPILL PREVENTION  contractor shall install signs 100 feet minimum from each stream bank and wetland to identify the hazardous materials exclusion area.

5— EROSION & A. SEDIMENT CONTROL  contractor shall supply, install and maintain sediment control structures, as depicted or along down gradient sides of work areas and staging areas such that no heavily silt laden water enters stream or wetland.

B. No heavily silt laden water shall be discharged directly or indirectly into the stream. All erosion and sediment control structure locations as depicted are approximate and may be adjusted as directed by the company inspector to suit actual site conditions. Silting fence or straw bale installations shall include removable sections to facilitate access during construction.

C. Sediment laden water from trench dewatering shall be discharged to a well vegetated upland area, into a straw bale dewatering structure or geotextile filter bag. Sediment control structures must be in place at all times across the disturbed construction right of way except during excavation/installation of the crossing pipe.

D. Soft ditch plugs must remain in place at convenient locations to separate mainline ditch from the river crossing until the river crossing is installed and backfilled.

E. Trench breakers are to be installed at the same spacing and immediately upslope of permanent slope breakers, or as directed by the company.

6— INSTALLATION  contractor shall maintain hard plugs in the ditch at the river edge until just prior to pipe installation. Contractor shall excavate trench and install pipe as expeditiously as practical to reduce the duration of work activities in the stream bed.

7— SPOIL PLACEMENT  contractor shall place trench spoil only in certificated work space and a minimum of 10 feet from the stream banks to prevent entry of spoil into the stream flow. Spoil shall be contained as necessary using either a straw bale barrier or an earth/rock berm.

8— CLEANUP BANK PRECONSTRUCTION CONTOURS, UNLESS OTHERWISE APPROVED BY THE COMPANY.

STABILIZATION RESTORATION  contractor shall install permanent erosion and sediment control structures as indicated. Any materials placed in the stream to facilitate construction shall be removed during restoration. Banks shall be stabilized and temporary sediment barriers installed as soon as possible after crossing, but within 24 hours of completing the crossing. Maintain a silt fence or straw bale barrier along the water course and wetland boundaries until vegetation is established in adjacent disturbed areas.

9— TEMPORARY VEHICLE CROSSING  vehicle crossing can be constructed using either a flume crossing or a temporary bridge.

10— REFERENCE  refer to water body and wetland crossing procedures for requirements.

REFER TO SHEET 1
NOTES:

1. SCHEDULE INSTREAM ACTIVITY FOR LOW FLOW PERIODS AND FOR THE APPROPRIATE TIMING WINDOW.

2. OBTAIN ADDITIONAL TEMPORARY WORK SPACE TO ALLOW INSTREAM SPOIL TO BE STORED ON BANKS WHERE POSSIBLE. THE SIZE OF THE AREA REQUIRED WILL DEPEND UPON THE ENCOUNTERED SOIL TYPE AND TOPOGRAPHIC CONDITIONS.

3. PIPE MAKEUP AREA TO BE LOCATED AT LEAST 50 FT. BACK FROM THE EDGE OF THE WATERCOURSE.

4. MAINTAIN HARD PLUGS AT BANK.

5. THE INSTREAM PIPE SECTION SHOULD BE FABRICATED, TESTED AND COATED PRIOR TO COMMENCEMENT OF INSTREAM ACTIVITY.

6. TRENCH THROUGH WATERCOURSE, RETAINING TRENCH/HARD PLUGS AT EACH BANK UNTIL JUST PRIOR TO PIPE INSTALLATION.

7. STOCKPILE AS MUCH SPOIL ON BANKS AS POSSIBLE. CONSTRUCT SPOIL CONTAINMENT BERM AND/OR SUMP WITH SECONDARY SILT FENCE PROTECTION TO PREVENT SATURATED SPOIL FROM FLOWING BACK INTO WATERCOURSE. ALL INSTREAM SPOIL STORED ON LAND SHOULD BE KEPT A MINIMUM OF 10 FT. FROM THE EDGE OF THE WATERCOURSE.

8. PLACE INSTREAM STORAGE IN DISCRETE PILES ON DOWNSTREAM SIDE OF TRENCH, AVOIDING AREAS OF HIGHEST WATER VELOCITY. DO NOT WINDROW SPOIL ACROSS THE CHANNEL OR BLOCK MORE THAN 2/3 OF THE CHANNEL WIDTH. MAINTAIN STREAM FLOW IF PRESENT, THROUGHOUT CROSSING CONSTRUCTION. LOWER IN AND BACKFILL IMMEDIATELY. RESTORE STREAM CHANNEL TO APPROXIMATE PRE-CONSTRUCTION PROFILE. ATTEMPT TO COMPLETE ALL INSTREAM ACTIVITY AS QUICKLY AS POSSIBLE.

9. RESTORE AND STABILIZE WATERCOURSE BANKS AND APPROACHES AS CLOSE TO ORIGINAL GRADE AS POSSIBLE. INSTALL BANK PROTECTION AS SPECIFIED IN THE CONSTRUCTION DRAWINGS.
NOTES:

1. SCHEDULE INSTREAM ACTIVITY FOR LOW FLOW PERIODS AND FOR THE APPROPRIATE TIMING WINDOW.

2. THE INSTREAM PIPE SECTION SHOULD BE FABRICATED, TESTED AND COATED PRIOR TO COMMENCEMENT OF INSTREAM ACTIVITY.

3. BARGE CAN BE STABILIZED BY TUG BOAT, SPUDS, WINCHED CABLES CONNECTED TO DEADMAN ANCHORS ON SHORE, OR A COMBINATION OF THESE METHODS.

4. BARGE HANDLING FACILITY TO BE EXCAVATED DEEP ENOUGH TO ACCOMMODATE LOADED BARGE WITH CRIBBING USED ON AT LEAST ONE SIDE TO ALLOW LOADING AND UNLOADING BY BACKHOE.

5. THE INSTREAM SPOIL REMOVED BY THE BARGE IS TO BE STOCKPILED IN A SPOIL CONTAINMENT AREA LOCATED A MINIMUM OF 50 FT. FROM THE RIVER'S EDGE. THE SPOIL IS TO BE LOCATED BEHIND BERM CONTAINMENT WITH SECONDARY SILT FENCE PROTECTION.

6. REMOVE SPOIL FROM THE BARGE BY BACKHOE AND MOVE TO CONTAINMENT AREA BY BULLDOZER, LOADER, OR TRUCK.

7. RESTORE AND STABILIZE WATERCOURSE BANKS AND APPROACHES AS CLOSE TO ORIGINAL GRADE AS POSSIBLE. INSTALL BANK PROTECTION AS SPECIFIED IN THE CONSTRUCTION DRAWINGS.
CONSTRUCTION PROCEDURE NOTES:

1. FLAG WETLAND BOUNDARIES PRIOR TO CLEARING.
2. NO REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE “NO FUELING” SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER SPCC PLAN.
3. INSTALL TEMPORARY SLOPE BREAKER UPSLOPE WITHIN 100 FEET OF WETLAND BOUNDARY IF DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
4. CONSTRUCT WHEN DRY, IF POSSIBLE. IF SITE BECOMES WET AT TIME OF TRENCHING, AVOID SOIL COMPACTION BY UTILIZING PREFABRICATED EQUIPMENT MATS.
5. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS (STRAW BALES AND/OR SILT FENCE) AT DOWN SLOPE EDGE OF RIGHT-OF-WAY ALONG WETLAND EDGE IF EVIDENT, OTHERWISE INSTALL BARRIER ON BOTH EDGES.
6. RESTRICT ROOT GRUBBING TO ONLY THAT AREA OVER THE DITCHLINE AND DITCH SPOIL AREAS. GRIND STUMPS IF NECESSARY IN OTHER AREAS TO FACILITATE CONSTRUCTION.
7. CONDUCT TRENCH LINE TOPSOIL STRIPPING (IF TOPSOIL IS NOT SATURATED). SALVAGE TOPSOIL TO ACTUAL DEPTH OR A MAXIMUM DEPTH OF 12 INCHES, AS DETERMINED BY THE ENVIRONMENTAL INSPECTOR. SEGREGATED TOPSOIL PILE MAY BE LOCATED ON SPOIL SIDE, AS REQUIRED.
8. TRENCH THROUGH WETLANDS.
9. PIPE SECTION MAY BE FABRICATED WITHIN THE WETLAND AND ADJACENT TO ALIGNMENT, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN.
10. LOWER-IN PIPE. PRIOR TO BACKFILLING TRENCH, TRENCH PLUG REQUIREMENTS SHALL BE DETERMINED BY THE ENVIRONMENTAL INSPECTOR. BACKFILL TRENCH.
11. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL AND INSTALL PERMANENT EROSION CONTROL.
12. REMOVE ANY TIMBER MATS OR PREFABRICATED MATS FROM WETLANDS UPON COMPLETION.
13. NO FILL SHALL BE PLACED UNDERNEATH BOARD MATS DURING PROJECT CONSTRUCTION.
CONSTRUCTION PROCEDURE NOTES:

1. FLAG WETLAND BOUNDARIES PRIOR TO CLEARING.

2. NO REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER SPCC PLAN.

3. INSTALL TEMPORARY SLOPE BREAKER UPSLOPE WITHIN 100 FEET OF WETLAND BOUNDARY IF DIRECTED BY THE ENVIRONMENTAL INSPECTOR.

4. MINIMIZE SOIL COMPACTION BY UTILIZING PREFABRICATED EQUIPMENT MATS.

5. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS (STRAW BALES AND/OR SILT FENCE) AT DOWN SLOPE EDGE OF RIGHT-OF-WAY AND ALONG WETLAND EDGE AS REQUIRED.

6. RESTRICT ROOT GRUBBING TO ONLY THAT AREA OVER THE DITCHLINE AND DITCH SPOIL AREAS. GRIND STUMPS IF NECESSARY IN OTHER AREAS TO FACILITATE CONSTRUCTION.

7. TOPSOIL STRIPPING SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.

8. LEAVE HARD PLUGS AT THE EDGE OF WETLAND UNTIL JUST PRIOR TO TRENCHING.

9. INSTALL TIMBER MATS THROUGH ENTIRE WETLAND AREA. EQUIPMENT NECESSARY FOR RIGHT-OF-WAY CLEARING MAY MAKE ONE (1) PASS THROUGH THE WETLAND BEFORE MATS ARE INSTALLED.

10. TRENCH THROUGH WETLANDS.

11. PIPE SECTION MAY BE FABRICATED WITHIN THE WETLAND AND ADJACENT TO ALIGNMENT, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN.

12. LOWER-IN PIPE, INSTALL TRENCH PLUGS AT WETLAND EDGES IF DIRECTED BY THE ENVIRONMENTAL INSPECTOR AND BACKFILL IMMEDIATELY.

13. REMOVE ANY TIMBER MATS OR PREFABRICATED MATS FROM WETLANDS UPON COMPLETION.

14. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL AND INSTALL PERMANENT EROSION CONTROL.

15. GENERALLY, SEEDING IN WETLANDS WILL NOT BE NECESSARY SINCE WETLANDS REVEGETATE QUICKLY AND SOIL WILL REMAIN INTACT EXCEPT OVER TRENCH. THE CONTRACTOR SHALL SEED ANY WETLANDS THAT MAY REQUIRE SEEDING AS DETERMINED BY THE ENVIRONMENTAL INSPECTOR.

16. NO FILL SHALL BE PLACED UNDERNEATH BOARD MATS DURING PROJECT CONSTRUCTION.
CONSTRUCTION PROCEDURE NOTES:

1. REDUCE THE CONSTRUCTION RIGHT-OF-WAY TO 75 FEET OR LESS IN TYPE III WETLAND.
2. FLAG WETLAND BOUNDARIES PRIOR TO CLEARING.
3. NO REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER SPCC PLAN.
4. INSTALL TEMPORARY SLOPE BREAKER UPSLOPE WITHIN 100 FEET OF WETLAND BOUNDARY AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
5. RESTRICT ROOT GRUBBING TO ONLY THE AREA OVER THE DITCHLINE.
6. TOPSOIL STRIPPING SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.
7. UTILIZE AMPHIBIOUS EXCAVATORS (PONTOON MOUNTED BACKHOES) OR TRACKED BACKHOES SUPPORTED BY FABRICATED TIMBER MATS OR FLOATS, TO EXCAVATE TRENCH. IF FABRICATED TIMBER MATS ARE USED FOR STABILIZATION, THE BACKHOE SHALL GRADUALLY MOVE ACROSS THE WETLAND BY MOVING THE MAT FROM IMMEDIATELY BEHIND TO IMMEDIATELY IN FRONT OF THE BACKHOE’S PATH.
8. AVOID ADJACENT WETLANDS, INSTALL SEDIMENT BARRIERS (STRAW BALES AND/OR SILT FENCE) AT EDGE OF RIGHT-OF-WAY AND ALONG WETLAND EDGE AS REQUIRED.
9. FABRICATE PIPE IN A STAGING AREA OUTSIDE THE TYPE III WETLAND AS INDICATED ON THE CONSTRUCTION DRAWINGS.
10. LEAVE HARD PLUGS AT THE EDGE OF TYPE III WETLAND UNTIL JUST PRIOR TO PIPE PLACEMENT.
11. FLOAT PIPE IN PLACE, LOWER-IN, INSTALL TRENCH PLUGS AT WETLAND EDGES OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR AND BACKFILL IMMEDIATELY.
12. REMOVE ANY MATS OR FILL CONSISTING OF NON-NATIVE MATERIAL FROM WETLANDS UPON COMPLETION.
13. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY AND INSTALL PERMANENT EROSION CONTROL.
14. WETLANDS CROSSED USING PUSH/PULL METHOD TEND TO BE TOO WET FOR EFFECTIVE SEEDING. HOWEVER, IF THE SITE IS DRY ENOUGH AND IF DIRECTED BY THE ENVIRONMENTAL INSPECTOR, THE RIGHT-OF-WAY SHALL BE SEEDED WITH ANNUAL RYE GRASS TO STABILIZE THE AREA UNTIL INDIGENOUS WETLAND SPECIES CAN RE-ESTABLISH THEMSELVES.
15. NO FILL SHALL BE PLACED UNDERNEATH BOARD MATS DURING PROJECT CONSTRUCTION.
NOTES:

1. STEEL CABLES TO BE STRUNG THROUGH BOTH ENDS OF TIMBERS.

2. STEEL CABLES TO BE SECURED BY ANY OF FOLLOWING MEANS:
   — CLAMP ENDS OF CABLE INTO A LIFTING LOOP.
   — CLAMP ENDS OF CABLE SO CABLE CAN'T BE PULLED BACK THROUGH TIMBERS.
   — LOOP END OF STRUNG CABLE BACK THROUGH HOLES AT OTHER END OF TIMBER.

3. ALL MATERIALS TO BE SUPPLIED BY CONTRACTOR.
C/L ACCESS ROAD

SHOULDER OF ROAD

SHOULDER OF ROAD

C/L ACCESS ROAD

NOTE: 12" MIN. CULVERT SIZE (AS REQUIRED)

PLAN VIEW

NOT TO SCALE

B

A

SECTION A-A

NOT TO SCALE

BOTTOM OF DITCH

ROCK FILL (COMPACTED)

6" (MIN.)

6" AGGREGATE (MIN.)

15' (TYP.)

GEOTEXTILE MATERIAL (SEE NOTE 2)

SECTION B-B

NOT TO SCALE

NOTES:

1. CONTRACTOR SHALL FURNISH AND INSTALL ADEQUATE TRAFFIC CONTROL SIGNS, MARKERS, FLASHERS, ETC.

2. CONTRACTOR SHALL FURNISH AND INSTALL COMPANY APPROVED GEOTEXTILE MATERIAL.

TYPICAL CULVERT INSTALLATION IN STREAM/WETLAND CROSSING
1. TO BE USED ONLY WHERE SPECIFIED ON THE CONSTRUCTION DRAWINGS.

2. NOT TO BE USED TO FILTER STEADY STREAM FLOW.
NOTES:

1. INSTALL TRENCH BREAKERS WHERE PIPELINE TRENCH MAY DRAIN A WETLAND OR DIVERT A STREAM AS DIRECTED BY THE COMPANY. BREAKERS SHALL ALSO BE INSTALLED WHERE NATURAL DRAINAGE PATTERN, PROFILE AND TYPE OF BACKFILL MATERIAL MAY RESULT IN LOSS OF BACKFILL MATERIAL OR ALTERATION OF NATURAL DRAINAGE PATTERN.

2. INSTALL TRENCH BREAKERS IMMEDIATELY UPSLOPE OF ALL DIVERSION BERMS UNLESS OTHERWISE AUTHORIZED BY THE COMPANY REPRESENTATIVE.

3. SLOPE BREAKER LOCATIONS AND SPACING SHALL BE DETERMINED IN ACCORDANCE WITH "THE UPLAND EROSION CONTROL, REVEGETATION AND MAINTENANCE PLAN" AND ENVIRONMENTAL SPECIFICATIONS.

4. KEY EACH TRENCH BREAKER A MINIMUM OF ONE (1) FT. INTO BOTTOMS AND SIDES OF TRENCH.

5. OPEN WEAVE HEMP OR JUTE SACKS SHALL BE FILLED WITH AN AVERAGE 55 LBS. MIXTURE OF:
   1) ONE (1) PART CEMENT AND SIX (6) PARTS SAND OR SUBSOIL, OR
   2) ONE (1) PART CEMENT, THREE (3) PARTS FLYASH, AND FIVE (5) PARTS SAND OR SUBSOIL
   WITH JUST SUFFICIENT WATER TO PERMIT MIXTURE TO EXUDE AND BOND SACKS TOGETHER.
   TOPSOIL IS NOT TO BE USED IN SACKS. ALTERNATIVELY, FOAM TRENCH BREAKERS MAY BE USED AS SPECIFIED BY THE ENVIRONMENTAL INSPECTOR.
1. TO BE USED ONLY WHERE SPECIFIED ON THE CONSTRUCTION DRAWINGS.

2. NOT TO BE USED TO FILTER STEADY STREAM FLOW.
NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHEREEVER IT IS NECESSARY AND AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATERBODIES OR WETLANDS. ALL DEWATERING ACTIVITIES SHALL BE IN ACCORDANCE WITH ENVIRONMENTAL SPECIFICATION AND RELEVANT PERMITS.

2. DISCHARGE SITE SHOULD BE WELL VEGETATED AND LOCATED AT LEAST 50 FEET FROM ANY WATERCOURSE. THE TOPOGRAPHY OF THE SITE SHOULD BE SUCH THAT WATER WILL FLOW INTO THE DEWATERING STRUCTURE AND AWAY FROM ANY WORK AREAS. THE AREA DOWNSLOPE FROM THE WATERING SITE MUST BE REASONABLY FLAT OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.

3. DIRECT THE PUMPED WATER ONTO A STABLE SPILL PAD CONSTRUCTED OF ROCKFILL, WEIGHTED TIMBERS, OR A WOMEN GEOTEXTILE STAKED TO THE GROUND SURFACE, SUCH AS MIRAFIX 600X, TERRAFIX 400W, OR A COMPANY APPROVED EQUIVALENT. BEYOND THE SPILL PAD FORCE THE DISCHARGE WATER INTO SHEET FLOW USING STRAW BALES AND THE NATURAL TOPOGRAPHY.

4. DISCHARGE RATES SHOULD BE SUCH THAT THE CAPACITY OF THE STRUCTURE WILL NOT BE EXCEEDED.

5. DISCHARGE WATER SHALL BE FORCED INTO SHEET FLOW IMMEDIATELY BEYOND THE SPILL PAD USING A COMBINATION OF STRAW BALES AND THE NATURAL TOPOGRAPHY. RECESS STRAW BALES A MIN. OF FOUR (4) INCHES. DRIVE TWO (2) STAKES OR REBAR INTO EACH BALE TO ANCHOR THEM IN PLACE.

6. MANUFACTURED FILTER BAGS ARE A SUITABLE ALTERNATIVE TO STRAW BALE STRUCTURES FOR TRENCH DEWATERING. FILTER BAGS SHALL BE INSTALLED AS SPECIFIED BY THE MANUFACTURER. DISPOSE OF FULL FILTER BAGS AT AN APPROVED OFF-SITE FACILITY.
NOTES:

1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS; MAT/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
2. LAY BLANKET LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL; DO NOT STRETCH MATERIAL.
3. STAPLES SHALL BE INSTALLED PER THE STAPLE LAYOUT DETAIL AND WITH STANDARD MAT STAPLES.
4. ON SLOPED AREAS MATTING SHOULD BE INSTALLED VERTICALLY DOWNSLOPE.
CRITICAL POINTS
A. OVERLAPS AND SEAMS
B. PROJECTED WATER LINE
C. CHANNEL BOTTOM/SIDE SLOPES VERTICES

NOTES:
1. HORIZONTAL STAPLE SPACING SHOULD BE ALTERED IF NECESSARY TO ALLOW STAPLES TO SECURE THE CRITICAL POINT ALONG THE CHANNEL SURFACE.
2. REFER TO THE GENERAL STAPLE PATTERN GUIDE FOR CORRECT STAPLE PATTERN RECOMMENDATIONS FOR CHANNELS.

NOTES:
1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING APPLICATION OF LIME, FERTILIZER, AND SEED
2. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE BLANKET IN A 6" DEEP x 6" WIDE TRENCH; BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
3. ROLL CENTER BLANKET IN DIRECTION OF WATER FLOW ON BOTTOM OF CHANNEL.
4. PLACE BLANKETS END OVER END (SINGLE STYLE) WITH A 6" OVERLAP. USE A DOUBLE ROW OF STAGGERED STAPLES, 4" APART, TO SECURE BLANKETS.
5. FULL LENGTH Edge OF BLANKETS AT THE TOP OF SIDE SLOPES MUST BE ANCHORED IN 6" DEEP x 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER SAMPLING.
6. BLANKETS ON SIDE SLOPES MUST BE OVERLAPPED 4" OVER THE CENTER BLANKET AND STAPLED.
7. IN MEDIUM TO HIGH FLOW CHANNEL APPLICATIONS, A STAPLE CHECK SLOT IS RECOMMENDED AT 30 TO 40 FOOT INTERVALS. USE A ROW OF STAPLES 4" APART OVER THE ENTIRE WIDTH OF THE CHANNEL. PLACE A SECOND ROW 4" BELOW THE FIRST ROW IN A STAGGERED PATTERN.
8. THE TERMINAL END OF THE BLANKETS MUST BE ANCHORED IN A 6" DEEP x 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
NOTES:

1. FOR OPTIMUM PERFORMANCE, AND IF POSSIBLE, LOWER WATER FROM LEVEL A TO LEVEL B BEFORE INSTALLING.

2. PREPARE SOIL BEFORE INSTALLING BLANKETS INCLUDING APPLICATION OF LIME, FERTILIZER AND SEED.

3. THE TOP EDGE OF THE BLANKET MUST BE ANCHORED IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.

4. PLACE BLANKETS END OVER END WITH 6" OVERLAP. STAPLE THROUGH BOTH BLANKETS OF THE OVERLAPPED AREA APPROXIMATELY 12" APART.

5. THE EDGE OF THE BLANKET THAT FALLS BELOW NORMAL WATER LEVEL MUST BE ANCHORED IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. (STONE MAY BE SUBSTITUTED FOR SOIL BACKFILL).

6. IF BANK IS STEEP, OR IF WATER LEVEL VARIES MORE THAN THE WIDTH OF THE BLANKET, USE VERTICAL INSTALLATION.

7. IN LOOSE SOIL CONDITIONS; THE USE OF 12" OR LONGER METAL/WASHER PINS MAY BE NECESSARY TO PROPERLY ANCHOR THE BLANKETS.

8. REFER TO THE GENERAL STAPLE PATTERN GUIDE FOR CORRECT STAPLE PATTERN RECOMMENDATIONS FOR SHORELINES.
NOTES:
SILT FENCE REMOVED WHEN VEGETATION ESTABLISHED.
TYPICAL DRAWING: NONE

APPLICATION RATES AND LOCATIONS:

1. HYDRO-MULCH WITH TACKIFIER SHALL BE USED AT LOCATIONS IDENTIFIED ON THE CONSTRUCTION DRAWINGS AND/OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR TO PROTECT SOIL AGAINST EROSION. AREAS TARGETED FOR HYDRO MULCH INCLUDE SLOPES BETWEEN 40% AND 60%.

2. THE CONTRACTOR SHALL BE REQUIRED TO USE EXTENSION HOSES TO REACH INACCESSIBLE AREAS.

3. HYDRO-MULCH AND TACKIFIER SHALL BE APPLIED AT A RATE OF 3000 LBS/ACRE AND 120 LBS/ACRE RESPECTIVELY. IN A SINGLE APPLICATION HYDRO-MULCH AND TACKIFIER SHALL PRODUCE A UNIFORM, MAT-LIKE COVERING THE GROUND.

4. WHEN DIRECTED BY THE ENVIRONMENTAL INSPECTOR, TOPSOIL STOCKPILES SHALL BE TACKIFIED AT A RATE OF 120 LBS/ACRE TO CONTROL WIND EROSION.

HYDRO-MULCH MATERIAL:

1. THE HYDRO-MULCH MATERIAL SHALL CONSIST OF WOOD FIBERS MEETING THE FOLLOWING PHYSICAL AND CHEMICAL PROPERTIES:
   * MOISTURE CONTENT 12% - 3.0%
   * ORGANIC MATTER (DRIED-DRIED BASIS) 65.2% - 0.2%
   * ASH CONTENT 0.8% - 0.2%
   * WATER HOLDING CAPACITY 1000 GRAMS MIL.

   NOTE: WATER HOLDING CAPACITY = 100 GRAMS OF DRIED MULCH SATURATED, DRIED AND WEIGHTED.

2. THE HYDRO-MULCH MATERIAL SHALL MEET THE FOLLOWING ADDITIONAL REQUIREMENTS:
   * THE FIBERS SHALL NOT CONTAIN ANY GROWTH GERMINATION INHIBITING FACTORS.
   * THE FIBERS SHALL NOT BE PRODUCED FROM RECYCLED MATERIAL SUCH AS SANDSTU, CARDBOARD OR PULP AND PAPER PLANT RESIDUE.
   * THE FIBERS SHALL BE DESIGNED TO FACILITATE VISUAL METERING DURING APPLICATION.

3. THE HYDRO-MULCH SHALL BE SUPPLIED IN 50 POUND NET WEIGHT BAGS. EACH PACKAGE SHALL BE MARKED BY THE MANUFACTURER TO SHOW THE AIR-DRY CONTENT.

4. THE HYDRO-MULCH MATERIAL SHALL BE OF SUCH CONSISTENCY THAT AFTER BEING COMBINED IN A SLURRY TANK WITH WATER AND APPROVED TACKIFIER, THE FIBERS IN THE MATERIAL SHALL BE UNIFORMLY SUSPENDED TO FORM A HOMOGENEOUS SLURRY.

5. THE HYDRO-MULCH MATERIAL SHALL BE MANUFACTURED BY WEYERHAEUSER COMPANY, FIBER MARKETING INTERNATIONAL OR AN APPROVED EQUAL AND BE SUPPLIED IN PACKAGES MARKED BY THE MANUFACTURER TO SHOW THE AIR DRY WEIGHT CONTENT. MULCH WHICH HAS BEEN DAMAGED BY MOISTURE OR OTHER MEANS SHALL NOT BE ACCEPTED.

6. IF REQUESTED, THE CONTRACTOR SHALL SUBMIT A MINIMUM ONE (1) POUND BAG OF THE PRODUCT PROPOSED TO USE ON THE PROJECT TO COMPANY FOR TESTING OR, IF REQUESTED, THE CONTRACTOR SHALL SUBMIT A SIGNED STATEMENT CERTIFYING THAT THE MATERIAL FURNISHED HAS BEEN LABORATORY AND FIELD TESTED AND THAT IT MEETS REQUIREMENTS FOR ITS INTENDED USE.

EXPRESS MAY ACCEPT THE HYDRO-MULCH MATERIAL FOR USE BASED ON A CERTIFICATE OF COMPLIANCE.

TACKIFIER MATERIAL:

1. TACKIFIER SHALL MEET THE FOLLOWING REQUIREMENTS:
   * BE A BIODEGRADABLE ORGANIC FORMULATION.
   * CONSIST OF SPECIFICALLY BLENDED COMPATIBLE HYDROCOLLOIDS (SOLUBLE POLYSACCHARIDES, GUM OR PLANTAGO).
   * STARCH BASED TACKIFIERS ARE UNACCEPTABLE.
   * HAVE AN EQUILIBRIUM AIR-DRY MOISTURE CONTENT AT TIME OF MANUFACTURE OF 8% - 2% WITH A MINIMUM WATER HOLDING CAPACITY OF 6.5 TIMES BY WEIGHT OF DRY MATERIAL.
   * HAVE THE CHARACTERISTICS OF HYDRATING AND UNIFORMLY DISPERSING IN CIRCULATING WATER TO FORM A HOMOGENEOUS SLURRY AND REMAIN IN SUCH A STATE IN THE HYDRAULIC MIXING UNIT (USUALLY A HYDRO-MULCHER).

2. TACKIFIER SHALL BE SUPPLIED IN PACKAGES MARKED BY THE MANUFACTURER TO SHOW WEIGHT CONTENT. TACKIFIER WHICH HAS BEEN DAMAGED BY MOISTURE OR OTHER MEANS SHALL NOT BE ACCEPTED.
NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHEREVER IT IS NECESSARY AND AS DIRECTED BY THE ENGINEER TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATER BODIES OR WETLANDS. ALL DEWATERING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT CONDITIONS.

2. DISCHARGE SITE SHOULD BE WELL VEGETATED AND LOCATED AT LEAST 100FT. FROM ANY WATERCOURSE. THE TOPOGRAPHY OF THE SITE SHOULD BE SUCH THAT WATER WILL FLOW INTO THE DEWATERING STRUCTURE AND AWAY FROM ANY WORK AREAS. THE AREA DOWNSLOPE FROM THE WATING SITE MUST BE REASONABLY LEVEL OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.

3. DIRECT THE PUMPED WATER ONTO A STABLE SPILL PAD CONSTRUCTED OF STRAW BALES, ROCK FILL, WEIGHTED TIMBERS, OR A WOVEN GEOTEXTILE STAKED TO THE GROUND SURFACE.

4. DISCHARGE RATES SHOULD BE SUCH THAT THE STRUCTURE WILL NOT OVERFLOW.

5. DISCHARGE WATER TO BE FORCED INTO SHEET FLOW IMMEDIATELY BEYOND THE SPILL PAD USING A COMBINATION OF STRAW BALES AND THE NATURAL TOPOGRAPHY. RECESS STRAW BALES A MINIMUM OF 4 IN. DRIVE TWO STAKES OR REBAR INTO EACH BALE TO ANCHOR THEM IN PLACE.

6. MANUFACTURED FILTER BAGS ARE A SUITABLE ALTERNATIVE TO STRAW BALE STRUCTURES FOR TRENCH DEWATERING.

7. ENERGY DISSIPATOR DEVICE SHALL BE ANCHORED BY CONTRACTOR.
SECTION 'A-A'
SCALE: N.T.S.

- EROSION CONTROL BLANKET (FOR PERMANENT INSTALLATIONS ONLY)
- COMPACTED SOIL
- EXCAVATED CHANNEL
- GRADE
- 1 FT. (MIN.)
- 5 FT. TO 12 FT.
- 1.5 FT. (MIN.)
- STAPLES (TYP.)
- ANCHOR FRONT EDGE OF BLANKET IN A MIN. 6 IN. DEEP BY 6 IN. WIDE TRENCH

NOTES:
1. ADDITIONAL BERMS WILL BE INSTALLED WITH ALTERNATE DIRECTIONS OF FLOW.
2. EROSION CONTROL BLANKET FOR PERMANENT DIVERSION BERMS SHALL CONSIST OF NORTH AMERICAN GREEN SC150 OR EQUIVALENT.
3. UPSLOPE EDGE OF BLANKET TO BE ANCHORED IN A 6 INCH x 6 INCH TRENCH.
4. TOTAL WIDTH OF BLANKET INSTALLATION TO BE AT LEAST 6 FT., (INCLUDING ANCHORING DETAILS).
5. LONGITUDINAL SLOPE TO BE GREATER THAN 1% AND LESS THAN 5%.
6. ENERGY DISSIPATING DEVICES CAN INCLUDE FENCES, ROCK, OR BLANKETS.
7. FOR TEMPORARY USE PRIOR TO FINAL CLEAN-UP, DIVERSION BERMS DO NOT REQUIRE A LINING, AND MAY BE DESTROYED EACH DAY TO ALLOW CONSTRUCTION ACTIVITIES. HOWEVER, THEY SHALL BE RECONSTRUCTED NIGHTLY. TEMPORARY BERMS CAN TYPICALLY BE CONSTRUCTED WITH A SINGLE PASS OF A BULLDOZER. MAINTAIN BREAKS IN SPOIL PILES TO ACCOMMODATE BERMS. MODIFY BERMS AS NECESSARY TO AVOID DISCHARGE OF RUN-OFF WATER INTO ANY OPEN DITCH.
EXCAVATED TOE DETAIL

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* INDICATES THAT NOT MORE THAN 20% OF TOTAL ROCK QUANTITIES SHALL BE LESS THAN 20 LBS. EACH.

1. ALL AREAS TO BE REVETTED SHALL BE CLEARED OF ALL TREES, BRUSH, LOGS, STUMPS AND DEBRIS.
2. RIP RAP SHALL BE PLACED IN SUCH A MANNER AS TO PRODUCE A REASONABLY WELL GRADED MASS.
3. THE FINISHED RIP RAP SHALL BE FREE OF OBJECTIONABLE POCKETS OF SMALL STONES.
4. PLACING OF RIP RAP WHICH MAY CAUSE SEGREGATION OF VARIOUS SIZES, WILL NOT BE PERMITTED.
5. RIP RAP SHALL BE NATURAL OR BROKEN STONE OR OTHER MATERIAL ACCEPTABLE TO THE COMPANY AND GOVERNING AGENCY.
6. THE FINISHED RIP RAP TO BE ACCEPTED BY THE GOVERNING AGENCY PRIOR TO LEAVING THE AREA.
NOTES:
1. INSTALL PRIOR TO GRADING.
2. ANGLE FIRST STAKE TOWARD PREVIOUSLY POSITIONED BALE.
3. IMBED BALES IN EARTH APPROXIMATELY 4".
4. WHEN REMOVING BALES, SCATTER SILT AND STRAW ACROSS RIGHT-OF-WAY.
5. ALL MATERIALS TO BE SUPPLIED BY CONTRACTOR.
NOTES:

1. WATER SHALL BE DIVERTED OFF THE GRADED RIGHT-OF-WAY BY CONSTRUCTING DIKES
   ACCORDING TO THE FOLLOWING PROCEDURE.
   
   A. THE HORIZONTAL CONTOUR LINE ACROSS THE ENTIRE RIGHT-OF-WAY WIDTH
      WILL BE ESTABLISHED AT EACH INTERCEPT OR DIKE. THE HORIZONTAL
      CONTOUR
      LINE WILL BE PERPENDICULAR TO THE DIRECTION OF FLOW. A SURVEYOR'S
      LEVEL
      OR HAND LEVEL WILL BE USED TO LOCATE THE CONTOUR LINE.

   B. THE WATER BAR SHALL SLOPE DOWNHILL 5' - 10' FROM HORIZONTAL CONTOUR
      LINE
      AND TOWARD DISCHARGE SIDE. CHANNEL THE FLOW TO THE SIDE OF THE GRADED
      RIGHT-OF-WAY WITH THE BEST VEGETATIVE COVER AND TOPOGRAPHY. IF VEGETATION
      IS SPARSE SECURE OUTLET WITH STRAW BALES.

2. SLOPE BREAKER SPACING SHALL BE IN ACCORDANCE WITH LOCAL SOIL CONSERVATION
   SERVICE RECOMMENDATIONS. IN ABSENCE OF THESE RECOMMENDATIONS THE ABOVE
   TABLE SHALL BE USED.

3. REFER TO "ENVIRONMENTAL AND RIGHT-OF-WAY STIPULATIONS" FOR INSTALLATION.
2" MIN. OVERLAP AT ALL SEAMS

PLACE STAPLES 3' TO 4' APART AROUND OUTSIDE EDGE

TYPICAL STAPLES CONSTRUCTED OF 8 GAUGE WIRE

1 1/2"

6"

10"

NOTES:

1. INSTALL AT LOCATIONS DIRECTED BY COMPANY (BOTTOM OF SURFACE DRAINS, STREAM BANKS, AND STEEP SLOPE AREAS).

2. LIME, FERTILIZE AND SEED, BY HAND, AREA TO BE THATCHED.

3. HYDROSEED OR EQUIVALENT AFTER INSTALLING.

4. ALL MATERIALS TO BE SUPPLIED BY CONTRACTOR.
NOTES:

SILT FENCES ARE CONSTRUCTED FROM SYNTHETIC MESH MATERIAL DESIGNED TO RETAIN SILT WHILE ALLOWING WATER TO PASS THROUGH. (AMOCO CONSTRUCTION FABRIC 1380 Silt Stop or Approved Equal).

SILT FENCES WILL BE CONSTRUCTED AT THE EDGE OF THE ROW:

- AT THE OUTFALL OF AN INTERCEPTOR DIKE IF NATURAL VEGETATION IS INSUFFICIENT TO FILTER THE SILT FROM THE RUN-OFF WATER.

- AT THE BASE OF SLOPES ADJACENT TO ROADWAYS AND STREAMS WHEN THE NATIVE VEGETATION COVER HAS BEEN DISTURBED.

- WHEN THE DISTANCE (IN AREAS OF GOOD VEGETATION COVER) OF THE ROW TO A BODY OF WATER IS EQUAL TO OR LESS THAN THE FOLLOWING SCHEDULE.

<table>
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<th>DISTANCE</th>
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<tr>
<td>0 - 5%</td>
<td>25 FEET</td>
</tr>
<tr>
<td>5 - 15%</td>
<td>50 FEET</td>
</tr>
<tr>
<td>15 - 30%</td>
<td>75 FEET</td>
</tr>
<tr>
<td>OVER 30%</td>
<td>100 FEET</td>
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- WHEN THE DISTANCE (IN AREAS OF POOR VEGETATION COVER) OF THE ROW TO A BODY OF WATER IS WITHIN 150 FEET AND THE AREA SLOPES TOWARD THE WATER.
NOTES:

1. INSTALL PRIOR TO GRADING.
2. ANGLE FIRST STAKE TOWARD PREVIOUSLY LAID BALE.
3. IMBED BALES IN EARTH APPROXIMATELY 4”.
4. WHEN REMOVING BALES, SCATTER SILT AND STRAW OVER RIGHT-OF-WAY.
5. ALL MATERIALS TO BE SUPPLIED BY CONTRACTOR.
SECTION "A−A"

NOTES:

1. BREAKERS SHALL BE INSTALLED ON ALL SLOPES GREATER THAN OR EQUAL TO 5% AT STREAM BANKS AND AT LOCATIONS DIRECTED BY COMPANY.

2. BREAKERS SHALL BE INSTALLED AT A SPACING SUCH THAT THE TOP OF THE LOWER BREAKER IS AT THE SAME ELEVATION AS THE BOTTOM OF THE NEXT HIGHER BREAKER.

3. DITCH PLUGS SHALL CONSIST OF EITHER SANDBAG BURLAP SACKS FILLED WITH A MINIMUM OF 0.6 FOOT OF EARTH OR SPRAYED−IN−PLACE POLYURETHANE FOAM, MINIMUM DENSITY OF 1.75 LB/CF AS DIRECTED BY COMPANY.

4. INSTALL ½" TERRA SHIELD PERFORATED ROCKSHIELD, FOR SACK BREAKERS, AND FIBER−BACKED (NOT FOAM−BACKED) CARPET FOR FOAM BREAKERS.

5. REFER TO "ENVIRONMENTAL AND RIGHT−OF−WAY STIPULATIONS" FOR INSTALLATION.
1. Windrow boulders/shot rock

2. Saddle weights

3. Straw bales (staked)

NOTES:

1. Other structures may be substituted if approved by engineer.
NOTES:

1. TEMPORARY SILL SHALL BE INSTALLED AT STREAM CROSSING LOCATIONS AS SPECIFIED BY COMPANY PRIOR TO ANY EXCAVATION WITHIN STREAMBANKS.

2. SILL SHALL BE CONSTRUCTED OF CONCRETE ECOLOGY BLOCKS (4'Lx2'Wx2'H) OR APPROVED EQUAL. CONTRACTOR SHALL PROVIDE AND PLACE ADDITIONAL REINFORCEMENT BLOCKS AS REQUIRED TO STABILIZE TEMPORARY SILL AND TO MINIMIZE WATER FLOW BETWEEN SILL BLOCKS.

3. TEMPORARY SILL SHALL BE COMPLETELY REMOVED UPON COMPLETION OF TRENCH BACKFILL. REMOVAL SHALL BE SYSTEMATIC AND GRADUAL TO MINIMIZE REENTRAINMENT OF DISTURBED SEDIMENTS. CONTRACTOR SHALL RESTORE STREAM BED AND BANKS AS NEARLY AS PRACTICAL TO PRECONSTRUCTION CONTOURS.
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4. PLACING OF RIP RAP WHICH MAY CAUSE SEGREGATION OF VARIOUS SIZES, WILL NOT BE PERMITTED.
5. RIP RAP SHALL BE NATURAL OR BROKEN STONE OR OTHER MATERIAL ACCEPTABLE TO THE COMPANY AND GOVERNING AGENCY.
6. THE FINISHED RIP RAP TO BE ACCEPTED BY THE GOVERNING AGENCY PRIOR TO LEAVING THE AREA.
1. MATING/NETTING SHALL BE RUN HORIZONTAL AND PARALLEL TO THE GROUND CONTOUR FOR THE FULL WIDTH OF THE PERMANENT ROW. RIPRIP MAY NOT BE PLACED HIGHER THAN TOP OF BANK VERTICALLY.

2. ONLY THE FOLLOWING MATERIALS MAY BE USED AS RIPRIP: CLEAN STONE, BROKEN CONCRETE, CONCRETE BLOCKS, FABRIC FORMED CONCRETE, ROCK & WIRE MATTRESSES, AND SAND/CEMENT FILLED BAGS OVER GEITECH FABRIC MATERIALS.

3. IF BROKEN CONCRETE IS USED, PROTRUDING MATERIALS SUCH AS STEEL REBAR SHALL BE CUT FLUSH WITH THE SURFACE OF THE CONCRETE AND REMOVED FROM CONSTRUCTION AREA.

4. STAPLES SHALL BE 10" LONG, STANDARD MATING/NETTING STAPLES.

5. THIS METHOD RECOMMENDED FOR SLOPES GREATER THAN 1.5 TO 1 OVER (34°)

6. DUMPED STONE MAY BE PLACED AT A SLOPE OF 2 TO 1 OR FLATTER. (27°)

7. HAND PLACED STONE SHOULD BE PLACED AT A SLOPE OF 1.5 TO 1 OR FLATTER. (34°)

8. RIPRIP CANNOT CHANGE THE CROSS SECTIONAL PROFILE OF THE STREAM AFTER CONSTRUCTION. THE BANK MAY BE GRADED TO ALLOW PLACEMENT OF RIPRIP TO BE EVEN WITH ADJACENT ELEVATIONS.

9. IN ILLINOIS THE INSTALLATION OF RIPRIP SHALL FOLLOW THE GUIDELINES AS LISTED IN THE STATE WIDE PERMIT NO. 9 FOR MINOR STREAM BANK STABILIZATION.
NOTES:

1. ROCK PADS WILL BE INSTALLED AT ROAD CROSSINGS WITH HIGH TRAFFIC VOLUME. TO MINIMIZE TRACKING MUD ONTO THE ROAD, CRUSHED STONE SHALL BE 6 INCHES.

2. MINIMUM ROCK PAD DIMENSIONS SHALL BE 20 FEET LONG AND 15 FEET WIDE. ADDITIONAL LENGTH WILL BE REQUIRED UNDER ADVERSE CONDITIONS.

3. HAY BALES MAY BE USED IN LIEU OF SILT FENCES.

4. IN AGRICULTURAL LAND, A 4 TO 6 INCH LAYER OF SAND OR A SYNTHETIC FIBER MAT WILL BE PLACED BELOW THE ROCK PAD TO FACILITATE ROCK REMOVAL UPON COMPLETION.
NOTES:

1. Matting/netting shall be run horizontal and parallel to the ground contour for the full width of the permanent row.
2. Sandbags may not be placed higher than top of bank vertically.
3. Staples shall be 10" long, standard matting/netting staples.
4. Roll any excess bag under sandbag.
5. Sandbags cannot change the cross-sectional profile of the stream after construction. The bank may be graded to allow placement of sandbags to be even with adjacent elevations.
6. In Illinois, the installation of sandbags shall follow the guidelines as listed in the state wide permit No. 8 for minor stream bank stabilization.
NOTES:

THE ENTIRE RIGHT-OF-WAY SHALL BE SEEDED. SEEDING METHOD, MIX AND APPLICATION RATE SHALL BE AS SPECIFIED IN THE CONSTRUCTION DRAWINGS, OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR. SEED SHALL BE EVENLY DISTRIBUTED.

A. BROADCAST

1. HAND OR MECHANICAL BROADCAST SEEDING SHALL BE USED AS SPECIFIED IN THE CONSTRUCTION AND ENVIRONMENTAL SPECIFICATIONS, UNLESS OTHERWISE DETERMINED BY THE ENVIRONMENTAL INSPECTOR.

2. BROADCAST SEEDING BY HAND SHALL BE WITH A CYCLONE SHOULDER STRAP BROADCAST SPREADER OR AN APPROVED EQUIVALENT. DISTRIBUTING SEED BY HAND WITHOUT A MECHANICAL BROADCASTER WILL NOT BE ALLOWED.

B. HYDROSEEDING

1. HYDRAULIC SEEDING EQUIPMENT (HYDRO-SEEDER) MAY BE USED, PROVIDING 1 POUND OF WOOD FIBER PER THREE (3) GALLONS OF WATER IS ADDED IN THE HYDRAULIC SEEDER TO CUSHION SEED DURING APPLICATION.

2. AFTER BLENDING SEED AND MULCH, THE SLURRY SHALL BE APPLIED TO THE SEEDBED WITHIN ONE HOUR AFTER THE SEED HAS BEEN ADDED TO THE MIXTURE. IF SLURRY CAN NOT BE APPLIED WITHIN THE SPECIFIED ONE HOUR, IT SHALL BE RECHARGED AT NO COST TO THE COMPANY, WITH THE CORRECT RATIO OF SEED TO THE REMAINING SLURRY AND A NEW ONE HOUR TIME FRAME ESTABLISHED FOR APPLYING THE FORTIFIED MIXTURE.

3. HYDROSEEDING SHALL BE CONDUCTED TO ENSURE SEED/SOIL CONTACT BY DIRECTING THE SPRAY AT THE GROUND AND AS MUCH AS POSSIBLE, MIXING SOIL, SEED AND MULCH TOGETHER.

4. THE CONTRACTOR SHALL BE REQUIRED TO USE EXTENSION HOSES TO REACH INACCESSIBLE AREAS.

5. THE MULCH USED AS A CUSHION MAY BE PART OF TOTAL REQUIRED MULCH, WITH THE REMAINDER APPLIED IN A SEPARATE APPLICATION AFTER SEED IS IN PLACE.

C. DRILL

1. DRILL SEEDING EQUIPMENT MUST BE OF RANGE OR RECLAMATION TYPE FOR APPLYING GRASS AND/OR FLUFFY SEED. THE DRILL SEEDER MUST REGULATE THE SEED APPLICATION RATE AND PLANTING DEPTH AND SHALL BE EQUIPPED WITH PRESS WHEELS. PLANTING DEPTH SHALL BE REGULATED BY DEPTH BANDS OR COULTERS. THE ROWS OF PLANTING SEED SHALL BE A MAXIMUM OF ELEVEN (11) INCHES APART. A DRILL SHALL BE NO WIDER THAN THE WIDTH OF THE AREA OVER WHICH IT IS TO OPERATE. THE DRILL BOX SHALL BE PARTITIONED BY DIVIDERS NO MORE THAN 24 INCHES APART, IN ORDER TO PROVIDE FOR MORE EVEN DISTRIBUTION ON SLOPING AREAS.

2. SEED MUST BE UNIFORMLY DISTRIBUTED IN THE DRILL HOPPER DURING OPERATION.

3. SEEDING DEPTH SHALL BE AT LEAST ¼ INCH AND A MAXIMUM OF ½ INCH OR AS SPECIFIED BY THE ENVIRONMENTAL INSPECTOR.
NOTES:

1. STRAW MULCH SHALL BE USED AT LOCATIONS IDENTIFIED ON THE CONSTRUCTION DRAWINGS AND/OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR TO PROTECT SOIL FROM EROSION. AREAS TARGETED FOR STRAW MULCH INCLUDE SLOPES BETWEEN 8% AND 40%.

2. STRAW MULCH SHALL BE APPLIED AT A RATE OF 2 TONS/acre. IN AREAS WHERE RESPREAD TOPSOIL EXHIBITS AN ADEQUATE COVER FROM RESPREAD PLANT DEBRIS AND COARSE FRAGMENTS, MULCH RATES MAY BE REDUCED OR ELIMINATED BY THE ENVIRONMENTAL INSPECTOR.

3. ONLY CERTIFIED NOXIOUS WEED-FREE STRAW SHALL BE USED. WRITTEN CONFIRMATION FROM A CERTIFIED SUPPLIER SHALL BE REQUIRED.

4. STRAW FIBER LENGTH SHALL BE AT LEAST EIGHT (8) INCHES LONG AND CRIMPED IN PLACE AFTER APPLICATION.

5. EQUIPMENT SPECIFICALLY DESIGNED TO CRIMP STRAW (SUCH AS STRAW MULCH CRIMPER MANUFACTURED BY FINN CORPORATION OR AN APPROVED EQUIVALENT) SHALL BE USED TO CRIMP STRAW FIBERS TO A DEPTH OF TWO (2) TO THREE (3) INCHES. STEEP SLOPES INACCESSIBLE WITH A CRIMPER SHALL BE CRIMPED BY TRACKING WITH A CRAWLER RUNNING PERPENDICULAR TO THE SLOPE. DISCS SHALL NOT BE ALLOWED FOR CRIMPING.
STEP 1
ON LEVEL LAND, DIG A SUMP DEPENDING ON ACTUAL FLOW RATES APPROXIMATELY 200 SQ. FT., WHICH IS 2'' DEEP AT THE CENTER. PLACE A LAYER OF STRAW BALES AS SHOWN, TO COMPLETELY SURROUND THE SUMP.

STEP 2
INSTALL SILT FENCE ALL AROUND THE STRAW BALES, (IF LAND IS LEVEL) DIG IN SILT FENCE 6''.

STEP 3
INSTALL AN OUTER LAYER OF BALES AROUND THE SILT FENCE, AND SECURE EACH BALE USING WOODEN STAKE. COVER THE ENTIRE SUMP WITH HI-VELOCITY EROSION CONTROL FABRIC (CURLEX OR EQUAL) BEFORE PUMPING THE WATER INTO THE FACILITY.

NOTE: PUMP INTAKE HOSE MUST NOT BE ALLOWED TO REST ON THE TRENCH BOTTOM THROUGHOUT DEWATERING. PROVISIONS MUST BE MADE TO ELEVATE THE INLET HOSE TO AT LEAST ONE FOOT ABOVE THE TRENCH BOTTOM UNTIL BOTTOM DEWATERING IS NECESSARY.

EROSION CONTROL DURING PIPELINE DITCH, AND HYDROSTATIC TEST DEWATERING FOR LEVEL AREAS WITH SPARSE VEGETATION.
NOTE:
1. ENSURE DISCHARGE AREA IS COVERED BY STABLE VEGETATION.
2. USE DIFFUSER NOZZLE OR LOW DISCHARGE RATE TO PREVENT SCOURING.
3. USE A FLOATATION DEVICE ON INTAKE; & MAINTAIN DISTANCE FROM SIDES & BOTTOM OF DITCH.

NOTE:
1. USE ON SLOPING TERRAIN OR IN AREA WITH EROSION PROBLEM SOILS.
2. USE DIFFUSER NOZZLE OR LOW DISCHARGE RATE TO PREVENT SCOURING.
3. ADDITIONAL STRAW BALES MAY BE USED TO INCREASE RETENTION & FILTERING.
4. USE A FLOATATION DEVICE ON INTAKE; & MAINTAIN DISTANCE FROM SIDES & BOTTOM OF DITCH.
D = 3 FEET
W = 5 TO 9 FEET
L = APPROXIMATELY 18 - 24 INCHES
NOTE: TRENCH PLUGS MAY NOT BE CONSTRUCTED USING TOPSOIL.
NOTES:

1. EROSION CONTROL BLANKETS SHALL BE NORTH AMERICAN GREEN S 150 FOR SLOPES 3 TO 1 AND SC 150 FOR SLOPES 2 TO 1 OR APPROVED EQUIALS.

2. INSTALL BLANKETS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

3. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING GRADING, REMOVAL OF LARGE ROCKS AND DEBRIS, AND THE APPLICATION OF SEED AND FERTILIZER.

4. EROSION CONTROL BLANKETS SHALL EXTEND COMPLETELY ACROSS DISTURBED AREAS TO PROTECT ERODIBLE SURFACES.

5. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A MINIMUM SIX (6) INCHES WIDE AND SIX (6) INCHES DEEP TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.

6. ROLL THE BLANKETS DOWN THE SLOPE IN THE DIRECTION OF THE WATER FLOW.

7. AS AN ALTERNATIVE TO STAPLES, WOODEN STAKES CAN BE USED.

8. ENSURE COMPLETE CONTACT BETWEEN THE BLANKETS AND THE SLOPE FACE. ADDITIONAL STAPLES CAN BE USE TO ELIMINATE GAPS.