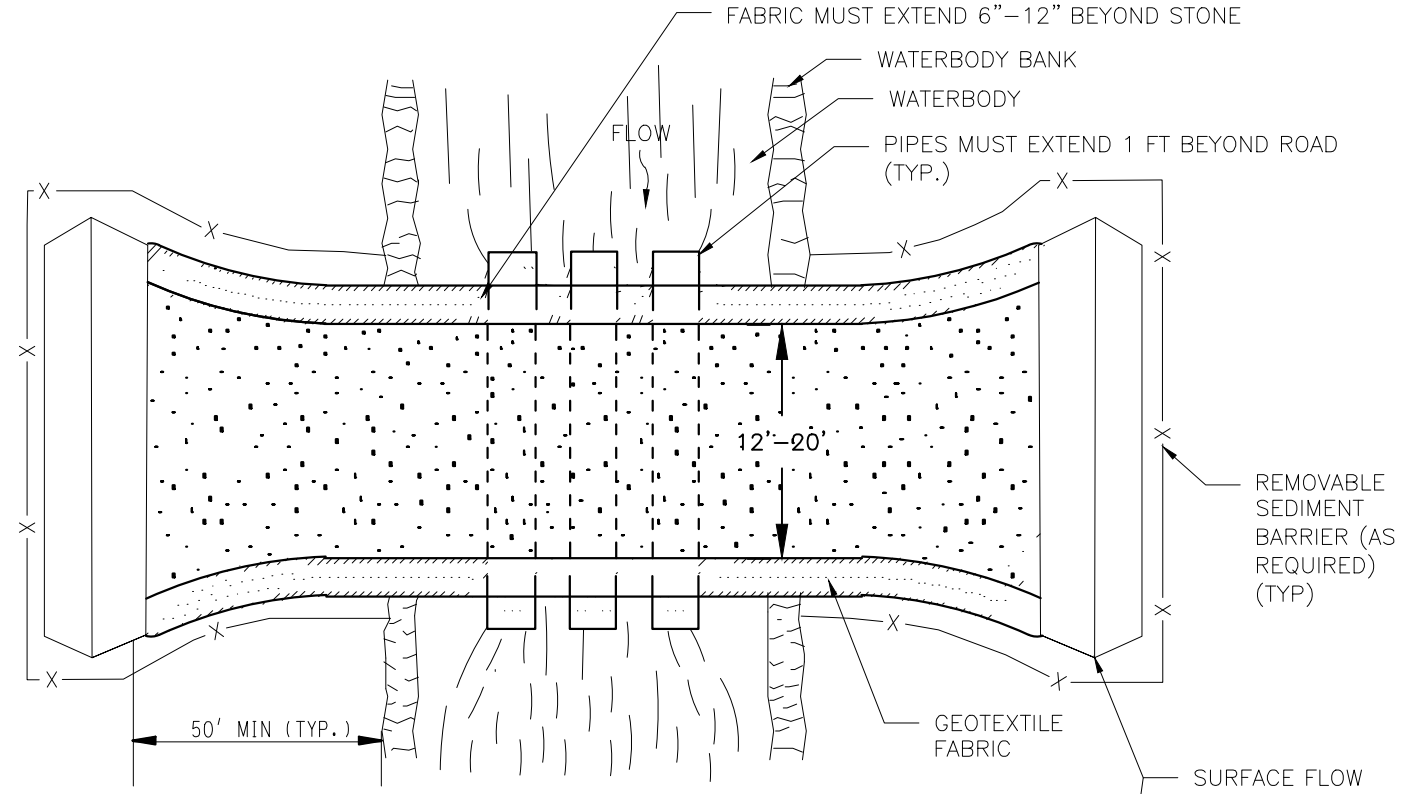
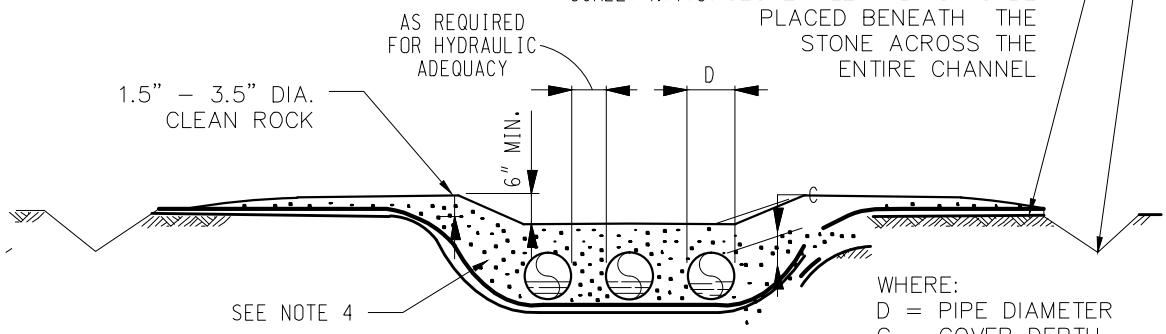
24” TYPICAL 75’ CONSTRUCTION WORKSPACE **(MASSACHUSETTS AND NEW YORK LOOP ONLY)**
24” TYPICAL 100’ CONSTRUCTION WORKSPACE **(MASSACHUSETTS AND NEW YORK LOOP ONLY)**
24” TYPICAL 125’ CONSTRUCTION WORKSPACE **(MASSACHUSETTS AND NEW YORK LOOP ONLY)**
24” TYPICAL 150’ CONSTRUCTION WORKSPACE **(MASSACHUSETTS AND NEW YORK LOOP ONLY)**



PLAN VIEW

SCALE: N.T.S.



PROFILE

SCALE: N.T.S.

NOTES:

1. TEMPORARY STREAM CROSSING SHALL BE INSPECTED ON A DAILY BASIS AND BUILD–UP OF SEDIMENT OR DEBRIS ON BRIDGE SHALL BE REMOVED.
2. CULVERTS SHALL BE PLACED AT LEAST ONE– HALF (1/2) THEIR DIAMETER APART.
3. ALL MATERIAL AND EQUIPMENT PLACED IN THE WATERBODY CHANNEL SHALL BE COMPLETELY REMOVED DURING FINAL CLEAN–UP. REMOVAL OF THESE ITEMS ARE NOT CONTINGENT UPON ESTABLISHMENT OF PERMANENT VEGETATION.
4. ONLY CLEAN ROCK WILL BE USED. THE ROCK MUST BE SIZED ACCORDING TO THE ANTICIPATED FLOW CONDITIONS. THE ROCK SIZE USED SHALL CONFORM TO CHAPTER 105 GENERAL PERMIT REQUIREMENTS. THE ROCK FILL SHOULD BE EXTENDED A MINIMUM OF 50' FROM THE TOP OF BANK ON EACH SIDE OF THE CROSSING. THE FILL SHOULD BE DEPRESSED A MINIMUM OF 6" OVER THE CHANNEL TO ALLOW FOR OVERFLOW. THE MAXIMUM DEPTH OF FILL OVER THE CULVERT IS THE MINIMUM THE MANUFACTURER REQUIRES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL LOAD CALCULATIONS REQUIRED TO ENSURE THE INSTALLED PIPES CAN STRUCTURALLY SUPPORT THE CONSTRUCTION EQUIPMENT. THIS SHALL INCLUDE, BUT IS NOT LIMITED TO, PIPE MATERIAL SELECTION AND REQUIRED PIPE COVER DEPTH.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

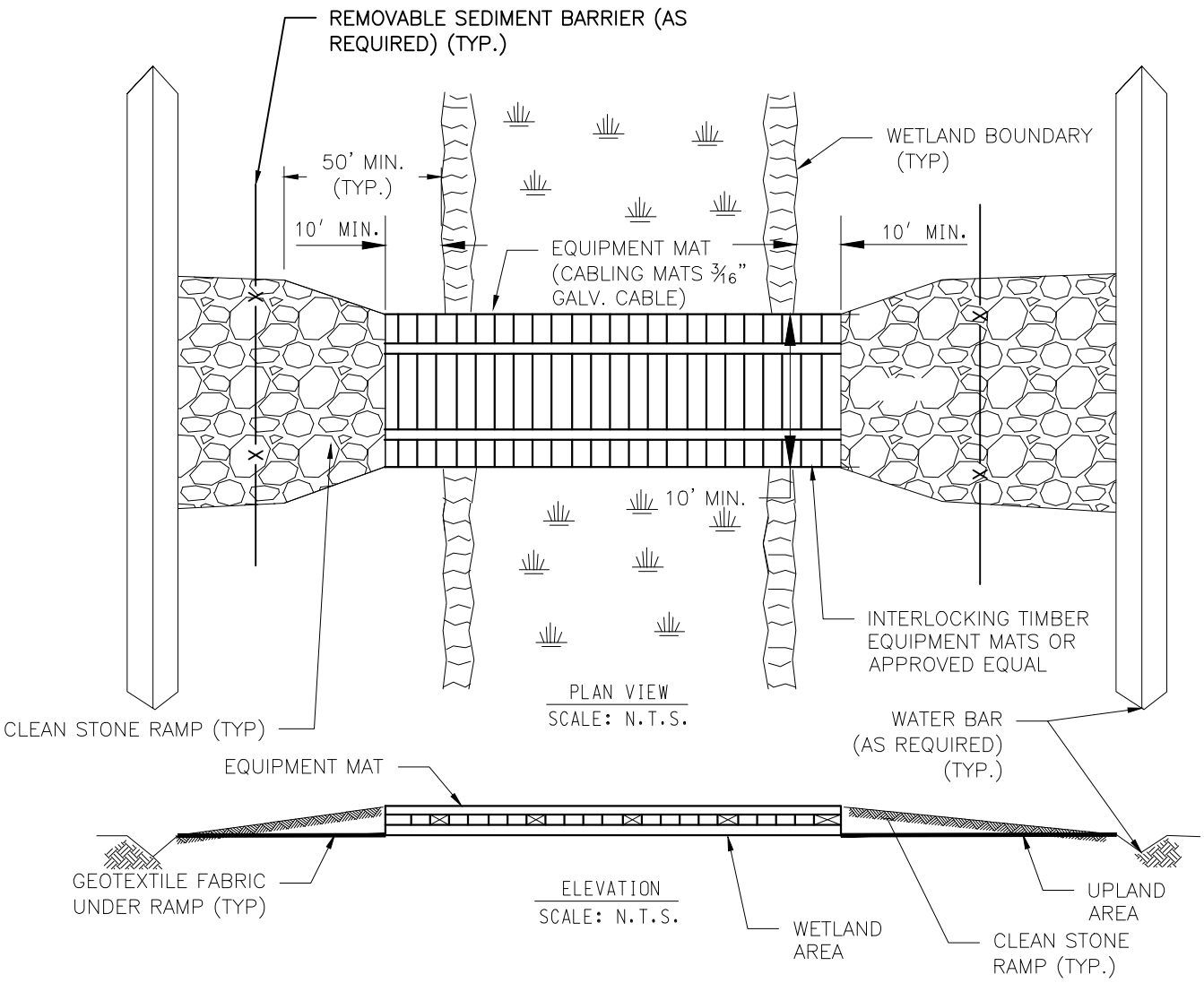
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
CULVERT EQUIPMENT CROSSING

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 1

Sheet: 1 of 127

Type:



NOTES:

1. INSPECT ON A DAILY BASIS AND REMOVE BUILD–UP OF SEDIMENT AND DEBRIS.
2. MATERIALS PLACED IN WETLANDS SHALL BE COMPLETELY REMOVED DURING FINAL CLEAN–UP. REMOVAL OF THESE MATERIALS IS NOT CONTINGENT UPON ESTABLISHMENT OF PERMANENT VEGETATION.
3. IF A WATERBODY IS LOCATED WITHIN A WETLAND, EXTEND EQUIPMENT MATS TO THE BRIDGE EQUIPMENT CROSSING CONSTRUCTED TO CROSS THE WATERBODY IN ORDER TO ALLOW FOR CONTINUOUS EQUIPMENT MAT COVERAGE THROUGH THE WETLAND AND WATERBODY AREA.
4. USE ADDITIONAL EQUIPMENT MATS TO RAISE THE CROSSING ABOVE THE ELEVATION WHERE POOR SOIL CONDITIONS EXIST. A MAXIMUM OF 2 TIMBER MAT LAYERS MAY BE USED WITHIN WETLANDS UNLESS OTHERWISE APPROVED BY THE ENVIRONMENTAL INSPECTOR.
5. EQUIPMENT MATS SHALL EXTEND A MINIMUM OF 10 FEET OUTSIDE OF THE WETLAND AND WATERBODY BOUNDARIES.
6. INSTALL CLEAN STONE RAMP APPROACHES TO EQUIPMENT MATS IN WETLAND AREAS.
7. EQUIPMENT MATS ARE TO BE CONSTRUCTED OF 4'X4' WOOD MEMBERS, LINKED WITH 3/16 GALVANIZED STEEL CABLE TO ENSURE REMOVAL OF ALL MATS.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

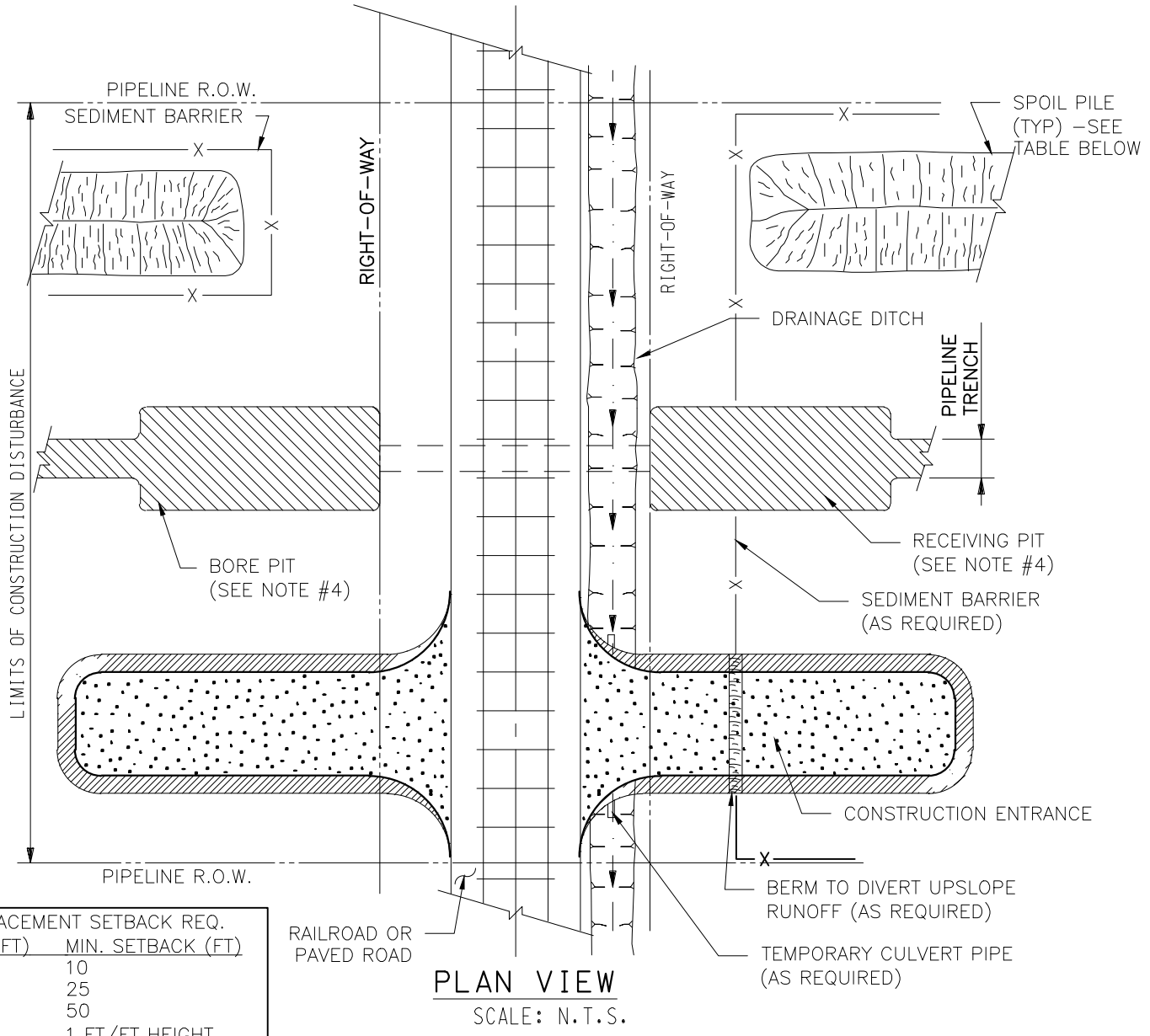
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
WETLAND EQUIPMENT CROSSING

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 2

Sheet: 2 of 127
Type:



PLAN VIEW

SCALE: N.T.S.

SPOIL PLACEMENT SETBACK REQ.	
HT. FILL (FT)	MIN. SETBACK (FT)
<10	10
10–25	25
25–50	50
>50	1 FT/FT HEIGHT

NOTES:

1. A SEDIMENT BARRIER SHALL BE INSTALLED AT THE BASE OF SLOPES ADJACENT TO THE CROSSING WHERE VEGETATION IS DISTURBED TO INTERCEPT SURFACE RUNOFF.
2. PROTECTION FOR SPOIL PILES SHALL BE INSTALLED ONLY WHERE SEDIMENT BARRIERS ACROSS THE ENTIRE DISTURBED AREA ARE NOT REQUIRED.
3. SEDIMENT BARRIERS SHALL BE MAINTAINED IN PLACE UNTIL PERMANENT REVEGETATION IS ESTABLISHED.
4. ANY WATER REMOVED FROM THE BORE PIT OR RECEIVING PIT SHALL BE FILTERED THROUGH AN APPROVED DEWATERING STRUCTURE OR FILTER BAG.
5. IF WELL POINTING IS REQUIRED, THE CONTRACTOR SHALL CONSULT WITH THE ENVIRONMENTAL INSPECTOR PRIOR TO COMMENCEMENT OF WORK IN ORDER TO DETERMINE PROPER DEWATERING LOCATIONS AND METHODS.
6. THE CONTRACTOR SHALL BE REQUIRED TO KEEP THE CROSSING CLEAR OF DEBRIS AT ALL TIMES.
7. THE CONTRACTOR MAY ELECT TO UTILIZE SHEET PILING IN ORDER TO STABILIZE THE BORE PITS AND RECEIVING PITS.
8. DEPENDING ON TOPOGRAPHY AND STATE AGENCY REQUIREMENTS, A SEDIMENT BARRIER MAY BE REQUIRED ACROSS THE ENTIRE CONSTRUCTION RIGHT OF WAY AT THE EDGE OF CROSSING. IN ADDITION TO THIS DETAIL, REFER TO THE ENVIRONMENTAL ALIGNMENT DRAWINGS FOR PLACEMENT OF SEDIMENT BARRIERS.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

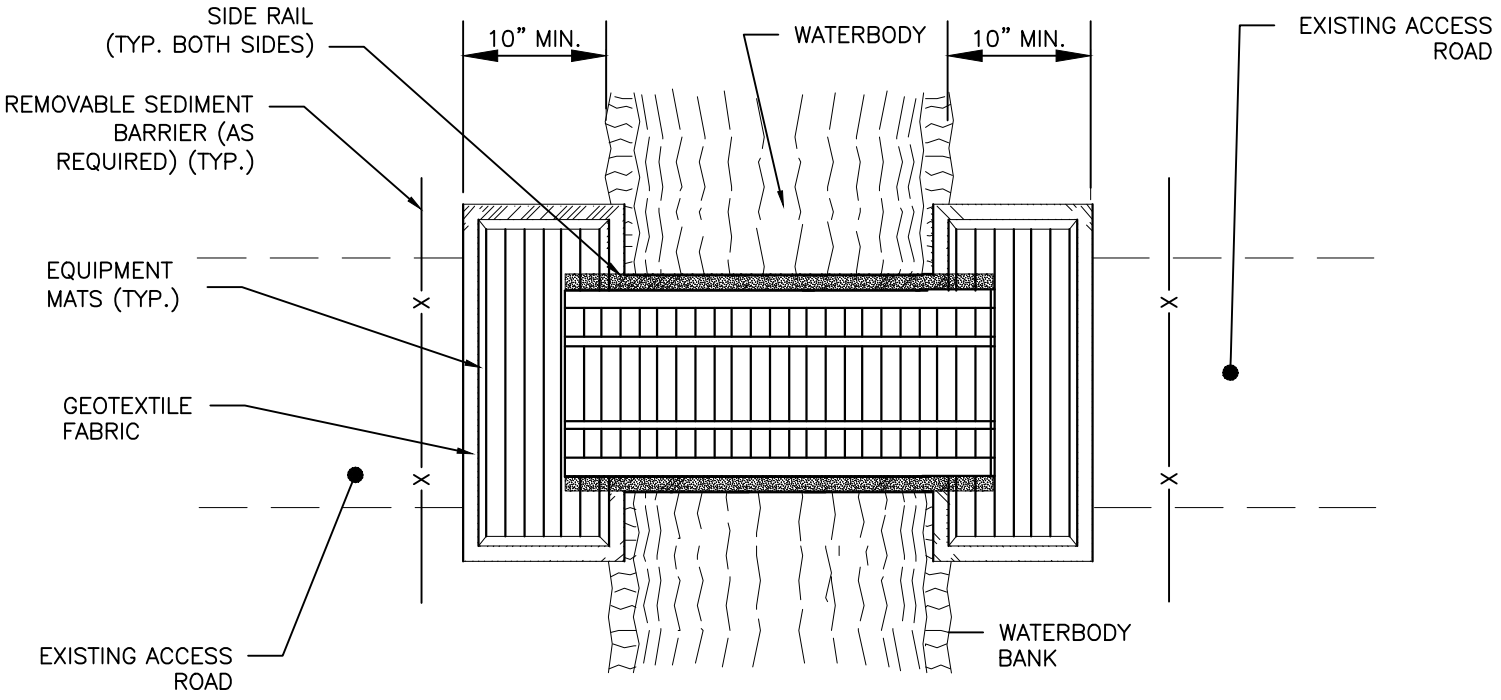
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
BORED ROAD/RAILROAD CROSSING

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

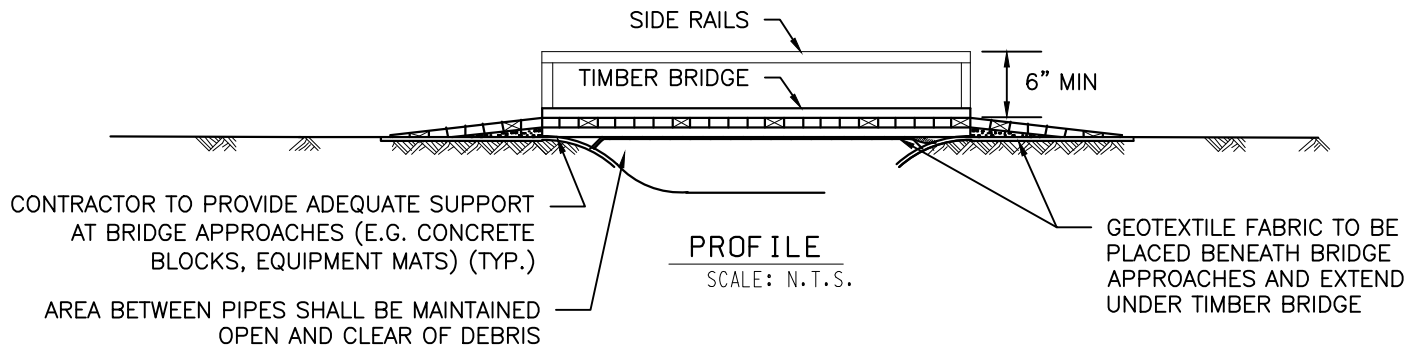
FIG. NO. 3

Sheet: 3 of 127

Type:



PLAN VIEW
SCALE: N.T.S.



PROFILE
SCALE: N.T.S.

NOTES:

1. TIMBER BRIDGES SHALL BE ADEQUATELY ANCHORED AT BOTH ENDS.
2. TEMPORARY STREAM CROSSINGS SHALL BE INSPECTED ON A DAILY BASIS AND BUILD UP OF SEDIMENT OR DEBRIS SHALL BE REMOVED.
3. BRIDGE APPROACHES SHALL BE SUPPORTED WITH EQUIPMENT MATS OR APPROVED EQUAL.
4. SIDE RAILS SHALL BE INSTALLED ON BOTH SIDES OF THE BRIDGE EQUIPMENT CROSSING IN ORDER TO PREVENT SEDIMENT FROM ENTERING THE WATERBODY. SIDE RAILS ARE TO BE CONSTRUCTED OF PLYWOOD NAILED TO THE OUTER EDGES OF THE EQUIPMENT MATS.
5. EQUIPMENT MATS SHALL EXTEND A MINIMUM OF 10 FEET OUTSIDE OF THE WATERBODY OR WETLAND BOUNDARIES.
6. UNLESS OTHERWISE INDICATED ON PLAN, CROSSING SHALL BE REMOVED IMMEDIATELY AFTER CONSTRUCTION IS COMPLETED.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL LOAD CALCULATIONS REQUIRED TO ENSURE THE INSTALLED MATS/EQUIPMENT BRIDGE CAN STRUCTURALLY SUPPORT THE CONSTRUCTION EQUIPMENT TO BE UTILIZED.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

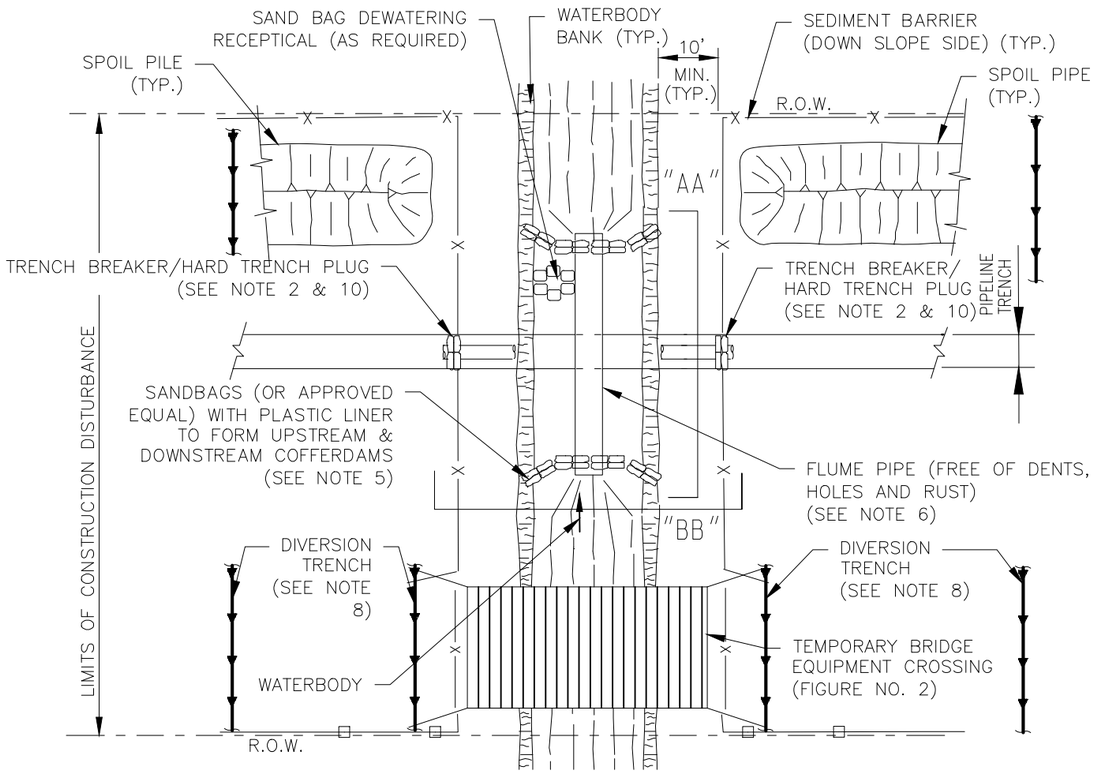
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
BRIDGE EQUIPMENT CROSSING

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

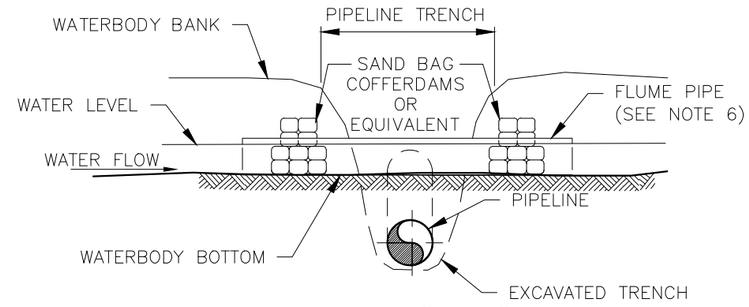
FIG. NO. 4

Sheet: 4 of 127
Type:



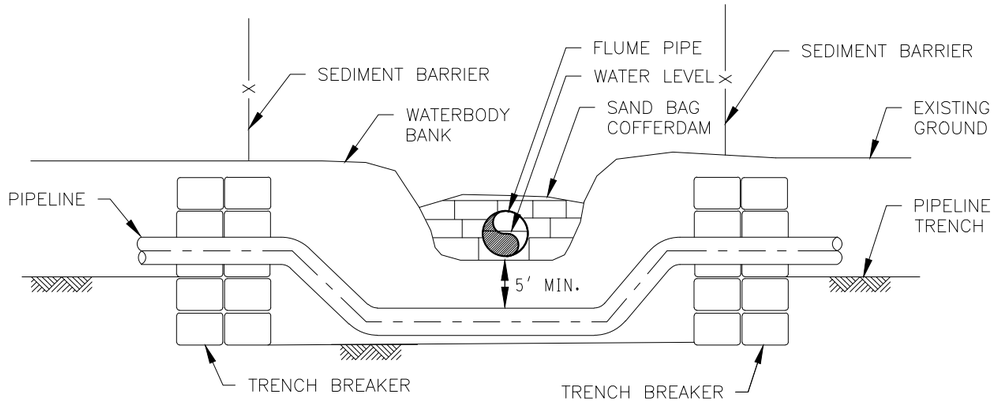
PLAN

SCALE: N.T.S.



SECTION "A–A"

SCALE: N.T.S.



SECTION "B–B"

SCALE: N.T.S.

NOTES:

1. SEDIMENT BARRIERS SHALL BE INSTALLED AS DEPICTED AND ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVY SILT LADEN WATER ENTERS THE WATERBODY OR LEAVES THE CONSTRUCTION RIGHT–OF–WAY.

2. HARD TRENCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE THE MAINLINE DITCH FROM THE WATERBODY CROSSING UNTIL THE WATERBODY CROSSING IS INSTALLED AND BACKFILLED.

3. EQUIPMENT OPERATING IN THE WATERBODY SHALL BE LIMITED TO THAT NEEDED TO PERFORM CONSTRUCTION. IF OTHER TYPES OF EQUIPMENT MUST CROSS THE WATERBODY, THE CONTRACTOR SHALL PROVIDE AND USE A TEMPORARY BRIDGE EQUIPMENT CROSSING.

4. STAGING AREA(S) FOR WATERBODY CROSSING(S), WHEN REQUIRED, SHALL BE LOCATED AT LEAST 50 FEET FROM THE WATER'S EDGE AND SHALL BE OF A MINIMUM SIZE NEEDED FOR CONVENIENT PREPARATION.

5. FLUME CROSSING METHOD REQUIREMENTS INCLUDE:
   (A) INSTALL FLUME PIPE(S) AFTER BLASTING (IF NECESSARY), BUT BEFORE ANY TRENCHING.
   (B) USE SAND BAG OR SAND BAG AND PLASTIC SHEETING DIVERSION STRUCTURES OR EQUIVALENT TO DEVELOP AN EFFECTIVE SEAL AND TO DIVERT WATERBODY FLOW THROUGH THE FLUME PIPE (SOME MINOR MODIFICATIONS TO THE WATERBODY BOTTOM MAY BE REQUIRED TO ACHIEVE AN EFFECTIVE SEAL).
   (C) PROPERLY ALIGN FLUME PIPE(S) TO PREVENT BANK EROSION AND WATERBODY CHANNEL BED SCOUR.
   (D) DO NOT REMOVE FLUME PIPE DURING TRENCHING, PIPE LAYING, OR BACKFILLING ACTIVITIES, OR INITIAL STREAM BED RESTORATION EFFORTS.
   (E) REMOVE ALL FLUME PIPES AND DAMS THAT ARE NOT ALSO PART OF THE EQUIPMENT BRIDGE AS SOON AS FINAL CLEANUP OF THE STREAM BED AND BANK IS COMPLETE.

6. THE FLUME PIPE MUST BE SIZED TO ADEQUATELY CONVEY MAXIMUM ANTICIPATED FLOW RATES AT THE TIME OF THE CROSSING WITHOUT FLOODING THE TRENCH, WHILE TO MAINTAINING ADEQUATE FLOW RATES TO PROTECT AQUATIC LIFE AND PREVENT THE INTERRUPTION OF EXISTING DOWNSTREAM USES.

7. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED DAILY AND REPAIRED IF NECESSARY.

8. INSTALL DIVERSION TRENCHES AT THE BASE OF ALL SLOPES ADJACENT TO THE WATERBODY AND AT 50' FROM WATERBODY BANKS.

9. CHEMICALS, FUELS AND LUBRICATING OILS SHALL NOT BE STORED AND EQUIPMENT SHALL NOT BE REFUELED WITHIN 100 FEET OF THE WATERBODY UNLESS OTHERWISE APPROVED BY THE ENVIRONMENTAL INSPECTOR.

10. ANY WATER ACCUMULATING IN THE WORK SPACE SHALL BE PUMPED TO A FILTER BAG PRIOR TO DISCHARGE TO A WATERBODY.

10. INSTALL TRENCH BREAKERS ON BOTH SIDES OF THE WATERBODY TO PREVENT DIVERSION OF WATER INTO UPLAND PORTIONS OF THE PIPELINE TRENCH AND TO KEEP ANY ACCUMULATED TRENCH WATER OUT OF THE WATERBODY.

11. ALL MATERIAL AND EQUIPMENT PLACED IN THE WATERBODY CHANNEL SHALL BE COMPLETELY REMOVED DURING FINAL CLEAN–UP. REMOVAL OF THESE ITEMS ARE NOT CONTINGENT UPON ESTABLISHMENT OF PERMANENT VEGETATION.

12. THE CONTRACTOR SHALL POSTPONE ROUGH GRADING AND GRUBBING OF THE RIGHT OF WAY WITHIN 50' OF TOP OF BANK UNTIL THE STAGING AREA IS PREPARED AND WORK IN THE WATERBODYIS READY TO COMMENCE. ALL DISTURBED AREAS WITHIN 50 FEET OF TOP OF BANK SHALL BE BLANKETED OR MATTED WITHIN 24 HOURS OF INITIAL DISTURBANCE FOR MINOR STREAMS OR 48 OF INITIAL DISTURBANCE FOR MAJOR STREAMS UNLESS OTHERWISE AUTHORIZED.

13. EXCEPT FOR BLASTING AND OTHER ROCK BREAKING MEASURES, THE CONTRACTOR SHALL COMPLETE IN WATERBODY CONSTRUCTION ACTIVITIES (INCLUDING TRENCHING, PIPE INSTALLATION, BACKFILL, AND RESTORATION OF THE WATERBODY CHANNEL CONTOURS) WITHIN 24 HOURS. WATERBODY BANKS AND UNCONSOLIDATED WATERBODY CHANNELS MAY REQUIRE ADDITIONAL RESTORTION AFTER THIS PERIOD.

14. THE CONTRACTOR SHALL COORDINATE THE ENVIRONMENTAL INSPECTOR TO DETERMINE THE APPROPAITE DRY CROSSING METHOD THAT SHOULD BE UTILIZED DURING CONSTRUCTION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division: | Op. Area.:
State: | Co./Par.:
Section: | Township: | Range:
Dft: | Date: | Scale:
Chk: | Date:
Appr: | Date: | Filename:

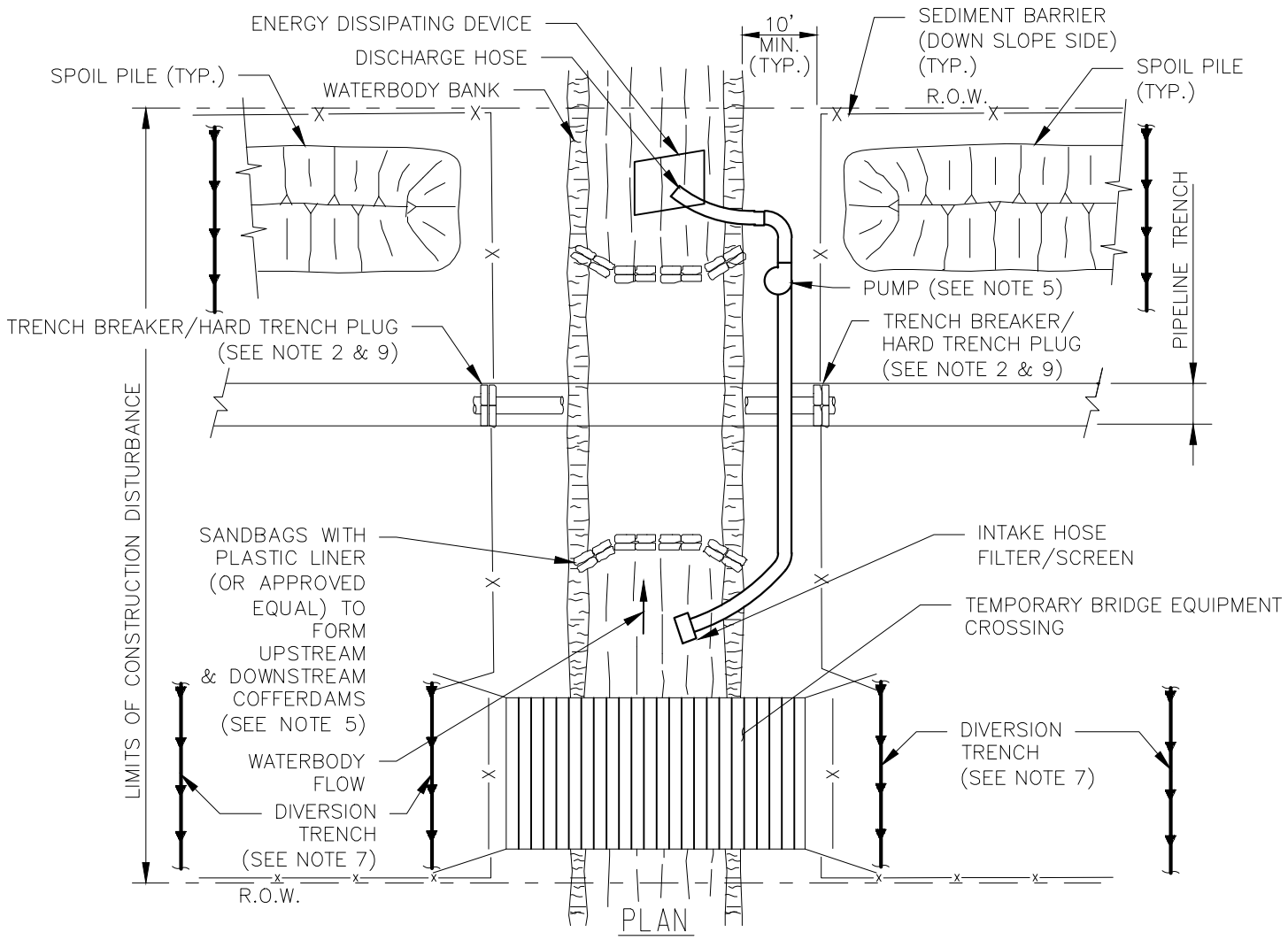
TENNESSE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
FLUME CROSSING

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 5

Sheet: 5 of 127
Type:

Jul 21, 2014 - 2:05PM



PLAN

SCALE: N.T.S.

NOTES:

1. SEDIMENT BARRIERS SHALL BE INSTALLED AS DEPICTED AND ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVY SILT LADEN WATER ENTERS THE WATERBODY OR LEAVES THE CONSTRUCTION RIGHT-OF-WAY
2. HARD TRENCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE THE MAINLINE DITCH FROM THE WATERBODY CROSSING UNTIL THE WATERBODY CROSSING IS INSTALLED AND BACKFILLED.
3. EQUIPMENT OPERATING IN THE WATERBODY SHALL BE LIMITED TO THAT NEEDED TO PERFORM CONSTRUCTION. IF OTHER TYPES OF EQUIPMENT MUST CROSS THE WATERBODY, THE CONTRACTOR SHALL PROVIDE AND USE A TEMPORARY BRIDGE EQUIPMENT CROSSING.
4. STAGING AREA(S) FOR WATERBODY CROSSING(S), WHEN REQUIRED, SHALL BE LOCATED AT LEAST 50 FEET FROM WATER'S EDGE AND SHALL BE OF A MINIMUM SIZE NEEDED FOR PREPARATION TO SAFELY AND EFFICIENTLY CONSTRUCT THE CROSSING.
5. IMPLEMENTATION OF THE DAM-AND-PUMP CROSSING METHOD MUST MEET THE FOLLOWING PERFORMANCE CRITERIA:
   (A) USE SUFFICIENT PUMPS, INCLUDING ON-SITE BACKUP PUMPS, TO MAINTAIN DOWNSTREAM FLOWS.
   (B) CONSTRUCT DAMS WITH MATERIALS THAT PREVENT SEDIMENT AND OTHER POLLUTANTS FROM ENTERING THE WATERBODY (E.G., SANDBAGS OR CLEAN GRAVEL WITH PLASTIC LINER).
   (C) SCREEN PUMP INTAKES;
   (D) PREVENT STREAM BED SCOUR AT PUMP DISCHARGE WITH AN ENERGY DISSIPATING DEVICE.
   (E) MONITOR THE DAM AND PUMPS TO ENSURE PROPER OPERATION THROUGHOUT THE WATERBODY CROSSING. INTAKE SHALL BE MAINTAINED A SUFFICIENT DISTANCE FROM THE BOTTOM TO PREVENT PUMPING OF SUBSTRATE MATERIALS.
   (F) INTAKE SHALL BE MAINTED AT A SUFFICIENT DISTANCE FROM THE CHANNEL BOTTOM TO PREVENT PUMPING OF SUBSTRATE MATERIALS.
6. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED DAILY AND REPAIRED IF NECESSARY.
7. INSTALL DIVERSION TRENCHES AT THE BASE OF ALL SLOPES ADJACENT TO THE WATERBODY AND AT MINIMUM 50' FROM WATERBODY BANK.
8. CHEMICALS, FUELS AND LUBRICATING OILS SHALL NOT BE STORED AND EQUIPMENT SHALL NOT BE REFUELED WITHIN 100 FEET OF THE WATERBODY, UNLESS OTHERWISE APPROVED BY THE ENVIRONMENTAL INSPECTOR. ANY WATER ACCUMULATING IN THE WORK SPACE SHALL BE PUMPED TO A FILTER BAG PRIOR TO DISCHARGE TO WATERBODY.
9. INSTALL TRENCH BREAKERS ON BOTH SIDES OF THE WATERBODY TO PREVENT DIVERSION OF WATER INTO UPLAND PORTIONS OF THE PIPELINE TRENCH AND TO KEEP ANY ACCUMULATED TRENCH WATER OUT OF THE WATERBODY.
10. THE CONTRACTOR SHALL POSTPONE GRUBBING AND ROUGH GRADING OF THE RIGHT-OF-WAY WITIN 50' OF TOP OF BANK UNTIL ALL MATERIALS REQUIRED TO COMPLETE CROSSING ARE ON SITE , THE STAGING AREA IS PREPARED, AND WORK IN THE WATERBODY IS READY TO COMMENCE. ALL DISTURBED AREAS WITHIN 50' OF TOP OF BANK SHALL BE STABILIZED WITHIN 24 HOURS OF INITIAL DISTURBANCE FOR MINOR STREAMS OR 48 HOURS OF INITIAL DISTURBANCE FOR MAJOR STREAMS UNLESS OTHERWISE AUTHORIZED. APPROPRIATE STREAMBANK PROTECTION SHALL BE PROVIDED WITHIN THE CHANNEL.
11. ANY WATER ACCUMULATING IN THE WORKSPACE SHALL BE PUMPED TO A FILTER BAG PRIOR TO DISCHARGE.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

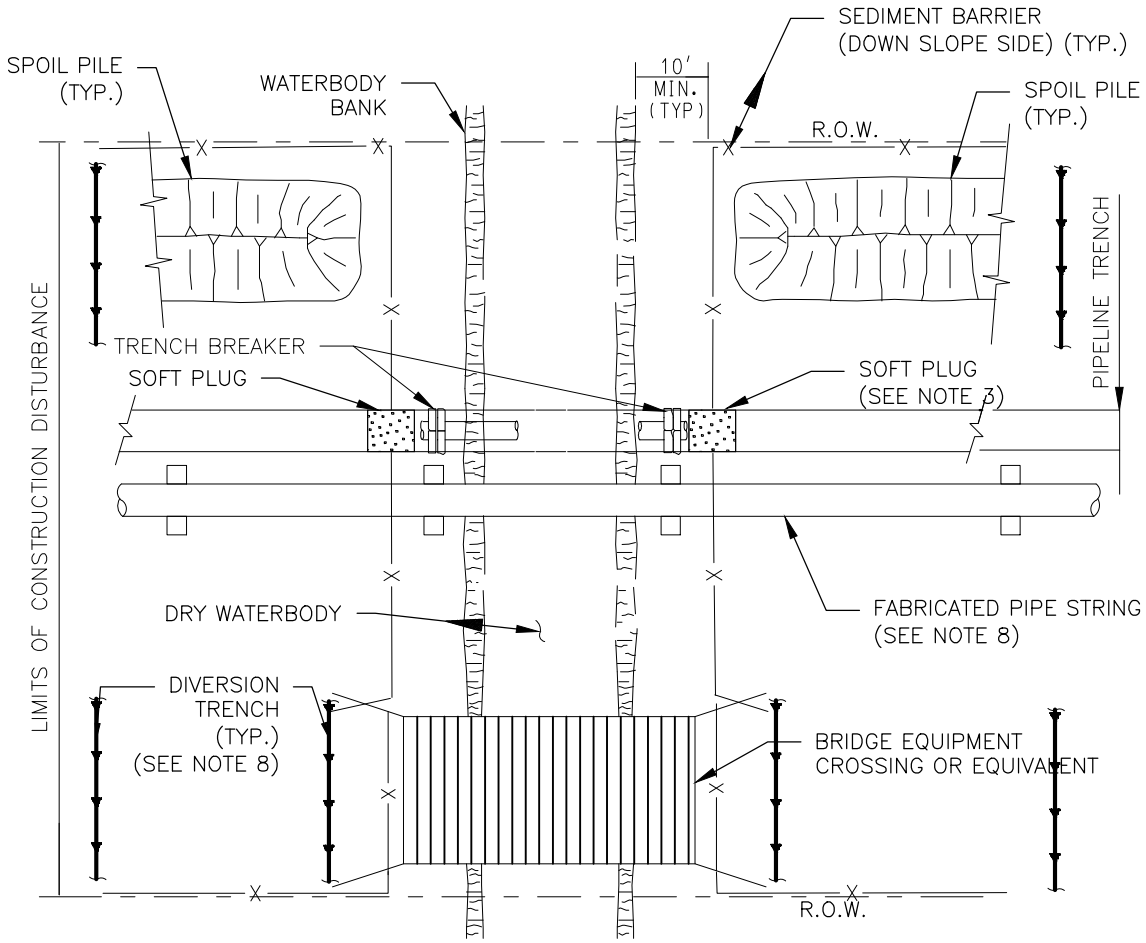
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
DAM AND PUMP CROSSING

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 6

Sheet: 6 of 127

Type:



NOTES:

1. THIS METHOD APPLIES TO WATERBODIES THAT ARE DRY AT THE TIME OF CROSSING.
2. SEDIMENT BARRIERS SHALL BE INSTALLED AS DEPICTED AND ALONG DOWN GRADIENT SIDES OF WORK AREAS SUCH THAT NO HEAVILY SILT LADEN WATER ENTERS THE WATERBODY OR LEAVES THE CONSTRUCTION RIGHT OF WAY.
3. SOFT PLUGS SHALL BE INSTALLED FOLLOWING EXCAVATION OF THE MAINLINE TRENCH THROUGH THE WATERBODY.
4. INSTALL TRENCH BREAKERS ON BOTH SIDES OF THE WATERBODY TO PREVENT DIVERSION OF WATER INTO UPLAND PORTIONS OF THE PIPELINE TRENCH AND TO KEEP ANY ACCUMULATED TRENCH WATER OUT OF THE WATERBODY.
5. EQUIPMENT OPERATING IN THE WATERBODY SHALL BE LIMITED TO THAT NEEDED TO PERFORM CONSTRUCTION. IF OTHER TYPES OF EQUIPMENT MUST CROSS THE WATERBODY, THE CONTRACTOR SHALL PROVIDE AND USE A TEMPORARY BRIDGE EQUIPMENT CROSSING OR EQUIVALENT AS APPROVED BY THE ENVIRONMENTAL INSPECTOR.
6. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED DAILY AND REPAIRED IF NECESSARY.
7. CHEMICALS, FUELS AND LUBRICATING OILS SHALL NOT BE STORED AND EQUIPMENT SHALL NOT BE REFUELED WITHIN 100 FEET OF WATERBODY, UNLESS OTHERWISE APPROVED BY THE REGULATORY AUTHORITY. ANY WATER ACCUMULATING IN THE WORKSPACE SHALL BE PUMPED TO A FILTER BAG PRIOR TO DISCHARGE TO A WATERBODY.
8. INSTALL DIVERSION TRENCHES AT THE BASE OF ALL SLOPES ADJACENT TO THE WATERBODY AND AT MINIMUM 50' FROM WATERBODY BANK.
9. THE FABRICATED PIPE STRING MAY SPAN THE DRY WATERBODY CROSSING IN PREPARATION FOR THE LOWERING–IN PHASE OF CONSTRUCTION.
10. THE DRY WATERBODY MAY BE TRENCHED IN SEQUENCE WITH NORMAL TRENCHING OPERATIONS AND THE PIPE INSTALLED THROUGH THE DRY WATERBODY CROSSING IN CONJUCTION WITH UPSTREAM AND DOWN STREAM PIPE.
11. THE CONTRACTOR SHALL POSTPONE GRUBBING AND ROUGH GRADING OF THE RIGHT–OF–WAY WITHIN 50' OF TOP OF BANK UNTIL ALL MATERIALS REQUIRED TO COMPLETE CROSSING ARE ON SITE, THE STAGING AREA IS PREPARED AND WORK IN THE WATERBODY IS READY TO COMMENCE. ALL DISTURBED AREAS WITHIN 50 FEET OF TOP OF BANK SHALL BE BLANKETED OR MATTED WITHIN 24 HOURS OF INITIAL DISTURBANCE OR MINOR STREAMS OR 48 HOURS OF INITIAL DISTURBANCE FOR MAJOR STREAMS UNLESS OTHERWISE AUTHORIZED. APPROPRIATE STREAMBANK PROTECTION SHALL BE PROVIDED WITHIN THE CHANNEL.
12. ANY WATER ACCUMULATING IN THE WORKSPACE SHALL BE PUMPED TO A FILTER BAG PRIOR TO DISCHARGE.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

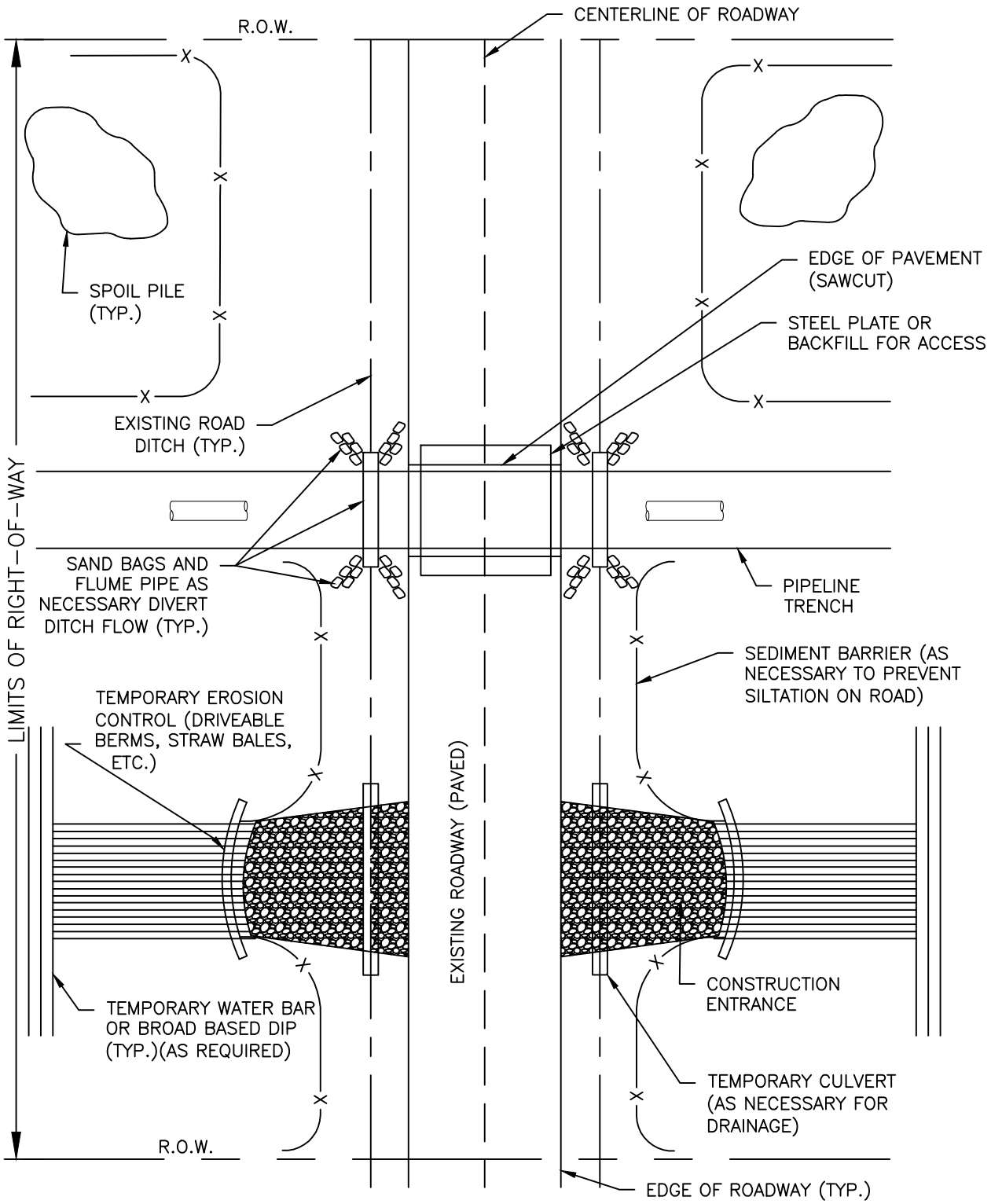
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
DRY WATERBODY CROSSING

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 7

Sheet: 7 of 127
Type:



NOTES:
1. THE CONTRACTOR SHALL MAINTAIN ACCESS FOR ALL EMERGENCY VEHICLES.
2. THE CONTRACTOR SHALL COORDINATE ACCESS RESTRICTIONS WITH ALL IMPACTED PARTIES PRIOR TO CROSSING THE ROAD.
3. THE CONTRACTOR SHALL MAINTAIN ONSITE ADEQUATELY SIZED STEEL PLATES TO COVER THE OPEN TRENCH AND ALLOW FOR EMERGENCY OR GENERAL ACCESS IN THE EVENT THAT CONSTRUCTION ACTIVITIES HAVE TO BE HALTED.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

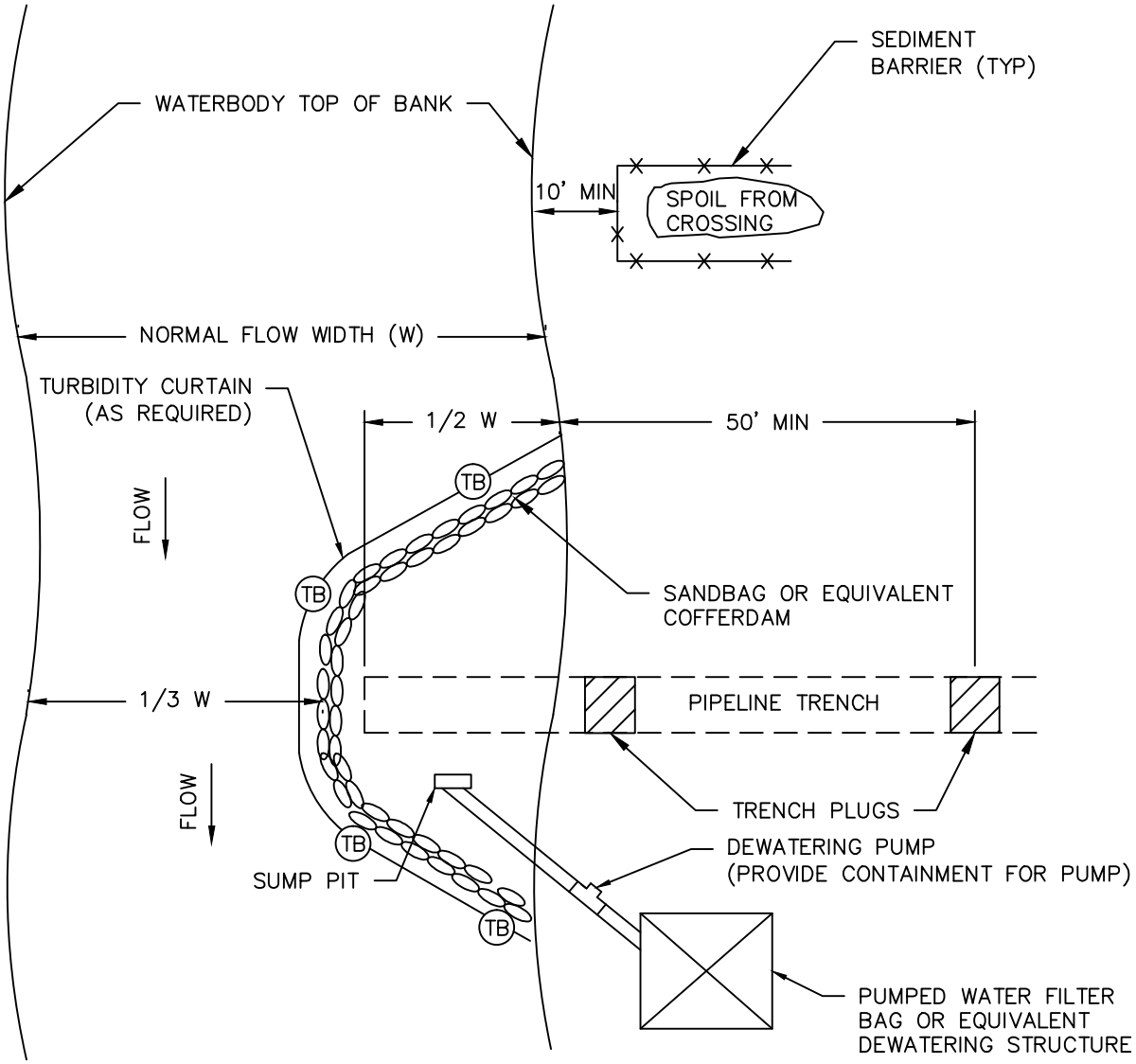
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL OPEN CUT PAVED
ROAD CROSSING

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 8

Sheet: 8 of 127
Type:



PLAN VIEW

NOTES:

1. GRUBBING SHALL NOT TAKE PLACE WITHIN 50 FEET OF TOP–OF–BANK UNTIL ALL MATERIALS REQUIRED TO COMPLETE CROSSING ARE ON SITE AND PIPE IS READY FOR INSTALLATION.
2. TRENCH BREAKER SHALL BE INSTALLED WITHIN THE TRENCH ON BOTH SIDES OF THE WATERBODY CHANNEL.
3. WATER ACCUMULATING WITHIN THE WORK AREA SHALL BE PUMPED TO A PUMPED WATER FILTER BAG OR SEDIMENT TRAP PRIOR TO DISCHARGING INTO ANY SURFACE WATER.
4. HAZARDOUS OR POLLUTANT MATERIAL STORAGE AREAS SHALL BE LOCATED AT LEAST 100 FEET BACK FROM THE TOP OF WATERBODY BANK.
5. ALL EXCESS EXCAVATED MATERIAL SHALL BE IMMEDIATELY REMOVED FROM THE WATERBODY CROSSING AREA.
6. ALL DISTURBED AREAS WITHIN 50 FEET OF TOP–OF–BANK SHALL BE BLANKETED OR MATTED WITHIN 24 HOURS OF INITIAL DISTURBANCE FOR MINOR WATERBODIES OR 48 HOURS OF INITIAL DISTURBANCE FOR INTERMEDIATE WATERBODIES UNLESS OTHERWISE AUTHORIZED.
7. APPROPRIATE WATERBODY BANK PROTECTION SHALL BE PROVIDED WITHIN THE CHANNEL.
8. THE WATERBODY CROSSING WILL GENERALLY BE COMPLETED IN 2 STAGES. THE DETAIL DEPICTS STAGE 1. STAGE 2 WILL GENERALLY BE COMPLETED USING THE SAME CONFIGURATION FROM THE OPPOSITE BANK.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

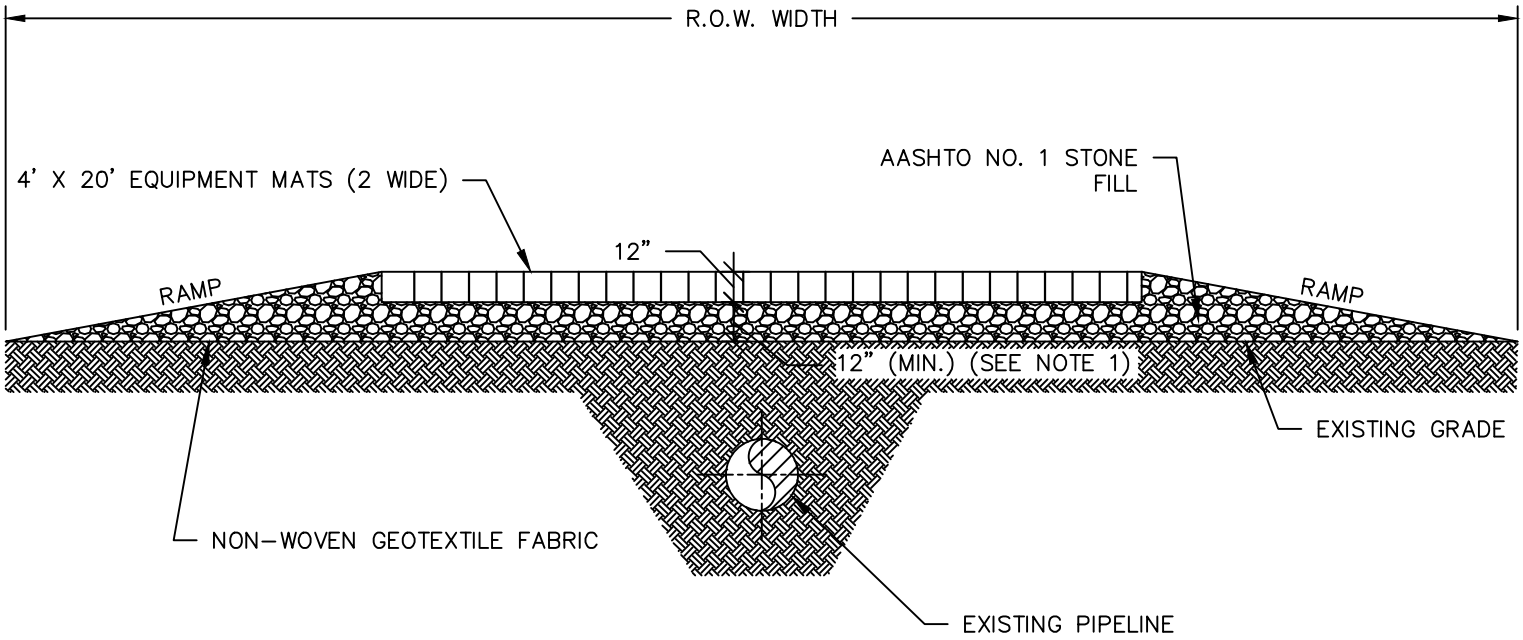
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL UTILITY LINE CROSSING
WITH COFFERDAM

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 9

Sheet: 9 of 127
Type:



NOTES:

1. ADDITIONAL STONE DEPTH MAY BE REQUIRED DEPENDING ON THE DEPTH OF COVER OVER THE EXISTING PIPE. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER FOR THE REQUIRED DEPTH OF STONE.
2. INSTALL 1 (ONE) LAYER OF NON–WOVEN GEOTEXTILE FABRIC PRIOR TO INSTALLING THE STONE.
3. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO DETERMINE THE NUMBER OF EQUIPMENT MATS REQUIRED.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

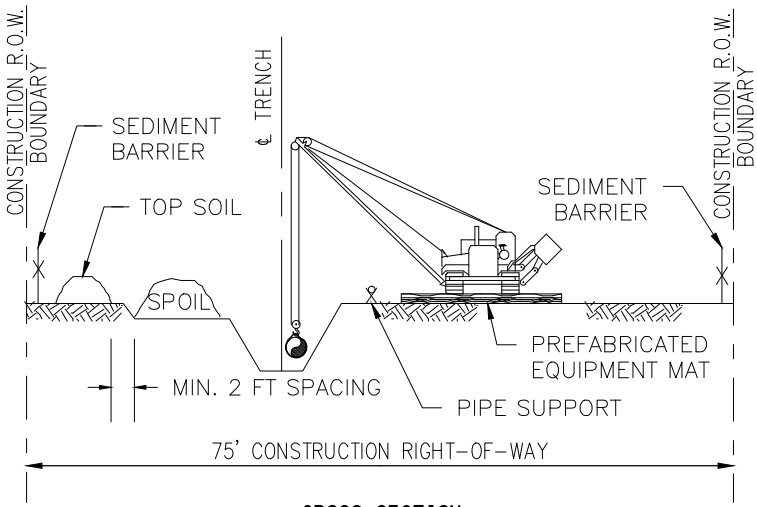
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TEMPORARY WOODEN MAT PIPELINE CROSSING

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

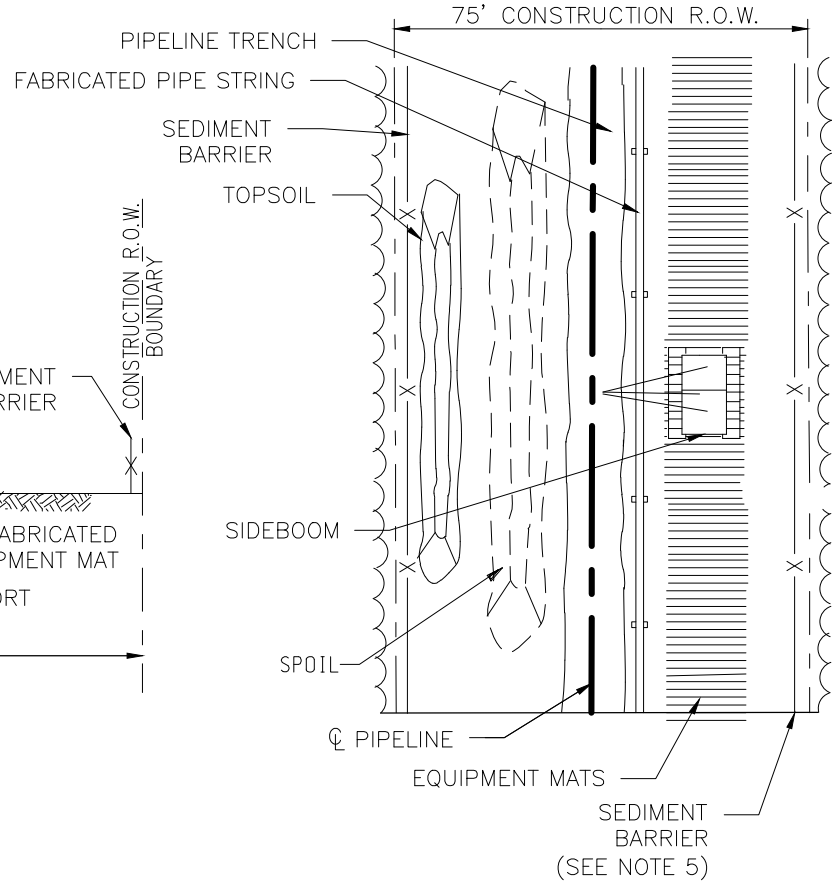
FIG. NO. 10

Sheet: 10 of 127
Type:



CROSS SECTION

SCALE: N.T.S.



PLAN VIEW

SCALE: N.T.S.

CONSTRUCTION PROCEDURE NOTES:

1. FLAG WETLAND BOUNDARIES AND INSTALL BOUNDARY SIGNS PRIOR TO CLEARING.
2. NO OVERNIGHT PARKING OR 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 SPCP PLAN.
3. INSTALL TEMPORARY SLOPE BREAKERS UPSLOPE OF WETLAND BOUNDARIES.
4. INSTALL PREFABRICATED EQUIPMENT MATS THROUGH THE ENTIRE WETLAND AREA ON THE WORKING SIDE OF THE CONSTRUCTION CORRIDOR.
5. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS AT THE OUTER BOUNDARIES OF THE WETLAND. INSTALL SEDIMENT BARRIERS ALONG THE EDGE OF THE SPOIL SIDE OF THE CONSTRUCTION CORRIDOR THROUGH THE WETLAND AND ALONG THE DOWN SLOPE EDGE OF THE WETLAND. IF THE DOWN SLOPE EDGE OF THE WETLAND IS THE SPOIL SIDE, THEN SEDIMENT BARRIERS ARE NOT REQUIRED ON THE WORKING SIDE OF THE CORRIDOR UNLESS EQUIPMENT TRAVERSING THROUGH THE WETLAND CAUSES SPOIL AND SEDIMENT TO EXIT THE CONSTRUCTION CORRIDOR.
6. LIMIT PULLING OF TREE STUMPS AND GRADING ACTIVITIES TO DIRECTLY OVER THE TRENCH LINE. DO NOT GRADE OR REMOVE STUMPS OR ROOT SYSTEMS FROM THE REST OF THE RIGHT-OF-WAY IN WETLANDS UNLESS THE CHIEF INSPECTOR AND COMPANY ENVIRONMENTAL INSPECTOR DETERMINE THAT SAFETY RELATED CONSTRUCTION CONSTRAINTS REQUIRE REMOVAL OF TREE STUMPS FROM UNDER THE WORKING SIDE OF THE RIGHT-OF-WAY.
7. CONDUCT TRENCH LINE TOPSOIL STRIPPING (IF TOPSOIL IS NOT SATURATED OR FROZEN). 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. LEAVE HARD PLUGS AT THE EDGES OF WETLAND UNTIL JUST PRIOR TO TRENCHING.
9. TRENCHING THROUGH WETLANDS MAY PROCEED WHEN THE PIPE SECTION IS FABRICATED AND READY TO LAY. ONCE TRENCHING COMMENCES, CONSTRUCTION THROUGH THE WETLAND IS TO PROCEED CONTINUOUSLY UNTIL THE CROSSING IS COMPLETED, BACK FILLED AND RESTORED IN ORDER TO MINIMIZE THE LENGTH OF TIME THE TRENCH IS OPEN.
10. PIPE SECTION MAY BE FABRICATED WITHIN THE WETLAND ADJACENT TO PIPE TRENCH, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN. NO CONCRETE COATING ACTIVITY SHALL OCCUR WITHIN 100 FEET OF WETLAND BOUNDARY UNLESS APPROVED BY ENVIRONMENTAL INSPECTOR.
11. LOWER-IN PIPE. PRIOR TO BACK FILLING TRENCH, INSTALL TRENCH BREAKERS IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS.
12. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL AND INSTALL PERMANENT EROSION CONTROL MEASURES.
13. REMOVE PREFABRICATED MATS FROM WETLANDS UPON COMPLETION.
14. SEED DISTURBED WETLAND AREAS (UNLESS STANDING WATER IS PRESENT) AS DETERMINED BY THE ENVIRONMENTAL INSPECTOR AND AS SHOWN ON DRAWINGS AND ECP. 48 LB PLS/ACRE ANNUAL RYE GRASS AND STRAW MULCH AT 3T/ACRE OR AS APPROVED BY THE APPLICABLE PERMITTING AGENCY.
15. NO FERTILIZER OR LIME IS PERMITTED.
16. DO NOT USE LIQUID MULCH BINDERS WITHIN 100 FT OF WETLANDS OR WATERBODIES.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

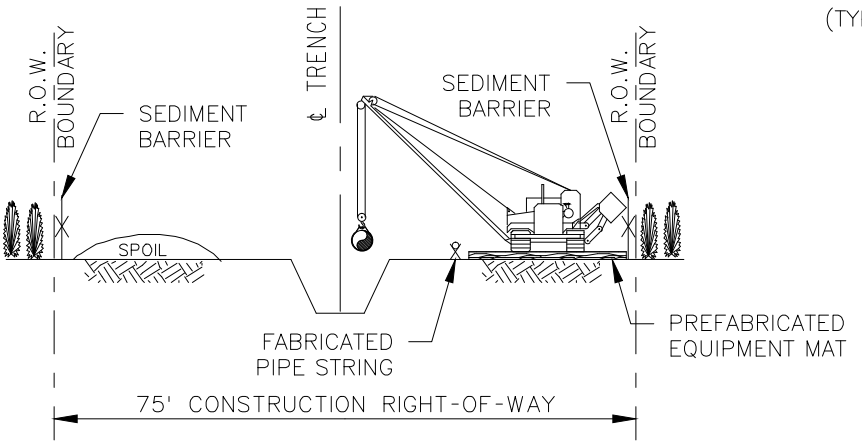
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPE I "NON-SATURATED WETLAND"
INSTALLATION PROCEDURE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 11

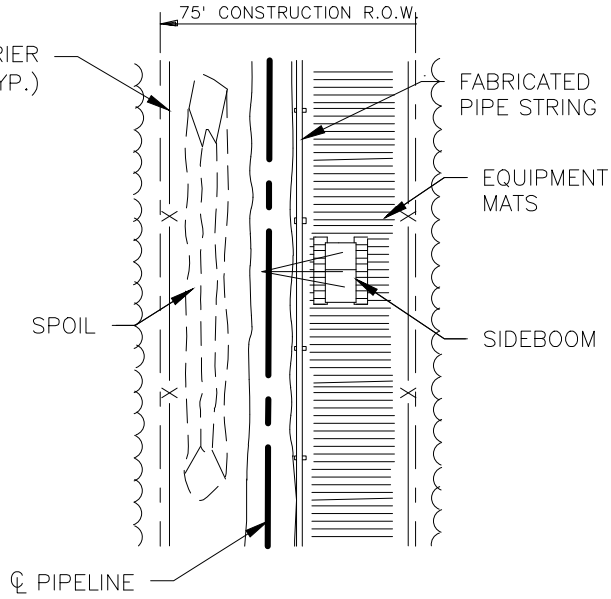
Sheet: 11 of 127

Type:



CROSS SECTION

SCALE: N.T.S.



PLAN VIEW

SCALE: N.T.S.

CONSTRUCTION PROCEDURE NOTES:

1. FLAG WETLAND BOUNDARIES AND INSTALL BOUNDARY SIGNS PRIOR TO CLEARING.
2. NO OVERNIGHT PARKING OR 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 BREAKERS UPSLOPE OF WETLAND BOUNDARIES.
4. INSTALL PREFABRICATED EQUIPMENT MATS THROUGH ENTIRE WETLAND AREA ON THE WORKING SIDE OF THE CONSTRUCTION CORRIDOR.
5. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS AT OUTER BOUNDARIES OF WETLAND AND ALONG BOTH WETLAND EDGES.
6. LIMIT PULLING OF TREE STUMPS AND GRADING ACTIVITIES TO DIRECTLY OVER THE TRENCHLINE. DO NOT GRADE OR REMOVE STUMPS OR ROOT SYSTEMS FROM THE REST OF THE RIGHT-OF-WAY IN WETLANDS UNLESS THE CHIEF INSPECTOR AND COMPANY ENVIRONMENTAL INSPECTOR DETERMINE THAT SAFETY RELATED CONSTRUCTION CONSTRAINTS REQUIRE REMOVAL OF TREE STUMPS FROM UNDER THE WORKING SIDE OF THE RIGHT-OF-WAY.
7. TOPSOIL STRIPPING SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.
8. LEAVE HARD PLUGS AT THE EDGES OF WETLAND UNTIL JUST PRIOR TO TRENCHING.
9. TRENCHING THROUGH WETLANDS MAY PROCEED WHEN THE PIPE SECTION IS FABRICATED AND READY TO LAY. ONCE TRENCHING COMMENCES, CONSTRUCTION THROUGH THE WETLAND IS TO PROCEDE CONTINUOUSLY UNTIL THE CROSSING IS COMPLETED, BACKFILLED AND RESTORED IN ORDER TO MINIMIZE THE LENGTH OF TIME THE TRENCH IS OPEN.
10. PIPE SECTION MAY BE FABRICATED WITHIN THE WETLAND ADJACENT TO PIPE TRENCH, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN. NO CONCRETE COATING ACTIVITY WITHIN 100 FEET OF WETLAND BOUNDARY, UNLESS APPROVED BY COMPANY ENVIRONMENTAL INSPECTOR.
11. LOWER-IN PIPE PRIOR TO BACKFILLING, INSTALL TRENCH PLUGS IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS.
12. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY AND INSTALL PERMANENT EROSION CONTROL MEASURES.
13. REMOVE PREFABRICATED MATS FROM WETLANDS UPON COMPLETION.
14. SEED DISTURBED WETLAND AREA (UNLESS STANDING WATER IS PRESENT) AS DETERMINED BY THE ENVIRONMENTAL INSPECTOR AND AS SHOWN ON DRAWINGS AND ECP. 48 LB PLS/ACRE ANNUAL RYE GRASS AND STRAW MULCH AT 3T/ACRE OR AS APPROVED BY THE APPLICABLE PERMITTING AGENCY.
15. NO FERTILIZER OR LIME IS PERMITTED.
16. DO NOT USE LIQUID MULCH BINDERS WITHIN 100 FT OF WETLANDS OR WATERBODIES.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

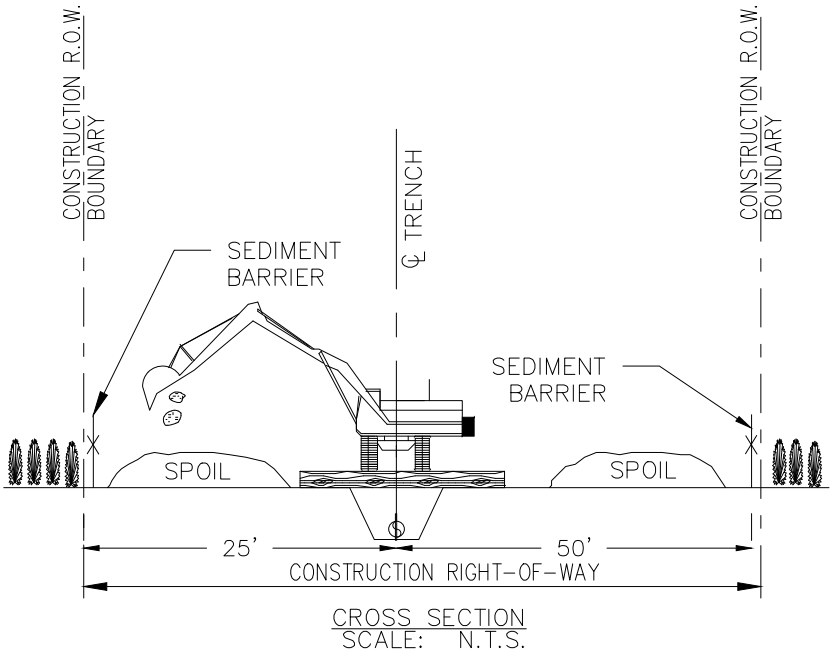
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPE II "SATURATED WETLAND"
INSTALLATION PROCEDURE

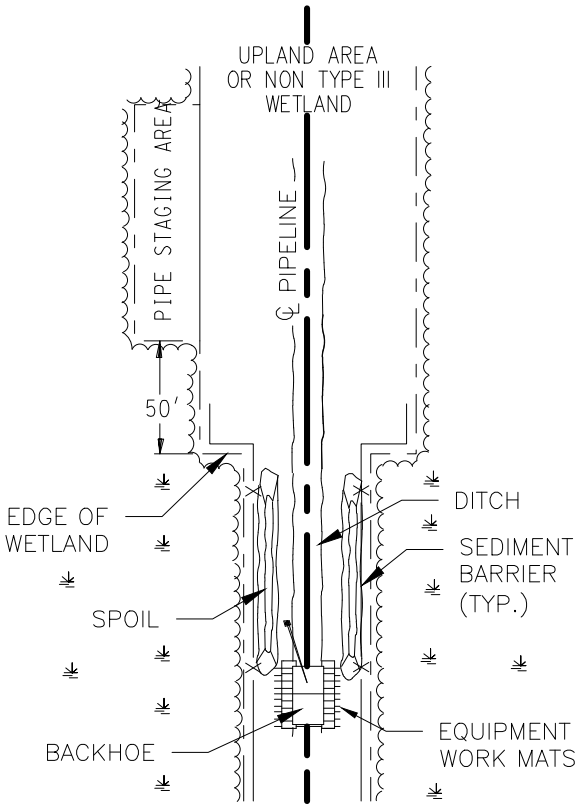
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 12

Sheet: 12 of 127
Type:



CROSS SECTION
SCALE: N.T.S.



PLAN VIEW
SCALE: N.T.S.

CONSTRUCTION PROCEDURE NOTES:

1. FLAG WETLAND BOUNDARIES AND INSTALL WETLAND BOUNDARY SIGNS PRIOR TO CLEARING.
2. NO OVERNIGHT PARKING OR 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 BREAKERS WITHIN 50' UPSLOPE OF WETLAND BOUNDARIES.
4. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS AT OUTER BOUNDARIES OF WETLAND AND ALONG BOTH WETLAND EDGES.
5. LIMIT PULLING OF TREE STUMPS AND GRADING ACTIVITIES TO DIRECTLY OVER TRENCH LINE. DO NOT REMOVE STUMPS OR ROOT SYSTEMS FROM THE REST OF THE RIGHT-OF-WAY IN WETLANDS UNLESS THE CHIEF INSPECTOR AND COMPANY ENVIRONMENTAL INSPECTOR DETERMINE THAT SAFETY RELATED CONSTRUCTION CONSTRAINTS REQUIRE REMOVAL OF TREE STUMPS FROM UNDER THE WORKING SIDE OF THE RIGHT-OF-WAY.
6. TOPSOIL STRIPPING SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.
7. UTILIZE AMPHIBIOUS EXCAVATORS (PONTOON MOUNTED BACKHOES) OR TRACKED BACKHOES SUPPORTED BY PREFABRICATED EQUIPMENT MATS OR FLOATS, TO EXCAVATE TRENCH. IF PREFABRICATED EQUIPMENT MATS ARE USED FOR STABILIZATION, THE BACKHOE SHALL GRADUALLY MOVE ACROSS THE WETLAND BY MOVING THE MATS FROM IMMEDIATELY BEHIND TO IMMEDIATELY IN FRONT OF THE BACKHOE'S PATH.
8. FABRICATE PIPE IN A STAGING AREA OUTSIDE THE TYPE III WETLAND AS INDICATED ON THE CONSTRUCTION DRAWINGS. NO CONCRETE COATING ACTIVITY SHALL OCCUR WITHIN 100 FEET OF THE WETLAND BOUNDARY, UNLESS APPROVED BY THE ENVIRONMENTAL INSPECTOR.
9. LEAVE HARD PLUGS AT THE EDGE OF TYPE III WETLAND UNTIL JUST PRIOR TO PIPE PLACEMENT.
10. FLOAT PIPE IN PLACE, LOWER-IN, INSTALL TRENCH PLUGS IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS, AND BACKFILL.
11. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY AND INSTALL PERMANENT EROSION CONTROL.
12. REMOVE ANY MATS UTILIZED TO SUPPORT AMPHIBIOUS EQUIPMENT FROM WETLANDS UPON COMPLETION.
13. WETLANDS CROSSED USING PUSH/PULL METHOD TEND TO BE TOO WET FOR EFFECTIVE SEEDING AND WILL NOT BE SEEDED IF STANDING WATER IS PRESENT.
14. NO FERTILIZER OR LIME IS PERMITTED.
15. DO NOT USE LIQUID MULCH BINDERS WITHIN 100 FT OF WETLANDS OR WATERBODIES.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

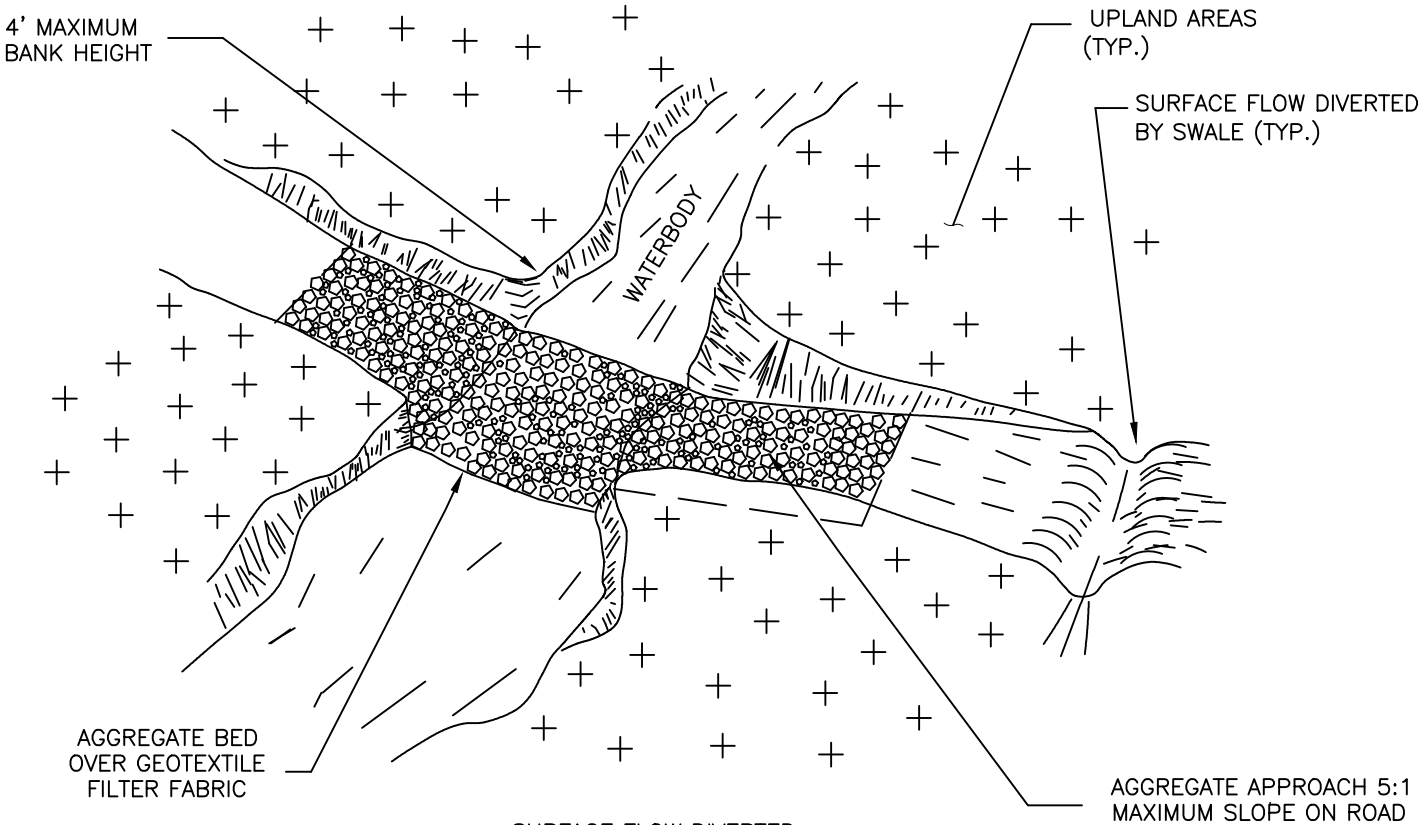
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

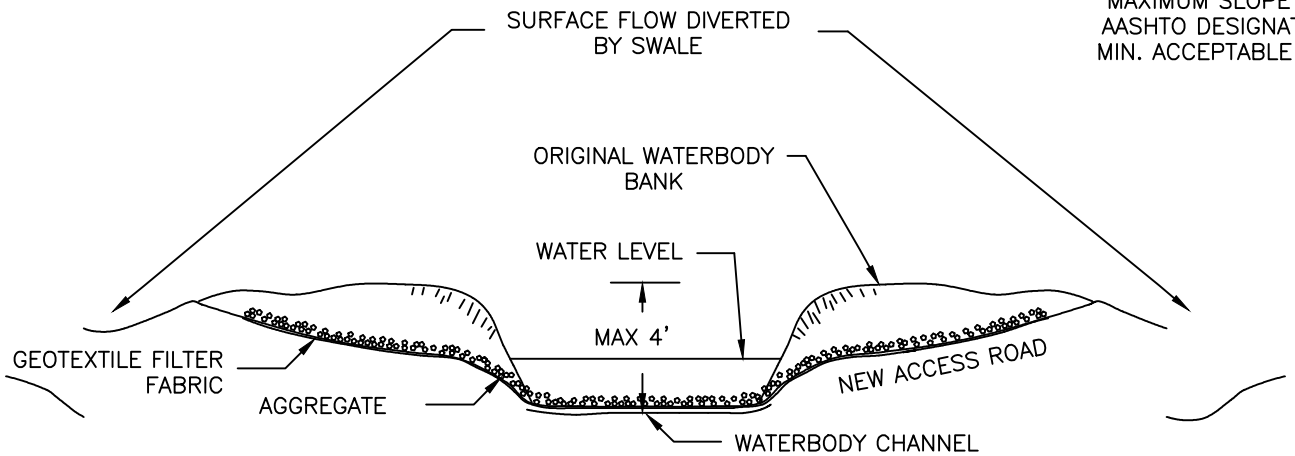
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPE III "INUNDATED WETLAND"
INSTALLATION PROCEDURE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 13

Sheet: 13 of 127
Type:





NOTES

1. THIS METHOD IS INTENDED FOR USE BY CLEARING EQUIPMENT AND CONSTRUCTION EQUIPMENT REQUIRED TO CONSTRUCT A TEMPORARY BRIDGE CROSSING PRIOR TO PIPE INSTALLATION (E.G. TRENCHING), UNLESS OTHERWISE APPROVED BY THE APPLICABLE REGULATORY AGENCY. UNLESS OTHERWISE APPROVED, THE CONTRACTOR SHALL LIMIT THE NUMBER OF CROSSINGS TO ONE PER PIECE OF EQUIPMENT.
2. THIS METHOD SHALL ONLY BE USED IF IT WILL NOT AFFECT AQUATIC LIFE SUCH AS FISH MIGRATION OR SPAWNING. COORDINATION WITH THE APPLICABLE PERMITTING AGENCY WILL BE REQUIRED PRIOR TO INSTALLATION.
3. THE ACCESS FORD SHALL BE CONSTRUCTED PERPENDICULAR TO THE WATERBODY BANKS TO MINIMIZE IMPACTS
4. A SWALE SHALL BE CONSTRUCTED AT BOTH APPROACHES A MAXIMUM OF 50' FROM THE EDGE OF THE WATERBODY BANK TO DIVERT RUNOFF AND PREVENT IT FROM DIRECTLY ENTERING THE WATERBODY.
5. THE MAXIMUM HEIGHT BETWEEN THE INVERT OF THE WATERBODY AND THE WATERBODY TOP OF BANK IS 4'. THIS METHOD SHALL NOT BE USED IF THE BANK HEIGHT EXCEEDS 4'.
6. ALL AREAS DISTURBED BY THE ACCESS FORD SHALL BE STABILIZED AS SOON AS PRACTICAL, BUT NO LATER THAN 14 CALENDAR DAYS AFTER REMOVAL.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

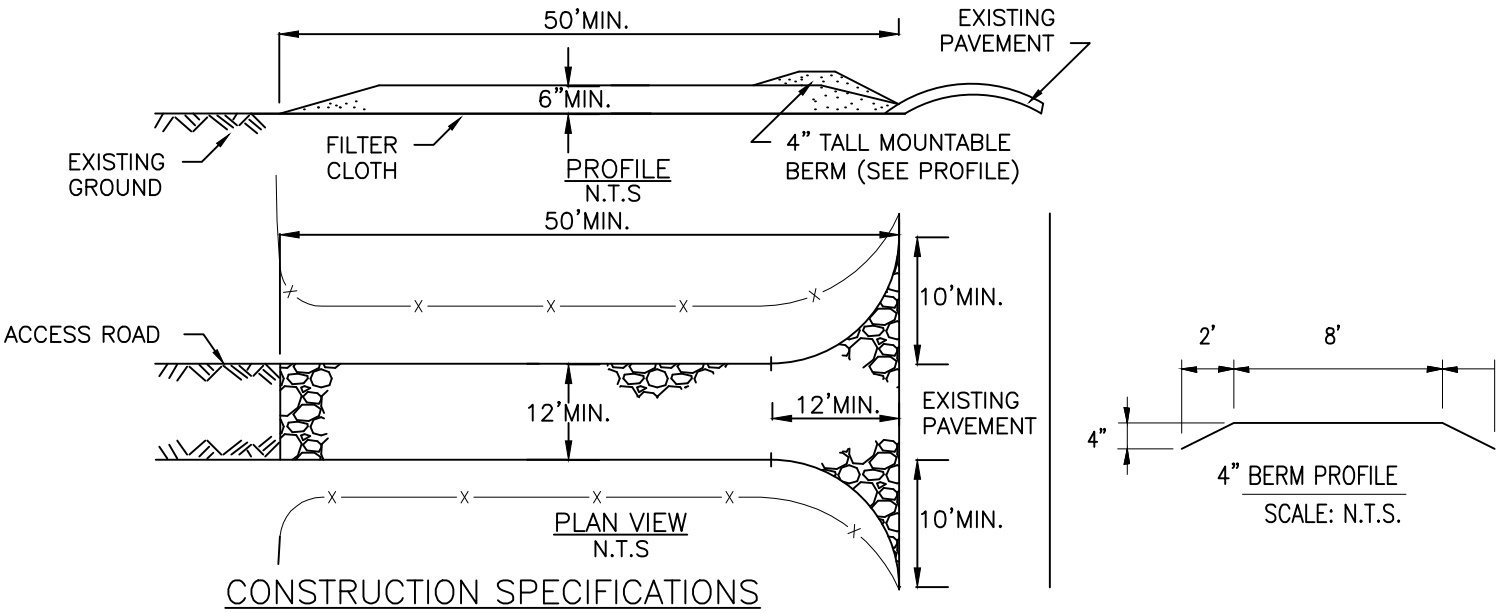
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TEMPORARY ACCESS FORD

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 14

Sheet: 14 of 127
Type:



CONSTRUCTION SPECIFICATIONS

1. STONE SIZE – 1–4" STONE PERMITTED FOR USE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH – NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
3. THICKNESS – NOT LESS THAN SIX (6) INCHES.
4. WIDTH – TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY–FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE. GEOTEXTILE MUST MEET CRITERIA IN TABLE BELOW.
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN EVENT.

TABLE: CRITERIA FOR GEOTEXTILE

FABRIC PROPERTIES	LIGHT DUTY ROADS GRADE SUBGRADE	HEAVY DUTY HAUL ROADS ROUGH GRADED	TEST METHOD
GRAB TENSILE STRENGTH (LBS)	200	220	ASTM D1682
ELONGATION AT FAILURE (%)	50	60	ASTM D1682
MULLEN BRUST STRENGTH (LBS)	190	430	ASTM D3786
PUNCTURE STRENGTH (LBS)	40	125	ASTM D3786 MODIFIED
EQUIVALENT OPENING SIZE	40–80	40–80	US STD SIEVE CW–02215
AGGREGATE DEPTH	6	10	

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

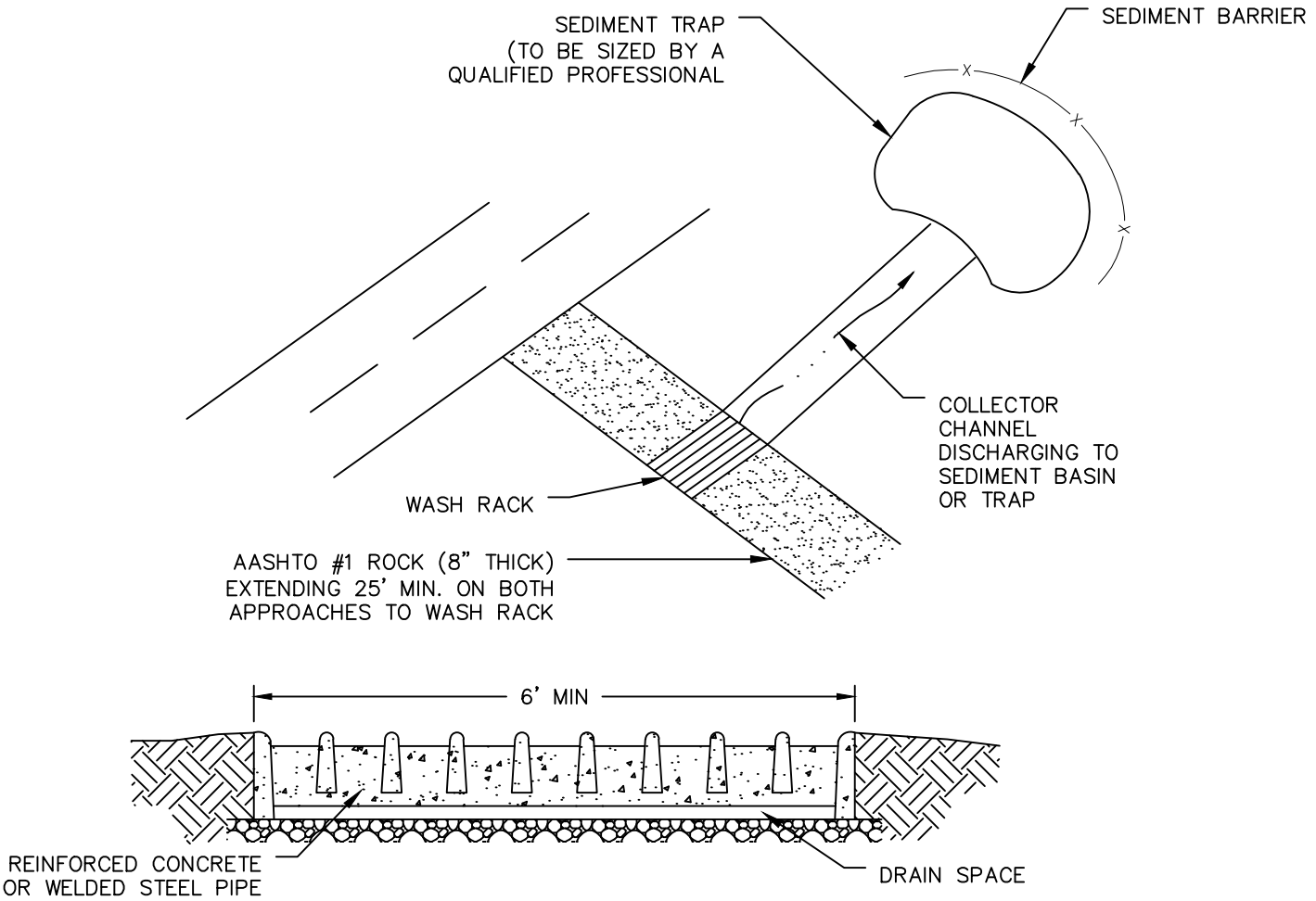
Division:		Op. Area:	
St.:		Co./Par.:	
Section:	Township:	Range:	
Dft:	Date:	Project ID:	
Chk:	Date:	Scale:	
Appr:	Date:	Filename:	

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
STABILIZED CONSTRUCTION ENTRANCE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 15

Sheet: 15 of 127
Type:



NOTES:

1. WASH RACK SHALL BE 20 FEET (MIN.) WIDE OR TOTAL WIDTH OF ACCESS.
2. WASH RACK SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE ANTICIPATED CONSTRUCTION VEHICULAR TRAFFIC.
3. A WATER SUPPLY SHALL BE MADE AVAILABLE TO WASH THE WHEELS OF ALL VEHICLES EXITING THE SITE.
4. MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FURTHER USE OF THE RACK. ALL SEDIMENT DEPOSITED ON ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

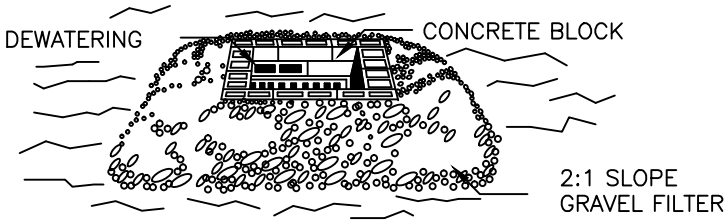
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
STABILIZED CONSTRUCTION ENTRANCE
WITH WASHRACK

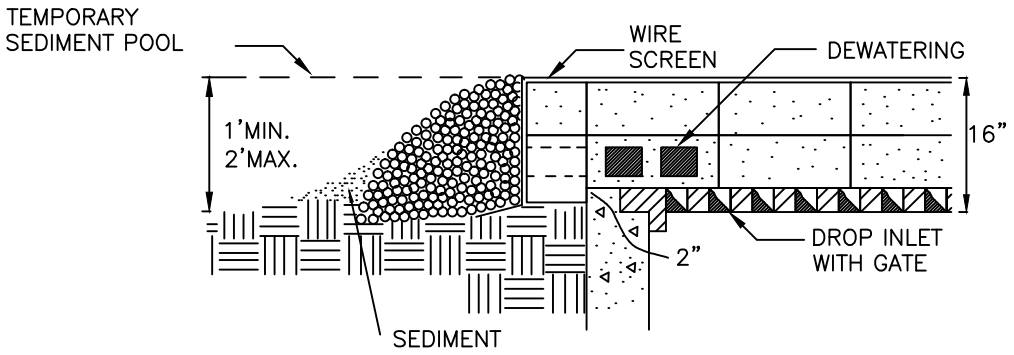
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 16

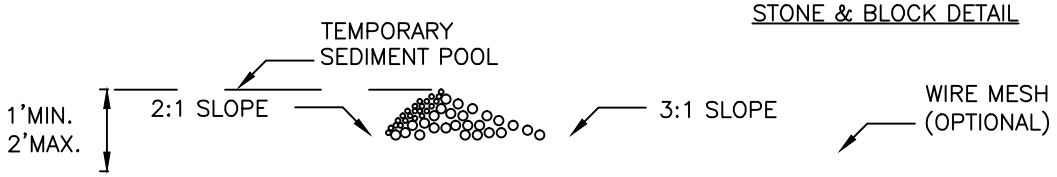
Sheet: 16 of 127
Type:



STONE & BLOCK PERSPECTIVE VIEW



STONE & BLOCK DETAIL



"DOUGHNUT" DETAIL

CONSTRUCTION SPECIFICATIONS

1. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE FOR DEWATERING. FOUNDATION SHALL BE 2 INCHES MINIMUM BELOW REST OF INLET AND BLOCKS SHALL BE PLACED AGAINST INLET FOR SUPPORT.
2. HARDWARE CLOTH OR 1/2" WIRE MESH SHALL BE PLACED OVER BLOCK OPENINGS TO SUPPORT STONE.
3. USE CLEAN STONE OR GRAVEL 1/2–3/4 INCH IN DIAMETER PLACED 2 INCHES BELOW TOP OF THE BLOCK ON A 2:1 SLOPE OR FLATTER.
4. FOR STONE STRUCTURES ONLY, A 1 FOOT THICK LAYER OF THE FILTER STONE WILL BE PLACED AGAINST THE 3 INCH STONE AS SHOWN ON THE DRAWINGS.
5. MAXIMUM DRAINAGE AREA 1 ACRE.
6. THIS SHALL BE USED IN ADDITION TO A SEDIMENT TRAPPING DEVICE (E.G. SEDIMENT BASIN, FILTER SACK, ETC.)

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

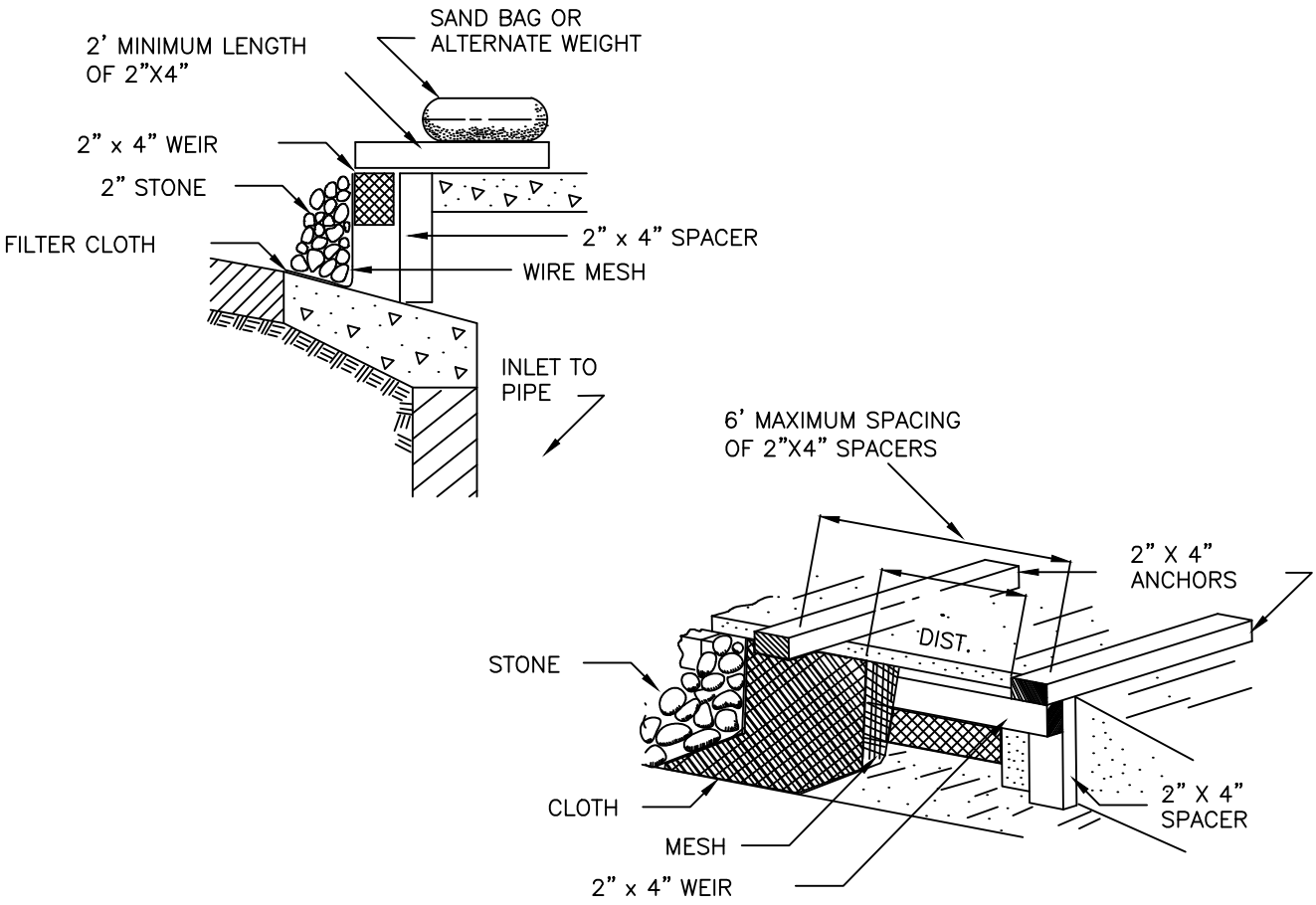
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
STONE & BLOCK DROP INLET
PROTECTION STRUCTURE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 17

Sheet: 17 of 127
Type:



CONSTRUCTION SPECIFICATIONS

1. FILTER FABRIC SHALL HAVE AN EOS OF 40–85.
2. WOODEN FRAME SHALL BE CONSTRUCTED OF 2" x 4" CONSTRUCTION GRADE LUMBER.
3. WIRE MESH ACROSS THROAT SHALL BE A CONTINUOUS PIECE 30 INCH MINIMUM WIDTH WITH A LENGTH 4 FEET LONGER THAN THE THROAT. IT SHALL BE SHAPED AND SECURELY NAILED TO A 2" x 4" WEIR.
4. THE WEIR SHALL BE SECURELY NAILED TO 2" x 4" SPACERS 9 INCHES LONG SPACED NO MORE THAN 6 FEET APART.
5. THE ASSEMBLY SHALL BE PLACED AGAINST THE INLET AND SECURED BY 2" x 4" ANCHORS 2 FEET LONG EXTENDING ACROSS THE TOP OF THE INLET AND HELD IN PLACE BY SANDBAGS OR ALTERNATE WEIGHTS.
6. MAXIMUM DRAINAGE AREA 1 ACRE

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

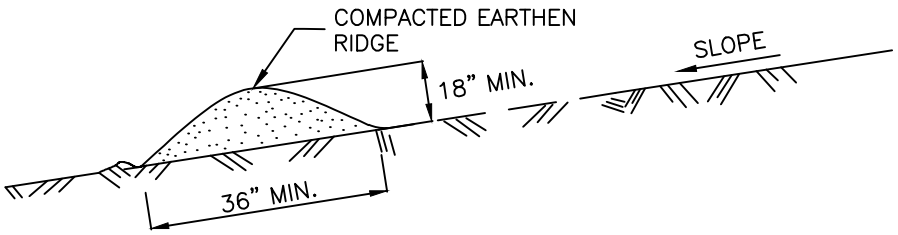
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
CURB DROP INLET PROTECTION
STRUCTURE

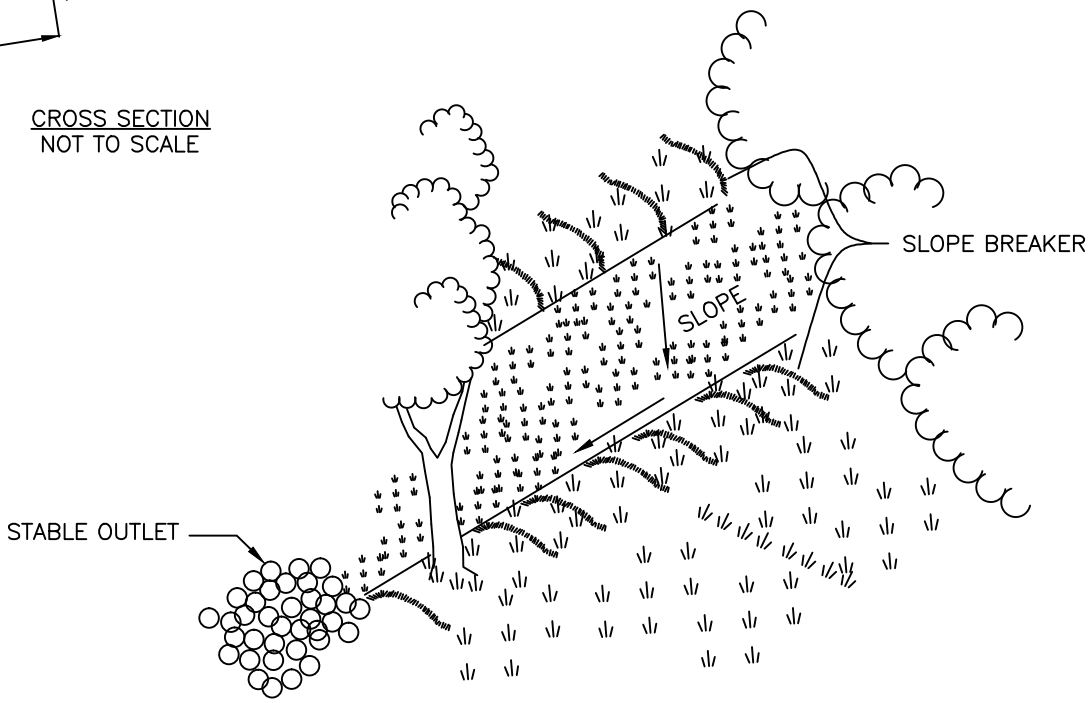
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 18

Sheet: 18 of 127
Type:



CROSS SECTION
NOT TO SCALE



CONSTRUCTION SPECIFICATIONS

1. INSTALL THE SLOPE BREAKER AS SOON AS THE RIGHT OF WAY IS CLEARED AND GRADED.
2. DISK OR STRIP THE SOD FROM THE BASE FOR THE CONSTRUCTED RIDGE BEFORE PLACING FILL.
3. TRACK THE RIDGE TO COMPACT IT TO THE DESIGN CROSS SECTION.
4. SLOPE BREAKERS MAY BE CURVED ALONG THE SLOPE TO CONFORM TO THE CONTOURS. REGARDLESS OF CURVATURE, ALL SLOPE BREAKERS SHALL BE CONSTRUCTED WITH A POSITIVE SLOPE TOWARDS A STABLE OUTLET.
5. THE OUTLET SHALL BE LOCATED ON AN UNDISTURBED AREA. FIELD SPACING WILL BE ADJUSTED TO USE THE MOST STABLE OUTLET AREAS. OUTLET PROTECTION WILL BE PROVIDED WHEN NATURAL AREAS ARE NOT ADEQUATE.
6. VEHICLE CROSSING SHALL BE STABILIZED WITH GRAVEL. EXPOSED AREAS SHALL BE IMMEDIATELY SEEDED AND MULCHED.
7. PERIODICALLY INSPECT SLOPE BREAKERS FOR EROSION DAMAGE AND SEDIMENT. CHECK OUTLET AREAS AND MAKE REPAIRS AS NEEDED TO RESTORE OPERATION.
8. THE POSITIVE GRADE OF THE SLOPE BREAKER SHALL NOT EXCEED 8%. A CROSSING ANGLE OF APPROX. 60 DEGREES IS PREFERRED. SLOPE BREAKERS FLOW MUST BE CONVEYED TO STABLE OUTLETS.

MAXIMUM SPACING OF PERMANENT AND TEMPORARY SLOPE BREAKERS

PERCENT SLOPE	SPACING (FT)
<5	125
5 TO 10	100
10 TO 20	75
20 TO 35	50
>35	25

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

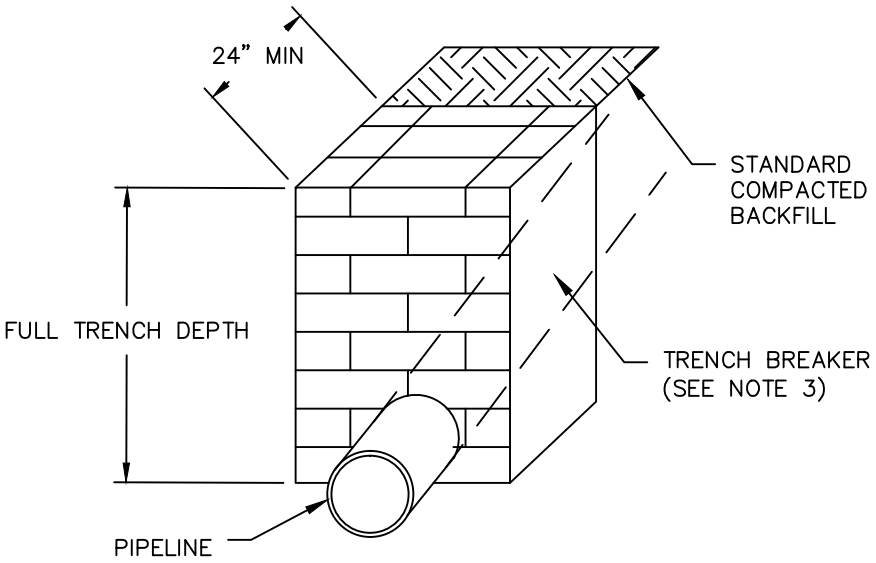
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
SLOPE BREAKER (WATERBAR)

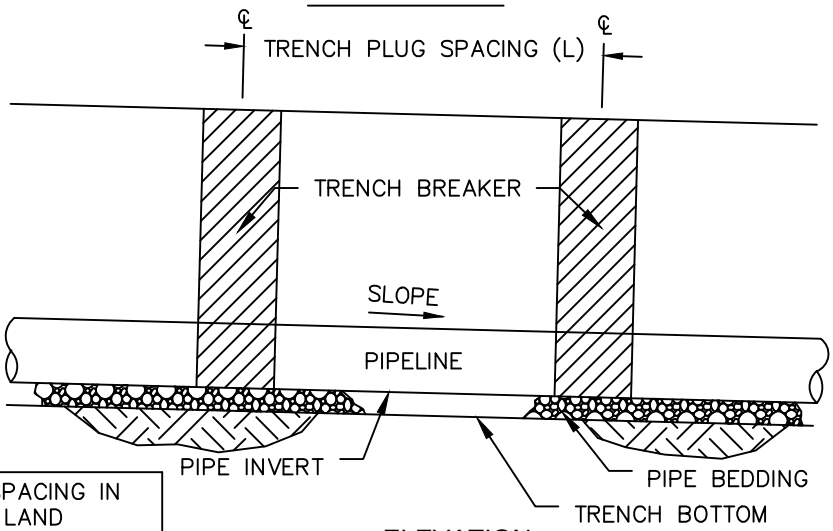
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 19

Sheet: 19 of 127
Type:



SECTION VIEW



ELEVATION

TRENCH BREAKER SPACING IN AGRICULTURAL LAND	
SLOPE (%)	SPACING (L) (FT)
< 5	AS REQUIRED
5 – 10	150
>10 – 15	100
>15 – 20	80
>20 – 30	70
>30 – 40	50
>40 – 100	40
>100	25

TRENCH BREAKER SPACING IN NON–AGRICULTURAL LAND	
SLOPE (%)	SPACING (L) (FT)
< 5	AS REQUIRED
5 – 10	150
>10 – 20	100
>20 – 35	80
<35 –	70

NOTES
1. TOPSOIL SHALL NOT BE USED TO FILL SACKS.
2. IMPERVIOUS TRENCH BREAKERS ARE REQUIRED FOR ALL STREAM, RIVER, WETLAND, OR OTHER WATER BODY CROSSINGS.
3. BREAKER MATERIAL MAY CONSIST OF STACKED CLAY, BENTONITE, SAND BAGS OR FOAM.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

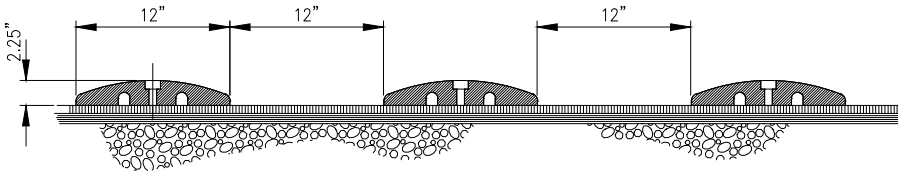
Division:		Op. Area:
St.:		Co./Par.:
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TRENCH BREAKER (TRENCH PLUG)

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 20

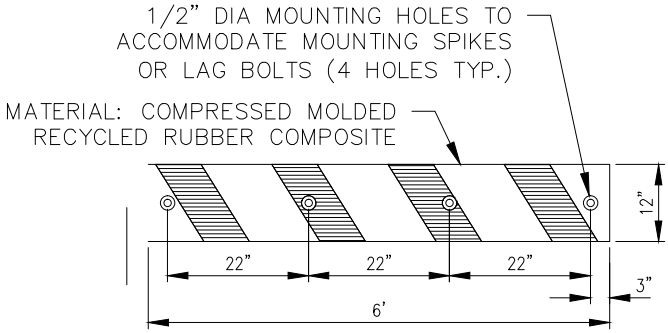
Sheet: 20 of 127
Type:



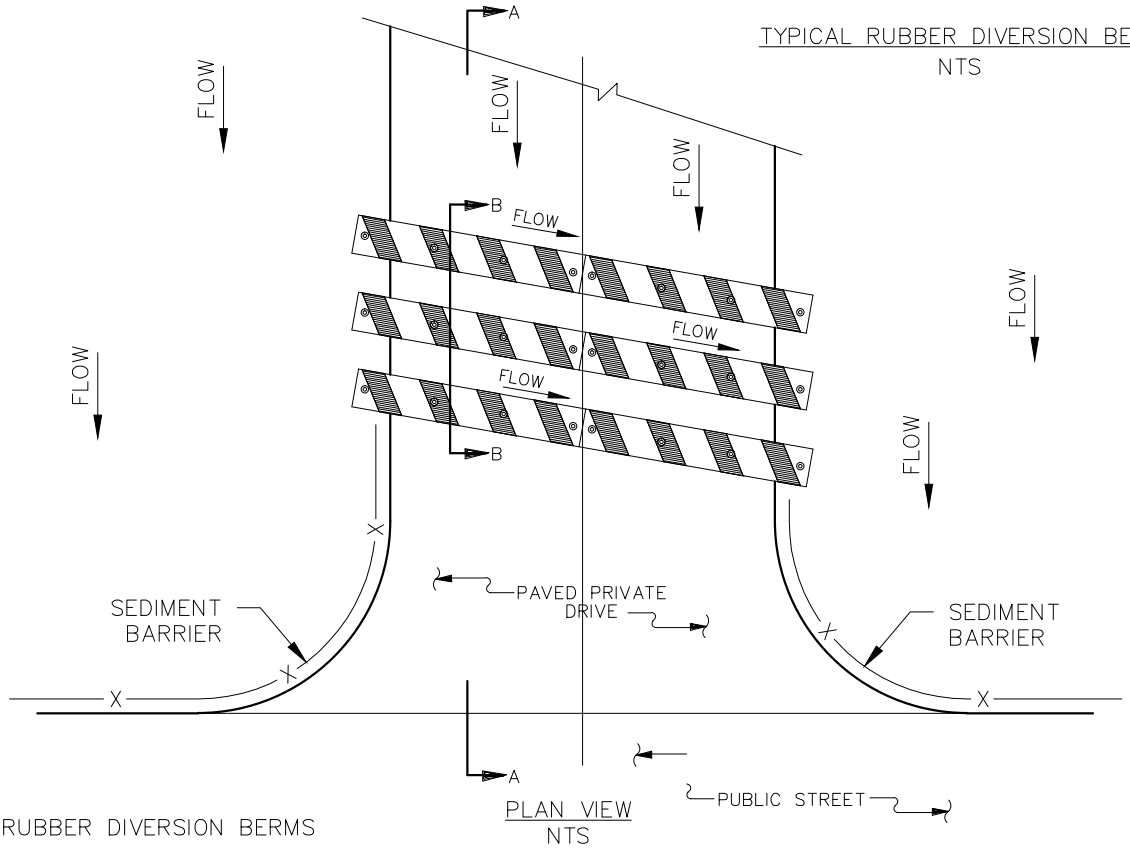
SECTION BB
NTS

NOTES:

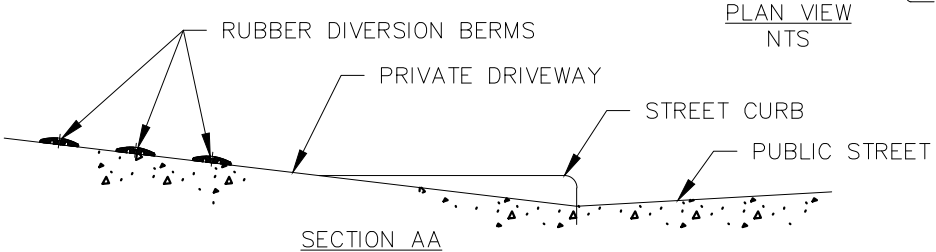
1. DIVERSION BERM TO BE SLOMO SPEED BUMPS BY CHECKER INDUSTRIAL SAFTEY PRODUCTS INC OR APPROVED EQUAL. SPEED BUMPS ARE MANUFACTURED FROM RECYCLED RUBBER COMPOSITE. MODEL NUMBER SB6D–H IS 72" L x 12" W x 2.25" H.
2. EACH 72" SECTION OF BERM TO HAVE MOUNTING HOLES SPACED ON 22" MAXIMUM, CENTERS.
3. BERM TO DIVERT RUNOFF TO EXISTING SEDIMENT BARRIER.
4. WHEN REMOVED, ALL HOLES AND DAMAGE TO EXISTING DRIVEWAY SURFACES SHALL BE REPAIRED.



TYPICAL RUBBER DIVERSION BERM
NTS



PLAN VIEW
NTS



SECTION AA
NTS

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

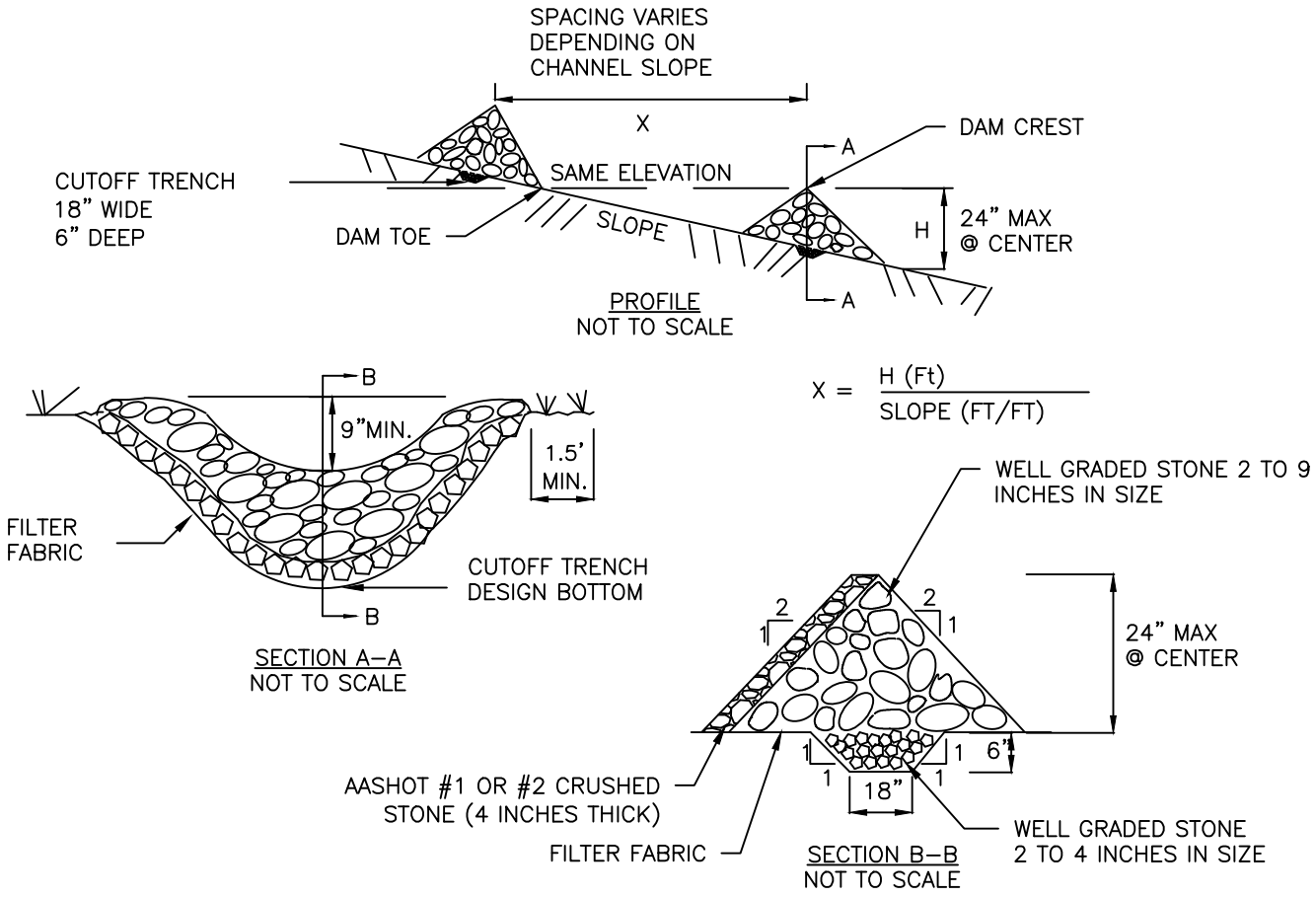
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
DRIVEWAY DIVERSION BERM

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 21

Sheet: 21 of 127
Type:



CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN.
2. SET SPACING OF CHECK DAMS TO ASSUME THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.
6. MAXIMUM DRAINAGE AREA 2 ACRES.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

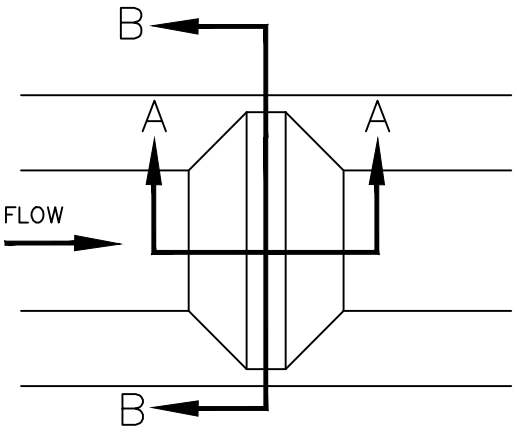
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
CHECK DAM

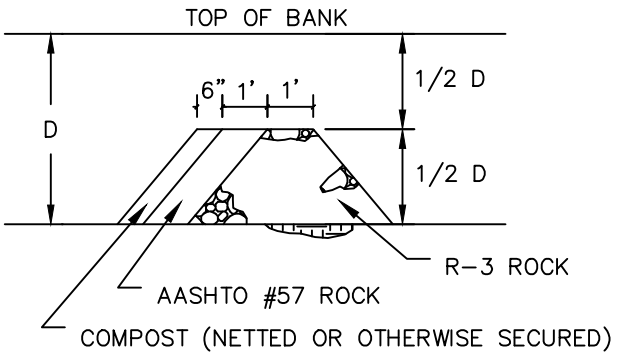
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 22

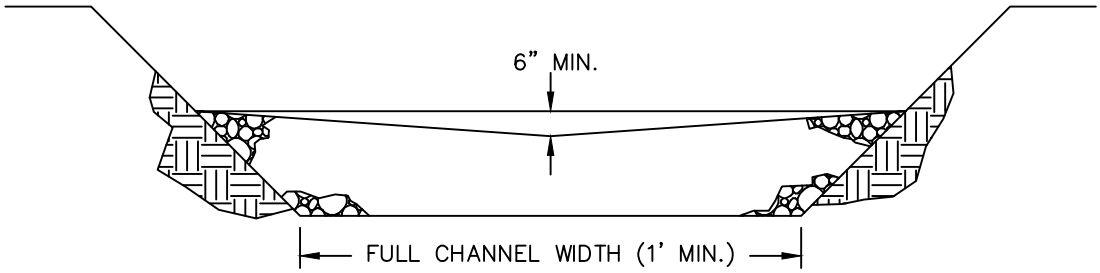
Sheet: 22 of 127
Type:



PLAN VIEW



SECTION A-A



SECTION B-B

FOR 3' ≤ D USE R–4
FOR 2' ≤ D < 3' USE R–3
NOT APPLICABLE FOR D<2'

ROCK FILTER NO.	LOCATION	D (FT.)	RIPRAP SIZE

THIS TABLE IS INTENTIONALLY LEFT BLANK AND SHOULD BE FILLED IN BY THE PLAN PREPARER.

NOTES:

1. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE HEIGHT OF THE FILTER.
2. IMMEDIATELY UPON STABILIZATION OF EACH CHANNEL, INSTALLER SHALL REMOVE ACCUMULATED SEDIMENT, REMOVE ROCK FILTER, AND STABILIZE DISTURBED AREAS.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

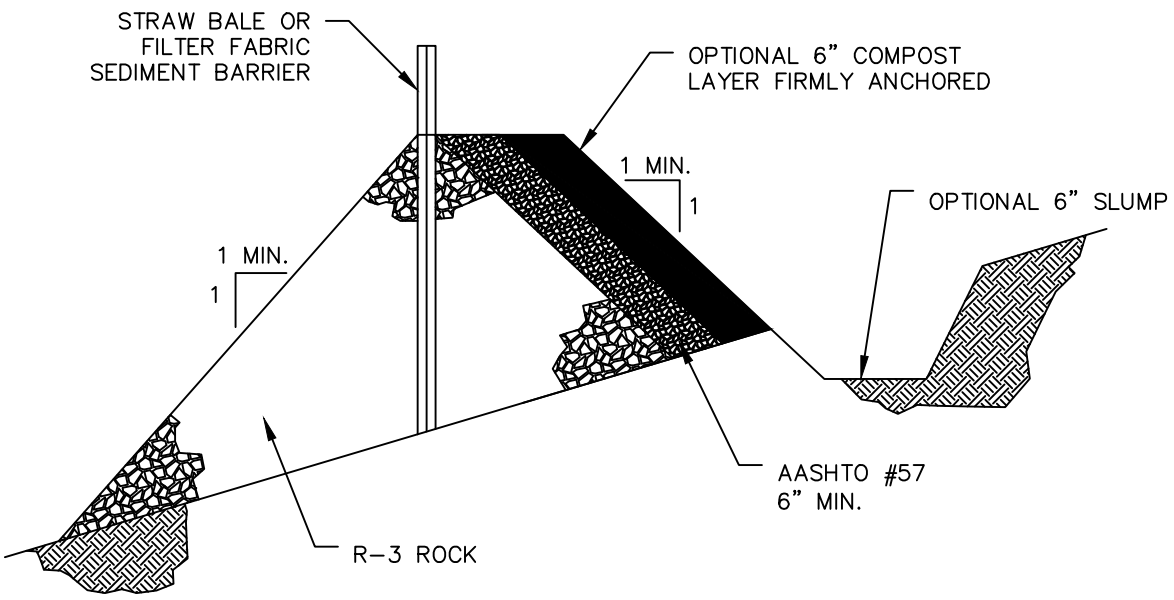
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
ROCK FILTER

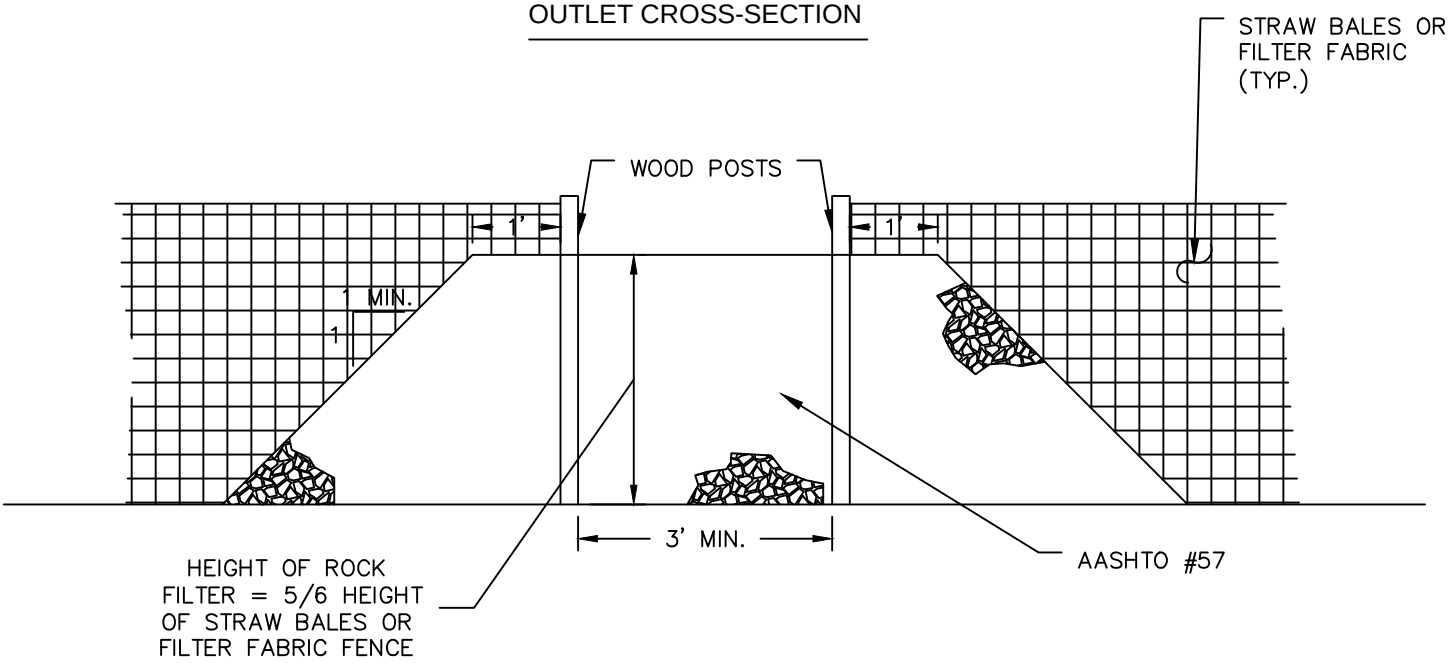
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 23

Sheet: 23 of 127
Type:



OUTLET CROSS-SECTION



UP-SLOPE FACE

NOTES:

1. A ROCK FILTER OUTLET SHALL BE INSTALLED WHERE FAILURE OF A SILT FENCE OR STRAW BALE BARRIER HAS OCCURRED DUE TO CONCENTRATED FLOW. ANCHORED COMPOST LAYER SHALL BE USED ON UPSLOPE FACE IN HIGH QUALITY AND EXCEPTIONAL VALUE WATERSHEDS.

2. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLET.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

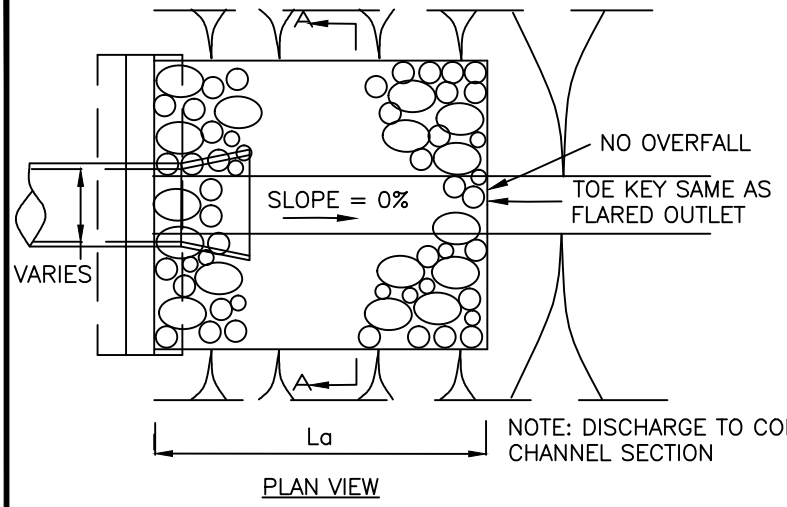
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
ROCK FILTER OUTLET

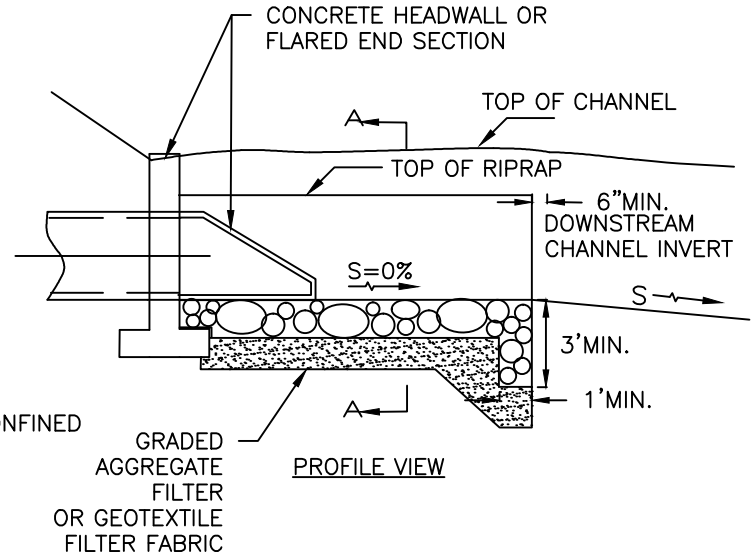
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 24

Sheet: 24 of 127
Type:

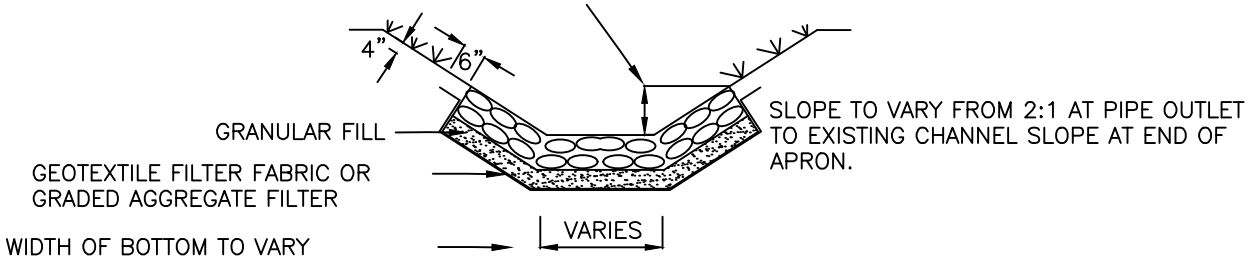


PLAN VIEW



PROFILE VIEW

MINIMUM DEPTH OF RIPRAP = MAXIMUM DEPTH OF FLOW (DOWNSTREAM NORMAL DEPTH OR DISCHARGE DEPTH, WHICHEVER IS GREATER).



CROSS SECTION A–A

NOTES:

1. THE OUTLET PROTECTION MAY BE DONE USING ROCK RIPRAP, GROUTED RIPRAP, OR GABIONS. RIPRAP SHALL BE COMPOSED OF A WELL–GRADED MIXTURE OF STONE SIZE SO THAT 50 PERCENT OF THE PIECES, BY WEIGHT, SHALL BE LARGER THAN THE D50 SIZE DETERMINED BY USING THE CHART. A WELL–GRADED MIXTURE, AS USED HEREIN, IS DEFINED AS A MIXTURE COMPOSED PRIMARILY OF LARGER STONE SIZES, BUT WITH A SUFFICIENT MIXTURE OF OTHER SIZES TO FILL THE SMALLER VOIDS BETWEEN THE STONES. THE DIAMETER OF THE LARGEST STONE SIZE IN SUCH A MIXTURE SHALL BE 1.5 TIMES THE D50 SIZE.

2. THE MINIMUM THICKNESS OF THE RIPRAP LAYER SHALL BE 1.5 TIMES THE MAXIMUM STONE DIAMETER FOR D50 OF 15 INCHES OR LESS; AND 1.2 TIMES THE MAXIMUM STONE SIZE FOR D50 GREATER THAN 15 INCHES.

D 50 (IN)	d max (in)	MIN. BLANKET THICKNESS (IN)
4	6	9
6	9	14
9	14	20
12	18	27
15	22	32
18	27	32
21	32	38
24	36	43

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

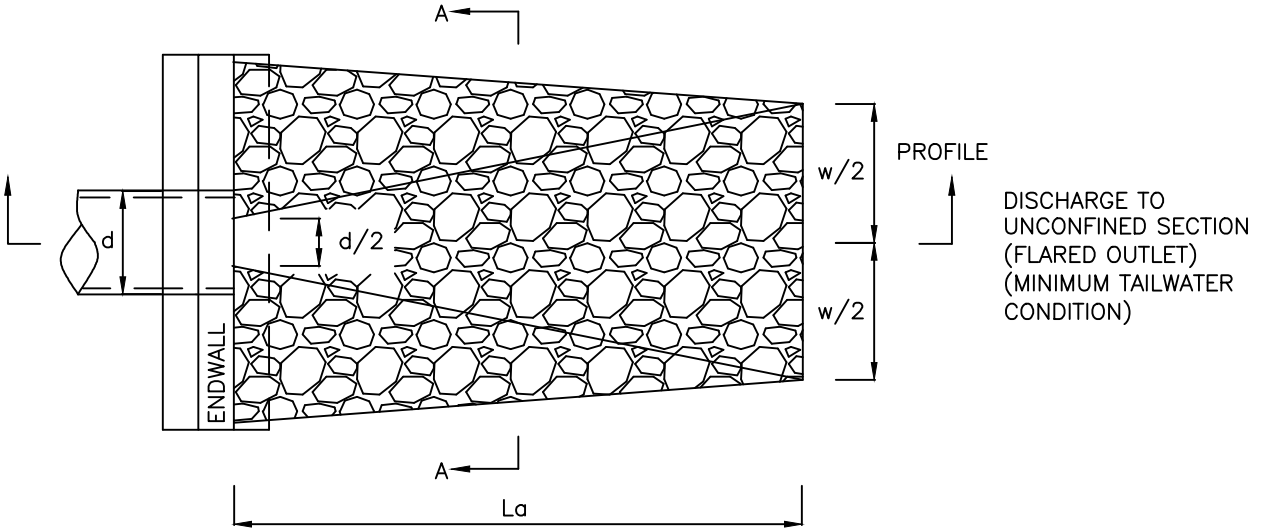
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
RIPRAP OUTLET PROTECTION–GENERAL

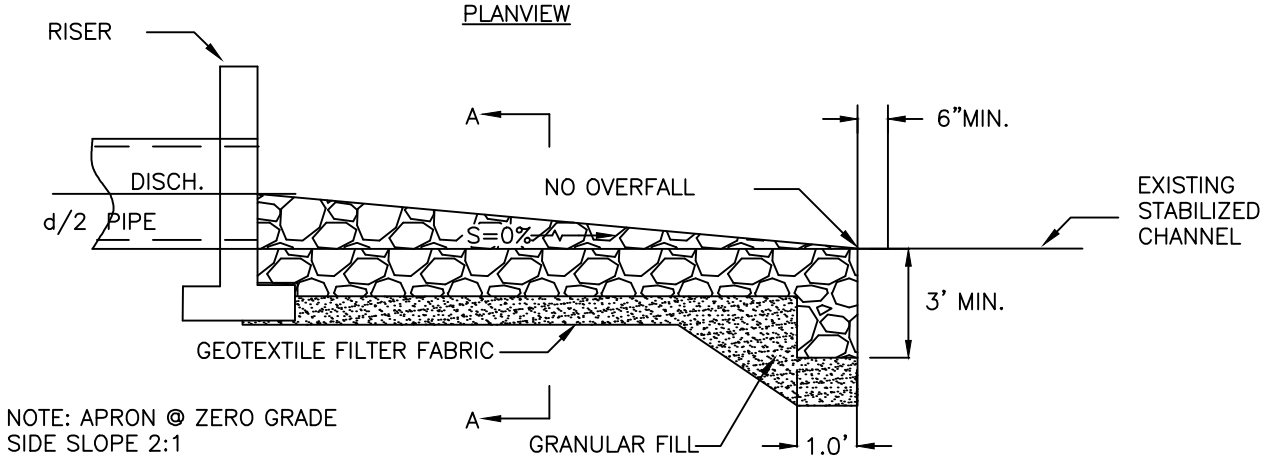
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 25

Sheet: 25 of 127
Type:

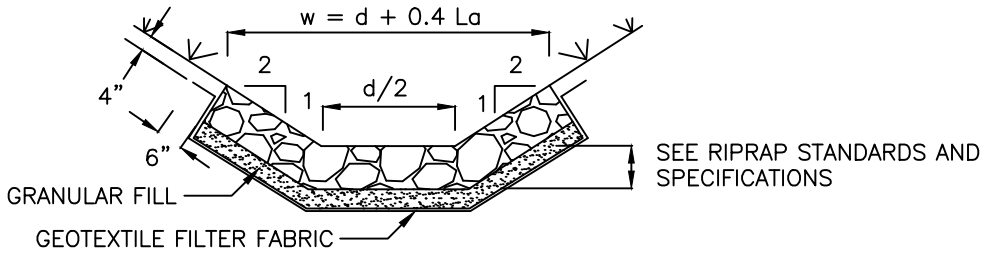


PLANVIEW



NOTE: APRON @ ZERO GRADE
SIDE SLOPE 2:1

PROFILE VIEW



CROSS SECTION A–A

NOTE:
SEE FIGURE 24 FOR NOTES AND TABLE REGARDING
MINIMUM RIPRAP THICKNESS.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

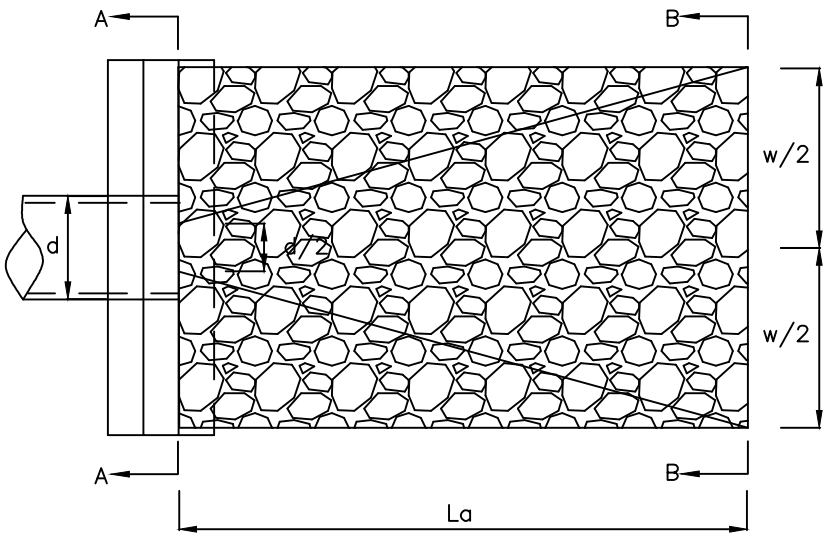
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
RIPRAP OUTLET PROTECTION
MINIMUM TAIL WATER

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

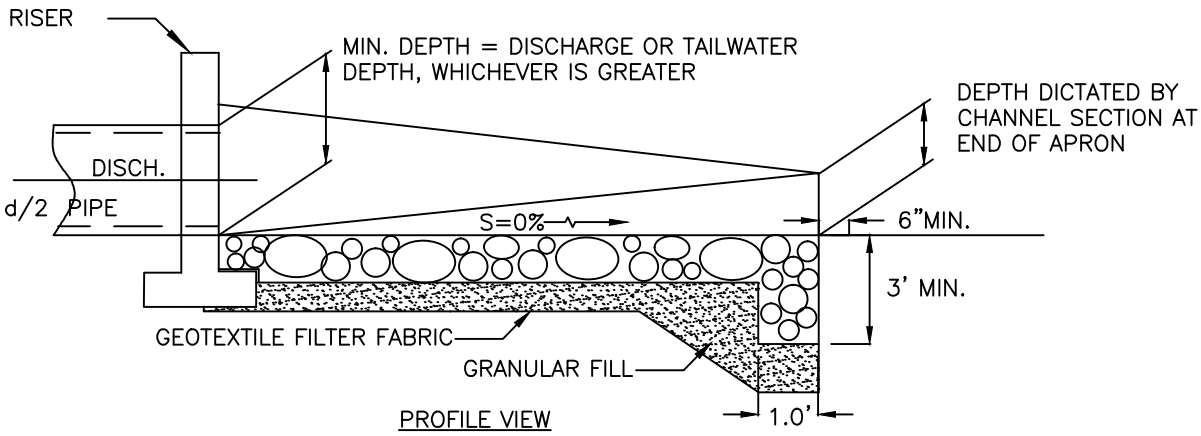
FIG. NO. 26

Sheet: 26 of 127
Type:

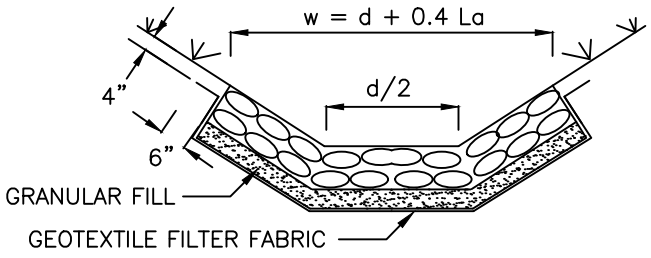


DISCHARGE TO SEMI–CONFINED SECTION (MAXIMUM TAILWATER CONDITION)

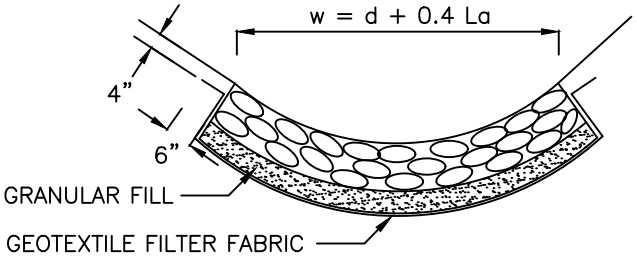
PLAN VIEW



PROFILE VIEW



SECTION A–A
(AT END OF CULVERT)



SECTION B–B
(AT END OF APRON)

NOTE:
SEE FIGURE 24 NOTES AND TABLE FOR MINIMUM RIPRAP THICKNESS.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

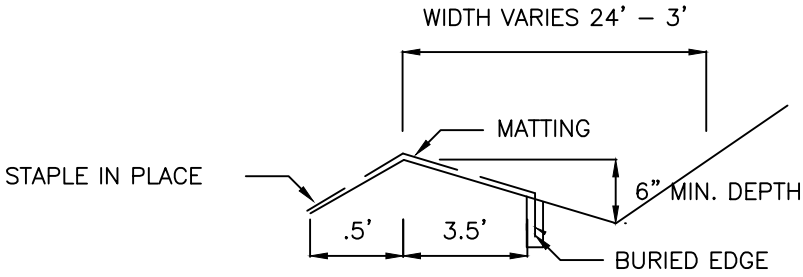
Division:		Op. Area:
St.:		Co./Par.:
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
RIPRAP OUTLET PROTECTION
MAXIMUM TAIL WATER

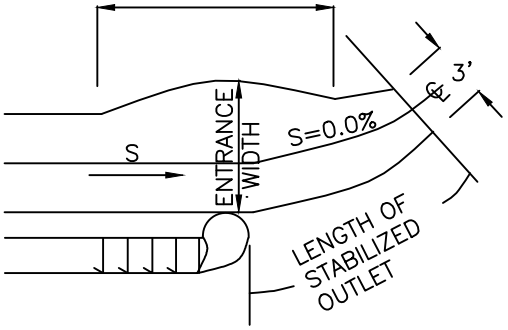
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 27

Sheet: 27 of 127
Type:



CROSS SECTION
NOT TO SCALE



PLAN VIEW
NOT TO SCALE

Q(cfs)	E.W.(FT)	D(FT)	END WIDTH(FT)	LENGTH(FT)
0–10	10	0.5	3	10
10–20	16	0.6	3	20
20–30	24	0.7	3	30

CONSTRUCTION SPECIFICATIONS

1. THE MATTING SHOULD BE A MINIMUM OF 4FT. WIDE EXTENDING 6 INCHES OVER THE LIP AND BURIED 6 INCHES DEEP IN A VERTICAL TRENCH ON THE LOWER EDGE. THE UPPER EDGE SHOULD BUTT AGAINST SMOOTHLY CUT SOD AND BE SECURELY HELD IN PLACE WITH CLOSELY SPACED HEAVY DUTY WIRE STAPLES AT LEAST 12 INCHES IN LENGTH.
2. ENSURE THAT THE LIP IS LEVEL TO UNIFORMLY SPREAD DISCHARGE.
3. THE LIP SHALL BE CONSTRUCTED ON UNDISTURBED SOIL NOT FILL.
4. A 20 FOOT TRANSITION SECTION WILL BE CONSTRUCTED FROM THE DIVERSION CHANNEL TO THE SPREADER TO SMOOTHLY BLEND THE DIFFERENT DIMENSION AND GRADES.
5. THE RUNOFF DISCHARGE WILL BE OUTLETED ONTO A STABILIZED VEGETATED SLOPE NOT EXCEEDING 10%.
6. SEED AND MULCH THE DISTURBED AREA IMMEDIATELY AFTER CONSTRUCTION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

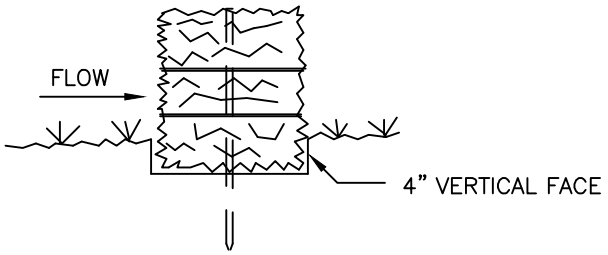
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
EARTHEN LEVEL SPREADER

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 28

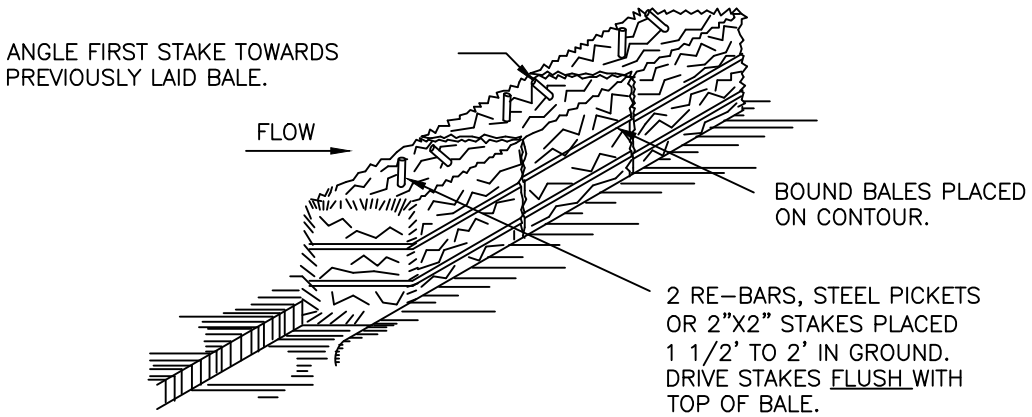
Sheet: 28 of 127
Type:

CONSTRUCTED SLOPE	PERCENT SLOPE	SLOPE LENGTH (FT)
2:1	50	25
3:1	33	50
4:1	25	75



BEDDING DETAIL
NOT TO SCALE

DRAINAGE AREA NO MORE THAN 1/4 ACRE PER 100 FEET OF STRAW BALE DIKE FOR SLOPES LESS THAN 25%.



ANCHORING DETAIL
NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF (4) INCHES, AND PLACED SO THE BINDINGS ARE HORIZONTAL.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE–BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.
4. INSPECTION SHALL BE FREQUENT AND REPAIR REPLACEMENT SHALL BE MADE PROMTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULLNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
6. BALES SHALL NOT BE USED AS A SEDIMENT BARRIER IN LOCATIONS WHERE THEY ARE EXPECTED TO LAST LONGER THAN 3 MONTHS DUE TO NATURAL DEGRADATION.
7. LENGTH OF SLOPE ABOVE THE STRAW BALE DIKE SHOULD NOT EXCEED THE LIMITS BELOW.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

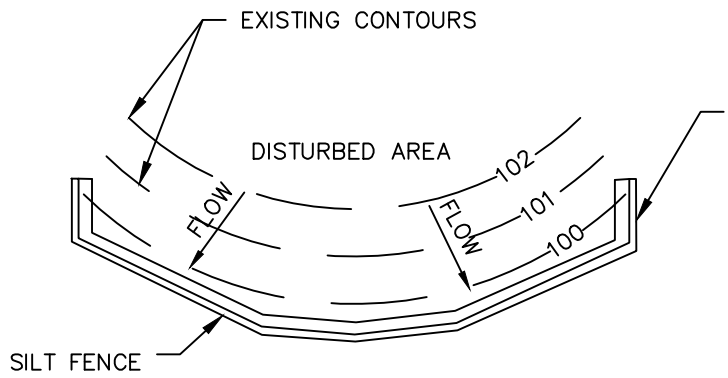
Division:		Op. Area:
St.:		Co./Par.:
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
STRAW BALE DIKE

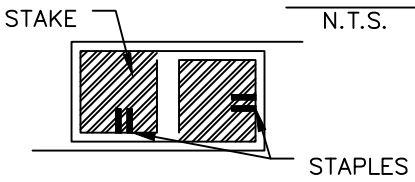
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 29

Sheet: 29 of 127
Type:

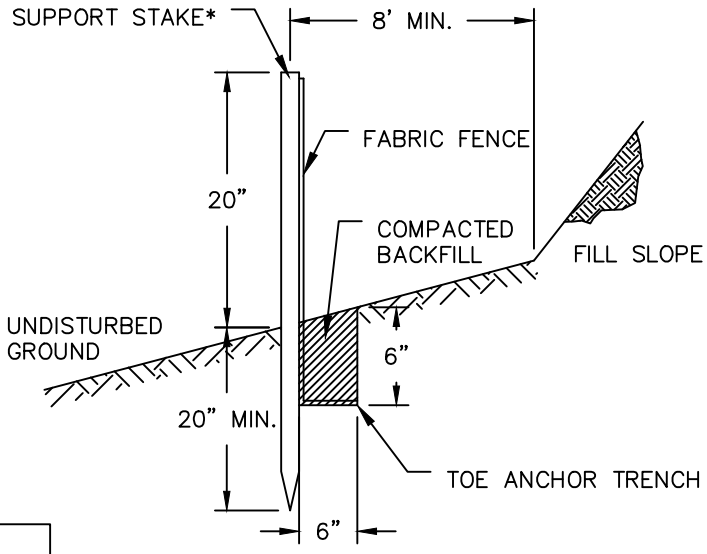


PLAN VIEW
N.T.S.



JOINING FENCE SECTION
N.T.S.

*STAKES SPACED @ 8' MAX.
USE 2" X 2" (+/- 3/8")
WOOD OR EQUIVALENT STEEL
(U OR T) STAKES



ELEVATION VIEW
N.T.S.

CONSTRUCTED SLOPE	PERCENTMAX. SLOPE	SLOPE LENGTH (FT)
2:1	50	25
3:1	33	50
4:1	25	75
5:1	20	100

NOTES:

1. FABRIC SHALL HAVE THE MINIMUM PROPERTIES AS SHOWN IN THE TABLE BELOW.
2. FABRIC WIDTH SHALL BE 30" MINIMUM. STAKES SHALL BE HARDWOOD OR EQUIVALENT STEEL (U OR T) STAKES.
3. SILT FENCE SHALL BE PLACED AT LEVEL EXISTING GRADE. BOTH ENDS OF THE FENCE SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT.
4. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH HALF THE ABOVEGROUND HEIGHT OF THE FENCE.
5. ANY SECTION OF SILT FENCE WHICH HAS BEEN UNDERMINED OR TOPPED SHALL BE IMMEDIATELY REPLACED WITH A ROCK FILTER OUTLET
6. FENCE SHALL BE REMOVED AND PROPERLY DISPOSED OF WHEN TRIBUTARY AREA IS PERMANENTLY STABILIZED.
7. SILT FENCE SHOULD NOT BE INSTALLED ON UNCOMPACTED FILLS OR IN EXTREMELY LOOSE SOILS (E.G. SANDY LOAM), IN ROCKY SOIL WHERE ANCHORING MAY BE DIFFICULT, OR IN FORESTED AREAS WHERE TREE ROOTS MAY BE SEVERED DURING INSTALLATION.
8. MAXIMUM ALLOWABLE SLOPE LENGTHS FOR RUNOFF CONTRIBUTING TO SILT FENCING ARE SHOWN ABOVE.

FABRIC PROPERTIES FOR SILT FENCE		
FABRIC PROPERTY	MINIMUM ACCEPTABLE VALUE	TEST METHOD
GRAB TENSILE STRENGTH (LB)	120	ASTM D1682
ELONGATION AT FAILURE (%)	50% MAX.	ASTM D1682
MULLEN BURST STRENGTH (PSI)	200	ASTM D3786
TRAPEZOIDAL TEAR STRENGTH (LB)	50	
PUNCTURE STRENGTH (LB)	40	ASTM D751 (MODIFIED)
SLURRY FLOW RATE (GAL/MIN/SF)	0.3	ASTM 5141
EQUIVALENT OPENING SIZE	40 – 80	US STD. SIEVE CW–02215
ULTRAVIOLET RADIATION STABILITY (%)	90	ASTM G–26

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

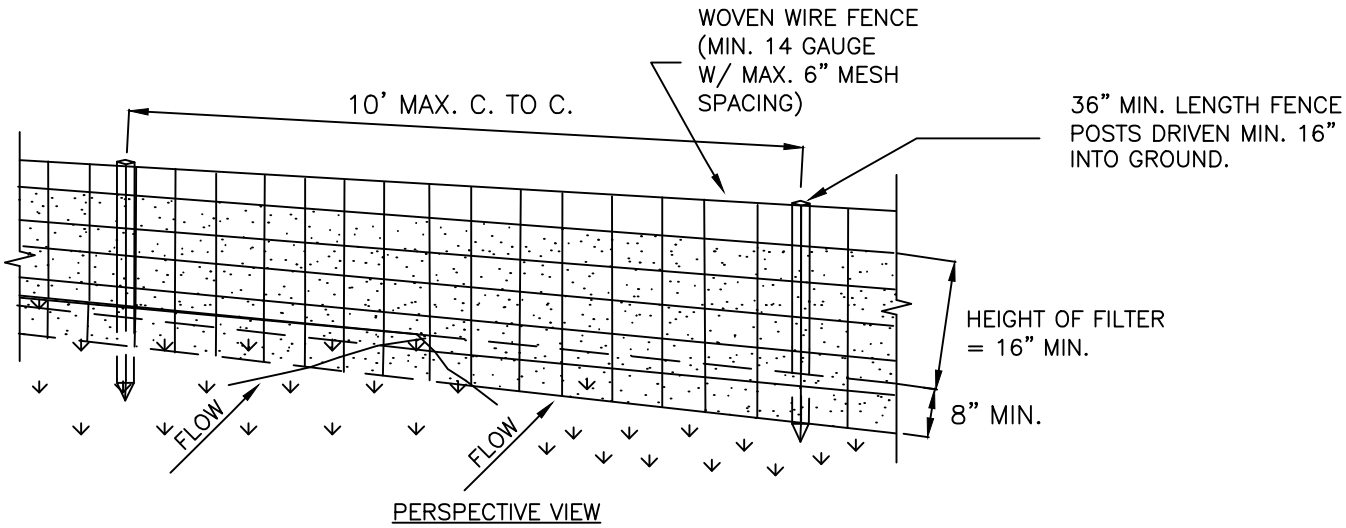
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
STANDARD SILT FENCE

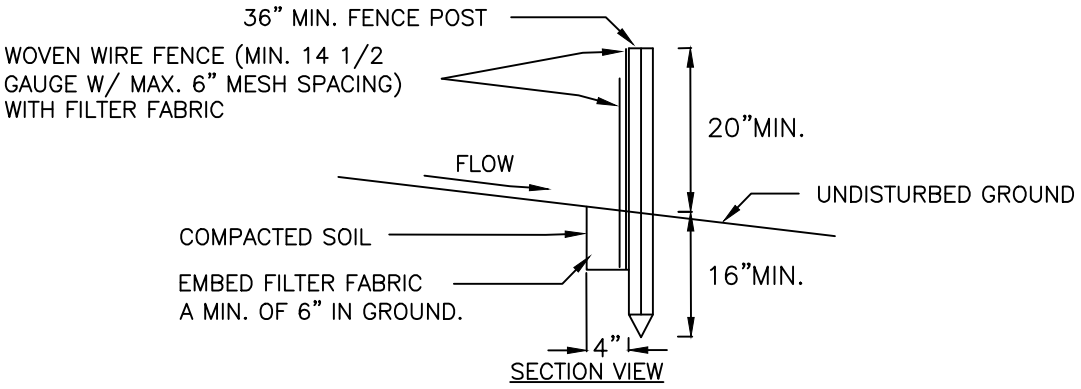
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 30

Sheet: 30 of 127
Type:



PERSPECTIVE VIEW



SECTION VIEW

CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 14 GAUGE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER FABRIC ADJOIN EACH OTHER THEY SHALL BE OVER–LAPPED BY SIX INCHES AND FOLDED. FILTER FABRIC SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.
6. MAXIMUM DRAINAGE AREA FOR OVERLAND FLOW TO A SILT FENCE SHALL NOT EXCEED 1/4 ACRE PER 100 FEET OF FENCE.
7. MAXIMUM ALLOWABLE SLOPE LENGTHS CONTRIBUTING RUNOFF TO SILT FENCE PLACED ON A SLOPE ARE AS FOLLOWS:

SLOPE STEEPNESS	MAXIMUM LENGTH (FT)
2:1	25
3:1	50
4:1	75
5:1 OR GREATER	100

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

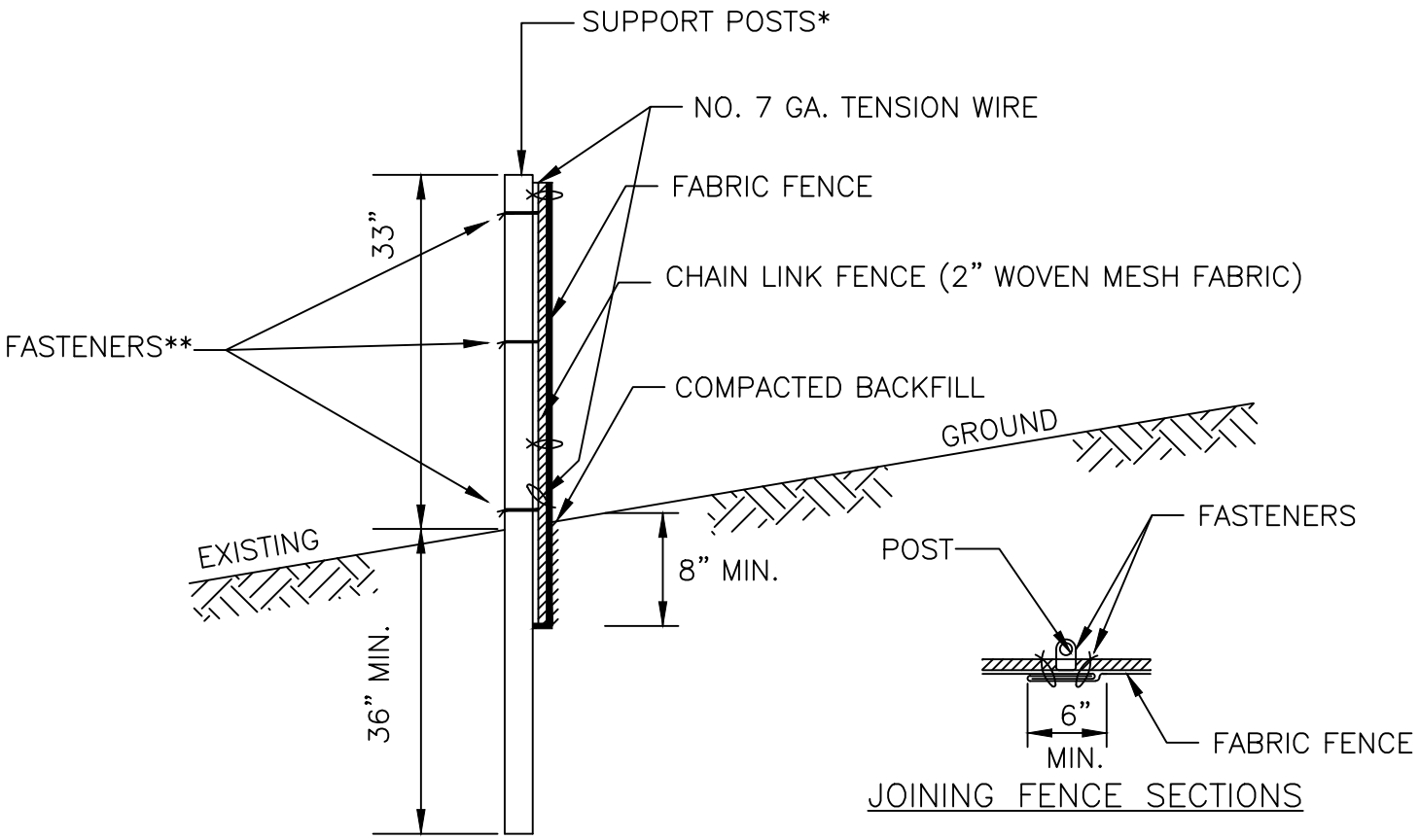
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
REINFORCED SILT FENCE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 31

Sheet: 31 of 127
Type:

STANDARD CONSTRUCTION DETAIL #22
Super Filter Fabric Fence



* POSTS SPACED @ 10' MAX. USE 2 1/2" DIA. GALVANIZED OR ALUMINUM POSTS.

** CHAIN LINK TO POST FASTENERS SPACED @ 14" MAX. USE NO. 6 GA. ALUMINUM WIRE OR NO. 9 GALVANIZED STEEL PRE-FORMED CLIPS. CHAIN LINK TO TENSION WIRE FASTENERS SPACED @ 60" MAX. USE NO. 10 GA. GALVANIZED STEEL WIRE. FABRIC TO CHAIN FASTENERS SPACED @ 24" MAX. C TO C.

NO. 7 GA. TENSION WIRE INSTALLED HORIZONTALLY AT TOP AND BOTTOM OF CHAIN-LINK FENCE.

FILTER FABRIC FENCE MUST BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER MUST BE EXTENDED AT LEAST 8 FEET UPSLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT.

SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE ABOVE GROUND HEIGHT OF THE FENCE.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
SUPER SILT FENCE (1)

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 32

Sheet: 32 of 127
Type:

NOTES:

1. SILT FENCE MUST BE LEFT IN PLACE UNTIL PERMANENT STABILIZATION.
2. FILTER FABRIC FENCE MUST BE INSTALLED AT EXISTING LEVEL GRADE.
3. SEDIMENT MUST BE REMOVED WHERE ACCUMULATIONS REACH 1/2 THE ABOVE GROUND HEIGHT OF THE FENCE.
4. AT A MINIMUM, THE FABRIC SHOULD HAVE THE FOLLOWING PROPERTIES:

FABRIC PROPERTY	MINIMUM ACCEPTABLE VALUE	TEST METHOD
GRAB TENSILE STRENGTH (lb)	120	ASTM D1682
ELONGATION AT FAILURE (%)	20% MAX.	ASTM D1682
MULLEN BURST STRENGTH (lb)	200	ASTM D3786
TRAPEZOIDAL TEAR STRENGTH (lb)	50	
PUNCTURE STRENGTH (lb)	40	ASTM D 751 (MODIFIED)
SLURRY FLOW RATE (gal/min/sf)	0.3	ASTM 5141
EQUIVALENT OPENING SIZE	30	US STD. SIEVE CW-02215
ULTRAVIOLET RADIATION STABILITY (%)	80	ASTM G-26

5. SILT FENCE MUST BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER WILL BE EXTENDED 8 FEET UPSLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT.
6. POSTS SHALL BE INSTALLED USING A POST HOLE DRILL.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

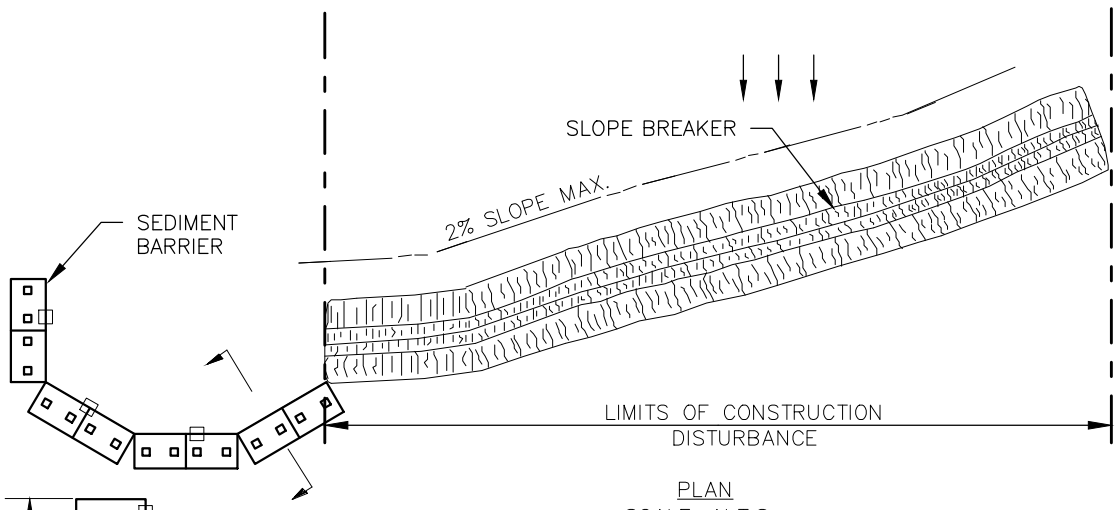
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
SUPER SILT FENCE (2)

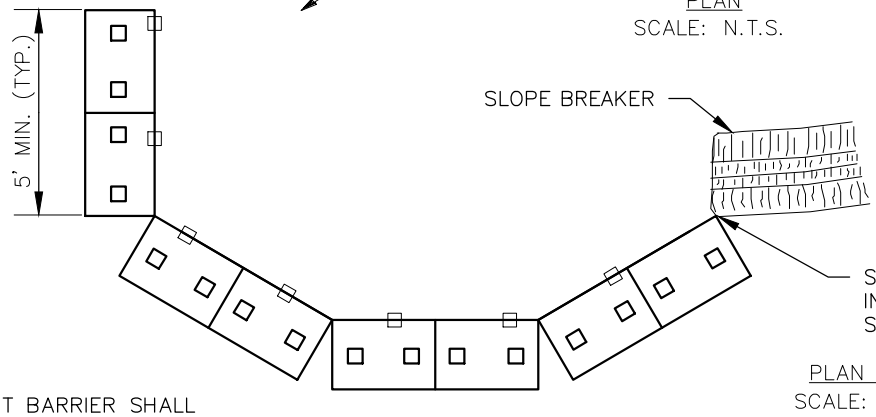
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 33

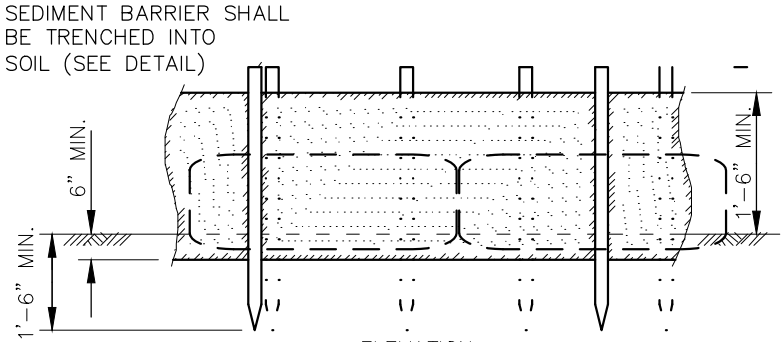
Sheet: 33 of 127
Type:



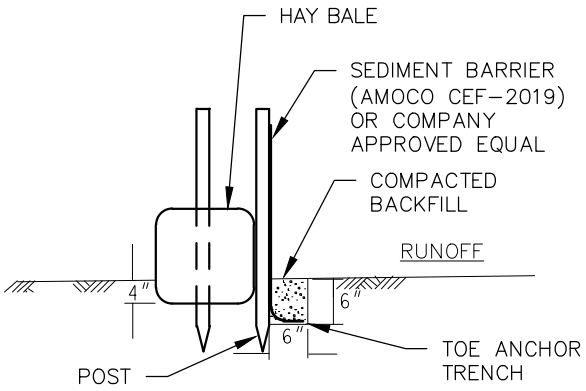
PLAN
SCALE: N.T.S.



PLAN DETAIL
SCALE: N.T.S.



ELEVATION
SCALE: N.T.S.



SEDIMENT BARRIER DETAIL
SCALE: N.T.S.

NOTES:

1. REINFORCED SEDIMENT BARRIER HOOKS SHALL BE PLACED AT THE OUTLET OF SLOPE BRAEAKERS AS SHOWN ON THE PLAN.
2. ONCE THE DISTURBED AREA IS STABILIZED, THE REINFORCED SEDIMENT BARRIER HOOK SHALL BE REMOVED AND ANY DISTURBED AREAS CAUSED BY REMOVAL SHALL BE RETURNED TO ORIGINAL CONDITION AND REVEGETATED.
3. SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE HEIGHT OF THE SEDIMENT BARRIER.
4. STAKES SHALL BE 2"X2"X48" HARDWOOD OR EQUIVALENT STEEL ("U" OR "T") STAKES.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

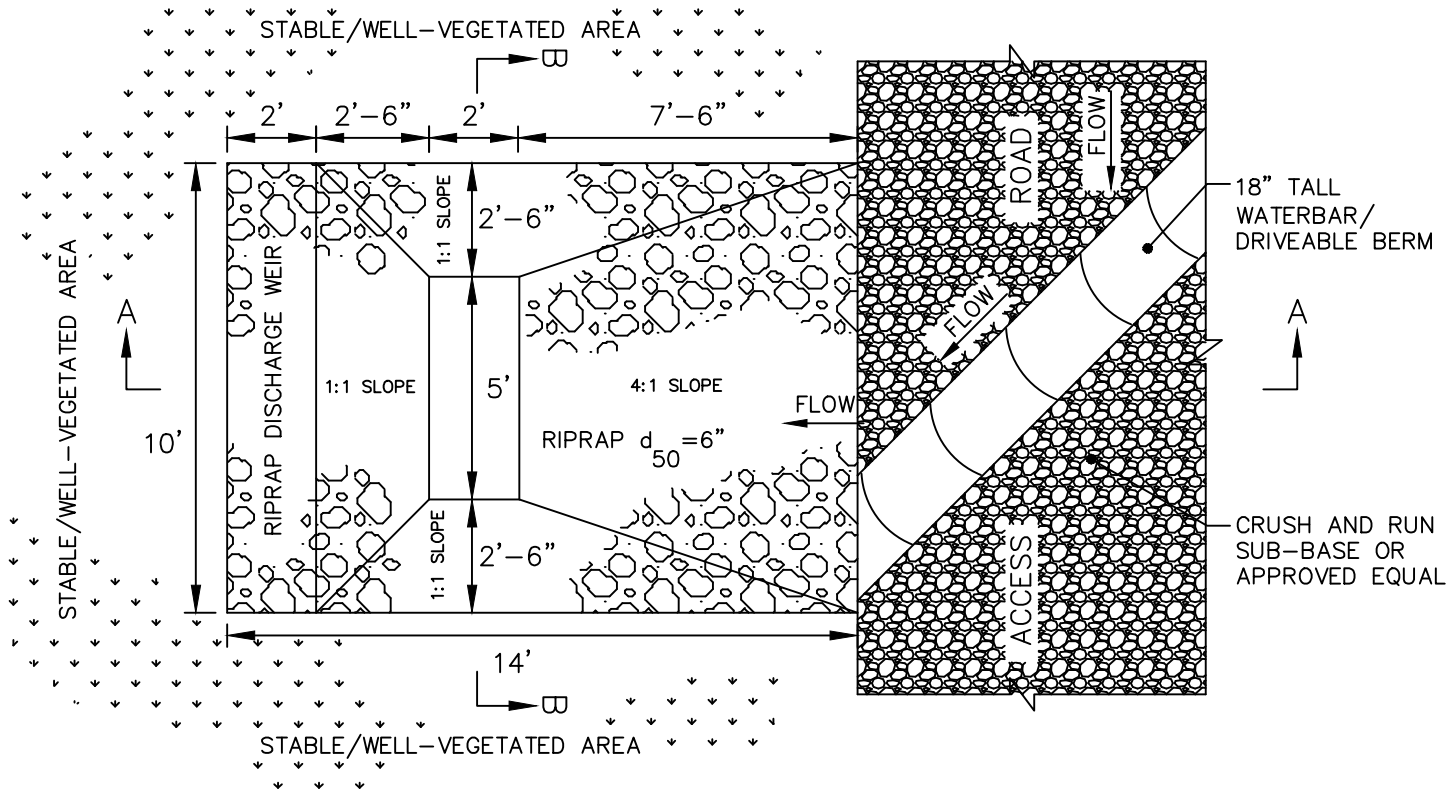
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
REINFORCED SEDIMENT BARRIER HOOK
OUTLET STRUCTURE

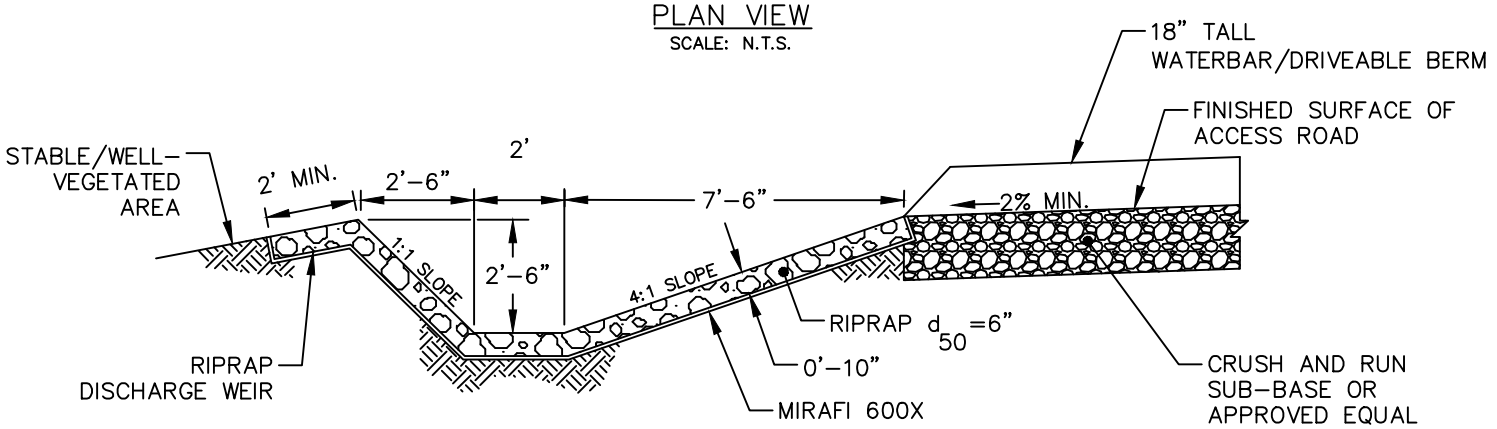
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 34

Sheet: 34 of 127
Type:



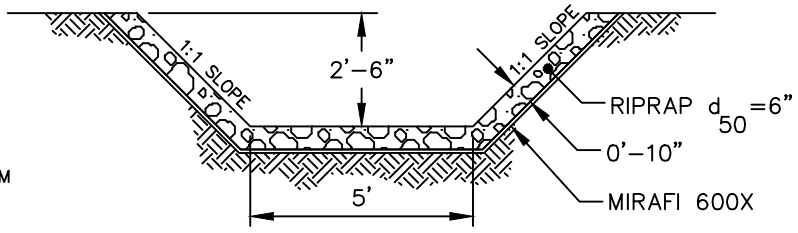
PLAN VIEW
SCALE: N.T.S.



SECTION A-A
SCALE: N.T.S.

NOTES:

1. RIPRAP SHALL CONFORM TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION'S STANDARDS AND SPECIFICATIONS FOR SEDIMENT AND EROSION CONTROL.
2. ADDITIONAL BEST MANAGEMENT PRACTICES (BMPS) MAY BE REQUIRED TO BE UTILIZED IN CONJUNCTION WITH THE WATERBAR OUTLET APRON TO ENSURE THAT EROSION AND SEDIMENTATION DOES NOT OCCUR DOWNSTREAM OF THE APRON. SOME ADDITIONAL BMPS MAY INCLUDE BUT ARE NOT LIMITED TO SILT FENCE, STRAWBALE BARRIER AND EROSION CONTROL MATTING. THE CONTRACTOR SHALL COORDINATE WITH THE ENVIRONMENTAL INSPECTOR TO ENSURE THAT INSTALLATION OF ADDITIONAL BMPS ARE NOT REQUIRED.



SECTION B-B
SCALE: N.T.S.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

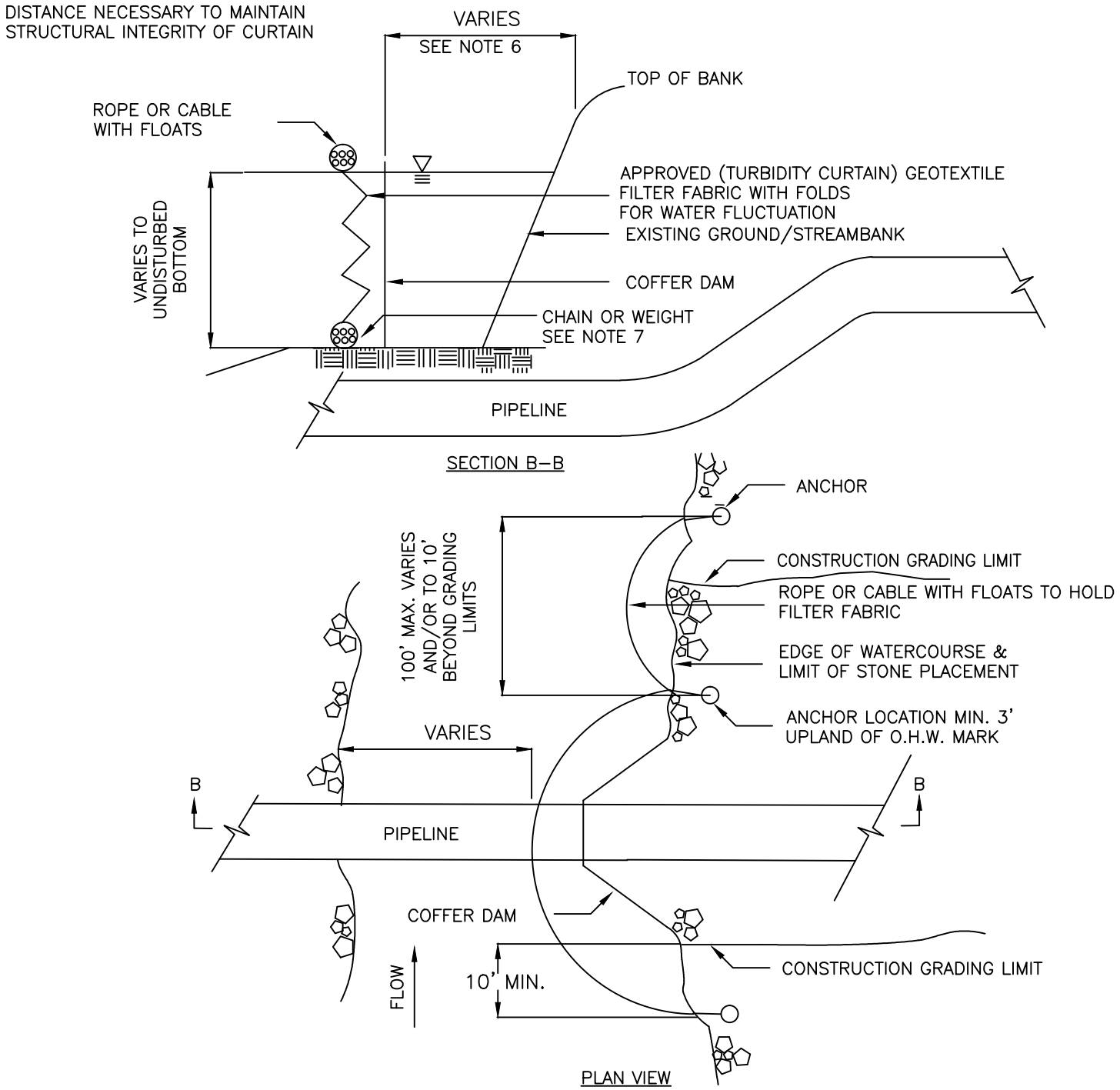
Division:		Op. Area:
St.:		Co./Par.:
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
WATERBAR OUTLET APRON

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 35

Sheet: 35 of 127
Type:



NOTES:

1. TO BE USED IN AREAS AS OUTLINED IN THE CONSTRUCTION DRAWINGS OR AS ORDERED BY THE ENVIRONMENTAL INSPECTOR.
2. HEIGHT OF THE CURTAIN SHALL BE 20% GREATER THAN THE DEPTH OF THE WATER.
3. NOT PERMITTED FOR USE ACROSS WATERCOURSES.
4. AREA SHALL NOT CONTAIN LARGE CURVERT/DRAINAGE AREAS.
5. TURBIDITY CURTAIN SHALL BE A MAX OF 100' LONG FOR EACH SECTION OF CURTAIN REQUIRED. END SECTIONS SHALL TERMINATE 10' BEYOND THE LIMIT OF DISTURBANCE.
6. THE TURBIDITY CURTAIN SHALL BE PLACED AS CLOSE TO THE WORK AS POSSIBLE WITHOUT INTERFERING WITH CONSTRUCTION OPERATIONS.
7. THE WEIGHTED ANCHOR SYSTEM SHALL BE A TYPE THAT ALLOWS THE CURTAIN TO CONFORM TO THE CONTOUR OF THE BOTTOM OF THE WATERBODY.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

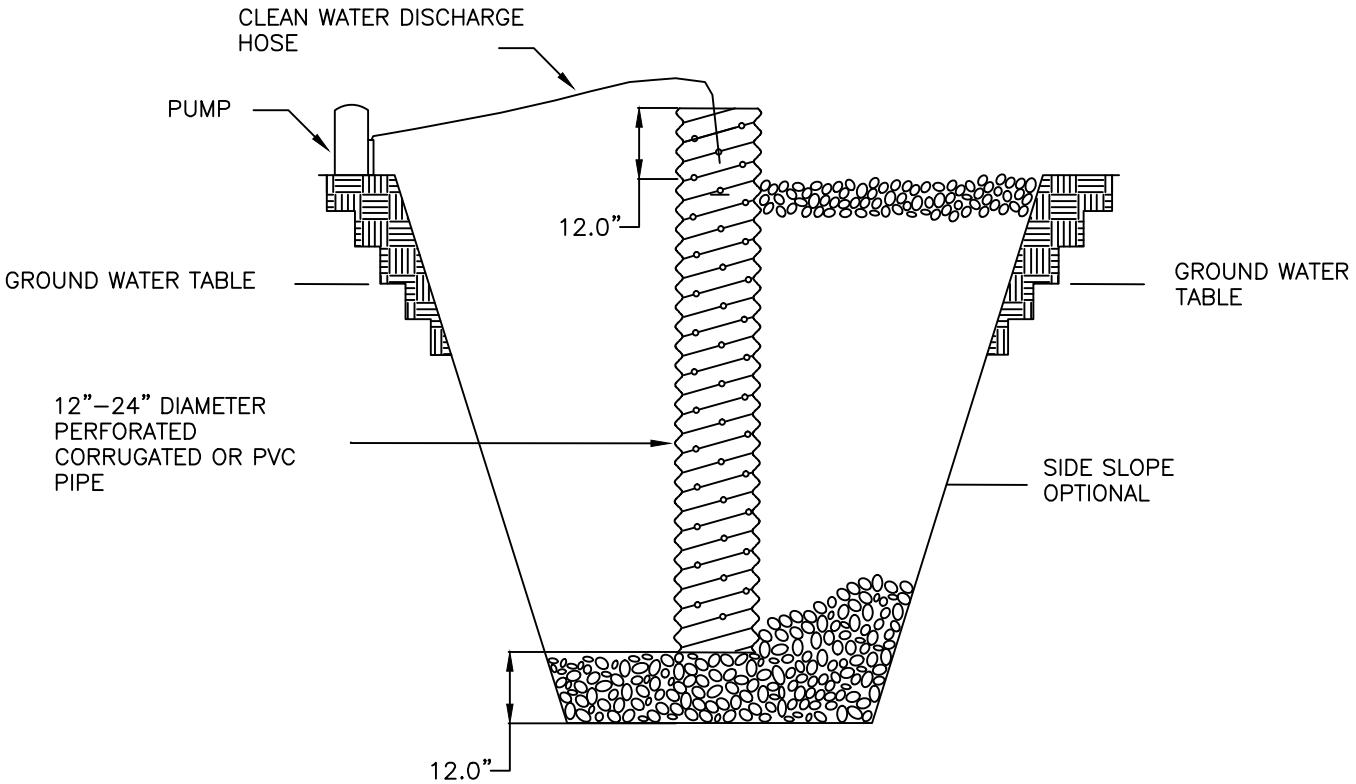
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TURBIDITY CURTAIN

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 36

Sheet: 36 of 127

Type:



CONSTRUCTION SPECIFICATIONS

1. PIT DIMENSIONS ARE OPTIONAL.
2. THE STANDPIPE SHOULD BE CONSTRUCTED BY PERFORATING A 12–24" DIAMETER CORRUGATED OR PVC PIPE.
3. A BASE OF 2" AGGREGATE SHOULD BE PLACED IN THE PIT TO A DEPTH OF 12". AFTER INSTALLING THE STANDPIPE, THE PIT SURROUNDING THE STANDPIPE SHOULD BE BACKFILLED WITH 2" AGGREGATE.
4. THE STANDPIPE SHOULD EXTEND 12" ABOVE THE LIP OF THE PIT.
5. THE OUTLET SHALL BE FILTERED THROUGH AN APPROVED DEWATERING DEVICE TO PREVENT HEAVY SILT LADEN WATER FROM DIRECTLY ENTERING A WATERBODY OR WETLAND.
6. THE OUTLET SHOULD BE SITUATED IN A WELL VEGETATED AREA.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

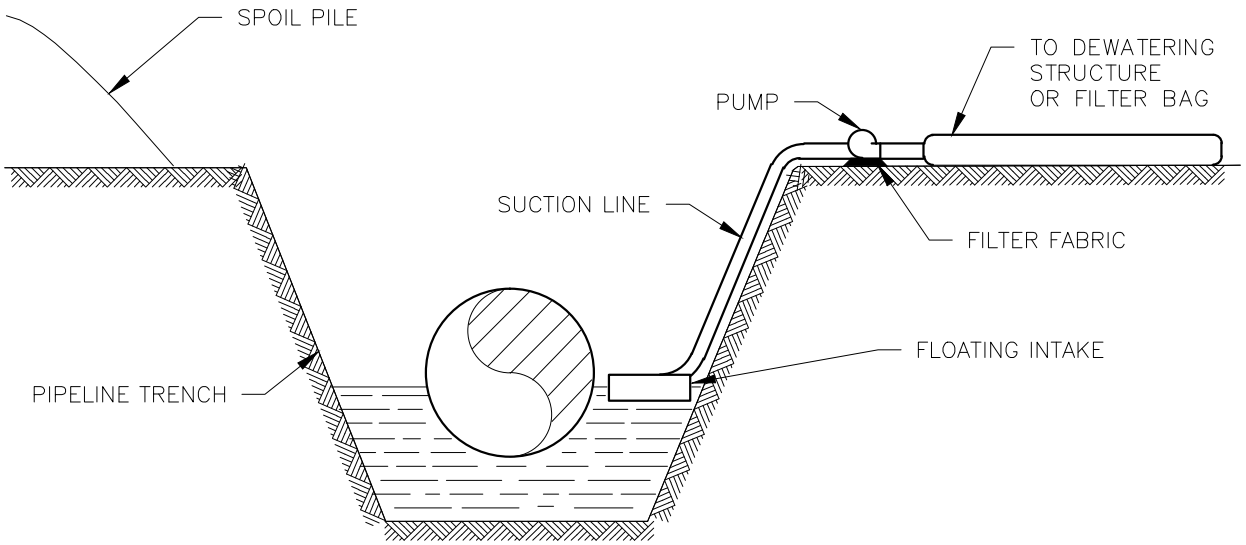
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
WELL POINT / SUMP PIT

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 37

Sheet: 37 of 127
Type:



NOTES:

1. WATER PUMPED OUT OF TRENCH SHALL NOT BE DISCHARGED DIRECTLY INTO WATERBODIES. WATER SHALL BE DISCHARGED INTO A FILTER BAG OR DEWATERING STRUCTURE.
2. PUMP SHALL BE CONTROLLED SO THAT THE DISCHARGE DOES NOT OVERFLOW DEWATERING STRUCTURE. THE DEWATERING STRUCTURE SHALL BE RESIZED IF ADDITIONAL FLOW IS REQUIRED.
3. PUMP SUCTION HOSE MUST NOT BE ALLOWED TO COME IN CONTACT WITH TRENCH BOTTOM. PROVISIONS MUST BE MADE TO ELEVATE THE SUCTION HOSE TO AT LEAST ONE FOOT ABOVE THE BOTTOM OF THE PIPE TRENCH UNTIL BOTTOM DEWATERING IS NECESSARY.
4. DEWATERING SHALL NOT OCCUR DURING TIMES OF HEAVY RAINFALL EXCEPT AS REQUIRED TO PREVENT FLOODING OF CONSTRUCTION EQUIPMENT LOCATED IN BORE PITS AND TRENCHES.
5. PUMPS UTILIZED DURING DEWATERING SHALL BE PLACED WITHIN SECONDARY CONTAINMENT IF POSITIONED WITHIN 100 FEET OF A WETLAND OR WATERBODY.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

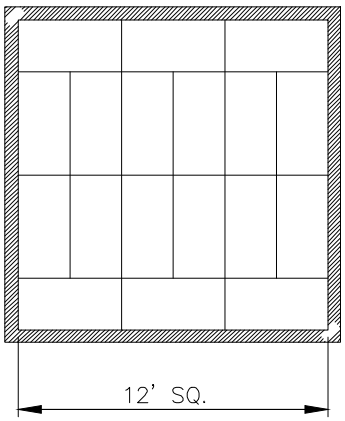
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TRENCH DEWATERING

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

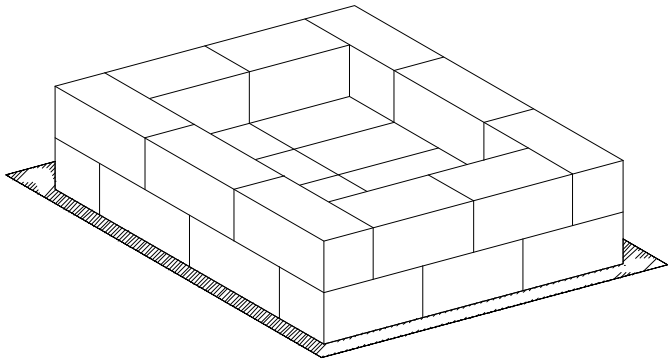
FIG. NO. 38

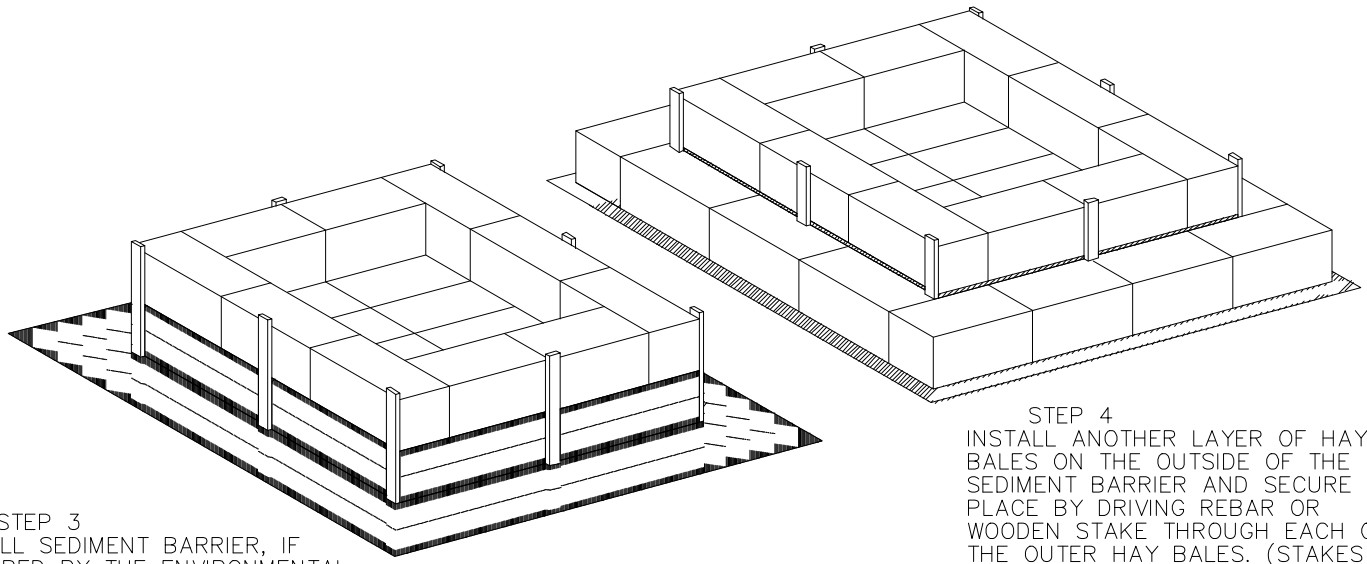
Sheet: 38 of 127
Type:



STEP 1
ARRANGE HAY BALES OVER GEOTEXTILE FABRIC OR STONE BASE ON LEVEL LAND TIGHTLY PACKED AS SHOWN TO COVER AN AREA APPROXIMATELY 12' x 12'

STEP 2
INSTALL ANOTHER LAYER OF HAY BALES ON THE OUTER EDGE AS SHOWN





STEP 3
INSTALL SEDIMENT BARRIER, IF REQUIRED BY THE ENVIRONMENTAL INSPECTOR, AROUND ENTIRE HAY BALE STRUCTURE AS SHOWN.

STEP 4
INSTALL ANOTHER LAYER OF HAY BALES ON THE OUTSIDE OF THE SEDIMENT BARRIER AND SECURE IN PLACE BY DRIVING REBAR OR WOODEN STAKE THROUGH EACH OF THE OUTER HAY BALES. (STAKES NOT SHOWN FOR CLARITY PURPOSES)

NOTES:

1. WHERE POSSIBLE, THE STRUCTURE SHALL BE PLACED ON A LEVEL, WELL VEGETATED UPLAND SITE SUCH THAT WATER WILL FLOW AWAY FROM STRUCTURE AND ANY WORK AREAS.
2. THE CONTRACTOR SHALL PROPERLY REMOVE AND PROPERLY DISPOSE OF THE DEWATERING STRUCTURE IMMEDIATELY UPON COMPLETION OF DEWATERING OPERATIONS. UNDER NO CIRCUMSTANCES SHALL USED DEWATERING STRUCTURES BE LEFT IN PLACE FOR A PERIOD OF TIME GREATER THAN 48 HOURS AFTER DEWATERING OPERATIONS ARE COMPLETE.
3. THE STRUCTURE SHOULD BE POSITIONED SUCH THAT WATER WILL NOT FLOW DIRECTLY INTO ANY WETLANDS OR WATERBODIES.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

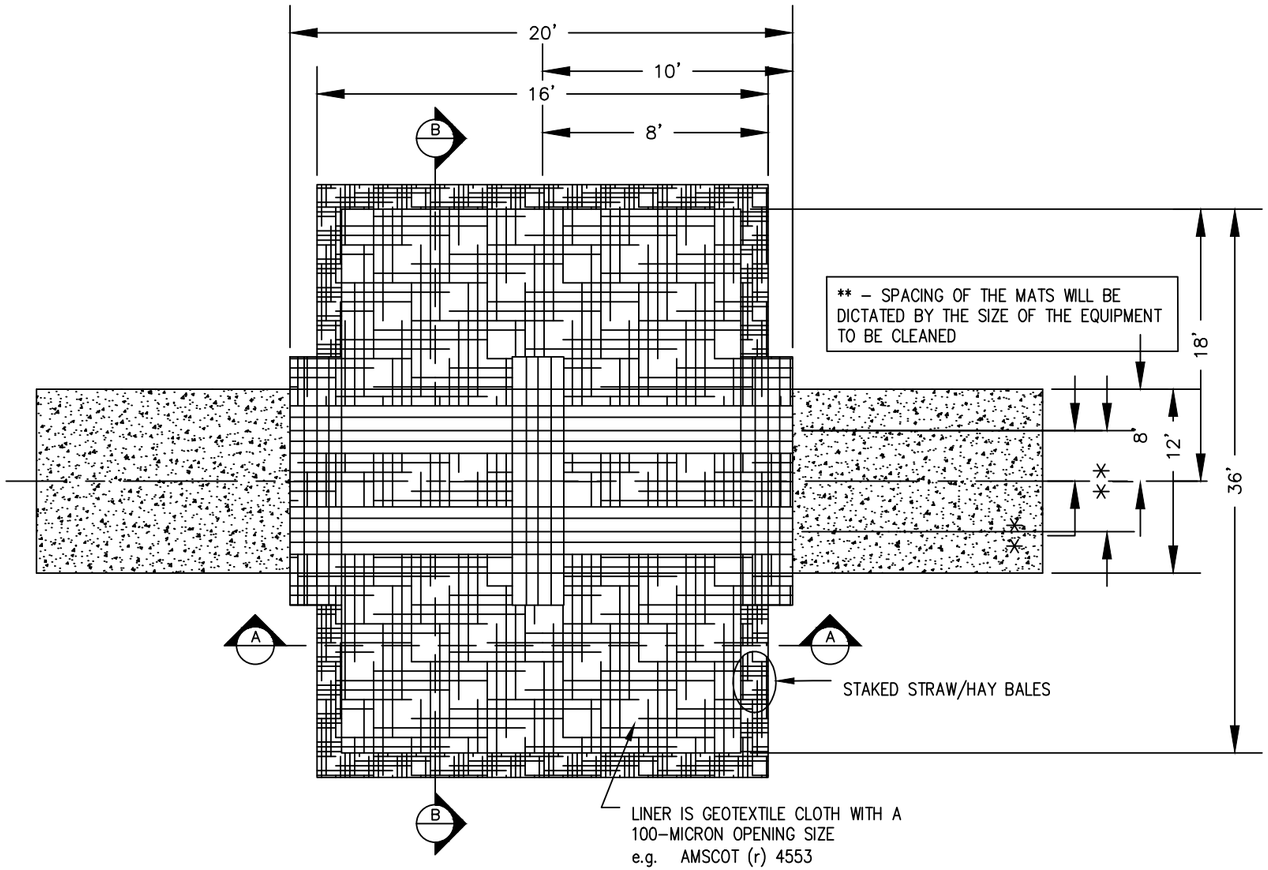
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

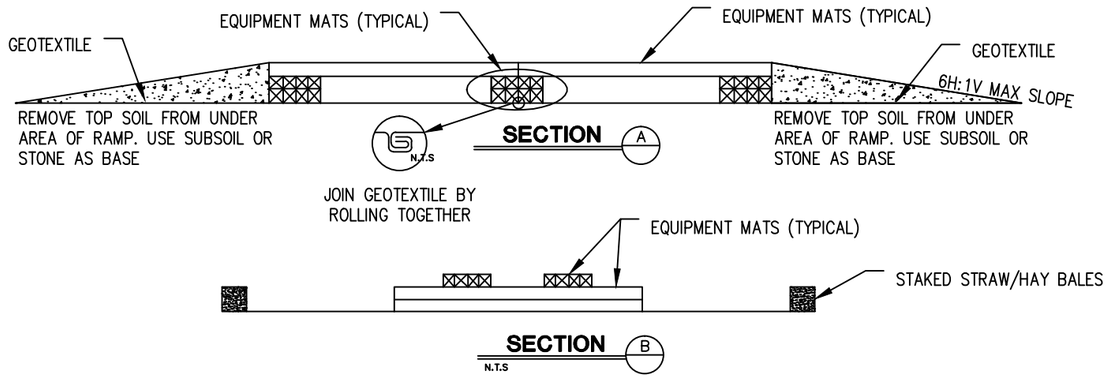
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
DEWATERING STRUCTURE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 39

Sheet: 39 of 127
Type:





ELEVATED WASHRACK STATION LOCATIONS

	MILEPOST	LL	WETLAND ID	INVASIVE WETLANDS SPECIES IDENTIFIED	STATION POSITION COMMENTS

THIS TABLE WAS INTENTIONALLY LEFT BLANK AND SHOULD BE COMPLETED BY THE PLAN PREPARER

NOTES:

1. WASH STATION MUST BE WITHIN THE ENVIRONMENTALLY CLEARED RIGHT–OF–WAY AND OUTSIDE THE 100' WETLAND BUFFER ZONE.
2. IF WASH STATION IS IN AGRICULTURAL LANDS, REMOVE THE TOPSOIL AND STOCKPILE BEFORE THE TOPSOIL IS REPLACED. THE SUBSOIL MUST BE DECOMPACTED AND ROCKS REMOVED. THE TOPSOIL MOISTURE MUST PASS THE ATTERBERG TEST PRIOR TO SPREADING THE TOPSOIL.
3. THE LOCATION OF THE PUMPING EQUIPMENT, WATER SUPPLY AND SPRAY EQUIPMENT WILL BE DICTATED BY THE LOCATION OF THE WASH STATION.
4. AFTER THE EQUIPMENT WASHING IS COMPLETE, FOLD OR ROLL THE GEOTEXTILE (CAUTION WILL BE EXCERCISED NOT TO SPILL ANY OF THE CONTAINED MATERIAL) AND REMOVE TO AN APPROPRIATE DISPOSAL SITE. REMOVE THE CLEANING EQUIPMENT, RAMPS AND STRAW/HAY BALES AND COMPLETE THE CLEANUP.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division: | Op. Area.:
State: | Co./Par.:
Section: | Township: | Range:
Dft: | Date: | Scale:
Chk: | Date:
Appr: | Date: | Filename:

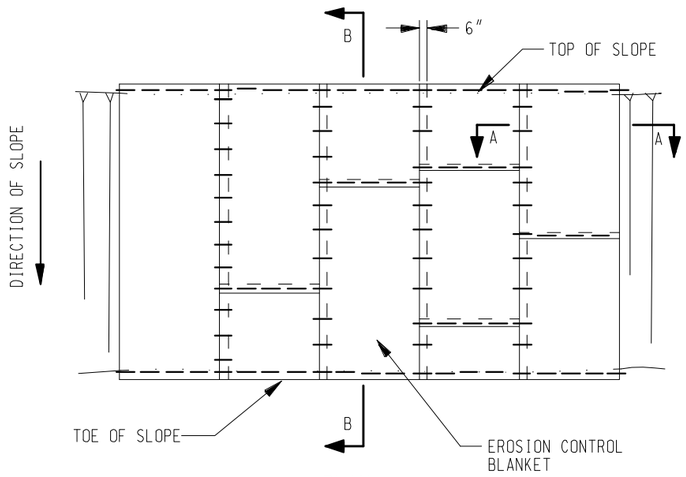
TENNESSE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
ELEVATED WASHRACK

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

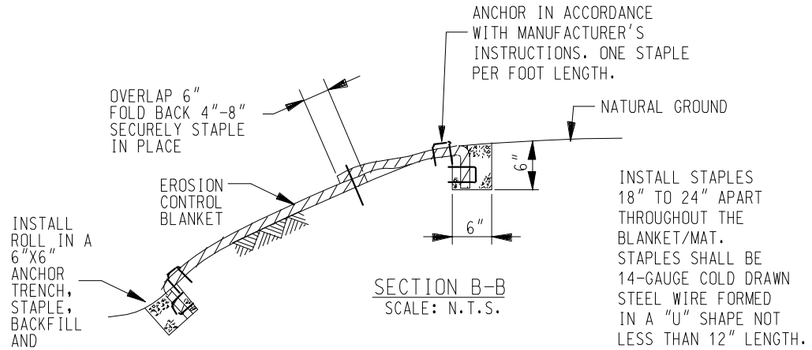
FIG. NO. 40

Sheet: 40 of 127
Type:

Jul 21, 2014 – 2:05PM

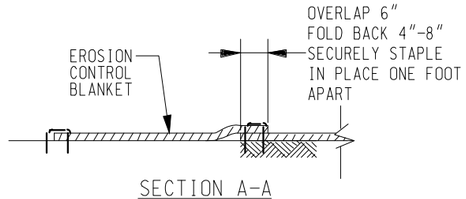


PLAN
SCALE: N.T.S.

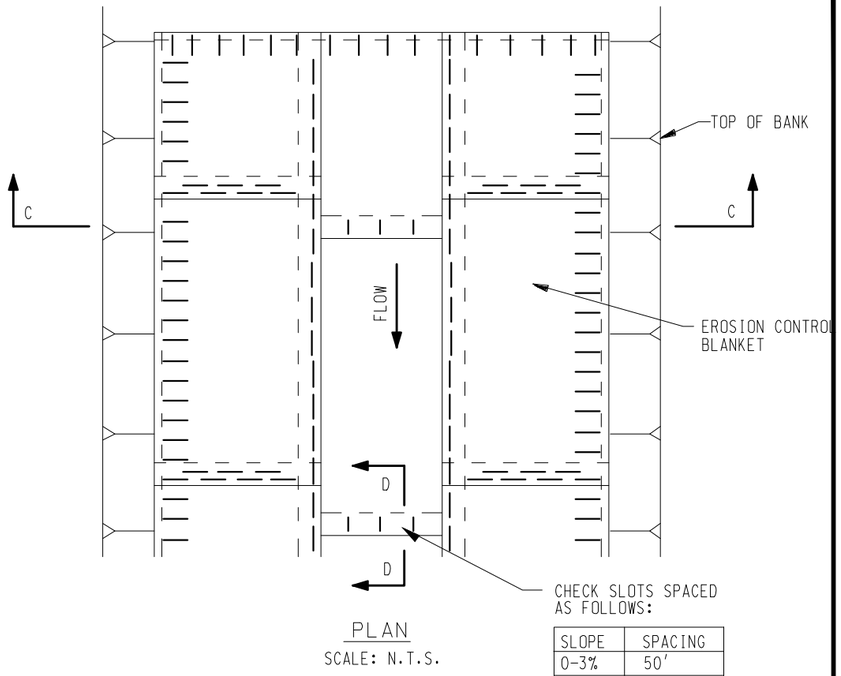


SECTION B-B
SCALE: N.T.S.

EMBANKMENT INSTALLATION

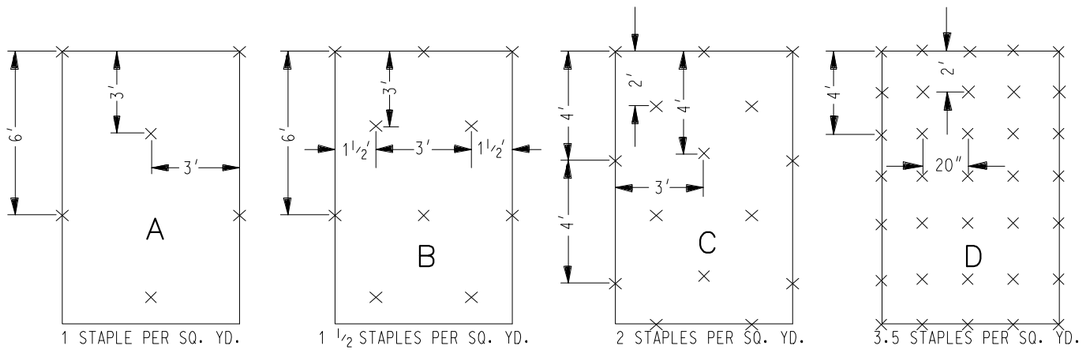


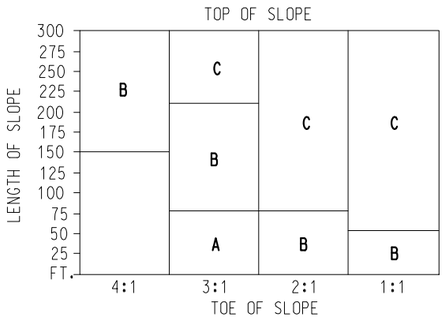
SECTION A-A
SCALE: N.T.S.



SLOPE	SPACING
0-3%	50'
> 3%	25'

PLAN
SCALE: N.T.S.





A EMBANKMENT INSTALLATION - STAPLE PATTERN TABLE (SEE STAPLE PATTERN GUIDE)

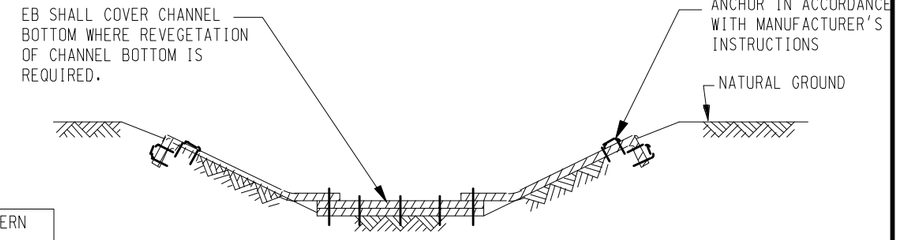
STAPLE PATTERN GUIDE

NOTES:

1. EROSION CONTROL BLANKETS SHALL EXTEND COMPLETELY ACROSS DISTURBED AREA TO PROTECT ERODIBLE SURFACES. THE SOIL SHALL BE PROPERLY PREPARED, SEEDED AND MULCHED PRIOR TO INSTALLATION.
2. INSTALL EROSION CONTROL BLANKETS ON FRESHLY GRADED EMBANKMENTS ON SLOPES IN EXCESS OF 3:1 (H:V) TO SUPPORT VEGETATION.
3. INSTALL BLANKETS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
4. BLANKET SHALL BE LOOSELY INSTALLED AND TAMPED OR ROLLED IN PLACE AFTER INSTALLATION. STAPLES SHALL BE DRIVEN FLUSH WITH THE GROUND.

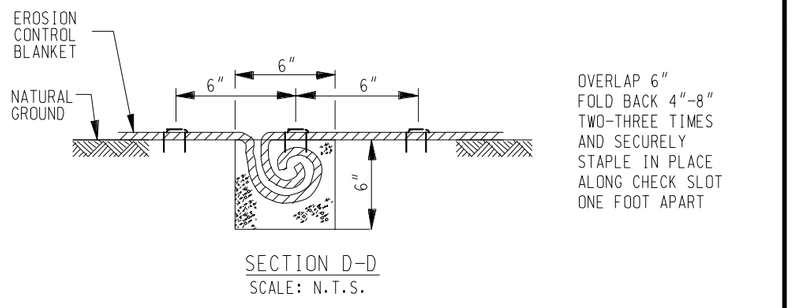
FLOW	STAPLE PATTERN TYPE
LOW VELOCITY	C
MED. TO HIGH VELOCITY	D

CHANNEL INSTALLATION - STAPLE PATTERN TABLE (SEE STAPLE PATTERN GUIDE)



SECTION C-C
SCALE: N.T.S.

CHANNEL INSTALLATION



SECTION D-D
SCALE: N.T.S.

Jul 21, 2014 - 2:05PM

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.
			REVISIONS		

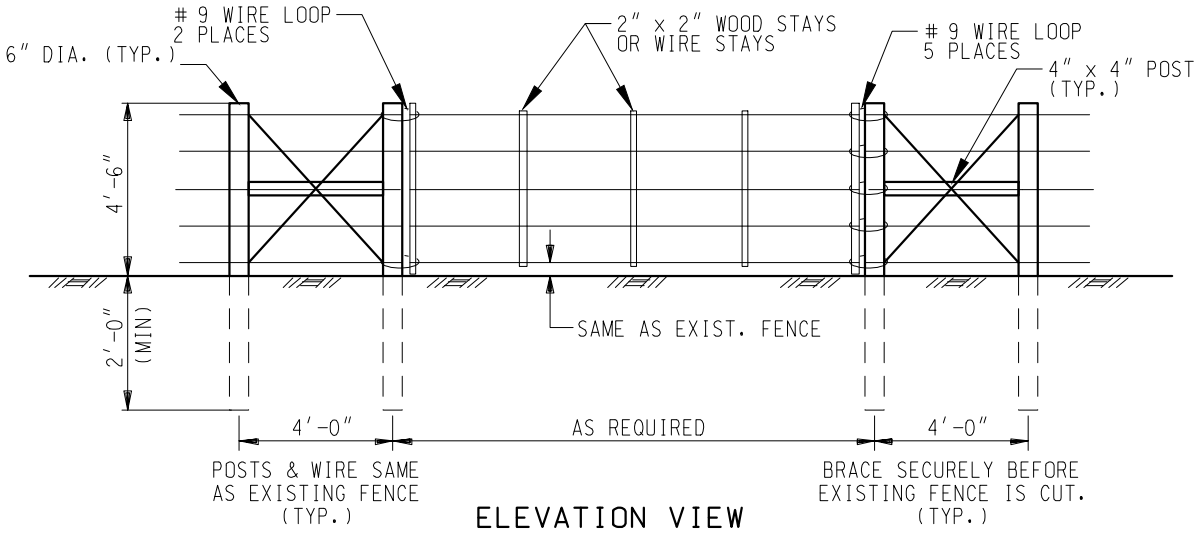
Division: | Op. Area.:
State: | Co./Par.:
Section: | Township: | Range:
Dft: | Date: | Scale:
Chk: | Date:
Appr: | Date: | Filename:

TENNESSE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
EROSION CONTROL BLANKET

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

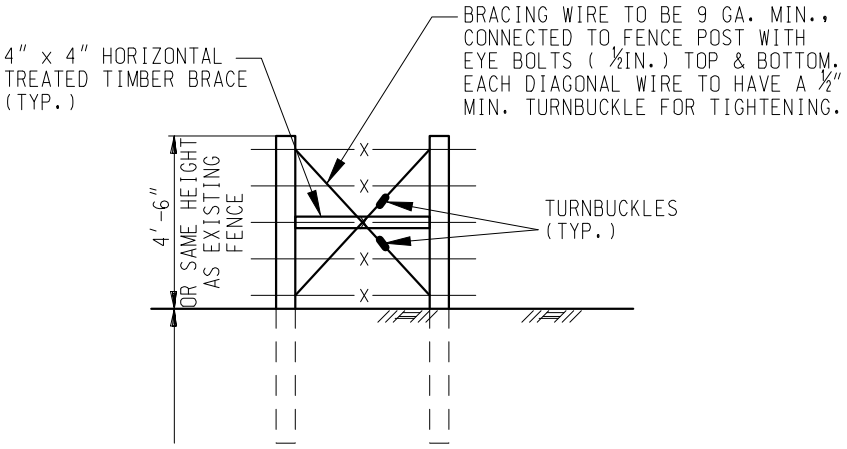
FIG. NO. 41

Sheet: 41 of 127
Type:



ELEVATION VIEW

SCALE: N.T.S.



NOTES:

1. THE CONTRACTOR SHALL FURNISH ALL NECESSARY MATERIAL TO CONSTRUCT A TEMPORARY FENCE GATE TO MATCH EXISTING FENCE.
2. BRACE THE SPAN TO BE CONSTRUCTED ON EACH SIDE OF PIPELINE RIGHT-OF-WAY, PRIOR TO INITIAL DISMANTLING OF FENCE.
3. THE CONTRACTOR SHALL RESTORE THE FENCE TO IT'S ORIGINAL CONDITION AND REMOVE ALL TEMPORARY MATERIALS AFTER COMPLETION OF PIPELINE CONSTRUCTION.
4. ACTUAL EMBEDMENT DEPTH REQUIRED WILL BE DETERMINED BY WHAT IS REQUIRED TO ACHIEVE A STABLE SUPPORT POST.
5. UNDER NO CIRCUMSTANCES SHALL FENCE POSTS BE PLACED DIRECTLY OVER THE PIPELINE. CONSULT COMPANY AUTHORIZED REPRESENTATIVES FOR LOCATIONS OF FENCE POSTS ADJACENT TO THE PIPELINE.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

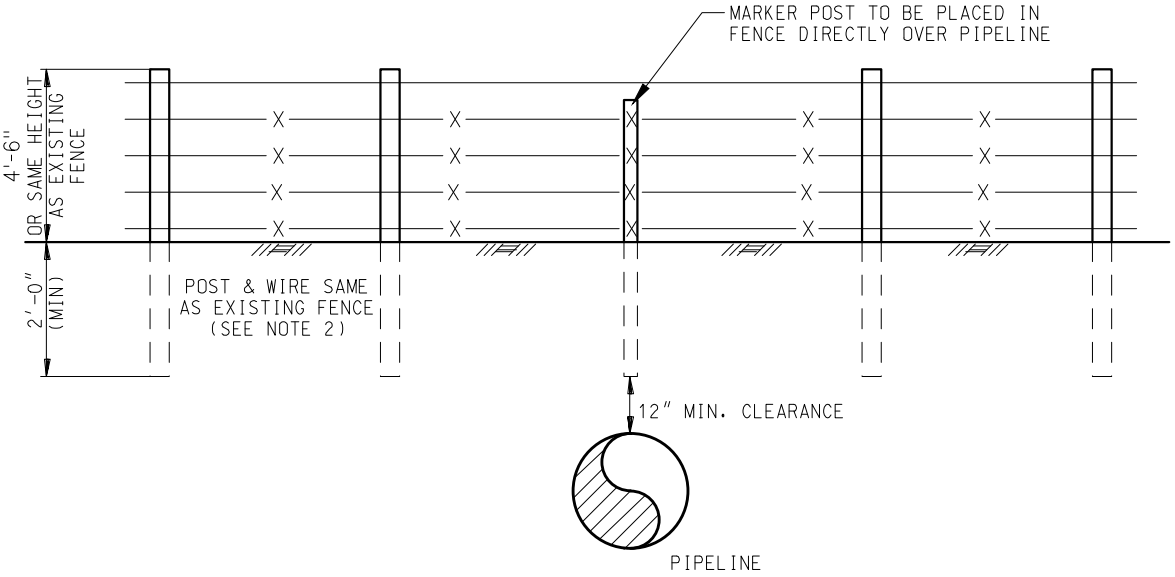
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
FENCE WITH TEMPORARY GATE

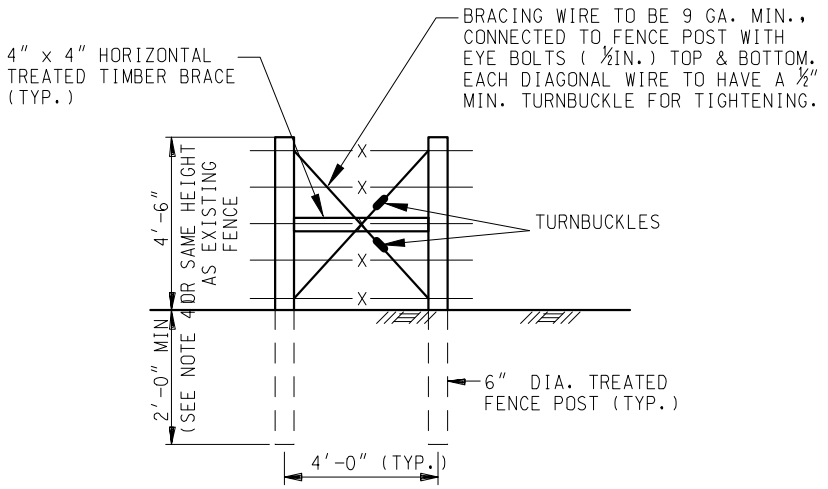
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 42

Sheet: 42 of 127

Type:





BRACE SPAN DETAIL (SEE NOTE 3)

NOTES:

1. THE CONTRACTOR SHALL FURNISH ALL NECESSARY MATERIAL TO RESTORE THE FENCE TO IT'S ORIGINAL CONDITION.
2. POSTS, WIRE AND OTHER MATERIAL SHALL BE THE SAME AS OR EQUIVALENT MATERIAL TO MATCH THE EXISTING FENCE.
3. BRACE SPAN TO BE CONSTRUCTED ON EACH SIDE OF PIPELINE RIGHT-OF-WAY, PRIOR TO INITIAL DISMANTLING OF FENCE.
4. ACTUAL EMBEDMENT DEPTH REQUIRED WILL BE DETERMINED BY WHAT IS REQUIRED TO ACHIEVE A STABLE SUPPORT POST.
5. UNDER NO CIRCUMSTANCES SHALL FENCE POSTS BE PLACED DIRECTLY OVER THE PIPELINE. CONSULT COMPANY AUTHORIZED REPRESENTATIVES FOR LOCATIONS OF FENCE POSTS ADJACENT TO THE PIPELINE.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

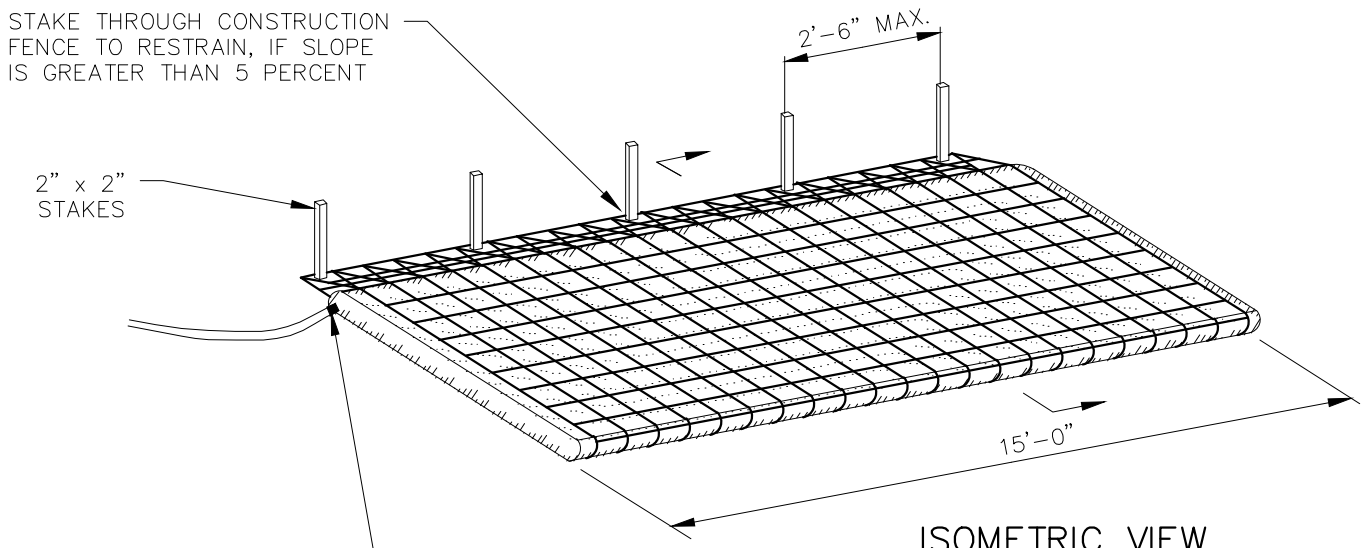
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
FENCE RESTORATION

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

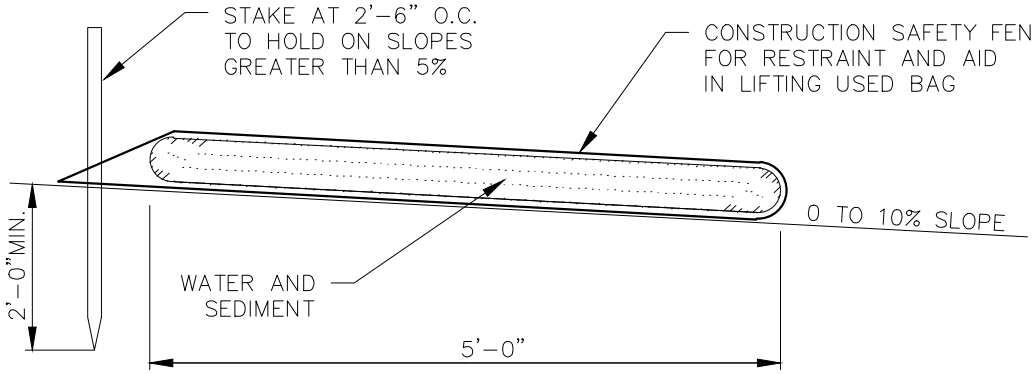
FIG. NO. 43

Sheet: 43 of 127
Type:



ISOMETRIC VIEW

SCALE: N.T.S.



SECTION

SCALE: N.T.S.

NOTES:

1. FILTER BAG SHALL BE PLACED ON A SLOPING OR LEVEL, WELL VEGETATED SITE SUCH THAT WATER WILL FLOW AWAY FROM THE DEVICE AND ANY WORK AREAS.
2. THE FILTER BAG MUST BE STAKED IN PLACE IF THE FILTER BAG IS PLACED ON A SLOPE GREATER THAN 5 PERCENT.
3. THE FILTER BAG SHALL NOT BE USED FOR DISCHARGE FLOWS GREATER THAN 300 GPM OR AS RECOMMENDED BY THE MANUFACTURER.
4. THE CONTRACTOR SHALL PROPERLY REMOVE AND PROPERLY DISPOSE OF USED FILTER BAGS IMMEDIATELY UPON COMPLETION OF DEWATERING OPERATIONS. UNDER NO CIRCUMSTANCES SHALL USED FILTER BAGS BE LEFT IN PLACE FOR A PERIOD OF TIME GREATER THAN 48 HOURS AFTER DEWATERING OPERATIONS ARE COMPLETE.
5. SEDIMENT FROM BAG, AT THE DISCRETION OF THE ENVIRONMENTAL INSPECTOR, MAY BE SPREAD IN UPLAND AREAS WITHIN THE CONSTRUCTION CORRIDOR AND THE AREA SHALL BE STABILIZED AND REVEGETATED.
6. TO ATTACH HOSE, CUT OPEN CORNER OF FILTER BAG, GATHER UP MATERIAL AND CLAMP TO A SHORT SECTION OF STEEL PIPE. CLAMP HOSE TO OTHER END OF PIPE. BOTH CONNECTIONS SHALL BE WATERTIGHT.
7. CONTRACTOR SHALL ONLY INSTALL ONE DEWATERING HOSE PER FILTER BAG.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

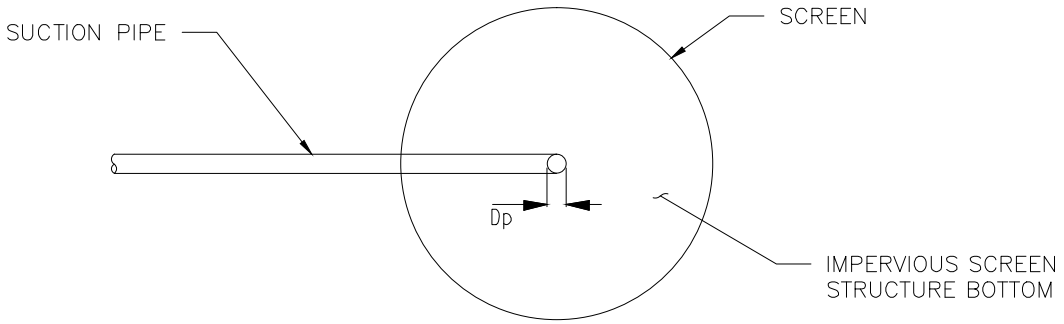
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
FILTER BAG

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

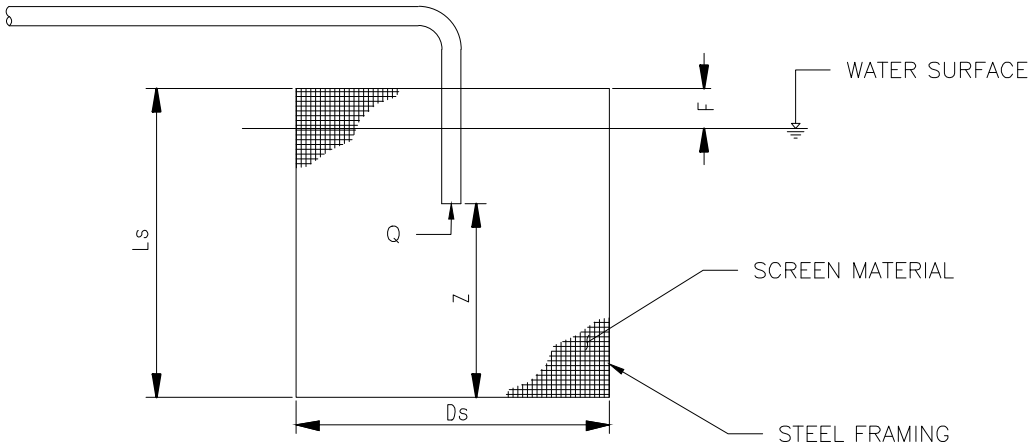
FIG. NO. 44

Sheet: 44 of 127

Type:



PLAN VIEW
N.T.S.



SIDE VIEW
N.T.S.

TO BE USED FOR HYDROSTATIC TESTING OF THE PIPELINE

NOTES:

1. CONTRACTOR SHALL NOT DEVIATE FROM THE SPECIFIED MATERIAL OR DIMENSIONS OF THE STRUCTURE WITHOUT WRITTEN APPROVAL FROM THE COMPANY.
2. THE FRAME OF THE SCREEN STRUCTURE SHALL BE OF STURDY CONSTRUCTION TO WITHSTAND ITS INTENDED USE.
3. SIDE AND TOP OF SCREEN STRUCTURE SHALL CONSIST OF 2MM X 2MM WIRE SCREEN.
4. THE SUCTION PIPE SHALL BE SECURED SO THAT THE INLET REMAINS WITHIN THE SCREEN STRUCTURE AND AT THE PROPER DEPTH ALL TIMES DURING PUMPING OPERATIONS. THE VERTICAL AXIS OF SUCTION PIPE SHALL BE ALIGNED WITH THE VERTICAL AXIS OF THE SCREEN STRUCURE.
5. SPECIFICATIONS:

Q =
Dp =
Ds =
Ls =
Z =
F =

DESIGN SPECIFICATIONS WILL VARY BASED ON SITE SPECIFIC APPLICATIONS. THE CONTRACTOR SHALL WORK WITH KINDER MORGAN INC. TO DEVELOP THE SITE SPECIFIC SPECIFICATIONS PRIOR TO TESTING.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

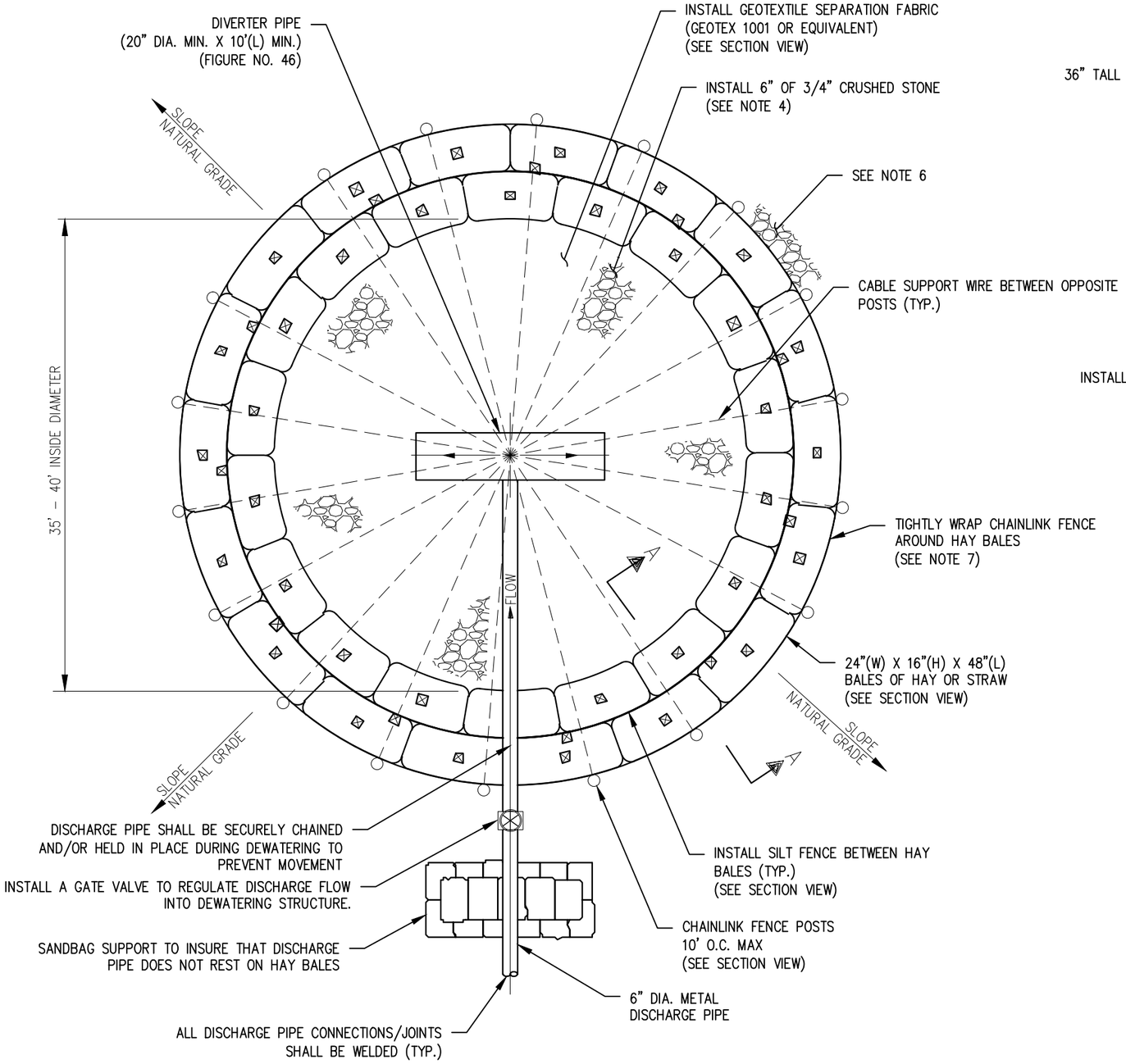
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
PUMP INLET SCREEN STRUCTURE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

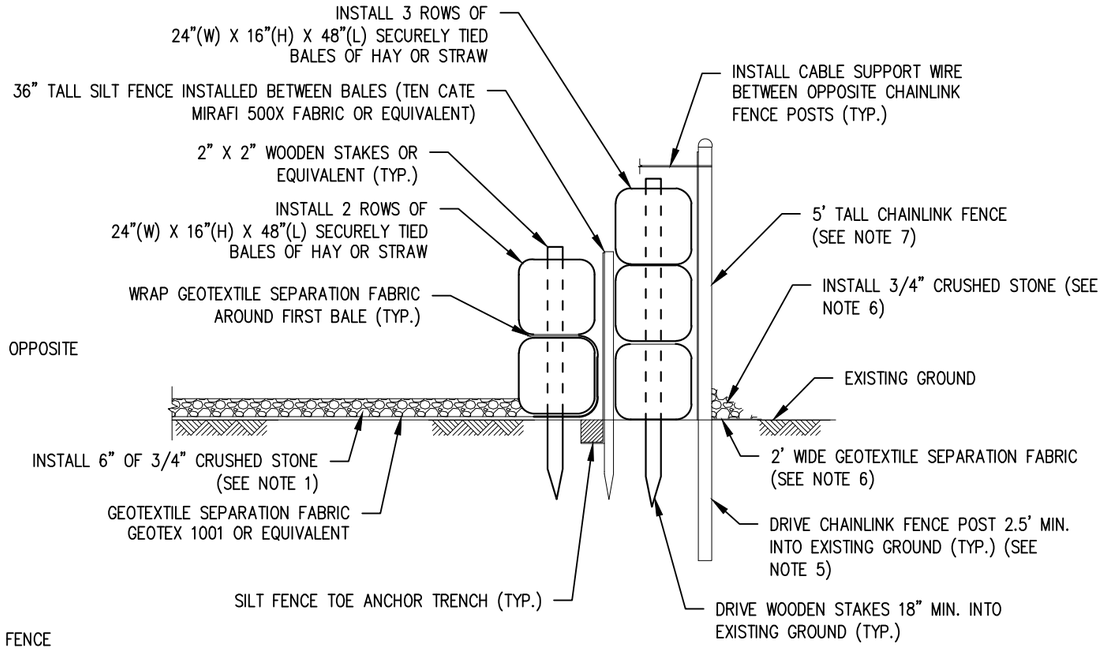
FIG. NO. 45

Sheet: 45 of 127
Type:



PLAN VIEW

SCALE: N.T.S.



SECTION "A-A" VIEW

SCALE: N.T.S.

NOTES:

1. STRUCTURE SHALL BE PLACED ON A LEVEL WELL VEGETATED SITE SUCH THAT WATER WILL FLOW AWAY FROM STRUCTURE AND ANY WORK AREAS AND MINIMIZE EROSION OF THE SURROUNDING AREA TO THE EXTENT PRACTICABLE.
2. AT THE DISCRETION OF THE ENVIRONMENTAL INSPECTOR, ADDITIONAL EROSION AND SEDIMENTATION CONTROL DEVICES (E.G. RIPRAP CHECK DAMS, COMPOST FILTER SOCKS, ETC.) MAY BE REQUIRED TO BE INSTALLED DOWNSTREAM OF THE STRUCTURE IF EROSION BECOMES APPARENT DURING DEWATERING.
3. FLOW RATES THROUGH DISCHARGE AND DIVERTER PIPES SHALL BE SUCH THAT STRUCTURE WILL NOT OVERFLOW. A MINIMUM FREEBOARD OF 3", MEASURED FROM THE TOP OF THE THIRD ROW OF HAYBALES TO THE WATER SURFACE ELEVATION, SHALL BE MAINTAINED AT ALL TIMES.
4. THE 3/4" CRUSHED STONE INSTALLED WITHIN THE BASIN SHALL BE WASHED TO REMOVE ALL DIRT/FINE PARTICLES PRIOR TO INSTALLATION.
5. THE CHAINLINK FENCE POSTS SHALL BE DRIVEN A MINIMUM OF 2.5 FT. INTO STABLE, EXISTING GROUND. THE CONTRACTOR MAY BE REQUIRED TO INSTALL THE POLES DEEPER IF STABLE SUBSOILS ARE NOT ACHIEVED WITHIN 2.5 FT.
6. AT THE DISCRETION OF THE ENVIRONMENTAL INSPECTOR, ADDITIONAL GEOTEXTILE SEPARATION FABRIC AND 3/4" CRUSHED STONE MAY BE REQUIRED TO BE INSTALLED AROUND THE OUTSIDE EDGE OF THE DEWATERING STRUCTURE.
7. CHAINLINK FENCE SHALL INSTALLED TIGHTLY AGAINST THE HAY BALES AND SECURELY FASTENED TOGETHER AT ALL JOINTS WITH CABLE TENSION WIRE AND STRETCHER BARS.
8. THE ENVIRONMENTAL INSPECTOR SHALL HAVE THE AUTHORITY TO MODIFY THE DESIGN AS REQUIRED TO PREVENT EROSION AND SEDIMENTATION DOWNSTREAM OF THE STRUCTURE.
9. HAY BALES SHALL BE STACKED SUCH THAT THE JOINTS ARE STAGGERED.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.
			REVISIONS		

Division:		Op. Area.:	
State:		Co./Par.:	
Section:	Township:	Range:	
Dft:	Date:	Scale:	
Chk:	Date:	Filename:	
Appr:	Date:		

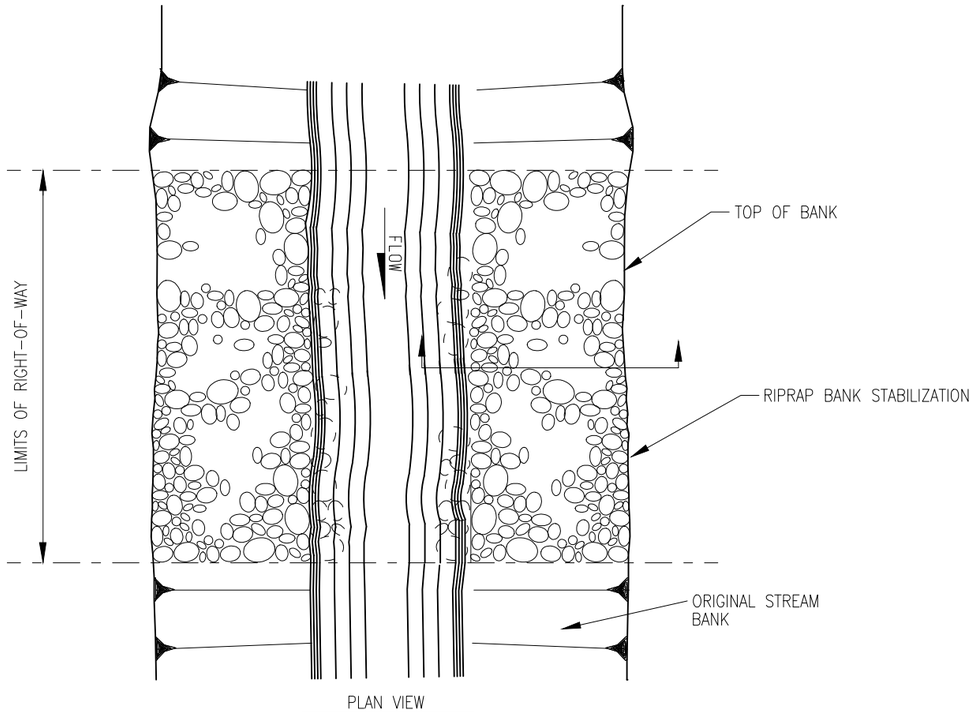
TENNESSE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
HYDROSTATIC DEWATERING STRUCTURE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

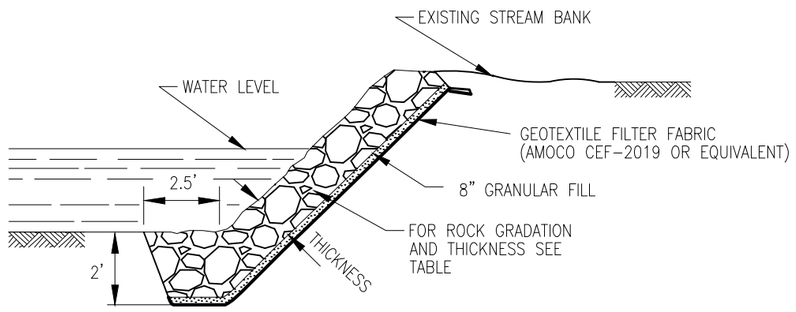
FIG. NO. 46

Sheet: 46 of 127
Type:

Jul 21, 2014 - 2:05PM



PLAN VIEW
SCALE: N.T.S.



SECTION
SCALE: N.T.S.

TABLE: RIPRAP GRADUATIONS

Class	Layer Thickness (in.)	Max Velocity (ft./s.)	Wave Height (ft.)		PERCENT FINER BY WEIGHT											
					D_{10}			D_{50}			D_{85}			D_{100}		
					Wt. (lbs.)	d_o (in.)	d□ (in.)	Wt. (lbs.)	d_o (in.)	d□ (in.)	Wt. (lbs.)	d_o (in.)	d□ (in.)	Wt. (lbs.)	d_o (in.)	d□ (in.)
I	18	8.5	-		5	5	4	50	10	8	100	13	10	150	15	12
II	18	10	-		17	7	6	170	15	12	340	19	15	500	22	18
III	24	12	2		46	10	8	460	21	17	920	26	21	1400	30	24
IV	36	14	3		150	15	12	1500	30	25	3000	39	32	4500	47	36
V	48	17	4.8		370	20	16	3700	42	34	7400	53	43	11,000	60	49

d_o = gravel material d□ = angular rock riprap
Wt = weight in pounds

NOTES:

1. ROCK UTILIZED FOR RIPRAP SHALL CONSIST OF SOUND, DURABLE ROCK, INSOLUBLE IN WATER, AND RESISTANT TO WEATHERING.
2. ALL MATERIAL SHALL BE FREE OF STRUCTURAL DEFECTS, SHALE SEAMS AND ORGANIC MATTER.
3. INDIVIDUAL PIECES SHOULD BE SHARPLY ANGULAR, BLOCK SHAPED AND HAVE A MINIMUM SPECIFIC GRAVITY OF 2.5.
4. NO PIECE SHALL HAVE A LENGTH EXCEEDING THREE (3) TIMES ITS WIDTH OR DEPTH.
5. EACH LOAD OF ROCK SHALL BE OF WELL-GRADED MIXTURE. A WELL-GRADED MIXTURE, AS USED HEREIN, IS DEFINED AS A MIXTURE COMPOSED PRIMARILY OF LARGER STONE, BUT WITH A SUFFICIENT MIXTURE OF SMALLER SIZES TO FILL THE VOIDS.
6. MATERIAL SHALL MEET SPECIFICATIONS AS NOTED IN ABOVE TABLE.
7. IF STREAM WIDTH IS EQUAL TO OR LESS THAN 2 TIMES THE TOE WIDTH, RIPRAP SHALL BE PLACED ACROSS THE ENTIRE STREAM WIDTH.
8. RIPRAP SHALL BE PLACED TO THE FULL COURSE THICKNESS IN ONE CONTINUOUS OPERATION. OPERATIONS WHICH CAUSE SEGREGATION OF THE MATERIALS SHALL NOT BE PERMITTED. INDIVIDUAL ROCKS MAY BE REARRANGED, AND THE VOIDS FILLED WITH HAND PLACED SMALLER ROCK IN ORDER TO ACHIEVE THE DESIRED UNIFORM ARMOR.
9. SLOPE SHALL BE GRADED TO 2:1 OR FLATTER PRIOR TO PLACING FILTER, FILTER FABRIC, OR RIPRAP.
10. ENDS OF THE RIPRAP SHALL BE KEYED INTO A STABLE BANK. WHEN TYING INTO OTHER STRUCTURES, LARGER RIPRAP CAN BE LAID IN STEPS OR STACKED AS NEEDED TO FIT. STONES LARGER THAN THOSE DESIGNED FOR FLOW SHALL BE USED FOR THIS PURPOSE.
11. REMAINING DISTURBED AREAS SHALL BE GRADED AND PERMANENTLY SEEDED AND MULCHED.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

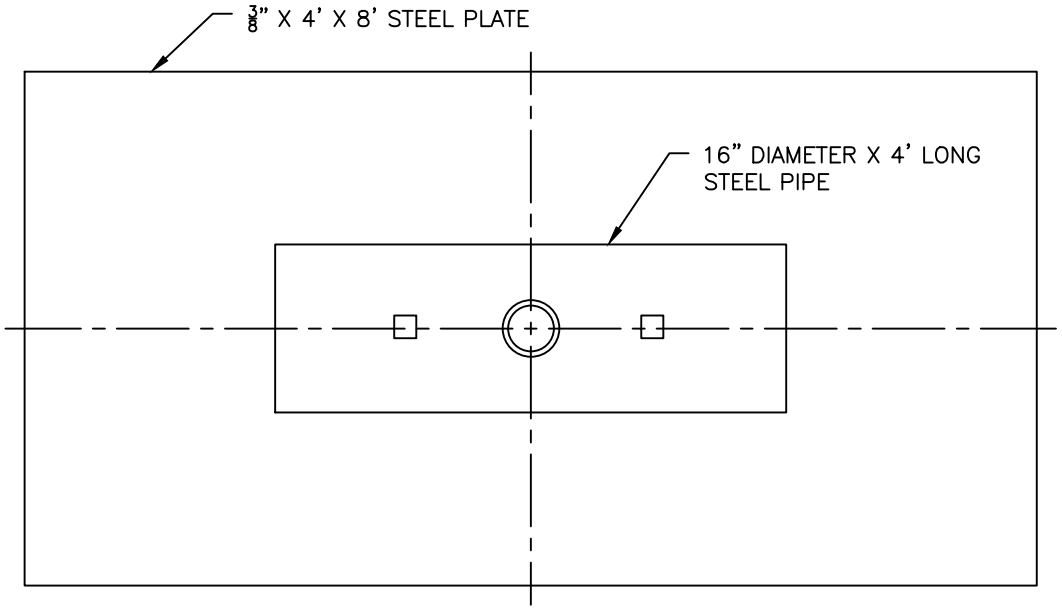
Division: | Op. Area.:
State: | Co./Par.:
Section: | Township: | Range:
Dft: | Date: | Scale:
Chk: | Date:
Appr: | Date: | Filename:

TENNESSE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
RIPRAP STREAM BANK STABILIZATION

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

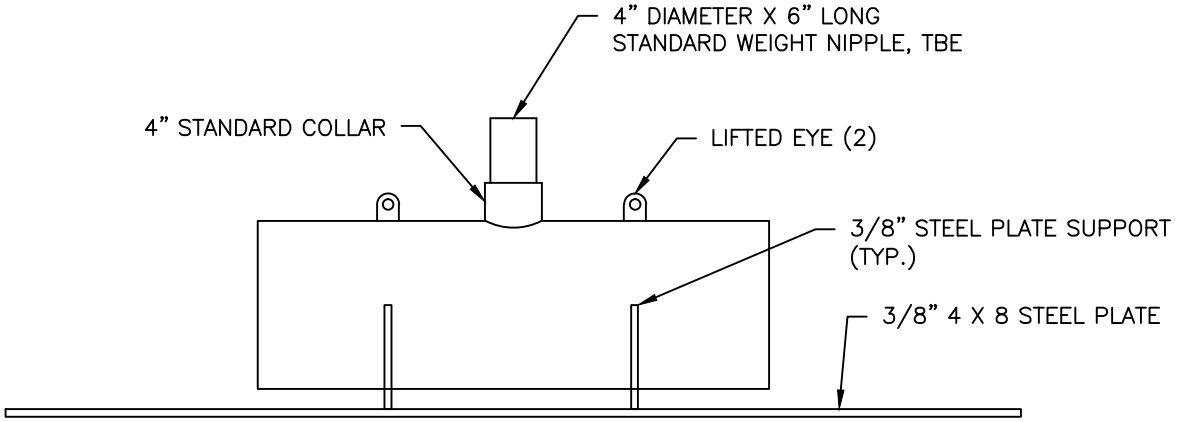
FIG. NO. 47 | Sheet: 47 of 127 | Type:

Jul 21, 2014 - 2:05PM



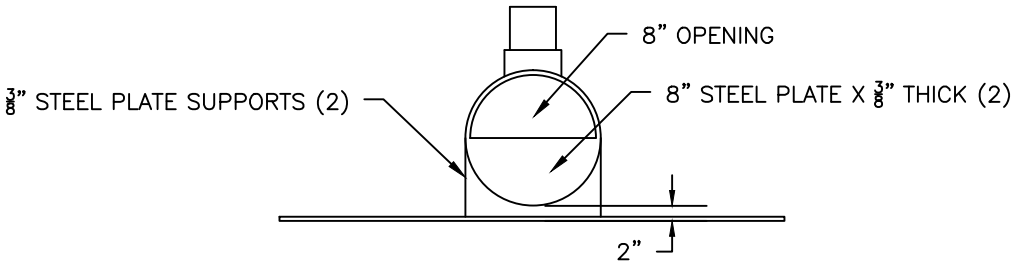
PLAN VIEW

N.T.S.



SECTION VIEW

N.T.S.



PROFILE VIEW

N.T.S.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

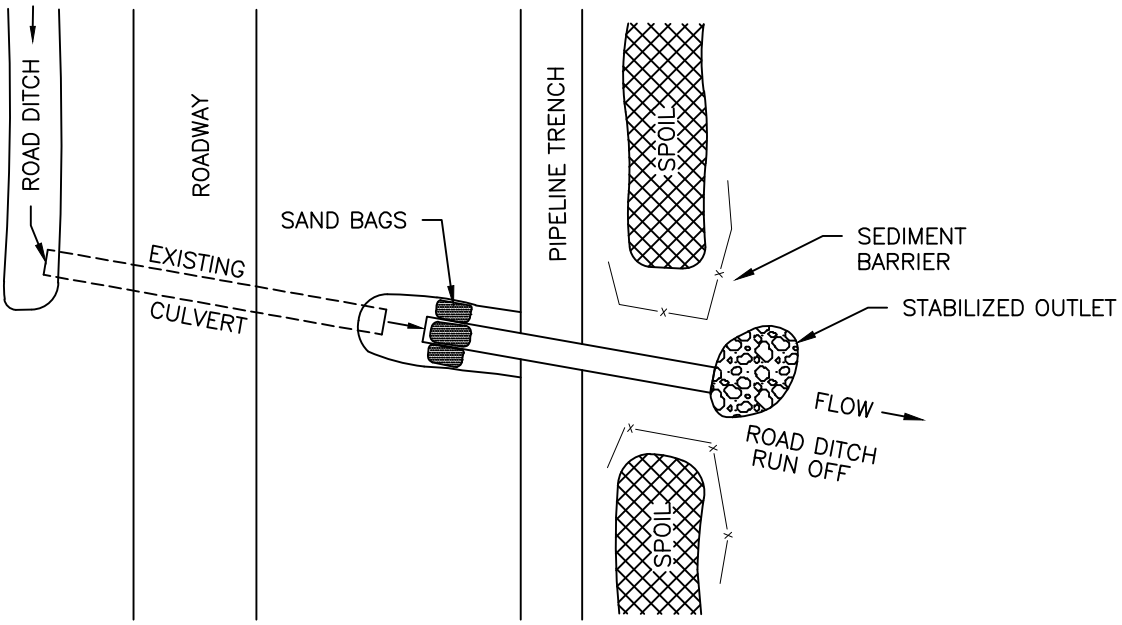
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
PIPE ENERGY DISSIPATER

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 48

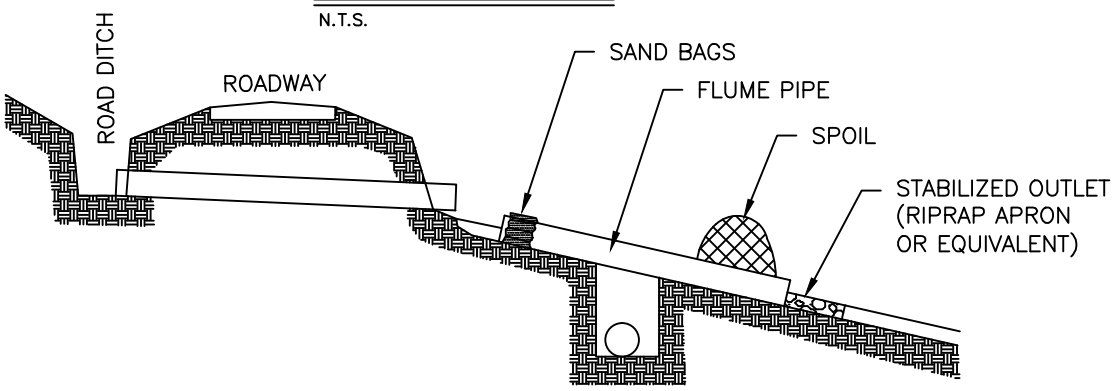
Sheet: 48 of 127

Type:



PLAN VIEW

N.T.S.



NOTES:

1. INSTALL THE TEMPORARY CULVERT ACROSS THE PIPELINE TRENCH AT ROAD CULVERT LOCATIONS WHERE THE PIPELINE TRENCH IS LOCATED BELOW THE ROAD SURFACE. AN 8" MINIMUM DIAMETER CULVERT IS TO BE INSTALLED, HOWEVER, THE TEMPORARY PIPE SHALL BE SIZED TO ADEQUATELY CONVEY THE MAXIMUM ANTICIPATED FLOW AT THE TIME OF CROSSING.

2. REMOVE CULVERT WHILE BACK FILLING AND RESTORE AND STABILIZE ROAD DITCH RUN OFF TO ORIGINAL CONDITION.

SECTION VIEW

N.T.S.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

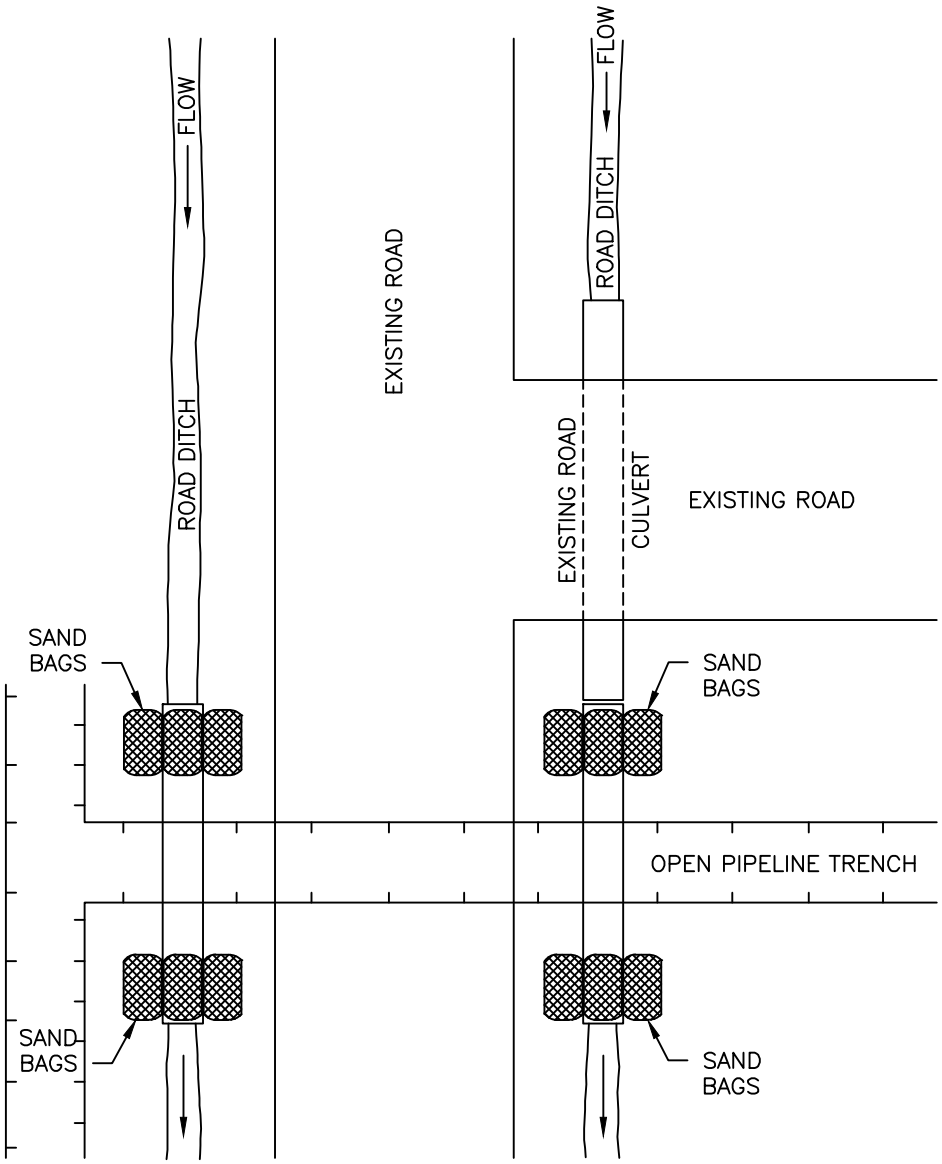
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
ROAD CULVERT EXTENSION ACROSS
PIPELINE TRENCH

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 49

Sheet: 49 of 127

Type:



NOTES:

1. INSTALL TEMPORARY CULVERT IN ROAD DITCH, ACROSS OPEN PIPELINE TRENCH. AN 8" MINIMUM DIAMETER CULVERT IS TO BE INSTALLED. HOWEVER, THE TEMPORARY PIPE SHALL BE SIZED TO ADEQUATELY CONVEY THE MAXIMUM ANTICPATED FLOW AT THE TIME OF CROSSING.

2. REMOVE CULVERT WHEN BACK FILLING AND RESTORE AND STABILIZE ROAD DITCH TO ORIGINAL CONDITION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

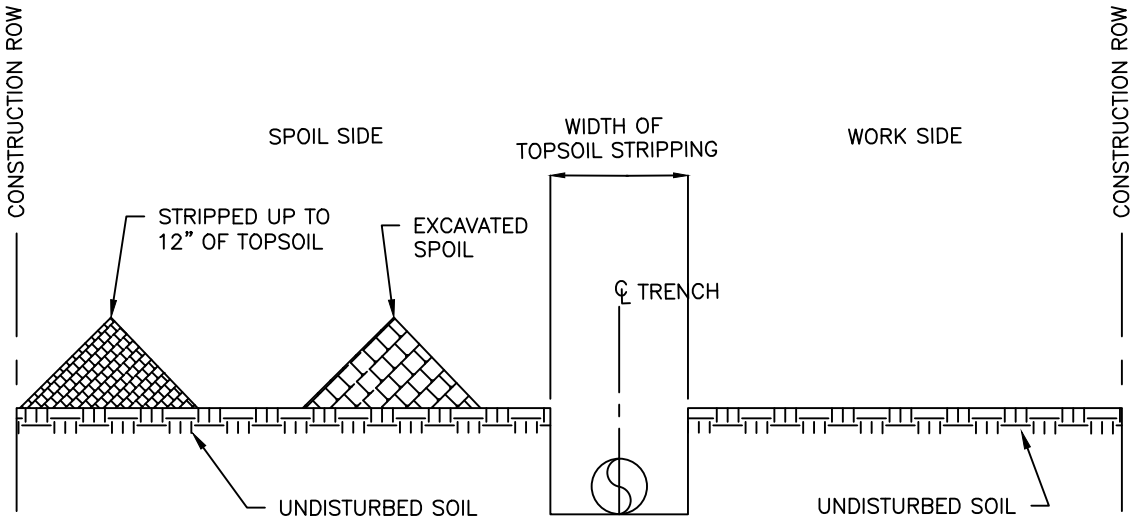
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TEMPORARY CULVERT ACROSS
OPEN TRENCH

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 50

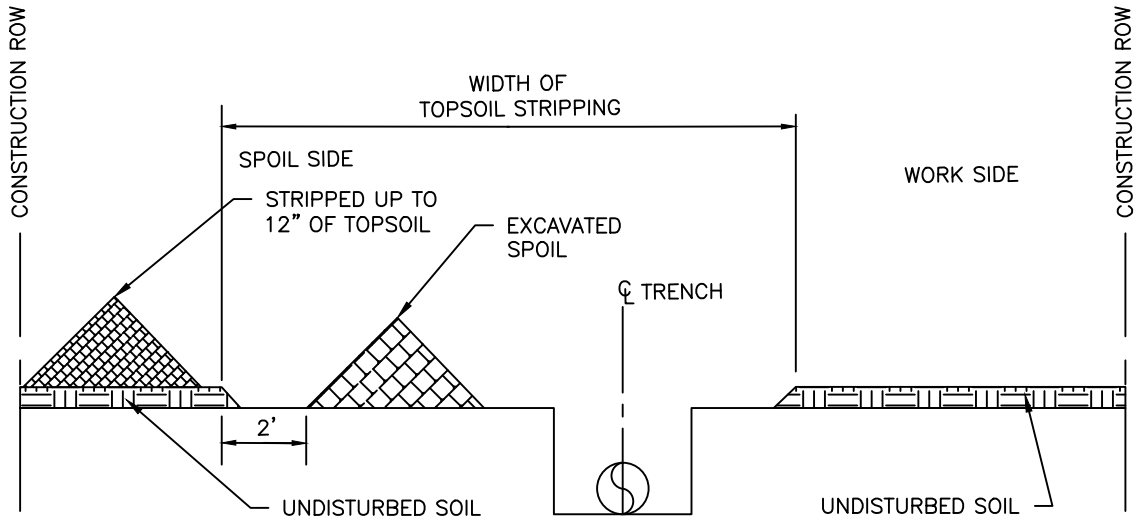
Sheet: 50 of 127
Type:



DITCH LINE TOPSOIL STRIPPING

N.T.S.

ALSO USED IN NON–SATURATED WETLANDS



DITCH PLUS SPOIL SIDE SEGREGATION

N.T.S.

NOTES:

1. ALLOW FOR A 3' SEPERATION BETWEEN THE TOPSOIL PILE AND THE TRENCH SPOIL.
2. RETURN TRENCH SPOIL TO TRENCH AND COMPACT. FEATHER OUT EXCESS SPOIL OVER STRIPPED AREA LEAVING A LOW CROWN CENTERED OVER THE TRENCH. ALLEVIATE COMPACTION OF SUBSOILS OVER THE STRIPPED AREA.
3. RETURN TOPSOIL EVENLY OVER THE STRIPPED AREA AFTER TRENCH HAS SUFFICIENTLY SETTLED OR HAS BEEN COMPACTED.
4. ALLEVIATE COMPACTION OF TOPSOIL OVER ENTIRE RIGHT–OF–WAY.
5. SEGREGATED TOPSOIL MAY NOT BE USED FOR PADDING THE PIPE.
6. INSTALL SEDIMENT BARRIER AS REQUIRED.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

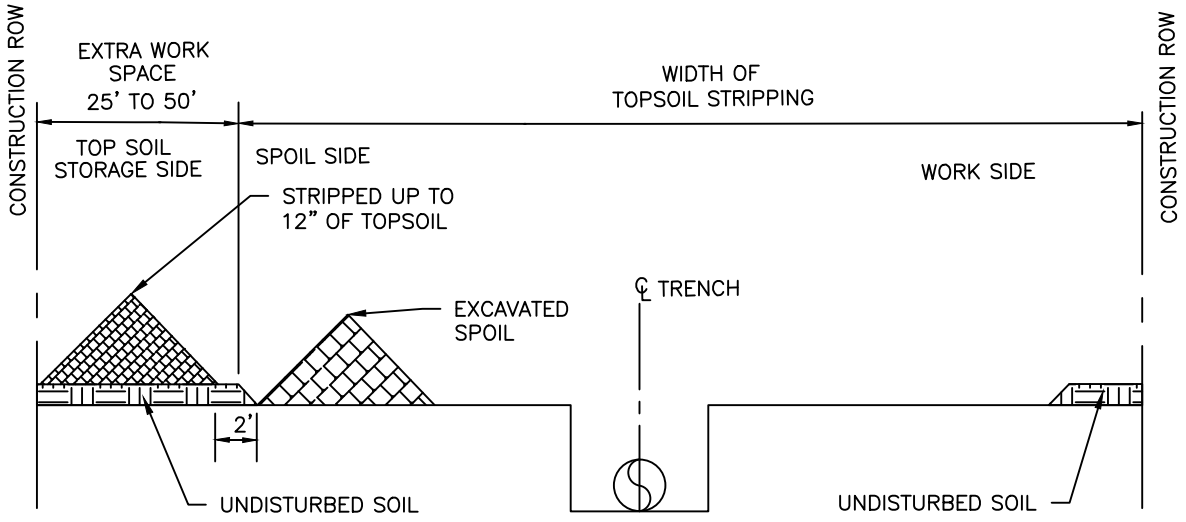
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TOPSOIL SEGREGATION (1)

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 51

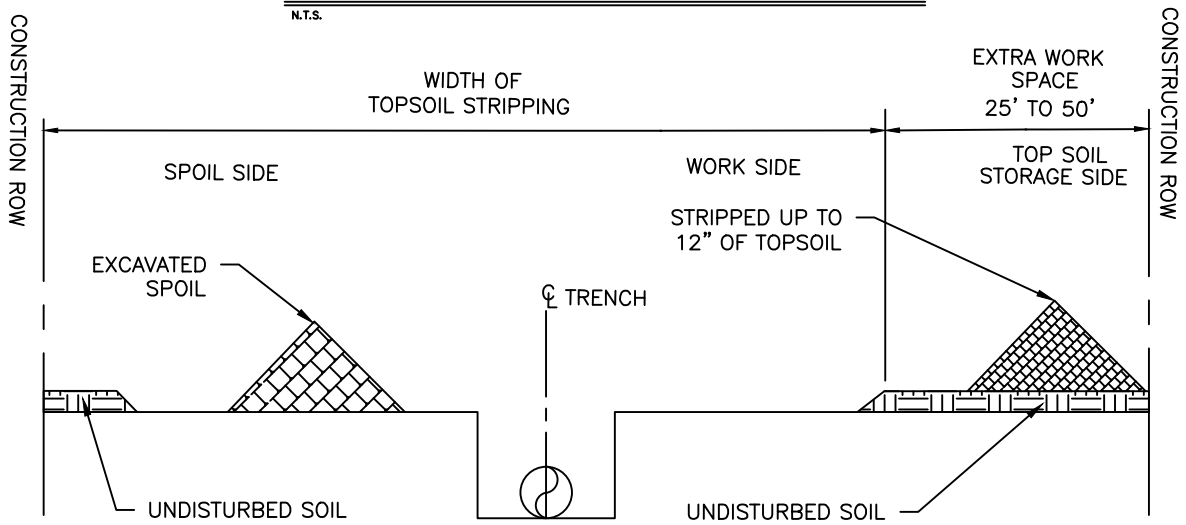
Sheet: 51 of 127

Type:



FULL RIGHT-OF-WAY TOPSOIL STRIPPING - A

N.T.S.



FULL RIGHT-OF-WAY TOPSOIL STRIPPING - B

N.T.S.

NOTES:

1. ALLOW FOR A 3' SEPERATION BETWEEN THE TOPSOIL PILE AND THE TRENCH SPOIL.
2. RETURN TRENCH SPOIL TO TRENCH AND COMPACT. FEATHER OUT EXCESS SPOIL OVER STRIPPED AREA LEAVING A LOW CROWN CENTERED OVER THE TRENCH. ALLEVIATE COMPACTION OF SUBSOILS OVER THE STRIPPED AREA.
3. RETURN TOPSOIL EVENLY OVER THE STRIPPED AREA AFTER TRENCH HAS SUFFICIENTLY SETTLED OR HAS BEEN COMPACTED
4. ALLEVIATE COMPACTION OF TOPSOIL OVER ENTIRE RIGHT–OF–WAY.
5. SEGREGATED TOPSOIL MAY NOT BE USED FOR PADDING THE PIPE
6. INSTALL SEDIMENT BARRIER AS REQUIRED

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

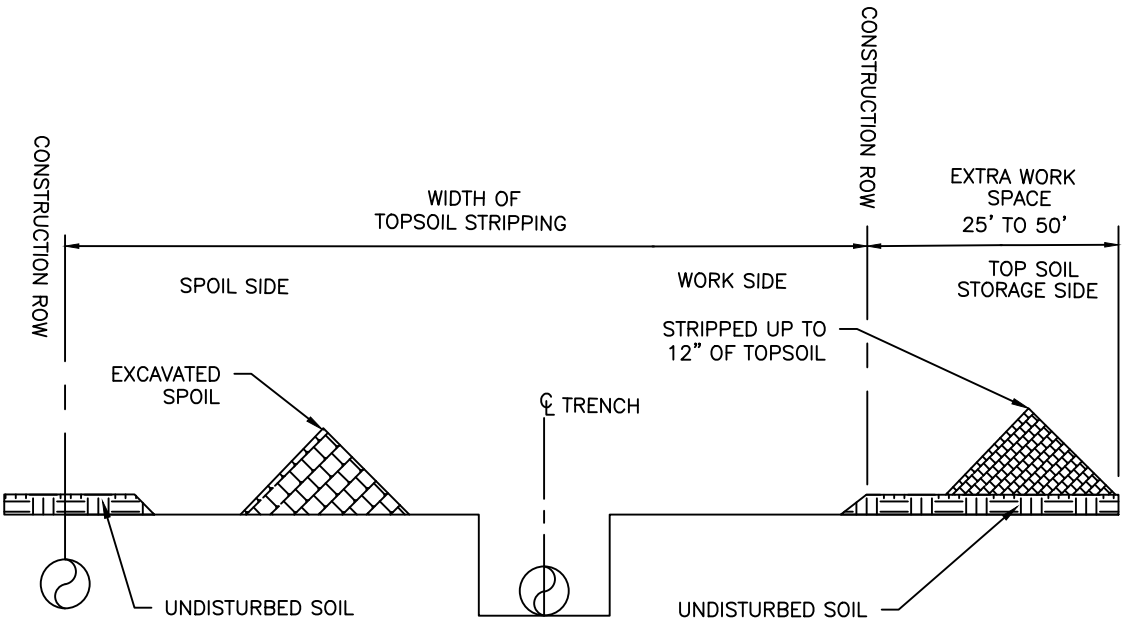
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TOPSOIL SEGREGATION (2)

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 52

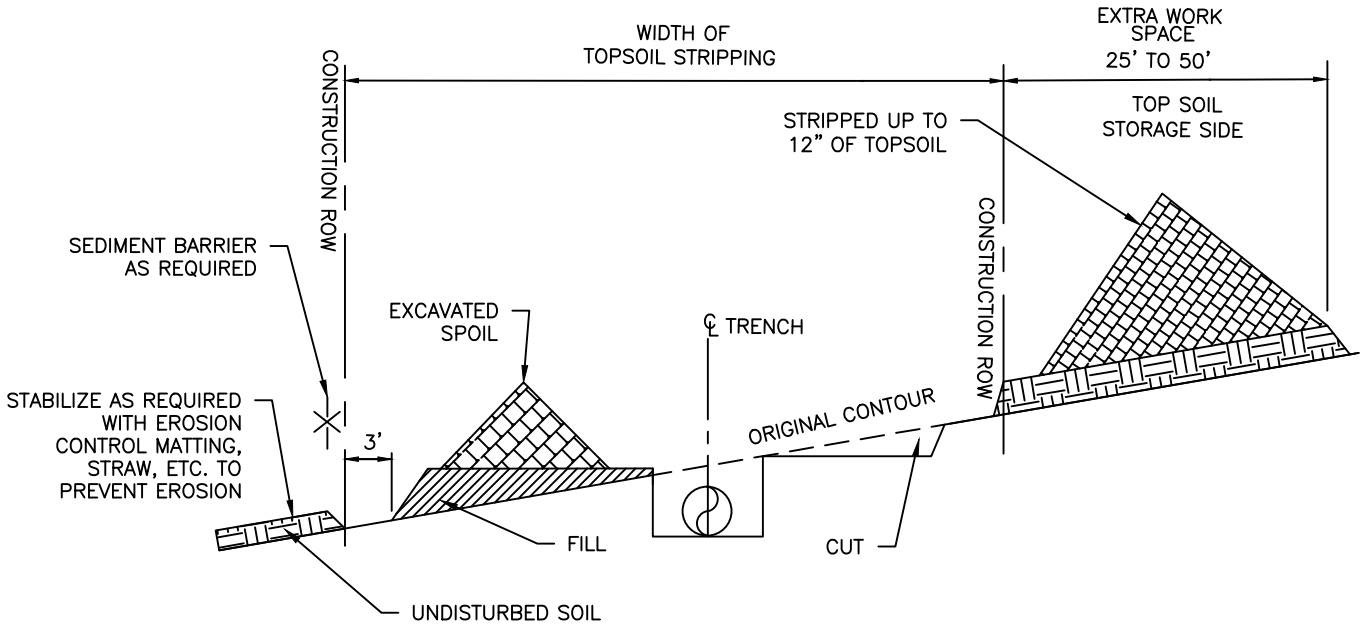
Sheet: 52 of 127

Type:



FULL RIGHT-OF-WAY TOPSOIL STRIPPING-PARALLELING PIPELINES

N.T.S.



FULL RIGHT-OF-WAY TOPSOIL STRIPPING-SIDE SLOPES

N.T.S.

NOTES:

1. ALLOW FOR A 3' SEPERATION BETWEEN THE TOPSOIL PILE AND THE TRENCH SPOIL.
2. RETURN TRENCH SPOIL TO TRENCH AND COMPACT. FEATHER OUT EXCESS SPOIL OVER STRIPPED AREA LEAVING A LOW CROWN CENTERED OVER THE TRENCH. ALLEVIATE COMPACTION OF SUBSOILS OVER THE STRIPPED AREA.
3. RETURN TOPSOIL EVENLY OVER THE STRIPPED AREA AFTER TRENCH HAS SUFFICIENTLY SETTLED OR HAS BEEN COMPACTED.
4. ALLEVIATE COMPACTION OF TOPSOIL OVER ENTIRE RIGHT–OF–WAY.
5. SEGREGATED TOPSOIL MAY NOT BE USED FOR PADDING THE PIPE.
6. INSTALL SEDIMENT BARRIER AS REQUIRED.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TOP SOIL SEGREGATION (3)

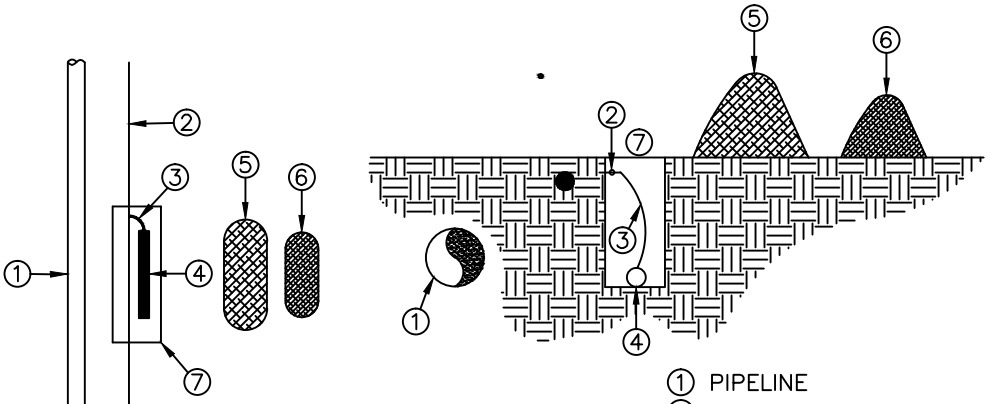
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 53

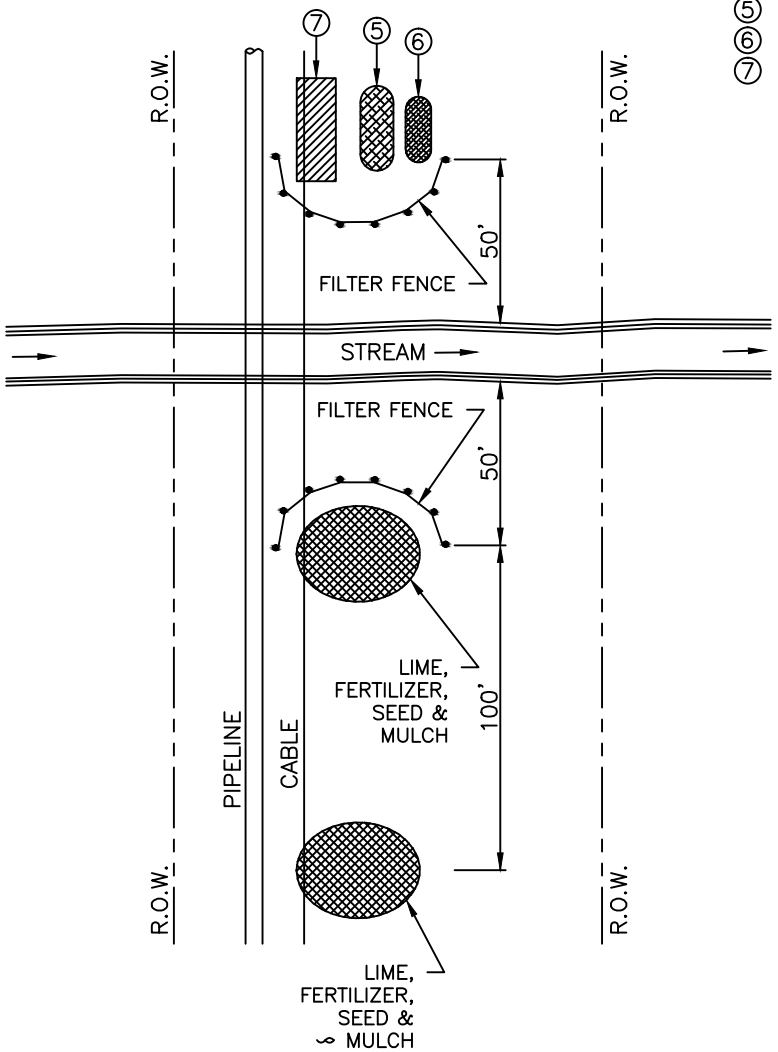
Sheet: 53 of 127

Type:

TYPICAL ANODE INSTALLATION



① PIPELINE
② CABLE
③ WIRE FROM ANODE TO CABLE
④ ANODE (8" X 7")
⑤ SUBSOIL
⑥ TOPSOIL
⑦ OPENING (4'W X 10'L X 5'D)



NOTES:

1. ANODES INSTALLED A MINIMUM OF 50' FROM EDGE OF WATER

2. INSTALL FILTER FENCE ACROSS THE DISTURBED AREAS AT ANODE INSTALLATIONS ADJACENT TO STREAMS.

3. LIME, FERTILIZER, SEED AND MULCH IMMEDIATELY AFTER BACKFILLING AS APPROVED BY THE EI OR LOCAL PERMITTING AGENCY. ALL DISTURBED AREAS WITHIN 50' OF THE TOP OF BANK WILL BE STABILIZED. LIME AND FERTILIZER SHALL NOT BE USED WITHIN WETLANDS OR WATERBODIES UNLESS APPROVED AS ABOVE.

4. PLACEMENT OF EROSION CONTROLS WILL BE ADJUSTED AS NECESSARY TO PREVENT THE TRANSPORTATION OF SEDIMENT INTO WETLANDS AND/OR WATERBOSIES

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

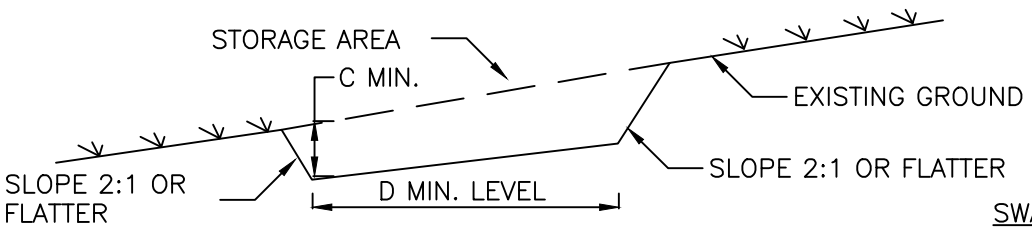
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
CATHODIC PROTECTION
ANODE INSTALLATION

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 54

Sheet: 54 of 127
Type:

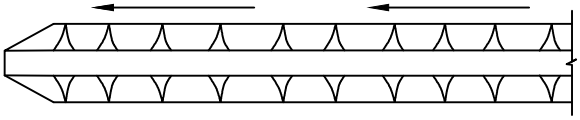


CROSS SECTION

	SWALE A	SWALE B
C	1'	1'
D	4'	6'

POSITIVE DRAINAGE: 0.5% OR STEEPER DEPENDENT ON TOPOGRAPHY

OUTLET AS REQUIRED
SEE ITEM 8 BELOW.



PLAN VIEW

CONSTRUCTION SPECIFICATIONS

1. ALL TEMPORARY SWALES SHALL HAVE UNINTERUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON–EROSIVE VELOCITY.
4. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE SWALE.
5. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
6. FILLS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
7. ALL EARTH REMOVED AND NOT NEEDED FOR CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE.
8. STABILIZATION SHALL BE AS PER THE FLOW CHANNEL STABILIZATION CHART BELOW:

TYPE OF TREATMENT	CHANNEL GRADE	A(5 AC. OR LESS)	B(5 AC –10AC)
1	0.5–3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1–5.0%	SEED AND STRAW MULCH	SEED USING JUTE OR EXCELSIOR
3	5.1–8.0%	SEED WITH JUTE OR EXCELSIOR, SOD	LINED WITH 4–8" RIP–RAP OR RECYCLED CONCRETE EQUIVALENT
4	8.1–20.%	LINED WITH 4–8" RIP–RAP	ENGINEERED DESIGN

9. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

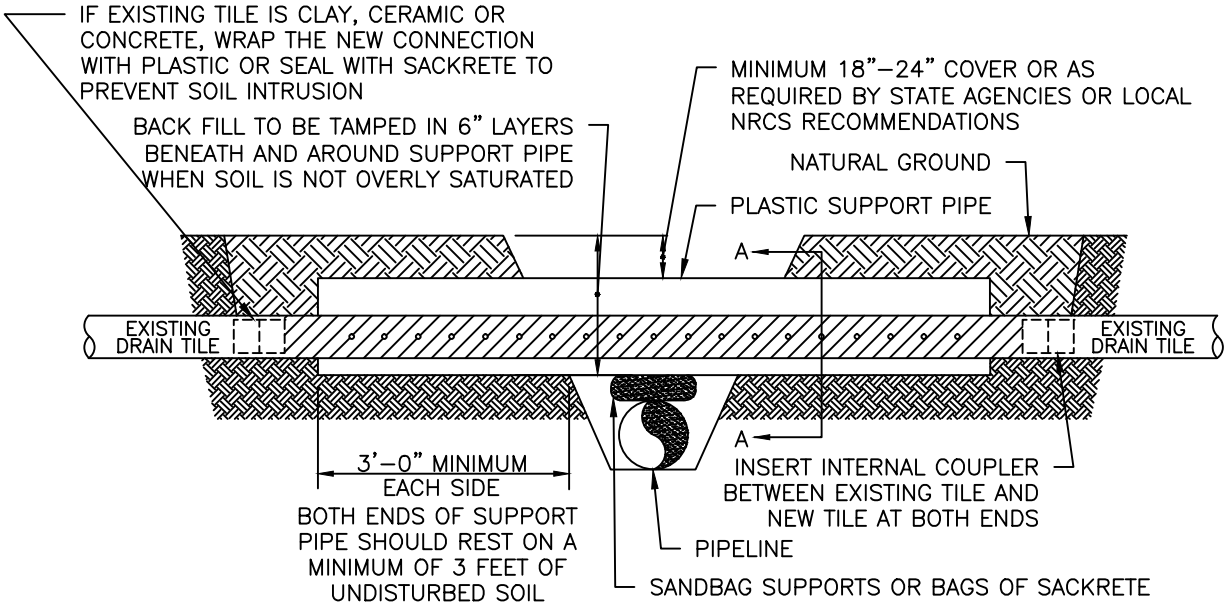
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TEMPORARY SWALE

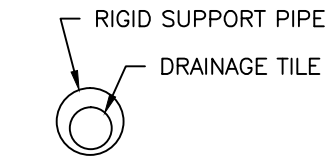
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 55

Sheet: 55 of 127
Type:

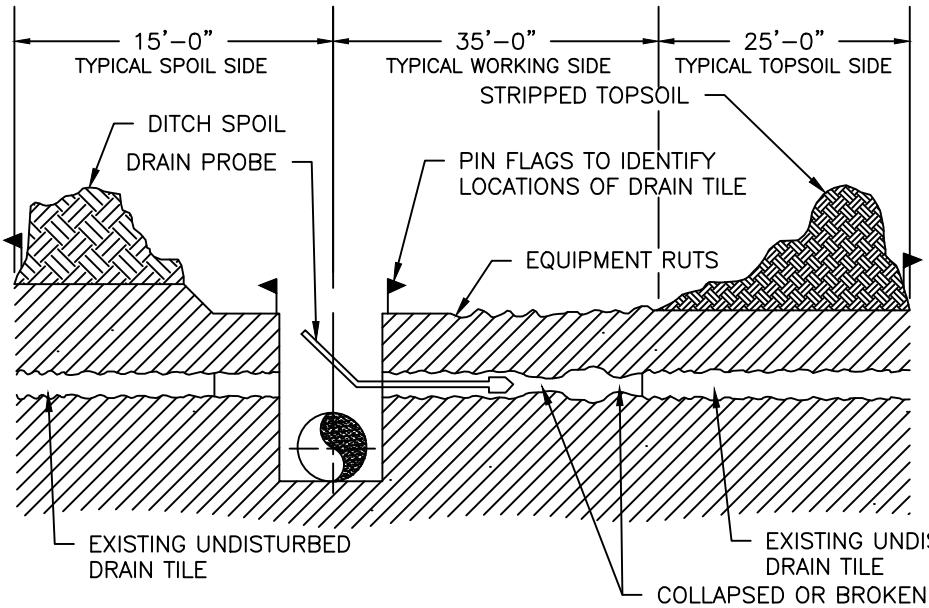


DRAINAGE TILE	SUPPORT SIZE
3" TO 5"	6" PIPE
6"	8" PIPE
7" TO 8"	10" PIPE
9" TO 10"	12" PIPE
12"	W12 X 14
15" TO 18"	W16 X 26
OVER 18"	W18 X 46



SECTION A–A
FOR UP TO 10" DRAIN TILE

NOTES:
1. SUPPORT PIPE TO BE OF 0.250" WALL THICKNESS OR HEAVIER. WHERE THE SUPPORT PIPE IS OVER 30" IN LENGTH OR IN SATURATED AREAS. PERFORATIONS TO THE SUPPORT PIPE MAY BE REQUESTED.
2. REPLACEMENT TILE TO BE HEAVY DUTY HIGHWAY GRADE PERFORATED PLASTIC DRAIN TUBING (ADS TYPE N–12) CONFORMING TO THE AASHTO M.252 SPECIFICATION.
3. IF THE TRENCH WIDTH EXCEEDS 10 FEET, SUFFICIENT STABILITY SHALL BE PROVIDED TO THE SUPPORT PIPE TO PREVENT SAGGING.



NOTES:
1. CLEAN OUT DRAIN TILES TO THE PERMANENT R.O.W. LIMITS ON THE BACKFILL SIDE AND TO THE TEMPORARY R.O.W. LIMIT ON THE WORKING SIDE.

2. REPLACE DAMAGED TILES AND REPAIR TILES AND JOINTS THAT REQUIRE WORK AND ARE WITHIN THE AREAS OF CONSTRUCTION ACTIVITIES.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

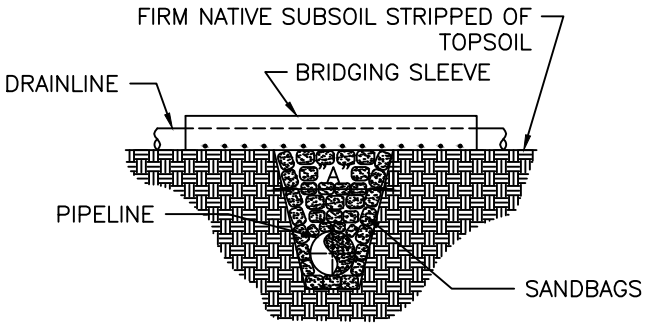
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL DRAIN TILE REPAIR ACROSS TRENCH (1)

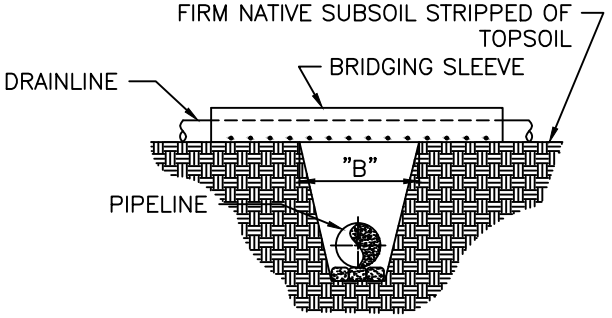
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 56

Sheet: 56 of 127
Type:

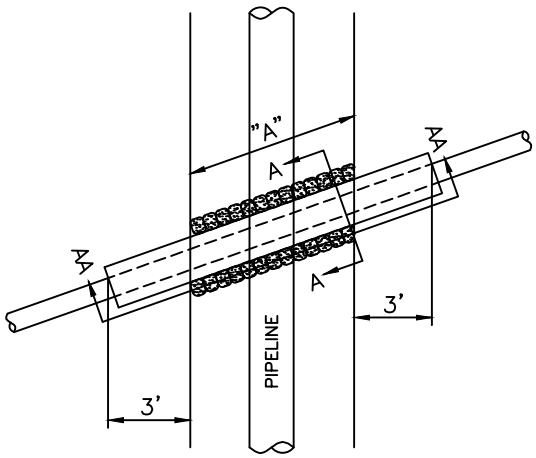


IF DISTANCE "A" EXCEEDS 10 FEET, THE SCHEDULE 80 PERFORMED BRIDGING–SLEEVE REQUIRES A MODIFIED SANDBAG TRENCH BREAKER UNDER THE BRIDGING SLEEVE.



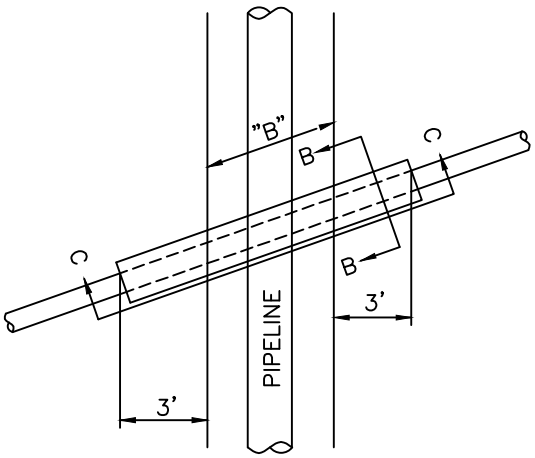
IF DISTANCE "B" DOES NOT EXCEED 10 FEET, THE SCHEDULE 80 PERFORMED BRIDGING–SLEEVE DOES NOT REQUIRE SUPPORT UNDER THE BRIDGING–SLEEVE.

SECTION AA-AA

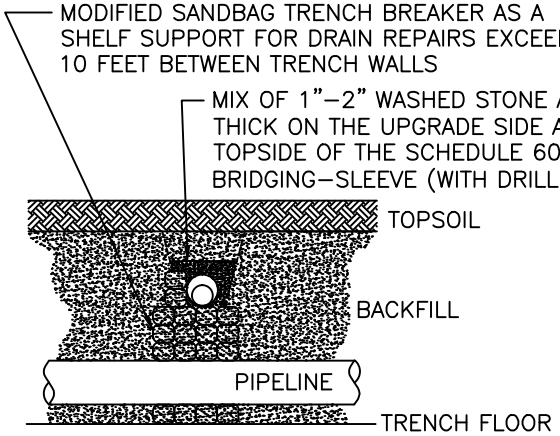


PLAN VIEW

SECTION C-C



PLAN VIEW



CROSS SECTION "B–B" IS THE SAME AS CROSS SECTION "A–A", MINUS THE SAND BAG TRENCH BREAKER. MINIMUM OF 1"–2" WASHED STONE, 4"–6" THICK UNDERNEATH,TO BE PLACED AROUND THE SIDES AND OVER TOP OF THE BRIDGING SLEEVE.

THE BRIDGING–SLEEVE DRAIN REPAIR RESTS ON THE UPGRADIENT SIDE OF THE MODIFIED SANDBAG TRENCH BREAKER. THE HIGHER PORTION OF THE TRENCH BREAKER IS ON THE DOWN GRADIENT SIDE OF THE REPAIR.

NOTE:

1.IF THE REPAIR OF THE SEVERED DRAINLINE CROSSES THE PIPELINE TRENCH AT AN ANGLE REQUIRING MORE THAN 20' OF BRIDGING–SLEEVE BETWEEN THE FARTHEST ENDS OF THE FIRM SHELVES, MODIFY THE CROSSING ANGLE TO SHORTEN THE TOTAL LENGTH OF THE CROSSING AND THEN TIE TO THE EXISTING DRAIN TILE.

2. ALL DRAIN TILE REPAIRS CONSISTING OF PLASTIC PIPE SHALL CONFORM TO THE AASHTO M.252 SPECIFICATION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

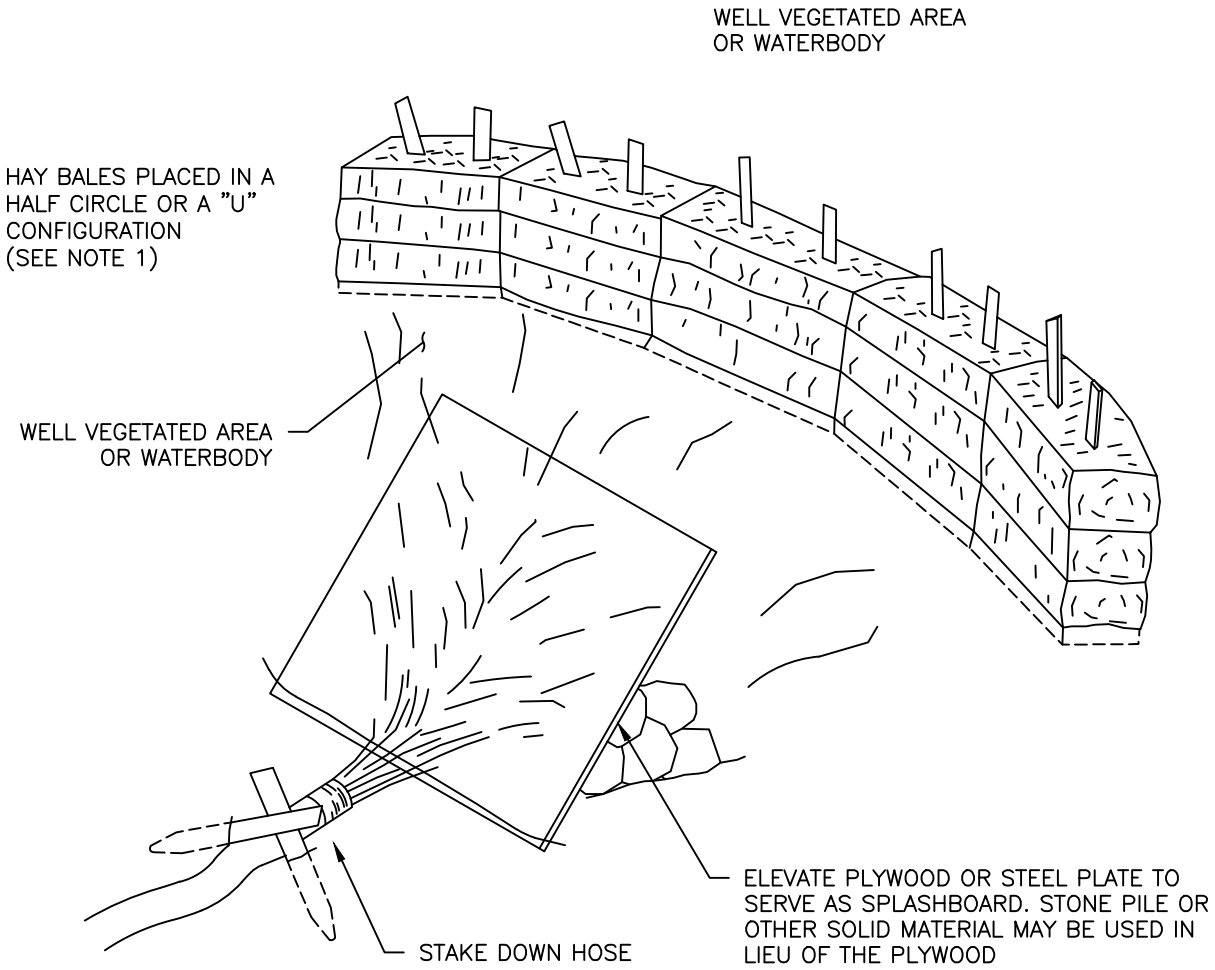
Division:		Op. Area:
St.:		Co./Par.:
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL DRAIN TILE REPAIR ACROSS TRENCH (2)

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 57

Sheet: 57 of 127
Type:



USED FOR TRENCH DE–WATERING AND DAM AND PUMP
WATERBODY CROSSINGS

NOTE:

1. THIS DISSIPATER MAY BE USED WITHIN A WATERBODY DURING A DAM AND PUMP DEWATERING OPERATION. THE HAYBALES WILL NOT BE INSTALLED IF UTILIZED IN A WATERBODY.
2. THIS SHALL NOT BE USED WHEN TRENCH DEWATERING IS REQUIRED AND THERE IS SILT LADEN WATER THAT WILL DISCHARGE DIRECTLY INTO A WETLAND OR WATERBODY.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

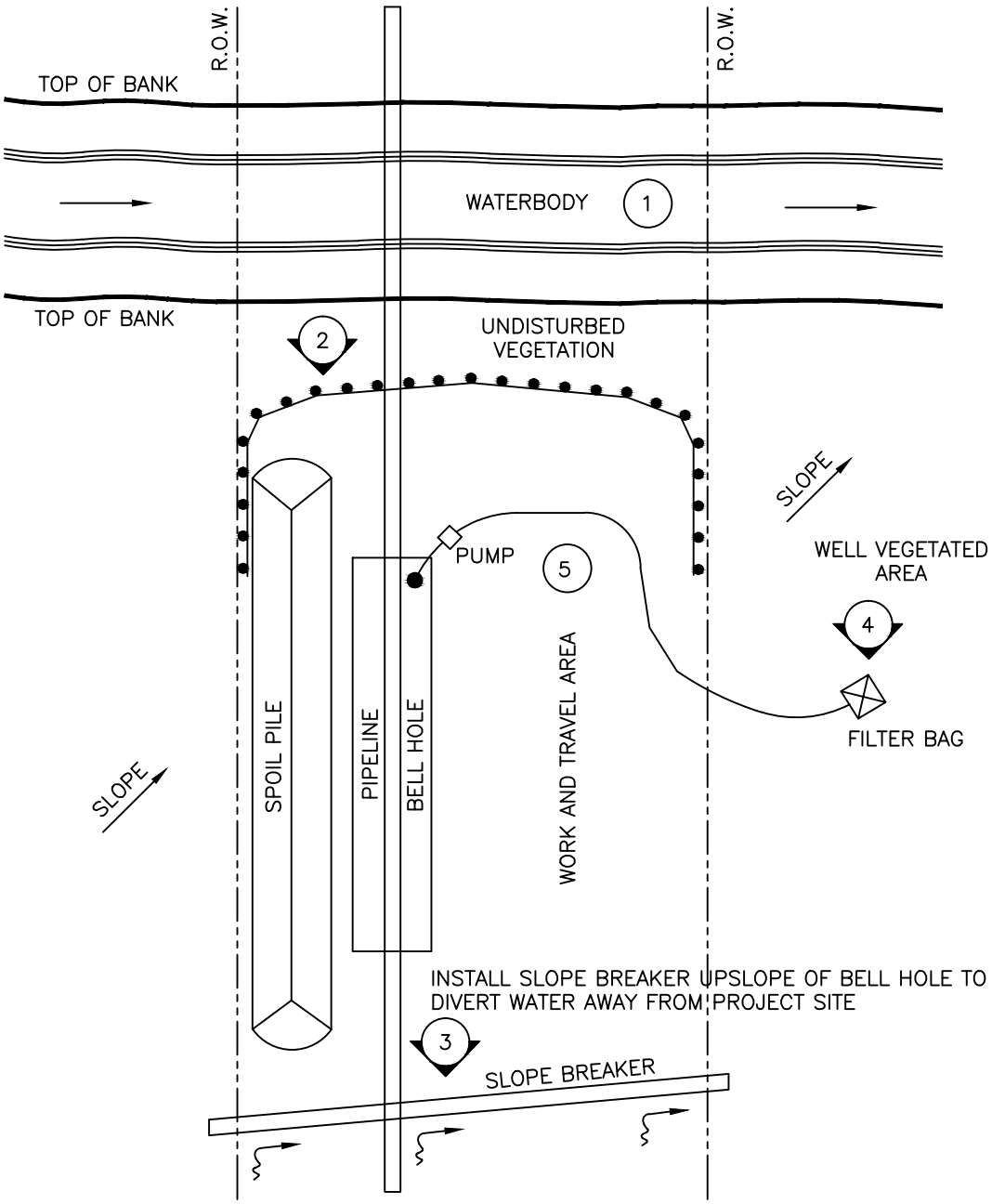
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
ENERGY DISSIPATER

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 58

Sheet: 58 of 127
Type:



1. (IF NEEDED) EQUIPMENT CROSSING, SEE CROSSING DETAILS FOR PROPER INSTALLATION
2. SEDIMENT BARRIER
3. SLOPE BREAKER
4. BELL HOLE DEWATERING OUTLET, SEE TRENCH DEWATERING DETAILS FOR PROPER METHODOLOGY
5. LIME, FERTILIZE, SEE AND MULCH ALL DISTURBED AREAS IMMEDIATELY AFTER BACKFILLING AS APPROVED BY THE EI OR LOCAL PERMITTING AGENCY. LIME AND FERTILIZER SHALL NOT BE USED WITHIN WETLANDS OR WATERBODIES UNLESS APPROVED AS NOTED ABOVE.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

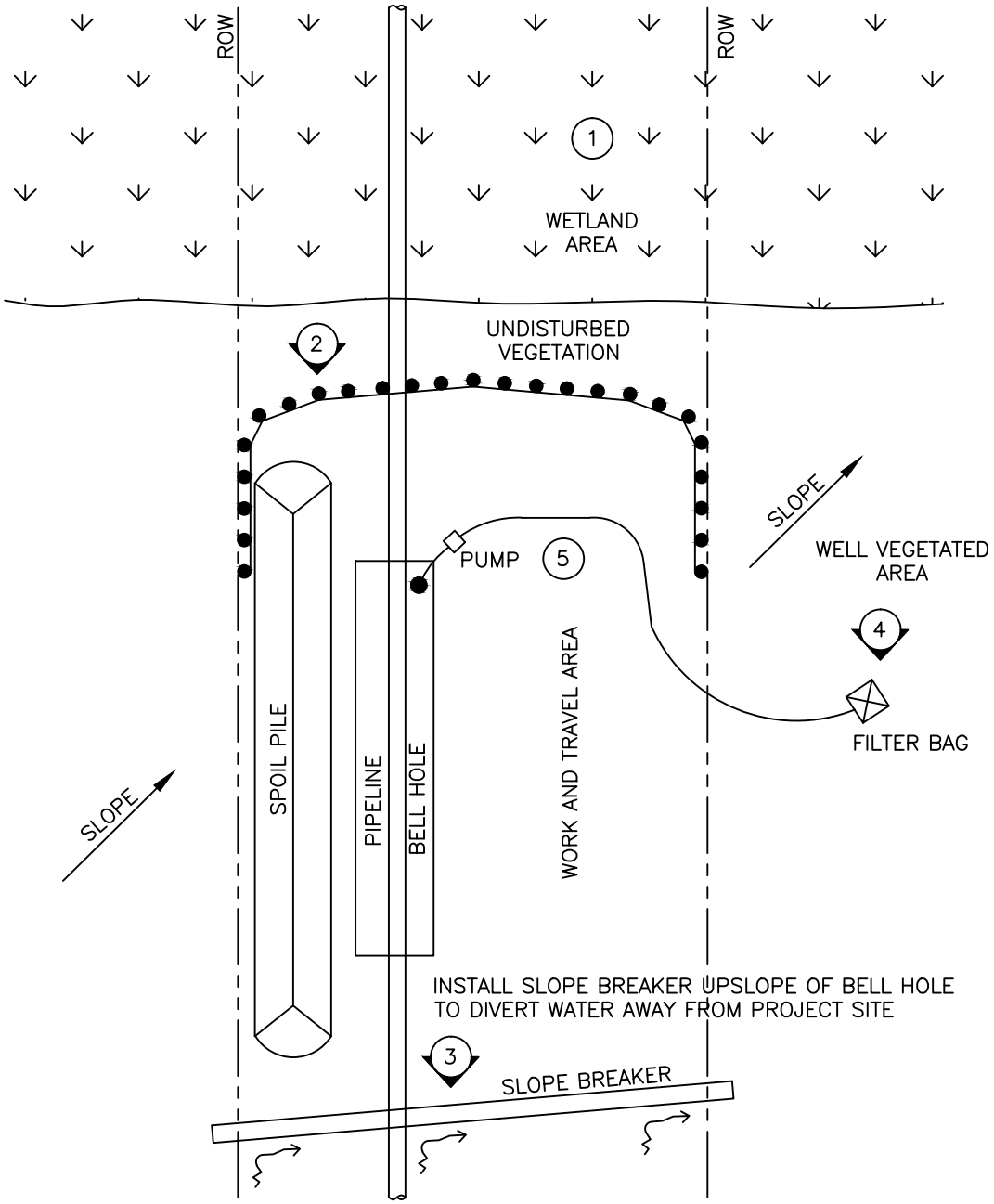
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
BELL HOLE NEXT TO WATERBODY

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 59

Sheet: 59 of 127
Type:



1. (IF NEEDED) EQUIPMENT CROSSING, SEE CROSSING DETAILS FOR PROPER INSTALLATION
2. SEDIMENT BARRIER
3. SLOPE BREAKER
4. BELL HOLE DEWATERING OUTLET, SEE TRENCH DEWATERING DETAILS FOR PROPER METHODOLOGY
5. LIME, FERTILIZE, SEED AND MULCH ALL DISTURBED AREAS IMMEDIATELY AFTER BACKFILLING AS APPROVED BY RGE EI OR LOCAL PERMITTING AGENCY. LIME AND FERTILIZER SHALL NOT BE USED WITHIN WETLANDS OR WATERBODIES UNLESS APPROVED AS NOTED ABOVE.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

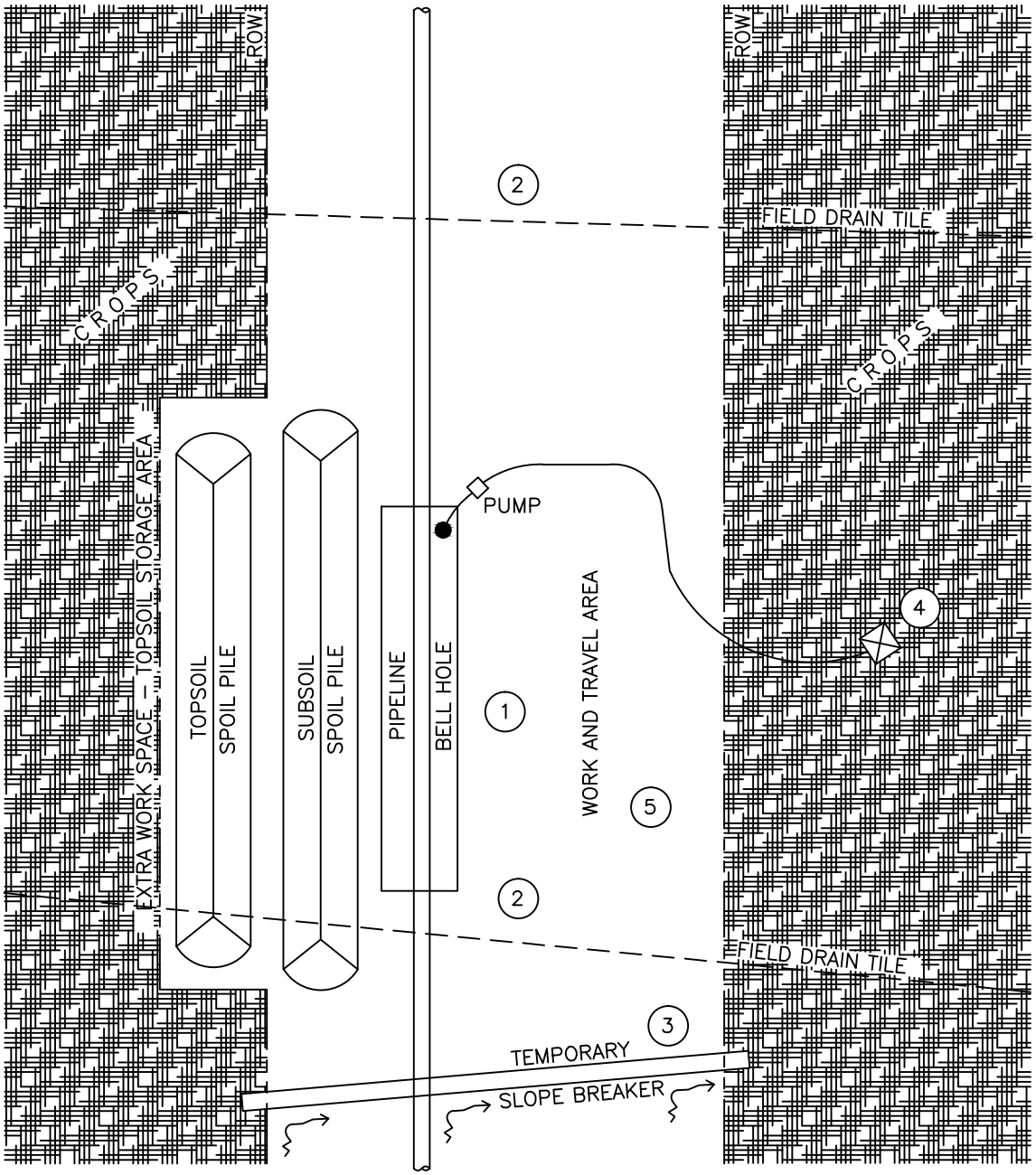
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
BELL HOLE NEXT TO WETLAND

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 60

Sheet: 60 of 127
Type:



(1) FULL RIGHT OF WAY TOPSOIL SEGREGATION

(2) DRAIN TILE, REPAIR AS REQUIRED.

(3) (IF NEEDED) TEMPORARY SLOPE BREAKER

(4) BELL HOLE DEWATERING OUTLET, SEE TRENCH DEWATERING DETAILS FOR PROPER METHODOLOGY

(5) SOIL COMPACTION MITIGATION, SEE DECOMPACTION PLAN FOR PROPER PROCEDURE

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

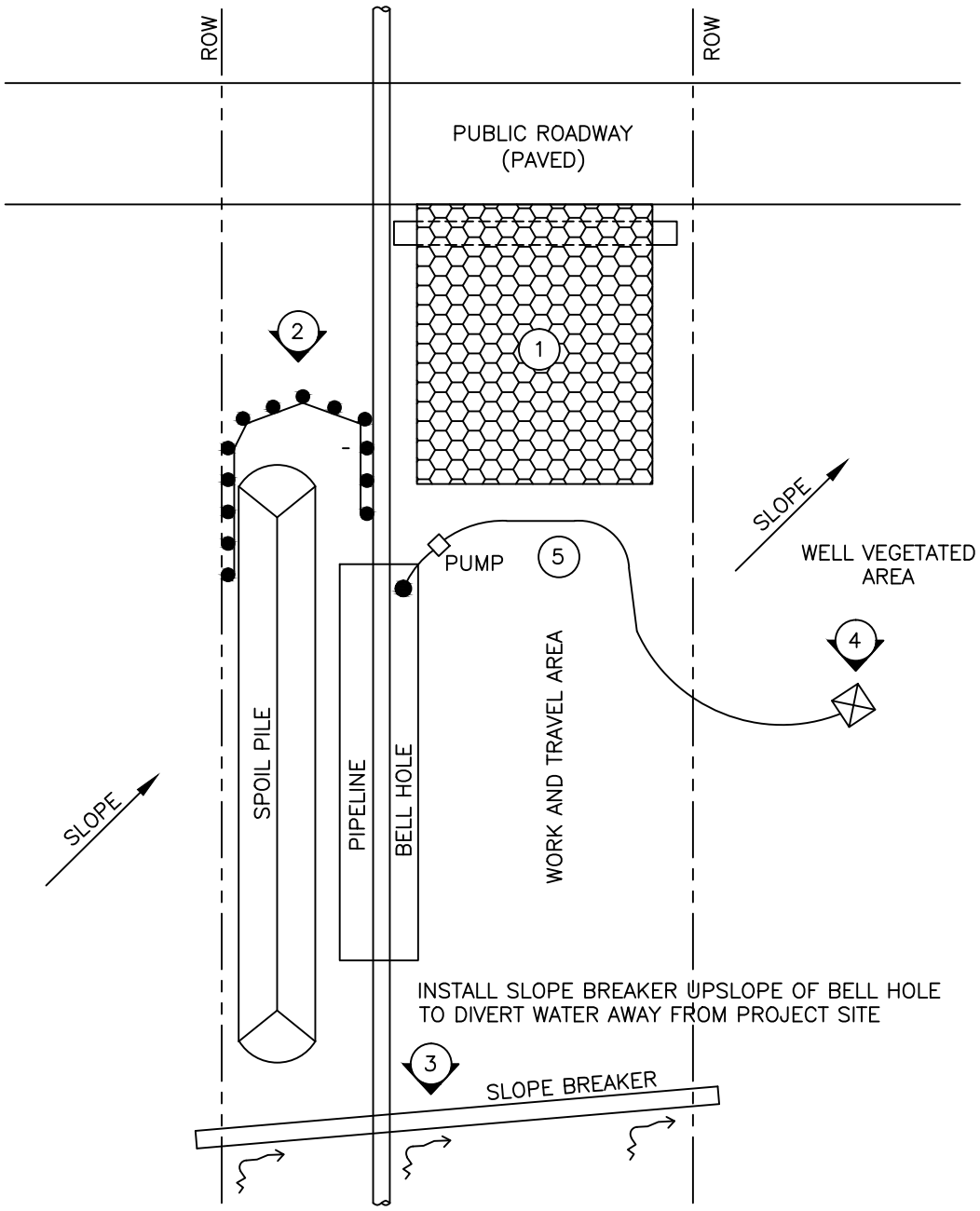
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
BELL HOLE NEXT TO
AGRICULTURAL FIELD

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 61

Sheet: 61 of 127

Type:



1. CONSTRUCTION ENTRANCE
2. SEDIMENT BARRIER
3. SLOPE BREAKER
4. BELL HOLE DEWATERING OUTLET, SEE TRENCH DEWATERING DETAILS FOR PROPER METHODOLOGY
5. LIME, FERTILIZE, SEED AND MULCH ALL DISTURBED AREAS IMMEDIATELY AFTER BACKFILLING

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

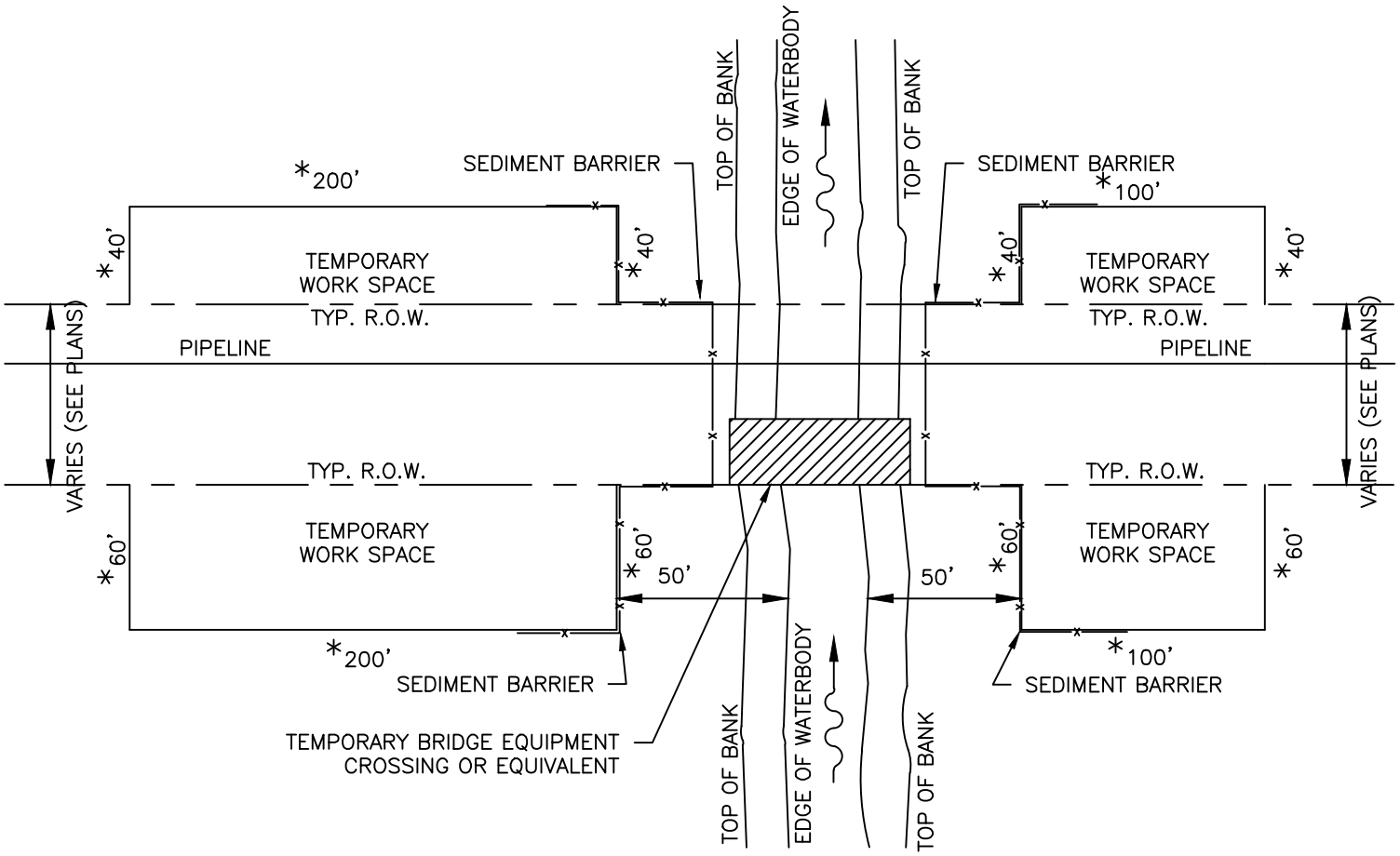
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
BELL HOLE NEXT TO
PUBLIC ROADWAY

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 62

Sheet: 62 of 127
Type:



* FOOTAGES SHOWN ARE FOR EXAMPLE PURPOSES ONLY. ACTUAL EXTRA WORK SPACE AREAS WILL VARY DEPENDING ON INDIVIDUAL PROJECTS.

NOTES:
1) ALL EXTRA WORK SPACES SHALL BE LOCATED AT LEAST 50 FEET FROM THE WATERS EDGE, EXCEPT WHERE THE ADJACENT UPLAND CONSISTS OF ACTIVELY CULTIVATED OR ROTATED CROPLAND OR OTHER DISTURBED LAND.
2) THE CONSTRUCTION ROW SHALL BE LIMITED TO 75 FT WIDE WITHIN 50 FT FROM THE WATERS EDGE UNLESS APPROVED OTHERWISE ON THE CERTIFICATE.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

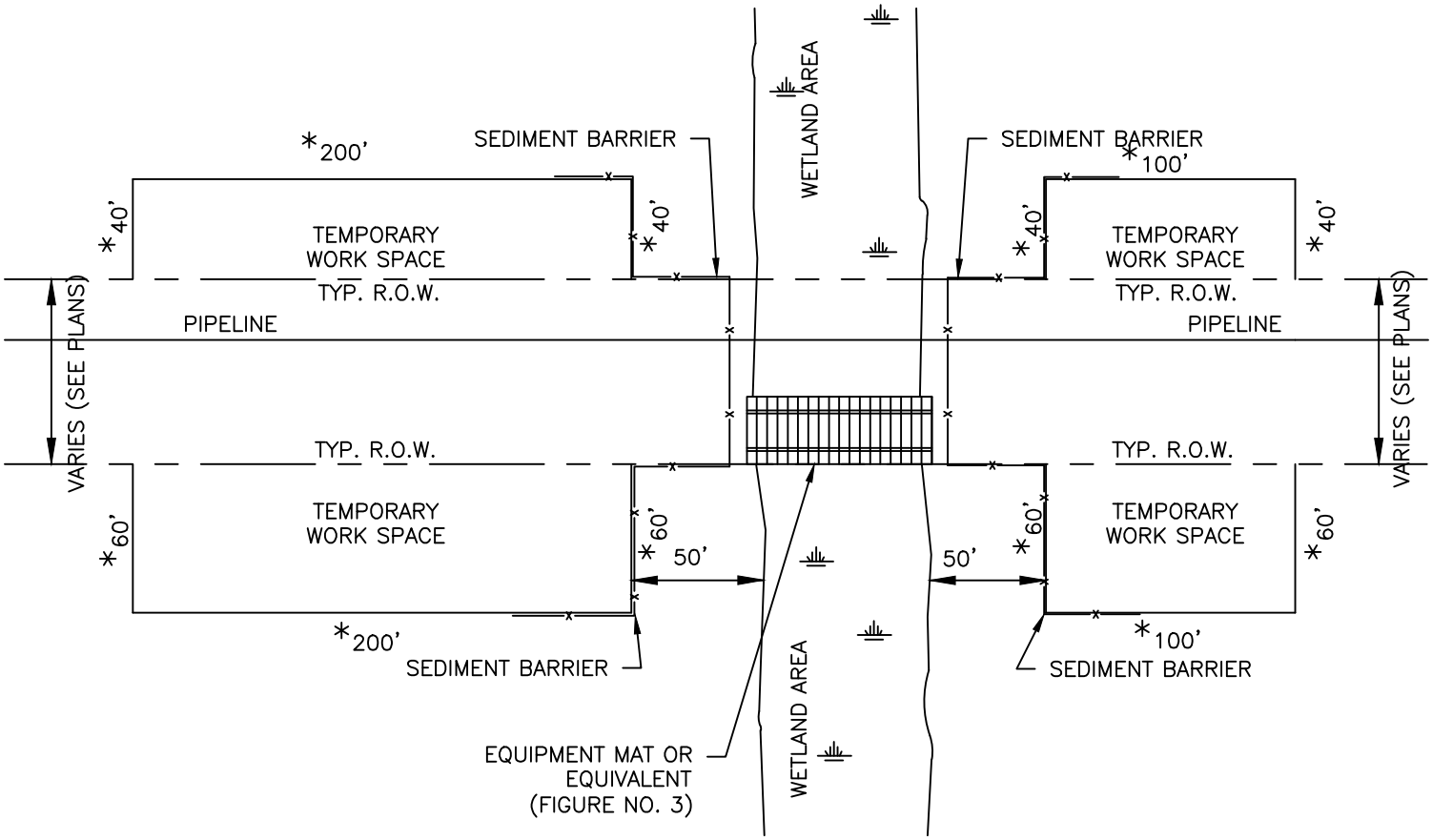
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL EXTRA WORK SPACES AT WATERBODY CROSSINGS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 63

Sheet: 63 of 127
Type:



* FOOTAGES SHOWN ARE FOR EXAMPLE PURPOSES ONLY. ACTUAL EXTRA WORK SPACE AREAS WILL VARY DEPENDING ON INDIVIDUAL PROJECTS.

NOTES:

1) ALL EXTRA WORK SPACES SHALL BE LOCATED AT LEAST 50 FEET FROM THE EDGE OF WETLAND, EXCEPT WHERE THE ADJACENT UPLAND CONSISTS OF ACTIVELY CULTIVATED OR ROTATED CROPLAND OR OTHER DISTURBED LAND.
2) THE CONSTRUCTION ROW SHALL BE LIMITED TO 75 FT WIDE WITHIN 50 FT FROM THE EDGE OF WETLANDS UNLESS APPROVED OTHERWISE ON THE CERTIFICATE.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

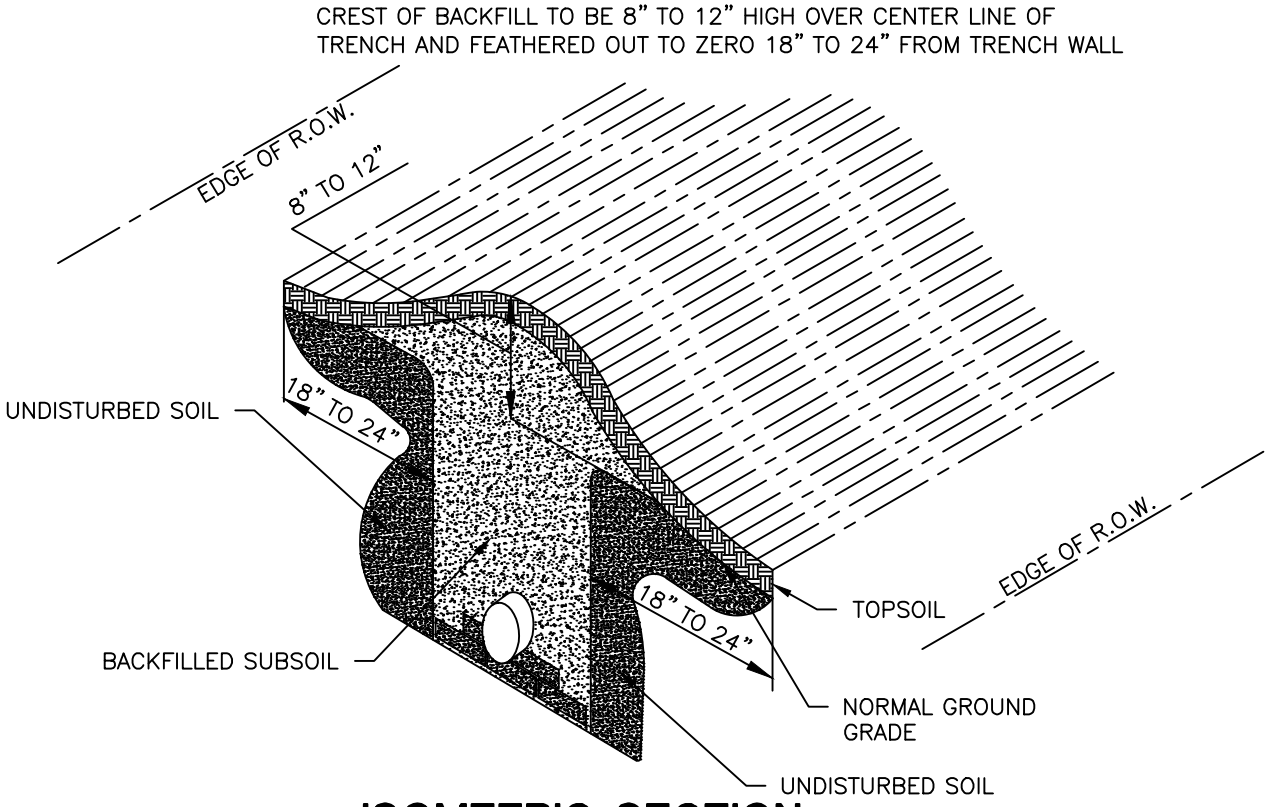
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL EXTRA WORK SPACES AT WETLAND CROSSINGS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

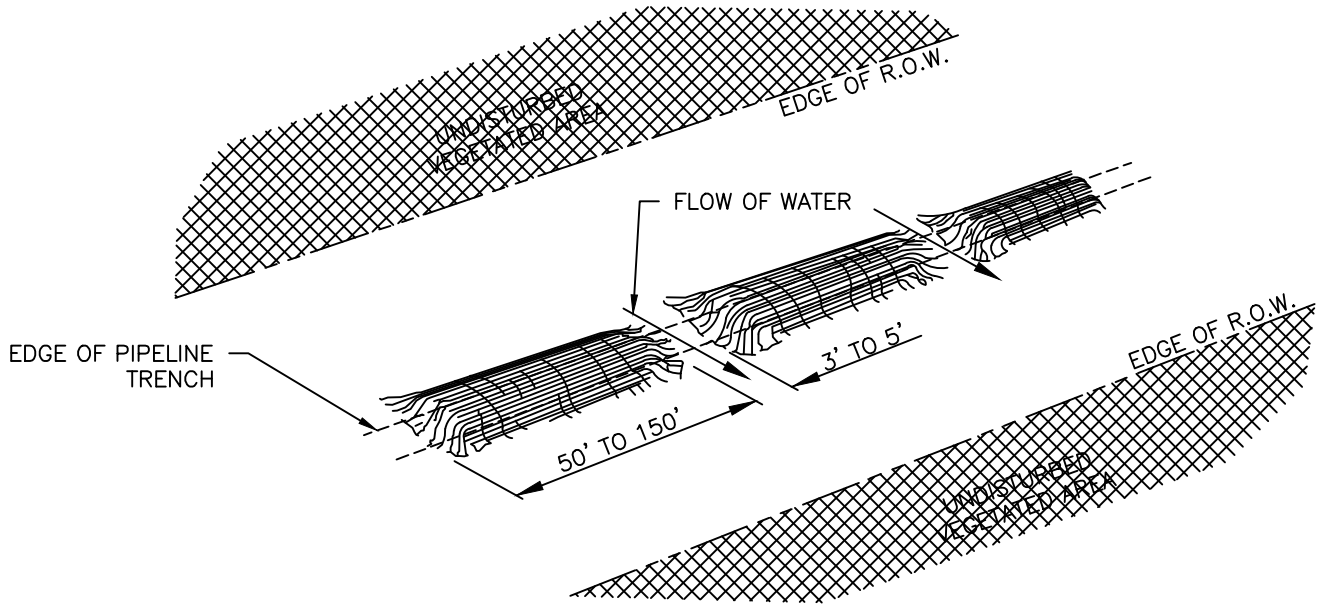
FIG. NO. 64

Sheet: 64 of 127
Type:



ISOMETRIC SECTION

N.T.S.



ISOMETRIC VIEW

N.T.S.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

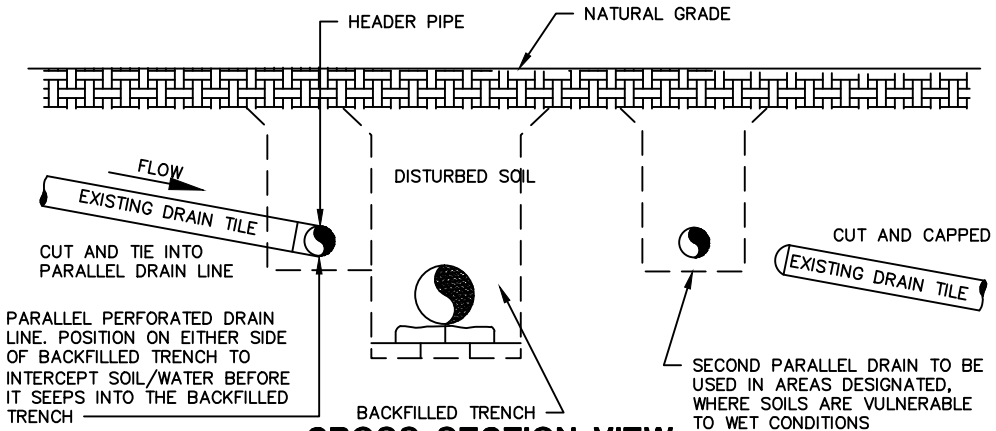
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
RIGHT–OF–WAY CROWNING

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 65

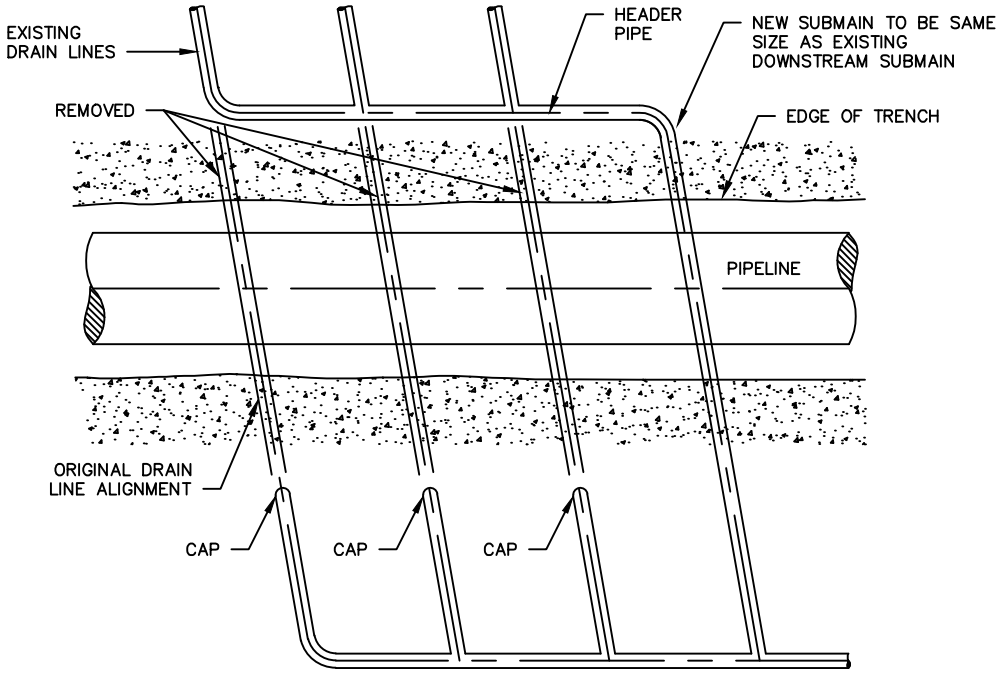
Sheet: 65 of 127
Type:



CROSS SECTION VIEW

N.T.S.

NOTE:
1. PARALLEL DRAINAGE TILE INSTALLATION TO BE APPROVED FOR SITE SPECIFIC AGRICULTURAL SOILS WHERE REPAIR OF EXISTING CROSS TILES WOULD BE LESS EFFECTIVE FOR EXAMPLE:
   A. SHALLOW BEDROCK.
   B. INTERFERENCE BY OTHER UTILITY LINES.
   C. HEADER TO CLOSELY SPACED, SHALLOW TILES AND FRENCH DRAINS.



PLAN VIEW TILE SYSTEM WITH NEW SUBMAIN

N.T.S.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

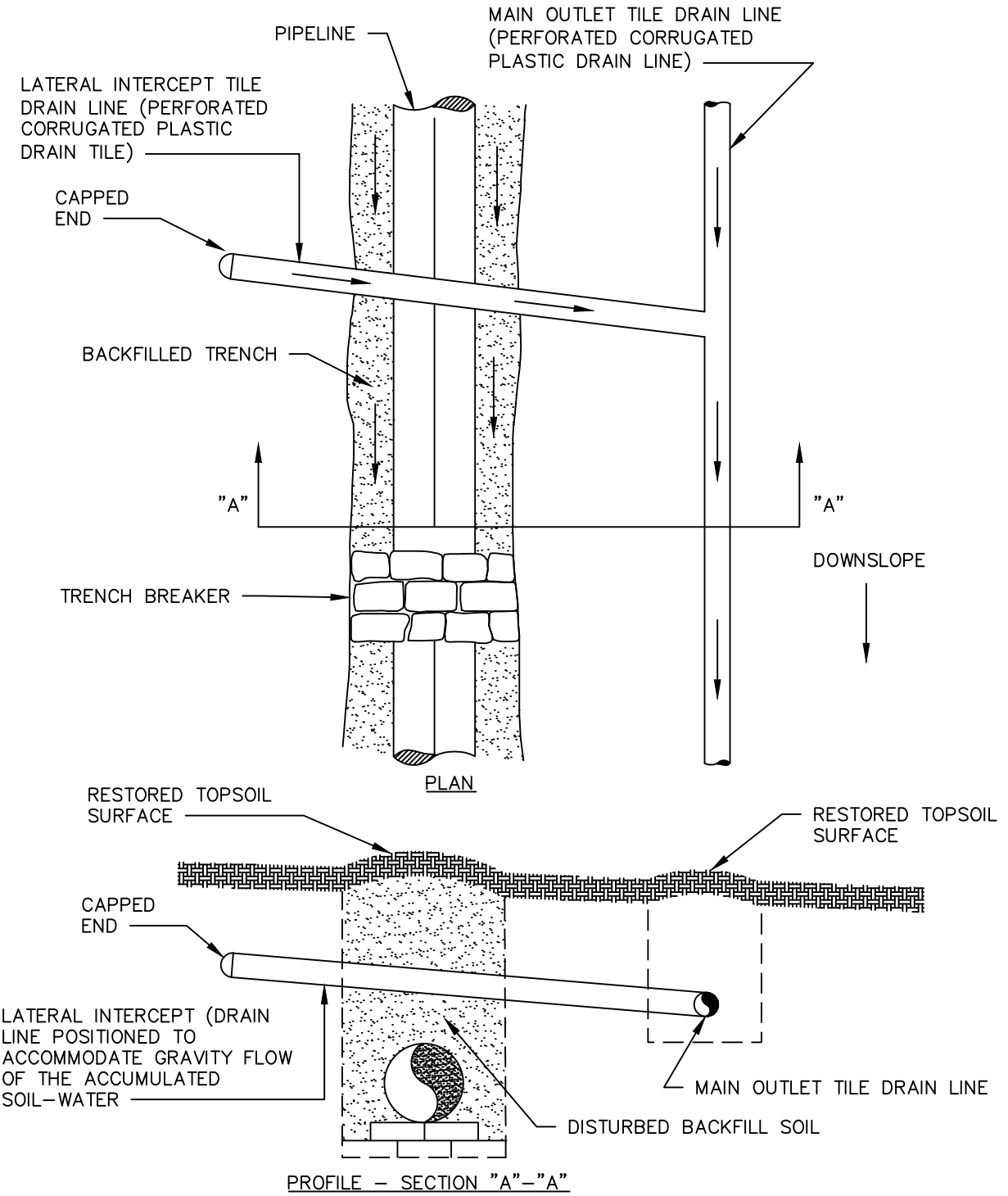
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
PARALLEL / NEW SUBMAIN
TILE INSTALLATION

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 66

Sheet: 66 of 127
Type:



NOTES:
1. TRENCH BREAKERS PREVENT GULLY EROSION WHILE THE TRENCH IS OPEN AND HELP INHIBIT WATER PIPING AND WATER BLOWOUTS DOWN THE COURSE OF THE PIPELINE AFTER BACKFILLING.
2. INTERCEPT DRAIN LINES ABSORB THE WATER WHICH DRAIN NATURALLY FROM THE UNDISTURBED SOIL PROFILE INTO THE DISTURBED BACKFILL SOIL MATERIAL OF THE TRENCH. THE INTERCEPT DRAIN LINES HELP PREVENT SATURATED SOIL CONDITIONS.
3. AGRICULTUTRAL CROPLAND MAY REQUIRE CROSS TRENCH DRAINAGE OR PARALLEL DRAINAGE.
4. ALL DRAIN TILE REPAIRS CONSISTING OF PLASTIC PIPE SHALL CONFORM TO THE AASHTO M.252 SPECIFICATION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

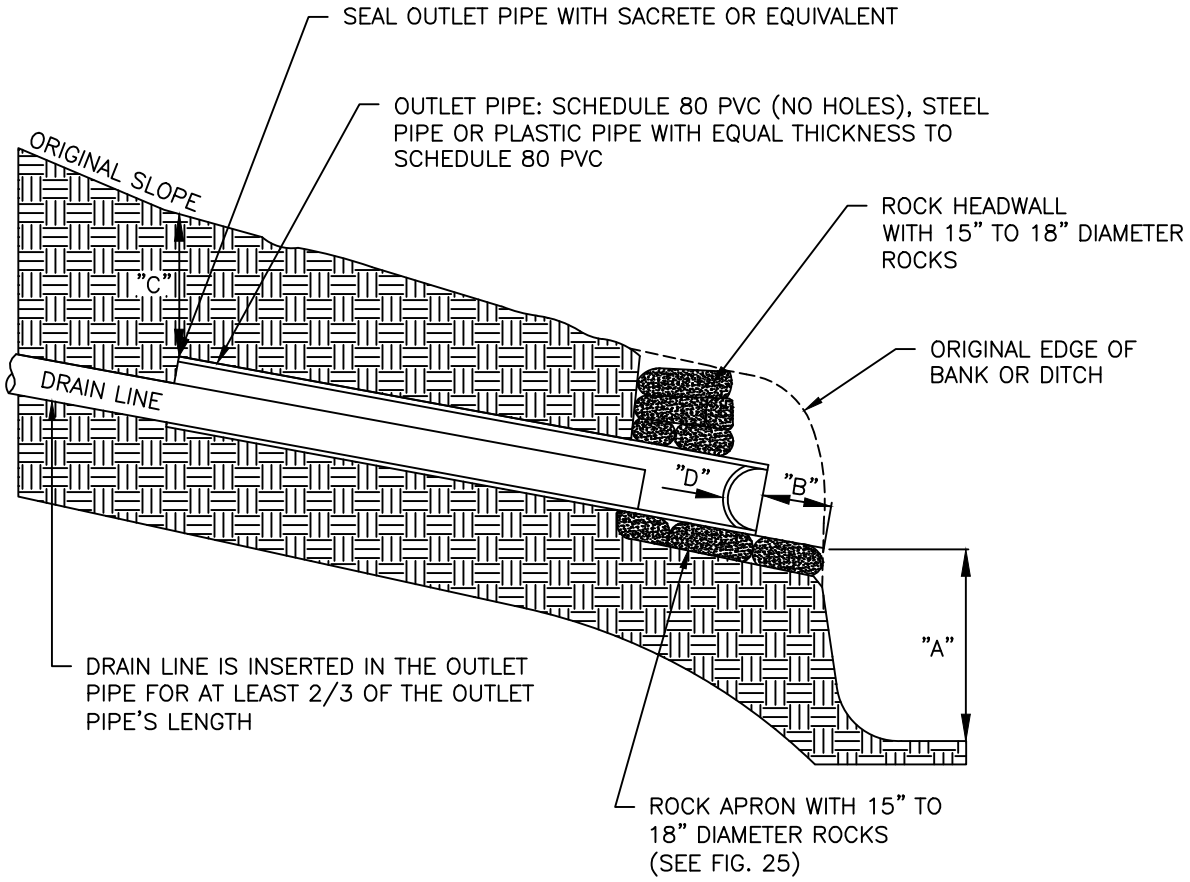
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
LATERAL INTERCEPT DRAIN

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 67

Sheet: 67 of 127
Type:



"A" – THE FREE DROP OR OUTFALL DISTANCE OF THE DRAINAGE WATER TO ITS UNRESTRICTED (FREE) DAYLIGHT OUTLET. GUIDELINE IS 2 FEET BUT NOT LESS THAN 1 FOOT WITHOUT SPECIAL DESIGN APPROVAL.

"B" – THE RECESS BACK FROM THE EDGE OF THE BANK OR DITCH OR OTHER POINT OF DAYLIGHT. GUIDELINE IS 2 FEET RECESSED BACK TO AVOID FUTURE DAMAGE.

"C" – THE MINIMUM DEPTH OF COVER OVER THE DRAIN LINE AT WHICH THE OUTLET PIPE MUST BEGIN. THE MINIMUM IS 2 FEET.

"D" – AN INTERNALLY HINGED ANIMAL (RODENT) GUARD. BOLTED FROM THE OUTSIDE. MOUNT THE GUARD 4"–6" BACK INSIDE THE OUTLET PIPE.

NOTE:
ALL DRAIN TILE REPAIRS CONSISTING OF PLASTIC PIPE SHALL CONFORM TO THE AASHTO M.252 SPECIFICATION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

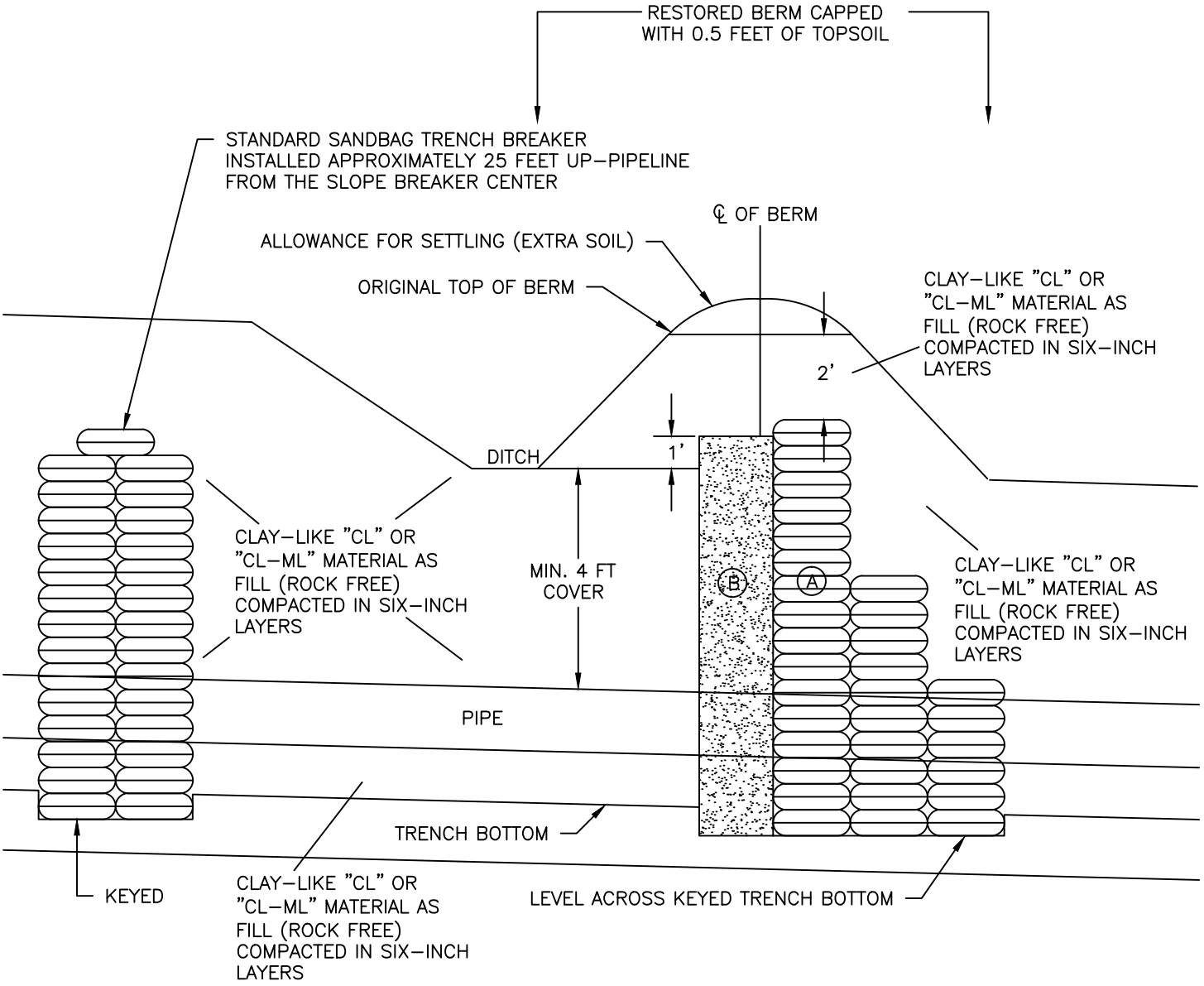
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL DRAIN TILE OUTLET

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 68

Sheet: 68 of 127
Type:



NOTES:

1. ALL CLAY–LIKE "CL" OR "CL–ML" MATERIAL USED FOR SLOPE BREAKER RE–ENGINEERED REPAIR / RECONSTRUCTION WILL BE VERIFIED BY THE INSPECTOR TO ENSURE THE MATERIAL IS ROCK–FREE (NO STONES / ROCKS LARGER THAN 3–4 INCHES IN DIAMETER), AND DOES NOT CONTAIN ANY TOPSOIL NOR OTHER ORGANIC MATERIALS (E.G. CLUMPS OF SOD, TREE AND BRUSH ROOTS). THE CLAY–LIKE "CL" OR "CL–ML" MATERIAL SHALL BE COMPACTED AT ALL AREAS IN SIX–INCH LIFTS WHEN THE MATERIAL IS MOIST, NOT WET NOR DRY. THE MAJORITY OF COMPACTION SHALL BE ACHIEVED INSIDE THE TRENCH ZONE WITH A VIBRATORY JUMPER COMPACTION, AND MAY INCLUDE FINAL SURFACE COMPACTION OF BERM WITH A SHEEPSFOOT ROLLER.

A. THE SANDBAG TRENCH BREAKER SHALL BE SNUGLY EMPLACED WITH 3 BAGS ACROSS THE BOTTOM WIDTH AS WELL AS AROUND THE PIPE AND OTHER LOWER LAYERS TO MID–LEVEL, 2 BAGS WIDTH ABOVE MID–LEVEL, AND 1 BAG WIDTH ACROSS UPPER SECTION.

B. CONCRETE–GRADE SAND APPLIED IN SIX–INCH LIFTS, EACH LIFT COMPACTED WITH A VIBRATORY JUMPER–COMPACTION (E.G. WACKER WITH AN 8" X 10" COMPACTOR PAD). MINIMUM WIDTH OF THE SAND COLUMN IS TWO (2) FEET ACROSS FOR ENTIRE HEIGHT (BOTTOM TO TOP). THE SAND MATERIAL SHOULD BE COMPACTED WHEN MOIST BUT NOT WHEN DRY NOR WET.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

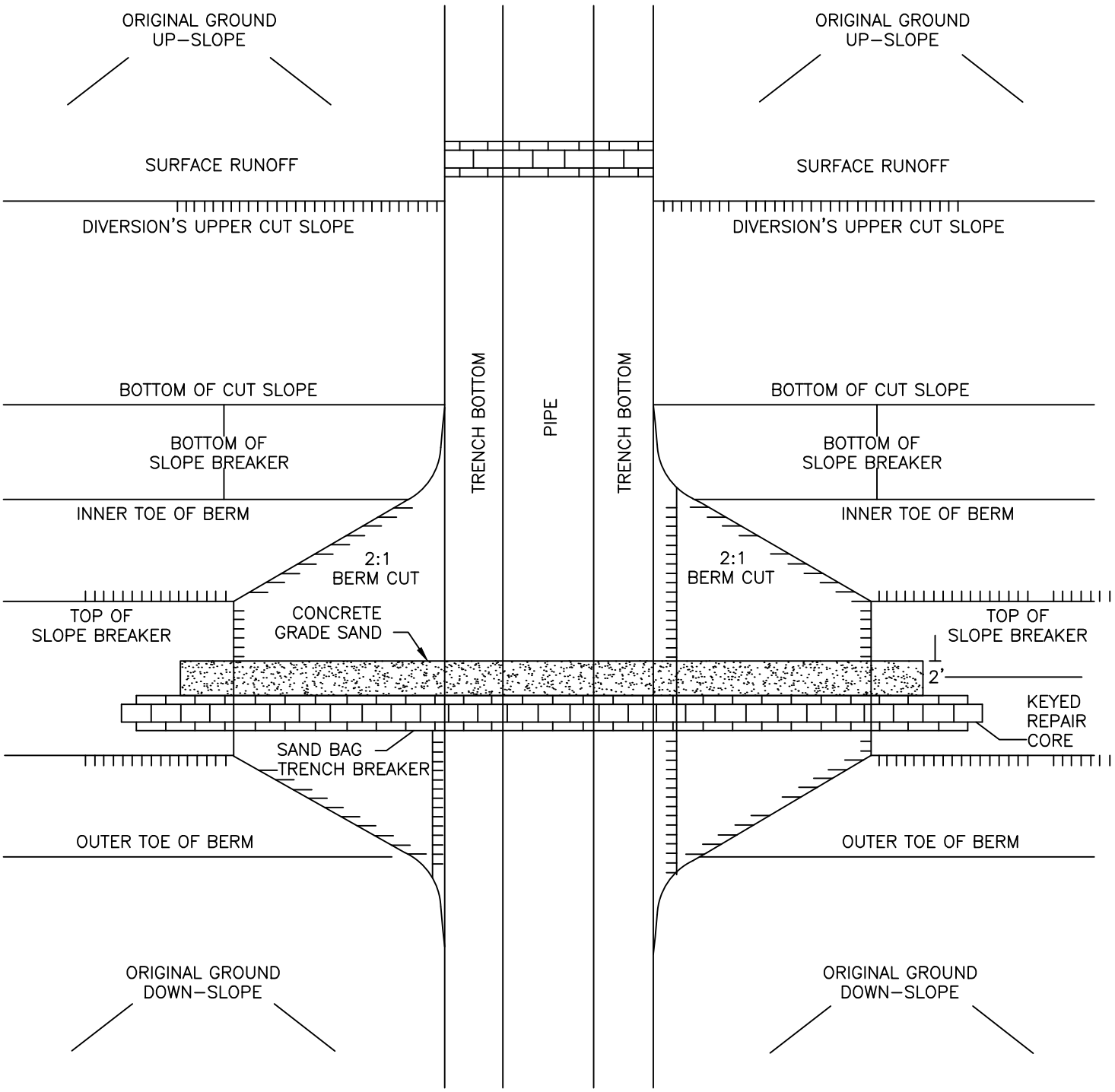
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
SLOPE BREAKER (WATERBAR) REPAIR (1)

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 69

Sheet: 69 of 127
Type:



NOTES:

1. KEYED–BACK CORE REPAIR ORIGINAL BERM TEN FEET NOMINAL BEYOND THE 2:1 BERM CUT

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

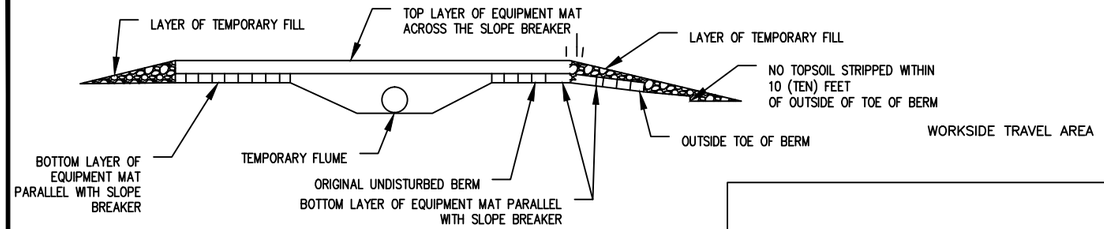
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
SLOPE BREAKER (WATERBAR)
REPAIR (2)

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 70

Sheet: 70 of 127
Type:



EQUIPMENT MAT SIDE VIEW

EQUIPMENT MAT TOP VIEW

NOTES:

1. THE ONLY PORTION OF DIVERSION TO BE DISTURBED IS THE PIPELINE TRENCH AND THE 2:1 BERM CUT, DURING CONSTRUCTION; AND THE BERM'S KEYED–IN REPAIR CORE DURING THE RECONSTRUCTION OF THE SLOPE BREAKER.
2. ALL OTHER ORIGINAL FEATURES OF THE DIVERSION TERRACE ARE PROTECTED THROUGHOUT THE RIGHT OF WAYS CONSTRUCTION AND RESTORATION STAGES OF WORK AND ACCESS BY TEMPORARY FILL LAYERS AND TIMBER BRIDGING.
3. A TEMPORARY FLUME WILL BE MAINTAINED UNTIL THE SLOPE BREAKER IS FULLY RECONSTRUCTED.
4. FILTER FENCE WILL BE INSTALLED AT THE UPSLOPE AND DOWNSLOPE SIDES OF THE SLOPE BREAKERS (AT THE LIMITS OF THE TOPSOIL STRIPPING) TO LIMIT ACCESS AND DISTURBANCE.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:		Op. Area.:	
State:		Co./Par.:	
Section:	Township:	Range:	
Dft:	Date:	Scale:	
Chk:	Date:	Filename:	
Appr:	Date:		

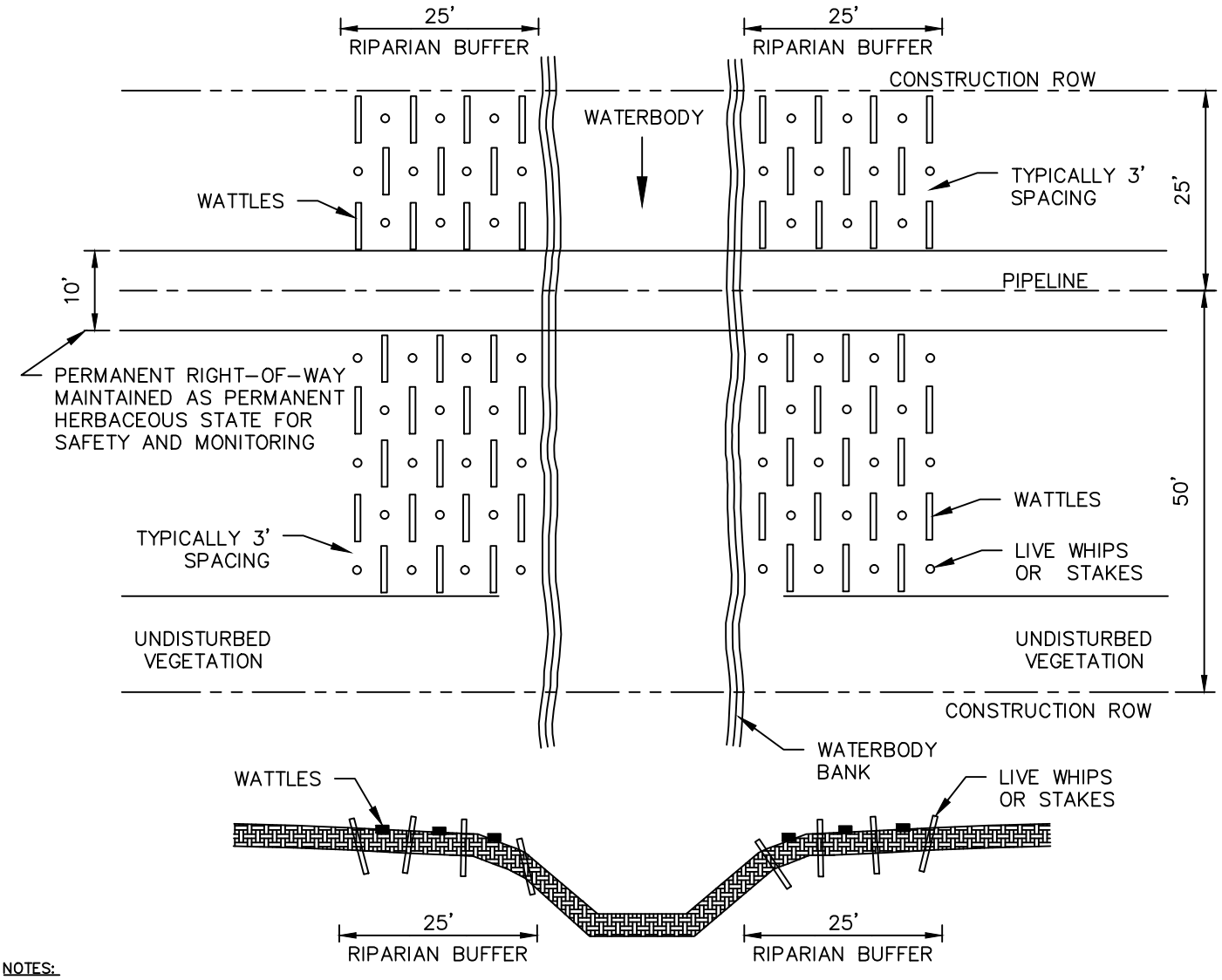
TENNESSE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
SLOPE BREAKER
(WATERBAR) PROTECTION

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 71

Sheet: 71 of 127
Type:

Jul 21, 2014 – 2:05PM



NOTES:

1. RESTORATION OF THE ROW SHALL INCLUDE PLANTING 25–FOOT RIPARIAN BUFFERS ALONG WATERBODIES WITH NATIVE PLANT SPECIES. RESTORATION OF CROSSINGS OF STATE DESIGNATED FISHERY WATERBODIES SHALL INCLUDE PLANTINGS OF NATIVE WOODY SPECIES TO RESTORE THE STREAM–SHADING CONDITIONS WITHIN A 25–FOOT RIPARIAN BUFFER.

2. SPACING OF WATTLE AND LIVE WHIP PLANTINGS ASSUMED TO BE APPROXIMATELY 3' IN A TRIANGLE PATTERN BASED ON NURSERY GUIDANCE AND VENDOR RECOMMENDATIONS. SPACING TO BE MODIFIED AS NEEDED BASED ON EACH SPECIFIC LOCATION CONDITION.

3. PLANTINGS SHALL BE PLACED WITHIN THE 25–FOOT RIPARIAN BUFFER AND OUTSIDE OF THE 10–FOOT MAINTAINED PERMANENT RIGHT–OF–WAY AS NEEDED. RIPARIAN BUFFER RESTORATION PLANTINGS SHALL NOT CONFLICT WITH EXISTING LAND USE OUTSIDE OF THE RIGHT–OF–WAY (E.G., AGRICULTURAL FIELDS).

4. PLANTINGS TO RESTORE THE STREAM–SHADING CONDITIONS SHALL INCLUDE NATIVE WOODY SPECIES, SUCH AS WILLOW (SALIX SPECIES) AND DOGWOOD (CORNUS SPECIES).

5. LIVE WHIPS ARE SLENDER, LIVE WOODY MATERIAL. THEY ARE GENERALLY 3/8"–1" DIAMETER. THEY ARE PUSHED INTO THE GROUND AS FAR AS THEY WILL GO, WITH AT LEAST TWO–THIRDS OF THE WHIP COVERED WITH SOIL. THEY CAN BE INSTALLED EITHER LAYING ON AN ANGLE OR ERECT IN THE SOIL. LIVE STAKES SHALL BE 1"–2" IN DIAMETER AND 2'–6' LONG DEPENDING ON THE APPLICATION. A MINIMUM OF 2"–4" OF LIVE STAKE SHALL BE EXPOSED AND SHALL INCLUDE TWO LIVE BUDS.

6. WATTLES ARE LIVING BRANCHES BOUND TOGETHER IN LONG, TUBULAR BUNDLES. THEY ARE PLACED IN SHALLOW TRENCHES ACROSS THE SLOPE AND SECURED WITH LIVE OR DEAD STAKES AT 2' OR 3' INTERVALS.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

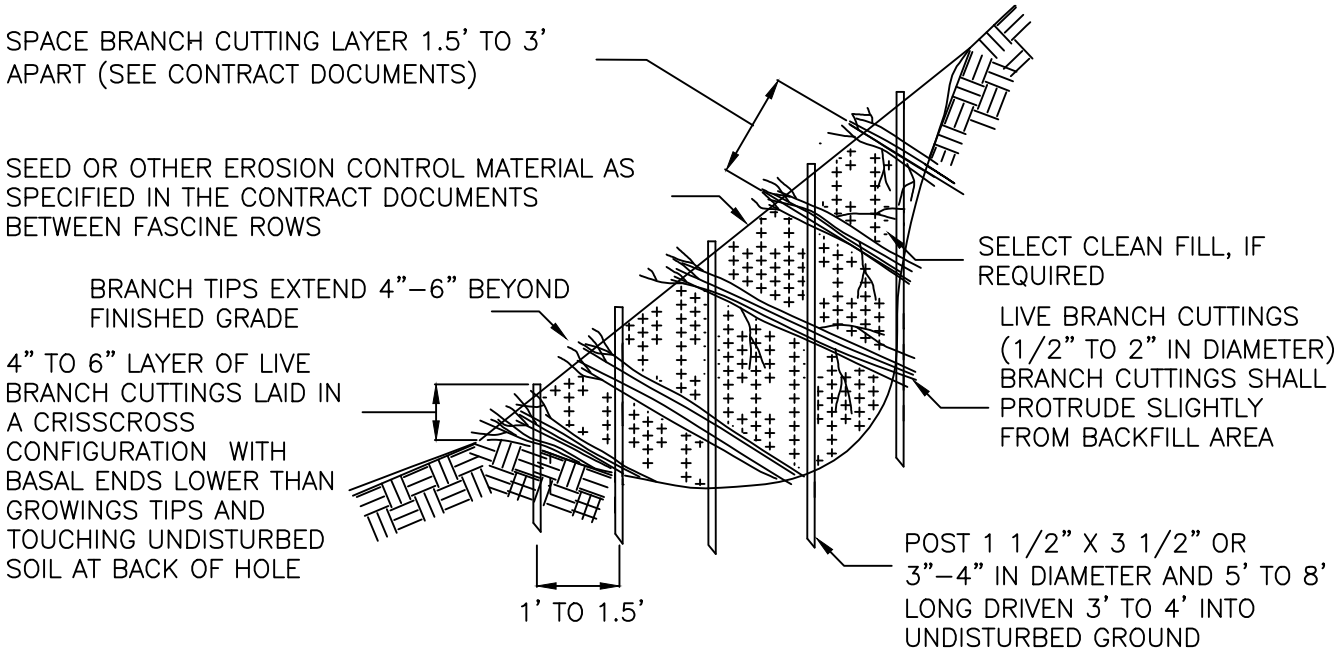
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
STREAM PLANTINGS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 72

Sheet: 72 of 127
Type:



CROSS SECTION – NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. STARTING AT THE LOWEST POINT DRIVE THE WOODEN POSTS VERTICALLY 3' TO 4' INTO THE GROUND. SET THEM 1' TO 1.5' APART.
2. A LAYER OF LIVING BRANCHES 4" TO 6" THICK IS PLACED IN THE BOTTOM OF THE HOLE, BETWEEN THE VERTICAL POSTS. THEY SHALL BE PLACED IN A CRISSCROSS CONFIGURATION WITH THE GROWING TIPS GENERALLY ORIENTED TOWARD THE SLOPE FACE. SOME OF THE BASAL ENDS OF THE BRANCHES FROM EACH LAYER SHALL TOUCH THE BACK OF THE HOLE OR SLOPE.
3. EACH LAYER OF BRANCHES SHALL BE INSTALLED WITH THE BASAL ENDS LOWER THAN THE GROWING TIPS OF THE BRANCHES.
4. THE FINAL INSTALLATION SHALL MATCH THE EXISTING SLOPE. BRANCHES SHOULD PROTRUDE ONLY SLIGHTLY FROM THE FILLED FACE.
5. EACH LAYER OF BRANCHES SHALL BE FOLLOWED BY A 1' LAYER OF SOIL HAND TAMPED TO ENSURE CONTACT WITH THE BRANCH CUTTINGS.
6. THE SOIL SHALL BE MOIST OR MOISTENED TO ENSURE THAT LIVE BRANCHES DO NOT DRY OUT.
7. WHERE SPECIFIED, LIVE STAKES SHALL BE USED IN PLACE OF POSTS.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:		Op. Area:
St.:		Co./Par.:
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

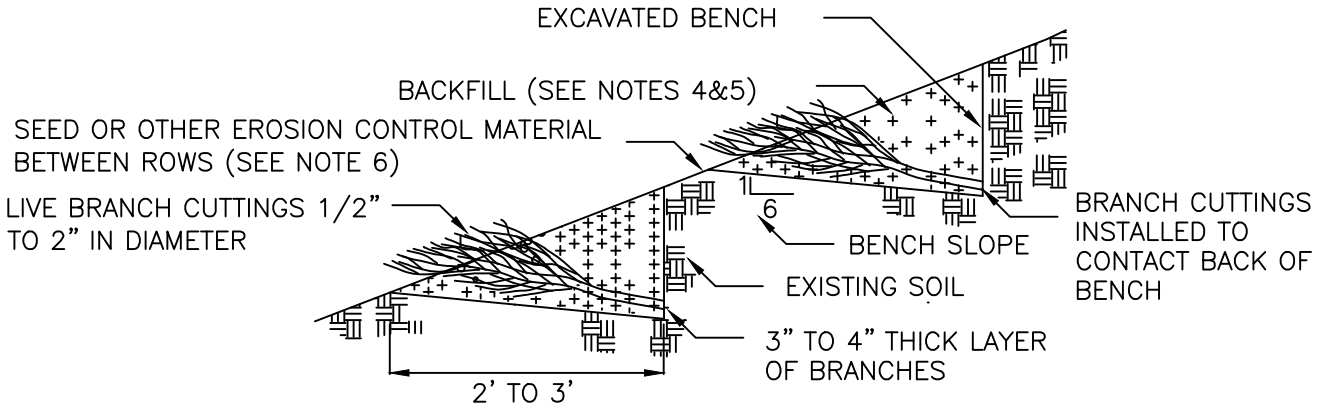
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
BRANCH PACKING

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

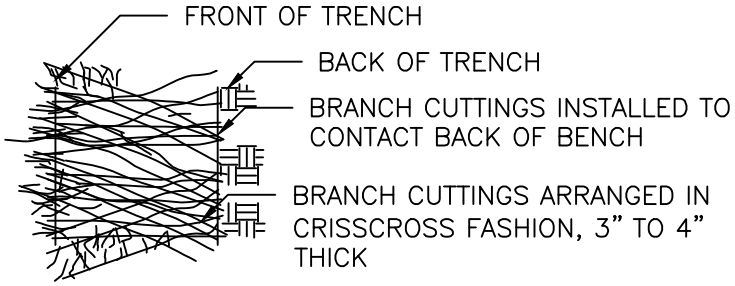
FIG. NO. 73

Sheet: 73 of 127

Type:



CROSS SECTION OF BRUSHLAYER ON CUT SLOPE
NOT TO SCALE



PLAN VIEW
NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. BENCH SHALL BE ANGLED SO OUTSIDE EDGE IS HIGHER THAN BACK OF BENCH.
2. LIVE BRANCH CUTTINGS SHALL BE PLACED ON THE BENCH IN A CRISSCROSS OR OVERLAP CONFIGURATION, 3" TO 4" THICK.
3. GROWING TIPS SHALL BE ALIGNED OUT OF THE SLOPE FACE AND SHALL EXTEND SLIGHTLY BEYOND THE FILL AREA.
4. FILL EACH LOWER BENCH WITH SOIL EXCAVATED FROM THE BENCH ABOVE. TOP BENCH TO BE BACKFILLED WITH INITIAL EXCAVATION.
5. PLACE BACKFILL ON TOP OF BRANCHES AND HAND TAMP IN 6" LIFTS TO REDUCE AIR POCKETS.
6. SEED OR OTHER EROSION CONTROL MATERIAL SHALL BE USED BETWEEN THE ROWS AS STATED IN THE CONTRACT DOCUMENTS.
7. BRUSHLAYER BENCHES SHALL BE FROM 3' TO 5' VERTICAL APART, DEPENDING ON SLOPE, AS SHOWN ON THE PLANS MEASURED BETWEEN FRONT EDGE OF BENCHES.
7. RECOMMENDED ON SLOPES IUP TO 2:1 IN STEEPNESS AND TWENTY FEET IN HEIGHT.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

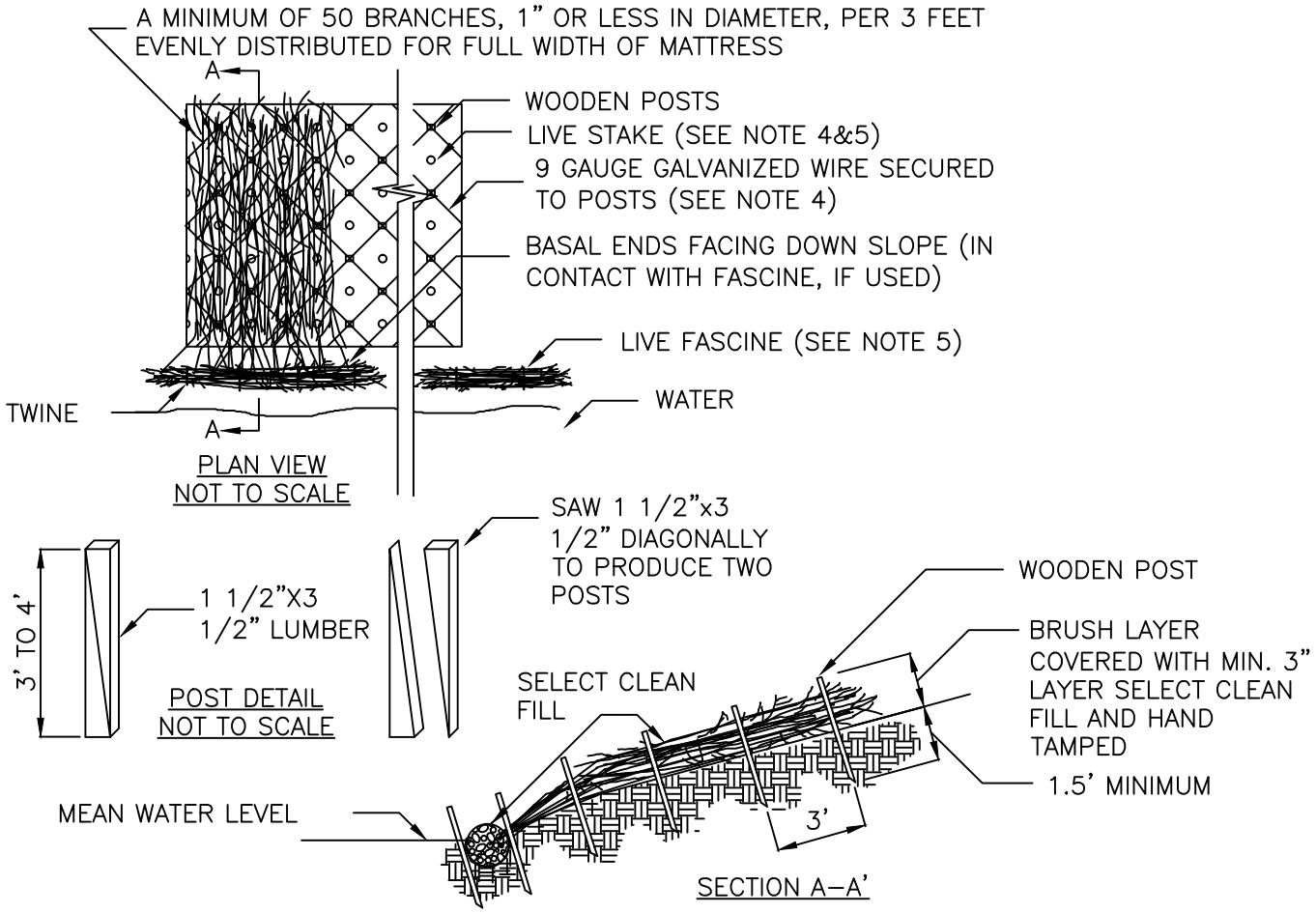
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
BRUSH LAYER

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 74

Sheet: 74 of 127
Type:



CONSTRUCTION SPECIFICATIONS

1. LAYERS SHALL BE COMPRISED OF LIVE QUICK–ROOTING SPECIES. SEE CONTRACT DOCUMENTS.
2. FILL MATTRESS WITH SOIL AND EVENLY DISTRIBUTE TO APPROXIMATELY 4" IN DEPTH AND HAND TAMP.
3. PLACE POSTS EVENLY OVER THE GRADED FACE USING 3' SQUARE SPACING. IF LIVE STAKES ARE SPECIFIED, ALTERNATE EVERY OTHER ON WITH THE POSTS.
4. STRETCH 9 GAUGE GALVANIZED WIRE DIAGONALLY FROM ONE POST TO ANOTHER BY TIGHTLY WRAPPING WIRE AROUND POSTS, NO CLOSER THAN 6" FROM THE TOP OF POST. WIRE SHALL NOT BE ATTACHED TO LIVE STAKES, IF THEY ARE SPECIFIED. POUND STAKES TO COMPRESS MATTRESS.
5. LIVE FASCINES AND LIVE STAKES ARE INSTALLED WHEN AND WHERE DIRECTED ON THE PLAN SHEET.
6. RECOMMENDED FOR STREAMBANKS WHERE VELOCITY IS <6 FT/SEC MAX SLOPE 1.5:1

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

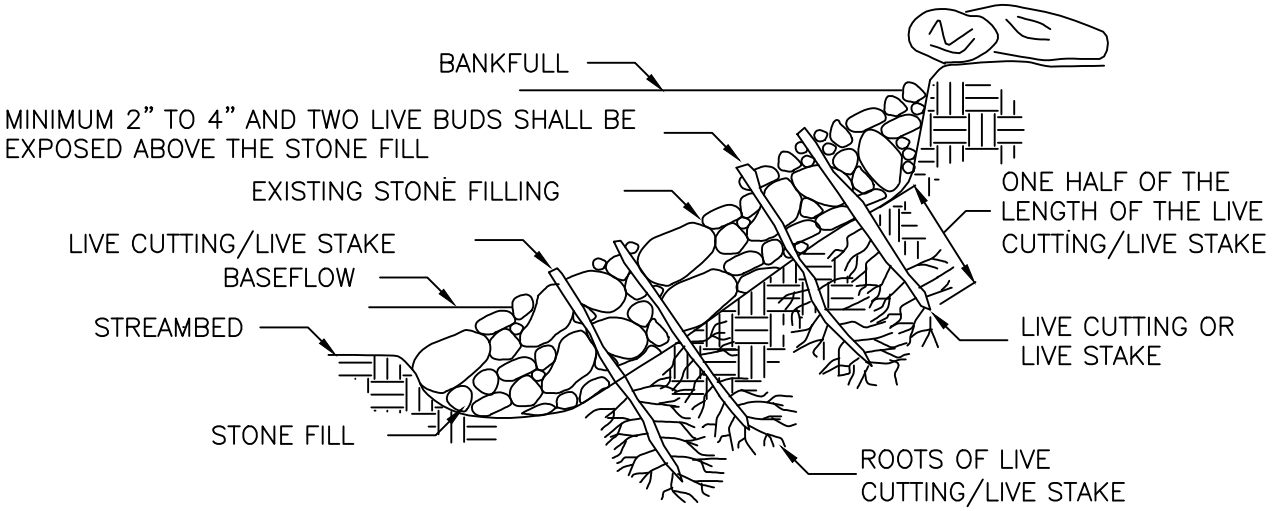
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
BRUSH MATTRESS

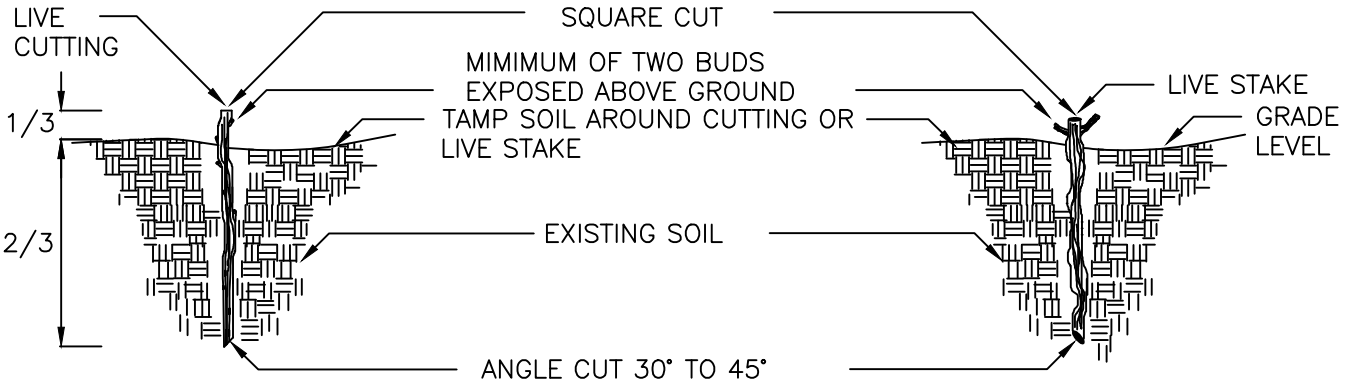
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 75

Sheet: 75 of 127
Type:



LIVE CUTTING/LIVE STAKE JOINT PLANTING CROSS SECTION



LIVE CUTTING CROSS SECTION
NOT TO SCALE

LIVE STAKE CROSS SECTION
NOT TO SCALE

NOTE:
1. NOT INTENDED FOR STRUCTURAL INTEGRITY NOR TO RESIST LARGE LATERAL EARTH PRESSURES.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
LIVE CUTTINGS LIVE STAKINGS
PLANTINGS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 76

Sheet: 76 of 127
Type:

LIVE STAKES SPECIFICATIONS

1. CARE SHALL BE TAKEN NOT TO DAMAGE THE LIVE CUTTINGS/LIVE STAKES DURING INSTALLATION. THOSE DAMAGED SHALL BE LEFT IN PLACE AND SUPPLEMENTED WITH AN INTACT LIVE CUTTING/LIVE STAKE.
2. THE LENGTHS OF LIVE CUTTINGS/LIVE STAKES DEPENDS UPON THE APPLICATION. THE LENGTH SHALL EXTEND THROUGH THE SURFACE OF THE STONE FILL. AT LEAST HALF THE LENGTH SHALL BE INSERTED IN TO THE SOIL, BELOW THE STONE FILL.
3. A PILOT HOLE IS REQUIRED TO ENSURE THAT THE LIVE CUTTING/LIVE STAKE IS NOT DAMAGED WHEN DRIVEN THROUGH THE STONE FILLING. ACCESS SHALL BE MADE THROUGH THE USE OF A DIBBLE BAR, OR SIMILAR TOOL TO WORK AN OPENING THROUGH THE ROCK LAYER.
4. MINIMUM 2" TO 4" AND TWO LIVE BUDS OF THE LIVE CUTTING/LIVE STAKE SHALL BE EXPOSED ABOVE THE STONE FILLING.

LIVE CUTTINGS SPECIFICATIONS

1. LIVE CUTTINGS SHALL RANGE FROM 1/2" TO 1" IN DIAMETER AND BE FROM 1' TO 4' IN LENGTH.
2. LIVE STAKES SHALL RANGE FROM 1" TO 4" IN DIAMETER AND BE FROM 5' TO 6' IN LENGTH.
3. SEE CONTRACT DOCUMENTS FOR SPECIES, SIZE, SPACING, LOCATION, AND FINAL DETERMINATION ON USE OF CUTTINGS OR STAKES.
4. LIVE CUTTINGS/LIVE STAKES SHALL BE CUT TO A POINT ON THE BASAL END FOR INSERTION IN THE GROUND.
5. USE A DEAD BLOW HAMMER TO DRIVE STAKES INTO THE GROUND. (HAMMER HEAD FILLED WITH SHOT OR SAND.) A DIBBLE, IRON BAR, OR SIMILAR TOOL SHALL BE USED TO MAKE A PILOT HOLE TO PREVENT DAMAGING THE MATERIAL DURING INSTALLATION.
6. LIVE CUTTINGS SHALL BE INSERTED BY HAND INTO PILOT HOLES.
7. WHEN POSSIBLE, TAMP SOIL AROUND LIVE CUTTING/LIVE STAKES.
8. ANY LIVE CUTTING/LIVE STAKE THAT IS DAMAGED SHALL BE LEFT IN PLACE AND SUPPLEMENTED WITH AN INTACT LIVE CUTTING/LIVE STAKE.
9. NO LEAF BUDS SHALL HAVE INITIATED GROWTH BEYOND ¼" AND CAMBIUM LAYER SHALL BE MOIST, GREEN AND HEALTHY.

GENERAL SPECIFICATION

1. FREQUENT INSPECTION IS RECOMMENDED DURING FIRST 1–2 YEARS DUE TO PHYSICAL CONSTRAINTS, CLIMATE CONDITIONS AND ANIMAL POPULATION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

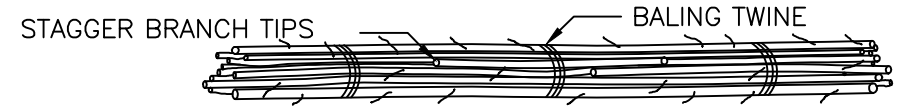
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
LIVE CUTTINGS LIVE STAKINGS
PLANTINGS SPECFICACTIONS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

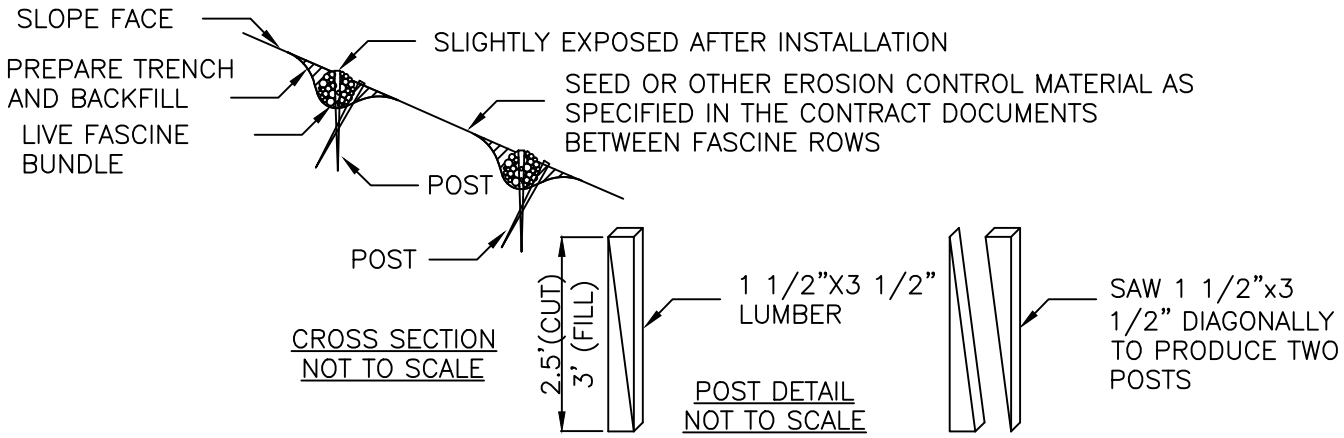
FIG. NO. 77

Sheet: 77 of 127
Type:



4" TO 8" DIAMETER AND MINIMUM LENGTH OF 8' REQUIRED

FASCINE BUNDLE DETAIL
NOT TO SCALE



CROSS SECTION
NOT TO SCALE

POST DETAIL
NOT TO SCALE

LIVE FACINE SPECIFICATIONS

1. LIVE FASCINES SHALL BE PREPARED FROM FRESHLY CUT DORMANT PLANTS AND INSTALLED WITHIN 8 HOURS OF THE TIME THE MATERIAL IS HARVESTED, UNLESS PROPERLY STORED.
2. LIVE FASCINE SHALL BE OBTAINED FROM SOURCES APPROVED BY THE ENGINEER.
3. LIVE FASCINES SHALL BE 4" TO 8" IN DIAMETER. LENGTHS MAY VARY TO SUIT CONDITIONS. A MINIMUM LENGTH OF 8' IS REQUIRED.
4. THE TIPS OF THE BRANCHES WITHIN THE LIVE FASCINE SHALL BE STAGGERED.
5. LIVE FASCINES SHALL BE PLACED AS INDICATED IN THE CONTRACT DOCUMENTS.
6. BEGINNING AT THE BASE OF THE SLOPE, A TRENCH SHALL BE DUG LARGE ENOUGH TO CONTAIN THE LIVE FASCINES. THE LIVE FASCINES SHALL BE PLACED IN THE TRENCH. WHERE ENDS MEET IN THE TRENCH, THE FASCINES SHALL OVERLAP BY 18".
7. WOOD POSTS SHALL BE INSTALLED FLUSH TO THE TOP OF THE FASCINE EVERY 18" ALONG THE LENGTH OF THE BUNDLES AS SHOWN ON THE CROSS SECTION. WHERE SPECIFIED LIVE STAKES MAY BE USED IN PLACE OF POSTS.
8. THE TRENCH SHALL BE BACKFILLED WITH MOIST SOIL AND HAND TAMPED. THE TOP OF THE FASCINE SHALL BE SLIGHTLY EXPOSED WHEN THE INSTALLATION IS COMPLETE AS SHOWN ON THE CROSS SECTION.
9. SEED OR OTHER EROSION CONTROL MATERIAL SHALL BE USED BETWEEN THE FASCINE ROWS, AS SPECIFIED IN THE CONTRACT DOCUMENTS.
10. LIVE FASCINE TRENCHES SHALL BE FROM 3' TO 8' APART, ACCORDING TO SLOPE AND/OR THE CONTRACT DOCUMENTS.
11. SLOPES MUST BE 1:1 OR FLATTER.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

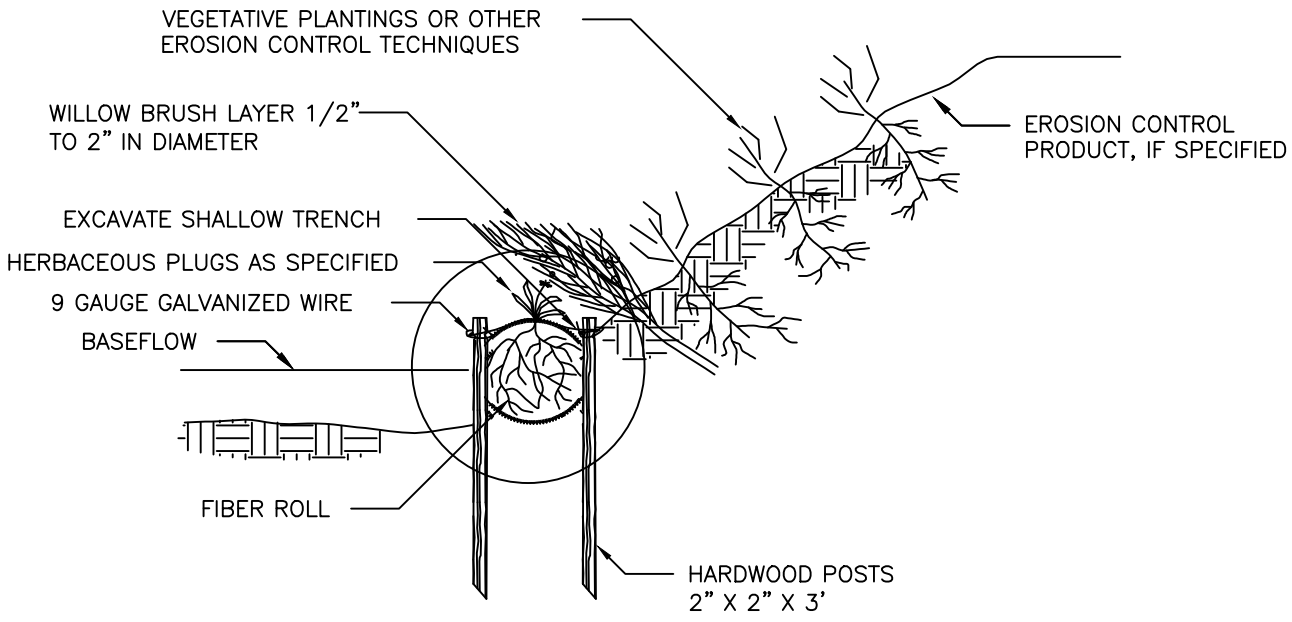
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
LIVE FASCINE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 78

Sheet: 78 of 127
Type:



CROSS SECTION
NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. EXCAVATE A SHALLOW TRENCH AT THE TOE OF SLOPE TO SLIGHTLY BELOW BASEFLOW.

2. PLACE THE ROLL IN THE TRENCH AND ANCHOR WITH 2" x 2" x 3' POSTS PLACED ON BOTH SIDES OF THE ROLL AND SPACED LATERALLY ON 2' TO 4' CENTERS. TRIM THE TOP OF THE POSTS EVEN WITH THE EDGE OF THE ROLL, IF NECESSARY.

3. NOTCH THE POSTS AND TIE TOGETHER, ACROSS THE ROLL, WITH 9 GAUGE GALVANIZED WIRE OR 1/8" DIAMETER BRAIDED NYLON ROPE.

4. PLACE SOIL EXCAVATED FROM THE TRENCH BEHIND THE ROLL AND HAND TAMP. PLANT WITH SUITABLE HERBACEOUS OR WOODY VEGETATION AS SPECIFIED ELSEWHERE IN THE CONTRACT DOCUMENTS. VEGETATION SHALL BE PLACED IMMEDIATELY ADJACENT TO THE ROLL TO PROMOTE ROOT GROWTH INTO THE FIBER. HERBACEOUS VEGETATION, IF SPECIFIED, SHALL BE PLANTED INTO THE FIBER ROLL.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

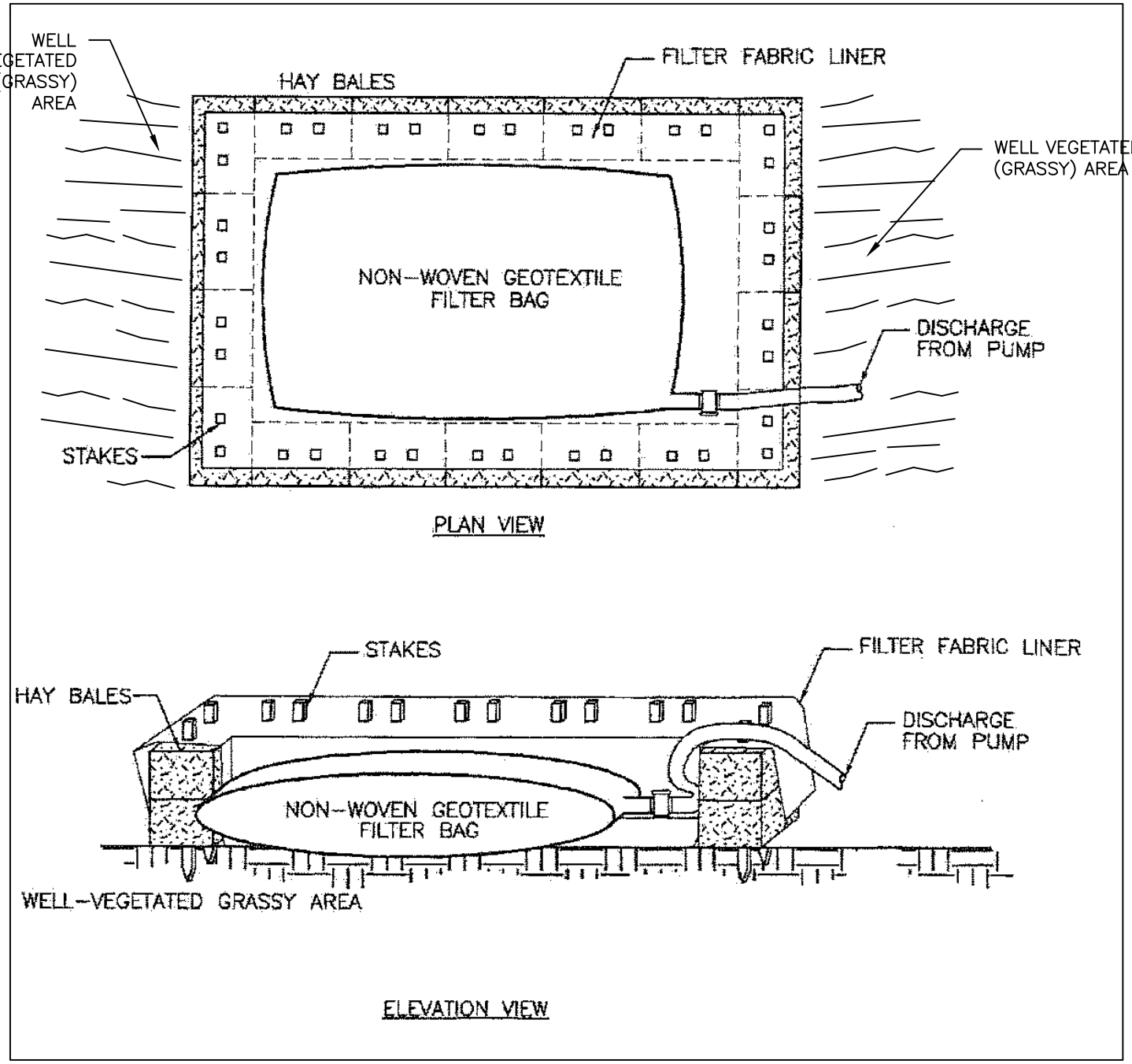
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
FIBER ROLL

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 79

Sheet: 79 of 127
Type:



NOTES:

1. RECTANGULAR DEWATERING DISCHARGE AREA CONSTRUCTED OUT OF HAY BALES STACKED ONE OR TWO ROWS HIGH AND SECURED WITH WOODEN STAKES.
2. FILTER FABRIC LINER INSTALLED COVERING ENTIRE INTERIOR OF STRUCTURE AND SECURED ON TOP OF THE HAY BALES WITH WOODEN STAKES.
3. THE DEWATERING DEVICE SHALL BE LOCATED IN A WELL-VEGETATED (GRASSY) AREA AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. A DISCHARGE DEVICE SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
4. FOR LESS TURBID WATER DISCHARGE, THE GEOTEXTILE FILTER BAG IS OPTIONAL AND THE STRUCTURE MAY UTILIZE JUST FILTER FABRIC LINER WITH NO FILTER BAG.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

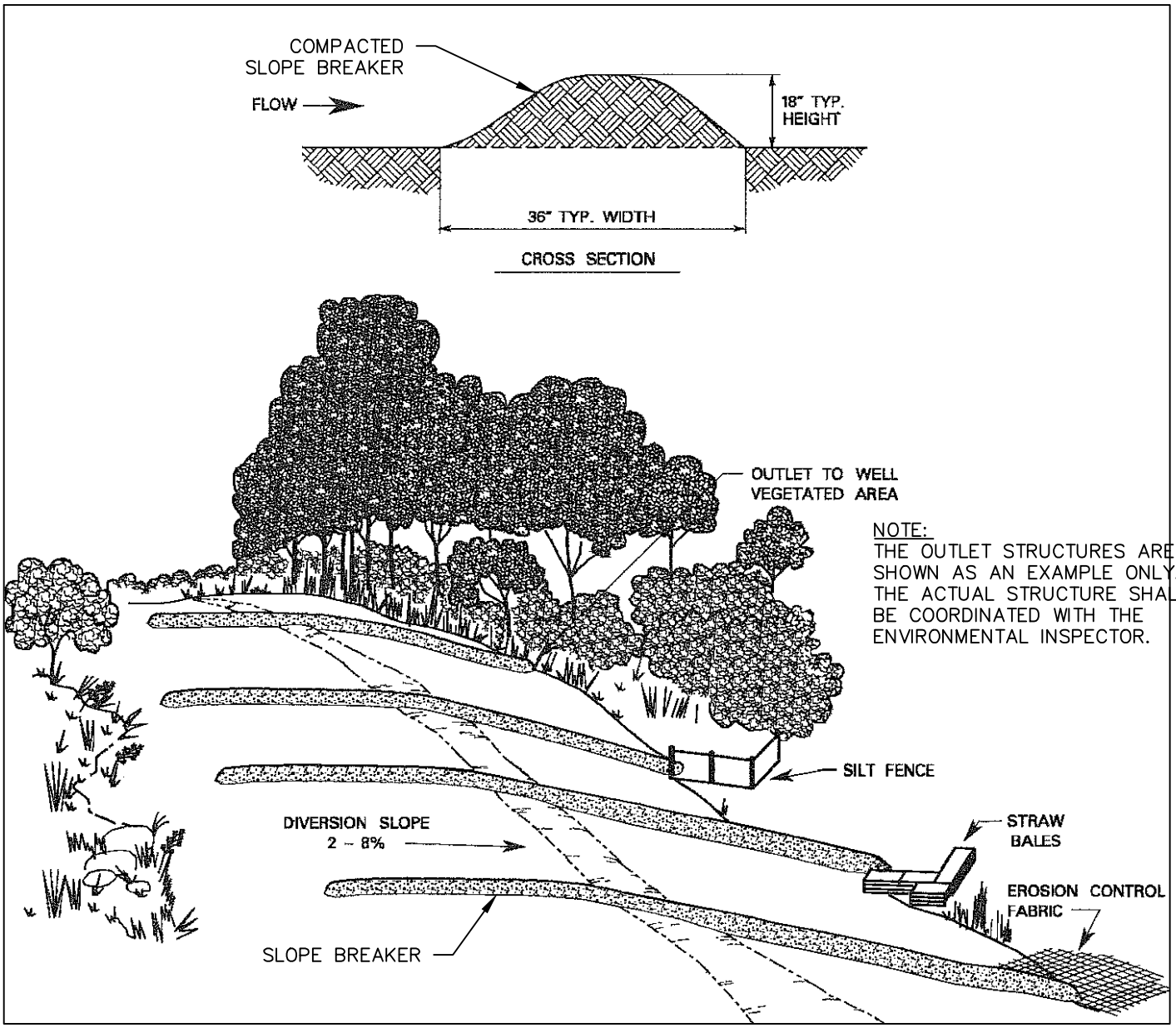
Division:		Op. Area:
St.:		Co./Par.:
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TRENCH DEWATERING SEDIMENT CORRAL

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 80

Sheet: 80 of 127
Type:



INSTALLATION REQUIREMENTS:

- INSTALL PERMANENT SLOPE BREAKERS IN ALL AREAS EXCEPT RESIDENTIAL OR AGRICULTURAL AS NECESSARY TO AVOID EXCESSIVE EROSION (UNLESS AUTHORIZED BY LANDOWNER OR LAND MANAGING AGENCY IN AGRICULTURAL OR RESIDENTIAL AREA).
- MUST BE INSTALLED WHERE THE BASE OF THE SLOPE IS LESS THAN 50 FEET FROM A WATERBODY, WETLAND OR ROAD CROSSING AND AT THE FOLLOWING MINIMUM SPACING:

SLOPE (%)	SPACING (FT.)
< 50	125
5–10	100
10–20	75
20–35	50
< 35	25

- CONSTRUCT USING COMPACTED EARTH AND ROCK FOR PERMANENT BREAKERS.
- INSTALL WITH A 2–8% OUTFALL ANGLE
- POSITION OUTFALL TO PREVENT SEDIMENT DISCHARGE INTO WETLANDS, WATERBODIES, OR OTHER SENSITIVE RESOURCES.
- FILTER RUN–OFF WATER BY CONSTRUCTING THE OUTLET IN A WELL VEGETATED STABLE AREA OR BY USING AN ENERGY DISSIPATING DEVICE (SILT FENCE, STRAW BALES, EROSION CONTROL FABRIC), AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.

MAINTENANCE REQUIREMENTS:

- INSPECT DURING AND FOLLOWING CONSTRUCTION AND MAKE REPAIRS AS NEEDED.
- KEEP THE CHANNEL FREE OF DEBRIS AND OBSTRUCTIONS.
- SEED AND MULCH PERMANENT SLOPE BREAKERS FOLLOWING CONSTRUCTION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

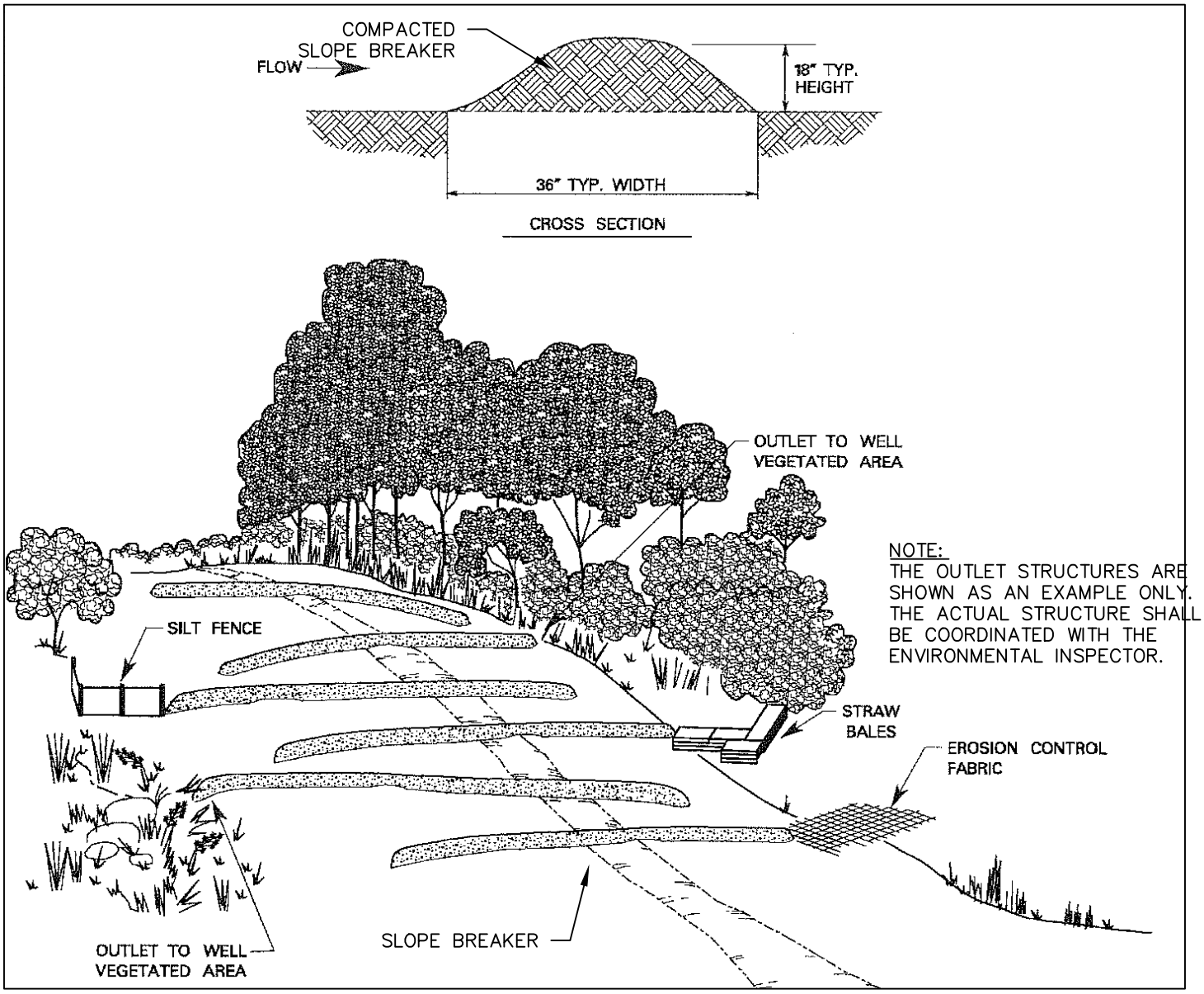
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
INTERCEPTOR SLOPE BREAKER
INSTALLATION

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 81

Sheet: 81 of 127
Type:



INSTALLATION REQUIREMENTS:

- INSTALL IN ALL AREAS EXCEPT RESIDENTIAL OR AGRICULTURAL (UNLESS AUTHOIRZED BY LANDOWNER OR LAND MANAGING AGENCY).
- CONSTRUCT USING COMPACTED EARTH AND ROCK FOR PERMANENT BREAKERS.
- INSTALL WITH A 2 – 8% OUTFALL ANGLE.
- FOR TEMPORARY CHEVRON SLOPE BREAKERS, POSITION OUTFALL TO PREVENT SEDIMENT DISCHARGE INTO WETLANDS, WATERBODIES, OR OTHER SENSITIVE RESOURCES.
- FILTER RUN–OFF WATER BY CONSTRUCTING AN OUTLET USING AN ENERGY DISSIPATING DEVICE (SILT FENCE, STRAW BALES, EROSIONS CONTROL FABRIC), AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
- ALTHOUGH ALTERNATING, ALL SLOPE BREAKERS MUST BE INSTALLED WHERE THE BASE OF THE SLOPE IS LESS THAN 50 FEET FROM A WATERBODY, WETLAND OR ROAD CROSSING AND AT THE FOLLOWING MINIMUM SPACING:

SLOPE (%)	SPACING (FT.)
< 50	125
5–10	100
10–20	75
20–35	50
> 35	25

MAINTENANCE REQUIREMENTS:

- INSPECT DURING AND FOLLOWING CONSTRUCTION AND MAKE REPAIRS AS NEEDED.
- KEEP THE CHANNEL FREE OF DEBRIS AND OBSTRUCTIONS.
- SEED AND MULCH PERMANENT SLOPE BREAKERS FOLLOWING CONSTRUCTION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
CHEVRON INTERCEPTOR SLOPE
BREAKER INSTALLATION & MAINTENANCE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 82

Sheet: 82 of 127
Type:

NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR DUST CONTROL ALONG THE SITE. THE CONTRACTOR SHALL COORDINATE WITH THE ENVIRONMENTAL INSPECTOR TO DETERMINE WHICH PRACTICES ACCOMMODATE THEIR NEEDS BASED ON SPECIFIC SITE AND WEATHER CONDITIONS. SOME OF THE TYPICAL PRACTICES INCLUDE THE FOLLOWING:

   - SPRINKLING/IRRIGATION. SPRINKLING THE GROUND SURFACE WITH WATER UNTIL IT IS MOIST IS AN EFFECTIVE DUST CONTROL METHOD FOR HAUL ROADS AND OTHER TRAFFIC ROUTES (SMOLEN ET AL., 1988). THIS PRACTICE CAN BE APPLIED TO ALMOST ANY SITE.
   - VEGETATIVE COVER. IN AREAS NOT EXPECTED TO HANDLE VEHICLE TRAFFIC, VEGETATIVE STABILIZATION OF DISTURBED SOIL IS OFTEN DESIRABLE. VEGETATIVE COVER PROVIDES COVERAGE TO SURFACE SOILS AND SLOWS WIND VELOCITY AT THE GROUND SURFACE, THUS REDUCING THE POTENTIAL FOR DUST TO BECOME AIRBORNE.
   - MULCH. MULCHING CAN BE A QUICK AND EFFECTIVE MEANS OF DUST CONTROL FOR A RECENTLY DISTURBED AREA (SMOLEN ET AL., 1988).
   - WIND BREAKS. WIND BREAKS ARE BARRIERS (EITHER NATURAL OR CONSTRUCTED) THAT REDUCE WIND VELOCITY THROUGH A SITE AND THEREFORE REDUCE THE POSSIBILITY OF SUSPENDED PARTICLES. WIND BREAKS CAN BE TREES OR SHRUBS LEFT IN PLACE DURING SITE CLEARING OR CONSTRUCTED BARRIERS SUCH AS A WIND FENCE, SNOW FENCE, TARP CURTAIN, HAY BALE, CRATE WALL, OR SEDIMENT WALL (USEPA, 1992).
   - TILLAGE. DEEP TILLAGE IN LARGE OPEN AREAS BRINGS SOIL CLODS TO THE SURFACE WHERE THEY REST ON TOP OF DUST, PREVENTING IT FROM BECOMING AIRBORNE.
   - STONE. STONE MAY BE AN EFFECTIVE DUST DETERRENT FOR CONSTRUCTION ROADS AND ENTRANCES OR AS A MULCH IN AREAS WHERE VEGETATION CANNOT BE ESTABLISHED.
   - SPRAY–ON CHEMICAL SOIL TREATMENTS. THE PENNSYLVANIA DIRT AND GRAVEL ROAD PROGRAM HAS PLACED STRICT LIMITATIONS ON THE USE OF PRODUCTS THAT MAY CAUSE DAMAGE TO THE ENVIRONMENT. WITH THIS IN MIND, IT HAS APPROVED A NUMBER OF CHEMICAL DUST SUPPRESSANTS. WHEN CONSIDERING CHEMICAL APPLICATION TO SUPPRESS DUST, CONSIDERATION SHOULD BE TAKEN AS TO WHETHER THE CHEMICAL IS BIODEGRADABLE OR WATER–SOLUBLE AND WHAT EFFECT ITS APPLICATION COULD HAVE ON THE SURROUNDING ENVIRONMENT, INCLUDING WATERBODIES AND WILDLIFE.

2. TABLE H.1 SHOWS APPLICATION RATES FOR SOME COMMON DUST SUPPRESSANTS, AS RECOMMENDED BY THE PENNSYLVANIA DIRT AND GRAVEL ROAD PROGRAM.

TABLE H.1. APPLICATION RATES FOR DUST SUPPRESSANTS

PRODUCT	WATER DILUTION	TYPE
PENN SUPPRESS "D"	1:4 EMULSION TO WATER (MINIMUM)	PETROLEUM EMULSION
ULTRABOND 2000	1:4 EMULSION TO WATER (MINIMUM)	PETROLEUM EMULSION
COHEREX	1:10 EMULSION TO WATER (MINIMUM)	PETROLEUM EMULSION
DUST BOND	1:10 EMULSION TO WATER (MINIMUM)	PETROLEUM EMULSION
EK 35	100% ACTIVE, NOT WATER REQUIRED FOR APPLICATION	SYNTHETIC FLUID
ENVIROKLEEN	100% ACTIVE, NOT WATER REQUIRED FOR APPLICATION	SYNTHETIC FLUID
PAVE–CYRL SUPPRESS	AS RECEIVED (51% SOLIDS)	ACRYLIC POLYMER (PVA)
PAVE–CYRL SUPPRESS PLUS	AS RECEIVED (51% SOLIDS)	ACRYLIC POLYMER (PVA)
DIRT GLUE	AS RECEIVED (51% SOLIDS)	ACRYLIC POLYMER (PVA)

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
DUST CONTROL

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 83

Sheet: 83 of 127
Type:

NOTES:

1. WATER–SOLUBLE ANIONIC POLYACRYLAMIDE (PAM) MAY BE APPLIED TO A DISTURBED AREA AS A TEMPORARY SOIL–BINDING AGENT TO REDUCE EROSION DUE TO WIND AND WATER. THIS PRACTICE IS RECOMMENDED FOR AREAS WHERE TIMELY ESTABLISHMENT OF A VEGETATIVE COVER IS NOT FEASIBLE (E.G. NON–GERMINATING SEASON), WHEREVER SOILS HAVE HIGH CLAY CONTENT, OR WHERE THE VEGETATIVE COVER IS INADEQUATE TO PROVIDE PROTECTION FROM EROSION. WHEREVER USED, THE APPLICATION MUST COMPLY WITH ALL FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS GOVERNING ANIONIC PAM.

2. PAM SPECIFICATIONS
   - ANIONIC PAM MIXTURES MUST BE ENVIRONMENTALLY SAFE AND NON–TOXIC TO FISH AND OTHER AQUATIC SPECIES, WILDLIFE, AND PLANTS. IT SHOULD ALSO BE NON–COMBUSTIBLE.
   - CATIONIC PAM MAY NOT BE USED DUE TO ITS TOXICITY TO AQUATIC SPECIES.
   - ANIONIC PAM MIXTURES MUST HAVE < 0.05% FREE ACRYLAMIDE MONOMER BY WEIGHT AS ESTABLISHED BY THE FOOD AND DRUG ADMINISTRATION (FDA) AND THE ENVIRONMENTAL PROTECTION AGENCY (EPA).
   - ACUTE TOXICITY TEST DATA SHOULD BE PROVIDED FROM EACH MANUFACTURER OR SUPPLIER.
   - THE MANUFACTURER SHOULD PROVIDE A PRODUCT EXPIRATION DATE FOR ANIONIC PAM BASED UPON EXPIRATION OF PAM IN THE PURE FORM.

3. APPLICATION
   - ANIONIC PAM SHOULD BE APPLIED IN ACCORDANCE WITH THE RECOMMENDED METHODS PROVIDED BY THE MANUFACTURER OR SUPPLIER FOR THE SPECIFIC SITE CONDITIONS (E.G. SLOPE AND SOIL TYPE). A RECORD OF THE APPLICATION, INCLUDING THE DATE OF APPLICATION, PRODUCT TYPE, WEATHER CONDITIONS, METHOD OF APPLICATION, AND THE NAME OF THE APPLICATOR, SHOULD BE KEPT ON SITE.
   - APPLICATION RATES SHOULD NOT EXCEED THE MANUFACTURER'S RECOMMENDATIONS. REPEATED APPLICATIONS MAY BE MADE IF NECESSARY TO ENSURE ADEQUATE COVERAGE.
   - THE APPLICATION METHOD USED SHOULD PROVIDE UNIFORM COVERAGE TO THE TARGET AREA WHILE AVOIDING DRIFT TO NON–TARGET AREAS, ESPECIALLY PAVED AREAS.
   - MANUFACTURER'S RECOMMENDATIONS FOR SAFE STORAGE, MIXING, AND USE OF THE PRODUCT SHOULD BE FOLLOWED.
   - USE OF ANIONIC PAM SHOULD BE IN CONJUNCTION WITH THE OTHER BMPS SPECIFIED IN THE APPROVED E&S PLAN.
   - ANIONIC PAM MAY NOT BE USED INSTEAD OF A PROTECTIVE LINER IN A CHANNEL OR IN PLACE OF MULCH ON A SEEDED AREA. HOWEVER, SEED MAY BE ADDED TO THE MIXTURE AT THE TIME OF APPLICATION.
   - DISPOSAL OF EXCESS MATERIAL MUST BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AS WELL AS FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.
   - ANIONIC PAM MAY NOT BE APPLIED WITHIN THE FLOODWAY OF A RECEIVING STREAM CHANNEL OR WITHIN 25 FEET OF OTHER WATER BODIES.
   - ANIONIC PAM MAY BE USED TO TEMPORARILY STABILIZE TOPSOIL STOCKPILES. HOWEVER, ANIONIC PAM MAY LOSE ITS EFFECTIVENESS IN AS LITTLE AS TWO MONTHS. THEREFORE, IT MIGHT BECOME NECESSARY TO REAPPLY THE MIXTURE.
   - ANIONIC PAM IS NOT RECOMMENDED FOR APPLICATION ON SURFACES OF PURE SAND OR GRAVELS WITH NO FINES OR ON SNOW–COVERED SURFACES.
   - A VISIBLE TRACER OR COLORANT MAY BE ADDED TO THE MIXTURE TO VISUALLY TRACK ITS APPLICATION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

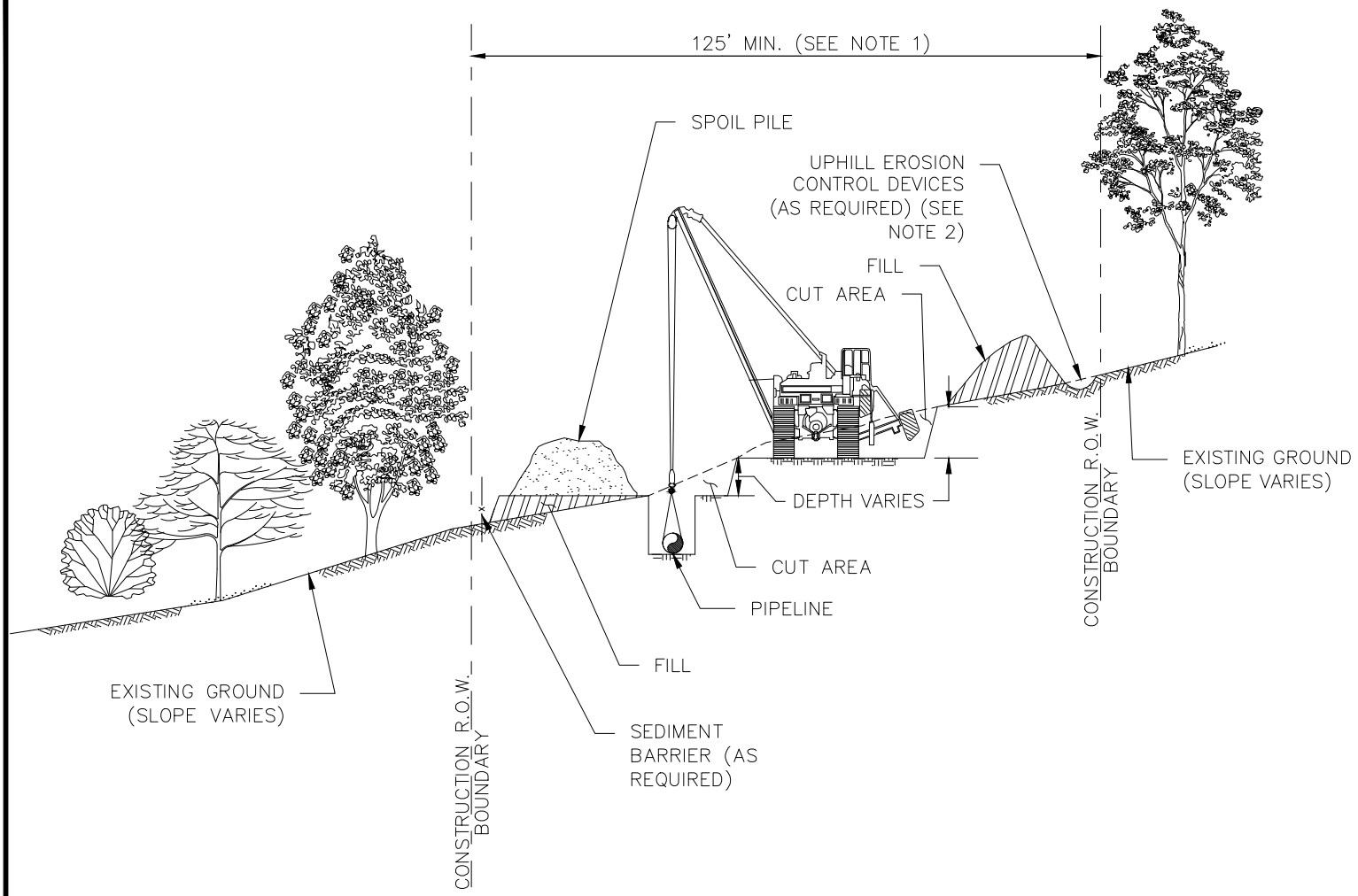
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
POLYACRYLAMIDE (PAM) SOIL BINDER

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 84

Sheet: 84 of 127
Type:



CROSS SECTION

SCALE: N.T.S.

CONSTRUCTION PROCEDURE NOTES:

1. TWO–TONE THE RIGHT–OF–WAY TO LIMIT THE NEED FOR DEEP CUTS AND ADDITIONAL RIGHT–OF–WAY ON STEEP SLOPES. THE MINIMUM WORKSPACE WIDTH ALONG STEEP SIDE SLOPES SHALL BE 125'. ADDITIONAL TEMPORARY WORKSPACE MAY BE REQUIRED FOR WORKER SAFETY DEPENDING ON THE SEVERITY OF THE GRADE.
2. EMPLOY EROSION CONTROL MEASURES SUCH AS BREAKERS, CROSS DITCHES AND BERMS, TEMPORARY DRAINAGE PIPES, TEMPORARY SWALES, TEMPORARY OUTLET PROTECTION, ETC. AS REQUIRED TO PREVENT EROSION AND SEDIMENTATION OUTSIDE OF THE CONSTRUCTION RIGHT–OF–WAY. CLEAR AND STAKE ADDITIONAL RIGHT–OF–WAY TO ALLOW FOR EXTRA SPOIL.
3. ENSURE SIDE BOOM TRACTORS ARE EQUIPPED WITH BOOM EXTENDERS AND COUNTERWEIGHTS IF REQUIRED.
4. USE BACKHOE TO ASSIST BULLDOZERS WITH REPLACING CUTS.
5. RESTORE GRADE TO NEAR PRE–CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL AND INSTALL PERMANENT EROSION CONTROL MEASURES AS REQUIRED.
6. REVEGETATE / SEED DISTURBED AREAS AS NOTED IN THE CONSTRUCTION DOCUMENTS OR AS DETERMINED BY THE ENVIRONMENTAL INSPECTOR.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

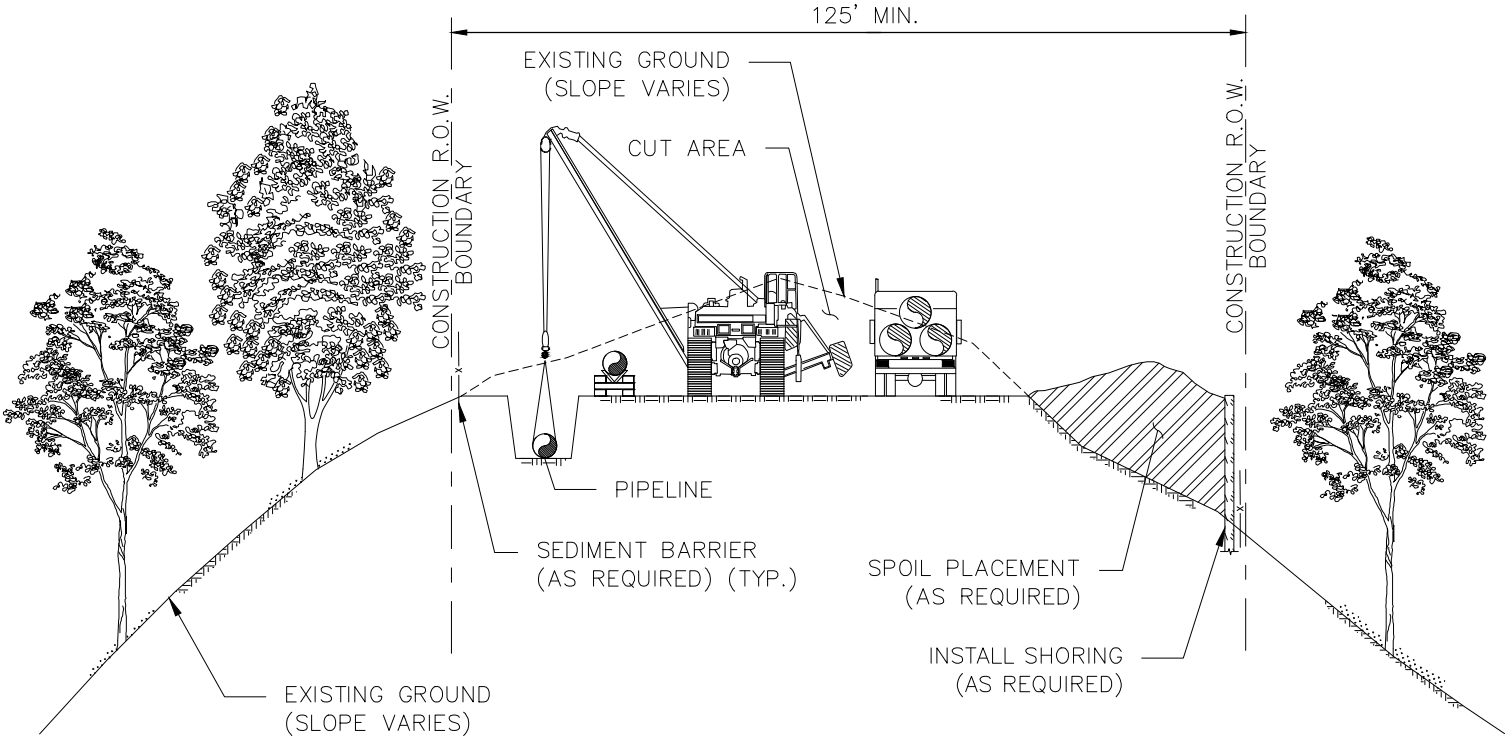
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
SIDE SLOPE (TWO–TONE)
CONSTRUCTION PROCEDURE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 85

Sheet: 85 of 127
Type:



CROSS SECTION

SCALE: N.T.S.

CONSTRUCTION PROCEDURE NOTES:

1. EMPLOY EROSION CONTROL MEASURES SUCH AS BREAKERS, CROSS DITCHES AND BERMS, TEMPORARY DRAINAGE PIPES, TEMPORARY SWALES, TEMPORARY OUTLET PROTECTION, ETC. AS REQUIRED TO PREVENT EROSION AND SEDIMENTATION OUTSIDE OF THE CONSTRUCTION RIGHT-OF-WAY. CLEAR AND STAKE ADDITIONAL RIGHT-OF-WAY TO ALLOW FOR EXTRA SPOIL.
2. ENSURE SIDE BOOM TRACTORS ARE EQUIPPED WITH BOOM EXTENDERS AND COUNTERWEIGHTS IF REQUIRED.
3. USE BACKHOE TO ASSIST BULLDOZERS WITH REPLACING CUTS.
4. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL AND INSTALL PERMANENT EROSION CONTROL MEASURES AS REQUIRED.
5. REVEGETATE / SEED DISTURBED AREAS AS NOTED IN THE CONSTRUCTION DOCUMENTS OR AS DETERMINED BY THE ENVIRONMENTAL INSPECTOR.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

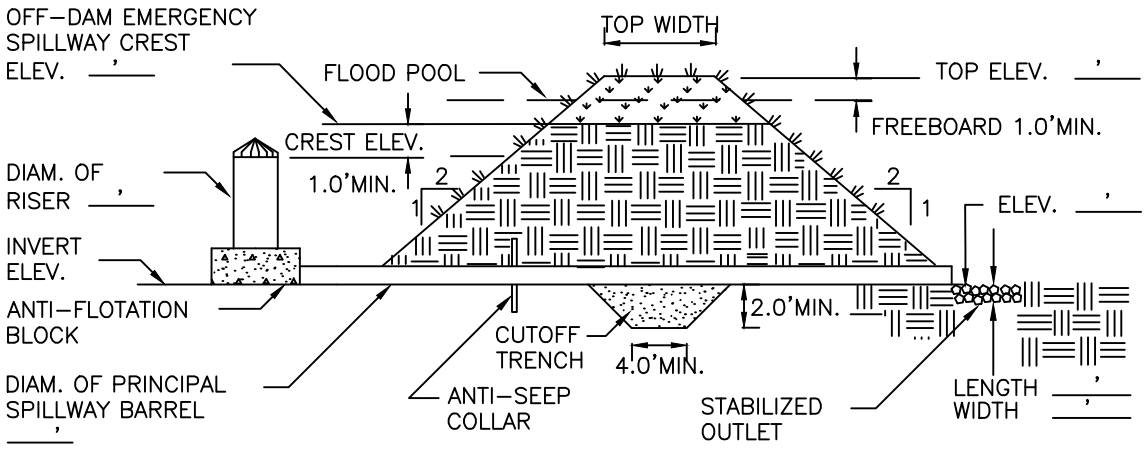
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
RIDGE-TOP CONSTRUCTION PROCEDURE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

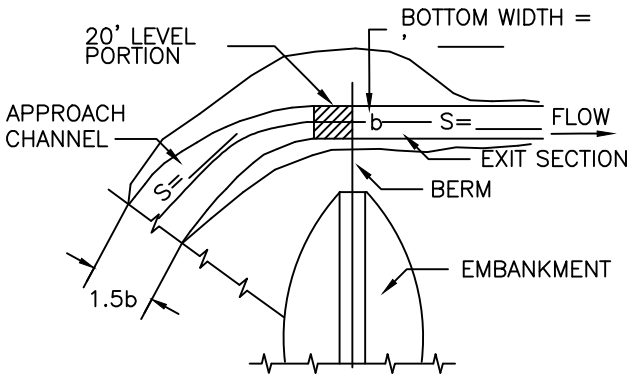
FIG. NO. 86

Sheet: 86 of 127
Type:

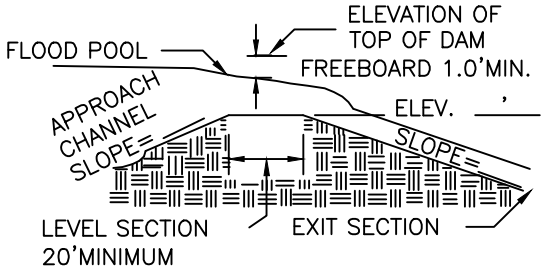


PRINCIPAL SPILLWAY PROFILE
NOT TO SCALE

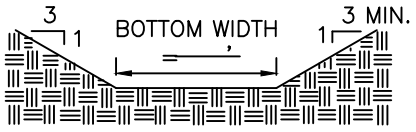
MAXIMUM DRAINAGE AREA = 100 ACRES



EMERGENCY SPILLWAY PLAN VIEW
NOT TO SCALE



PROFILE ALONG ℄ OF SPILLWAY
NOT TO SCALE



CROSS SECTION AT CONTROL SECTION
NOT TO SCALE

NOTE: THE ELEVATIONS AND DIMENSIONS WILL BE COMPLETED AS REQUIRED FOR THE FINAL SUBMISSION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

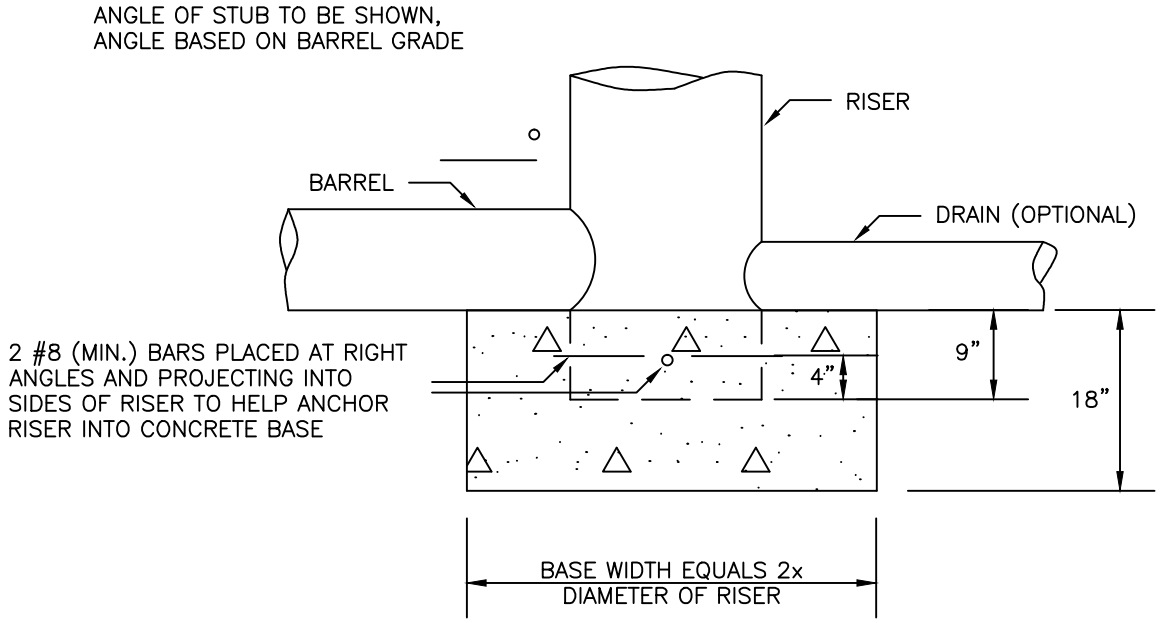
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
SEDIMENT BASIN DETAILS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 87

Sheet: 87 of 127
Type:



CONSTRUCTION SPECIFICATIONS

NOTES:

1. THE CONCRETE BASE SHALL BE POURED IN SUCH A MANNER TO INSURE THAT THE CONCRETE FILLS THE BOTTOM OF THE RISER TO THE INVERT OF THE OUTLET PIPE TO PREVENT THE RISER FROM BREAKING AWAY FROM THE BASE.
2. WITH ALUMINUM OR ALUMINIZED PIPE, THE EMBEDDED SECTION MUST BE PAINTED WITH CHROMATE OR EQUIVALENT.
3. RISER BASE MAY BE SIZED AS COMPUTED USING FLOATATION WITH A FACTOR OF SAFETY OF 1.2.

NOTE: THE ELEVATIONS AND DIMENSIONS WILL BE COMPLETED AS REQUIRED FOR THE FINAL SUBMISSION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

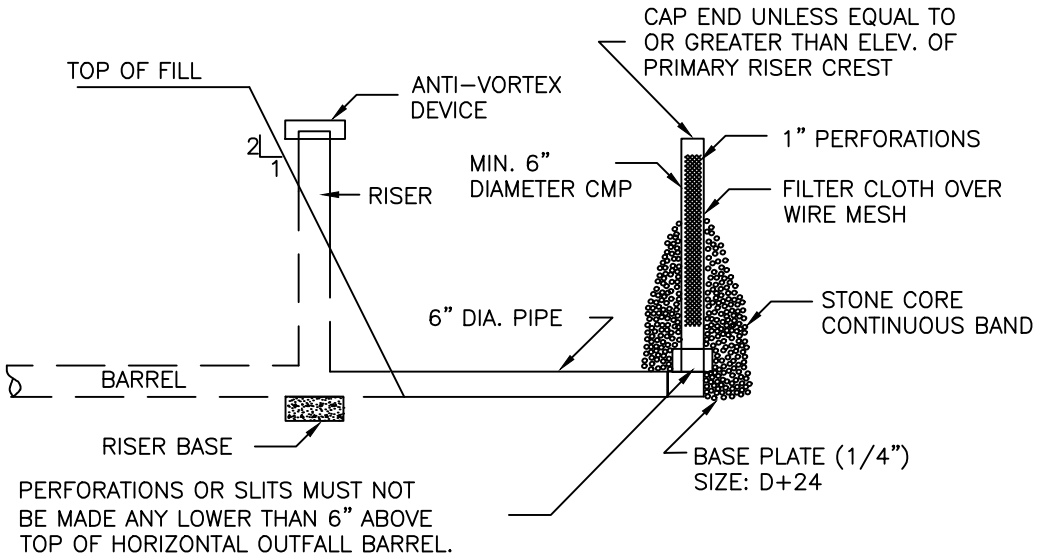
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
SEDIMENT BASIN RISER BASE DETAIL

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

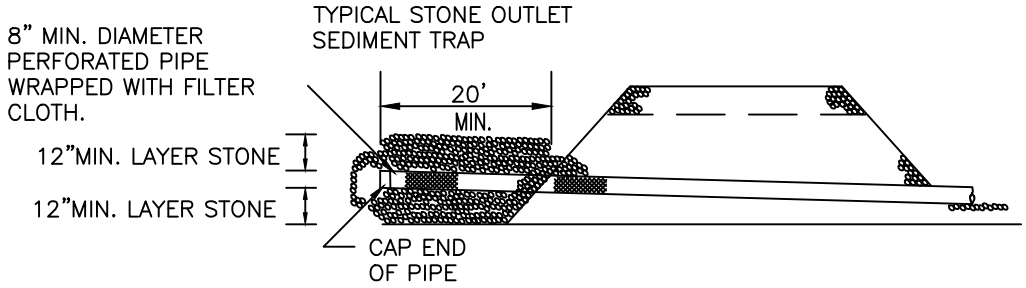
FIG. NO. 88

Sheet: 88 of 127
Type:



PERFORATIONS – 6" SPACING HORIZONTAL &
VERTICAL LOCATED IN CONCAVE.

OPTIONAL SEDIMENT TRAP DEWATERING DEVICE – 1 WITH 6" PERFORATED RISER



OPTIONAL SEDIMENT TRAP DEWATERING DEVICE – II

NOTE: THE ELEVATIONS AND DIMENSIONS WILL BE
COMPLETED AS REQUIRED FOR THE FINAL SUBMISSION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

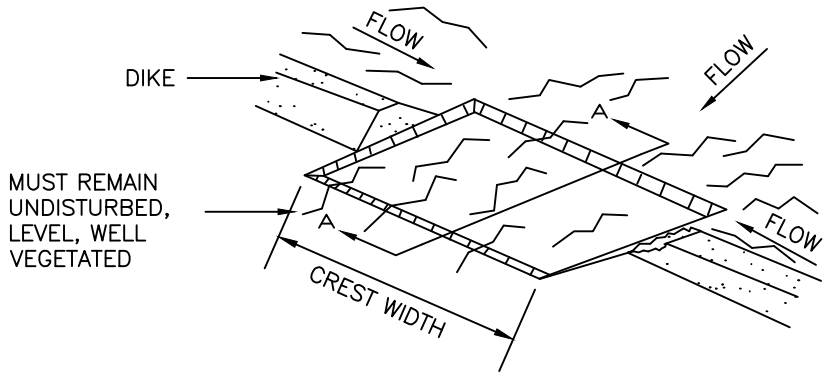
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

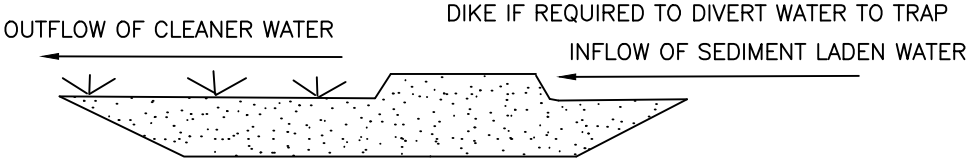
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
OPTIONAL SEDIMENT TRAP
DEWATERING DEVICES

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 89

Sheet: 89 of 127
Type:





CREST WIDTH (FT)=4xDRAINAGE AREA (ACRES)

SECTION A – A
EXCAVATED GRASS OUTLET SEDIMENT TRAP

CONSTRUCTION SPECIFICATIONS

1. VOLUME OF SEDIMENT STORAGE SHALL BE 1800 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE AREA.
2. MINIMUM CREST WIDTH SHALL BE 4 x DRAINAGE AREA
3. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
4. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
5. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION SHALL BE MINIMIZED.
6. THE SEDIMENT TRAP SHALL BE REMOVED AND AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
7. ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.

MAXIMUM DRAINAGE AREA: 5 ACRES

NOTE: THE ELEVATIONS AND DIMENSIONS WILL BE COMPLETED AS REQUIRED FOR THE FINAL SUBMISSION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

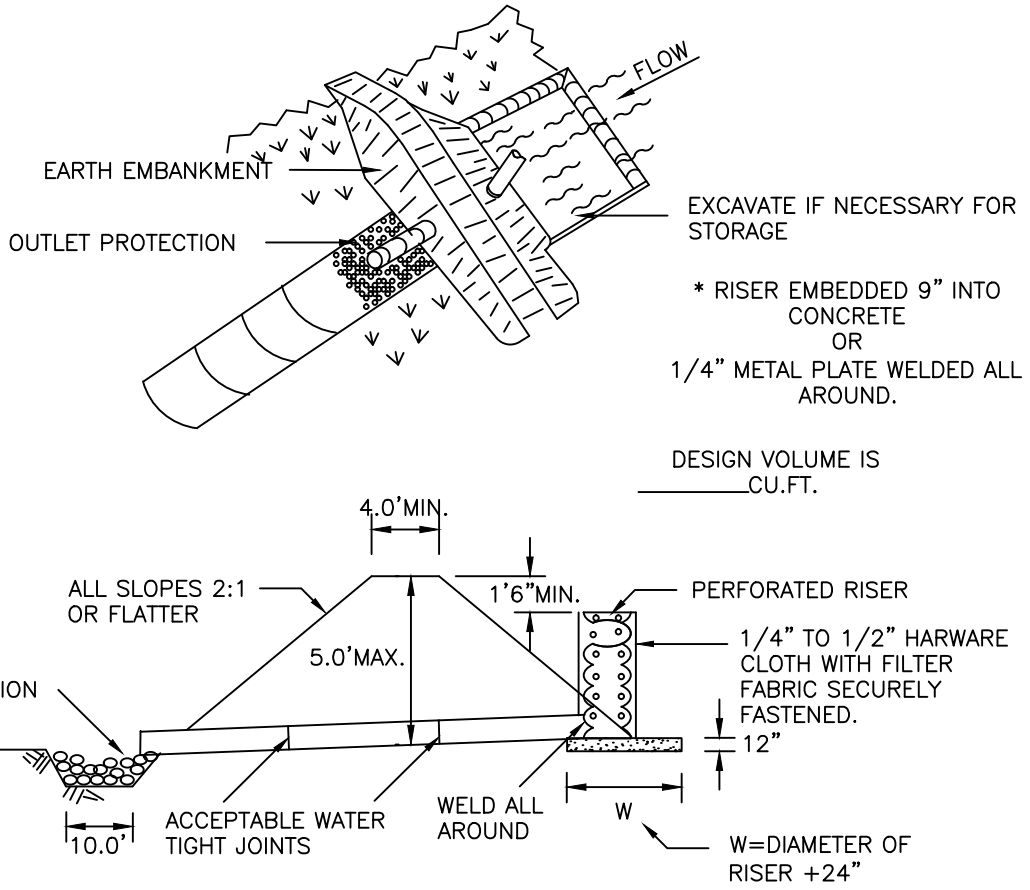
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
GRASS OUTLET SEDIMENT TRAP

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 90

Sheet: 90 of 127
Type:



EMBANKMENT SECTION THRU RISER

SIZES OF PIPE NEEDED:

BARREL DIAMETER: _____
RISER DIAMETER: _____

NOTE:
CONSTRUCTION SPECIFICATION SHOULD BE ATTACHED TO THIS DETAIL TO COMPLETE DESIGN.

MAXIMUM DRAINAGE AREA: 5 ACRES

NOTE: THE ELEVATIONS AND DIMENSIONS WILL BE COMPLETED AS REQUIRED FOR THE FINAL SUBMISSION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
SEDIMENT TRAP PIPE OUTLET

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 91

Sheet: 91 of 127
Type:

CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER–SIZED STONES, ROCKS, ORGANIC MATERIAL, OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. VOLUME OF SEDIMENT STORAGE SHALL BE 1800 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.
4. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
5. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
6. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION ARE MINIMIZED.
7. THE STRUCTURE SHALL BE REMOVED AND AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
8. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER; CUT SLOPES 1:1 OR FLATTER.
9. ALL PIPE CONNECTIONS SHALL BE WATERTIGHT.
10. THE TOP 2/3 OF THE RISER SHALL BE PERFORATED WITH ONE (1) INCH DIAMETER HOLES OR SLITS SPACED SIX (6) INCHES VERTICALLY AND HORIZONTALLY AND PLACED IN THE CONCAVE PORTION OF PIPE. NO HOLES WILL BE ALLOWED WITHIN SIX (6) INCHES OF THE HORIZONTAL BARREL.
11. THE RISER SHALL BE WRAPPED WITH 1/4 TO 1/2 INCH HARDWARE CLOTH WIRE THEN WRAPPED WITH FILTER CLOTH (HAVING AN EQUIVALENT SIEVE SIZE OF 40–80). THE FILTER CLOTH SHALL EXTEND SIX (6) INCHES ABOVE THE HIGHEST HOLE AND SIX (6) INCHES BELOW THE LOWEST HOLE. WHERE ENDS OF THE FILTER CLOTH COME TOGETHER, THEY SHALL BE OVER–LAPPED, FOLDED AND STAPLED TO PREVENT BYPASS.
12. STRAPS OR CONNECTING BANDS SHALL BE USED TO HOLD THE FILTER CLOTH AND WIRE FABRIC IN PLACE. THEY SHALL BE PLACED AT THE TOP AND BOTTOM OF THE CLOTH.
13. FILL MATERIAL AROUND THE PIPE SPILLWAY SHALL BE HAND COMPACTED IN FOUR (4) INCH LAYERS. A MINIMUM OF TWO (2) FEET OF HAND COMPACTED BACKFILL SHALL BE PLACED OVER THE PIPE SPILLWAY BEFORE CROSSING IT WITH CONSTRUCTION
14. THE RISER SHALL BE ANCHORED WITH EITHER A CONCRETE BASE OR STEEL PLATE BASE TO PREVENT FLOTATION. FOR CONCRETE BASED THE DEPTH SHALL BE TWELVE (12) INCHES WITH THE RISER EMBEDDED NINE (9) INCHES. A 1/4 INCH MINIMUM THICKNESS STEEL PLATE SHALL BE ATTACHED TO THE RISER BY A CONTINUOUS WELD AROUND THE BOTTOM TO FORM A WATERTIGHT CONNECTION AND THEN PLACE TWO (2) FEET OF STONE, GRAVEL, OR TAMPED EARTH ON THE PLATE.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

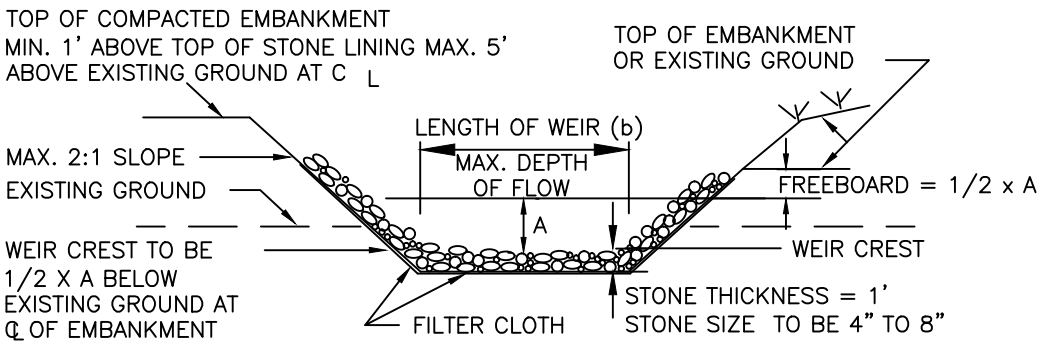
Division:		Op. Area:
St.:		Co./Par.:
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
SEDIMENT TRAP PIPE OUTLET
SPECIFICATIONS

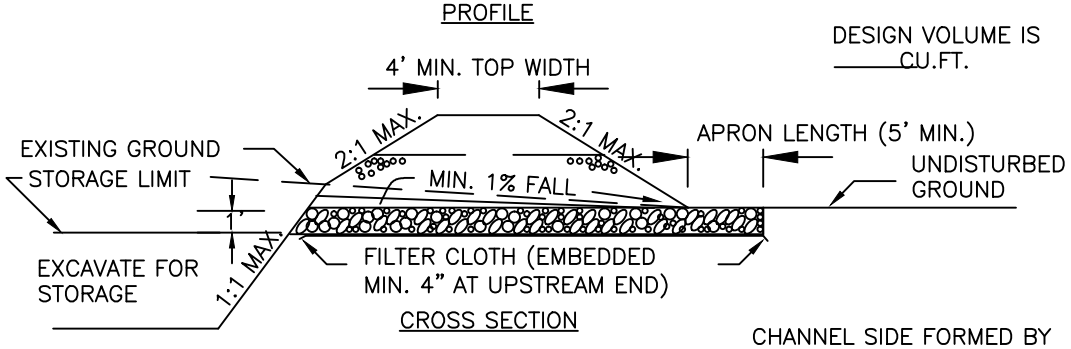
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 92

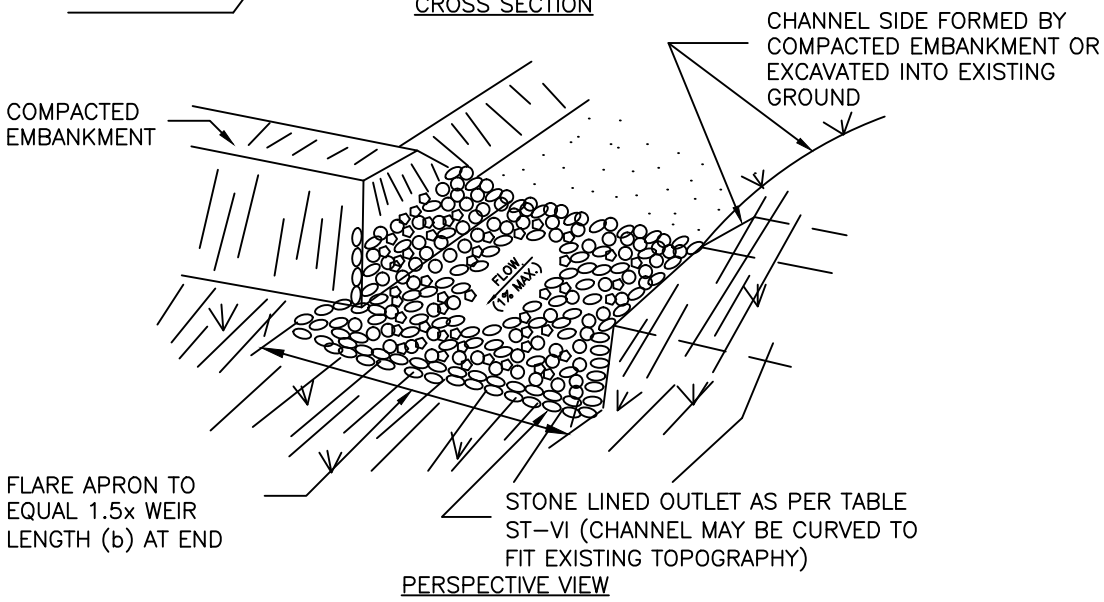
Sheet: 92 of 127
Type:



PROFILE



CROSS SECTION



PERSPECTIVE VIEW

MAXIMUM DRAINAGE AREA = 15 ACRES

NOTE: THE ELEVATIONS AND DIMENSIONS WILL BE COMPLETED AS REQUIRED FOR THE FINAL SUBMISSION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
SEDIMENT TRAP RIPRAP OUTLET

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 93

Sheet: 93 of 127
Type:

CONSTRUCTION SPECIFICATIONS

1. THE AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER–SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED. MAXIMUM HEIGHT OF OF EMBANKMENT SHALL BE FIVE (5) FEET, MEASURED AT CENTERLINE OF EMBANKMENT.
3. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER, CUT SLOPES 1:1 OR FLATTER.
4. ELEVATION OF THE TOP OF ANY DIKE DIRECTING WATER INTO TRAP MUST EQUAL OR EXCEED THE HEIGHT OF EMBANKMENT.
5. STORAGE AREA PROVIDED SHALL BE FIGURED BY COMPUTING THE VOLUME AVAILABLE BEHIND THE OUTLET CHANNEL UP TO AN ELEVATION OF ONE (1) FOOT BELOW THE LEVEL WEIR CREST.
6. FILTER CLOTH SHALL BE PLACED OVER THE BOTTOM AND SIDES OF THE OUTLET CHANNEL PRIOR TO PLACEMENT OF STONE. SECTIONS OF FABRIC MUST OVERLAP AT LEAST ONE (1) FOOT WITH SECTION NEAREST THE ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OUTLET CHANNEL.
7. STONE USED IN THE OUTLET CHANNEL SHALL BE FOUR (4) TO EIGHT (8) INCH RIPRAP. TO PROVIDE A FILTERING EFFECT, A LAYER OF FILTER CLOTH SHALL BE EMBEDDED ONE (1) FOOT WITH SECTION NEAREST ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OF OUTLET
8. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
9. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRED AS NEEDED.
10. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION ARE MINIMIZED.
11. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
12. DRAINAGE AREA FOR THIS PRACTICE IS LIMITED TO 15 ACRES OR LESS.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

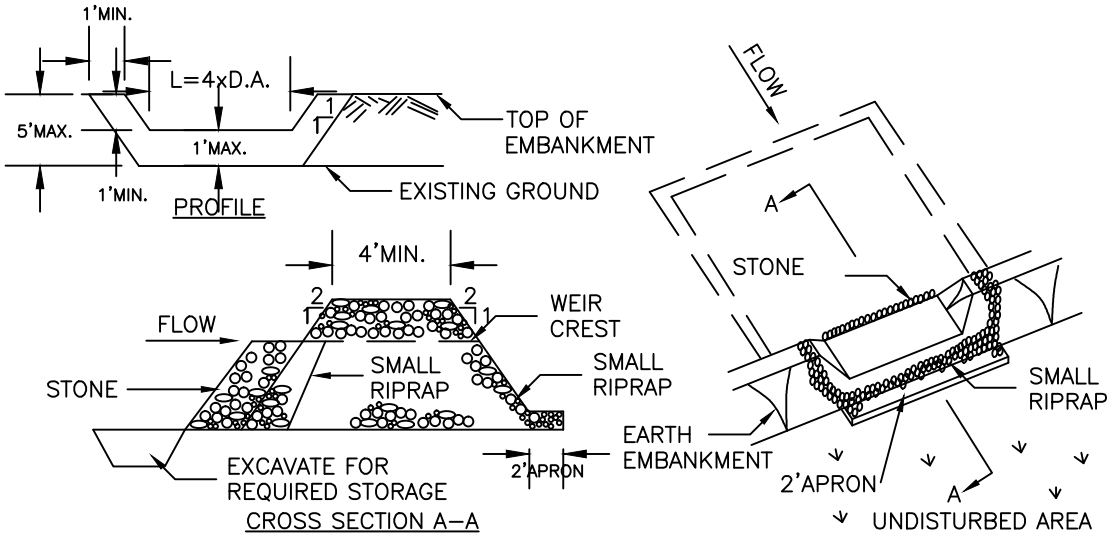
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
SEDIMENT TRAP RIPRAP OUTLET
SPECIFICATIONS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 94

Sheet: 94 of 127
Type:



CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS AND OTHER WOODY VEGETATION AS WELL AS OVER–SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. ALL CUT AND FILL SLOPES SHALL BE 2:1 OR FLATTER.
4. THE STONE USED IN THE OUTLET SHALL BE SMALL RIPRAP 4"–8" ALONG WITH A 1' THICKNESS OF 2" AGGREGATE PLACED ON THE UP–GRADE SIDE ON THE SMALL RIPRAP OR EMBEDDED FILTER CLOTH IN THE RIPRAP.
5. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMEN–SIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP.
6. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
7. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION IS MINIMIZED.
8. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

MAXIMUM DRAINAGE AREA 5 ACRES

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
SEDIMENT TRAP STONE OUTLET

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 95

Sheet: 95 of 127
Type:

FILTER STRIPS

FILTER STRIPS ARE VEGETATED AREAS ALONG WATER BODIES, DESIGNED TO SLOW THE MOVEMENT OF OVERLAND FLOW OF WATER SO THAT SEDIMENT WILL BE LEFT BEHIND, PROVIDE AN OPPORTUNITY FOR VEGETATION TO REMOVE NUTRIENTS FROM SUBSURFACE FLOW, PROVIDE SHADE TO THE ADJACENT WATER BODY TO MAINTAIN COOL WATER TEMPERATURE, AND PROTECT BANK STABILITY AND PREVENT EROSION.

REQUIRED BMPS

FILTER STRIPS ARE REQUIRED ALONG ALL PONDS, LAKES, REGULATED STREAMS, AND CERTIFIED VERNAL POOLS.

FILTER STRIPS WILL EXTEND 50 FEET BACK FROM THE BANK, MEASURED ALONG THE SLOPE. EXCEPTIONS TO THIS FILTER STRIP WIDTH ARE:

1. SLOPES GREATER THAN 30%: FILTER STRIPS SHALL BE 100 FEET IN WIDTH, OR TO THE POINT BETWEEN 50 AND 100 FEET FROM THE BANK, WHERE A BREAK IN THE TOPOGRAPHY REDUCES THE SLOPE TO LESS THAN 30%.

2. STREAMS GREATER IN WIDTH THAN 25 FEET BANK TO BANK, PONDS 10 ACRES OR LARGER IN AREA, AND ALONG OUTSTANDING RESOURCE WATERS AND THEIR TRIBUTARIES: IN THESE CIRCUMSTANCES, VARIABLE–WIDTH FILTER STRIPS MUST BE USED IN ACCORDANCE WITH TABLE 4.

SLOPE (%)	FILTER STRIP WIDTH (FT)
0	50
10	90
20	130
30	170
40	210
50	250
60	290
70	330
80	370
90	410
100	450

NO LOGGING EQUIPMENT MAY OPERATE IN A FILTER STRIP UNLESS IT IS INCLUDED IN AN APPROVED FOREST CUTTING PLAN, AND IT:

- WILL REDUCE ENVIRONMENTAL DAMAGE;
- IS AT AN APPROVED STREAM CROSSING;
- IS ON A PRE–EXISTING LOGGING ROAD, OR;
- IS IN FILTER STRIPS GREATER THAN 50 FEET IN WIDTH, EQUIPMENT CAN OPERATE BEYOND 50 FEET OF THE WATERBODY. HOWEVER, NO PRINCIPAL SKID TRAILS MAY BE LOCATED IN THIS AREA, THE DISTURBANCE OF THE FORREST FLOOR MUS T BE MINIMIZED, AND ANY DISTRIBUTED SOIL MUST BE PROMPTLY STABILIZED.

NO MORE THAN 50% OF THE BASAL AREA MAY BE CUT AT ANY ONE TIME, AND A WAITING PERIOD OF FIVE YEARS MUST ELAPSE BEFORE ANOTHER CUT IS MADE. THE RESIDUAL STAND WILL BE COMPOSED OF HEALTHY GROWING TREES WELL DISTRIBUTED OVER THE AREA. EXCEPTIONS TO THIS STANDARD MAY BE MADE BY THE SERVICE FORESTER IF IT IS SHOWN IN THE FOREST CUTTING PLAN THAT A HEAVIER CUT IS NECESSARY TO PROTECT THE STREAM, BANK, OR WATER QUALITY.

CUT TREES WILL BE PULLED OUT OF THE FILTER STRIP AND SLASH WILL BE DISPOSED OF ACCORDING TO THE SLASH LAW OF MASSACHUSETTS.

THE FOLLOWING GUIDELINES MAY BE USED TO PROVIDE ADDITIONAL PROTECTION TO SENSITIVE STREAMS (E.G., TRIBUTARIES TO WATER SUPPLY RESERVOIRS, COLDWATER FISH RESOURCES, AND WILDLIFE HABITAT IN RIPARIAN CORRIDORS):

- LEAVE A 15 FOOT NO CUT BUFFER.
- AVOID SOIL COMPACTION AND RUTTING WITHIN 200 FEET OF A STREAM.
- MAINTAIN AREAS WITHIN 200 FEET OF A STREAM IN A FORRESTED CONDITION.
- PRESERVE IMPORTANT HABITAT CHARACTERISTICS WITHIN 200 FEET OF A STREAM, SUCH AS TREES WITH CAVITIES, DOWNED LOGS, STONE WALLS, AND ROCK JUMBLES.
- USE VARIABLE–WIDTH FILTER STRIP GUIDELINES ABOVE.
- MINIMIZE THE CUTTING OF TREES DIRECTLY ON THE STREAM BANK.

*MASSACHUSETTS LOOP ONLY

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

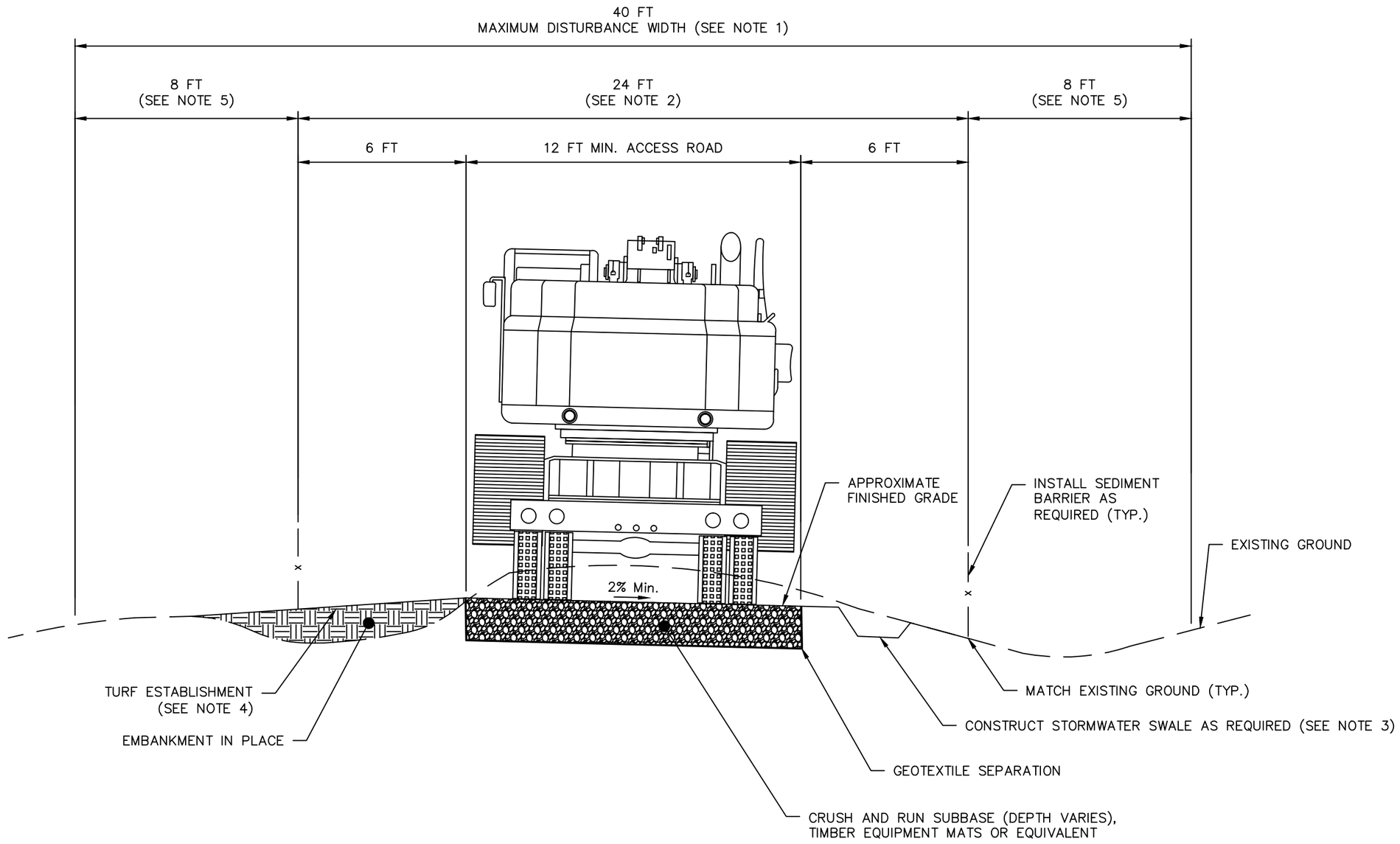
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
FILTER STRIPS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 96

Sheet: 96 of 127

Type:



NOTES:

1. THE MAXIMUM DISTURBANCE WIDTH ASSOCIATED WITH THE CONSTRUCTION OF ACCESS ROADS WILL BE 40FT.
2. ACCESS ROADS WILL TYPICALLY INCLUDE A 12 FT TRAVEL LANE AND 12 FT OF GRADING DISTURBANCE. THE GRADING DISTURBANCE WILL BE REQUIRED TO MATCH INTO EXISTING GROUND AND CONSTRUCT REQUIRED EROSION CONTROL MEASURES (E.G. SILT FENCE) AND SEDIMENT CONTROL DEVICES (E.G. STORMWATER SWALE). ADDITIONAL CONSTRUCTION WIDTH MAY BE REQUIRED IN AREAS THAT REQUIRED TRUCK PULL OFFS, TRUCK TURNAROUNDS, AND AROUND SHARP CURVES WHERE EQUIPMENT TRAILERS HAVE LARGE TURNING RADIUSES.
3. REFER TO THE STORMWATER SWALE TABLES FOR LOCATIONS AND SIZES OF ALL SWALES REQUIRED ALONG ACCESS ROADS.
4. SEED MIXES TO BE UTILIZED FOR TURF ESTABLISHMENT ALONG ACCESS ROADS SHALL CONFORM TO THE SEED MIXES OUTLINED IN THE ENVIRONMENTAL CONSTRUCTION PLANS (ECPs).
5. THE ADDITIONAL 16 FT OF DISTURBANCE MAY BE REQUIRED TO ACCOMMODATE TRUCK PULL-OFFS, TRUCK TURNAROUNDS, AND INCREASED TRAVEL LANE WIDTHS AROUND CURVES DUE TO THE LARGE TRUCK TURNING RADIUSES.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.
			REVISIONS		

Division:		Op. Area.:	
State:		Co./Par.:	
Section:	Township:	Range:	
Dft:	Date:	Scale:	
Chk:	Date:	Filename:	
Appr:	Date:		

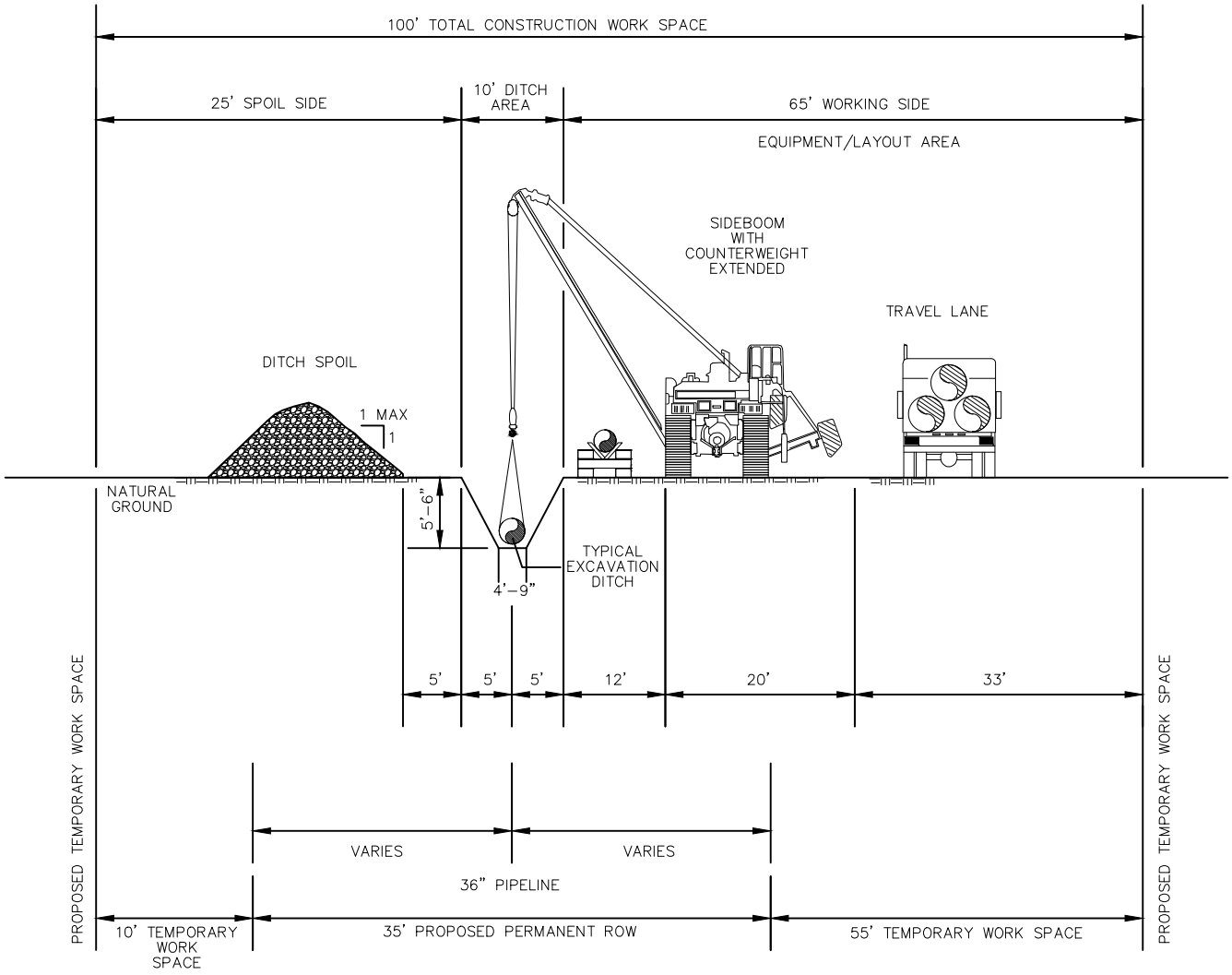
TENNESSE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL ACCESS ROAD
CROSS SECTION

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 97

Sheet: 97 of 127
Type:

Jul 21, 2014 - 2:05PM



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

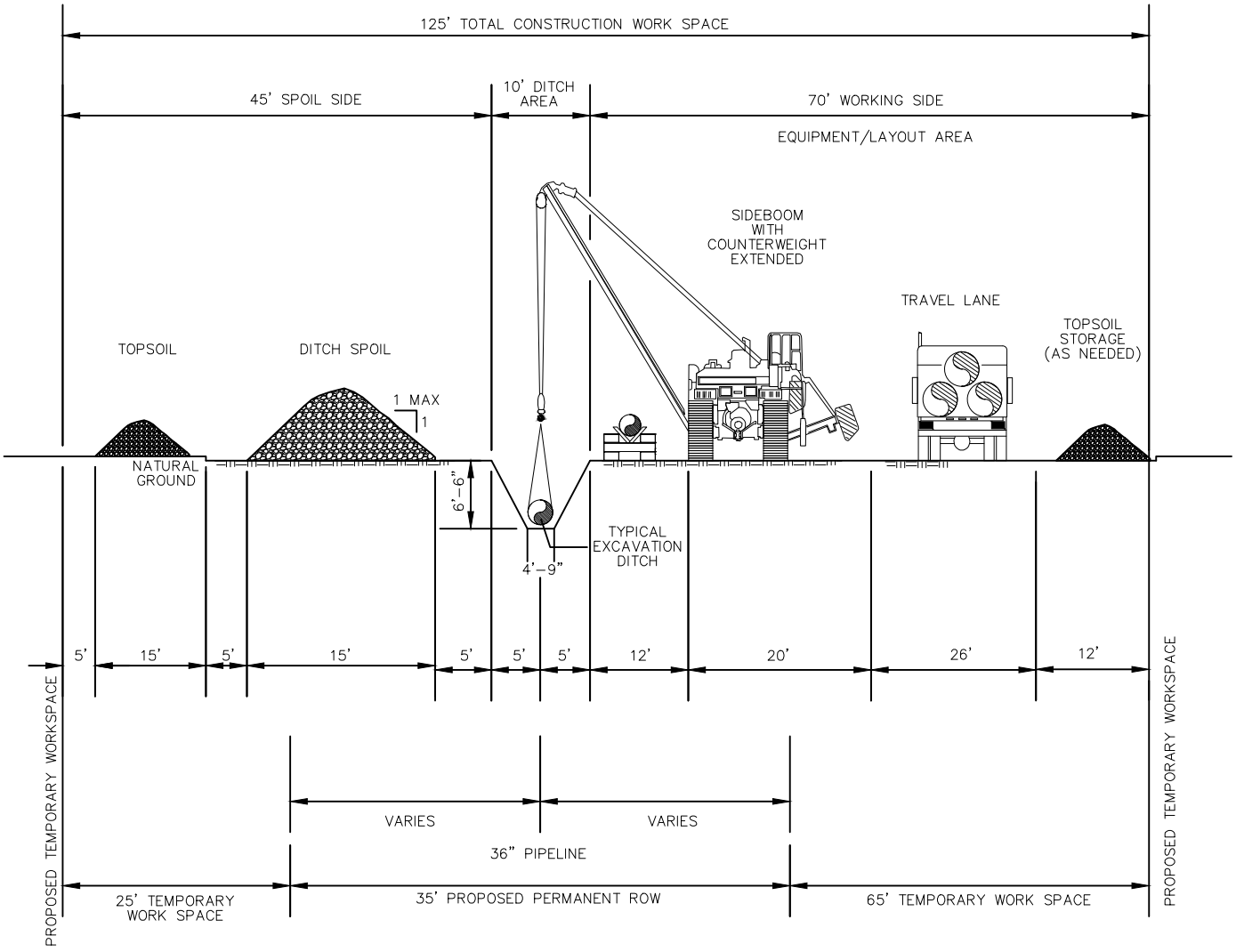
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL ROW CROSS SECTION
CONVENTIONAL CONSTRUCTION

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 98

Sheet: 98 of 127
Type:



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

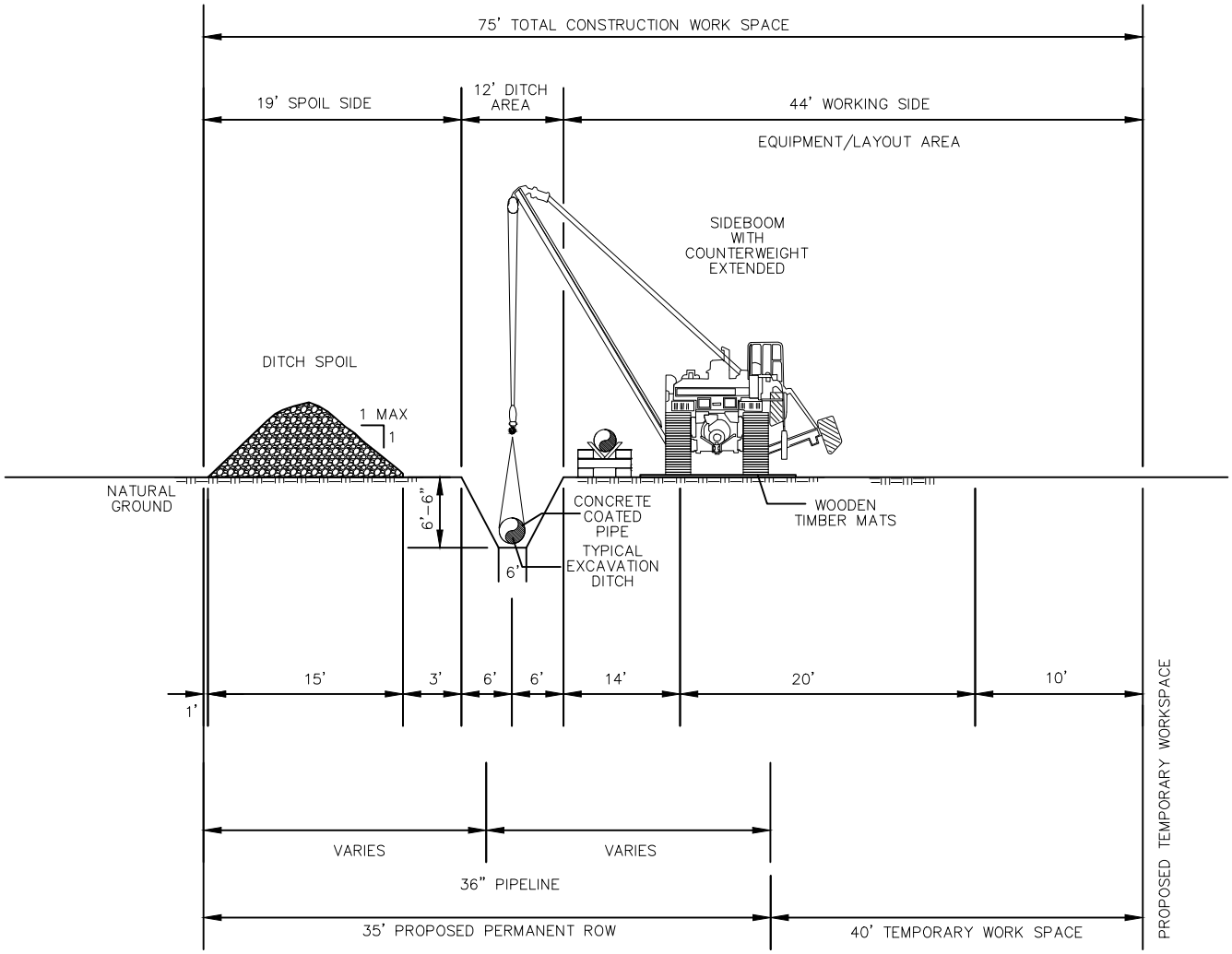
TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL ROW CROSS SECTION ACROSS AGRICULTURAL LAND

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 99

Sheet: 99 of 127

Type:



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

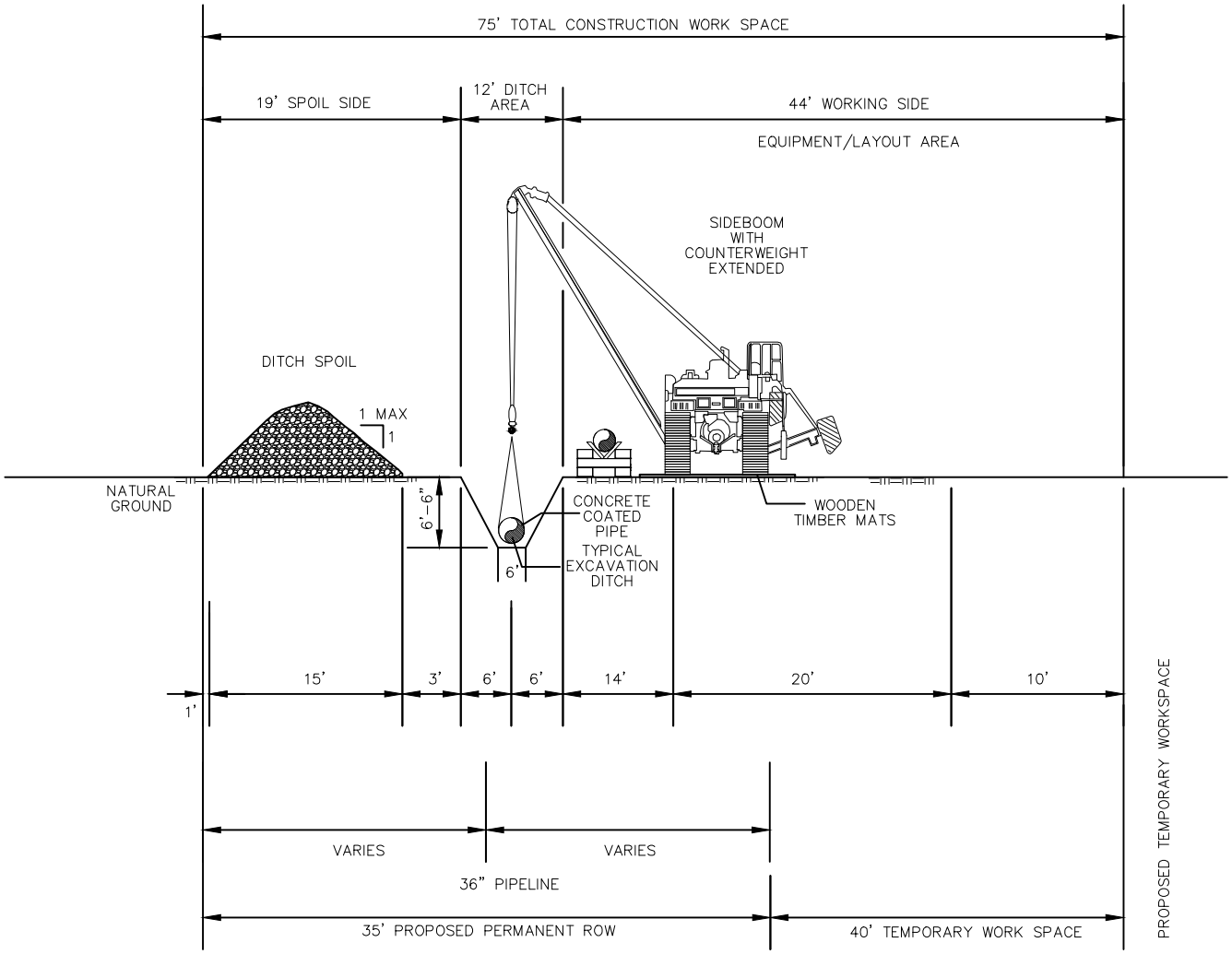
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL ROW CROSS SECTION
ACROSS SATURATED WETLAND

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 100

Sheet: 100 of 127
Type:



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:		Op. Area:	
St.:		Co./Par.:	
Section:	Township:	Range:	
Dft:	Date:	Project ID:	
Chk:	Date:	Scale:	
Appr:	Date:	Filename:	

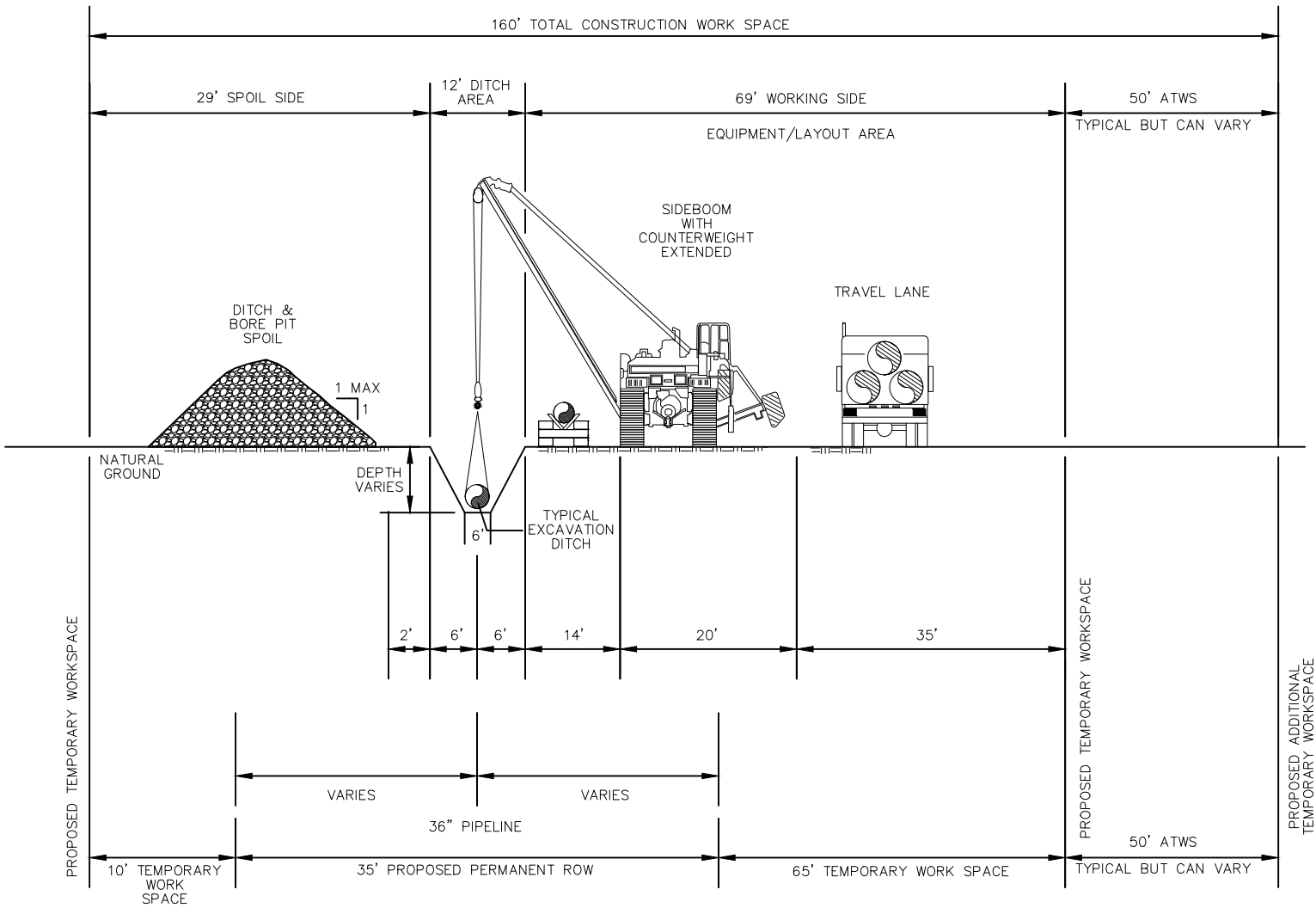
TENNESSEE GAS PIPELINE,LLC. STANDARD ENVIRONMENTAL DETAIL CONNECTICUT EXPANSION PROJECT TYPICAL ROW CROSS SECTION– ACROSS NON–SATURATED WETLANDS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 101

Sheet: 101 of 127

Type:



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

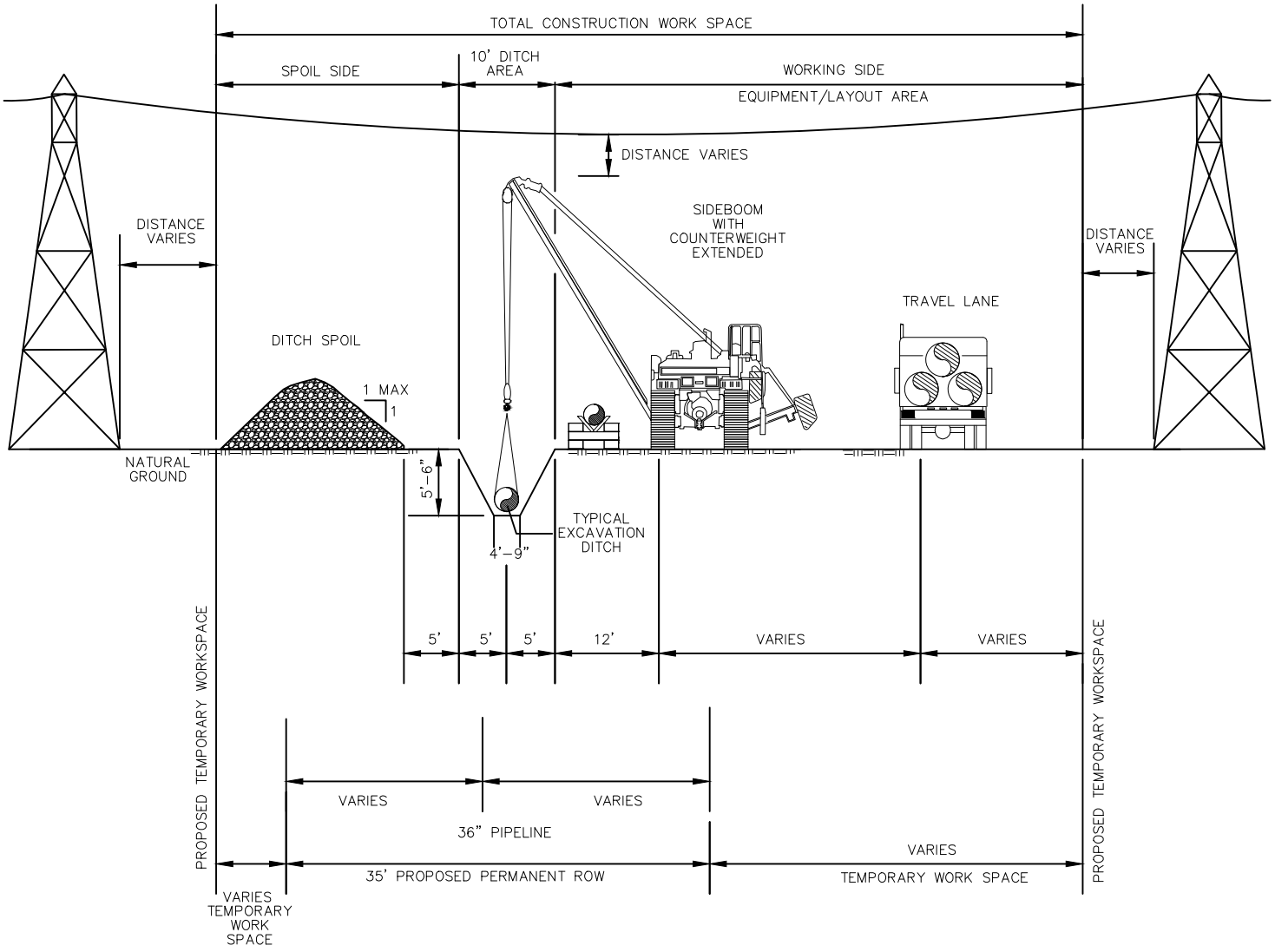
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL ROW CROSS SECTION–
CONSTRUCTION AT ROAD CROSSING

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 102

Sheet: 102 of 127
Type:



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

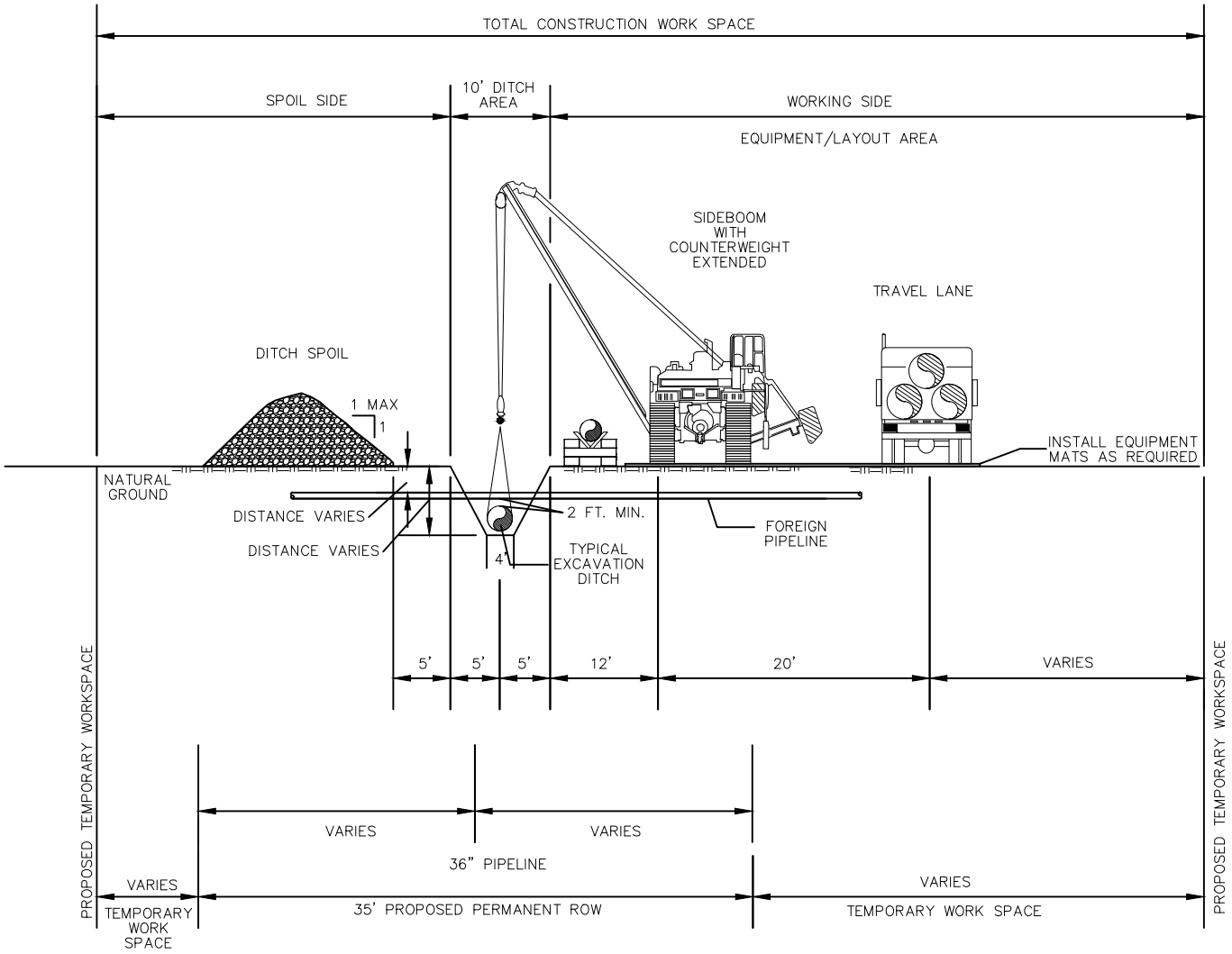
Division:		Op. Area:
St.:		Co./Par.:
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYP. ROW CROSS SECTION–CONVENTIONAL CONSTR. WITH OVERHEAD UTILITY LINE CROSSING

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 103

Sheet: 103 of 127
Type:



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

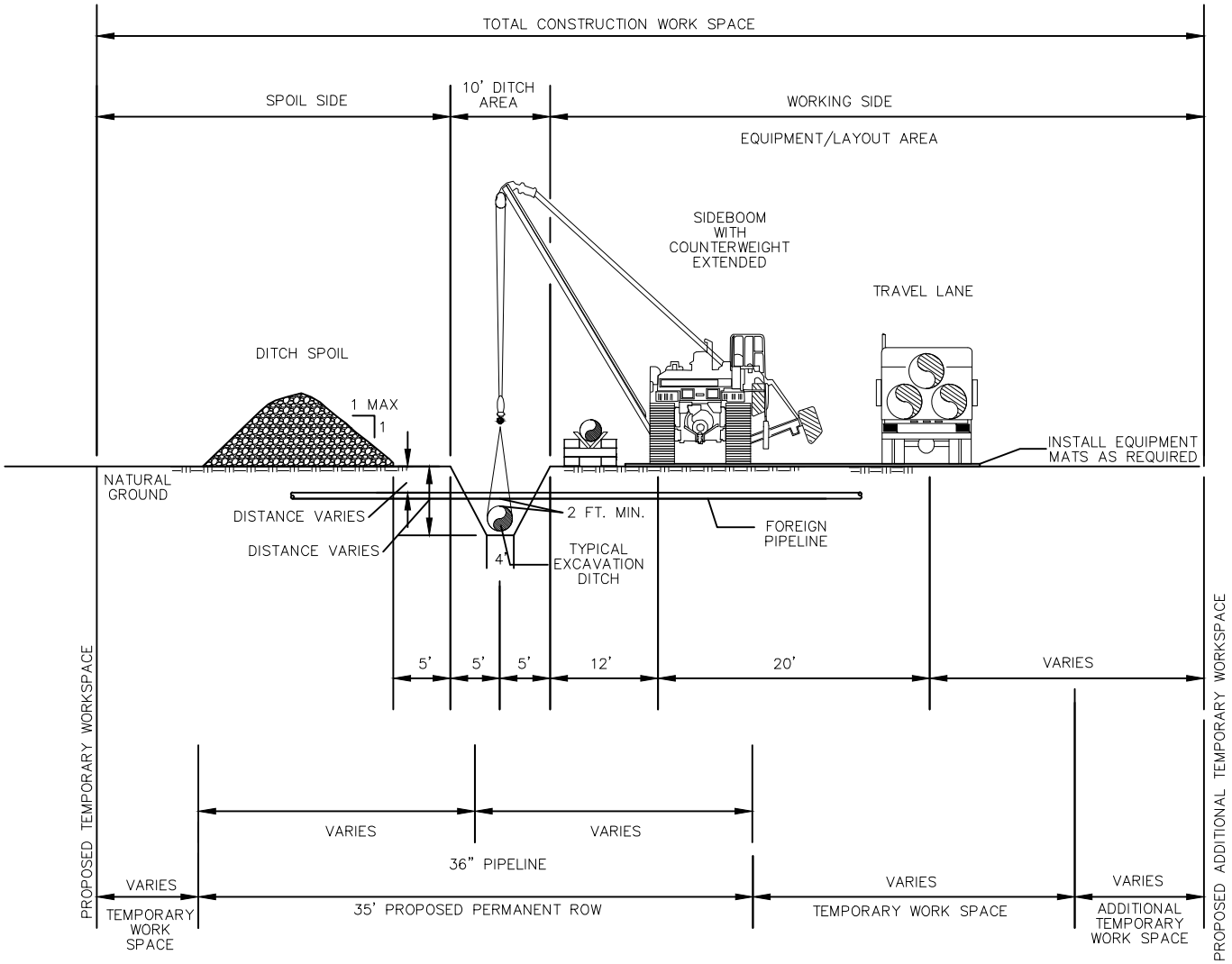
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYP. ROW CROSS SECTION–NORMAL CONSTR.
WITH FOREIGN PIPELINE CROSSING–TWS LEFT

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 104

Sheet: 104 of 127
Type:



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

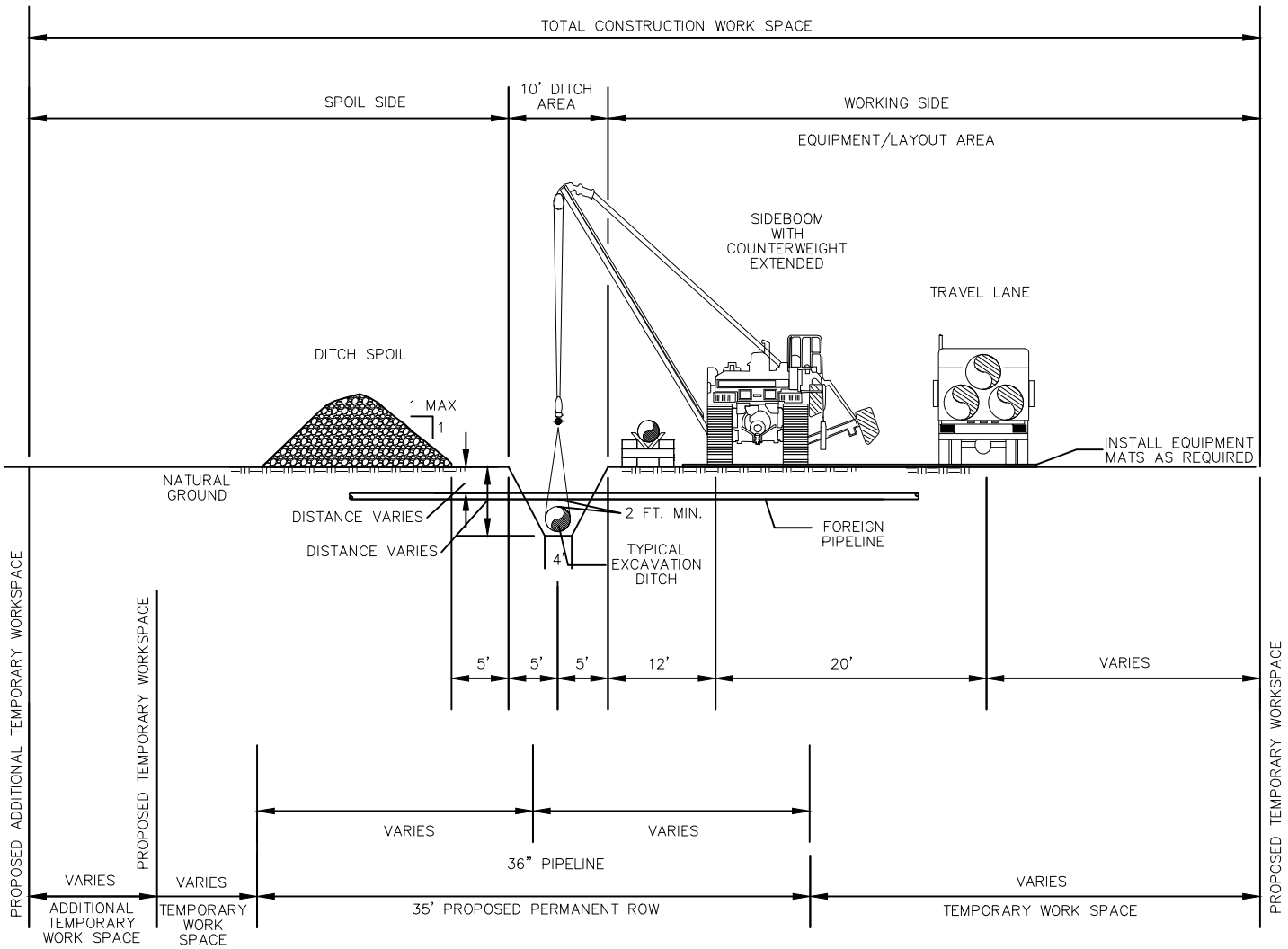
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYP. ROW CROSS SECTION–CONVENTIONAL CONSTR.
WITH FOREIGN PIPELINE CROSSING–A TWS LEFT & RIGHT

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 105

Sheet: 105 of 127
Type:



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

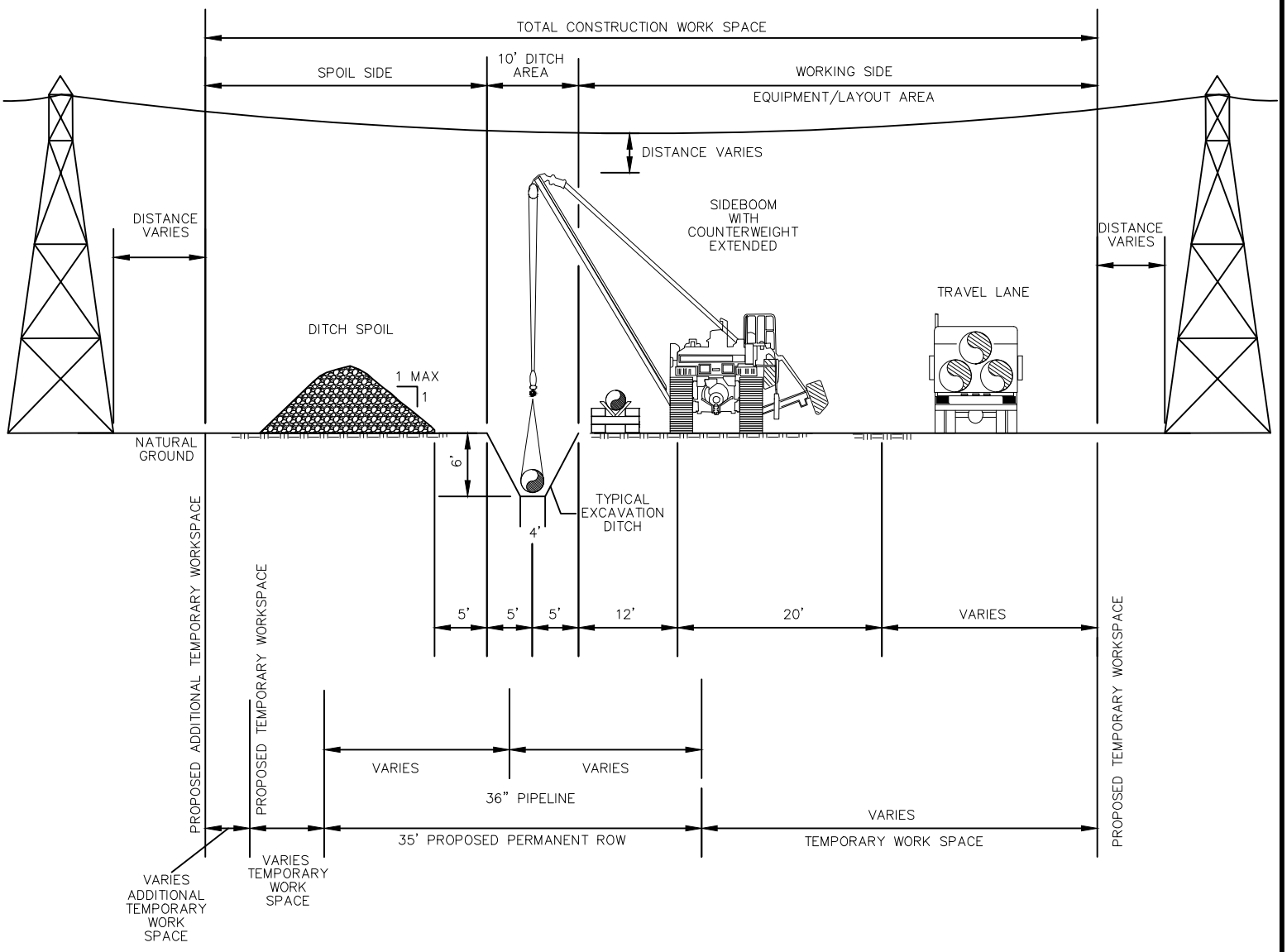
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYP. ROW CROSS SECTION–CONVENTIONAL CONSTR.
WITH FOREIGN PIPELINE CROSSING–ATWS LEFT

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 106

Sheet: 111 of 127
Type:



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

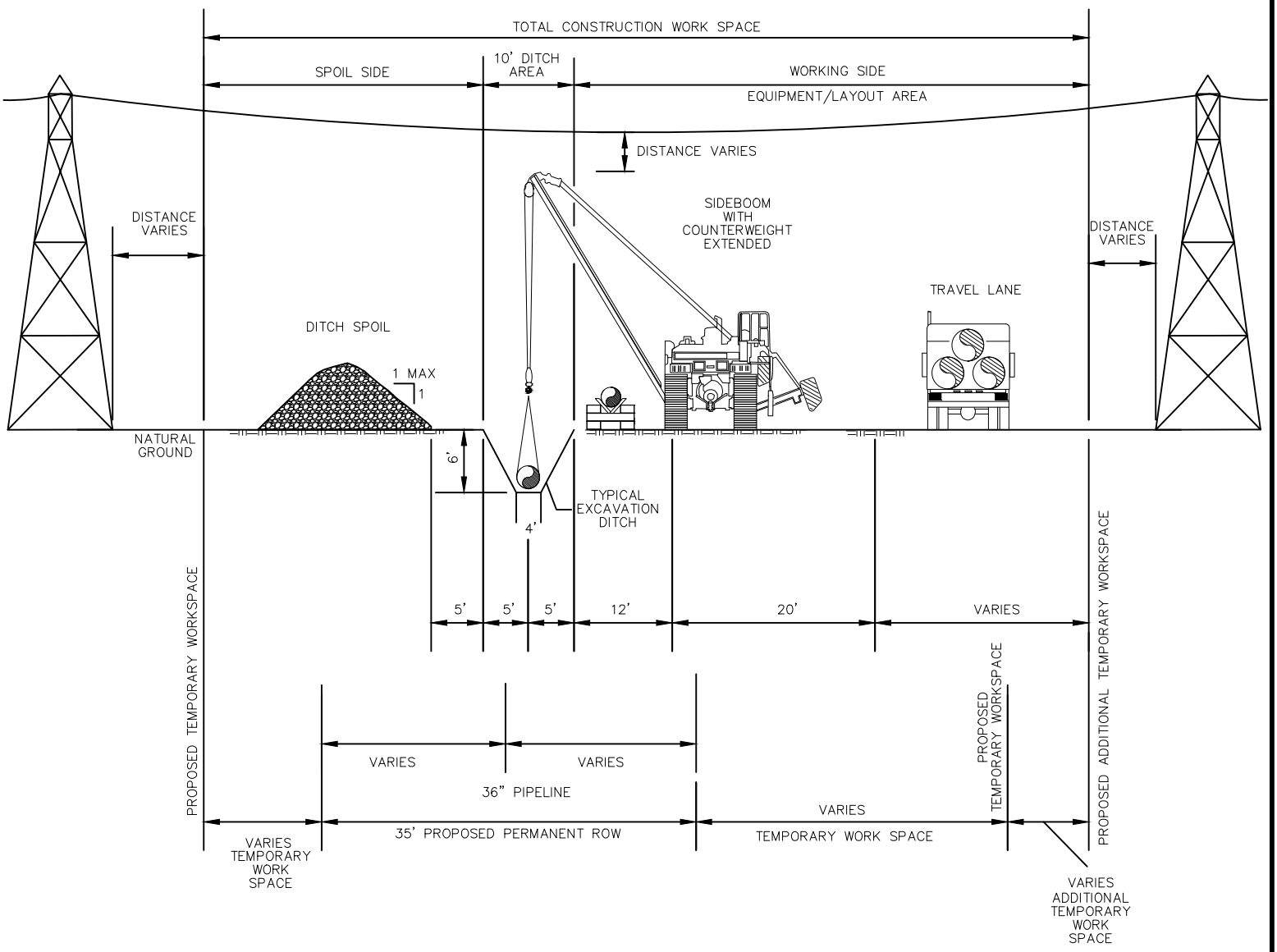
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYP. ROW CROSS SECTION–CONVENTIONAL CONSTR.
WITH OVERHEAD UTILITY LINE CROSSING–ATWS LEFT

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 107

Sheet: 107 of 127
Type:



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

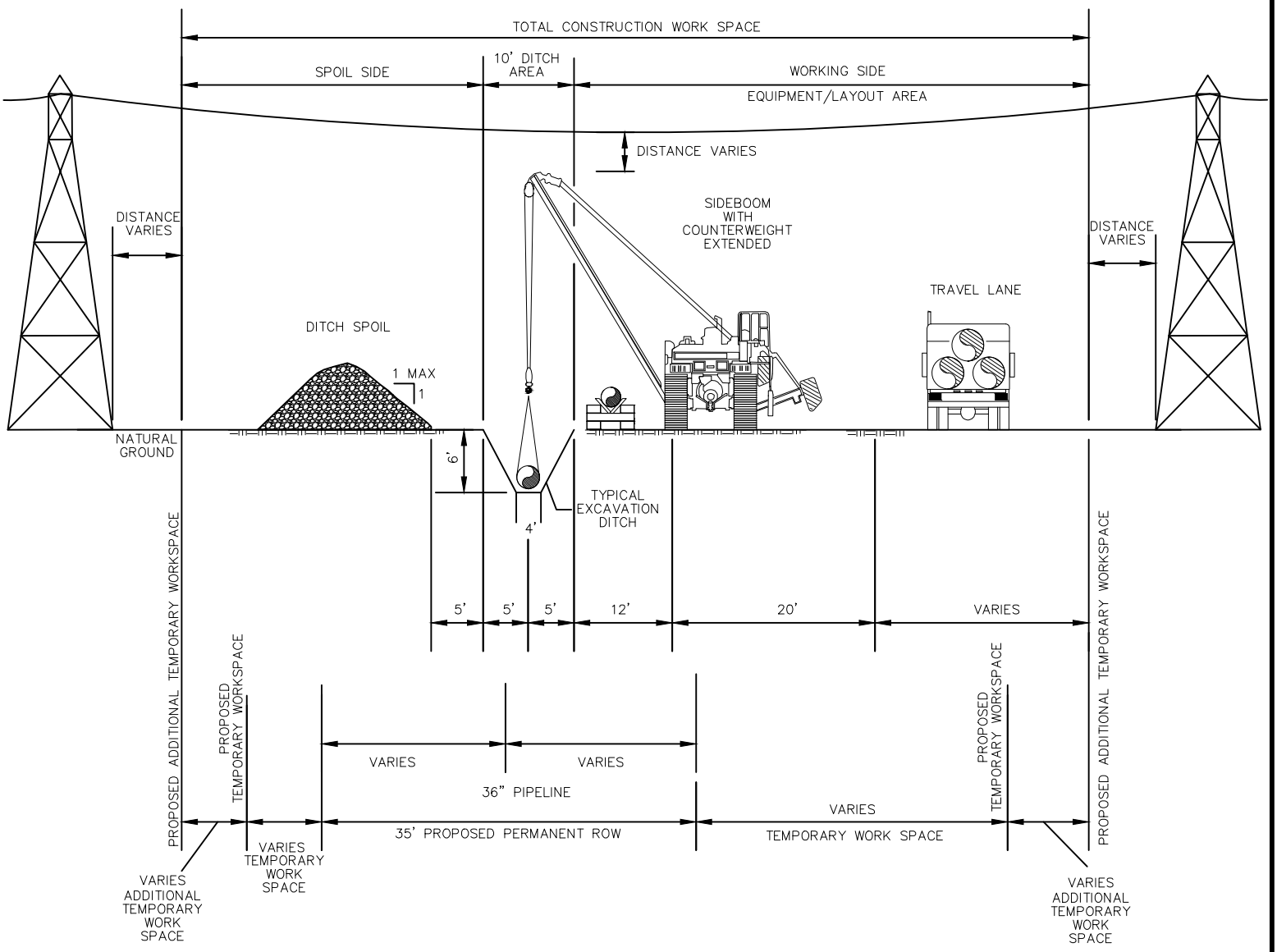
Division:		Op. Area:	
St.:		Co./Par.:	
Section:	Township:	Range:	
Dft:	Date:	Project ID:	
Chk:	Date:	Scale:	
Appr:	Date:	Filename:	

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYP. ROW CROSS SECTION–CONVENTIONAL CONSTR.
WITH OVERHEAD UTILITY LINE CROSSING–ATWS RIGHT

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 108

Sheet: 108 of 127
Type:



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

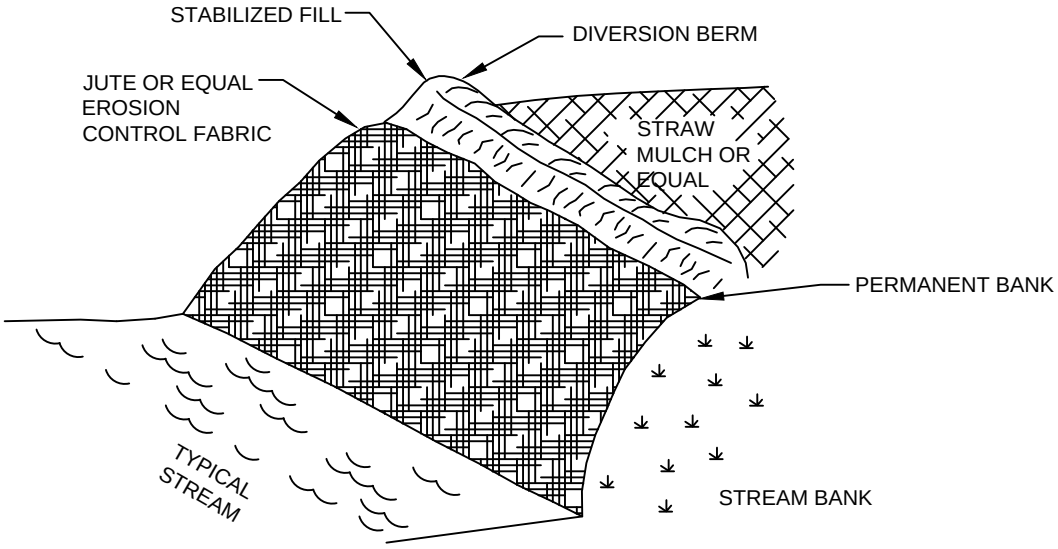
TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYP. ROW CROSS SECTION–CONVENTIONAL CONSTR.
WITH OVERHEAD UTILITY LINE CROSSING–ATWS LT & RT

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

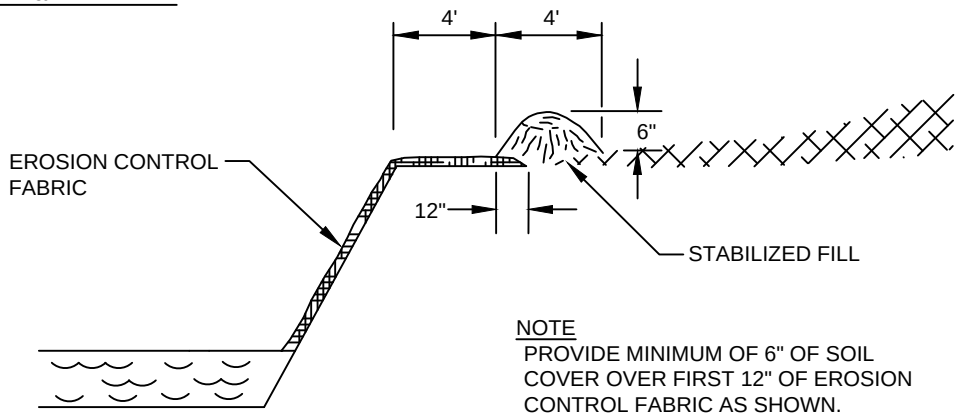
FIG. NO. 109

Sheet: 109 of 127
Type:

STAKE TO THE SLOPE WITH WOOD PEGS OR STAPLE
PER MANUFACTURERS SPECIFICATION



STRAW MULCH OR EQUAL
OVER SEED & FERTILIZER



NOTE
PROVIDE MINIMUM OF 6" OF SOIL
COVER OVER FIRST 12" OF EROSION
CONTROL FABRIC AS SHOWN.

SLOPE SECTION

NOTES:

EROSION CONTROL MATTING WILL BE INSTALLED WITHIN 50' OF BANK FOR ALL HQ/EV WATERSHEDS.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

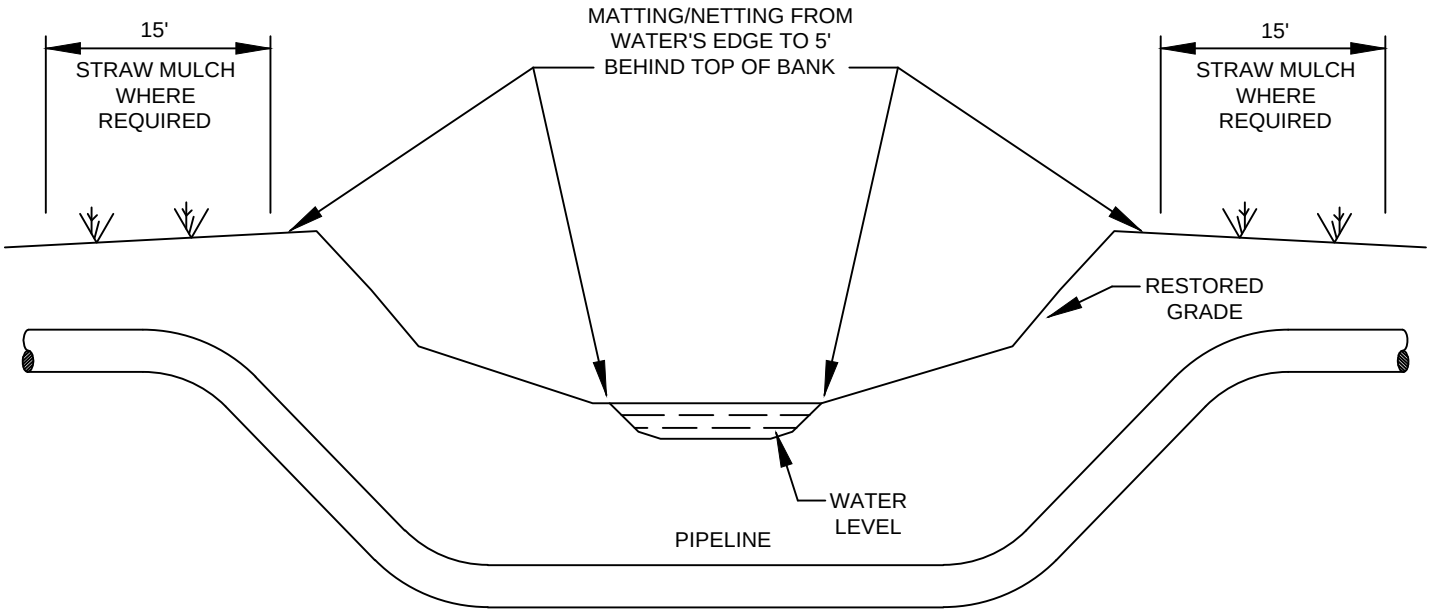
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL EROSION
CONTROL FABRIC

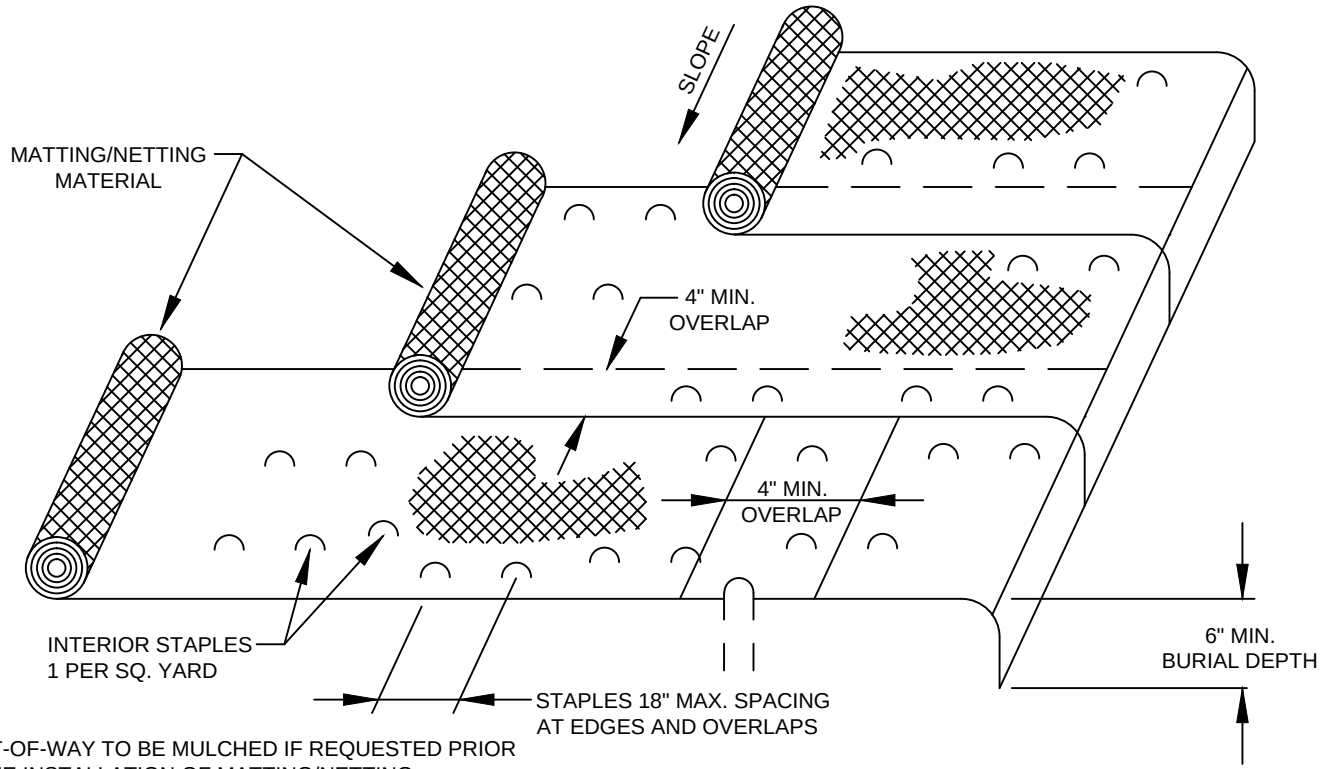
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 110

Sheet: 110 of 127
Type:



PROFILE
(NOT TO SCALE)



NOTES:

1. RIGHT-OF-WAY TO BE MULCHED IF REQUESTED PRIOR TO THE INSTALLATION OF MATTING/NETTING.
2. MATTING/NETTING SHALL BE RUN HORIZONTAL AND PARALLEL TO THE GROUND CONTOUR.
3. STAPLES SHALL BE 10"-LONG, STANDARD MATTING/NETTING STAPLES.
4. **EROSION CONTROL MATTING WILL BE INSTALLED WITHIN 50' OF BANK FOR ALL HQ/EV WATERSHEDS.**

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:		Op. Area:
St.:		Co./Par.:
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

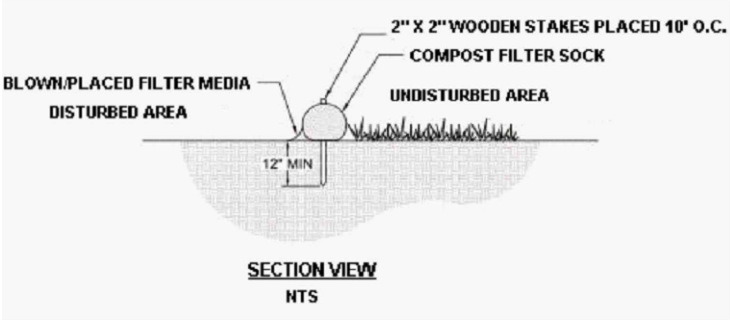
TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL MATTING/NETTING
INSTALLATION FOR WATER CROSSING

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

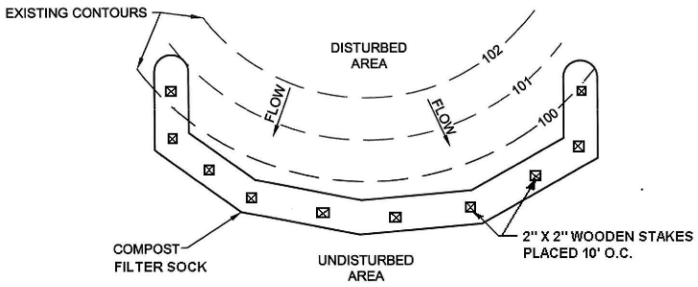
FIG. NO. 111

Sheet: 111 of 127
Type:

STANDARD CONSTRUCTION DETAIL 4-1
COMPOST FILTER SOCK



SECTION VIEW
NTS



PLAN VIEW
NTS

Adapted from Filtrexx

Sock fabric shall meet standards of Table 4.1. Compost shall meet the following standards:

Organic Matter Content	**80% - 100% (dry weight basis)**
Organic Portion	**Fibrous and elongated**
pH	**5.5 – 8.0**
Moisture Content	**35% - 55%**
Particle Size	**98% pass through 1" screen**
Soluble Salt Concentration	**5.0 dS Maximum**

NOTES:

COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN SOCK ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY SOCK SHALL NOT EXCEED 500 FEET.

TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.

ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE SOCK AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.

SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUN OFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURE'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.

BIODEGRADABLE FILTER SOCK SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND MULCH SPREAD AS SOIL SUPPLEMENT.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

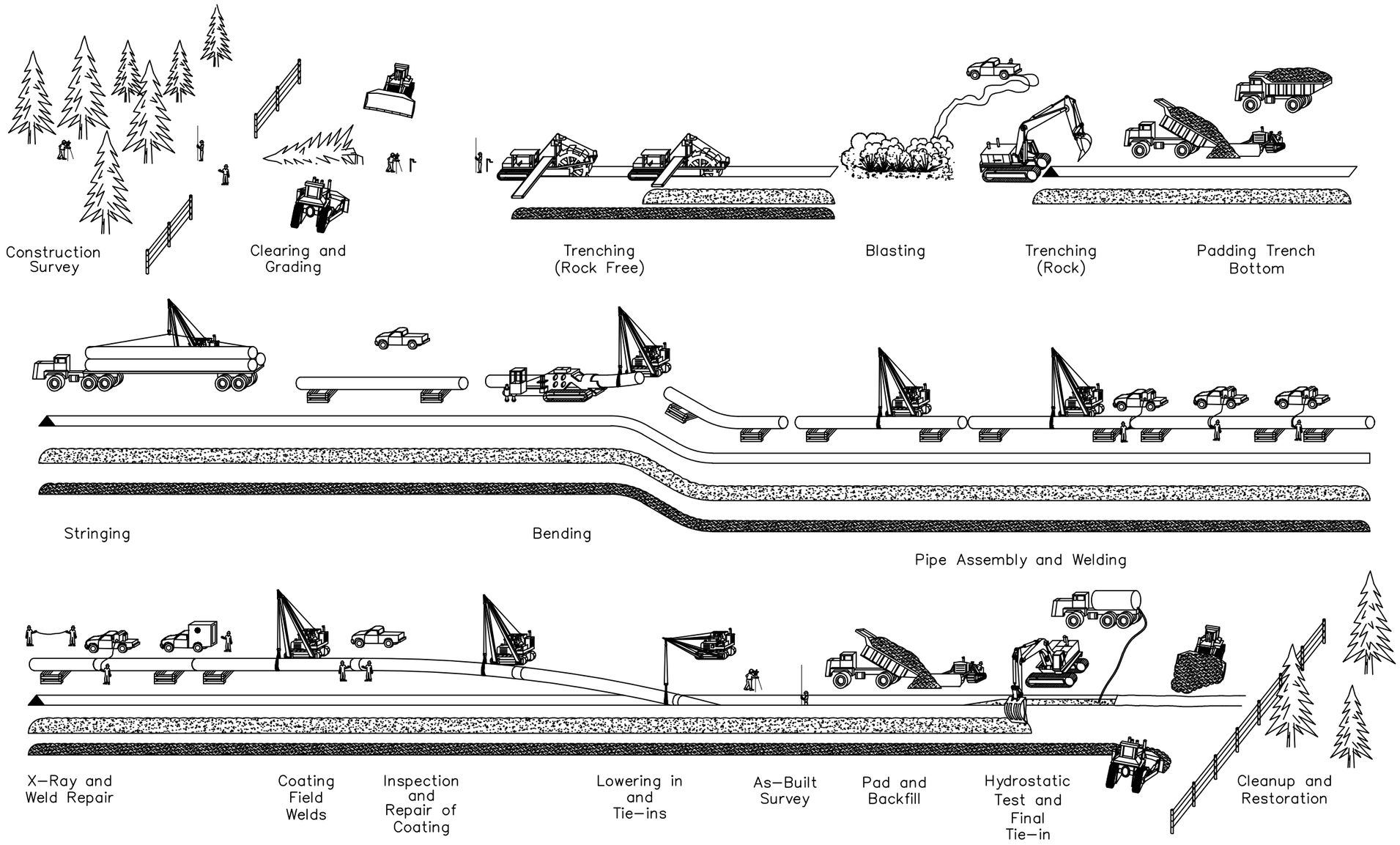
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
STANDARD CONSTRUCTION DETAIL,
COMPOST FILTER SOCK

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 112

Sheet: 112 of 127
Type:



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:		Op. Area.:	
State:		Co./Par.:	
Section:	Township:	Range:	
Dft:	Date:	Scale:	
Chk:	Date:	Filename:	
Appr:	Date:		

TENNESSE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL PIPELINE CONSTRUCTION SEQUENCE

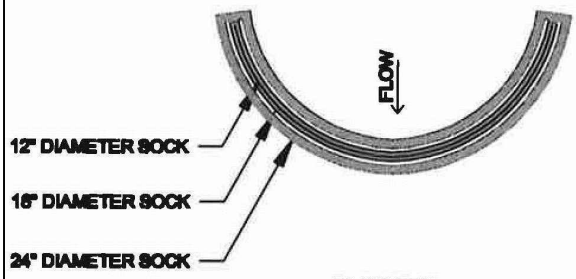
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 113

Sheet: 113 of 127
Type:

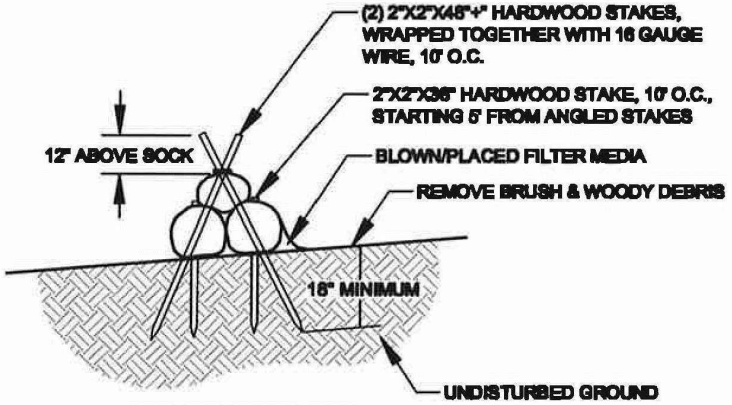
Jul 21, 2014 – 2:05PM

COMPOST SOCK SEDIMENT TRAP



PLAN VIEW

1. COMPOST SOCK SEDIMENT TRAP SHALL BE SIZED TO PROVIDE 2,000 CUBIC FEET OF STORAGE CAPACITY FOR EACH ACRE TRIBUTARY TO THE TRAP.
2. MINIMUM BASE WIDTH IS EQUIVALENT TO THE HEIGHT.
3. SEDIMENT ACCUMULATION SHALL NOT EXCEED 1/3 THE TOTAL HEIGHT OF THE TRAP.
4. SOCKS SHALL BE OF LARGER DIAMETER AT THE BASE OF THE TRAP AND DECREASE IN DIAMETER FOR SUCCESSIVE LAYERS AS INDICATED TO THE LEFT.
5. ENDS OF THE TRAP SHALL BE A MINIMUM OF 1 FOOT HIGHER IN ELEVATION THAN THE MID-SECTION, WHICH SHALL BE LOCATED AT THE POINT OF DISCHARGE.



ADAPTED FROM FILTREXX
STAKING DETAIL

SOCK MATERIAL SHALL MEET THE STANDARDS OF TABLE 4.1 COMPOST SHALL MEET THE FOLLOWING STANDARDS:

ORGANIC MATTER CONTENT	80%-100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS AND ELONGATED
pH	5.5-8.0
MOISTURE CONTENT	35%-55%
PARTICLE SIZE	99% PASS THROUGH 1" SCREEN
SOLUBLE SALT CONCENTRATION	5.0 dS MAXIMUM

COMPOST SOCK TRAPS SHALL NOT EXCEED THREE SOCKS IN HEIGHT AND SHALL BE STACKED IN PYRAMIDAL FORM AS SHOWN ABOVE. MINIMUM TRAP HEIGHT IS ON 24" DIAMETER SOCK. ADDITIONAL STORAGE MAY BE PROVIDED BY MEANS OF AN EXCAVATED SUMP 12" DEEP EXTENDING 1 TO 3 FEET UPSLOPE OF THE SOCKS.

COMPOST SOCK TRAPS SHALL PROVIDE 2,000 CUBIC FEET STORAGE CAPACITY WITH 12" FREEBOARD FOR EACH TRIBUTARY DRAINAGE AREA.

THE MAXIMUM TRIBUTARY DRAINAGE AREA IS 5.0 ACRES. SINCE COMPOST SOCKS ARE "FLOW-THROUGH", NO SPILLWAY IS REQUIRED.

COMPOST SOCK TRAPS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/3 THE HEIGHT OF THE SOCK.

PHOTODEGRADABLE AND BIODEGRADABLE SOCKS SHALL NOT BE USED FOR MORE THAN 1 YEAR.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

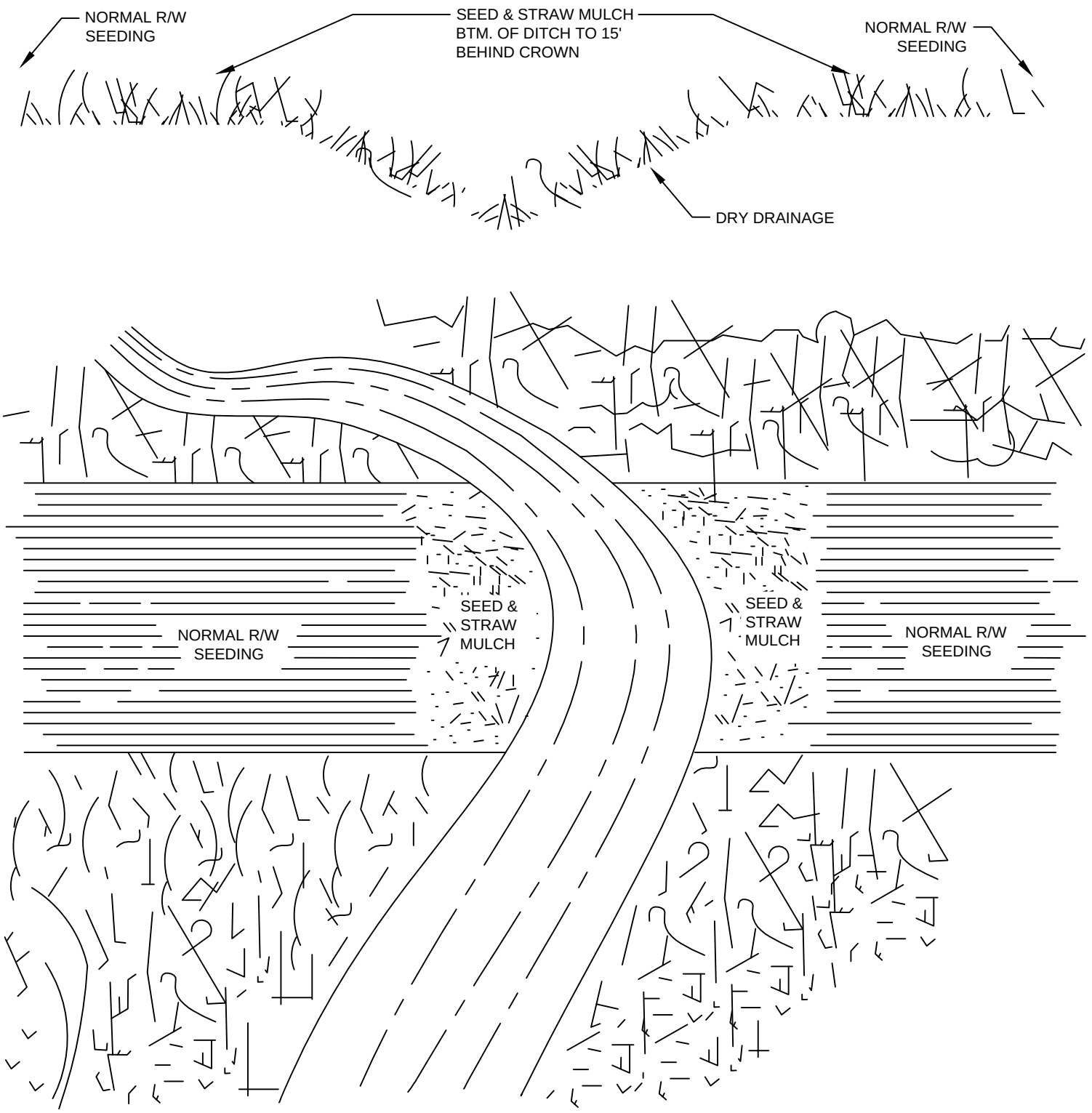
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
COMPOST SOCK
SEDIMENT TRAP

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 114

Sheet: 114 of 127
Type:



NOTES:

EROSION CONTROL MATTING WILL BE INSTALLED WITHIN 50' OF BANK FOR ALL HQ/EV WATERSHEDS.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

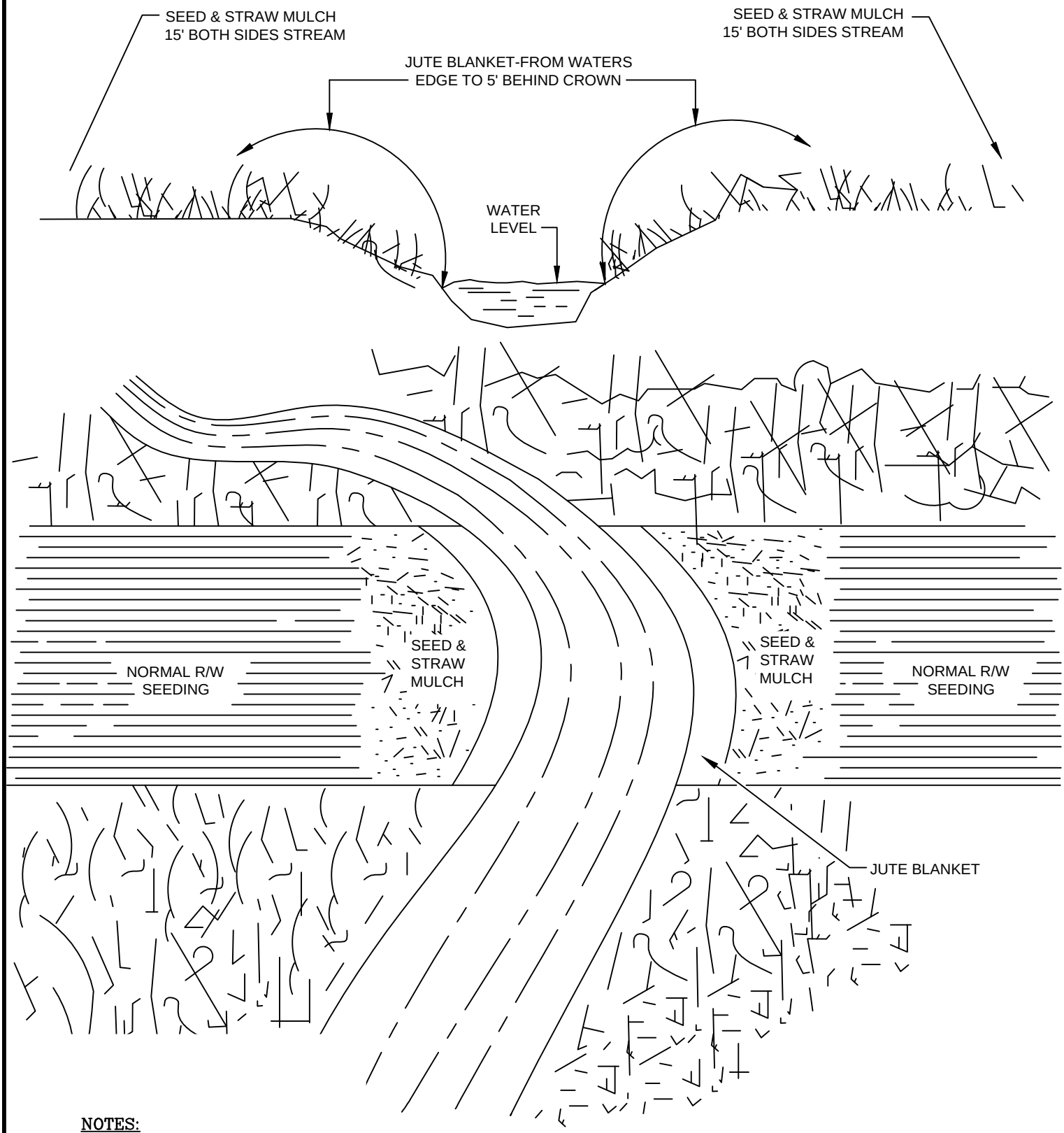
Division:		Op. Area:
St.:		Co./Par.:
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
FINAL STREAM
BANK STABILIZATION (1)

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 115

Sheet: 115 of 127
Type:



NOTES:

EROSION CONTROL MATTING WILL BE INSTALLED WITHIN 50' OF BANK FOR ALL HQ/EV WATERSHEDS.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

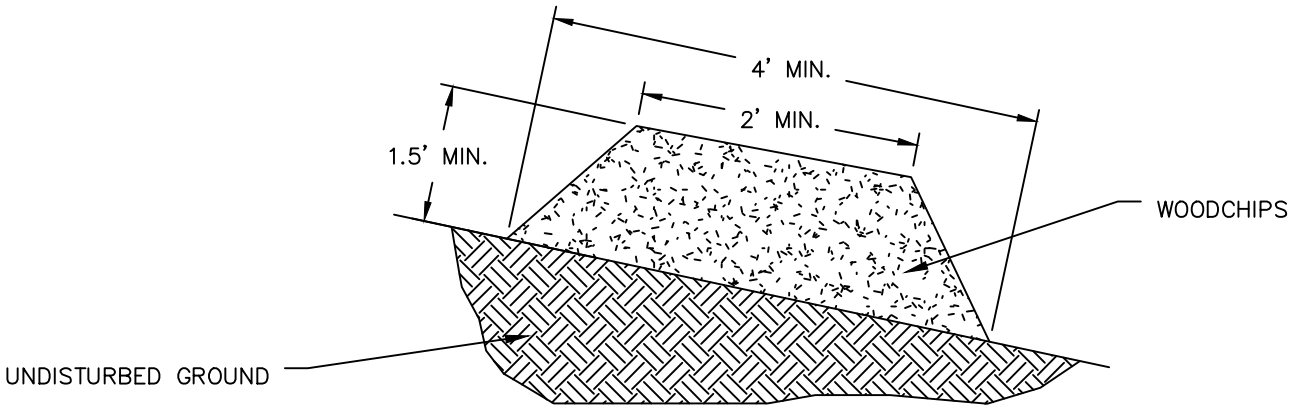
Division:		Op. Area:
St.:		Co./Par.:
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
FINAL STREAM BANK
STABILIZATION (2)

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 116

Sheet: 116 of 127
Type:



PRIOR TO PLACEMENT OF THE BERM, OBSTRUCTIONS SUCH AS TREE LIMBS, LARGE ROCKS, ETC. SHALL BE REMOVED.

WOOD CHIP FILTER BERM SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BERM SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BERM ALIGNMENT. WOOD CHIP BERMS SHALL NOT BE LOCATED IN AREAS OF CONCENTRATED FLOW OR USED TO CONSTRUCT SEDIMENT TRAPS OR OTHER IMPOUNDMENTS.

A 6" THICK LAYER OF COMPOST SHALL BE ADDED TO THE UPSLOPE SIDE OF ANY WOOD CHIP FILTER BERM LOCATED IN AN HQ WATERSHED. THIS BMP SHALL NOT BE ROUTINELY USED IN EV WATERSHEDS.

BERMS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH HALF THE HEIGHT OF THE BERM. DAMAGED OR DETERIORATED PORTIONS OF THE BERM SHALL BE REPLACED IMMEDIATELY UPON INSPECTION.

BERMS MAY BE LEVELED WHEN THE TRIBUTARY AREA HAS BEEN PERMANENTLY STABILIZED OR LEFT IN PLACE.

REVISIONS

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

Division:		Op. Area:
St.:		Co./Par.:
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

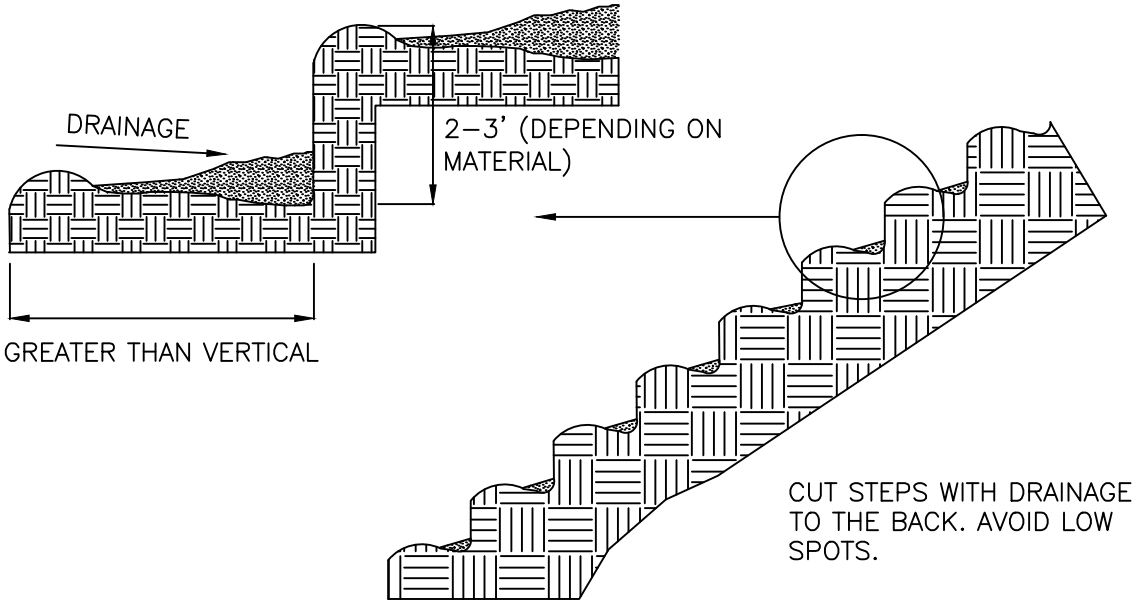
TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
WOODCHIP
FILTER BERM

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

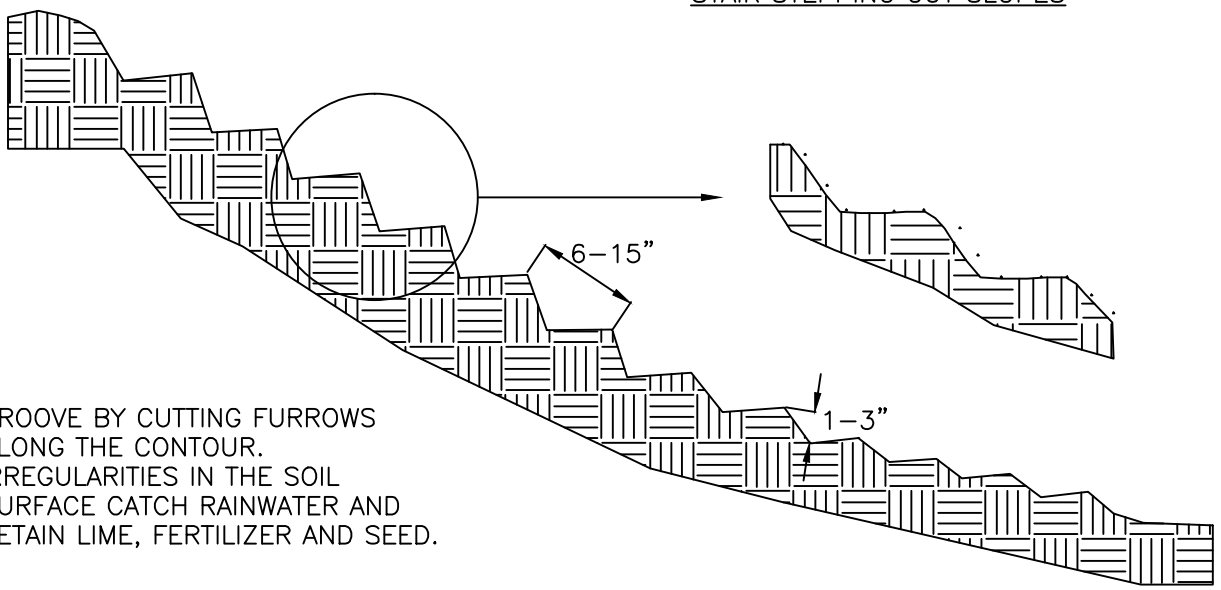
FIG. NO. 117

Sheet: 117 of 127
Type:

DEBRIS FROM SLOPE ABOVE IS CAUGHT BY STEPS



STAIR STEPPING CUT SLOPES



GROOVE BY CUTTING FURROWS ALONG THE CONTOUR. IRREGULARITIES IN THE SOIL SURFACE CATCH RAINWATER AND RETAIN LIME, FERTILIZER AND SEED.

GROOVING SLOPES

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

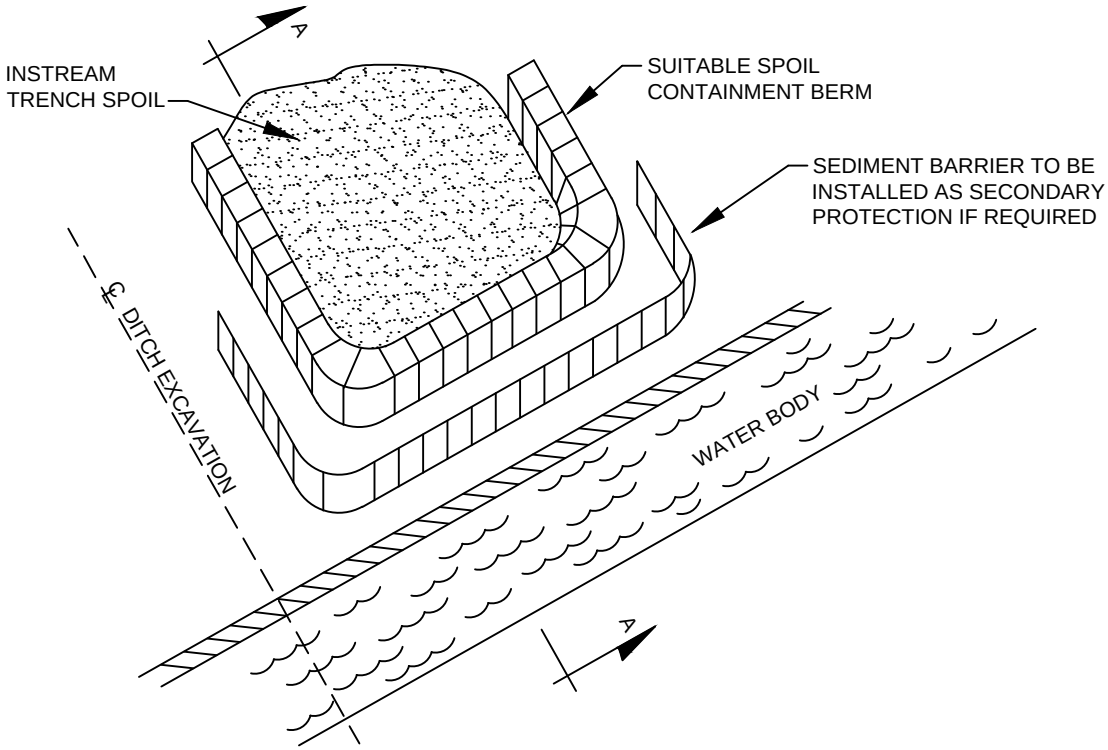
Division:		Op. Area:	
St.:		Co./Par.:	
Section:	Township:	Range:	
Dft:	Date:	Project ID:	
Chk:	Date:	Scale:	
Appr:	Date:	Filename:	

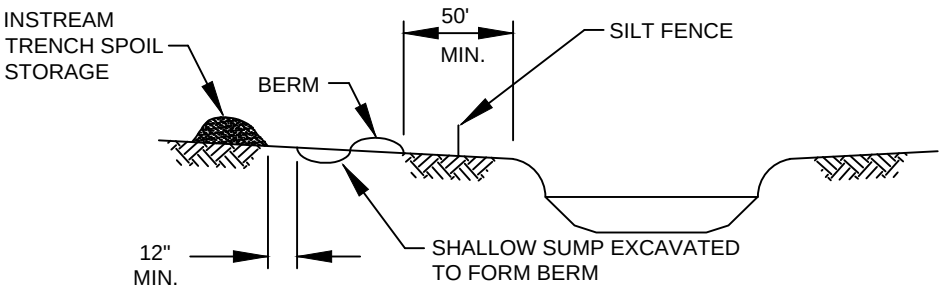
TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
SURFACE ROUGHENING

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 118

Sheet: 118 of 127
Type:





SECTION A-A
NOT TO SCALE

NOTES:

1. SOIL CONTAINMENT BERNS ARE TO BE USED WHERE INSTREAM TRENCH SPOIL COULD REENTER THE WATERCOURSE DIRECTLY OR INDIRECTLY AND WITH STIMULTANEOUS UTILIZATION OF SEDIMENT BARRIERS IF REQUIRED.
2. MATERIAL USED FOR THE CONTAINMENT BERM SHOULD BE A MINIMUM OF 50' FROM THE WATERS EDGE. IT SHOULD BE KEPT TO A HEIGHT WHICH REMAINS STABLE DURING THE CONSTRUCTION PERIOD.
3. CARE SHOULD BE TAKEN THAT THE SPOIL PILE DOES NOT OVERTOP THE CONTAINMENT BERM.
4. THE CONTAINMENT BERM SHOULD BE DISMANTLED AND THE SITE RESTORED TO THE ORIGINAL CONDITION UPON COMPLETION OF THE WATER CROSSING.
5. WHERE POSSIBLE, RIPARIAN VEGETATION SHALL BE LEFT IN PLACE.
6. STAGED MOVEMENT OF INSTREAM SPOIL MAY BE REQUIRED IF QUANTITIES ARE EXCESSIVE.
7. CARE AND ATTENTION MUST BE TAKEN TO ENSURE SPOIL CONTAINMENT BERMS ARE MAINTAINED.
8. FULL CONSIDERATION FOR OVERALL SLOPE STABILITY IS REQUIRED WHEN SELECTING A SPOIL CONTAINMENT LOCATION.

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

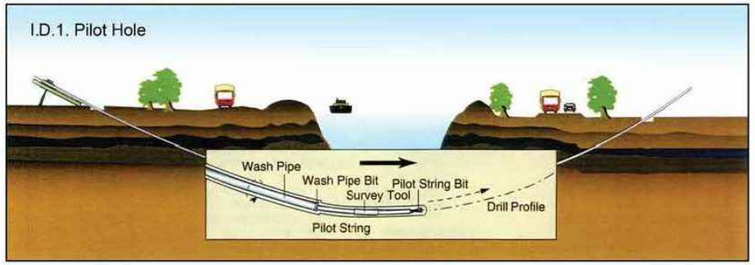
TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL TEMPORARY SOIL CONTAINMENT
BERM FOR WATERBODY TRENCH SPOIL

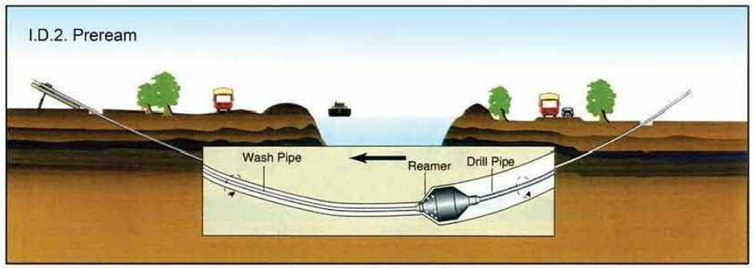
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

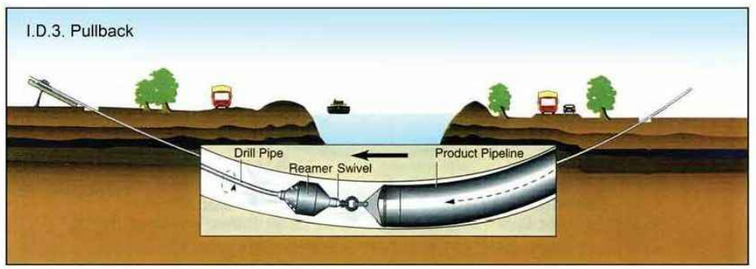
FIG. NO. 119

Sheet: 119 of 127
Type:

Figure 1. Technique







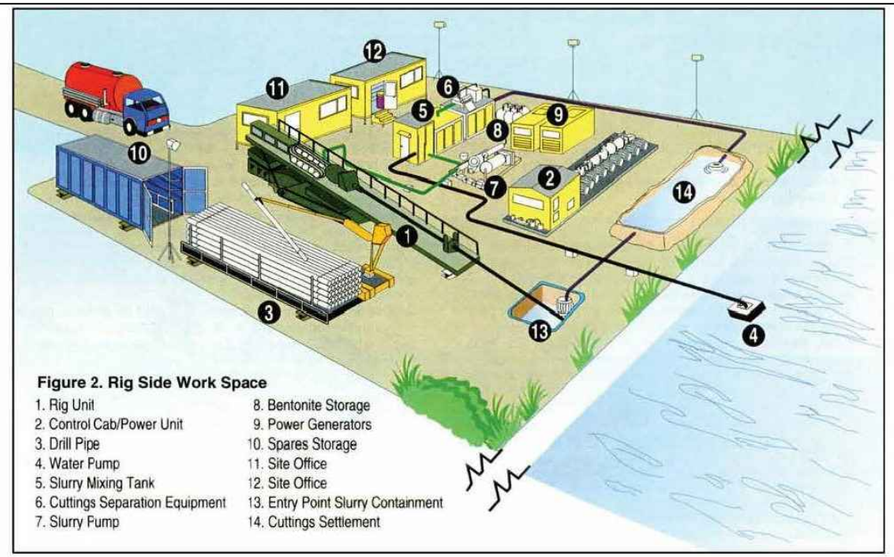


Figure 2. Rig Side Work Space

1. Rig Unit
2. Control Cab/Power Unit
3. Drill Pipe
4. Water Pump
5. Slurry Mixing Tank
6. Cuttings Separation Equipment
7. Slurry Pump
8. Bentonite Storage
9. Power Generators
10. Spares Storage
11. Site Office
12. Site Office
13. Entry Point Slurry Containment
14. Cuttings Settlement

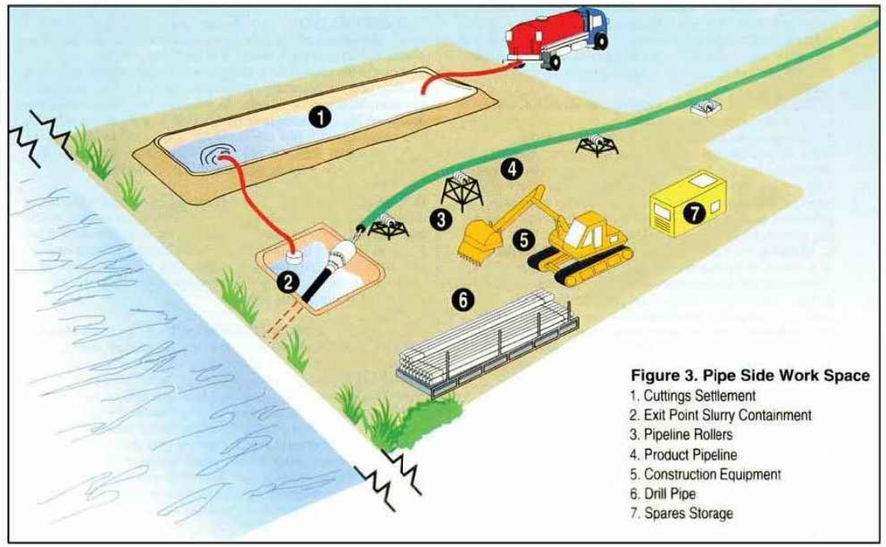


Figure 3. Pipe Side Work Space

1. Cuttings Settlement
2. Exit Point Slurry Containment
3. Pipeline Rollers
4. Product Pipeline
5. Construction Equipment
6. Drill Pipe
7. Spares Storage

*CONNECTICUT LOOP ONLY

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.
REVISIONS					

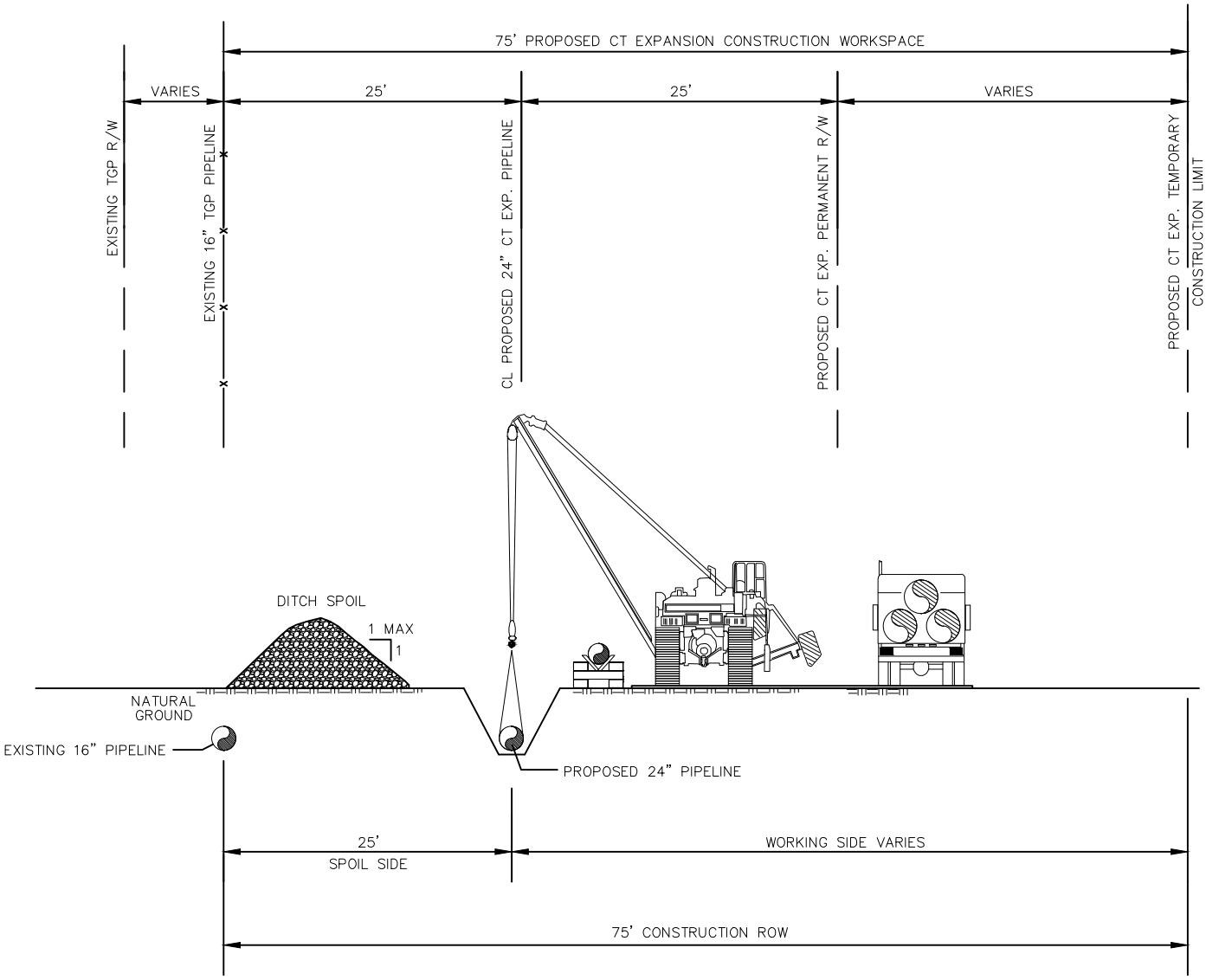
Division:		Op. Area.:	
State:		Co./Par.:	
Section:	Township:	Range:	
Dft:	Date:	Scale:	
Chk:	Date:	Filename:	
Appr:	Date:		

TENNESSE GAS PIPELINE, LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
TYPICAL CONSTRUCTION HORIZONTAL DIRECTIONAL DRILL (HDD)

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 120 | Sheet: 120 of 127 | Type:

Jul 21, 2014 – 2:05PM



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

*CONNECTICUT LOOP ONLY

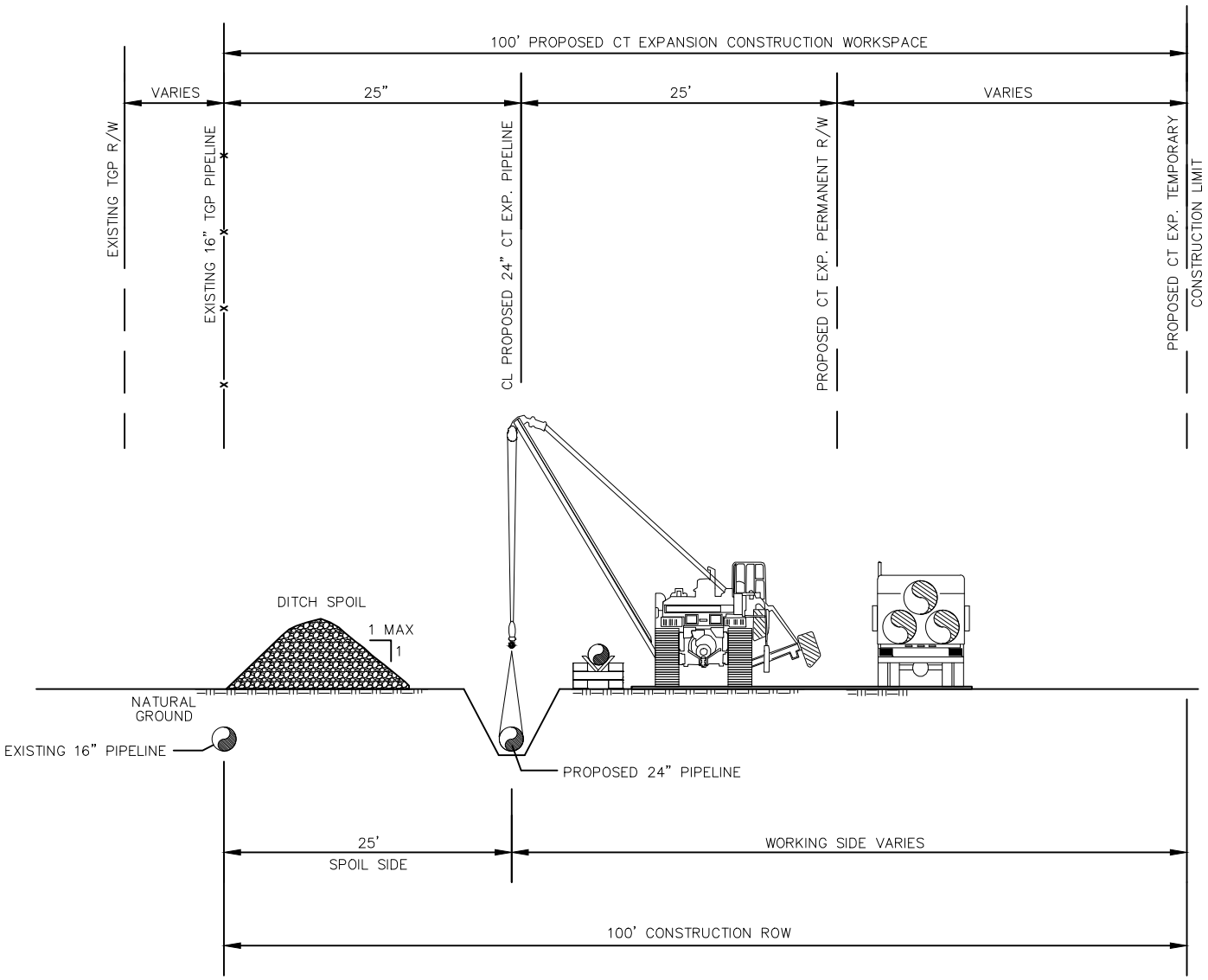
Division:		Op. Area:
St.:		Co./Par.:
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
24" TYPICAL 75' CONSTRUCTION WORKSPACE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 121

Sheet: 121 of 127
Type:



*CONNECTICUT LOOP ONLY

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

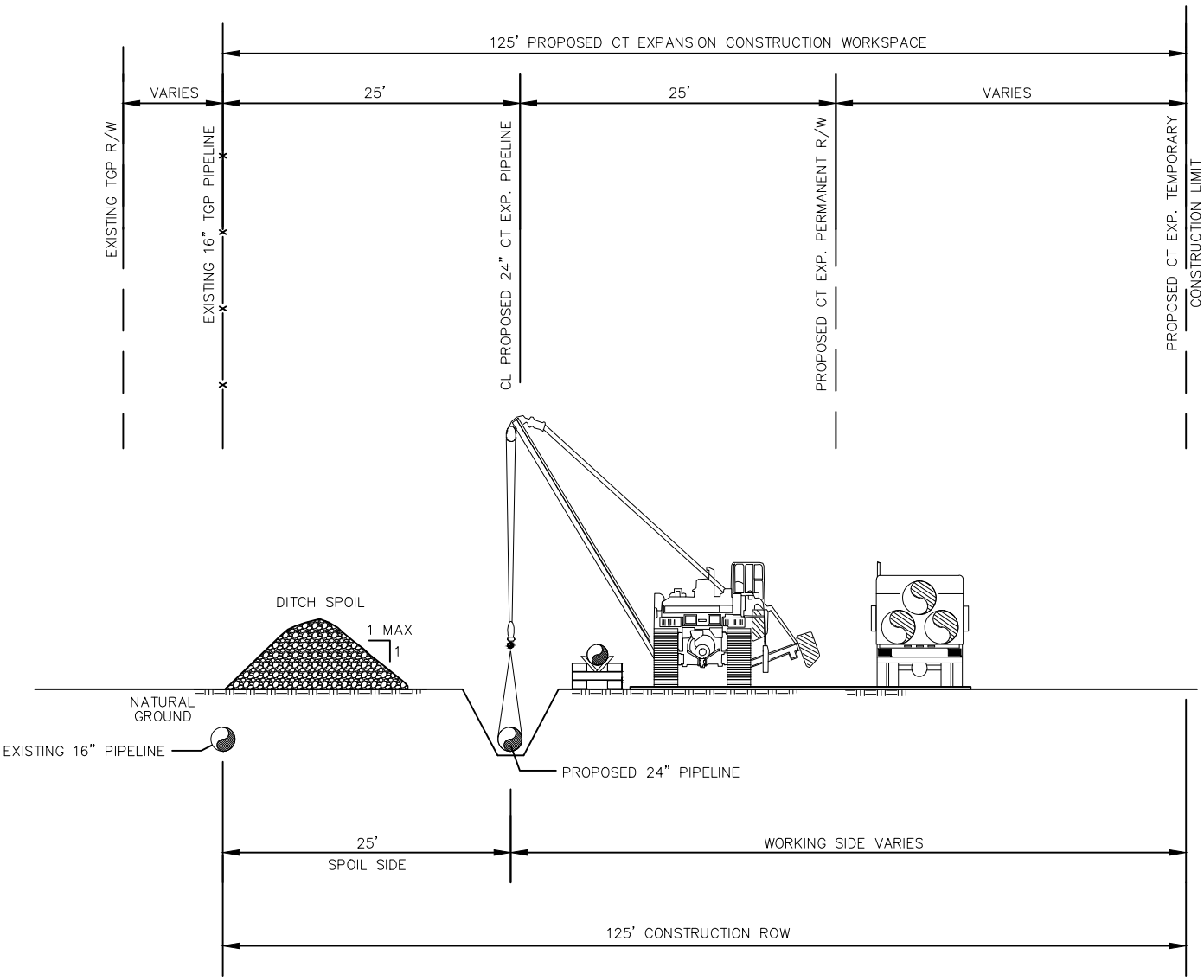
Division:		Op. Area:
St.:		Co./Par.:
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
24" TYPICAL 100' CONSTRUCTION WORKSPACE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 122

Sheet: 122 of 127
Type:



*CONNECTICUT LOOP ONLY

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

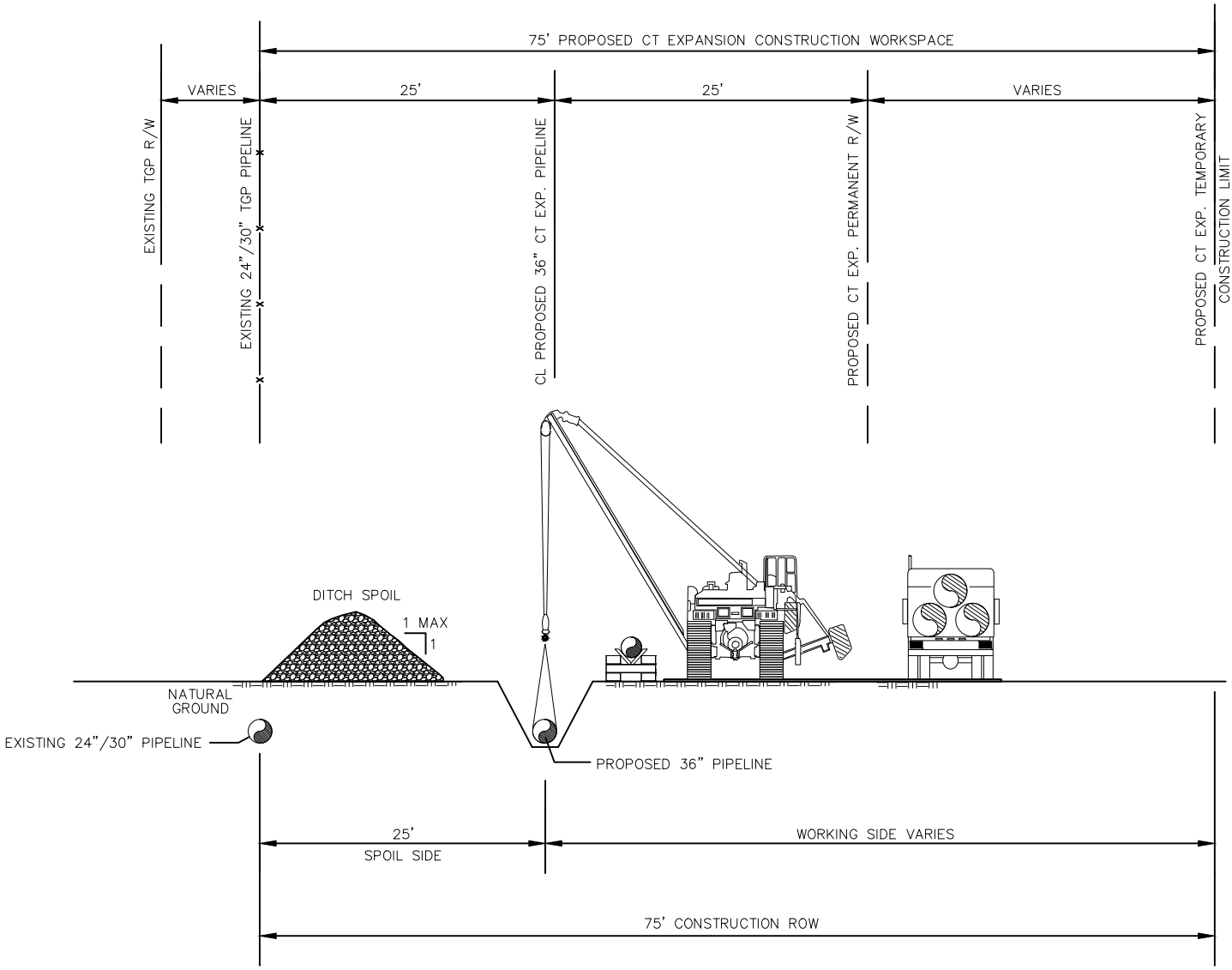
Division:		Op. Area:
St.:		Co./Par.:
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
24" TYPICAL 125' CONSTRUCTION WORKSPACE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 123

Sheet: 123 of 127
Type:



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

*MASSACHUSETTS AND NEW YORK LOOP ONLY

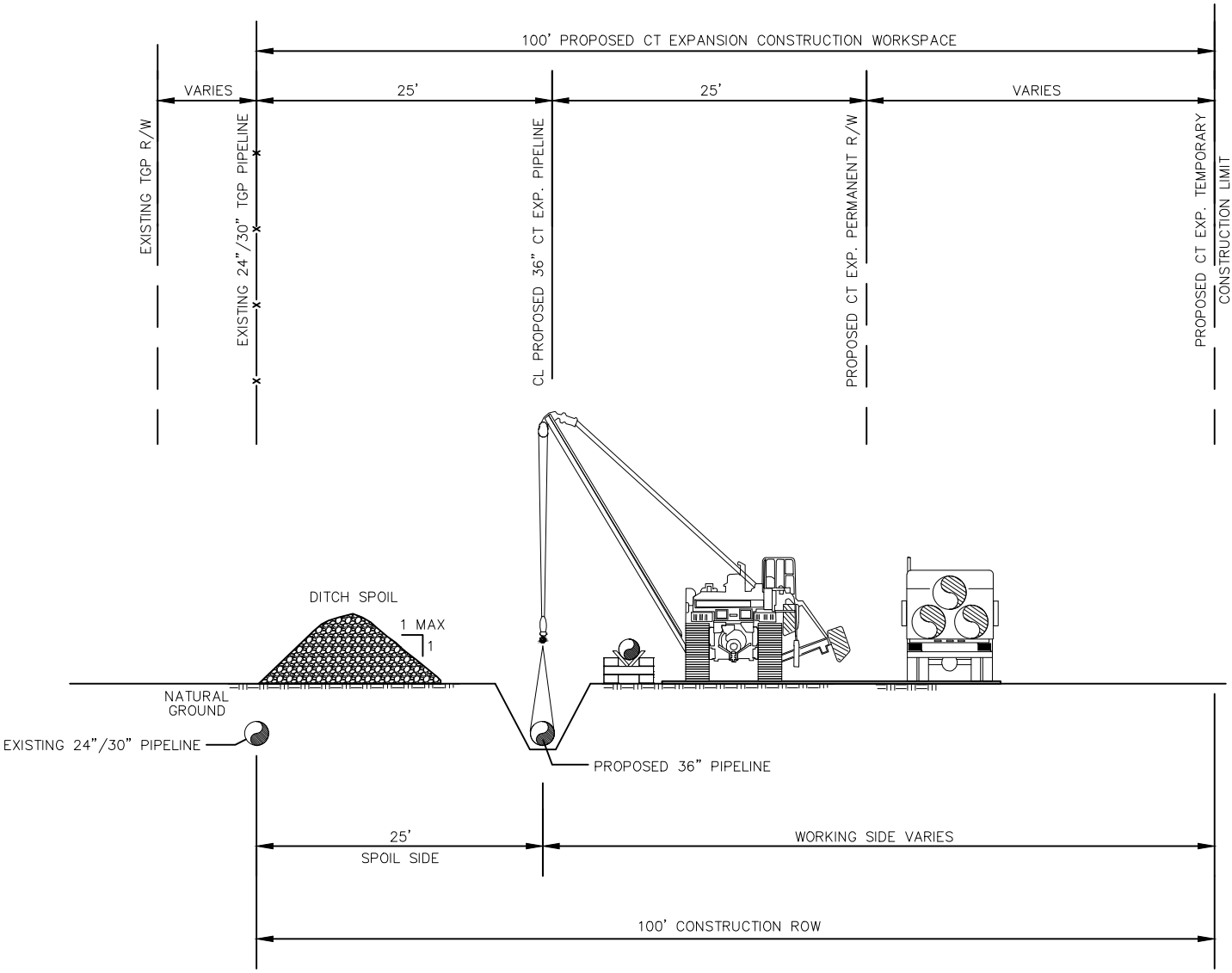
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
36" TYPICAL 75' CONSTRUCTION WORKSPACE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 124

Sheet: 124 of 127
Type:



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

*MASSACHUSETTS AND NEW YORK LOOP ONLY

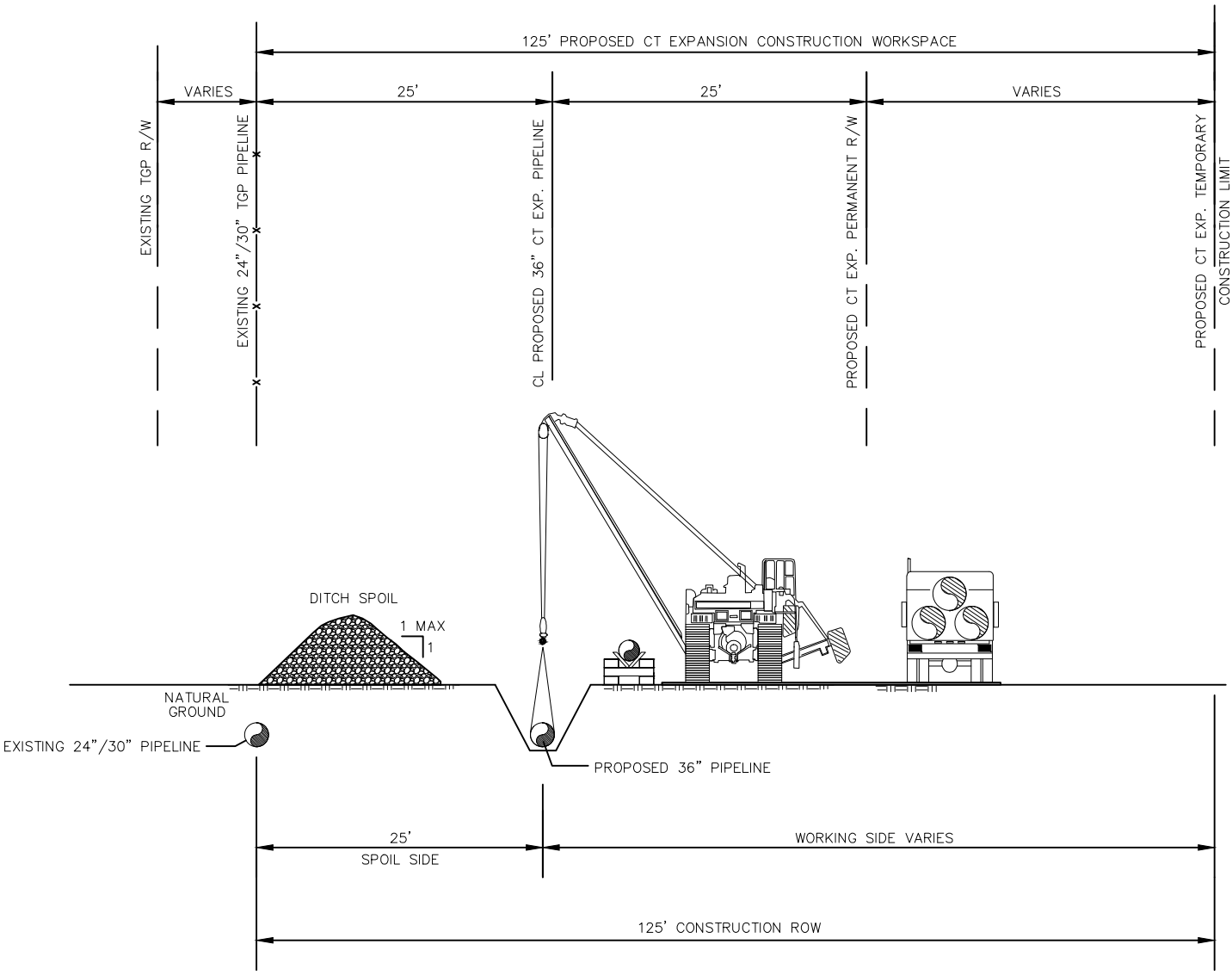
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
36" TYPICAL 100' CONSTRUCTION WORKSPACE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 125

Sheet: 125 of 127
Type:



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

*MASSACHUSETTS AND NEW YORK LOOP ONLY

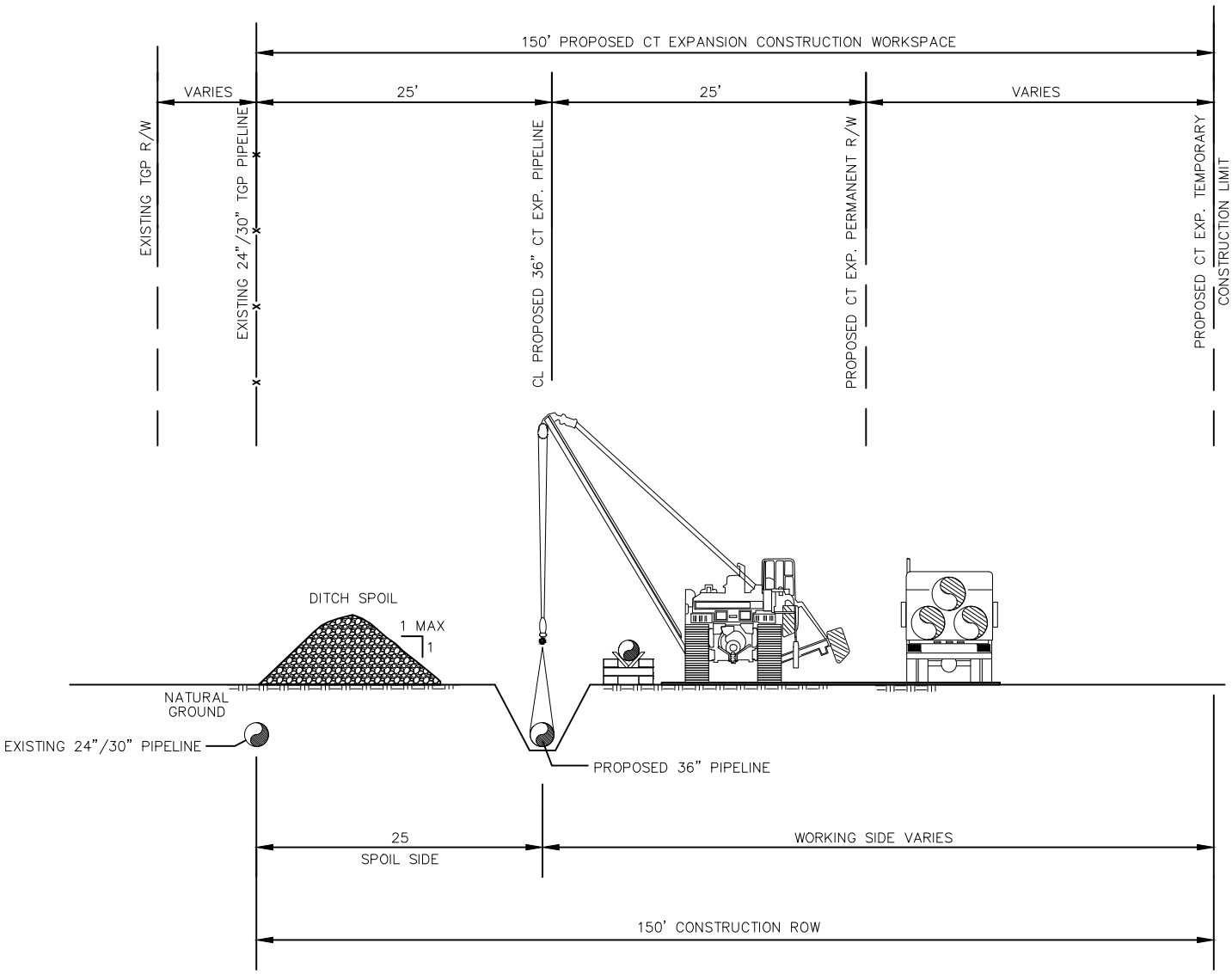
Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
36" TYPICAL 125' CONSTRUCTION WORKSPACE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 126

Sheet: 126 of 127
Type:



NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

*MASSACHUSETTS AND NEW YORK LOOP ONLY

Division:	Op. Area:	
St.:	Co./Par.:	
Section:	Township:	Range:
Dft:	Date:	Project ID:
Chk:	Date:	Scale:
Appr:	Date:	Filename:

TENNESSEE GAS PIPELINE,LLC.
STANDARD ENVIRONMENTAL DETAIL
CONNECTICUT EXPANSION PROJECT
36" TYPICAL 150' CONSTRUCTION WORKSPACE

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

FIG. NO. 127

Sheet: 127 of 127
Type: