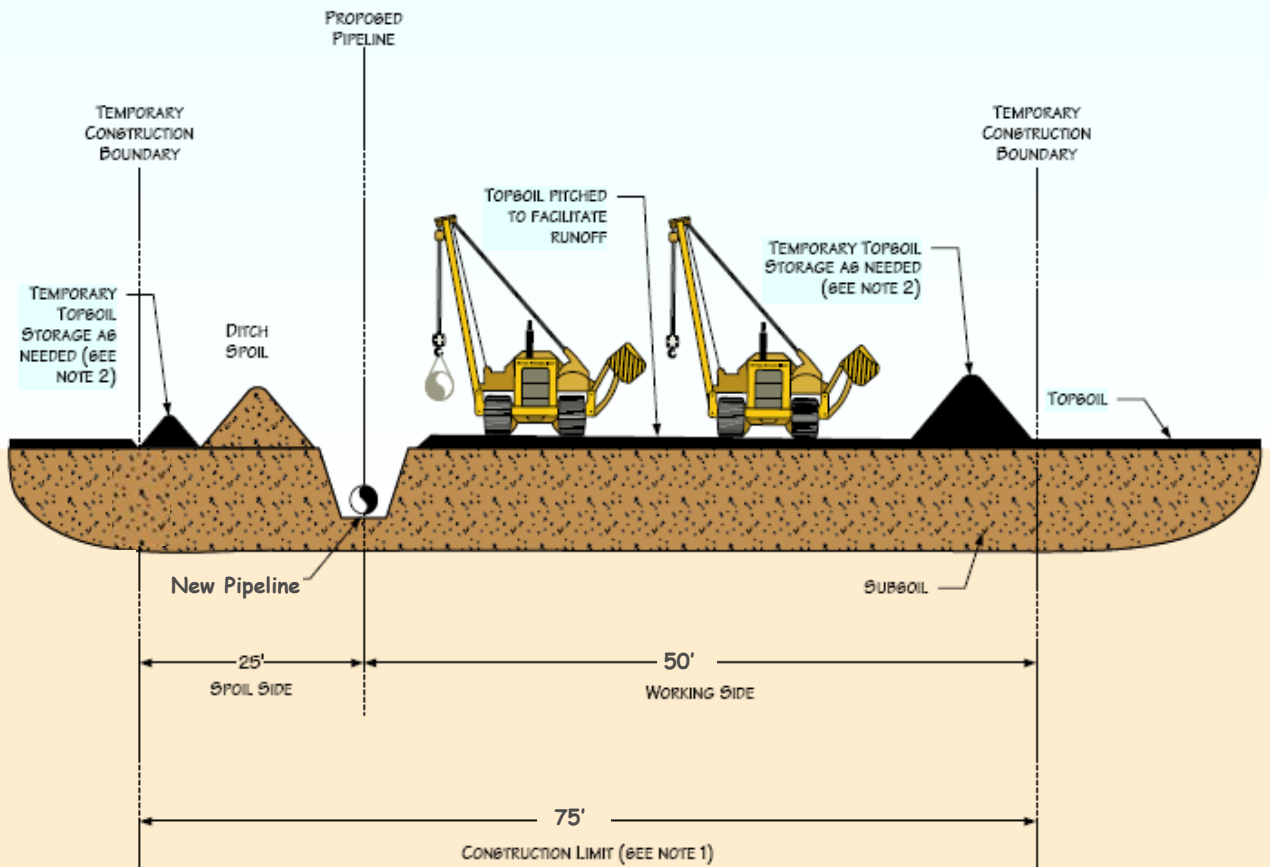


## **TAB 6 – Environmental Mitigation Plan Exhibits**

- Figure 6.1.1 Typical Construction Layout
- Figure 6.1.2 Typical Topsoil Segregation – Ditch Plus Spoil Side
- Figure 6.1.3 Typical Topsoil Segregation – Full Right-of-Way
- Figure 6.1.4 Typical Topsoil Segregation – Trench Line Only
- Figure 6.1.5 Typical Temporary or Permanent Berms – Perspective View
- Figure 6.1.6 Typical Temporary or Permanent Berms – Elevation View
- Figure 6.1.7 Typical Silt Fence Installation
- Figure 6.1.8 Typical Straw Bale installation
- Figure 6.1.9 Typical Trench Breakers – Perspective View
- Figure 6.1.10 Typical Trench Breakers – Plan and Profile Views
- Figure 6.2.1 Typical Waterbody Crossing – Wet Trench Method
- Figure 6.2.2 Typical Waterbody Crossing – Dam and Pump Method
- Figure 6.2.3 Typical Waterbody Crossing – Flume Method
- Figure 6.2.4 Typical Waterbody Crossing – Directional Drill Method
- Figure 6.2.5 Typical Span Type Bridge
- Figure 6.2.6 Typical Rock and Flume Bridge
- Figure 6.2.7 Typical Dewatering Measures
- Figure 6.2.8 Typical Straw Bale Dewatering Structure
- Figure 6.3.1 Typical Wetland Crossing
- Figure 6.4.1 Typical Paved Road Crossing – Sediment Control
- Figure 6.7.1 Permanent Slope Breakers – Perspective View
- Figure 6.7.2 Erosion Control Blanket - Steep Slopes ( $\geq 30\%$ )
- Figure 6.7.3 Typical Final Stream Bank Stabilization – Rip Rap & Erosion Control



**PROFILE**

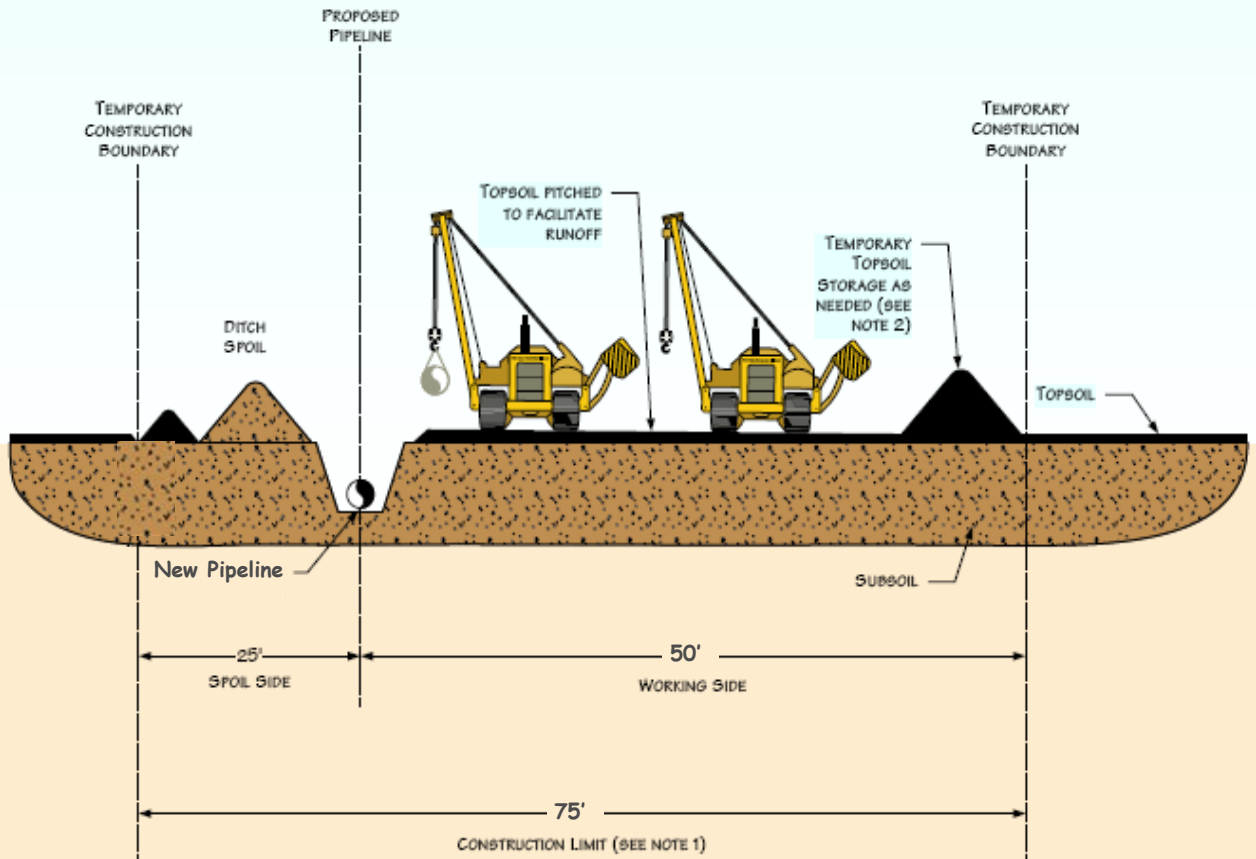
**NOTES:**

1. CONSTRUCTION LIMITS WILL TYPICALLY BE 75' WIDE. SPOIL SIDE WILL BE APPROXIMATELY 25' WIDE.
2. THIS DRAWING REFLECTS "DITCH PLUS SPOIL" SIDE TOPSOIL STRIPPING PROCEDURE. STOCKPILE TOPSOIL SEPARATELY FROM DITCH SPOIL SHOWN OR IN OTHER CONFIGURATION APPROVED BY COMPANY.
3. THE OFFSET FROM OUTERMOST EXISTING PIPELINE WILL BE 25' FOR MOST LOCATIONS BUT MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS.



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**Figure 6.1.1 – Typical Construction Layout**  
 McKenzie, Williams, Mountrail Counties  
 Crude Oil Pipeline  
 March 2014



PROFILE

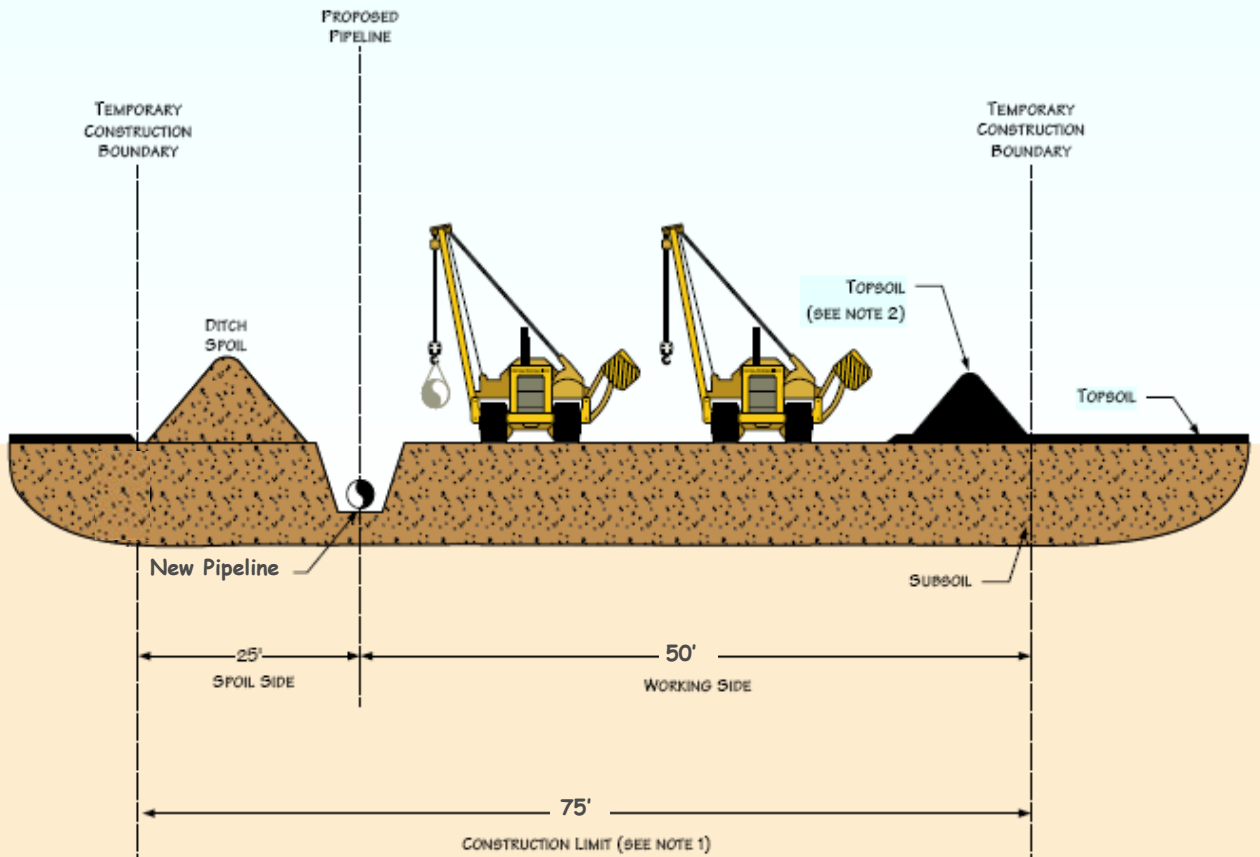
NOTES:

1. CONSTRUCTION LIMITS WILL TYPICALLY BE 75' WIDE. SPOIL SIDE WILL BE APPROXIMATELY 25' WIDE.
2. THIS DRAWING REFLECTS "DITCH PLUS SPOIL" SIDE TOPSOIL STRIPPING PROCEDURE. STOCKPILE TOPSOIL SEPARATELY FROM DITCH SPOIL SHOWN OR IN OTHER CONFIGURATION APPROVED BY COMPANY.
3. THE OFFSET FROM OUTERMOST EXISTING PIPELINE WILL BE 25' FOR MOST LOCATIONS BUT MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS.



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**Figure 6.1.2 – Typical Topsoil Segregation  
 Ditch Plus Spoil Side**  
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 March 2014



PROFILE

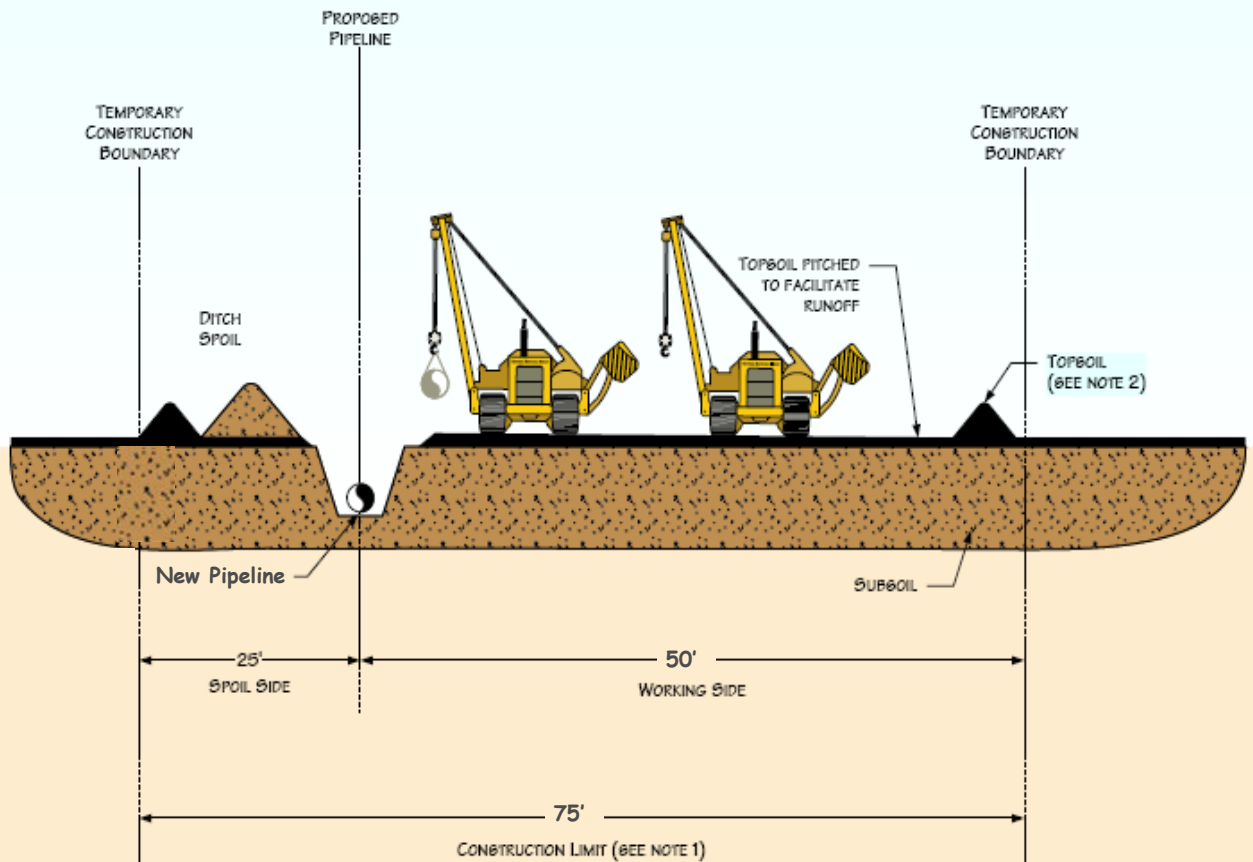
NOTES:

1. CONSTRUCTION LIMITS WILL TYPICALLY BE 75' WIDE. SPOIL SIDE WILL BE APPROXIMATELY 25' WIDE.
2. THIS DRAWING REFLECTS "FULL RIGHT OF WAY" TOPSOIL STRIPPING PROCEDURE. STOCKPILE TOPSOIL SEPARATELY FROM DITCH SPOIL SHOWN OR IN OTHER CONFIGURATION APPROVED BY COMPANY.
3. THE OFFSET FROM OUTERMOST EXISTING PIPELINE WILL BE 25' FOR MOST LOCATIONS BUT MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS.



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**Figure 6.1.3 – Typical Topsoil Segregation Full Right-of-Way**  
 McKenzie, Williams, Mountrail Counties  
 Crude Oil Pipeline  
 March 2014



PROFILE

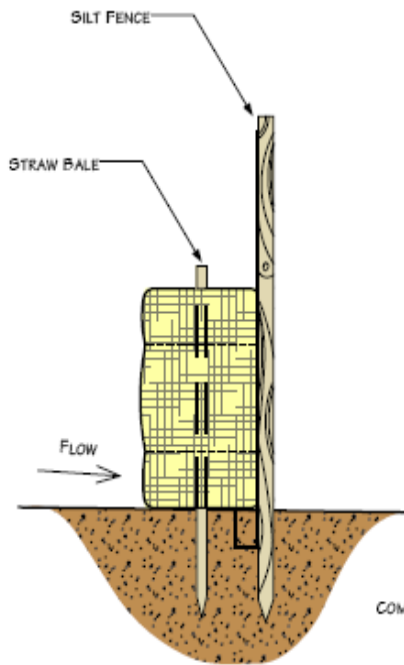
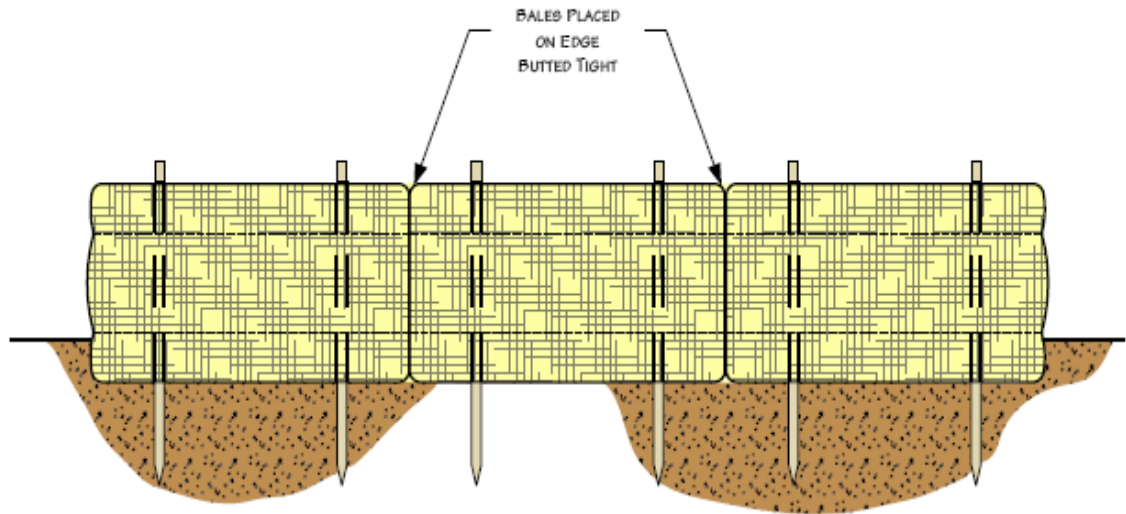
NOTES:

1. CONSTRUCTION LIMITS WILL TYPICALLY BE 75' WIDE. SPOIL SIDE WILL BE APPROXIMATELY 25' WIDE.
2. THIS DRAWING REFLECTS "TRENCH LINE ONLY" TOPSOIL STRIPPING PROCEDURE. STOCKPILE TOPSOIL SEPARATELY FROM DITCH SPOIL SHOWN OR IN OTHER CONFIGURATION APPROVED BY COMPANY.
3. THE OFFSET FROM OUTERMOST EXISTING PIPELINE WILL BE 25' FOR MOST LOCATIONS BUT MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS.

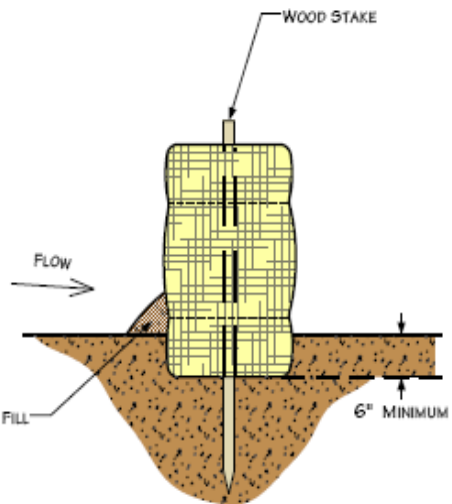


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**Figure 6.1.4 – Typical Topsoil Segregation Trench Line Only**  
 McKenzie, Williams, Mountrail Counties  
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STRAW/HAY BALES & SILT FENCE



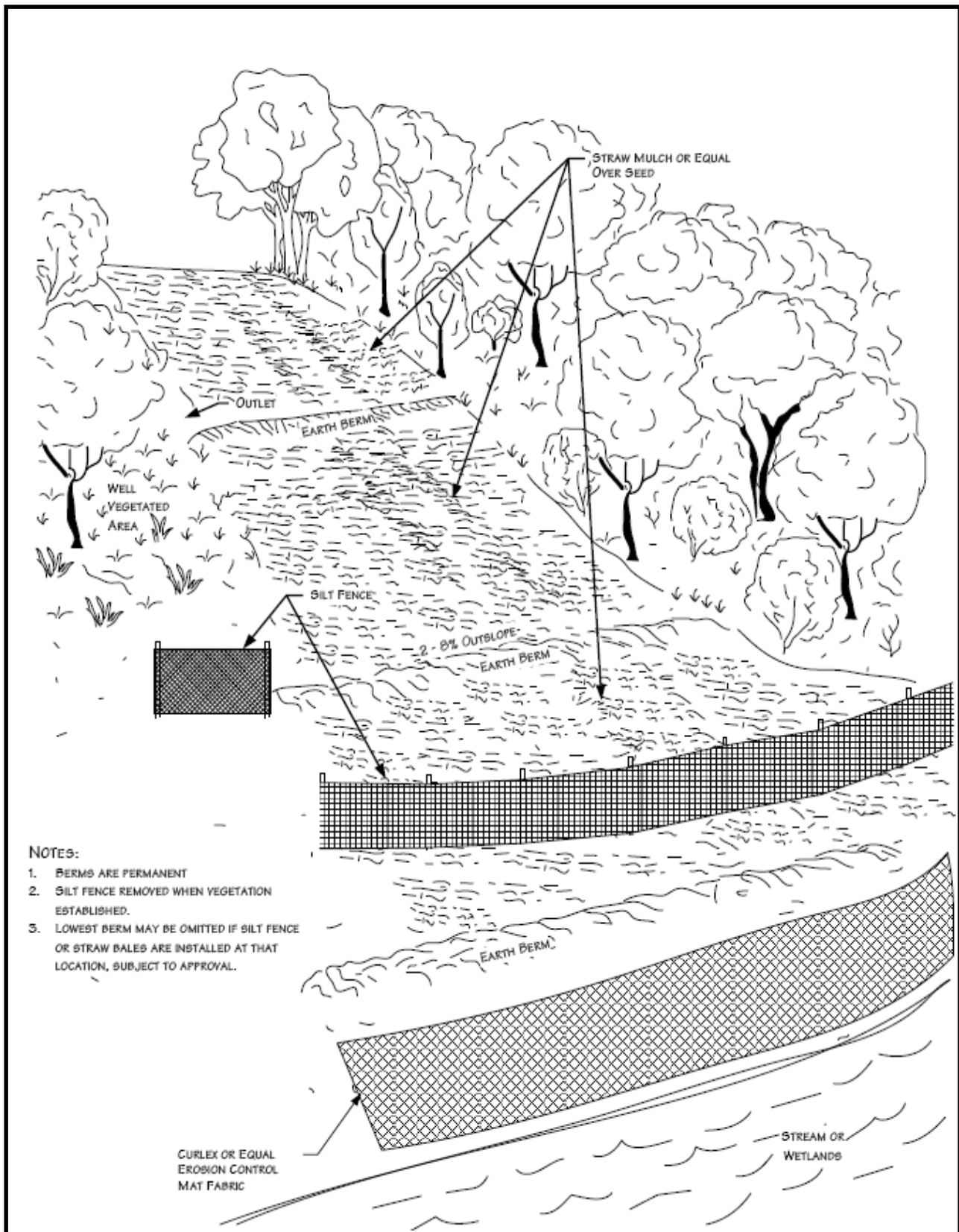
STRAW/HAY BALES ONLY



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**Figure 6.1.8 –Straw Bale Installation**

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 Crude Oil Pipeline  
 March 2014



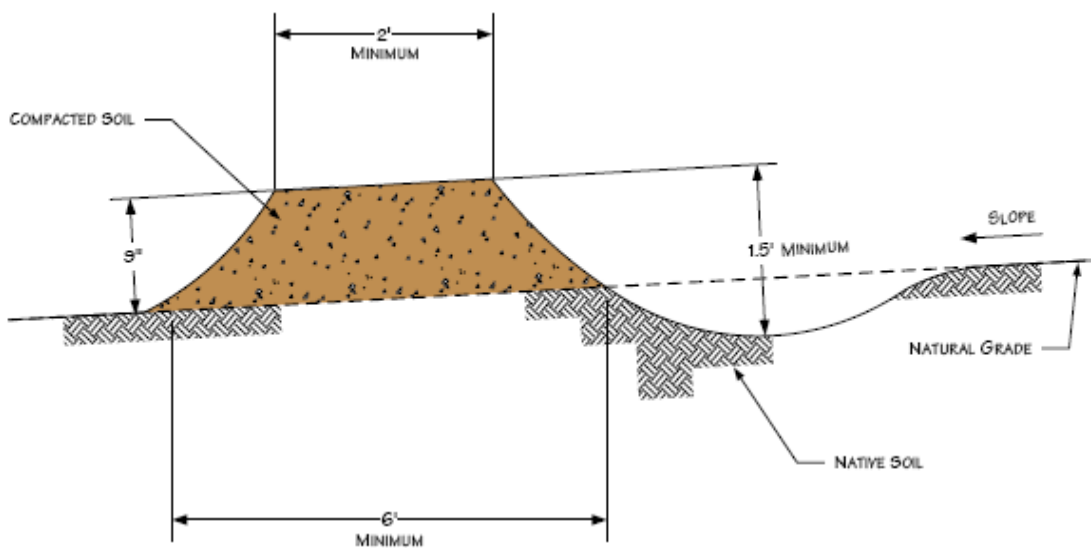
**NOTES:**

1. BERMS ARE PERMANENT
2. SILT FENCE REMOVED WHEN VEGETATION ESTABLISHED.
3. LOWEST BERM MAY BE OMITTED IF SILT FENCE OR STRAW BALES ARE INSTALLED AT THAT LOCATION, SUBJECT TO APPROVAL.



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**Figure 6.1.5 – Typical Temporary or Permanent Berms-Perspective View**  
 McKenzie, Williams, Mountrail Counties  
 Crude Oil Pipeline  
 March 2014



**NOTES**

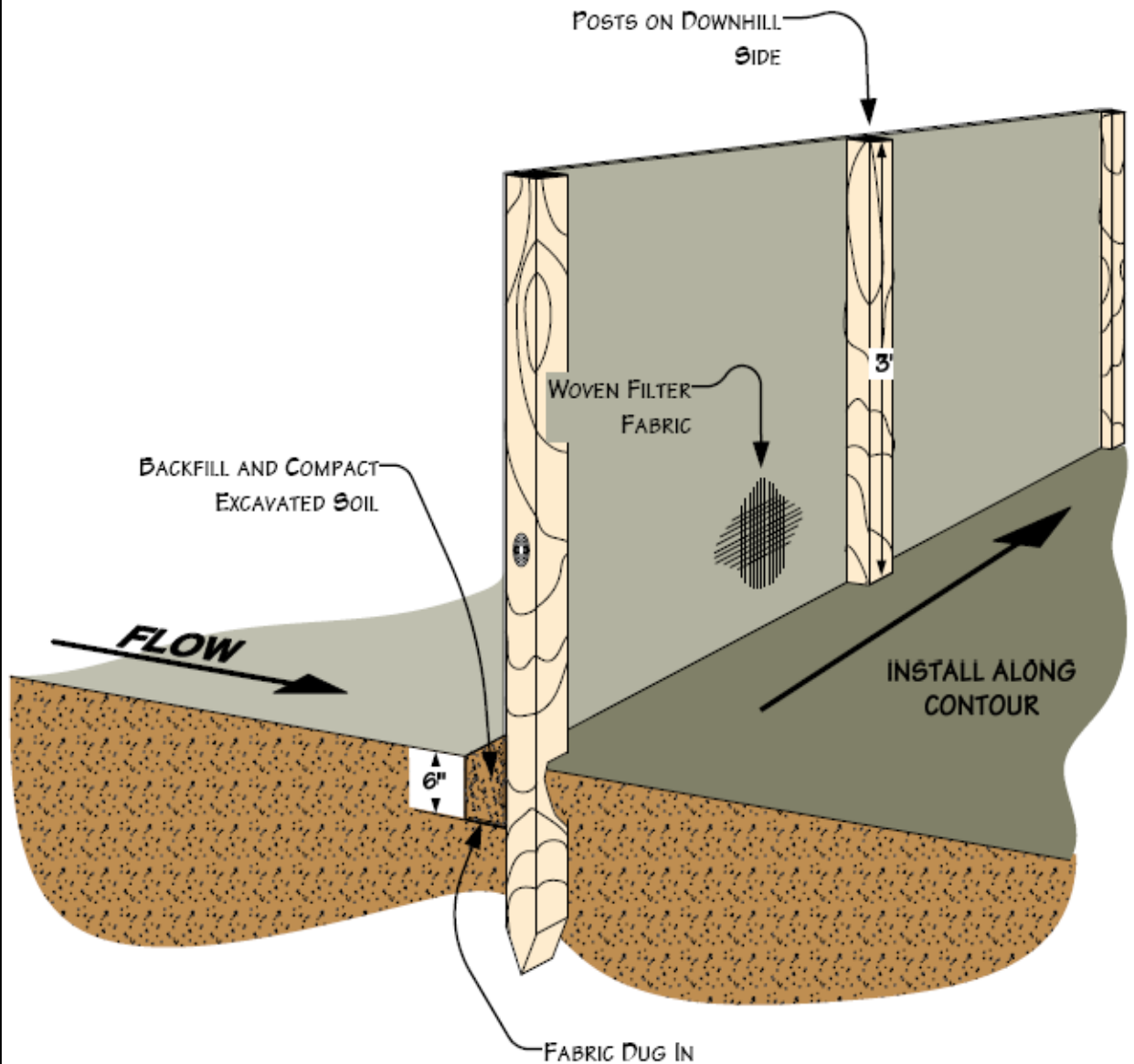
1. BERMS SHALL BE CONSTRUCTED WITH 2 TO 3 PERCENT OUTSLOPE.
2. BERMS SHALL BE OUTLETED TO WELL VEGETATED STABLE AREAS, SILT FENCES, STRAW/HAY BALES OR ROCK APRONS.
3. BERMS SHALL BE SPACED AS DESCRIBED IN CONSTRUCTION SPECIFICATIONS.
4. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS.



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**Figure 6.1.6 – Typical Temporary or Permanent Berm-Elevation View**  
 McKenzie, Williams, Mountrail Counties  
 Crude Oil Pipeline  
 March 2014

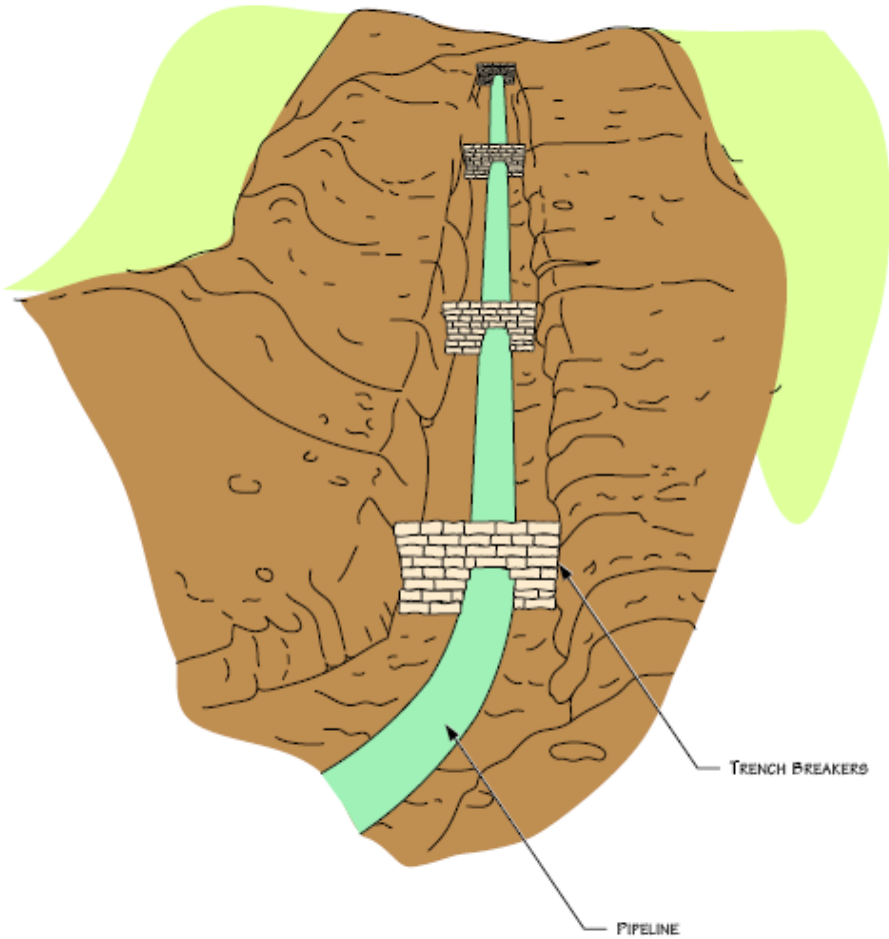




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**Figure 6.1.7 – Typical Silt Fence Installation**

McKenzie, Williams, Mountrail Counties  
 Crude Oil Pipeline  
 March 2014



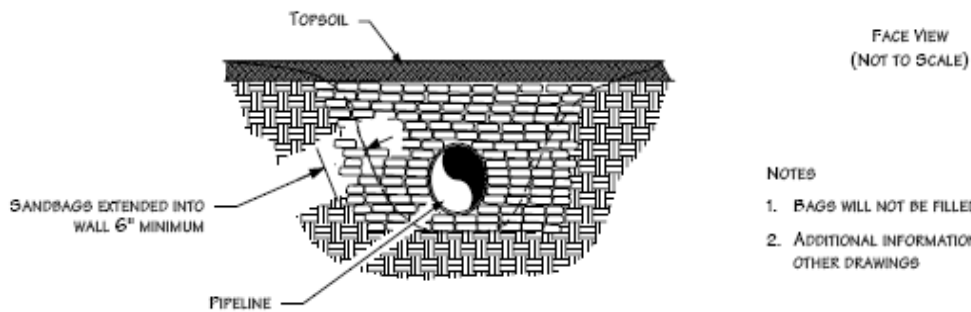
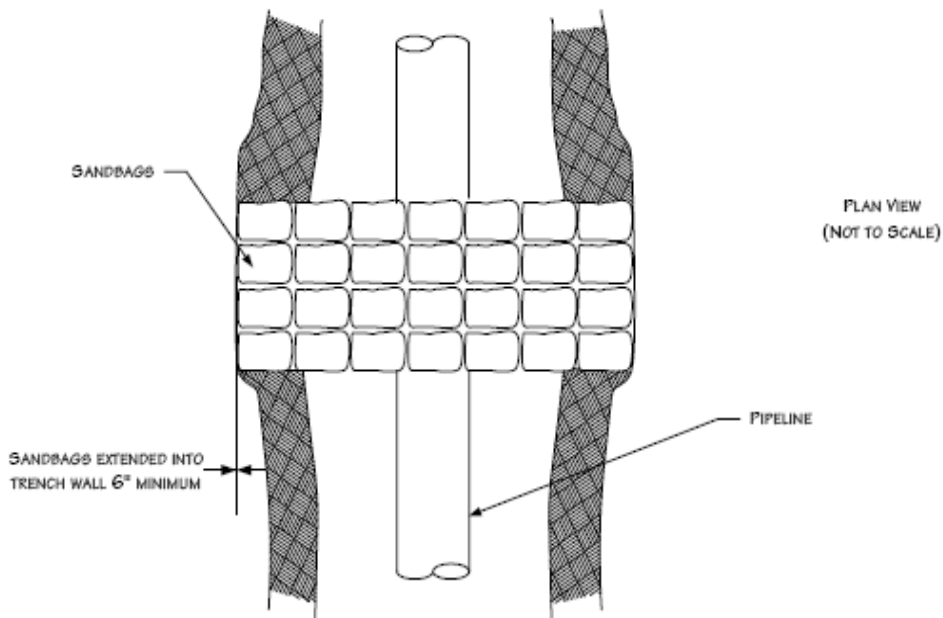
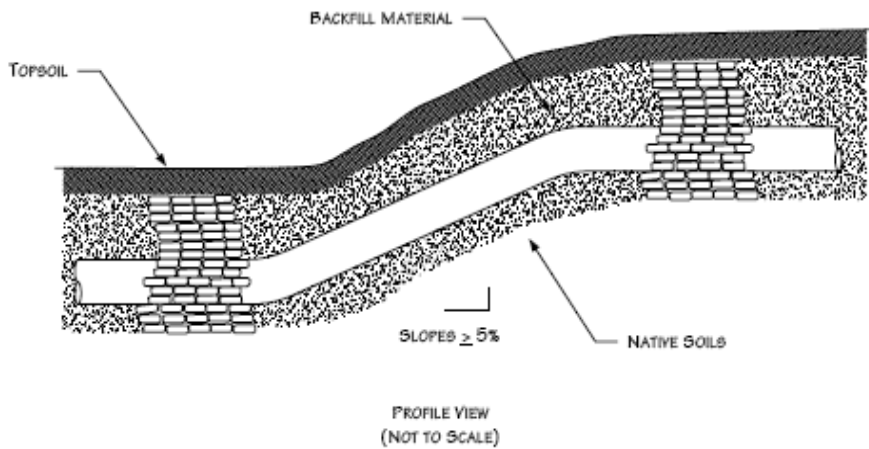
NOTES

1. BAGS WILL NOT BE FILLED WITH TOPSOIL.
2. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS.



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**Figure 6.1.9 – Typical Trench Breaker  
 Perspective View**  
 McKenzie, Williams, Mountrail Counties  
 Crude Oil Pipeline  
 March 2014



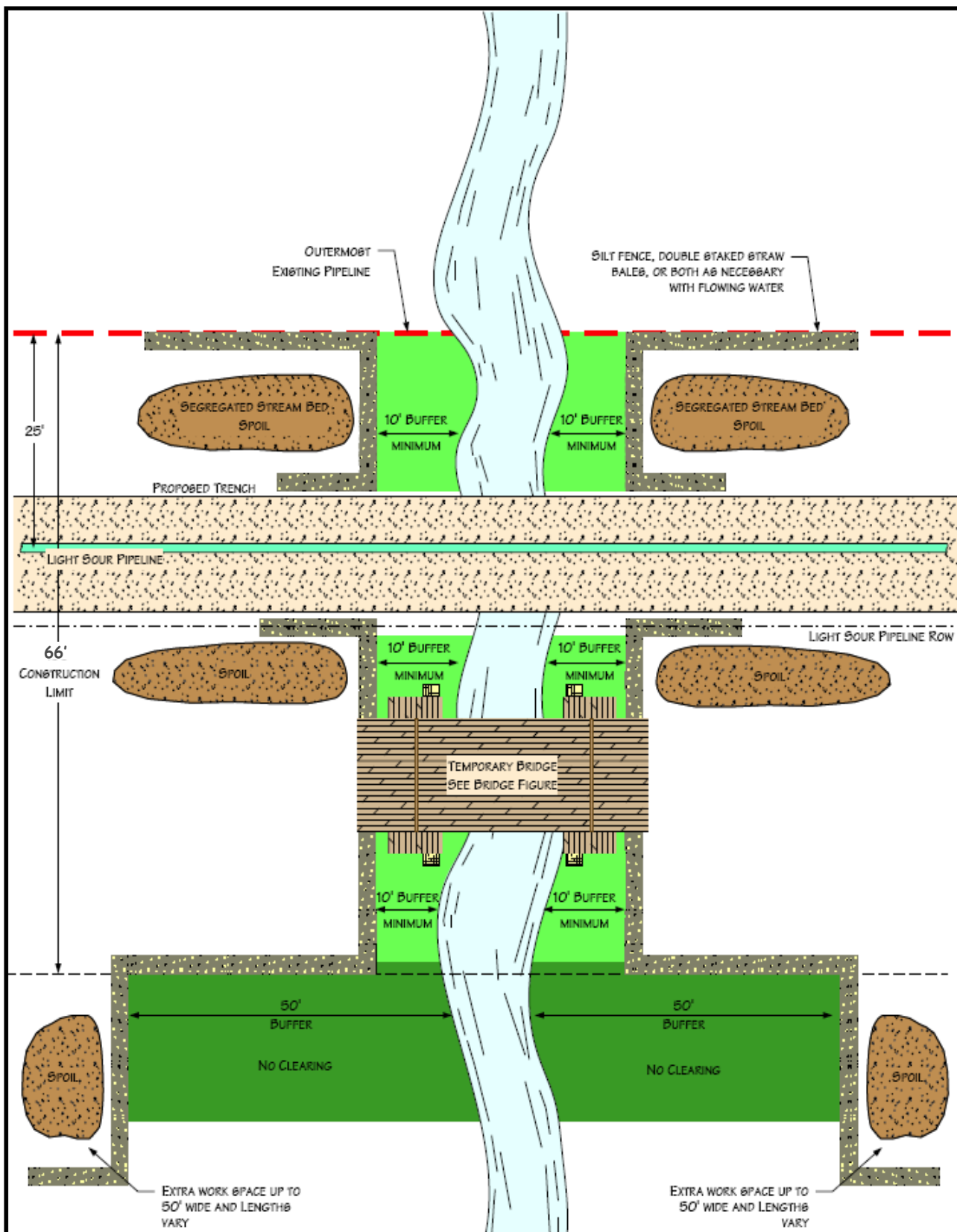
NOTES

1. BAGS WILL NOT BE FILLED WITH TOPSOIL
2. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS



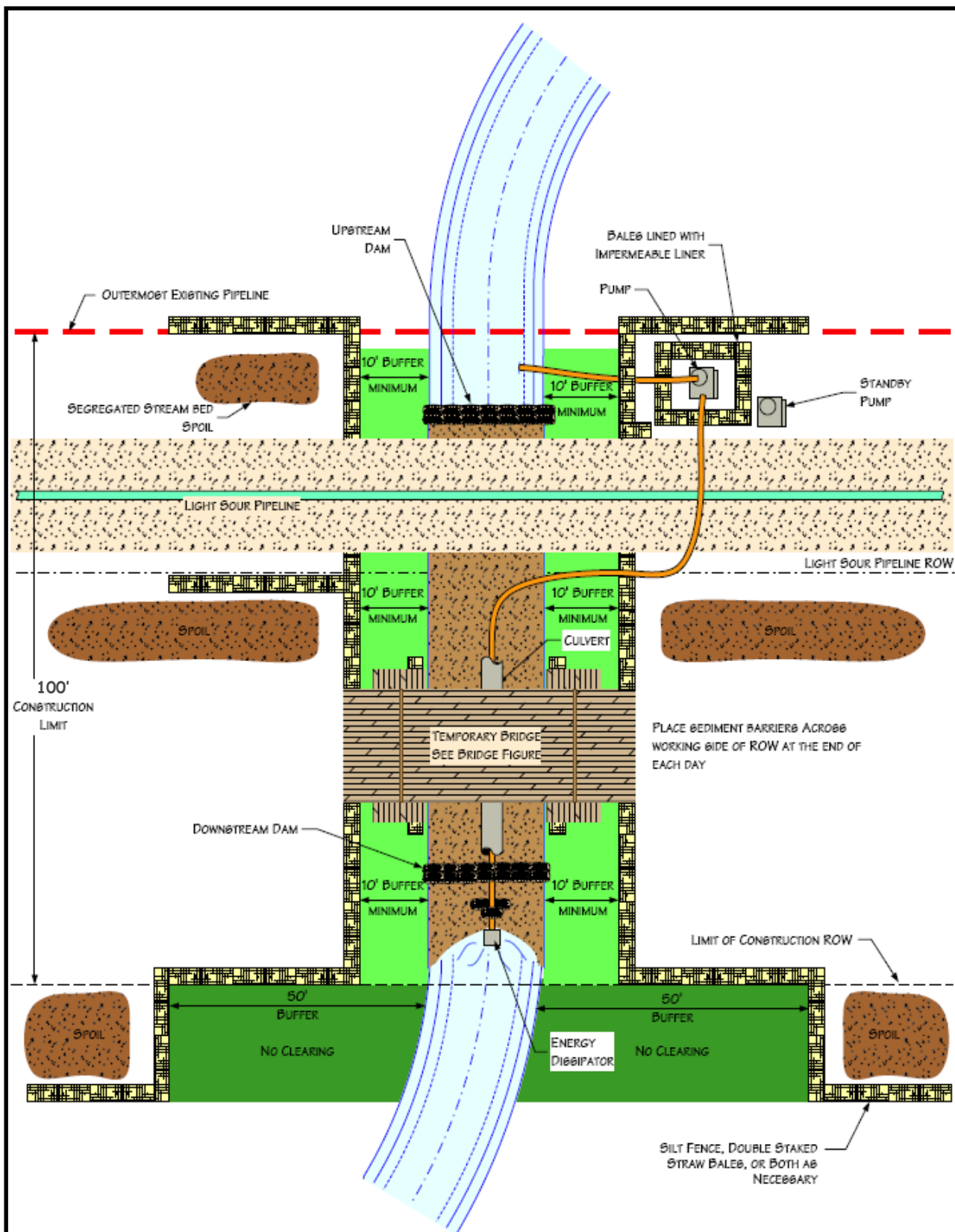
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**Figure 6.1.10 – Typical Trench Breaker  
 Plan and Profile View**  
 McKenzie, Williams, Mountrail Counties  
 Crude Oil Pipeline  
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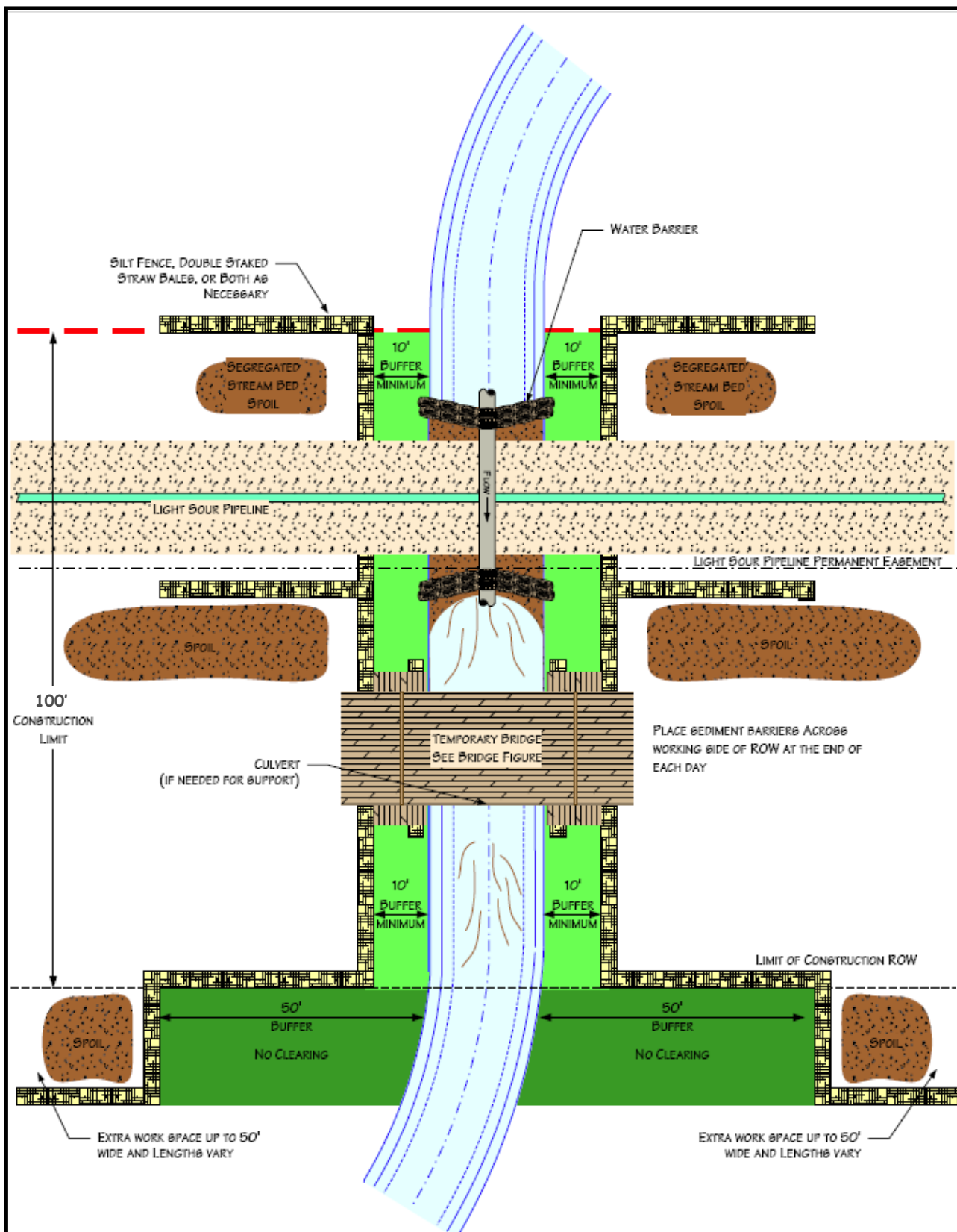
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**Figure 6.2.1 – Typical Waterbody Crossing Wet Trench Method**  
 McKenzie, Williams, Mountrail Counties  
 Crude Oil Pipeline  
 March 2014



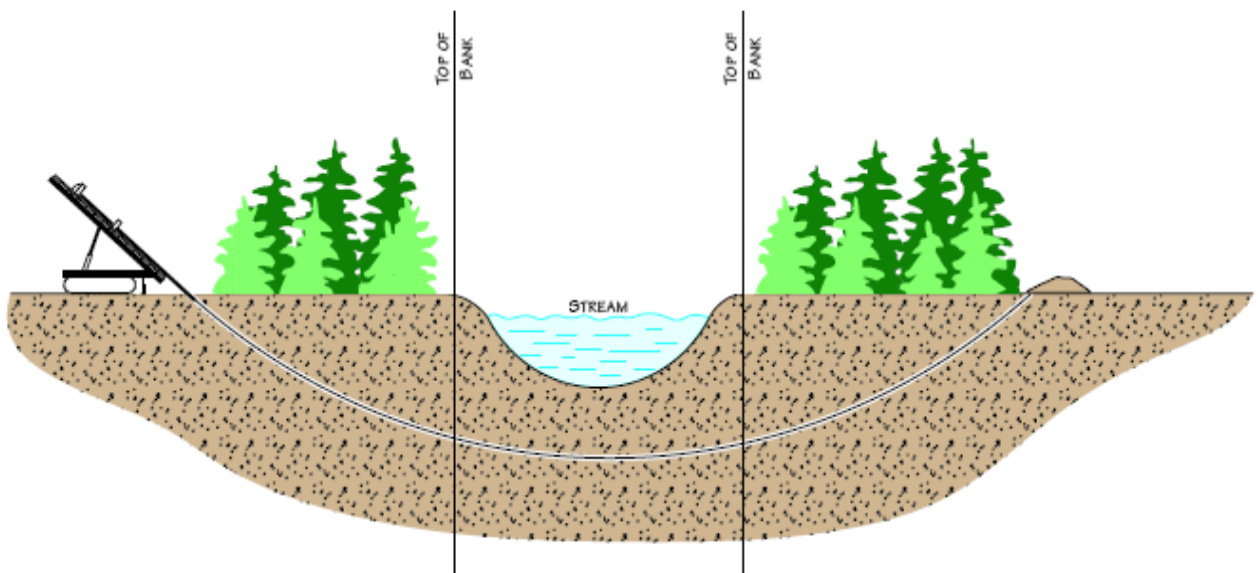
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**Figure 6.2.2 – Typical Waterbody Crossing Dam and Pump Method**  
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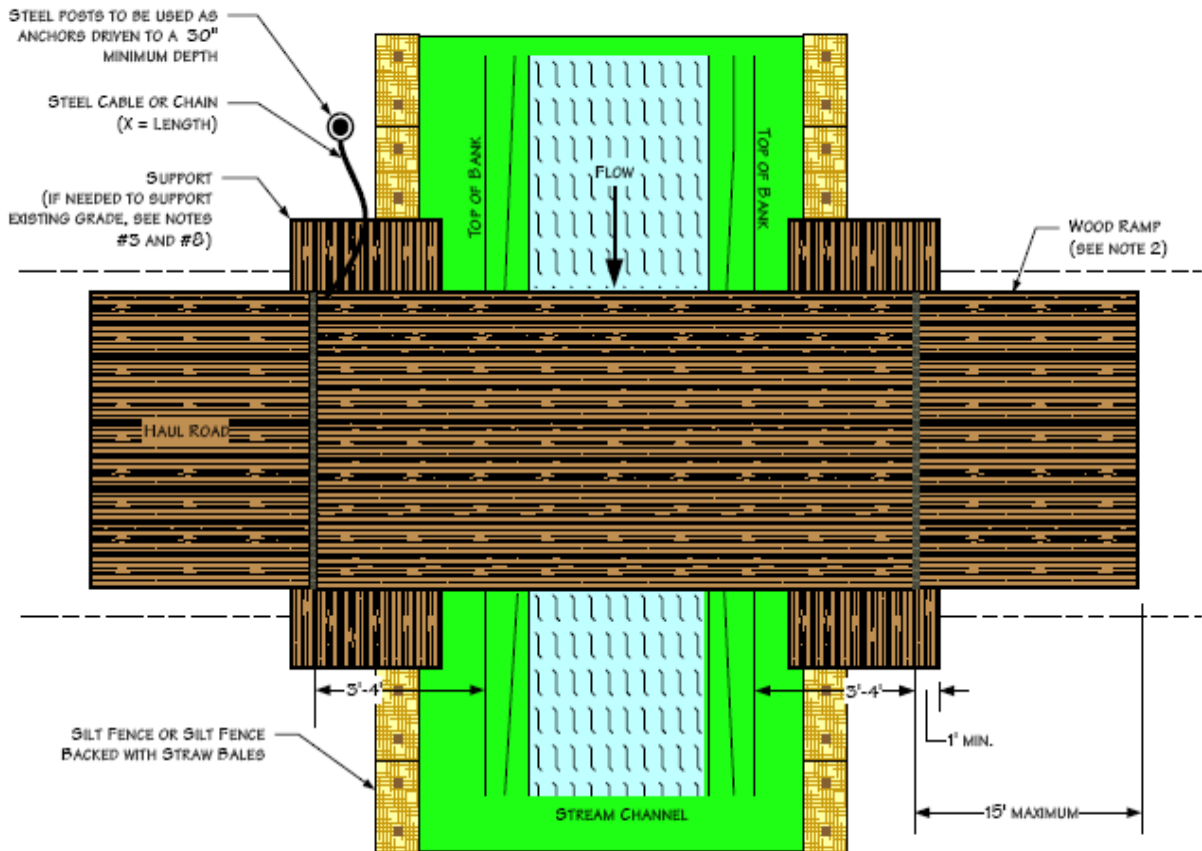
**Figure 6.2.3 – Typical Waterbody Crossing Flume Method**  
 McKenzie, Williams, Mountrail Counties  
 Crude Oil Pipeline  
 March 2014



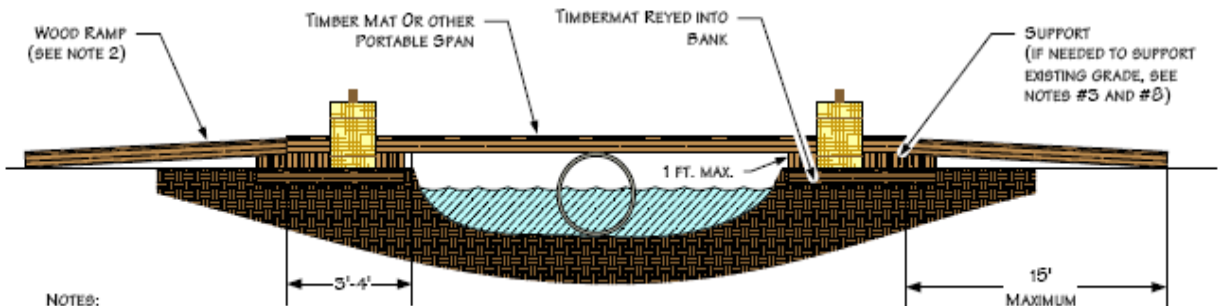
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**Figure 6.2.4 – Typical Waterbody Crossing  
 Directional Drill Method**  
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 Crude Oil Pipeline  
 March 2014

## Plan View



## Profile View



### NOTES:

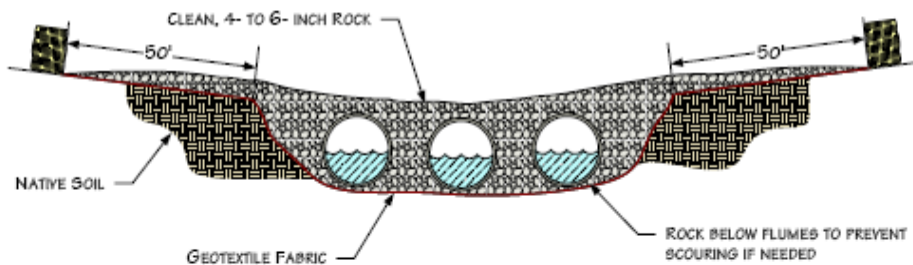
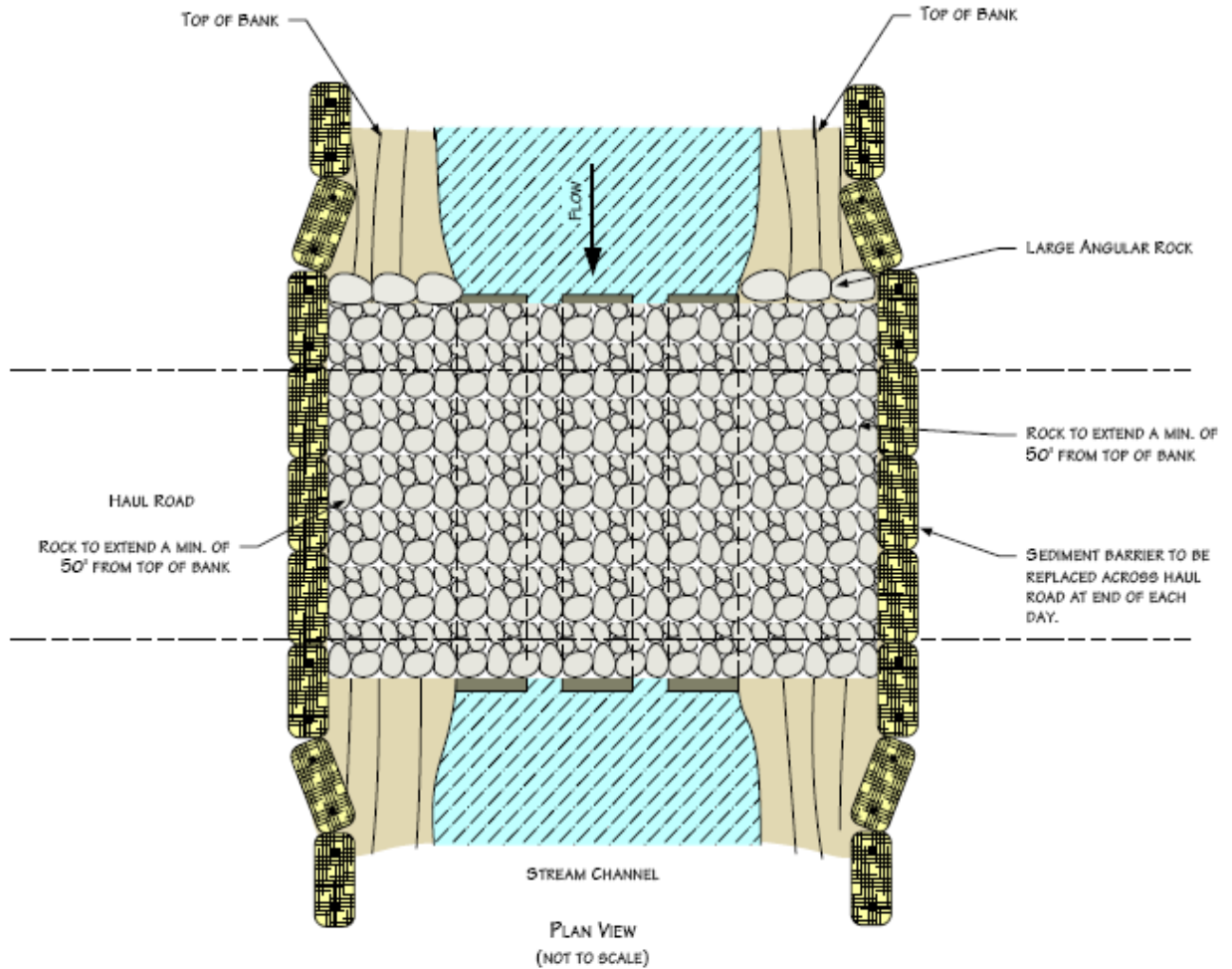
1. INSPECT BRIDGE OPENING PERIODICALLY AND FOLLOWING RAINFALLS OF OVER 1/2". REMOVE ANY DEBRIS RESTRICTING FLOW AND DEPOSIT IT AT AN UPLAND SITE OUTSIDE OF FLOODPLAIN.
2. IF PHYSICAL CIRCUMSTANCES PROHIBIT WOOD OR METAL RAMPS, EARTHEN RAMPS MAY BE USED AS APPROVED.
3. INSPECT BRIDGE ELEVATION SO BRIDGE REMAINS SUPPORTED ABOVE HIGH BANK AND DOES NOT SINK INTO BANK.
4. THE CULVERT SUPPORT MUST BE ANCHORED TO THE STREAM BOTTOM AND MAY NOT BE SUPPORTED WITH FILL.
5. EARTHEN RAMP CANNOT BE TALLER THAN 1' AND CANNOT EXTEND FOR MORE THAN 15' ON EITHER SIDE OF THE CROSSING.
6. THE BRIDGE MUST SPAN FROM TOP OF BANK TO TOP OF BANK.
7. THE BRIDGE MUST BE FIRMLY ANCHORED TO PREVENT IT FROM BEING TRANSPORTED DOWNSTREAM DURING HIGH FLOW.
8. ADDITIONAL SUPPORT MUST BE ADDED ON TOP OF BANK AND UNDER SPAN IF INITIAL SUPPORT STARTS TO SETTLE.
9. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED IN ACCORDANCE WITH THE COMPANY'S ENVIRONMENTAL MITIGATION PLAN



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**Figure 6.2.5 – Typical Span Type Bridge With or Without Instream Support**  
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 Crude Oil Pipeline  
 March 2014





**NOTES:**

1. STEEL FLUME PIPE(S) SIZED TO ALLOW FOR STREAM FLOW AND EQUIPMENT LOAD.
2. STRAW BALES SHALL BE PLACED ACROSS BRIDGE ENTRANCE EVERY NIGHT.
3. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS.



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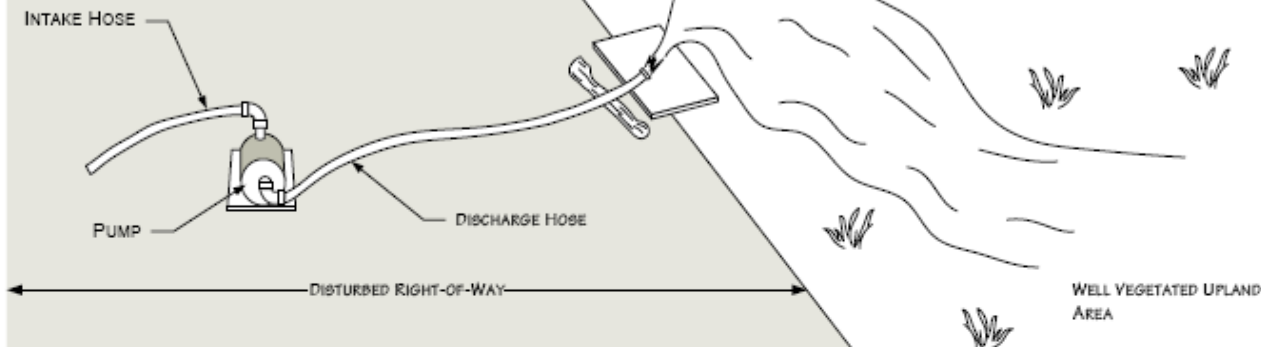
**Figure 6.2.6 –Typical Rock Flume Bridge**

McKenzie, Williams, Mountrail Counties  
 Crude Oil Pipeline  
 March 2014

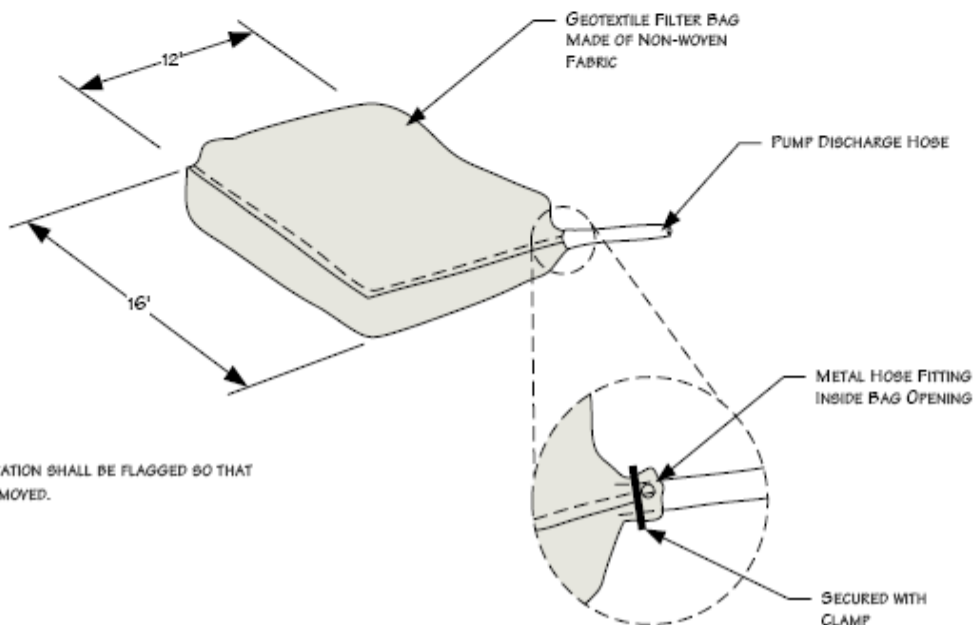
## DEWATERING DISCHARGE IN WELL VEGETATED UPLANDS

**NOTES:**

1. PUMP INTAKE HOSE MUST BE SECURED AT LEAST ONE FOOT ABOVE THE TRENCH BOTTOM.
2. IF VEGETATION IS SPARSE, DEWATER INTO GEOTEXTILE FILTER BAG OR STRAW BALE DEWATERING STRUCTURE.



## GEOTEXTILE FILTER BAG



**NOTE:**

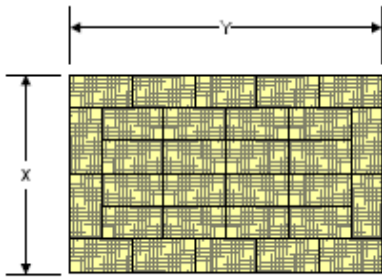
1. FILTER BAG LOCATION SHALL BE FLAGGED SO THAT BAG CAN BE REMOVED.



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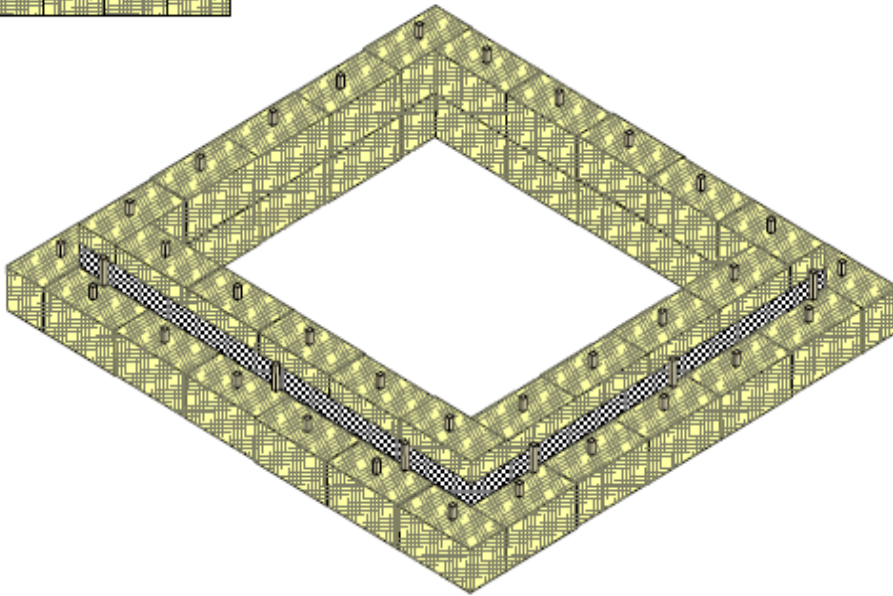
**Figure 6.2.7– Typical Dewatering Measures**

McKenzie, Williams, Mountrail Counties  
 Crude Oil Pipeline  
 March 2014

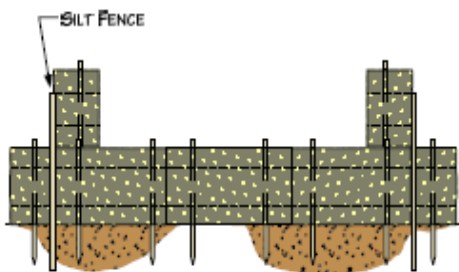


**NOTES**

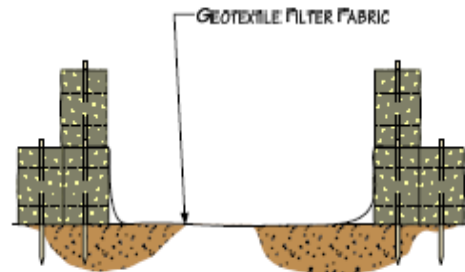
1. ARRANGE THE STRAW BALES TO THE X AND Y DIMENSIONS AS SPECIFIED BELOW.
2. IF BOTTOM OF STRUCTURE IS NOT LINED WITH STRAW BALES (OPTION 1), LINE ENTIRE STRUCTURE WITH GEOTEXTILE FILTER FABRIC.



PERSPECTIVE VIEW



OPTION 1



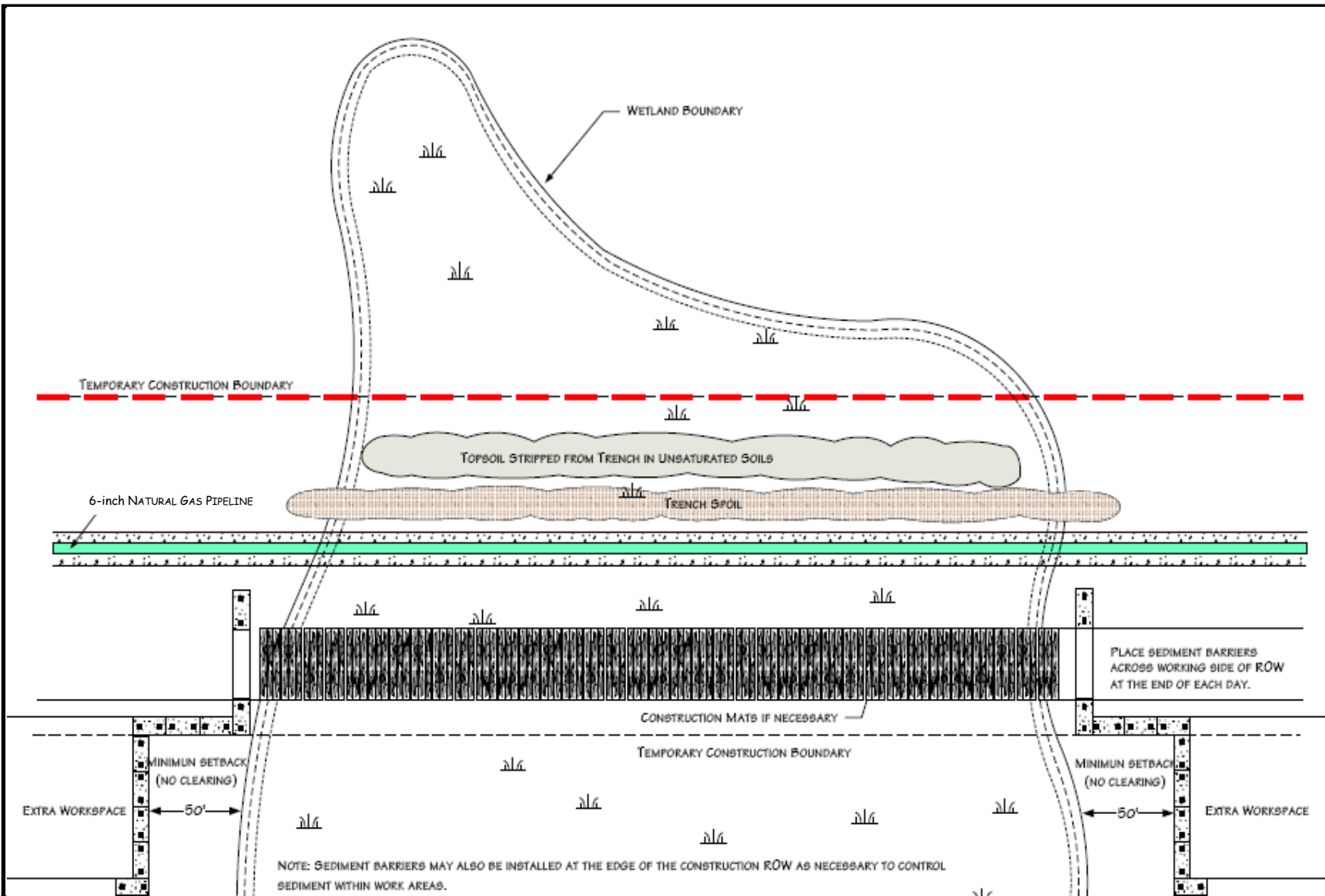
OPTION 2

MINIMUM SUMP DIMENSIONS (FEET)		MAXIMUM PUMPING RATE GALLONS PER MINUTE
X	Y	
10	20	300
15	20	350
20	20	400
20	25	450
25	25	500
25	30	550
30	30	660



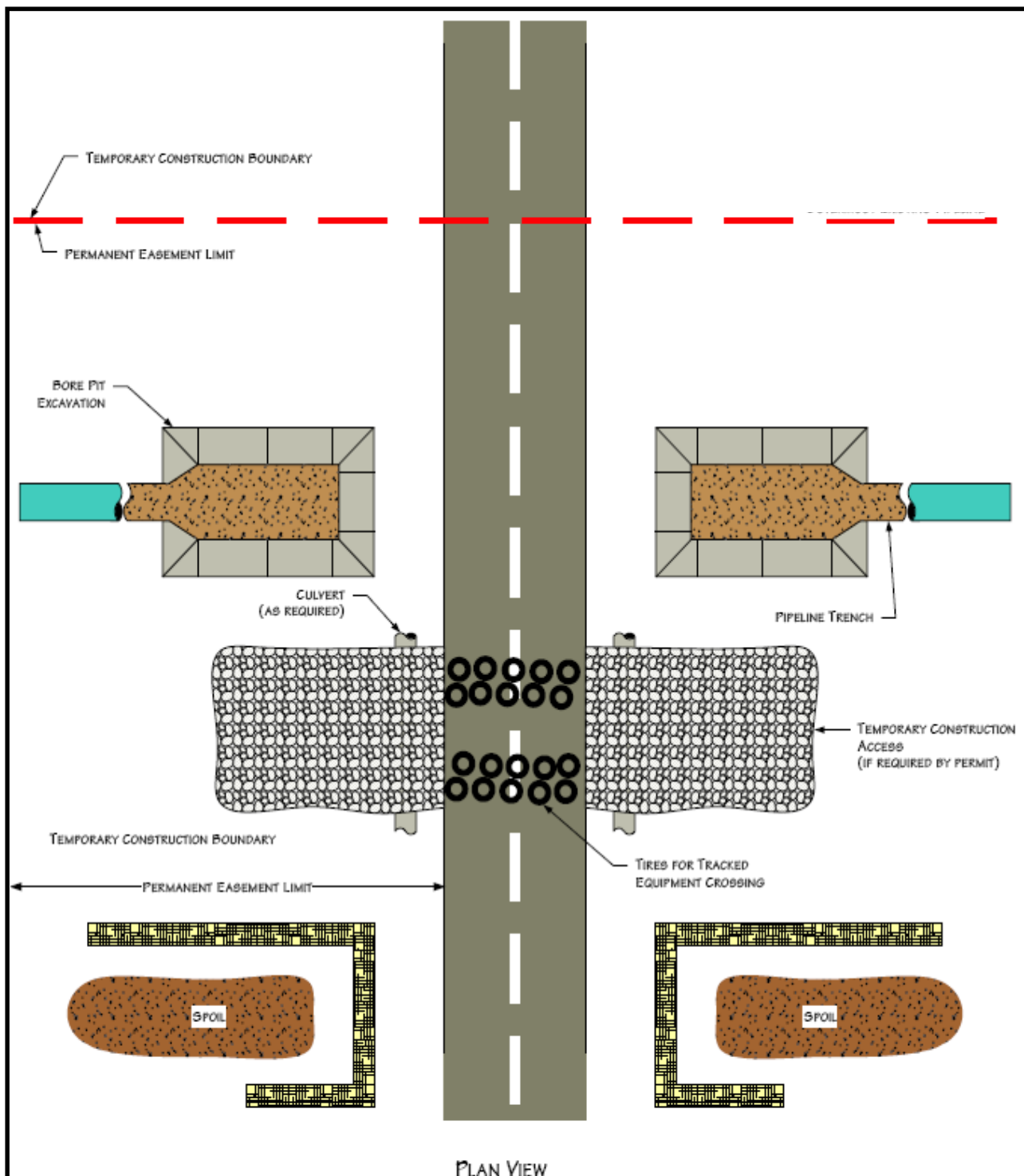
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**Figure 6.2.8 – Typical Straw-Bale  
 Dewatering Structure**  
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**Figure 6.3.1 – Typical Wetland Crossing Method**  
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 Crude Oil Pipeline  
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PLAN VIEW

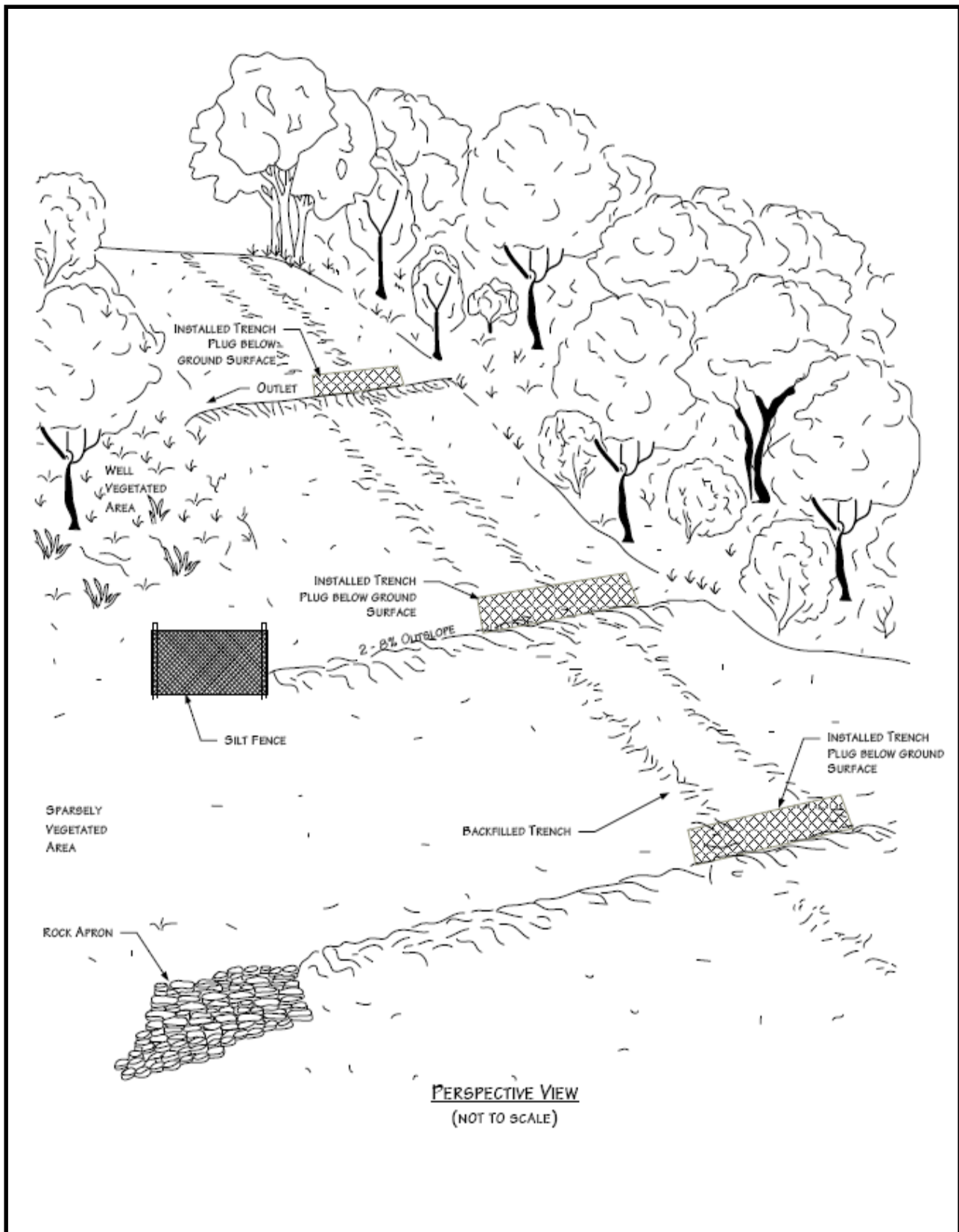
**NOTES**

1. PROCEDURES SHOWN IN THIS DRAWING APPLY TO IMPROVED ROADS.
2. ROADS MUST BE CLEANED AFTER EQUIPMENT CROSSES AND DIRT PLACED IN SPOIL CONTAINMENT AREAS.
3. TEMPORARY ACCESS MATERIALS MUST BE REMOVED UPON PROJECT COMPLETION.
4. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS OR PERMITS.
5. CONSTRUCTION AREAS LOCATED OUTSIDE ROAD ROW.



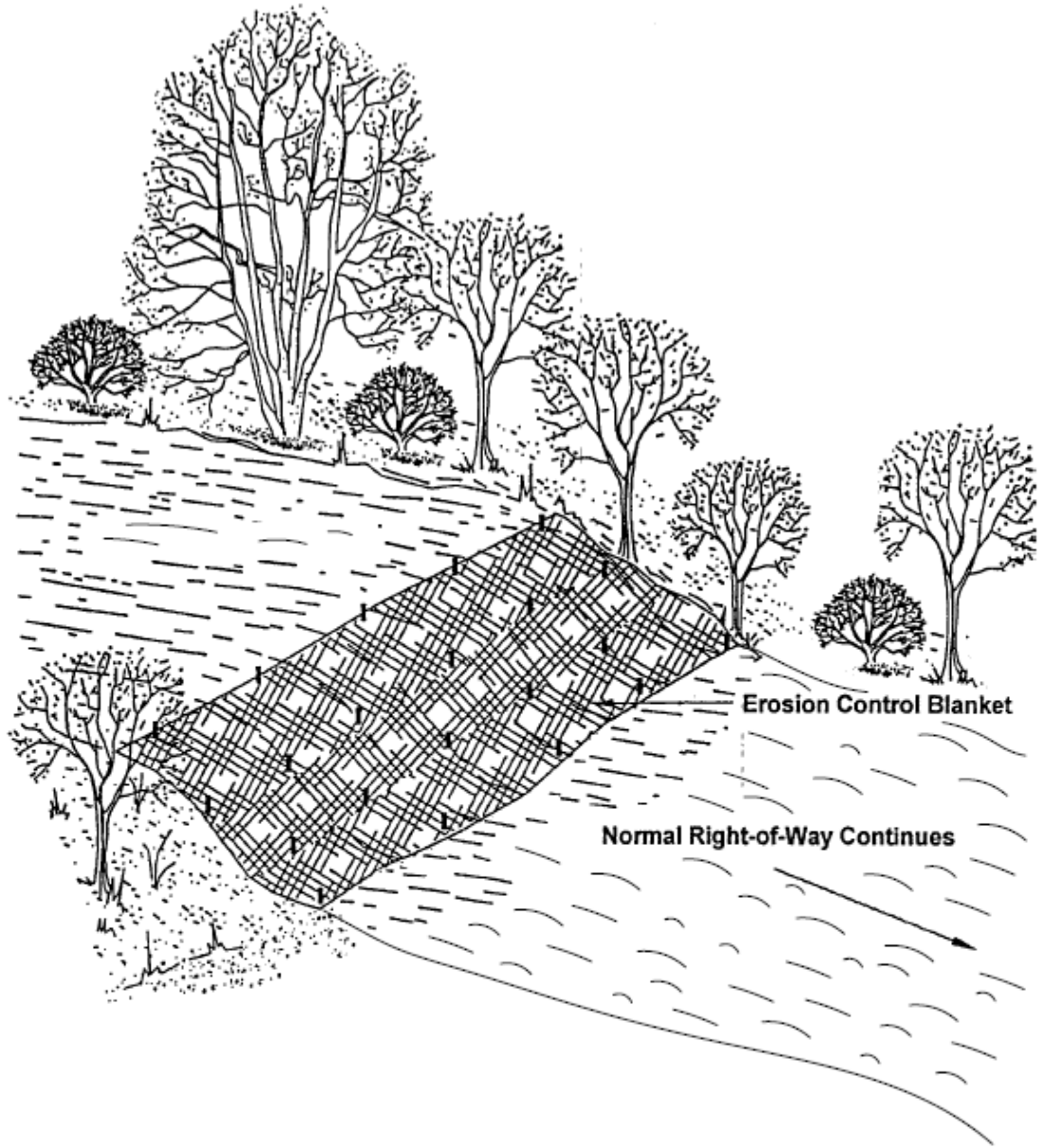
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**Figure 6.4.1—Typical Improved Road Crossing-Directional Bore Method**  
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 March 2014



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**Figure 6.7.1 – Permanent Slope Breakers  
 Perspective View**  
 McKenzie, Williams, Mountrail Counties  
 Crude Oil Pipeline  
 March 2014



**NOTES**

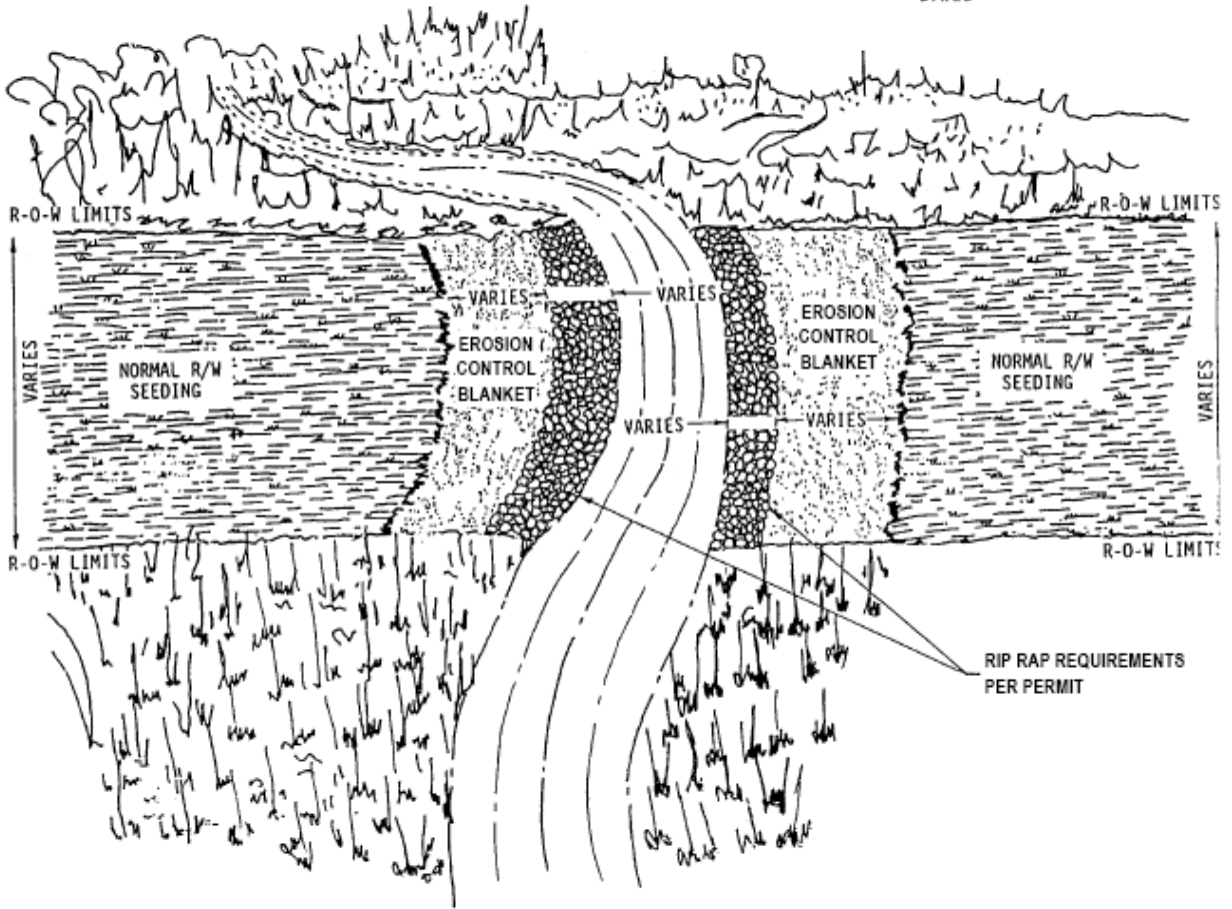
1. INSTALL EROSION CONTROL BLANKET AS PER MANUFACTURER'S SPECIFICATIONS.
2. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS.



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**Figure 6.7.2 – Erosion Control Blanket  
 Steep Slopes (>30%)**  
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 Crude Oil Pipeline  
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NOTE: PLACE JUTE BLANKET A MINIMUM OF ONE (1) FOOT UNDER RIP RAP. EXTEND JUTE BLANKET FROM MEAN HIGH WATER LEVEL TO SEVERAL FEET BEHIND HIGH BANK.



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**Figure 6.7.3 – Typical Final Stream Bank Stabilization-Rip Rap & Erosion Control**  
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 Crude Oil Pipeline  
 March 2014