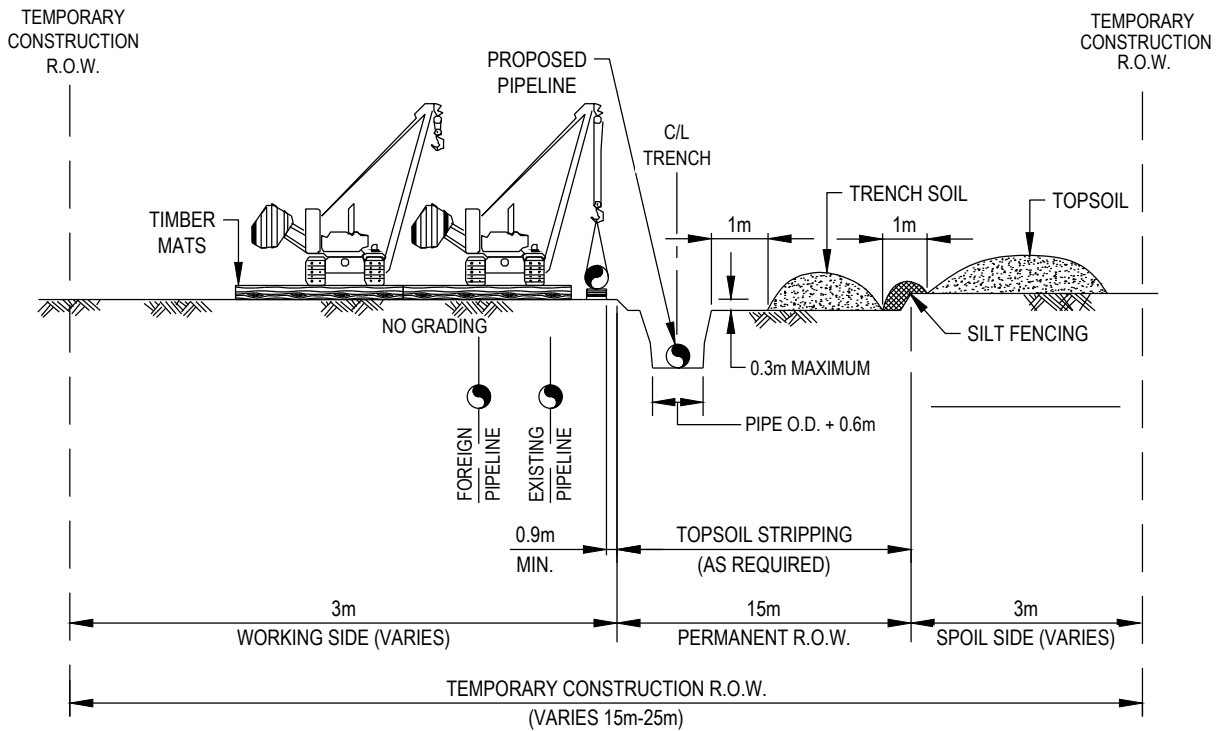


APPENDIX A CONSTRUCTION TYPICAL DRAWINGS



**CONFIGURATION
PROFILE - LOOKING DOWNSTREAM
CO-LOCATION WITH EXISTING/FOREIGN PIPELINES**

NOTES:

1. THIS DRAWING REFLECTS "TRENCH AND SPOIL SIDE" TOPSOIL STRIPPING PROCEDURE.
2. SALVAGE TOPSOIL OVER TRENCH AND UNDER THE SPOIL PILE AT LOCATIONS IDENTIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS, OR AS DIRECTED BY ENVIRONMENTAL INSPECTOR.
3. TOPSOIL IN URBAN, COMMERCIAL, AND INDUSTRIAL AREAS WILL BE SEPARATED WHERE THERE IS A DISTINCT SOIL CHANGE. AG LAND TOPSOIL SEPARATION WILL BE TO A MAXIMUM OF 0.3m.
4. STOCKPILE TOPSOIL AS SHOWN OR IN CONFIGURATION APPROVED BY ENVIRONMENTAL INSPECTOR.
5. KEEP TOPSOIL CLEAN OF ALL CONSTRUCTION DEBRIS.
6. MAINTAIN A 1m SEPARATION OR AN INSTALLED MITIGATION MEASURE TO PREVENT SOIL MIXING.
7. BREAKS / GAPS IN THE TOPSOIL PILES AND SUB-SOIL PILES SHOULD BE MADE AT LOCATIONS TO INSURE NATURAL DRAINAGE IS NOT IMPEDED.
8. DO NOT USE TOPSOIL FOR PADDING.
9. BACKFILLING TOPSOIL SHOULD BE DONE CAREFULLY TO MINIMIZE SCALPING OF THE EXISTING VEGETATION.
10. TEMPORARILY SUSPEND TOPSOIL HANDLING OPERATIONS DURING HIGH WIND AND WET CONDITIONS UNTIL MITIGATION MEASURES TO REDUCE WIND EROSION CAN BE IMPLEMENTED.
11. EXTRA TEMPORARY WORK SPACE MAY BE NECESSARY IN SPECIAL CIRCUMSTANCES.

FILE INFO:\HOU\F51\HOUJ_PROJECTS\24255\0500_ENG-DSN\1507_GEO\MATICS_DSN\TYP-TYPICALS\ONT-WF-SPPL-UP-KD-0006.DWG:LAST SAVED BY: JOSEPH.CARDENAS ON 1/17/2019 12:36 PM

**WATERDOWN TO FINCH
PROJECT**

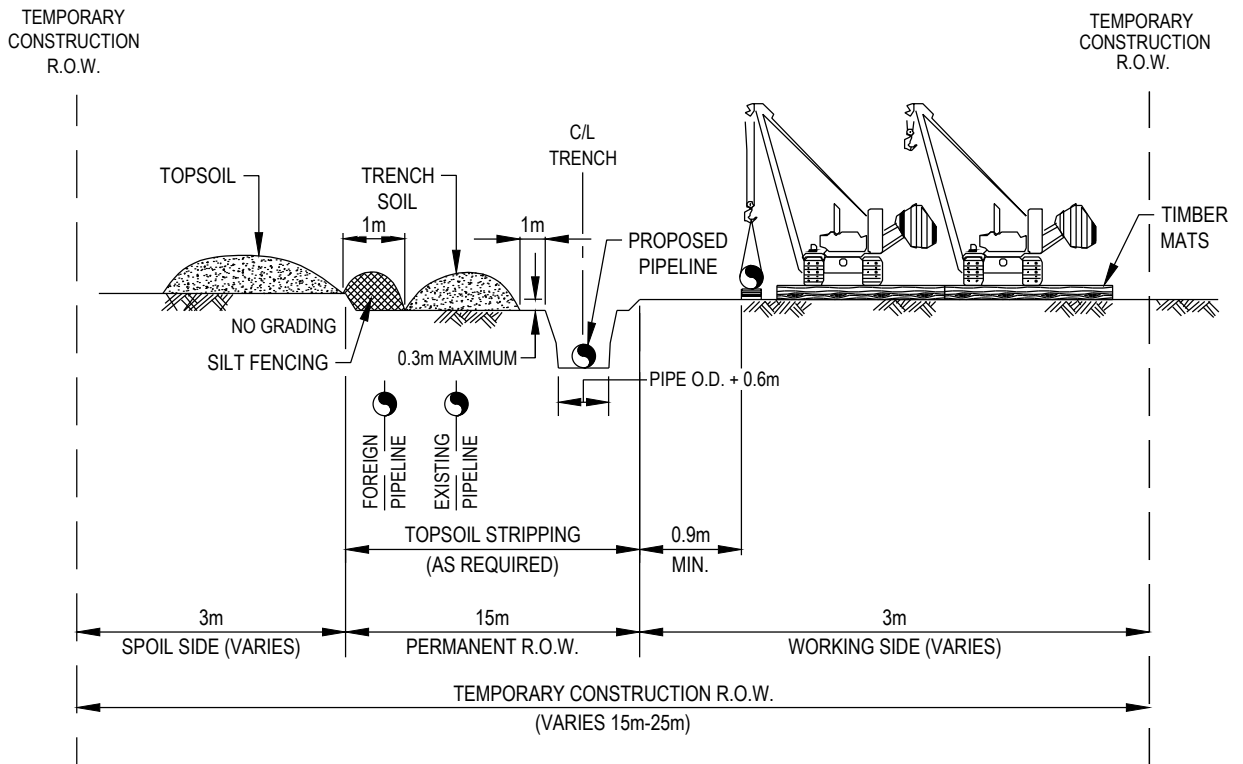


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NO.	REVISION	DATE	APPR.

**TYPICAL
CONVENTIONAL LAY
CONSTRUCTION CONFIGURATION 1**

SCALE	DATE	DRAWN	CHECKED	APPROVED	PROJ. NO.	DRAWING NUMBER	SHEET
N.T.S.	09/10/2018	JMC	HC	JW	24255	ONT-WF-SPPL-UP-KD-0006	1 OF 1

UPI DRAWING NO. 24255-507-TYP-20001



**CONFIGURATION
PROFILE - LOOKING DOWNSTREAM
CO-LOCATION WITH EXISTING/FOREIGN PIPELINES**

NOTES:

1. THIS DRAWING REFLECTS "TRENCH AND SPOIL SIDE" TOPSOIL STRIPPING PROCEDURE.
2. SALVAGE TOPSOIL OVER TRENCH AND UNDER THE SPOIL PILE AT LOCATIONS IDENTIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS, OR AS DIRECTED BY ENVIRONMENTAL INSPECTOR.
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5. KEEP TOPSOIL CLEAN OF ALL CONSTRUCTION DEBRIS.
6. MAINTAIN A 1m SEPARATION OR AN INSTALLED MITIGATION MEASURE TO PREVENT SOIL MIXING.
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11. EXTRA TEMPORARY WORK SPACE MAY BE NECESSARY IN SPECIAL CIRCUMSTANCES.

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**WATERDOWN TO FINCH
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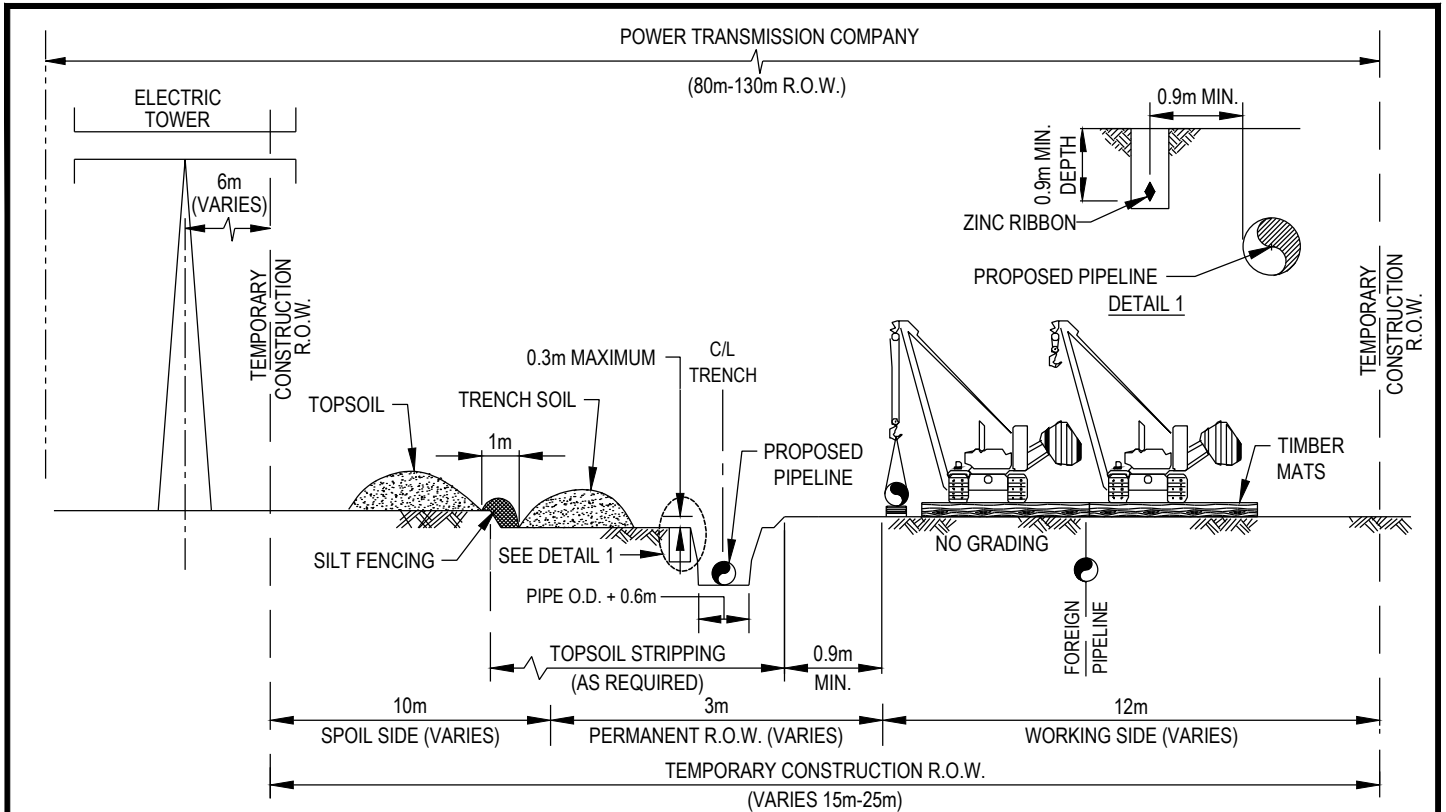


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NO.	REVISION	DATE	APPR.		
SCALE	DATE	DRAWN	CHECKED	APPROVED	
N.T.S.	09/11/2018	JMC	HC	JW	

**TYPICAL
CONVENTIONAL LAY
CONSTRUCTION CONFIGURATION 2**

PROJ. NO.	DRAWING NUMBER	SHEET
24255	ONT-WF-SPPL-UP-KD-0007	1 OF 1

UPI DRAWING NO: 24255-507-TYP-20002



**CONFIGURATION
PROFILE - LOOKING UPSTREAM**

WORKING LAYOUT CONFIGURATION CO-LOCATION WITH TRANSMISSION LINES AND FOREIGN PIPELINE

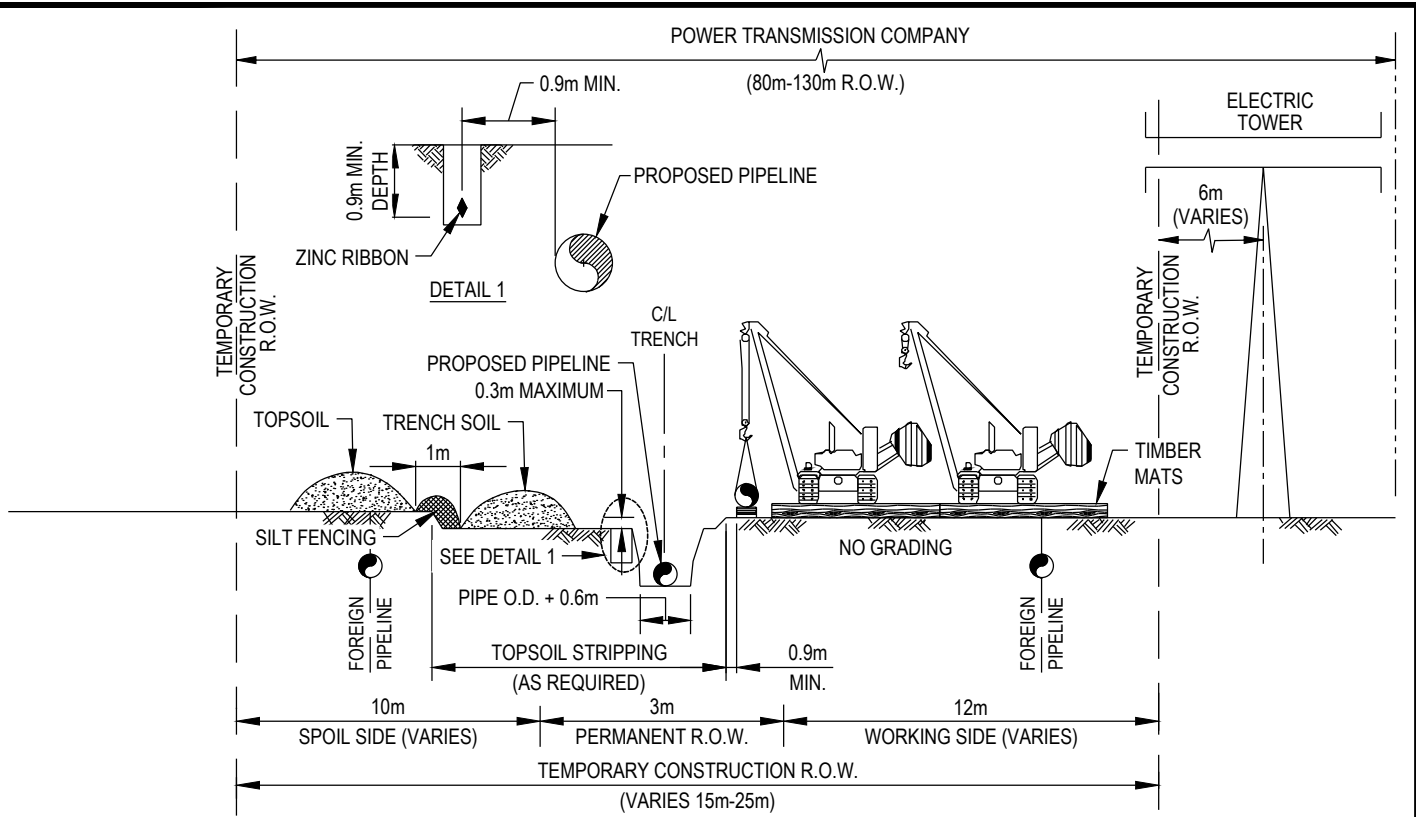
NOTES:

1. THIS DRAWING REFLECTS "TRENCH AND SPOIL SIDE" TOPSOIL STRIPPING PROCEDURE.
2. SALVAGE TOPSOIL OVER TRENCH AND UNDER THE SPOIL PILE AT LOCATIONS IDENTIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS, OR AS DIRECTED BY ENVIRONMENTAL INSPECTOR.
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4. STOCKPILE TOPSOIL AS SHOWN OR IN CONFIGURATION APPROVED BY ENVIRONMENTAL INSPECTOR.
5. KEEP TOPSOIL CLEAN OF ALL CONSTRUCTION DEBRIS.
6. MAINTAIN A 1m SEPARATION OR AN INSTALLED MITIGATION MEASURE TO PREVENT SOIL MIXING.
7. BREAKS / GAPS IN THE TOPSOIL PILES AND SUB-SOIL PILES SHOULD BE MADE AT LOCATIONS TO INSURE NATURAL DRAINAGE IS NOT IMPEDED.
8. DO NOT USE TOPSOIL FOR PADDING.
9. BACKFILLING TOPSOIL SHOULD BE DONE CAREFULLY TO MINIMIZE SCALPING OF THE EXISTING VEGETATION.
10. TEMPORARILY SUSPEND TOPSOIL HANDLING OPERATIONS DURING HIGH WIND AND WET CONDITIONS UNTIL MITIGATION MEASURES TO REDUCE WIND EROSION CAN BE IMPLEMENTED.
11. EXTRA TEMPORARY WORK SPACE MAY BE NECESSARY IN SPECIAL CIRCUMSTANCES.

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NO.	REVISION	DATE	APPR.				
SCALE	DATE	DRAWN	CHECKED	APPROVED	PROJ. NO.	DRAWING NUMBER	SHEET
N.T.S.	09/11/2018	JMC	HC	JW	24255	ONT-WF-SPPL-UP-KD-0008	1 OF 1

UPI DRAWING NO: 24255-507-TYP-20003





**CONFIGURATION
PROFILE - LOOKING UPSTREAM**

WORKING LAYOUT CONFIGURATION CO-LOCATION WITH TRANSMISSION LINES AND FOREIGN PIPELINE

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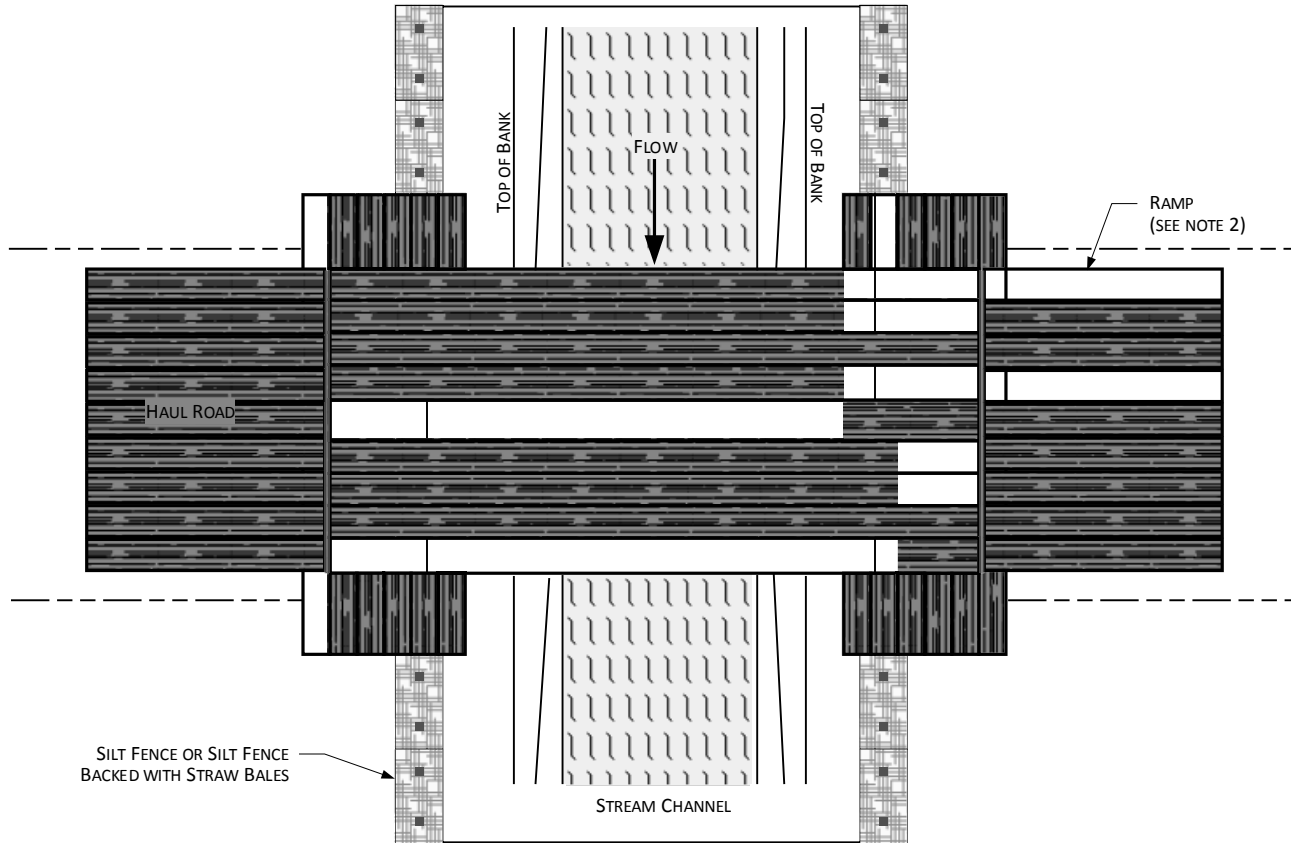
1. THIS DRAWING REFLECTS "TRENCH AND SPOIL SIDE" TOPSOIL STRIPPING PROCEDURE.
2. SALVAGE TOPSOIL OVER TRENCH AND UNDER THE SPOIL PILE AT LOCATIONS IDENTIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS, OR AS DIRECTED BY ENVIRONMENTAL INSPECTOR.
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11. EXTRA TEMPORARY WORK SPACE MAY BE NECESSARY IN SPECIAL CIRCUMSTANCES.

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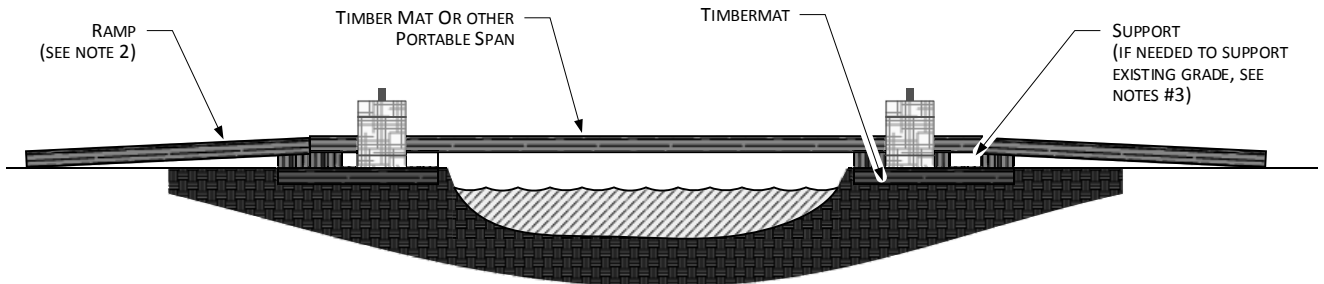
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N.T.S.	09/11/2018	JMC	HC	JW	24255	ONT-WF-SPPL-UP-KD-0009	1 OF 1

UPI DRAWING NO: 24255-507-TYP-20004

Plan View



Profile View



NOTES:

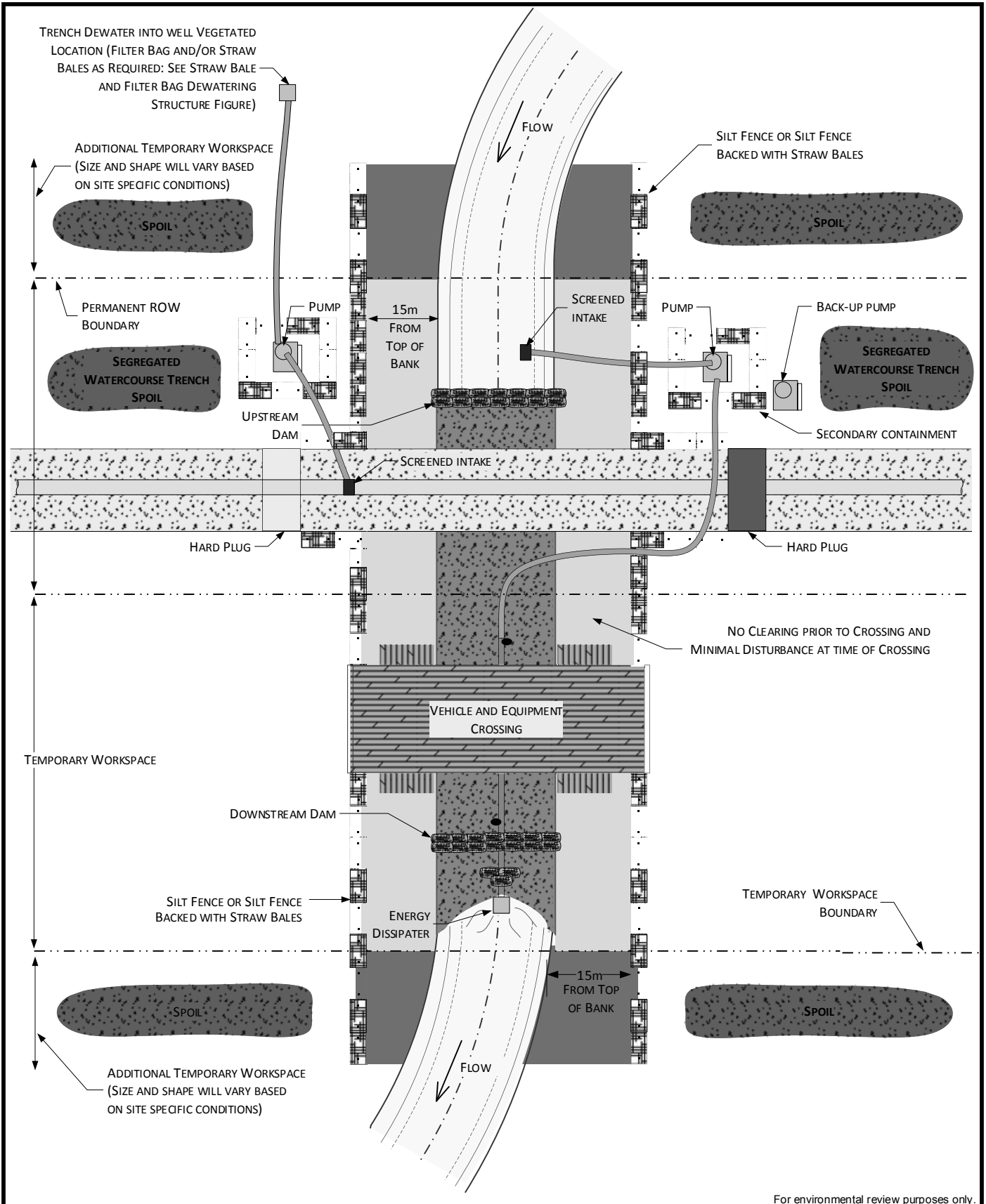
1. INSPECT BRIDGE OPENING PERIODICALLY AND FOLLOWING RAINFALLS OF OVER 1.5CM. REMOVE ANY DEBRIS RESTRICTING FLOW AND DEPOSIT IT AT AN UPLAND SITE OUTSIDE OF FLOODPLAIN.
2. IF PHYSICAL CIRCUMSTANCES PROHIBIT WOOD OR METAL RAMPS, EARTHEN RAMPS MAY BE USED AS APPROVED.
3. INSPECT BRIDGE ELEVATION SO BRIDGE REMAINS SUPPORTED ABOVE HIGH BANK AND DOES NOT SINK INTO BANK.
4. THE BRIDGE MUST SPAN FROM TOP OF BANK TO TOP OF BANK.
5. IN THE EVENT OF SETTLING, ADDITIONAL SUPPORT WILL BE ADDED.
6. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED IN ACCORDANCE WITH THE COMPANY'S ENVIRONMENTAL MITIGATION PLAN

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Typical Temporary Span Type Bridge (Removed after Construction)
Waterdown to Finch Project



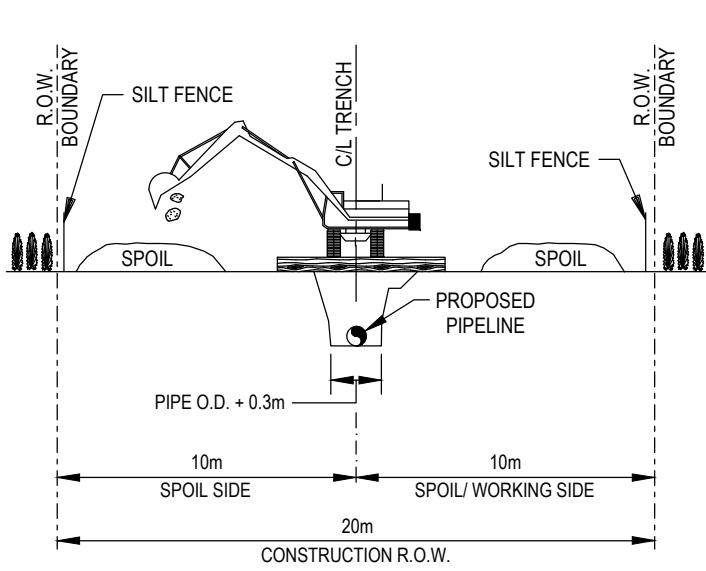


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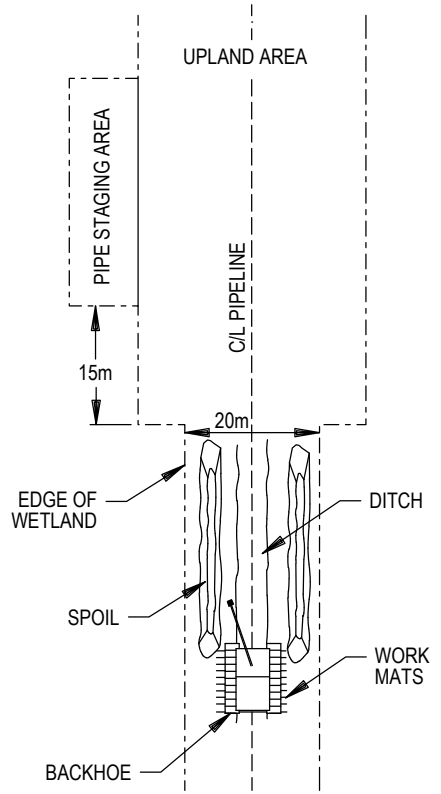
Typical Waterbody Crossing – Isolation Open Cut Waterdown to Finch Project





CROSS SECTION

SCALE: N.T.S.



PLAN VIEW

SCALE: N.T.S.

CONSTRUCTION PROCEDURE NOTES:

1. FLAG WETLAND BOUNDARIES PRIOR TO CLEARING.
2. NO REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 30 METERS OF WETLAND. PLACE "NO FUELING" SIGN POSTS 30 METERS BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER SPCC PLAN.
3. INSTALL TEMPORARY SLOPE BREAKER UPSLOPE WITHIN 15 METERS OF WETLAND BOUNDARY AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
4. RESTRICT ROOT GRUBBING TO ONLY THE AREA OVER THE DITCHLINE.
5. TOPSOIL STRIPPING SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.
6. UTILIZE AMPHIBIOUS EXCAVATORS (PONTOON MOUNTED BACKHOES) OR TRACKED BACKHOES SUPPORTED BY FABRICATED TIMBER MATS OR FLOATS, TO EXCAVATE TRENCH. IF FABRICATED TIMBER MATS ARE USED FOR STABILIZATION, THE BACKHOE SHALL GRADUALLY MOVE ACROSS THE WETLAND BY MOVING THE MAT FROM IMMEDIATELY BEHIND TO IMMEDIATELY IN FRONT OF THE BACKHOE'S PATH.
7. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS (STRAW BALES AND/OR SILT FENCE) AT EDGE OF R.O.W. AND ALONG WETLAND EDGE AS REQUIRED.
8. FABRICATE PIPE IN A STAGING AREA OUTSIDE THE WETLAND AS INDICATED ON THE CONSTRUCTION DRAWINGS.
9. LEAVE HARD PLUGS AT THE EDGE OF WETLAND UNTIL JUST PRIOR TO PIPE PLACEMENT.
10. FLOAT PIPE IN PLACE, LOWER-IN, INSTALL TRENCH PLUGS AT WETLAND EDGES OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR AND BACKFILL IMMEDIATELY.
11. REMOVE ANY MATS OR FILL CONSISTING OF NON-NATIVE MATERIAL FROM WETLANDS UPON COMPLETION.
12. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY AND INSTALL TEMPORARY AND PERMANENT STRUCTURES TO MAINTAIN STABILITY AS NEEDED.
13. WETLANDS WILL NOT TYPICALLY BE SEEDED. HOWEVER, IF THE SITE IS DRY AND IF DIRECTED BY THE ENVIRONMENTAL INSPECTOR, THE DISTURBED AREAS SHALL BE SEEDED TO STABILIZE THE AREA UNTIL INDIGENOUS SPECIES IS RE-ESTABLISHED.

FILE INFO:\HOU\F5\HOU_PROJECTS\24255\0500.ENG-DSM\507_GEO\MATICS_DSN\TYP-TYPICALS\ONT-WF-SPPL-UP-HD-0102.DWG:LAST SAVED BY: JOSEPH.CARDENAS ON 1/17/2019 12:44 PM

WATERDOWN TO FINCH PROJECT

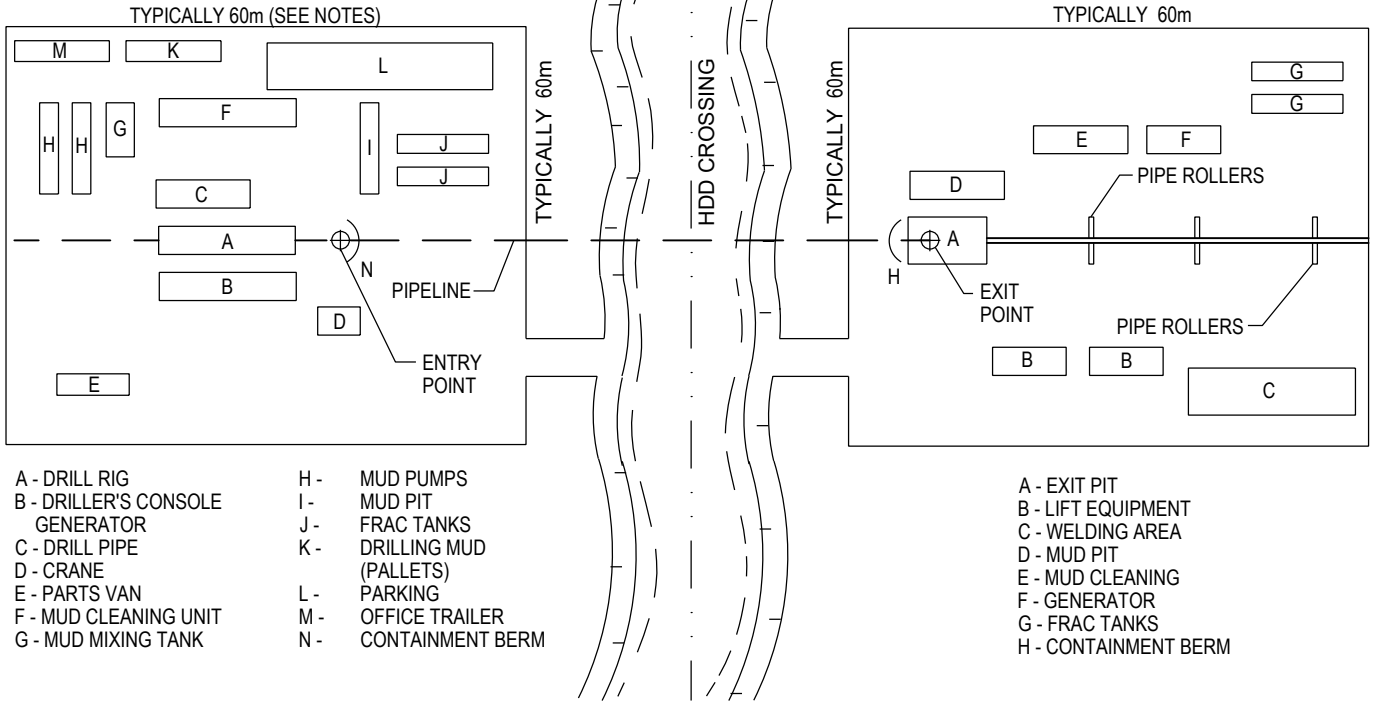


TYPICAL FLOODED WETLAND CROSSING (PUSH/PULL)

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NO.	REVISION	DATE	APPR.	
SCALE	DATE	DRAWN	CHECKED	APPROVED
N.T.S.	09/12/2018	JMC	HC	JW

PROJ. NO.	DRAWING NUMBER	SHEET
24255	ONT-WF-SPPL-UP-HD-0102	1 OF 1

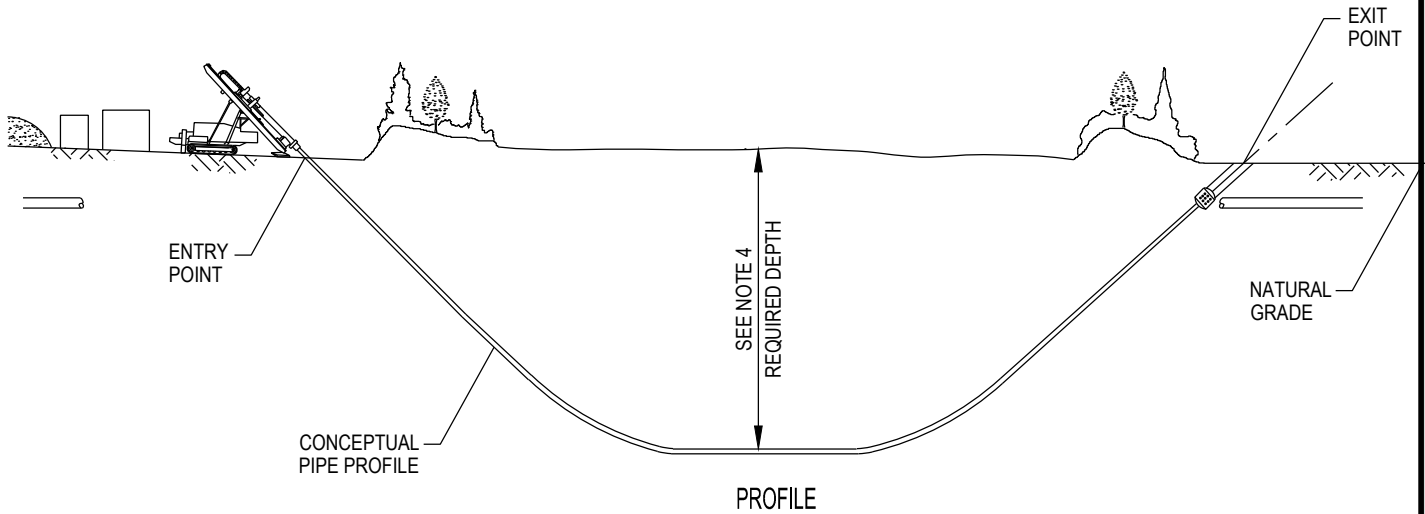
UPI DRAWING NO: 24255-507-TYP-2007



- A - DRILL RIG
- B - DRILLER'S CONSOLE
GENERATOR
- C - DRILL PIPE
- D - CRANE
- E - PARTS VAN
- F - MUD CLEANING UNIT
- G - MUD MIXING TANK
- H - MUD PUMPS
- I - MUD PIT
- J - FRAC TANKS
- K - DRILLING MUD
(PALLETES)
- L - PARKING
- M - OFFICE TRAILER
- N - CONTAINMENT BERM

- A - EXIT PIT
- B - LIFT EQUIPMENT
- C - WELDING AREA
- D - MUD PIT
- E - MUD CLEANING
- F - GENERATOR
- G - FRAC TANKS
- H - CONTAINMENT BERM

PLAN



PROFILE

NOTES

1. INSTALL DRILLING MUD TANKS OR SUMPS TO PREVENT DRILLING MUD RELEASE IN AREA.
2. INSTALL BERMS DOWN SLOPE FROM THE DRILL ENTRY AND ANTICIPATED EXIT POINTS TO CONTAIN ANY RELEASE OF DRILLING MUD.
3. DISPOSE OF DRILLING MUD IN ACCORDANCE WITH THE APPROPRIATE REGULATORY AUTHORITY REQUIREMENTS.
4. REQUIRED DEPTH TO BE DETERMINED AFTER SITE SPECIFIC GEOTECHNICAL INVESTIGATION AND REVIEW OF SPECIFIC CROSSING REQUIREMENTS.
5. WORKSPACE DIMENSIONS MAY VARY BASED UPON AVAILABLE WORKING AREA.
6. PIPE STAGING AREA WILL EXTEND BEYOND WORKING AREA SHOWN ABOVE.

FILE INFO:\HOU\FS1\HOU_PROJECTS\24255\0500_ENG-DSN\607_GEOMATICS_DSN\TYPICALS\ONT-WF-SPPL-UP-HD-0100.DWG, LAST SAVED BY: JOSEPH.CARDENAS ON 11/17/2019 12:42 PM

**WATERDOWN TO FINCH
PROJECT**

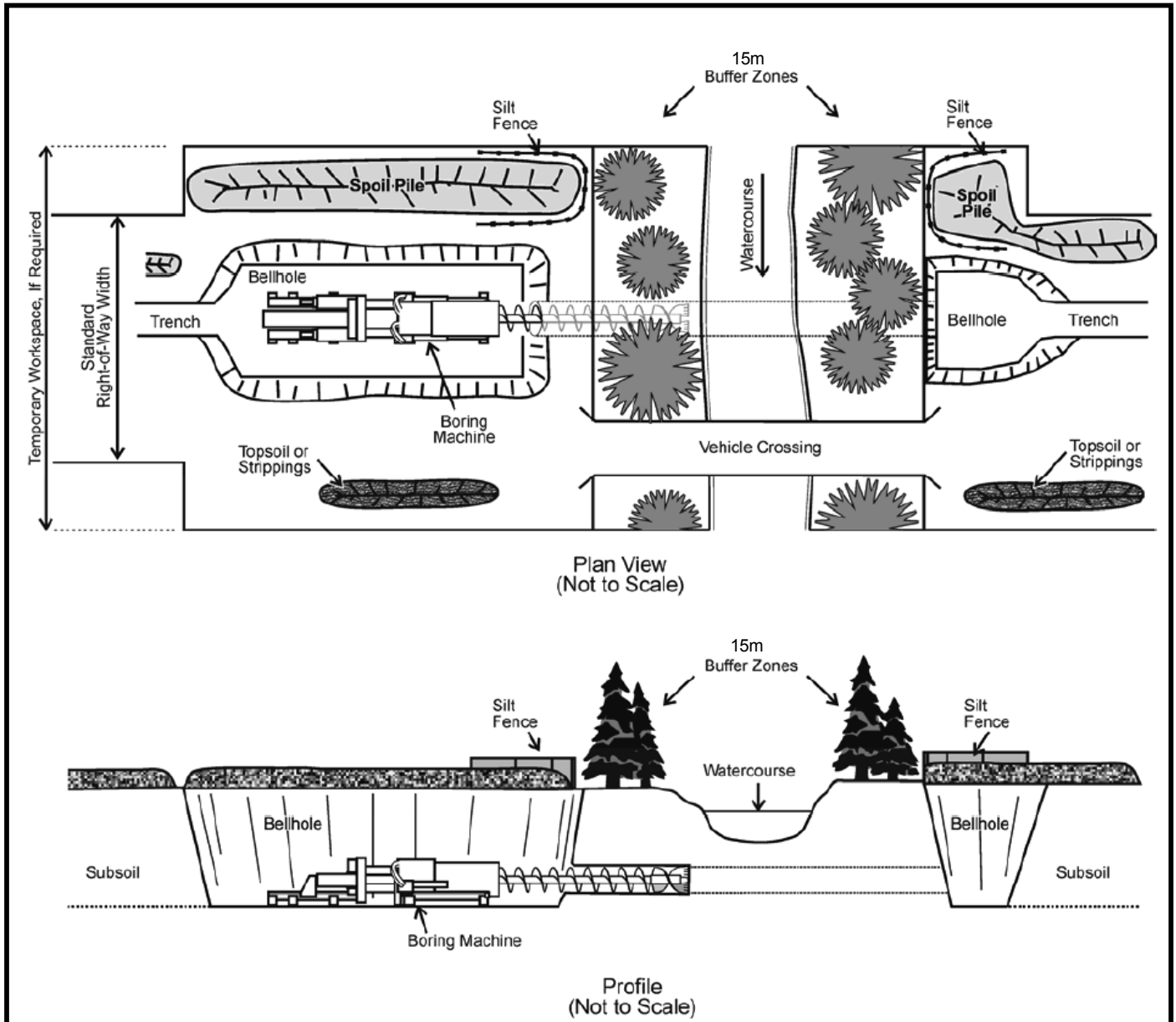


**TYPICAL
HORIZONTAL DIRECTIONAL DRILL**

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NO.	REVISION	DATE	APPR.		
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SCALE	DATE	DRAWN	CHECKED	APPROVED	
N.T.S.	09/10/2018	JMC	HC	JW	

PROJ. NO.	DRAWING NUMBER	SHEET
24255	ONT-WF-SPPL-UP-HD-0100	1 OF 1

UPI DRAWING NO: 24255-507-TYP-20005



NOTES:

1. ACQUIRE AND MARK ADDITIONAL TEMPORARY WORKSPACE.
2. SET UP EQUIPMENT BACK FROM THE EDGE OF THE WATERCOURSE; DO NOT CLEAR OR GRADE WITHIN BUFFER ZONE EXCEPT ALONG THE WORK SIDE, IF TEMPORARY VEHICLE CROSSING IS INSTALLED.
3. EXCAVATE BELLHOLE. STORE SPOIL ON OPPOSITE SIDE OF RIGHT-OF-WAY.
4. COMPLETE BORING AND TIE-IN TO MAINLINE.
5. PUMP BELLHOLE DRY IF SEEPAGE BECOMES A PROBLEM. DEWATER BELLHOLES ONTO STABLE, VEGETATED LAND, NOT DIRECTLY BACK INTO WATERCOURSE.
6. BACKFILL AND COMPACT.

SOURCE: ADAPTED FROM PIPELINE ASSOCIATED WATERCOURSE CROSSINGS 3RD EDITION 2005

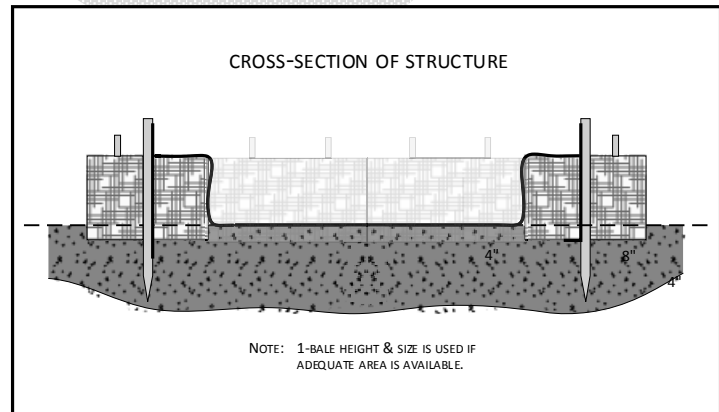
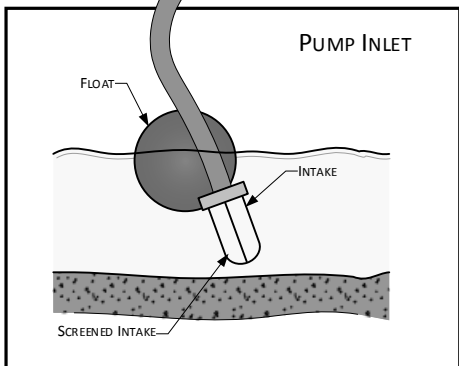
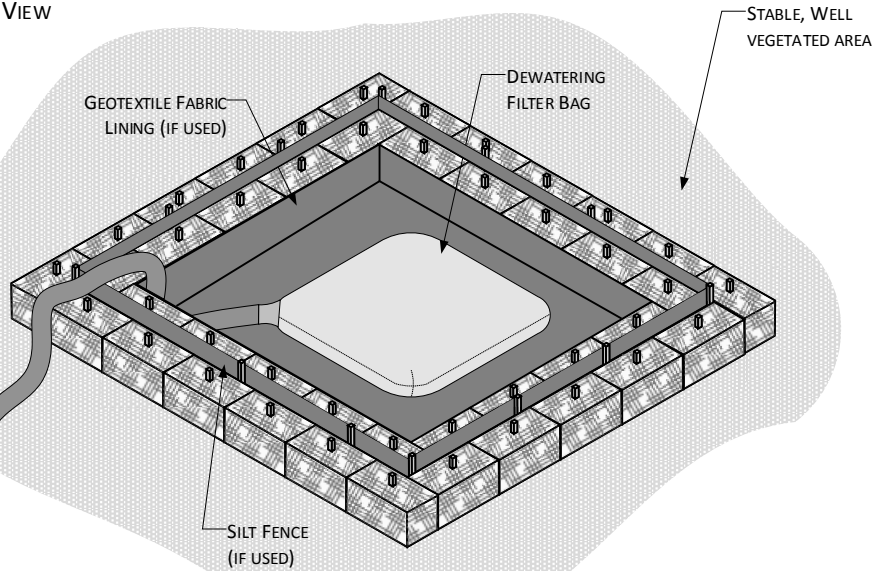
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Typical Waterbody Crossing - Bore Method
Waterdown to Finch Project



PERSPECTIVE VIEW



CONSTRUCT DEWATERING STRUCTURE TO ACCOMMODATE ANTICIPATED PUMPING RATES.

NOTES:

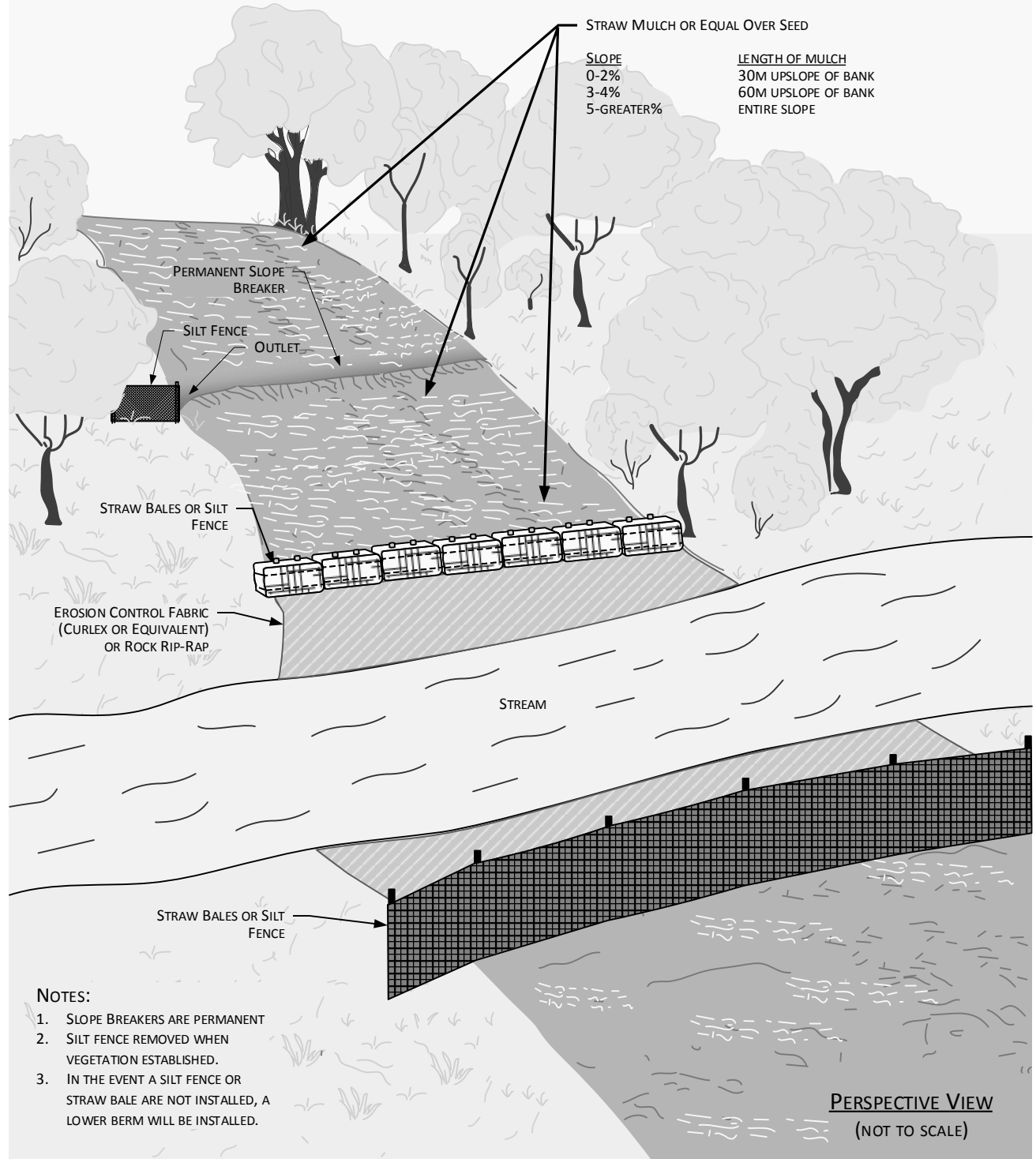
1. CONSTRUCT DEWATERING STRUCTURE TO ACCOMMODATE ANTICIPATED PUMPING RATES.
2. USE A FILTER BAG AT THE DISCHARGE HOSE END.
3. IF SILT FENCE IS USED, ENDS MUST BE WRAPPED TO JOIN TWO SECTIONS.
4. INSTALL SILT FENCE 5CM ABOVE TOP OF STRAW BALE (IF USED), AND ANCHOR A MINIMUM OF 20CM STRAIGHT DOWN.
5. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE USED, INSPECTED, AND MAINTAINED IN ACCORDANCE WITH THE PROJECTS EROSION AND SEDIMENT CONTROL PLAN.

For environmental review purposes only.



Typical Straw Bale and Filter Bag Dewatering Structure
Waterdown to Finch Project



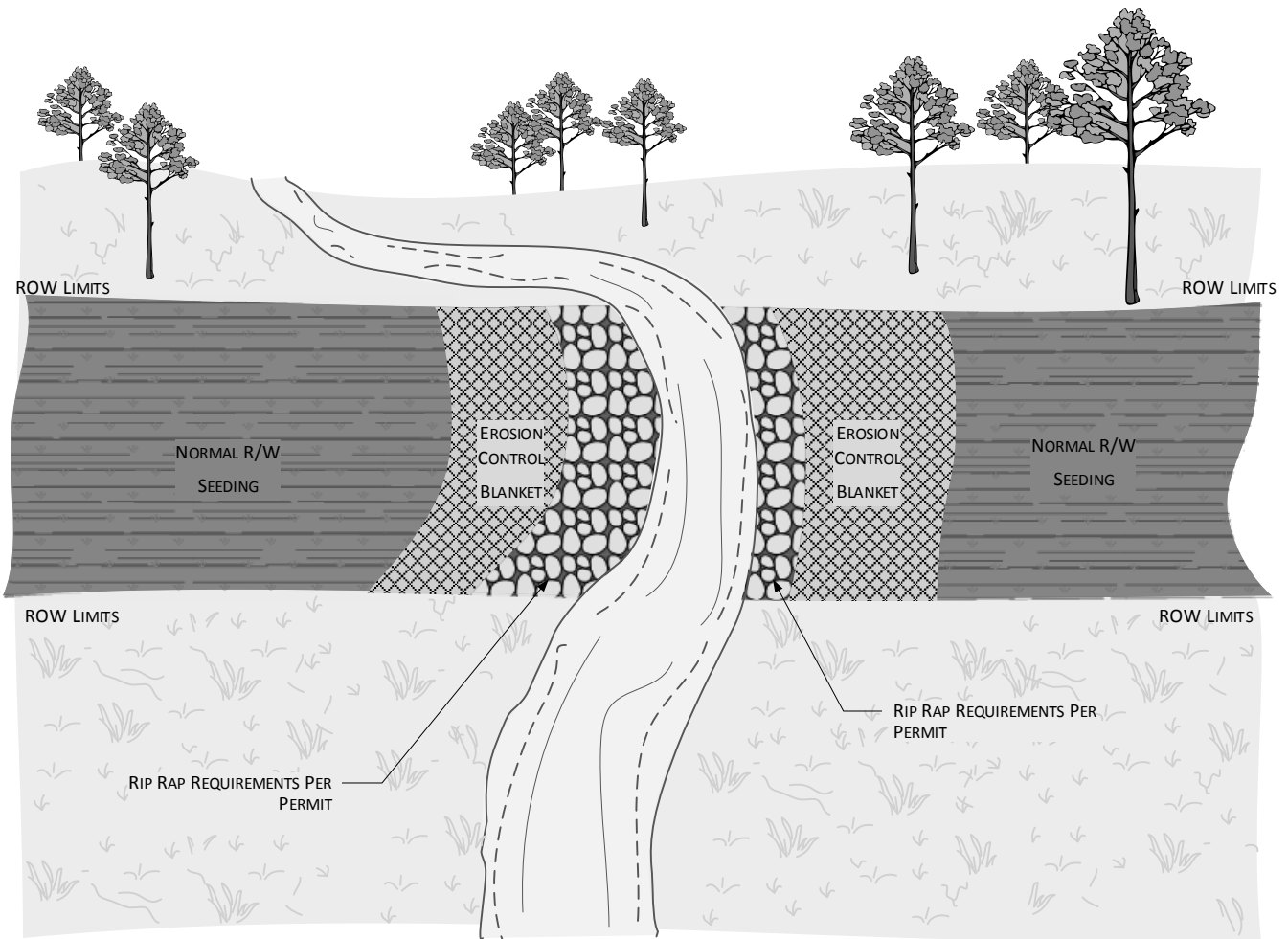


For environmental review purposes only.



Typical Stabilized Stream Crossing
Waterdown to Finch Project





NOTE:

PLACE JUTE BLANKET A MINIMUM OF 30CM UNDER RIP RAP. EXTEND JUTE BLANKET FROM MEAN HIGH WATER LEVEL TO BEHIND BANK.

For environmental review purposes only.



**Typical Final Stream Bank Stabilization -
Rip Rap & Erosion Control
Waterdown to Finch Project**

