

December 9, 2022

Natural Forces
1801 Hollis Street
Suite 1205
Halifax, NS
B3J 3N4

Attention: Megan MacIsaac:

RE: Benjamins Mill Wind Project – West Hants, NS – Surface Water Management Memo

Introduction

The proposed Benjamins Mill Wind Project is being developed by Natural Forces Developments Limited Partnership (Natural Forces) on behalf of the Benjamins Mill Wind Limited Partnership (the Partnership), a partnership formed between Natural Forces and Wskijnu'k Mtmo'ta'nuow Agency Ltd (the Agency), a corporate body wholly owned by the 13 Mi'kmaw bands in Nova Scotia. Together, the Partnership will develop, construct, own and operate the project. The project is located in the West Hants Regional Municipality in Hants County, 14 km southwest of Windsor.

The project is proposed to be built in several phases. As such, the project could have an approximate total capacity of up to 150 MW, representing up to 28 turbines that could collectively power up to 58,000 Nova Scotian homes.

The purpose of this memo is to provide a summary of the local hydrologic conditions, describe potential effects of the Project on surface water during construction and operations, and detail mitigation measures to limit or avoid impacts on existing watercourses and wetlands.

Site Geology

The Benjamins Mill wind project site is located on predominantly on forested land that has a network of clear-cut areas and logging roads from several generations of past wood harvesting activities. The general overall site is on a regional topographical elevated ridge with individual proposed turbine locations generally positioned on localized elevated ridges. Geologic mapping of the overall development area shows principal native conditions varying from surface exposed bedrock to shallow bedrock with thin veneer till cover.

Site Access

As noted in the section above, the existing site is located within an area that has been heavily logged in the past. The intent for this project is to utilize existing roads and cleared areas as much as possible, however, construction of some new access roads and additional clearing will be required. The typical roads will have a travel surface with a width of 6.0m, except for area where the crane will be walking. Areas where crane walks are planned will require a road width of 12.0m at straight areas and up to 13.0m in width at turn areas. The intent for the construction of all new roads would be to avoid wetlands, watercourses, and any areas of steep slopes (where possible) as these pose challenges with the delivery of turbine components and efforts are being made to minimize impacts to environmental features.

Site Drainage

Drainage for both the existing and proposed roads will be provided using roadside ditches and culverts where required. The intent would be to use existing drainage culverts where possible, however, if the existing culverts do require upgrades, they will be designed to the current Nova Scotia Environment Standards for watercourse culverts (i.e. sized for the 1 in 100 year storm event with fish passage if required). All new culverts will be designed to the current NSE standards for watercourse crossings. Any additional culverts required for drainage would be designed for the 1:10 year storm event.

Typically, circular culverts will be installed for all watercourse crossings and drainage structures. If they are within areas of limited fill/cover, alternative culvert designs will be considered using rectangular shaped box culverts.

As the existing underlying soils have low permeability (intact bedrock) and with the use of existing roads and cleared areas, we are of the opinion that an increase in peak storm water flows from this project would be negligible. During the detailed design, if it is determined that the increase in post development storm water flows are higher than expected, these will be managed using industry best management practices. A detailed stormwater management plan employing industry best practices will be provided to the construction team and Nova Scotia Environment part of the detailed design which will outline pre-development and post development flows. While a larger footprint is needed during the construction phase, most of the areas disturbed during construction will be returned to their natural states once construction is completed. Furthermore, the intent would be to maintain existing drainage boundaries. A preliminary review of the drainage boundaries for the existing and proposed culverts are shown on the attached surface water management plan along with the general direction for surface water flows for the overall site.

Erosion and Sedimentation Control

To mitigate the impact on existing watercourses and wetlands, a detailed erosion and sedimentation control plan will be prepared by DesignPoint prior to any construction activities on-site. The plan will include measures as outlined in the Nova Scotia Erosion and Sedimentation Control Handbook for Construction Sites. These will include measures such as rip rap entrance aprons, silt fence, diversion ditches, check dams, dispersion aprons etc. For installation of watercourse crossing culverts additional measures will be required following current Nova Scotia Environment Standards for watercourse culverts. A plan showing proposed details and construction guidelines is included as part of this submission.

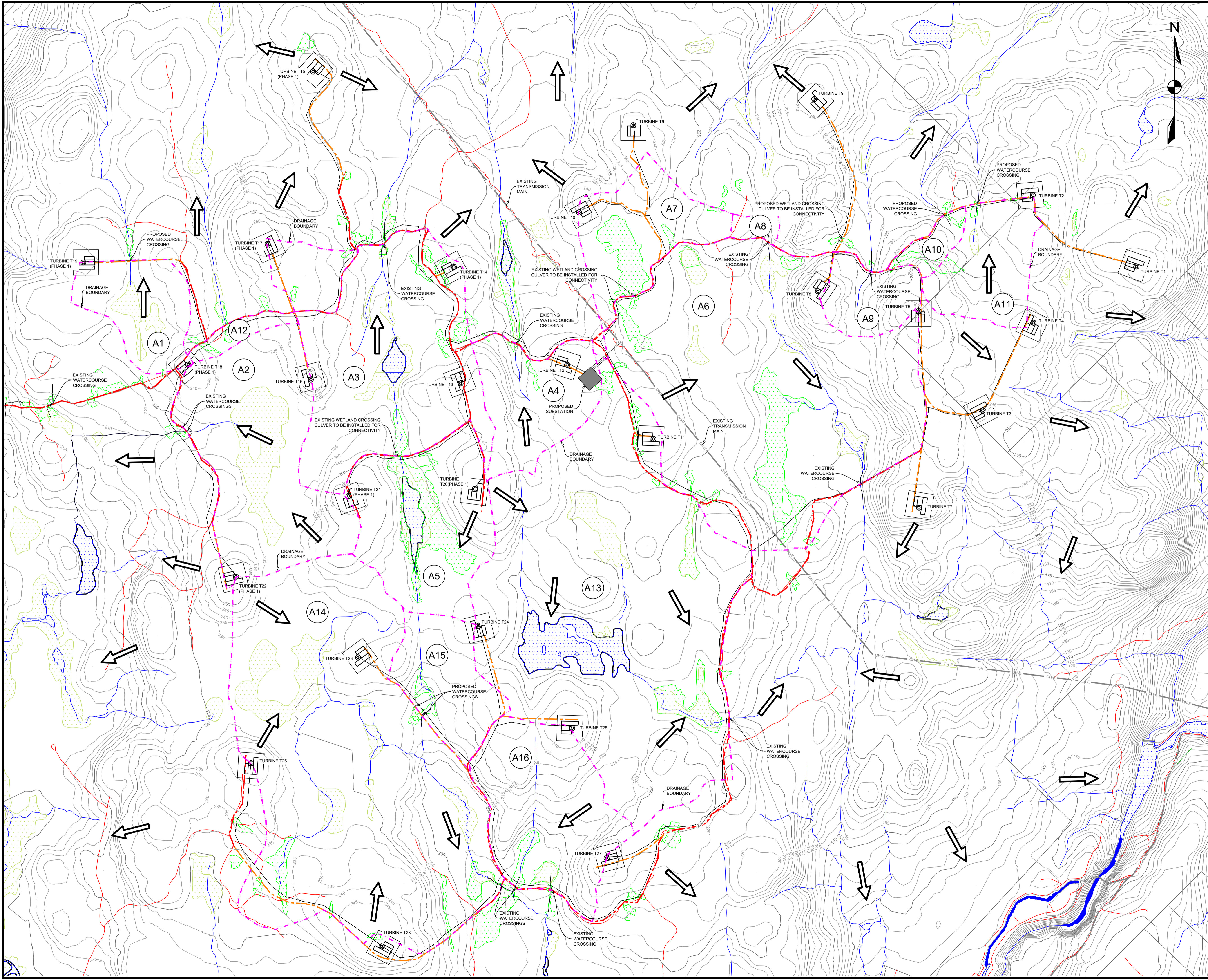
We trust the information provided above meets your requirements. If you have any questions or comments, please contact the undersigned.

Thank you,
DesignPoint Engineering & Surveying Ltd.



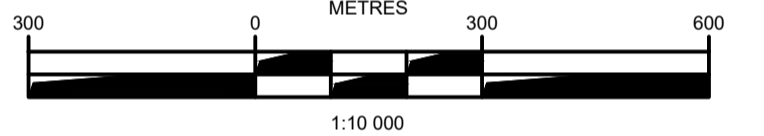
Neil Fougere, P.Eng.
Senior Engineer & Principal

NTF



- A10 CATCHMENT ID
- MAJOR FLOW ARROW*
- EXISTING ROAD TO BE UPGRADED
- PROPOSED ROADS
- DRAINAGE BOUNDARY
- FIELD DELINEATED WETLAND
- PROVINCIAL MAPPING WETLAND
- PROVINCIAL MAPPING WATER BODY

*MAJOR FLOW AREAS DEPICT GENERAL DIRECTION OF SURFACE WATER FLOW



1	DEC. 09, 2022	ISSUED FOR REVIEW
ISSUE	DATE	DESCRIPTION
		CONSULTANT

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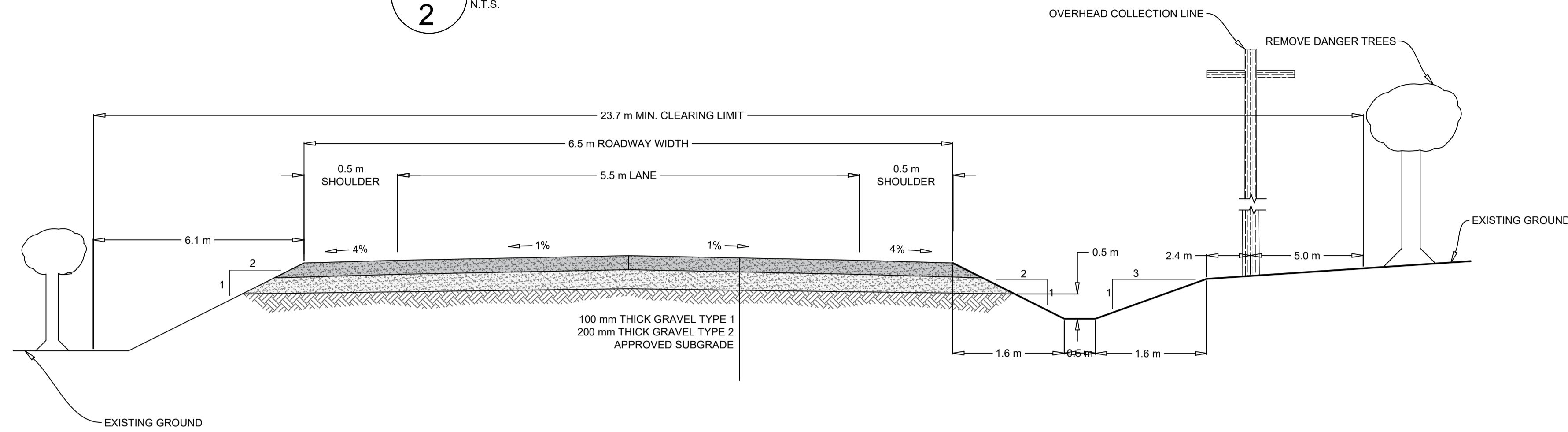
natural forces
Delivering renewable energy for communities

PROJECT DESCRIPTION
BENJAMIN MILLS WIND PROJECT
BENJAMIN MILLS, NOVA SCOTIA
SHEET DESCRIPTION

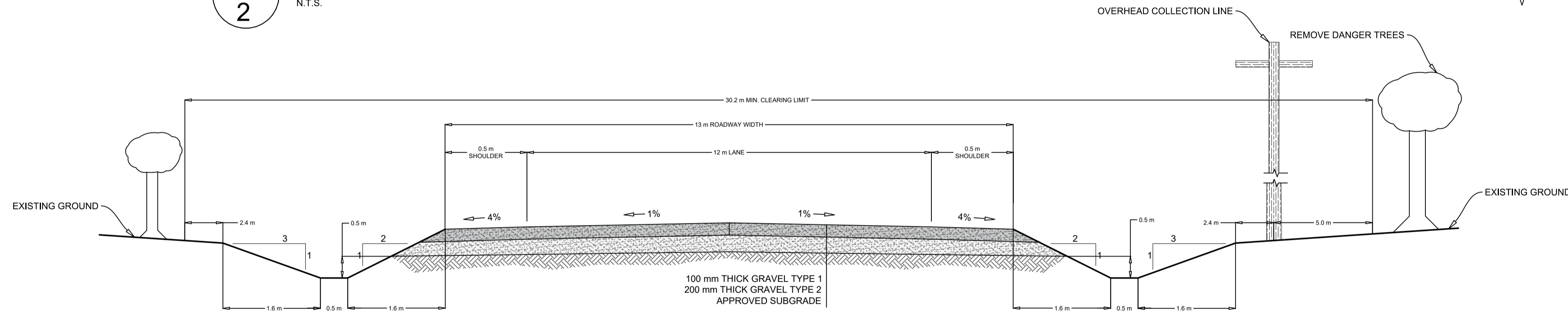
SURFACE WATER MANAGEMENT PLAN

Drawn N. FOUGERE	Engineer N. FOUGERE	Project No. 22-411	Drawing No. C-200
Scale 1:10 000	Filename 22-411_STM.dwg		1 of 2

A
2 TYPICAL 6.0 m CROSS SECTION
N.T.S.

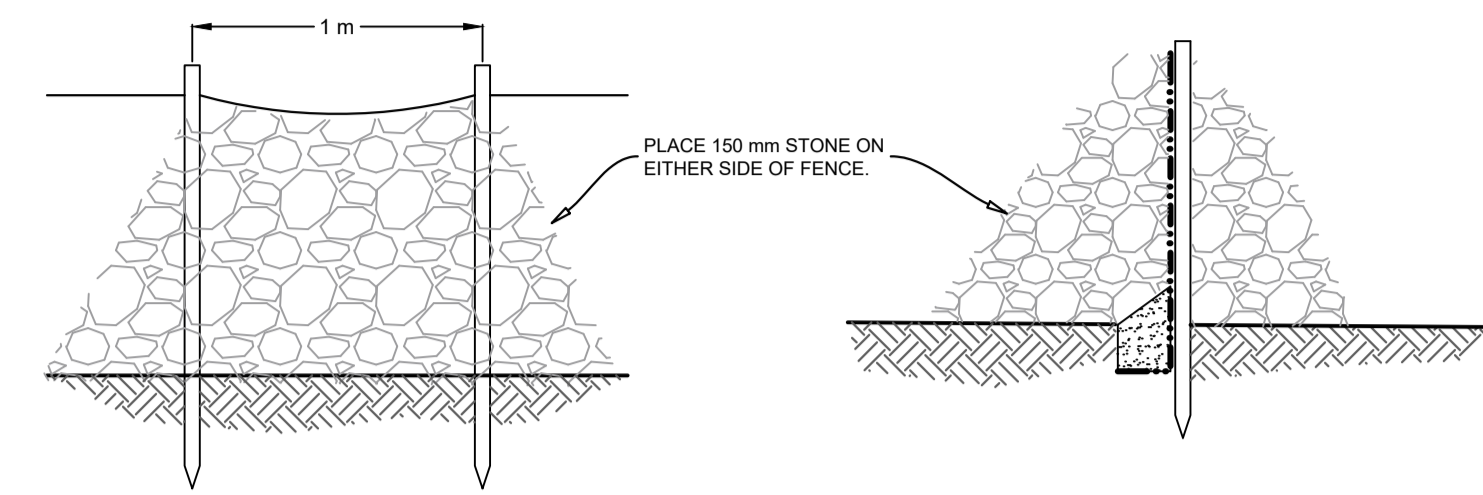


B
2 TYPICAL 12.0 m CROSS SECTION - OPTIONAL WHERE CRANE WALKING IS POSSIBLE
N.T.S.

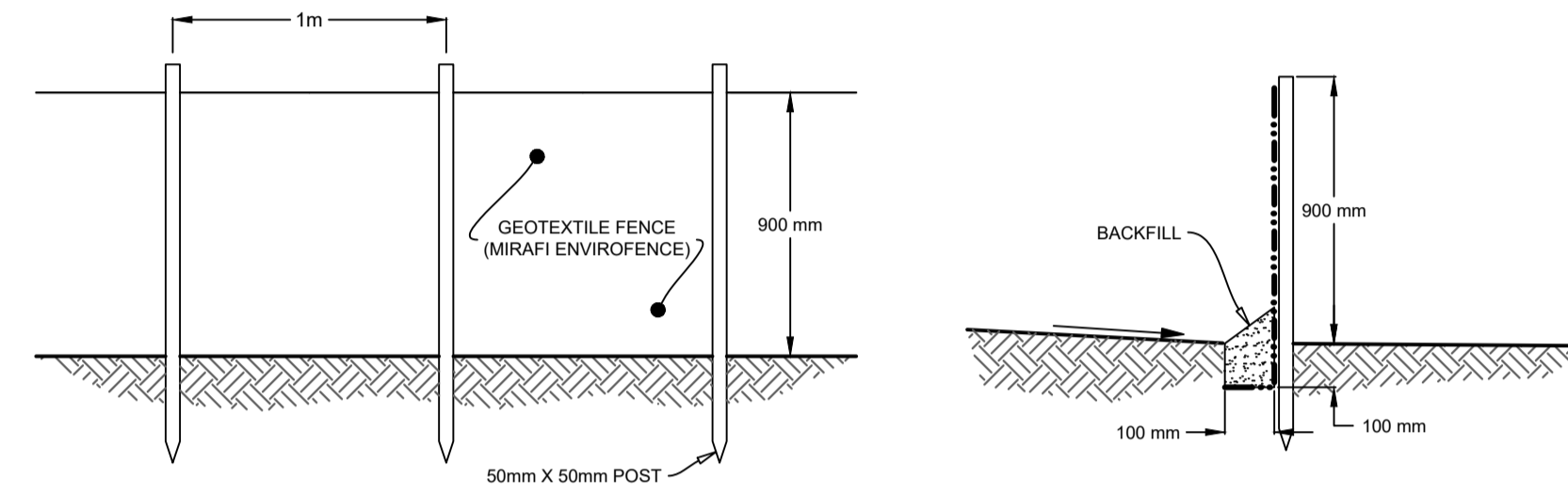


NOTE: FOR HORIZONTAL CURVES THE LANE WIDTH SHALL BE 13 m WIDE

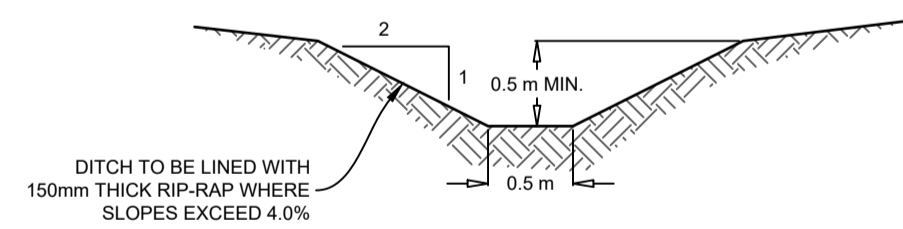
C
2 SILT FENCE OVERFLOW DETAIL
N.T.S.



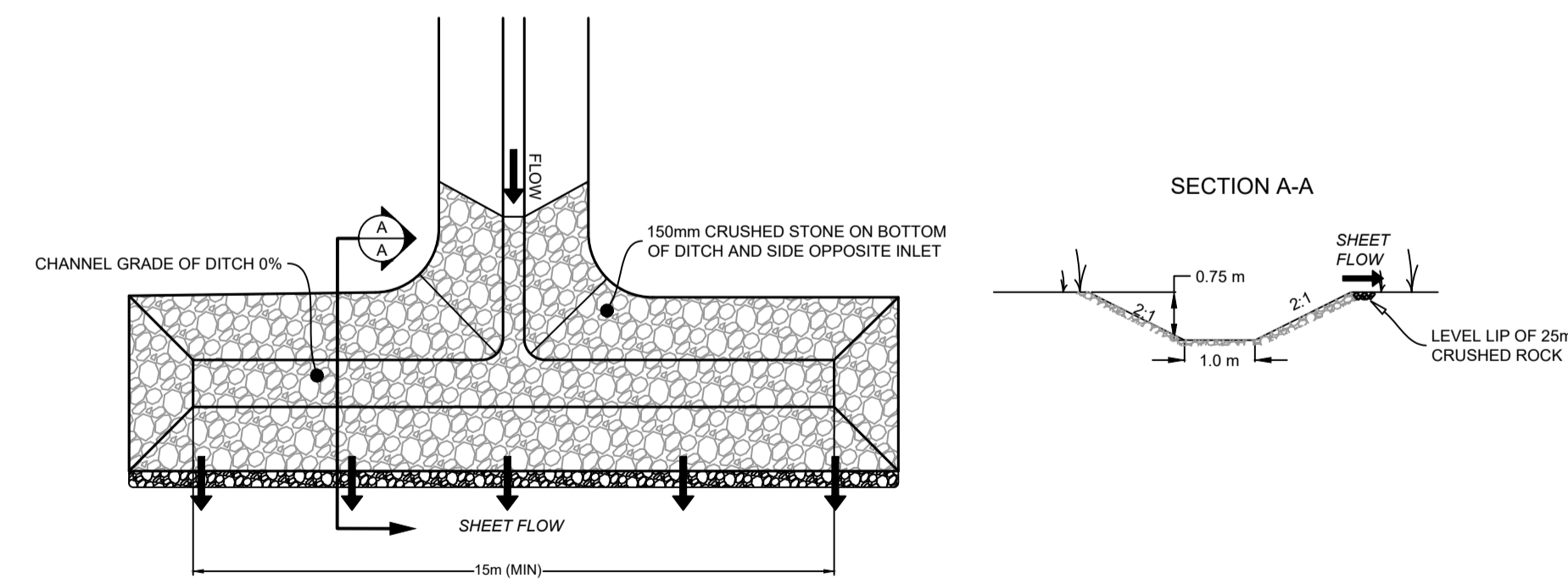
D
2 SILT FENCE DETAIL
N.T.S.



E
2 DIVERSION DITCH DETAIL
N.T.S.

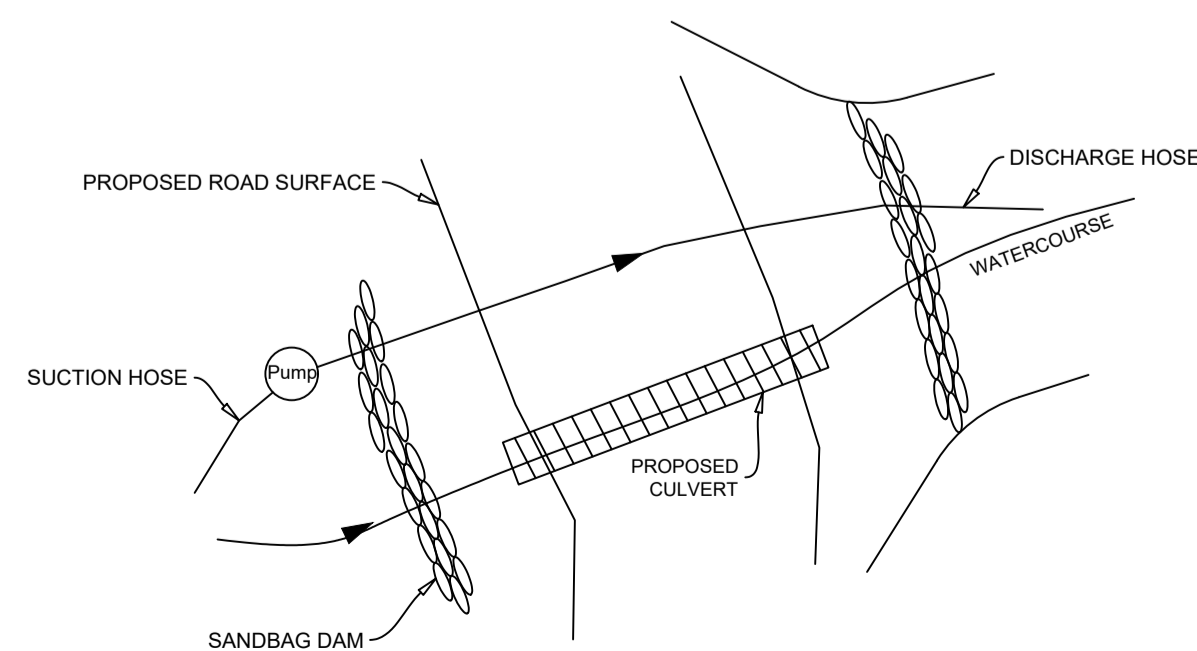


F
2 DISPERSION APRON
N.T.S.

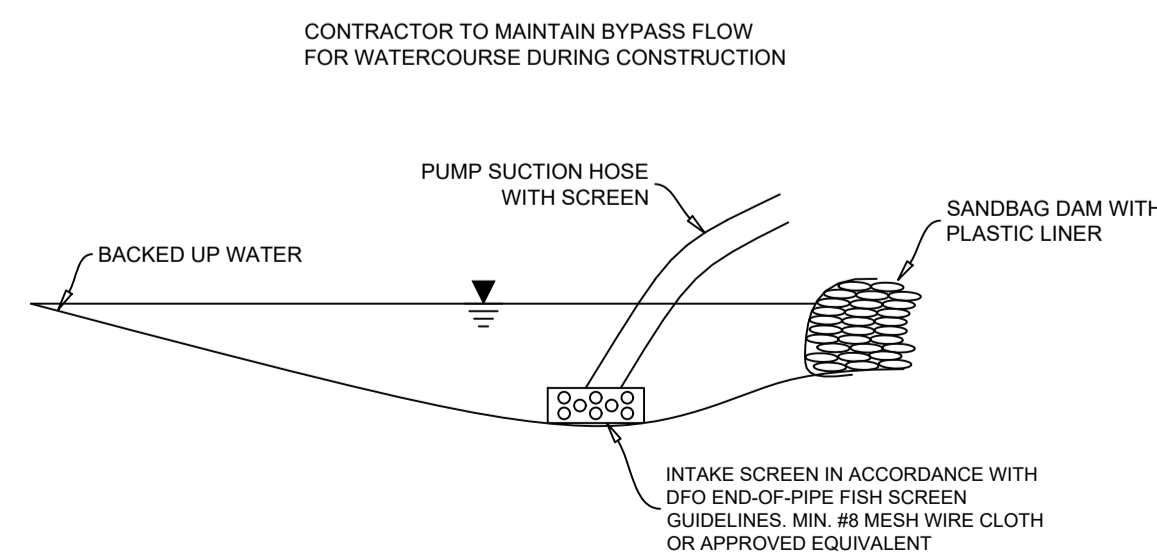


- DITCH TO BE CONSTRUCTED ON UNDISTURBED SOIL OR PROPERLY COMPACTED FILL.
- DISPERSION DITCH TO OUTLET TO LEVEL, VEGETATED SURFACE IN AN UNDISTURBED, STABILIZED AREA.

G
2 CULVERT INSTALLATION DETAIL
N.T.S.



H
2 PUMP INTAKE DETAIL
N.T.S.



CONTRACTOR TO MAINTAIN BYPASS FLOW FOR WATERCOURSE DURING CONSTRUCTION

INTAKE SCREEN IN ACCORDANCE WITH DFO END-OF-PIPE FISH SCREEN GUIDELINES. MIN. #8 MESH WIRE CLOTH OR APPROVED EQUIVALENT

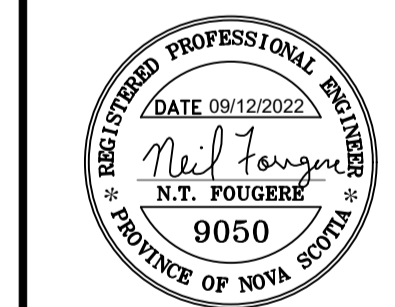
GENERAL EROSION AND SEDIMENT CONTROL NOTES

- CONTRACTOR MUST PREVENT SEDIMENT-LADEN WATER FROM LEAVING THE SITE.
- EXPOSED SOIL TO BE MINIMIZED AT ALL TIMES DURING CONSTRUCTION TO LIMIT SEDIMENT LADEN RUNOFF. THIS IS TO BE ACCOMPLISHED BY COMPLETING ALL WORK IN A GIVEN AREA ONCE EXCAVATION HAS BEGUN BEFORE DISTURBING ADDITIONAL SOIL. CONTRACTOR IS TO BE AWARE OF CURRENT WEATHER FORECASTS AND PLAN SOIL STABILIZATION ACCORDINGLY.
- ALL WORKS TO BE IN ACCORDANCE WITH NOVA SCOTIA DEPARTMENT OF ENVIRONMENT REQUIREMENTS INCLUDING WATERCOURSE ALTERATION PERMITS.
- CONTRACTOR TO ACQUIRE ALL PERMITS REQUIRED TO PERFORM WORK AND TO COMPLY WITH ALL PERMIT REQUIREMENTS DURING CONSTRUCTION.
- CONTRACTOR TO PROTECT NATURAL WATERCOURSES FROM SILT LADEN RUNOFF FROM CONSTRUCTION SITE. CONSTRUCTION PROCEDURES CAN BE FOUND IN THE CURRENT EDITION OF "EROSION AND SEDIMENTATION CONTROL HANDBOOK FOR CONSTRUCTION SITES" BY THE NOVA SCOTIA DEPARTMENT OF ENVIRONMENT.
- CONTRACTOR TO ENSURE THAT ALL EXPOSED AREAS ARE STABILIZED PRIOR TO RAINFALL EVENTS BY CHECKING ENVIRONMENT CANADA FORECASTS. FORECASTS TO BE CHECKED DAILY (https://weather.gc.ca/canada_e.html).
- CONTRACTOR TO PERFORM WEEKLY INSPECTIONS OF SEDIMENT CONTROL MEASURES AND MAKE REPAIRS AS NEEDED. ADDITIONAL INSPECTION AND REPAIR TO BE CARRIED OUT BEFORE AND AFTER ANY RAINFALL EXCEEDING 10mm OVER 24 HRS AND FOR AREAS NEAR EXISTING WATERCOURSES. A LOG OF EACH INSPECTION AND REPAIR IS TO BE KEPT ALONG WITH A WEEKLY REPORT OF EXPOSED AREAS.
- TRIBUTARY STORM RUNOFF FROM SITE TO BE DIRECTED INTO SEDIMENT CONTROL DEVICES DURING CONSTRUCTION.
- CONTRACTOR TO CONSTRUCT AND MAINTAIN DIVERSION DITCHES THROUGH AND AROUND THE SITE TO MINIMIZE CONTAMINATION OF CLEAN WATER.
- CONTRACTOR TO HAVE ADDITIONAL SEDIMENT CONTROL MEASURES ON SITE INCLUDING SILT FENCE, BALED HAY, AND LOOSE HAY/MULCH TO MAINTAIN OR INSTALL CONTROL MEASURES AS REQUIRED.
- EXPOSED SURFACES TO BE COVERED WITH HAY, MULCH, OR WOOD CHIPS TO LIMIT SEDIMENT RUNOFF.
- CONTRACTOR MAY SUBSTITUTE WOOD CHIP BERM FOR SILT FENCE IN ROCKY AREAS WHERE SILT FENCE CANNOT BE INSTALLED.
- SEDIMENTATION BERMS AND PONDS TO REMAIN IN SERVICE UNTIL VEGETATION IS ESTABLISHED. REMOVAL OF THE MEASURES SHALL BE APPROVED BY THE PROJECT ENGINEER OR THE MUNICIPALITY REQUESTS. THIS WILL ONLY OCCUR AFTER LOT AND BUILDING CONSTRUCTION IS COMPLETE.
- SEDIMENTATION BERMS AND PONDS TO BE REMOVED IN THE FOLLOWING ORDER: LEVEL OFF BERMS, HYDROSEED AND COVER ALL EXPOSED AREAS WITH HAY, THEN FILL IN PONDS. WATER AND SEDIMENT FROM PONDS TO BE DISPOSED OF AT AN APPROVED FACILITY.
- UPON COMPLETION OF GRADING ACTIVITY, ALL LOT DRAINAGE EASEMENTS ARE TO BE HYDROSEED AND MULCHED.
- TOPSOIL AND HYDROSEED TO BE PLACED ON ALL AREAS NOT FINISHED WITH ASPHALT, CONCRETE, GRAVEL, OR SOIL.
- ACCESS ROADS TO SITE ARE TO BE MAINTAINED WITH CLEAN GRAVEL APPLIED PERIODICALLY TO COVER MUDDY AREAS. CLEANING OF ADJACENT STREETS IS THE RESPONSIBILITY OF THE CONTRACTOR AS DIRECTED BY THE ENGINEER.
- VEHICLE ACCESS TO CONSTRUCTION SITE TO BE RESTRICTED.
- STABILIZE ON-SITE STOCKPILES USING APPROPRIATE MEASURES (SILT FENCE, HAY, TAPPS, ETC.)
- ALL SEDIMENT CONTROL MEASURES TO BE OPERATIONAL OVER ENTIRE CONSTRUCTION PERIOD.
- THE SEDIMENTATION AND EROSION CONTROL MEASURES SHOWN ON THIS PLAN ARE SUBJECT TO CHANGE. ADDITIONAL MEASURES MAY BE REQUIRED DEPENDING ON SITE CONDITIONS DURING CONSTRUCTION. CONTRACTOR TO DEVELOP AN EROSION AND SEDIMENTATION CONTROL PLAN PRIOR TO START OF CONSTRUCTION TO BE APPROVED BY THE ENGINEER.
- CONTRACTOR TO COMPLETE THE EROSION AND SEDIMENTATION CONTROL COURSE PROVIDED BY NS DEPARTMENT OF PUBLIC WORKS, DEPARTMENT OF FISHERIES AND OCEANS OR DALHOUSIE UNIVERSITY (OR APPROVED EQUIVALENT).
- ANY TRAPPED SEDIMENT TO BE REMOVED FROM SITE AS REQUIRED AND DISPOSED OF AT AN APPROVED FACILITY.
- CONTRACTOR TO NOTIFY NOVA SCOTIA ENVIRONMENT, THE OWNER AND THE ENGINEER IMMEDIATELY OF ANY FAILURES OR SEDIMENT RELEASE EVENTS.

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1	DEC. 09, 2022	ISSUED FOR REVIEW

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CLIENT

natural forces
Delivering renewable energy for communities

PROJECT DESCRIPTION

BENJAMIN MILLS WIND PROJECT
BENJAMIN MILLS, NOVA SCOTIA

SHEET DESCRIPTION

NOTES AND DETAILS

Drawn	Engineer	Project No.	Drawing No.
N. FOUGERE	N. FOUGERE	22-411	C-201
Scale	Filename		
N.T.S.	22-411_STM.dwg		2 of 2