Environmental Control Planning on Highway Construction Projects

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Date: May 18, 2016


….. a look back in time …..

Development of ECPs between 1992 and 2016

- **1992** - No ESC pay items in NSTIR 100 Series Highway construction contracts
- **1996** - Considerable improvements made
- The approach to erosion and sediment control on projects in **2016** is not much different than was mandated in 1996 …….. …… **20 years ago**
- Except now there are many new BMPs to use

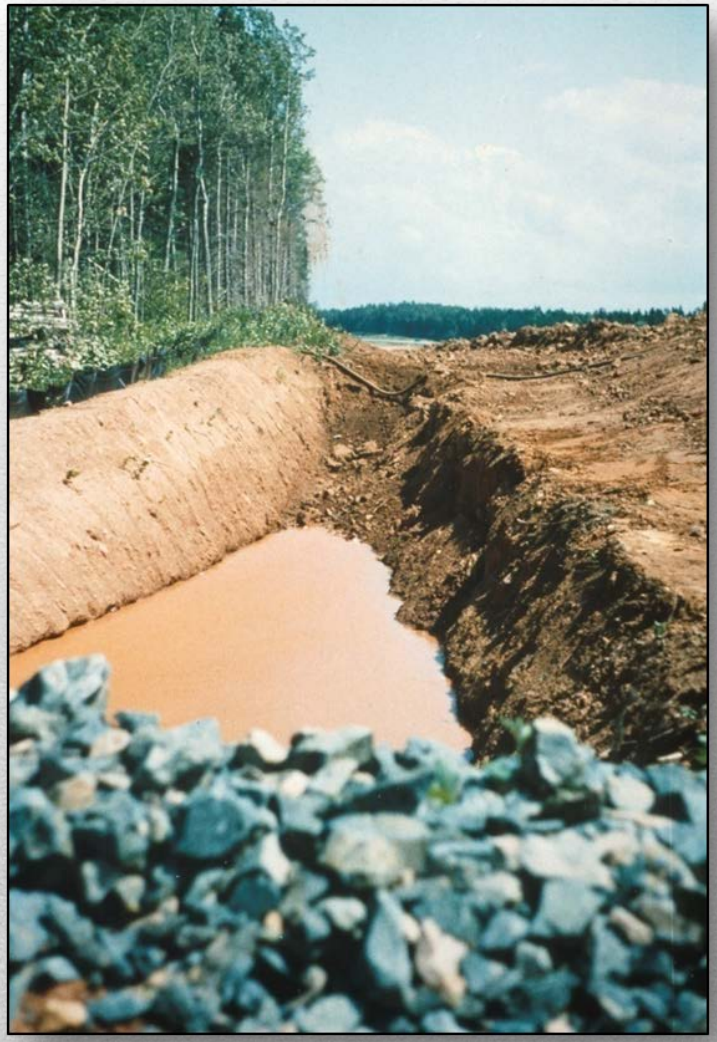
Fish Passage in 1992

ESC Measures in 1992

Lots of Exposed Soil

Hydroseeding in Fall

Sediment Ponds Implemented in 1993



Emphasis Placed on Erosion Control and Work Progression in 1996

Same Project a Few Weeks Later

Similar Project in 2012

Fish Passage in 1993

Removal of Barriers at Culvert Outlets in 1994

Failed Culvert in 2013

Gasperau Unable to Get Up Stream

Culvert Outlet and Plunge Pool

Salvaged Vegetation Being Watered

Salvaged Vegetation Re-used on Slope

Revisions to the NSE ESC Manual

DEFINITIONS

- **Soil Erodibility –** A rating (i.e., high, medium, low) assigned to a soil type based on its physical and chemical properties.
- **Erosion Control BMPs –** The environmental controls implemented to prevent erosion.
- **Erosion Potential –** A rating (i.e., high, moderate low) given to a disturbed site based on the soil erodibility, maximum gradient and slope length within a site.
- **Erosion Potential Risk Assessment –** The process of identifying the erosion potential of a disturbed site and then determining the required level of environmental control to be implemented to minimize erosion.

Erosion Potential Risk Assessment

- **Desk Top** – Collect all available data such as contour plans, project drawings, soil type, hydrology data, etc.
- **Site Visit** – Collect soil samples, denote sensitive receptors and areas of ongoing erosion, confirm existing drainage channels, ditches, etc.
- **Design Phase** – Determine:
  - Soil erodibility (Refer to Table),
  - Soil erosion potential for the site (Refer to Table), and
  - Level of environmental control required for the site (Refer to Table).

Table: Soil Erodibility

Soil Classification	Erodibility Classification	Soil Erodibility Rating
Silt, Silty Loam, Loam, Silty Sand	High ↓ Low	High
Sandy Loam , Silty Clay Loam, Sandy Clay Loam, Silty Clay		Medium
Sandy Clay, Clay, Heavy Clay, Loamy Sand, Sand, Poorly Graded Gravel, Well-graded Gravel		Low

Table: Soil Erosion Potential

Slope Gradient	Slope Erodibility	Slope Length	
		<70 m	>70 m
0 - 10%	Low	Low	Low
	Medium	Low	Moderate
	High	Moderate	High
10 - 20%	Low	Low	Moderate
	Medium	Moderate	High
	High	High	High
>20%	Low	Moderate	Moderate
	Medium	High	High

Table: Level of Environmental Control

Erosion Potential	Consequence if Sediment-Laden Runoff Left Site	Procedural BMPs	ESC & Structural BMPs	Water Management BMPs	Work Progression Schedule
Low	Low	Required	–	–	–
	High	Required	Required	Recommended[b]	–
Moderate	Low	Required	Required	Recommended[b]	–
	High	Required	Required	Required	Recommended[b]
High	Low	Required	Required	Required	Required
	High	Required	Required	Required	Required

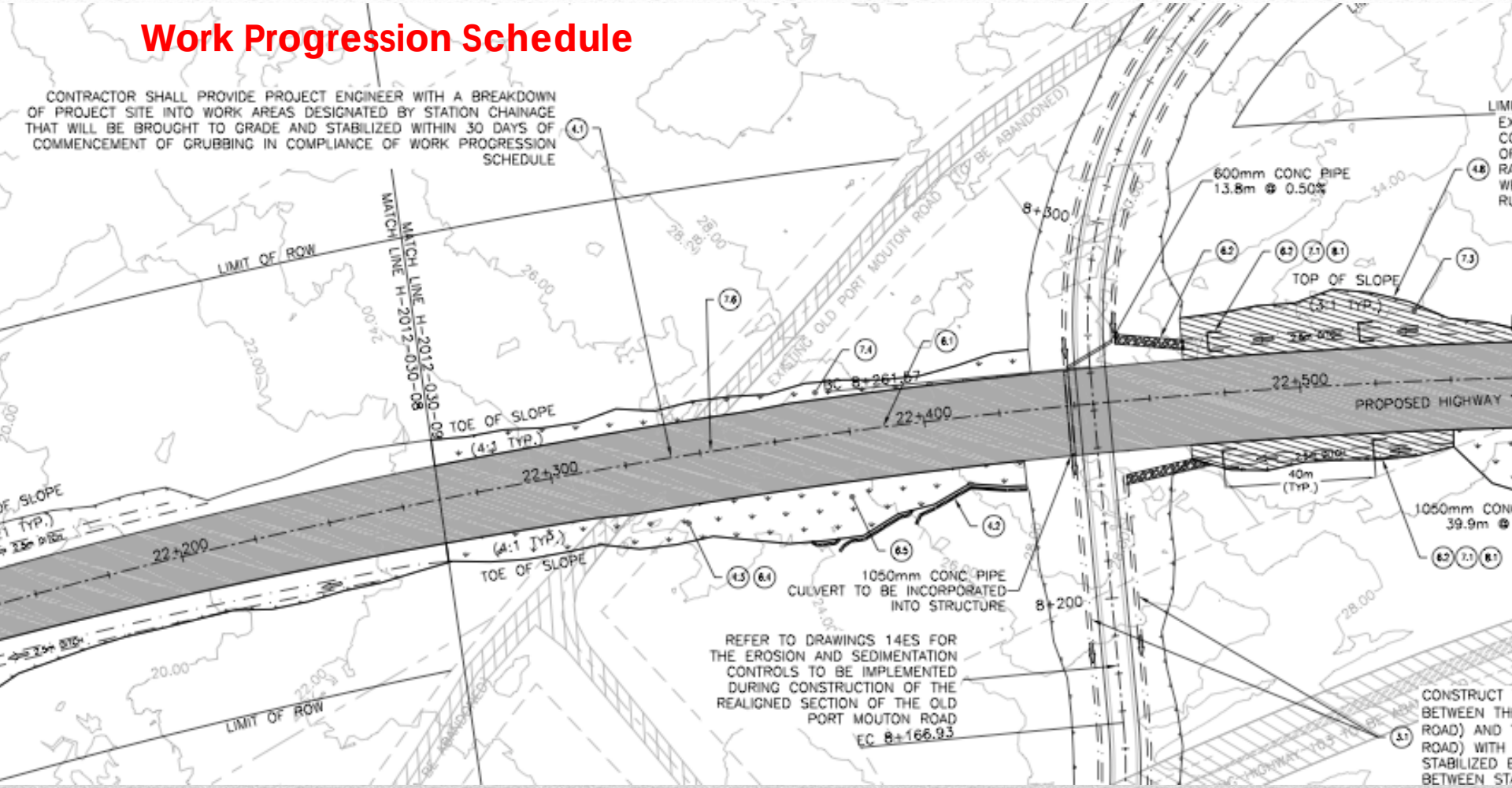
Ongoing Project in 2014

Ongoing Project in 2014

Construction Sequencing in ECP

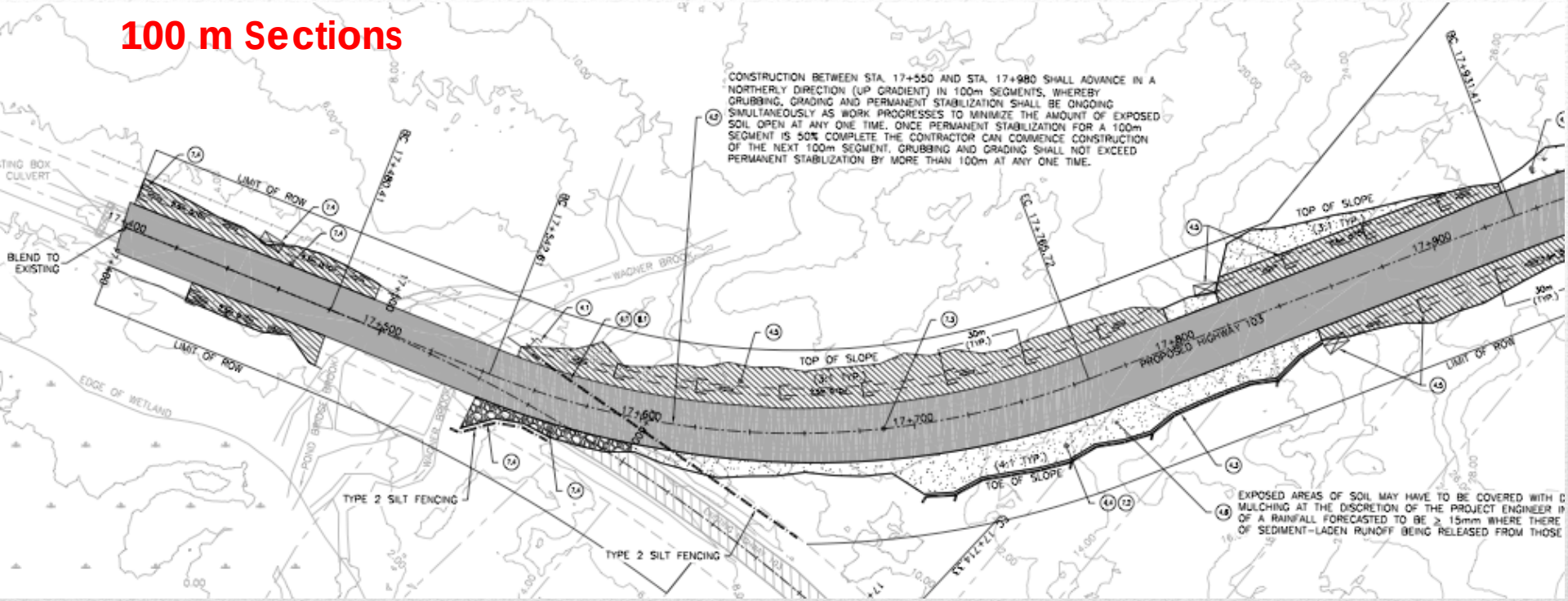
1. Clearing Operation
2. Installation of Culverts
3. Surface Water Management
4. Grubbing Operation
5. Alteration of Wetlands
6. Grading Operation
7. Stabilization Operation
8. Removal of Sediment Controls

Work Progression Schedule



ECP Drawing Included in ECP Report

100 m Sections



ECP Drawing Included in EC Report

Project in Same Area in 2015

Project in Same Area in 2015

- Erosion Control Blankets
- C2 or C3 Clear Stone
- Straw/Hay Mulch

Erosion Control BMPs Available in 1996

- Erosion Control Blankets (specific situations)
- C2 and C3 Clear Stone
- Dry Mulching
- Bonded Fiber Matrix (BFM)
- Fiber Reinforced Matrix (FRM)
- Grubbing Material
- Re-use of Existing Vegetation
- Planting of Native or Naturalized Plants/Shrubs

Erosion Control BMPs Available in 2016

Erosion Control Blankets

Dry Mulching

Fiber Reinforced Matrix (FRM)

Grubbing Material

Re-use of Existing Vegetation

Planting of Native and Naturalized Vegetation