HALIFAX
REGIONAL MUNICIPALITY

P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Environment & Sustainability Standing Committee
March 6, 2014

TO: Chair and Members of Environment & Sustainability Standing Committee

SUBMITTED BY: Original Signed
Jane Fraser, Director, Planning & Infrastructure

DATE: January 21, 2014

SUBJECT: **Update: Green Infrastructure Project, Oathill Lake**

INFORMATION REPORT

ORIGIN

Environment & Sustainability Standing Committee, June 6, 2013 Item 6.3.1

LEGISLATIVE AUTHORITY

Part IV, Finance, Power to expend money, 79, (1), (al): The Council may expend money required by the municipality for wastewater facilities and stormwater systems.

BACKGROUND

On June 6, 2013, the Oathill Lake Conservation Society presented at the Environment & Sustainability Standing Committee on a proposal for a pilot green infrastructure project which would result in decreased environmental impact to the lake and increase the recreational enjoyment of the lake.

The presentation included a December 2012, conceptual solution shown in Attachment 1 provided to Halifax Water.

Committee instructed staff to provide quarterly updates on the project.

DISCUSSION

The green infrastructure revision to the traditional stormwater infrastructure requires participation from the municipality, as the alternative solutions are not supported by a Utility and Review Board funding mechanism. As a result, this project estimated at under $50,000, was approved for funding from the Sustainable Communities Reserve by the Green Municipal Fund in 2014/2015.

Design and construction details have been completed and are in Attachment 2.

The work will be tendered and completed during the 2014/2015 construction season.

Brief Project Description: The project will relocate an existing concrete stormwater pipe that discharges directly into the lake, at a key public access, by installing a diversion by way of installing a manhole chamber with a pipe leading to a small manufactured wetland. This will result in improved public access and enjoyment of the lake and improved environmental impact on the lake by naturally filtering the rainflow.

FINANCIAL IMPLICATIONS

Funding is available for this project in cost centre D948 (Sustainable Community Projects) proposed 2014/15 operating budget.

COMMUNITY ENGAGEMENT

This project resulted from a community proposal and collaboration.

ATTACHMENTS

Attachment 1: Stormwater Discharge Pollution Reduction Plan Report
Attachment 2: Oathill Lake Sections and Site Plans Details

A copy of this report can be obtained online at http://www.halifax.ca/commcoun/index.html then choose the appropriate Community Council and meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by: Richard MacLellan, Manager, Energy & Environment 233-4846

Oathill Lake
Dartmouth

Stormwater Discharge Pollution Reduction Plan

Application of Best Management Practices to the Oathill Crescent Outfall

December 2012

Prepared for Halifax Water by Norman Steele for the
Oathill Lake Conservation Society
www.oathilllake.ca

The Oathill Lake Conservation Society

We are a non-profit community-based organization dedicated to restoring and maintaining the ecological health and biological diversity of Oathill Lake. Our membership is comprised of volunteers–all dedicated to improving and maintaining the health of this small lake and its parkland as a resource for walking, swimming, boating, skating, skiing and fishing. We want this urban gem to remain a source of recreational and aesthetic pleasure for this and future generations.

Education is the key to getting people involved and invested in our cause. But we also conduct environmental monitoring, and make scientifically-based recommendations to government agencies, whose policies and activities are seen to have the greatest influence on the health and integrity of the lake.

In advance, OLCS would like to thank HRM and Halifax Water for its continued support and consideration of the proposed stormwater pipe alterations detailed in this document.

Concerns about Stormwater

Stormwater drainage which is intended to remove water from properties, streets, roadways, and parking lots is flowing directly into Oathill Lake without any treatment, structural features, or retention that might allow for more natural processes that would improve water quality. Water quality data for Oathill Lake (available on our website) collected as far back as 1981 indicate Canadian Council of Minister of Environment (CCME) guideline exceedances for human health and aquatic life for chloride, various metals, bacteriological parameters, and dissolved oxygen. As well, a trend of increasing levels of total phosphorous is developing. Influences from road salt, organic loading; property activities such as fertilizing, washing with soaps, illegal dumping into storm drains, and petroleum hydrocarbon products leaking from vehicles currently have a direct pathway to the waters of the lake. Of particular concern is the storm sewer outfall located at the end of the Oathill Crescent pathway on the south east end of the Lake (See Photo #1).

Photo 1 – Oathill Crescent Storm Sewer

Summary of Concerns Regarding Oathill Crescent Stormwater Drain

1. direct untreated input of stormwater into Oathill Lake;
2. contribution to a deterioration of water quality and overall health of Oathill Lake as well as possible impacts to Lake Banook to which Oathill Lake flows;
3. risk to the aquatic life of Oathill Lake;
4. risk to the health of swimmers and other recreational users due to E. coli and fecal coliform – In particular the stormwater pipe is located in one of the lakes most popular swimming areas; and
5. velocity and discharge of flow from the pipe during rain events alters and disturbs sediment on the lake bottom (further negative impacts on water quality).

Proposed Solution

Halifax Water is asked to redirect the up gradient outflow stormwater pipe to a rip rap day-lighted channel and a wet/dry pond (pocket wetland). A cost estimate, and conceptual drawings are provided in Annex A, B, and C.

Summary of Reasons to Alter the Oathill Crescent Storm Sewer Pipe

1. the project would be an example of HRMs and HWs commitment to follow best management practices for stormwater systems;
2. demonstrate support for and partnership with local community interests and preservation of a valuable natural asset;
3. day-lighting, infiltration, and the retention time influence of a rip rap channel and wet/dry pond, if designed correctly, may reduce contaminates as follows:

Example of Pollutant Removal Capabilities

Parameter	**Wet Pond**
TSS	77%
Organic Carbon	45%
Total Phosphorous	47%
Nitrate	24%
Lead	73%
Copper	57%
Cadmium	24%
Hydrocarbons	83%
Bacteria	65%

Source HRM Stormwater Management Guidelines 2006

4. improved quality and naturally treated stormwater entering the Oathill Lake;
5. proposed alterations provide well known and proven effective contaminate reduction;
6. the site is well suited for the alterations and is easily accessible for construction and maintenance;
7. reduced risk to human and aquatic life health, and
8. at our March 18, 2010 meeting, Halifax Water made a verbal commitment to the OLCS to make improvements to the stormwater inflows at Oathill Lake.

Annex A
Conceptual Drawings

Figure 1 – Oathill Crescent Stormwater Pipe Alteration

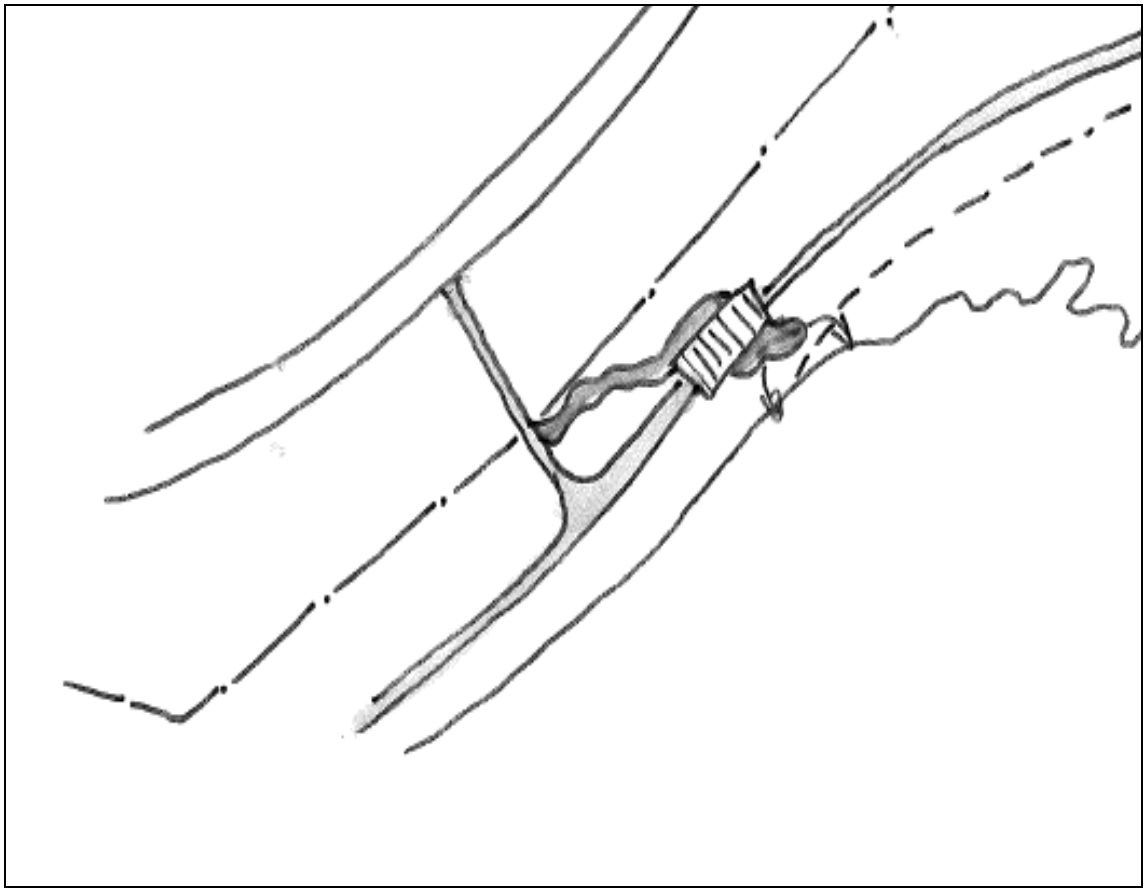
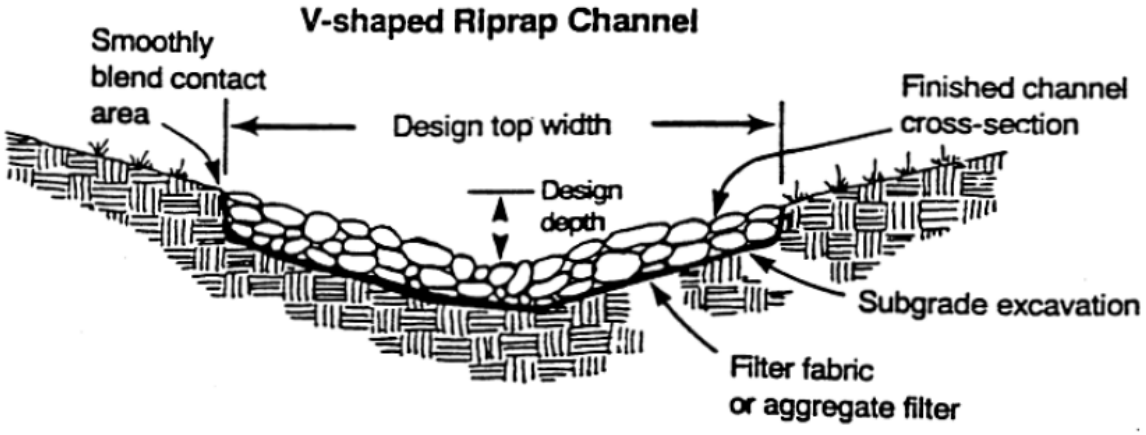


Figure 2 – Oathill Crescent Storm Sewer Pipe Alterations

Figure 3 – Oathill Crescent Storm Sewer Pipe Alterations

Annex B
Sample Construction Details



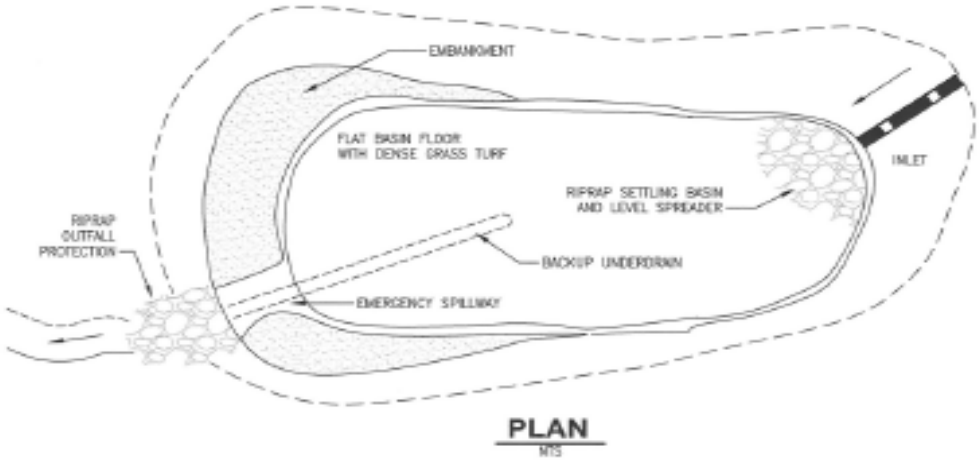


Figure 11 **Bioretention Plan and Profile (New York State Stormwater Manual)**

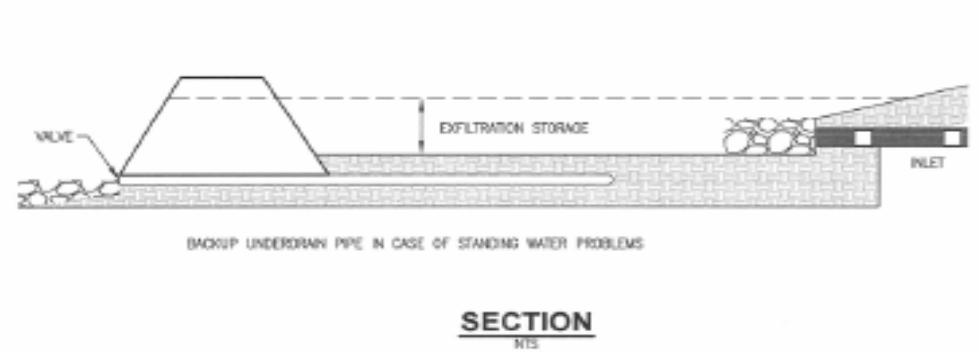


Figure 12 **Infiltration Basin (Schueler 1987)**

Annex C
Cost Estimate

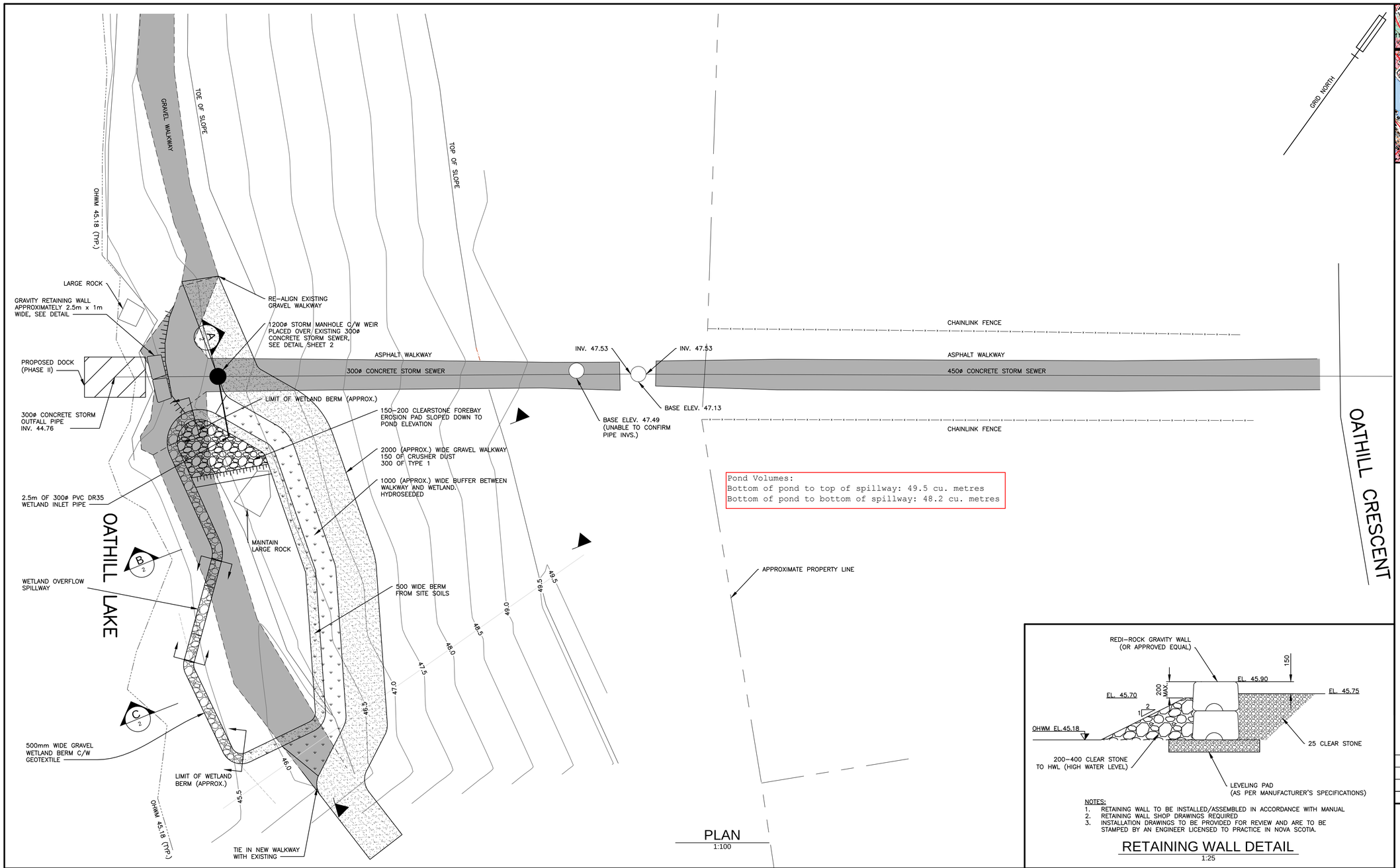
Construction of Rip Rap Channel and Dry/Wet Pond, Alteration of Existing Oathill Cresent Storm Sewer Pipe - Estimate

Prepared by Norman Steele 18-Dec-12

Description	Units	Quantity	Unit Price	Total
Rip Rap - channel	m^3	24	$200.00	$4,800.00
Rip Rap - dry/wet pond	m^3	10	$300.00	$3,000.00
Type 2 Gravel	m^3	20	$70.00	$1,400.00
Geotextile	m^2	120	$20.00	$2,400.00
Concrete	m^3	1	$300.00	$300.00
Mobilization / Demobilization	Lump	1	$1,000.00	$1,000.00
Rubber Tire Excavator	day	1	$600.00	$600.00
Excavations	m^3	40	$20.00	$800.00
Paving	m^2	14	$100.00	$1,400.00
Labour Cost	Lump	24	$112.00	$2,688.00
Removal of existing storm sewer pipe & misc demolitions	Lump	1	$2,000.00	$2,000.00
Waste Disposal	tonnes	2	$110.00	$220.00
Construction of Footbridge	m^2	15	$85.00	$1,275.00
Manhole Installation	Lump	1	$4,000.00	$4,000.00
General Requirements (Overheads,Engineering fees, project clean-up etc)	Lump	1	$4,000.00	$4,000.00
Contingency			10.00%	$2,988.30

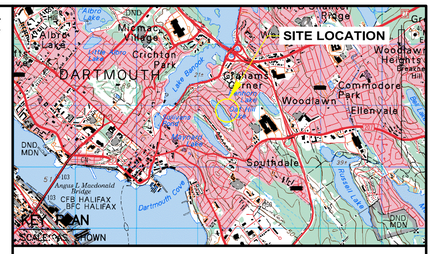
TOTAL (excl. HST) $35,859.60

Labour Cost Included in most items



Pond Volumes:
Bottom of pond to top of spillway: 49.5 cu. metres
Bottom of pond to bottom of spillway: 48.2 cu. metres

PLAN
1:100



PLAN LEGEND

EXISTING		PROPOSED
NSCM	N.S. COORDINATE MONUMENT	
PT NO	SURVEY CONTROL POINT	
	FOUND SURVEY MARKER	
IB	FOUND IRON BAR	
IP	FOUND IRON PIPE	
	FIRE HYDRANT	
	UTILITY POLE AND GUY WIRE	
	SIGN ON POST	
	FENCE	
	RETAINING WALL	
	STREET LINE	
	CONSTRUCTION BASELINE	
	COMBINED MANHOLE & PIPE	
	STORM MANHOLE & PIPE	
	SANITARY MANHOLE & PIPE	
	CATCHBASIN	
	CONCRETE SURFACE	
	ASPHALT SURFACE	
	EDGE OF GRAVEL SURFACE	
	WATERMAIN	
	TREE	
	SHRUB	
	LIMITS OF CONSTRUCTION	

NOTES

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8. TRAFFIC SIGNS ARE NOT TO BE REMOVED OR REPLACED WITHOUT AUTHORIZATION FROM THE TRAFFIC AUTHORITY AND THE ENGINEER.
9. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF TREES. TREES ARE NOT TO BE REMOVED WITHOUT PERMISSION FROM THE ENGINEER.
10. WORK IN THE IMMEDIATE AREA OF A NOVA SCOTIA COORDINATE MONUMENT MUST BE CARRIED OUT BY HAND. THE CONTRACTOR IS RESPONSIBLE FOR ANY COSTS IF MONUMENTS ARE DISTURBED.
11. AT COMPLETION OF WORK REINSTATE ALL DISTURBED SURFACES TO THE SATISFACTION OF THE ENGINEER.
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13. FOR EXISTING TREE AND GRUB PROTECTION, SEE NS ROAD BUILDERS STANDARD SPECIFICATIONS FOR MUNICIPAL SERVICES, SECTION 32 91 10.
14. LIMIT OF EXCAVATION IS TO TERMINATE 1000mm (1.0m) FROM ORDINARY HIGH WATER MARK.
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16. APPROPRIATE SIGNAGE INDICATING CLOSURE OF PATH MUST BE USED.
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18. MANHOLE TO BE 1200mm IN SIZE.
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20. TRANSPLANT NATIVE REEDS TO POND.
21. TOPSOIL/HYDROSEED BUFFER ALL DISTURBED AREAS.
22. MAINTAIN NATIVE VEGETATION WHERE EVER POSSIBLE.

NOTES:
1. RETAINING WALL TO BE INSTALLED/ASSEMBLED IN ACCORDANCE WITH MANUAL
2. RETAINING WALL SHOP DRAWINGS REQUIRED
3. INSTALLATION DRAWINGS TO BE PROVIDED FOR REVIEW AND ARE TO BE STAMPED BY AN ENGINEER LICENSED TO PRACTICE IN NOVA SCOTIA.

RETAINING WALL DETAIL
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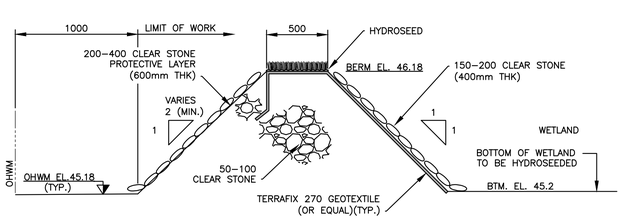
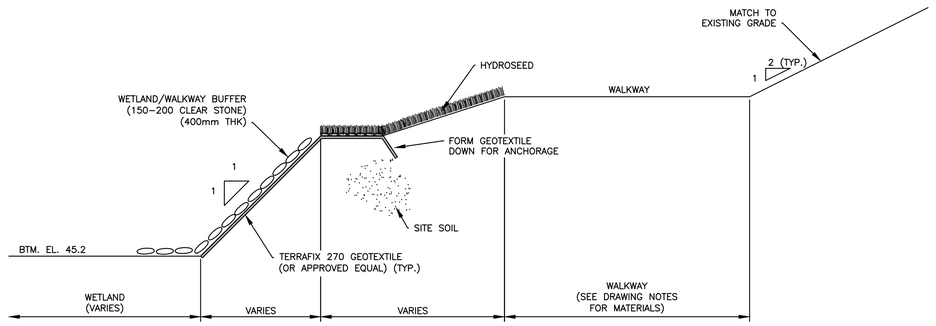


NOTE: SEE PLAN DRAWING FOR LIMITS OF WETLAND BERM

BERM DETAIL
1:25



EARTH BERM/WALKWAY DETAIL
1:25

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SITE PLAN AND DETAILS

Date 07/18/13	Drawn STAFF	Tender No. 13-7807
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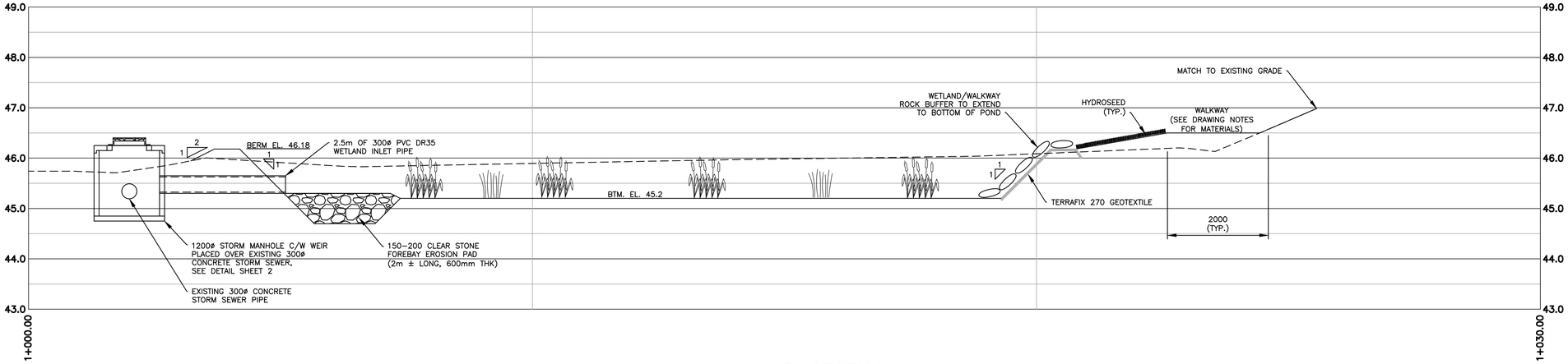

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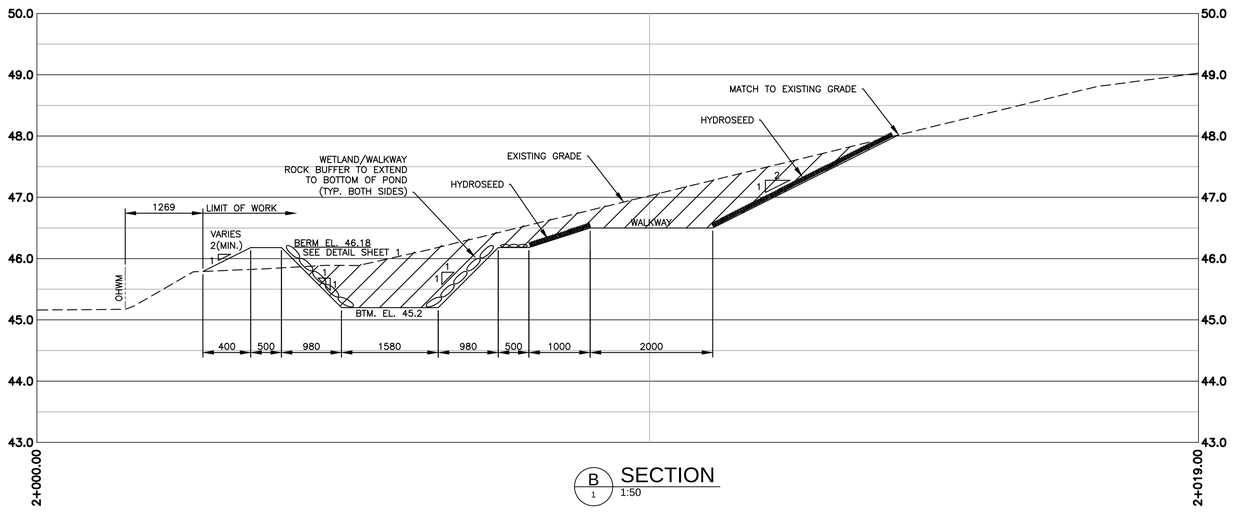

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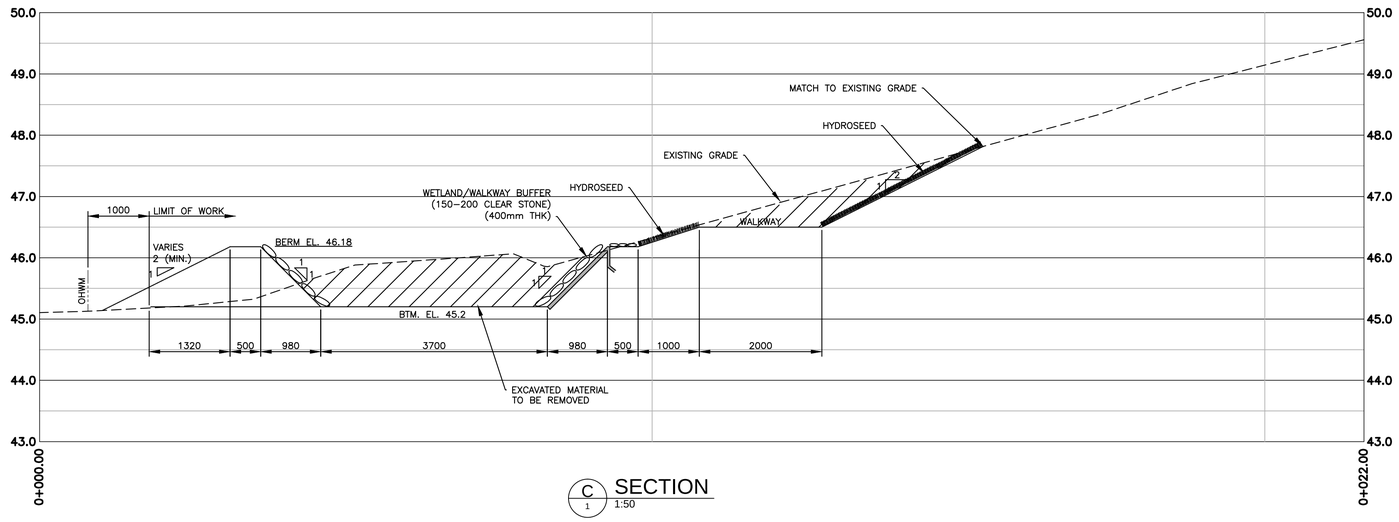

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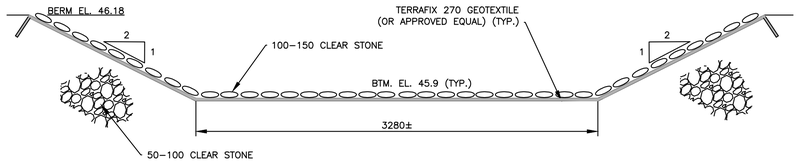

WETLAND OVERFLOW SPILLWAY DETAIL
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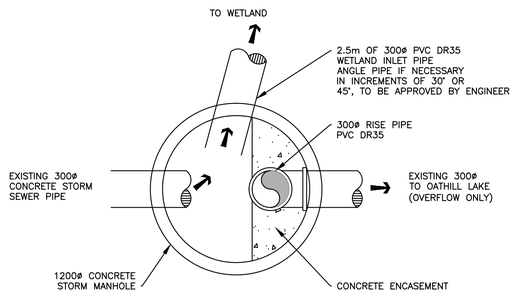
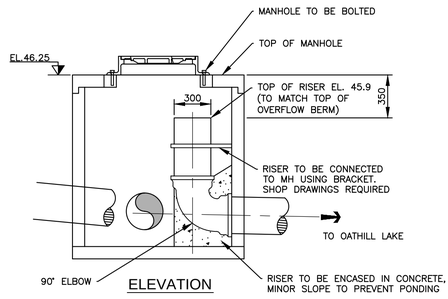


PLAN



ELEVATION

MANHOLE/WEIR DETAIL
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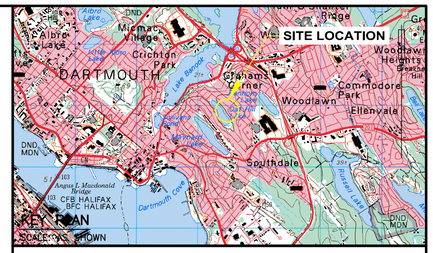

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SECTIONS AND DETAILS

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