

N-10111-02 March 14, 2016

Scott D. Turner, P.E., AICP, LEED AP ND Director of Planning Nitsch Engineering, Inc. 2 Center Plaza, Suite 430 Boston, MA 02108

Re: Response to Comments for Notice of Intent/Stormwater Report

Former Polymerine 241 Duchaine Boulevard, New Bedford, MA DEP File # SE049-0730

Dear Mr. Turner:

Based on our phone discussions from Thursday March 11, 2016, Tighe & Bond is providing this revised response to the comments provided in your review of the Notice of Intent (NOI) and Stormwater Report submittals for the above referenced project site. Specifically, this letter seeks to address Comments 5, 8, and 9 of your review letter dated February 26, 2016.

With that background, our responses to Nitsch's paraphrased comments are as follows:

• Comment No. 5: "The NOI describes that the site will be used as a parking lot. Typically, parking lots are required to include water quality treatment to remove 80% of suspended solids generated by the vehicles entering the site and parking in the parking lot. The proposed project does not include any water quality treatment......We recommend that water quality best management practices (BMPs) be included on the project consistent with the Guidelines. Details of the BMPs should also be included on the plans."

Response: Tighe & Bond has revised the grading plan shown on Sheet 6 of the plan set to include Best Management Practices (BMP's) consistent with Mass Stormwater Handbook Guidelines. The BMP's chosen, given this site's unique situation, include vegetated filter strips in combination with grassed channels, as well as sediment forebays in combination with grassed channels to provide TSS removal to the maximum extent practicable. Calculations made relative to sizing of the BMP's, as well as anticipated TSS removal have been tabulated in spreadsheet form, and provided as attachments to this letter for your reference.

Infiltration and Structural based BMP's were not recommended due to the site's contaminated nature, therefore an optimal combination of Pre-Treatment and Conveyance BMP's were selected to provide TSS removal for the paved cap. Although the recommended 80% TSS removal was not achieved with the BMP combinations chosen, it is felt that given the nature of the contaminated site, and its unknown proposed end-use, the resultant TSS removals were the most practicable solution.

Construction details related to the chosen BMP's are also provided on the new Sheet 7 of the Permit Set. Both Sheets 6 and Sheet 7 have been provided as attachments to this letter as well.

Comment No. 8: "The grading plan shows a 4-foot 3:1 slope along the southern property line. We recommend a swale be constructed on the property to insure that stormwater does not flow onto the adjacent property."

Response: In the process of revised site grading, and design of BMP's for TSS removal, a grassed channel swale with sediment forebay was sited against the southern slope of the proposed pavement cap to comply with the required TSS removal for the site, as well as to insure that stormwater runoff does not flow onto the adjacent property.

Comment No. 9: "The Operations and Maintenance Plan does not include any information regarding water quality BMPs because they are not proposed. If the applicant adds water quality BMPs consistent with the Guidelines, they should be added to the Operations and Maintenance Plan."

Response: The Stormwater Operations and Maintenance Plan previously submitted with the NOI has been revised to include information regarding maintenance of the chosen BMPs. A copy of the revised Stormwater Operations and Maintenance Plan is attached to this letter for your reference.

We hope that our response to comments addresses your concerns at this time and that a favorable letter can be provided recommending an Order of Conditions at the next scheduled Conservation Commission meeting. If you have any questions or comments in the meantime, please feel free to contact me at 508-471-9168.

Very truly yours,

TIGHE & BOND, INC.

Charles Tripp, P.E. Project Engineer

CC:

Ray Holberger, Environmental Planner, City of New Bedford Sarah Porter, Conservation Agent, City of New Bedford

Attachments

Attachment A - Revised Sheet 6 of NOI Permit Plans

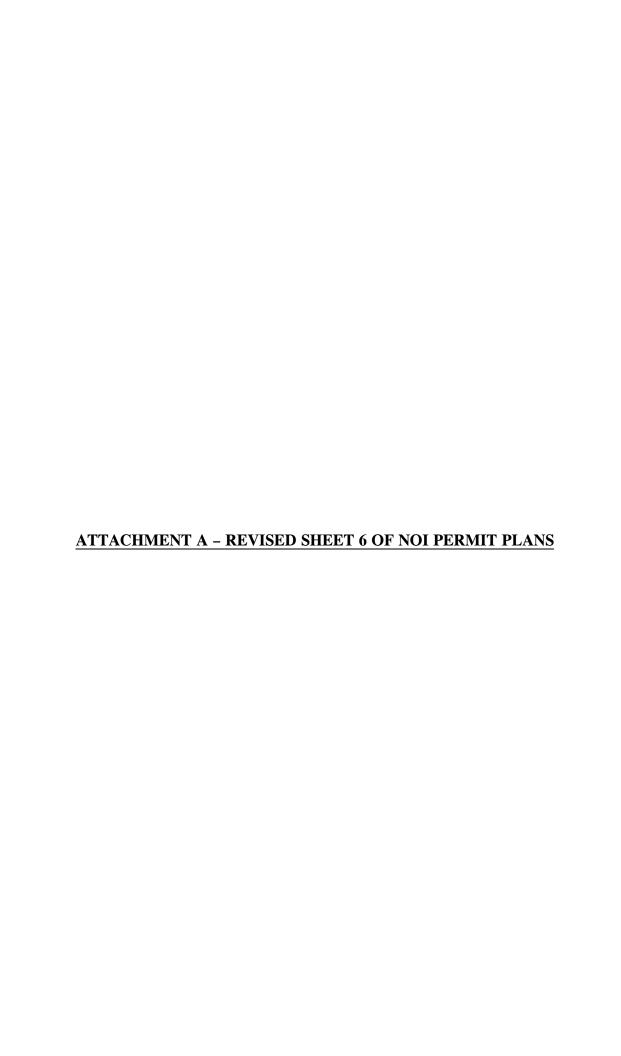
Attachment B - New Sheet 7 of NOI Plans (Details of BMP's)

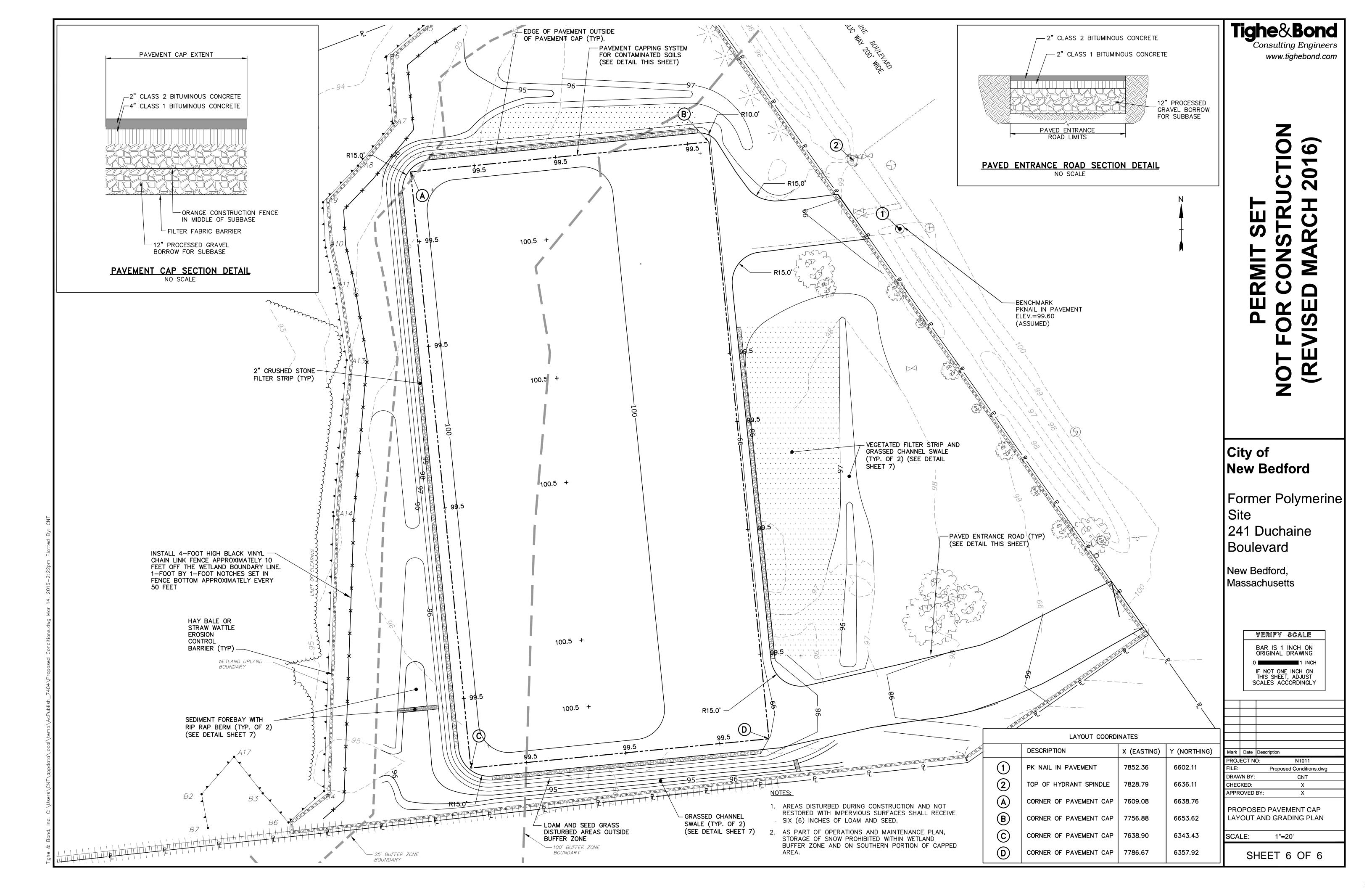
Attachment C - BMP Design Calculation Spreadsheets

Attachment D – TSS Removal Calculation Spreadsheets

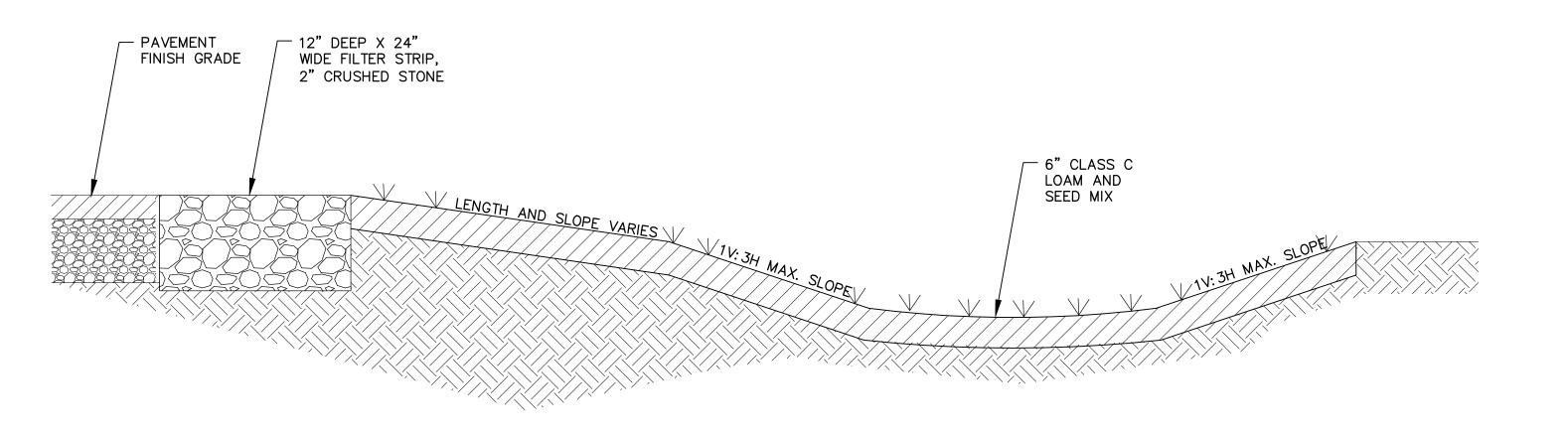
Attachment E - Revised Stormwater O&M Plan (BMP Maintenance Included)

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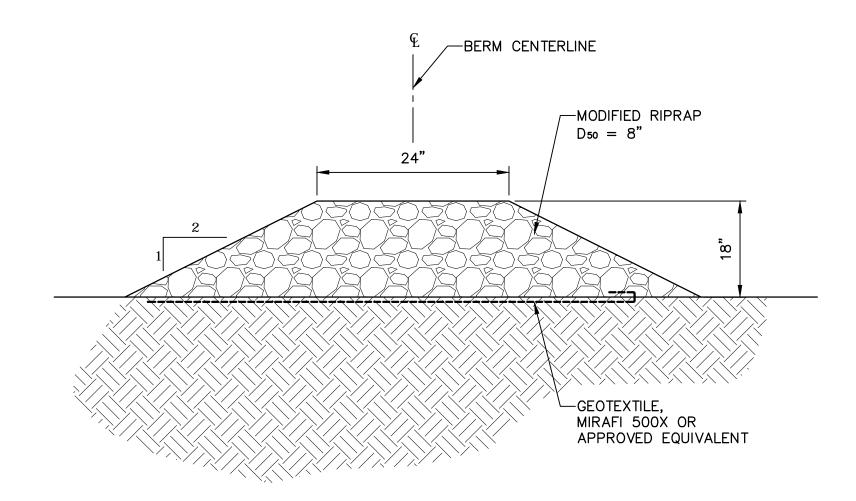




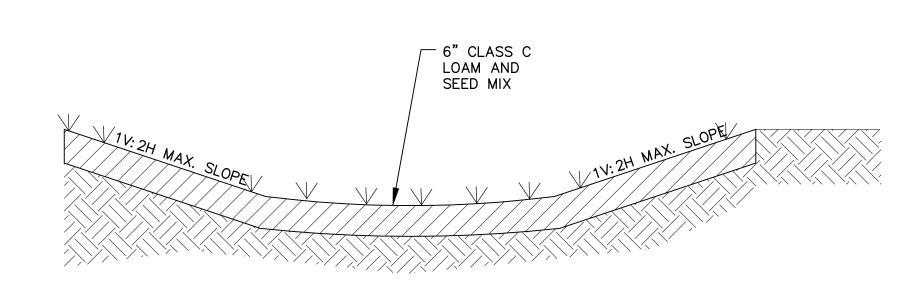




VEGETATIVE STRIP & GRASS CHANNEL SWALE DETAIL NO SCALE



RIRAP SEDIMENT FOREBAY BERM NO SCALE



TYPICAL GRASS CHANNEL SWALE DETAIL
NO SCALE

Tighe&Bond Consulting Engineers www.tighebond.com

NOT FOR CONSTRUCTION (REVISED MARCH 2016)

City of New Bedford

Former Polymerine
Site
241 Duchaine
Boulevard

New Bedford, Massachusetts

WERIFY SCALE

BAR IS 1 INCH ON ORIGINAL DRAWING

0 1 INCH

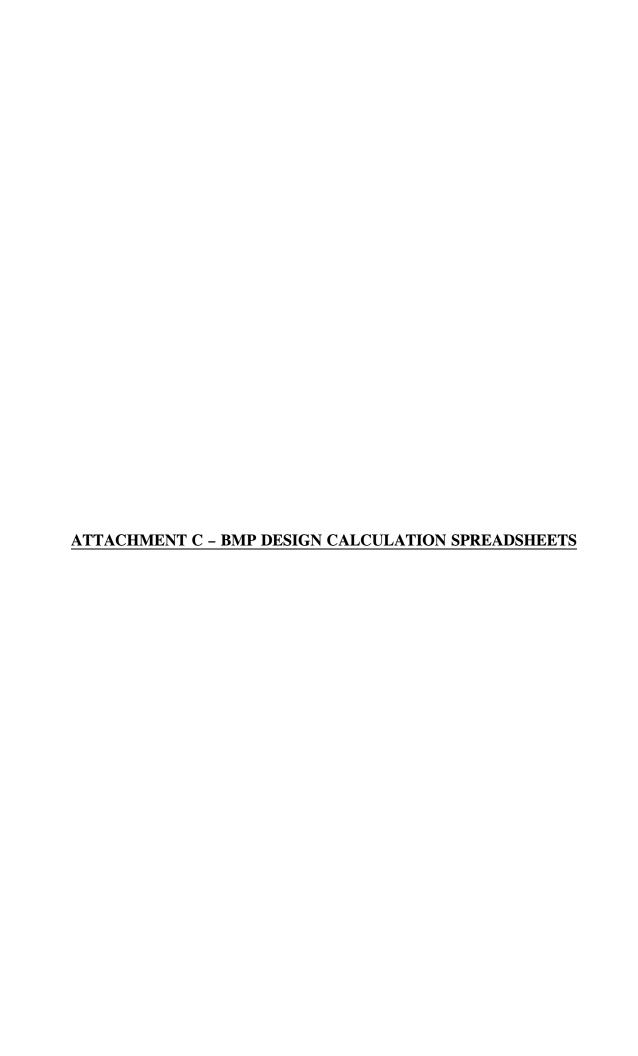
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

Mark	Date	Description		
PROJ	ECT N) :	N1011	
FILE:		Details	s.dwg	
DRAV	VN BY:		CNT	
CHEC	KED:		Х	
APPR	OVED	BY:	Х	

DRAINAGE DETAILS

SCALE: NONE

SHEET 7 OF 7





Project Number: N 1011

Project Location: New Bedford, MA

Description: Forebay Size Calculation
Prepared By: CNT Date: March 14, 2016

South Grass Channel

Required Sediment Forebay Size

Total Area in acres (A)	=	0.760
Impervious Area in acres (a)	=	0.070

Minimum Volume Required

Based on 0.1" of Rainfall on Impervious Surfaces

Minimum Volume Required

Based on 10% of WQV

Total Area in acres (A)	=	0.760
Impervious Area in acres	=	0.070
Pecenct of Impervious Area (I)	=	9
Volumetric Runoff Coefficient (R)		

$$R = 0.05 + 0.009(I) = 0.133$$

10% of WQv = = 18 cf

Volume Provided = 100 cf

Calculated in accordence with the Massachusetts Stormwater Handbook



Project Number: N 1011

Project Location: New Bedford, MA

Description: Forebay Size Calculation
Prepared By: CNT Date: March 14, 2016

West Grass Channel

Required Sediment Forebay Size

Total Area in acres (A)	=	0.327
Impervious Area in acres (a)	=	0.292

Minimum Volume Required

Based on 0.1" of Rainfall on Impervious Surfaces

Minimum Volume Required

Based on 10% of WQV

Total Area in acres (A)	=	0.327
Impervious Area in acres	=	0.292
Pecenct of Impervious Area (I)	=	89
Volumetric Runoff Coefficient (R)		

$$R = 0.05 + 0.009(I) = 0.854$$

10% of WQv = = 51 cf

Volume Provided = 212 cf

Calculated in accordence with the Massachusetts Stormwater Handbook



Project Number: N-1011

Project Location: New Bedford, MA

Description: North Grassed Channel Design

Prepared By: CNT Date: March 14, 2016

Designation: North Grassed Channel Swale

Location: North Side of Paved Lot

Cover Type	Area, ac	Coef.	AxC
Pavement	0.034	0.90	0.0310
Landscaped and Lawns	0.034	0.30	0.0103
	0.069		0.0413

Weighted C: 0.60

Time of Concentration

Direct Entry Total Tc = 5.0 Min.

10 Year 24 Hour Channel Flow (Q) = 0.09 CFS (via HydroCAD)

Channel Characteristics

Section Type Trapezoidal
Bottom Width 3 feet
Side Slopes 3:1
Total Depth 1 foot
Longitudinal Slope 1.45%

Manning's Roughness 0,024 (Grass Cover)

Flow depth 0.15 feet Velocity 0.192 ft/s

Channel Lining Materal Class C Turf Establishment

Permisable Shear Strees 1.00 lb/ft²

Max Shear Strees= γ *depth *Slope

 $y = 62.4 \text{ lb/ft}^{\circ}$

Max Shear Strees = 62.4*0.15*.0145

0.14 lb/ft²

 0.14 lb/ft^2 (max shear Stress) < 1.00 lb/ft^2 (permisable shear stress)



Project Number: N-1011

Project Location: New Bedford, MA

Description: West Grassed Channel Design

Prepared By: CNT Date: March 14, 2016

Designation: West Grassed Channel Swale

Location: West Side of Paved Lot

Cover Type	Area, ac	Coef.	AxC
Pavement	0.293	0.90	0.2637
Landscaped and Lawns	0.034	0.30	0.0103
	0.327		0.2740

Weighted C: 0.84

Time of Concentration

Direct Entry Total Tc = 5.0 Min.

10 Year 24 Hour Channel Flow (Q) = 1.24 CFS (via HydroCAD)

Channel Characteristics

Section Type Trapezoidal
Bottom Width 5 feet
Side Slopes 3:1
Total Depth 1 foot
Longitudinal Slope 1.00%

Manning's Roughness 0,024 (Grass Cover)

Flow depth 0.54 feet **Velocity** 0.349 ft/s

Channel Lining Materal Class C Turf Establishment

Permisable Shear Strees 1.00 lb/ft²

Max Shear Strees= γ *depth *Slope

 $y = 62.4 \text{ lb/ft}^{\circ}$

Max Shear Strees = 62.4*0.54*.01

0.34 lb/ft²

 0.34 lb/ft^2 (max shear Stress) < 1.00 lb/ft^2 (permisable shear stress)



Project Number: N-1011

Project Location: New Bedford, MA

Description: North Grassed Channel Design

Prepared By: CNT Date: March 14, 2016

Designation: South Grassed Channel Swale

Location: South Side of Paved Lot

Cover Type	Area, ac	Coef.	AxC
Pavement	0.100	0.90	0.0900
Landscaped and Lawns	0.660	0.30	0.1980
	0.760		0.2880

Weighted C: 0.38

Time of Concentration

Direct Entry Total Tc = 5.0 Min.

10 Year 24 Hour Channel Flow (Q) = 0.01 CFS (via HydroCAD)

Channel Characteristics

Section Type Trapezoidal
Bottom Width 2 feet
Side Slopes 2:1
Total Depth 1 foot
Longitudinal Slope 1.00%

Manning's Roughness 0,024 (Grass Cover)

Flow depth 0.057 feet Velocity 0.087 ft/s

Channel Lining Materal Class C Turf Establishment

Permisable Shear Strees 1.00 lb/ft²

Max Shear Strees= γ*depth *Slope

 $y = 62.4 \text{ lb/ft}^3$

Max Shear Strees= 62.4*0.057*.01

0.04 lb/ft²

0.04 lb/ft² (max shear Stress) < 1.00 lb/ft² (permisable shear stress)



Project Number: N-1011

Project Location: New Bedford, MA

Description: East Grassed Channel Design
Prepared By: CNT Date: March 14, 2016

Designation: East Grassed Channel Swale

Location: East Side of Paved Lot

Cover Type	Area, ac	Coef.	AxC
Pavement	0.585	0.90	0.5265
Landscaped and Lawns	0.070	0.30	0.0210
	0.655		0.5475

Weighted C: 0.84

Time of Concentration

Direct Entry Total Tc = 5.0 Min.

10 Year 24 Hour Channel Flow (Q) = 2.49 CFS (via HydroCAD)

Channel Characteristics

Section Type Trapezoidal
Bottom Width 3 feet
Side Slopes 3:1
Total Depth 1 foot
Longitudinal Slope 1.09%

Manning's Roughness 0,024 (Grass Cover)

Flow depth 0.929 feet Velocity 0.462 ft/s

Channel Lining Materal Class C Turf Establishment

Permisable Shear Strees 1.00 lb/ft²

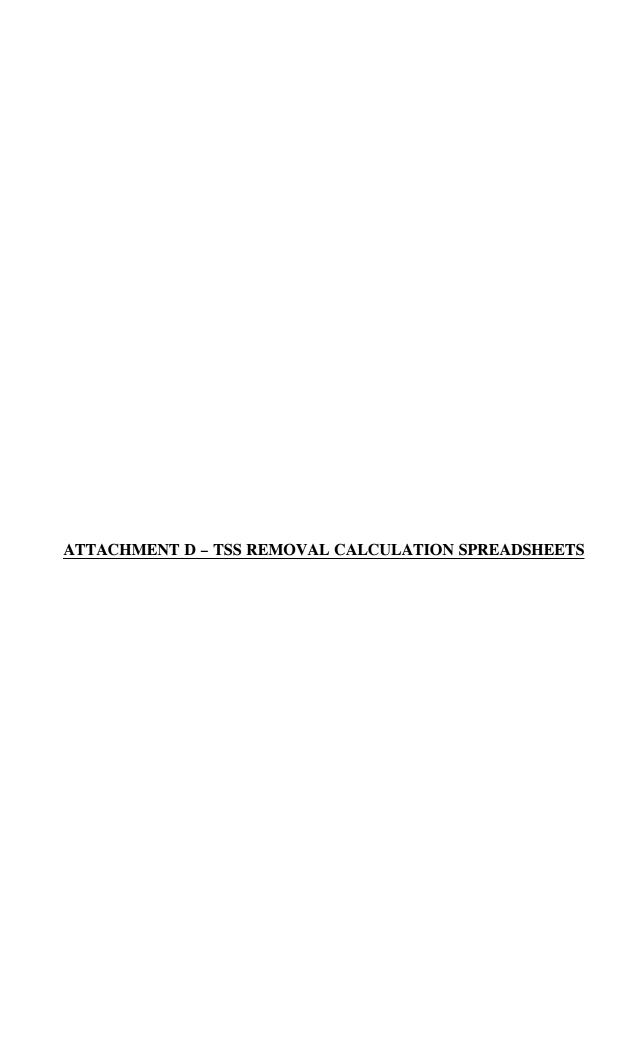
Max Shear Strees= γ*depth *Slope

 $y = 62.4 \text{ lb/ft}^3$

Max Shear Strees= 62.4*0.929*.0109

0.63 lb/ft²

 0.63 lb/ft^2 (max shear Stress) < 1.00 lb/ft^2 (permisable shear stress)



INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

- 1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
- 2. Select BMP from Drop Down Menu
- 3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Location: North & East Grassed Channel Swales

	В	С	D	Е	F
		TSS Removal	Starting TSS	Amount	Remaining
	BMP ¹	Rate ¹	Load*	Removed (C*D)	Load (D-E)
eet	Vegetated Filter Strip >50 feet	0.45	1.00	0.45	0.55
=	LS CONTRACTOR OF THE CONTRACTO		1.00	01-10	1 0.00
Removal	Vegetated Filter Strip >50 feet Grass Channel	0.50	0.55	0.28	0.28
4					
1 2	<u>ō</u>	0.00	0.28	0.00	0.28
TSS	Calculation	0.00	0.28	0.00	0.28
	al C				
ပိ	ပိ	0.00	0.28	0.00	0.28
		Total TSS Removal =			Separate Form Needs to be Completed for Each Outlet or BMP Train
	Project:				=
	Prepared By:			*Equals remaining load from	n previous BMP (E)
	Date:			which enters the BMP	

INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

- 1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
- 2. Select BMP from Drop Down Menu
- 3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Location: South & West Grassed Channel Swales

	В	С	D	Е	F
	BMP ¹	TSS Removal Rate ¹	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
moval Worksheet	Sediment Forebay	0.25	1.00	0.25	0.75
<u>_</u> _		0.20	1.00	0.23	0.73
0	Grass Channel	0.50	0.75	0.38	0.38
TSS Removal		0.00	0.38	0.00	0.38
	Sulati	0.00	0.38	0.00	0.38
		0.00	0.38	0.00	0.38
		Total T	SS Removal =	63%	Separate Form Needs to be Completed for Each Outlet or BMP Train
	Project: Prepared By: Date:			*Equals remaining load from	n previous BMP (E)

ATTACHMENT E – REVISED STORMWATER O&M PLAN (NEW BMP MAINTENANCE INCLUDED)

Section 1 Introduction

Section 2 Ownership and Responsibilities

Section 3 General BMPs

3.1	Good Housekeeping	3-1
3.2	Preventative Maintenance	3-1
3.3	Management of Run-off	3-1
3.4	Snow Management	3-2
3.5	BMP Operation & Maintenance	3-2
	3.5.1 Sediment Forebays	3-2
	3.5.2 Vegetated Filter Strips	3-2
	3.5.2 Grassed Channels	3-3

Section 4 Operation and Maintenance Log Form

Section 1 Introduction

The following Long-Term Operations and Maintenance Plan has been prepared for the stormwater management system Former Polymerine Site in New Bedford, Massachusetts. The purpose of the plan is to provide guidance and procedures for proper stormwater management following construction completion.

The proposed project does not significantly alter the existing site conditions and the existing stormwater management system. Existing stormwater flow paths will be retained and will not be significantly altered by solar facility features. The quality of the stormwater collected from impervious areas on-site will not change from existing conditions prior to discharging off-site.

Section 2 Ownership and Responsibilities

The City of New Bedford is responsible for maintaining the paved lot and stormwater management facilities post construction.

During construction the contractor will be responsible for stormwater management system maintenance. After construction is complete, all stormwater and property maintenance within the project area will be the responsibility of the City of New Bedford.

Section 3 General BMPs

Prior to the start of construction, the site will be inspected to document current conditions and areas identified as needing maintenance, if any, will be addressed as appropriate. Following construction and re-establishment of any vegetation impacted during construction, the operation and maintenance of the site should not be significantly altered from the current requirements. The site should continue to be inspected regularly for erosion and to ensure the stormwater system is operating as designed. Any erosion to the vegetative surfaces should be stabilized and repaired immediately upon discovery.

The following items described are the general Best Management Practices (BMPs) to be implemented for the proposed improvements at the Former Polymerine Site.

3.1 Good Housekeeping

The goal of the good housekeeping policy is to keep the site in a clean orderly condition. A disorderly site can lead to improper materials management, and can reduce the efficiency of any response to potential pollution problems.

The following good housekeeping measures will be followed at the site to aid in pollution prevention:

- Promptly clean and remove any spills or contamination from vehicles.
- Perform preventative maintenance on all equipment and on the structural components of the stormwater system.

3.2 Preventative Maintenance

Preventative maintenance is an important factor in minimizing the release of pollution from the site. Preventative maintenance for this project will consist of primarily equipment maintenance.

It is important that all of the equipment used to access the site and perform routine maintenance paved lot undergo routine maintenance and service so that fluid leaks are managed. Any equipment exhibiting fluid leaks will be repaired or removed from the site and repaired prior to returning to service.

3.3 Management of Run-off

The stormwater collected from the impervious areas of the post-development site will sheet flow into the existing vegetated surface adjacent to the Hobomock Swamp, conveying stormwater off-site as under existing conditions. The proposed site improvements do not utilize formal stormwater management control systems. Stormwater runoff quantity and quality will not be detrimentally impacted by the proposed development. Vegetative surfaces within the limits of the project site will be maintained by the City of New Bedford.

3.4 Snow Management

Snow removal will occur within the paved lot and access roads as needed. The storage of plowed snow will only be along the northeastern and eastern portions of the site, outside of the wetland buffer zone. Snow removal will also not occur in existing vegetative surfaces.

3.5 BMP Operation & Maintenance

Best management practices (BMPs) require specific maintenance. Generally these activities include visual inspections and physical maintenance. An operation and maintenance log is also attached to track the scheduled inspection and maintenance activities. The following sections describe the maintenance requirements for each BMP located on the property and include a table at the end of each section summarizing the maintenance activities and frequency.

3.5.1 Sediment Forebays

The grassed channels shall also be cleaned as needed during construction. Inspection and maintenance shall occur as detailed in Table 2 below to ensure proper functioning during post-construction periods.

TABLE 1Sediment Forebays Maintenance Activity Summary

Activity	Frequency
Inspect forebays for sediment buildup	Monthly
Remove sediment from the forebay	Quarterly; or more frequently as needed

3.5.2 Vegetated Filter Strips

The vegetated filter strips shall be cleaned as needed during construction. Inspection to ensure proper functioning during post-construction periods should occur after every major storm during the first 3 months of operation. Any sediments removed shall be disposed of in accordance with the latest DEP guidelines for stormwater sediment disposal. Mowing should occur regularly.

TABLE 2Vegetated Filter Strip Maintenance Activity Summary

Activity	Frequency
Inspect level spreader for sediment buildup and the vegetation for signs of erosion, bare spots, and overall health	Every 6 months during first year; Annualy thereafter
Regularly mow grass	As Needed
Remove sediment from the toe of slope or level spreader and reseed bare spots	As Needed

3.5.2 Grassed Channels

The grassed channels shall also be cleaned as needed during construction. Inspection and maintenance shall occur as detailed in Table 2 below to ensure proper functioning during post-construction periods.

TABLE 3Grassed Channels Maintenance Activity Summary

Activity	Frequency
Remove sediment from forebay	Annually
Remove sediment from grassed channel	Annually
Mow grass	Once a month during growing season
Repair areas of erosion and revegetate	As needed, but no less than once a year

Additional overall inspections shall be performed in accordance with the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Handbook. The following additional items will be evaluated during each inspection:

- Vegetated Surfaces will be observed to identify locations of settlement, erosion and other impacts from the paved lot installation.
- The Paved Lot and Access Roads be observed for signs of sediment accumulation, deterioration, or ponding of surface runoff.

Inspections shall be logged using the Inspection Forms provided in Section 4.

Section 4 Operation and Maintenance Log Form

Date:
Person conducting Inspection:
Reason for Inspection (Routine / Significant Rainfall):
Stormwater Management System Components:
Sediment Forebays
Component inspected during this inspection
Any Repair Necessary
Other Comments
Vegetated Filter Strips
Component inspected during this inspection
Any Repair Necessary
Other Comments
Grassed Channels
Component inspected during this inspection
Any Repair Necessary
Other Comments
Vegetated Surfaces
Component inspected during this inspection
Any Repair Necessary
Other Comments
Paved Lot and Access Roads
Component inspected during this inspection
Any Repair Necessary
Other Comments