

Appendix A: Field Forms and Sketches

HINGHAM-WALTON'S COVE

Subwatershed: Walton's Cove Outfall Pipe 1

Site ID:
WCOP1-1

Name: Sewer Pump Station (Daley Road) - Bioretention

Site & Concept Description:

The Town's sewer pump station is located on the corner of Downer Avenue and Daley Road. For this site, a bioretention area is proposed in the grassy area along Daley Road to manage runoff from approximately half an acre of impervious cover. There is an existing catch basin in the road that could be modified to direct runoff from smaller storms into the bioretention, while bypassing larger flows into the existing drainage system. This site may be designed and constructed with site WCOP1-2.



Additional Notes/Feasibility:

This site seems to have few conflicts, though there may be more underground utilities than we currently are aware of. There are a few trees in this area that may be affected by this project.

GENERAL SITE INFORMATION	RETROFIT DETAILS	
Site Contact Info: DPW - Sewer Dept.	Project Candidate: Yep, Love It	
Ownership: Public	Retrofit of existing or new BMP: New BMP	
Land Use: Municipal	Proposed Retrofit Practices: Bioretention	
Existing BMP on site? No	Non-Structural Controls: -None-	
Is site a hotspot? No	Maintenance Burden: Low	
Pollutants Observed: Sediment	Benefits:	Conflicts:
SIZING INFO	Storage: YES Water Quality: YES Recharge: NO Demo: YES Repair: NO	Soils: NO Access: NO Land Use: NO Utilities: MAYBE Polluted: NO High WT: NO Wetlands: NO
Drainage Area (ac): 0.47		
Impervious Area (ac): 0.47		
Practice Area Available (ac): 0.03		
Impervious Area Type: Street		
Existing Head Available? YES		

Date Assessed: Apr 7, 2014, 8:33 AM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 8:33 AM

Assessed by: MW KH



HINGHAM-WALTON'S COVE

Subwatershed: Walton's Cove Outfall Pipe 1

Site ID:
WCOP1-2

Name: Sewer Pump Station (Downer Avenue) - Bioretention

Site & Concept Description:

The Town's sewer pump station is located on the corner of Downer Avenue and Daley Road. For this site, a bioretention area is proposed in the grassy area along Downer Avenue in front of the pump station. There is an existing catch basin in the road – runoff from smaller storms from Downer Avenue would be redirected into the bioretention, while bypassing larger flows into the existing drainage system. This site may be designed and constructed with site WCOP1-1.



Additional Notes/Feasibility:

This site seems to have few conflicts, with the pump station utilities located far below the proposed practice. There are a few trees in this area that may be affected by this project. Gas service may be an issue.

GENERAL SITE INFORMATION	RETROFIT DETAILS	
Site Contact Info: DPW - Sewer Dept.	Project Candidate: Yep, Love It	
Ownership: Public	Retrofit of existing or new BMP: New BMP	
Land Use: Municipal	Proposed Retrofit Practices: Bioretention	
Existing BMP on site? No	Non-Structural Controls: -None-	
Is site a hotspot? No	Maintenance Burden: Low	
Pollutants Observed: Sediment	Benefits: Storage: YES Water Quality: YES Recharge: NO Demo: YES Repair: NO	Conflicts: Soils: NO Access: NO Land Use: NO Utilities: MAYBE Polluted: NO High WT: NO Wetlands: NO
Soils: Poor Infiltration		
SIZING INFO		
Drainage Area (ac): 0.12		
Impervious Area (ac): 0.12		
Practice Area Available (ac): 0.04		
Impervious Area Type: Street		
Existing Head Available? YES		

Date Assessed: Apr 7, 2014, 8:41 AM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 8:41 AM

Assessed by: MW KH



HINGHAM-WALTON'S COVE

Subwatershed: Walton's Cove Outfall Pipe 1

Site ID:
WCOP1-3

Name: Downer Ave South - Green Streets

Site & Concept Description:
The concept for this site is to utilize the space between the sidewalk and the road for "Green streets." Green streets is a way to manage runoff in the public ROW in trenches that also support street trees. These are being used more frequently in urban locations. This is a great area for green streets given that Downer Avenue is a major road in this area, and there is already a sidewalk here. There is a stretch where it is currently paved between the sidewalk and the road – this is an opportunity for impervious cover reduction. Converting the sidewalk to a permeable surface may be considered.

Additional Notes/Feasibility:
It is important to get buy-in from the abutting residential properties for this concept. Also, there are utility poles that will need to be worked around in this location. This is a great location for a demonstration project since it is a major road for the neighborhood.



GENERAL SITE INFORMATION	RETROFIT DETAILS		
Site Contact Info:	Project Candidate: Ok		
Ownership: Public	Retrofit of existing or new BMP: New BMP		
Land Use: Road	Proposed Retrofit Practices: Tree Trenches		
Existing BMP on site? No	Non-Structural Controls: Impervious Cover Removal		
Is site a hotspot? No	Maintenance Burden: Medium		
Pollutants Observed: No			
Soils: Poor Infiltration	Benefits: Storage: YES Water Quality: YES Recharge: YES Demo: YES Repair: NO	Conflicts: Soils: NO Access: NO Land Use: YES Utilities: YES Polluted: NO High WT: NO Wetlands: NO	
SIZING INFO			
Drainage Area (ac): 0.17			
Impervious Area (ac): 0.17			
Practice Area Available (ac): 0.11			
Impervious Area Type: Street			
Existing Head Available? YES			

Date Assessed: Apr 7, 2014, 9:28 AM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 9:28 AM

Assessed by: MW KH



HINGHAM-WALTON'S COVE

Subwatershed: Walton's Cove Outfall Pipe 1

Site ID:
WCOP1-4

Name: Downer Ave at Grove St - Bioretention

Site & Concept Description:
Bioretention area near intersection with Grove Avenue.



Additional Notes/Feasibility: A portion of this site may be on private property so coordination with the property owner will be necessary.

GENERAL SITE INFORMATION	RETROFIT DETAILS		
Site Contact Info:	Project Candidate: Ok		
Ownership: Public/Private	Retrofit of existing or new BMP: New BMP		
Land Use: Road	Proposed Retrofit Practices: Bioretention		
Existing BMP on site? No	Non-Structural Controls: -None Selected-		
Is site a hotspot? No	Maintenance Burden: Low		
Pollutants Observed: Sediment/Organics			
Soils: Poor Infiltration	Benefits: Storage: YES Water Quality: YES Recharge: YES Demo: YES Repair: NO	Conflicts: Soils: NO Access: NO Land Use: YES Utilities: NO Polluted: NO High WT: NO Wetlands: NO	
SIZING INFO			
Drainage Area (ac): 0.11			
Impervious Area (ac): 0.11			
Practice Area Available (ac): 0.03			
Impervious Area Type: Street			
Existing Head Available? YES			

Date Assessed: Apr 7, 2014, 9:15 AM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 9:15 AM

Assessed by: MW KH



HINGHAM-WALTON'S COVE

Subwatershed: Walton's Cove Outfall Pipe 1

Site ID:
WCOP1-5

Name: Otis Street - Green Streets

Site & Concept Description:

The concept for this site is to utilize the space between the sidewalk and the road for green streets. This is another great area for green streets given that Otis Street is also a major road in this area, and there is already a sidewalk here. Runoff from large storm events would bypass into the existing storm drain system.



Additional Notes/Feasibility:

It is important to get buy-in from the abutting residential properties for this concept. This is a great location for a demonstration project since it is a major road for the neighborhood. Soil testing would be necessary here given the proximity to exposed bedrock. This site receives a lot of pedestrian and dog-walking traffic.

GENERAL SITE INFORMATION	RETROFIT DETAILS		
Site Contact Info:	Project Candidate: Ok		
Ownership: Public	Retrofit of existing or new BMP: New BMP		
Land Use: Road	Proposed Retrofit Practices: Tree Trenches		
Existing BMP on site? No	Non-Structural Controls: -None-		
Is site a hotspot? No	Maintenance Burden: Medium		
Pollutants Observed: Sediment/Pet-waste			
Soils: Poor Infiltration	Benefits: Storage: YES Water Quality: YES Recharge: YES Demo: YES Repair: NO	Conflicts: Soils: YES Access: NO Land Use: NO Utilities: YES Polluted: NO High WT: NO Wetlands: NO	
SIZING INFO			
Drainage Area (ac): 0.48			
Impervious Area (ac): 0.48			
Practice Area Available (ac): 0.13			
Impervious Area Type: Street			
Existing Head Available? NO			

Date Assessed: Apr 7, 2014, 10:38 AM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 10:38 AM

Assessed by: MW KH



HINGHAM-WALTON'S COVE

Subwatershed: Walton's Cove Outfall Pipe 1

Site ID:
WCOP1-6

Name: Governor Andrew Road - Dry Swales

Site & Concept Description:
The concept for this site is to construct a series of dry swales along this residential street. The swales would manage runoff from smaller storm events, while larger flows would bypass into the existing storm drain system on the street.



Additional Notes/Feasibility:
The swales should be designed to avoid impact to large trees. The abutting residents should be consulted to minimize impact to their properties and parking areas.

GENERAL SITE INFORMATION	RETROFIT DETAILS	
Site Contact Info:	Project Candidate: Yep, Love It	
Ownership: Public	Retrofit of existing or new BMP: New BMP	
Land Use: Road	Proposed Retrofit Practices: Swale	
Existing BMP on site? No	Non-Structural Controls: -None-	
Is site a hotspot? No	Maintenance Burden: Low	
Pollutants Observed: Nutrients / Organics		
Soils: Poor Infiltration	Benefits: Storage: YES Water Quality: YES Recharge: YES Demo: YES Repair: NO	Conflicts: Soils: NO Access: NO Land Use: NO Utilities: NO Polluted: NO High WT: NO Wetlands: NO
SIZING INFO		
Drainage Area (ac): 0.27		
Impervious Area (ac): 0.27		
Practice Area Available (ac): 0.1		
Impervious Area Type: Street		
Existing Head Available? YES		

Date Assessed: Apr 7, 2014, 9:35 AM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 9:35 AM

Assessed by: MW KH



HINGHAM-WALTON'S COVE

Subwatershed: Walton's Cove Outfall Pipe 2

Site ID:
WCOP2-1

Name: Downer Ave North - Green Streets

Site & Concept Description:

The concept for this site is to utilize the space between the sidewalk and the road for green streets. This is another location on Downer Avenue that would be great for green streets since it is a major road in this area, and there is already a sidewalk here. Runoff from large storm events would bypass into the existing storm drain system.



Additional Notes/Feasibility:

It is important to get buy-in from the abutting residential properties for this concept. Also, there are utility poles that will need to be worked around in this location. This is a great location for a demonstration project since it is a major road for the neighborhood.

GENERAL SITE INFORMATION	RETROFIT DETAILS	
Site Contact Info:	Project Candidate: Yep, Love It	
Ownership: Public	Retrofit of existing or new BMP: New BMP	
Land Use: Road	Proposed Retrofit Practices: Tree Trenches	
Existing BMP on site? No	Non-Structural Controls: -None-	
Is site a hotspot? No	Maintenance Burden: Medium	
Pollutants Observed: Sediment/Pet Waste		
Soils: Poor Infiltration	Benefits: Storage: YES Water Quality: YES Recharge: YES Demo: YES Repair: YES	Conflicts: Soils: NO Access: NO Land Use: NO Utilities: YES Polluted: NO High WT: NO Wetlands: NO
SIZING INFO		
Drainage Area (ac): 0.16		
Impervious Area (ac): 0.16		
Practice Area Available (ac): 0.08		
Impervious Area Type: Street		
Existing Head Available? YES		

Date Assessed: Apr 7, 2014, 2:40 PM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 2:40 PM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES

Date Assessed: Apr 7, 2014, 2:40 PM

Assessed by: MW KH



HINGHAM-WALTON'S COVE

Subwatershed: Walton's Cove Outfall Pipe 2

Site ID:
WCOP2-3

Name: Downer Ave at Whiton Ave - Bioretention

Site & Concept Description:

The concept for this site is to construct a bioretention area at this intersection. Runoff from larger storm events would bypass into the existing storm drain system.



Additional Notes/Feasibility:

While the majority of this concept can be constructed in the public ROW, there may need to be a private easement created depending on final sizing and design, as well as coordination with the property owner given the current residential parking situation.

GENERAL SITE INFORMATION	RETROFIT DETAILS	
Site Contact Info:	Project Candidate: Ok	
Ownership: Public/Private	Retrofit of existing or new BMP: New BMP	
Land Use: Road	Proposed Retrofit Practices: Bioretention	
Existing BMP on site? No	Non-Structural Controls: -None-	
Is site a hotspot? No	Maintenance Burden: Low	
Pollutants Observed: Sediment	Benefits: Storage: YES Water Quality: YES Recharge: NO Demo: YES Repair: NO	Conflicts: Soils: NO Access: NO Land Use: YES Utilities: NO Polluted: NO High WT: NO Wetlands: NO
Soils: Poor Infiltration		
SIZING INFO		
Drainage Area (ac): 0.11		
Impervious Area (ac): 0.11		
Practice Area Available (ac): 0.02		
Impervious Area Type: Street		
Existing Head Available? YES		

Date Assessed: Apr 7, 2014, 2:44 PM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 2:44 PM

Assessed by: MW KH



HINGHAM-WALTON'S COVE

Subwatershed: Walton's Cove Outfall Pipe 3

Site ID:
WCOP3-1

Name: Causeway Road - Basin Retrofit

Site & Concept Description:

There is an existing stormwater basin at the end of this private road that discharges near the mouth of Walton's Cove below a set of stairs. This basin's overflow pipe is located at the bottom of the basin; thus, not providing much detention of stormwater for settling of sediments. This can be easily modified by retrofitting the outlet.



Additional Notes/Feasibility:

Would need buy-in from the homeowner.

GENERAL SITE INFORMATION	RETROFIT DETAILS	
Site Contact Info:	Project Candidate: Ok	
Ownership: Private	Retrofit of existing or new BMP: Existing BMP	
Land Use: Road	Proposed Retrofit Practices: Pond	
Existing BMP on site? Yes	Non-Structural Controls: -None-	
Is site a hotspot? No	Maintenance Burden: Low	
Pollutants Observed: No	Benefits: Storage: YES Water Quality: YES Recharge: NO Demo: NO Repair: NO	Conflicts: Soils: NO Access: NO Land Use: NO Utilities: NO Polluted: NO High WT: NO Wetlands: NO
Soils: Poor Infiltration		
SIZING INFO		
Drainage Area (ac): 0.20		
Impervious Area (ac): 0.20		
Practice Area Available (ac): 0.02		
Impervious Area Type: Street		
Existing Head Available? YES		

Date Assessed: Apr 7, 2014, 4:37 PM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 4:37 PM

Assessed by: MW KH



HINGHAM-WALTON'S COVE

Subwatershed: Fee Pond

Site ID:
FP-1

Name: Westview Circle Cul-de-Sac - Bioretention

Site & Concept Description:

Appears that there are existing drainage issues here from ponding/clogging at the existing catch basin. The concept for this site is to remove excess pavement from an oversized cul-de-sac and use bioretention areas/swales to manage runoff.



Additional Notes/Feasibility:

Work with the neighbors in this area to minimize impacts to parking and driveway access.

GENERAL SITE INFORMATION	RETROFIT DETAILS	
Site Contact Info:	Project Candidate: Ok	
Ownership: Public	Retrofit of existing or new BMP: New BMP	
Land Use: Road	Proposed Retrofit Practices: Bioretention	
Existing BMP on site? No	Non-Structural Controls: Impervious Cover Removal	
Is site a hotspot? No	Maintenance Burden: Medium	
Pollutants Observed: Sediment/Organics	Benefits:	Conflicts:
Soils: Poor Infiltration	Storage: YES Water Quality: YES Recharge: NO Demo: YES Repair: NO	Soils: NO Access: NO Land Use: NO Utilities: NO Polluted: NO High WT: NO Wetlands: NO
SIZING INFO		
Drainage Area (ac): 0.43		
Impervious Area (ac): 0.43		
Practice Area Available (ac): 0.05		
Impervious Area Type: Street		
Existing Head Available? YES		

Date Assessed: Apr 7, 2014, 3:02 PM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 3:02 PM

Assessed by: MW KH



HINGHAM-WALTON'S COVE

Subwatershed: Fee Pond

Site ID:
FP-2

Name: High View Dr at Ocean View - Bioretention

Site & Concept Description:

There is a large open grassy area at this oversized intersection. Currently, stormwater flows along the edge of the road, eroding the soil and undermining the pavement. The concept is to remove excess pavement at intersection and use a bioretention area to manage runoff. Overflows from large storm events would continue to flow down Ocean View.



Additional Notes/Feasibility:

The extents of the ROW would need to be determined as this design moves forward. Coordination with the homeowner will be necessary.

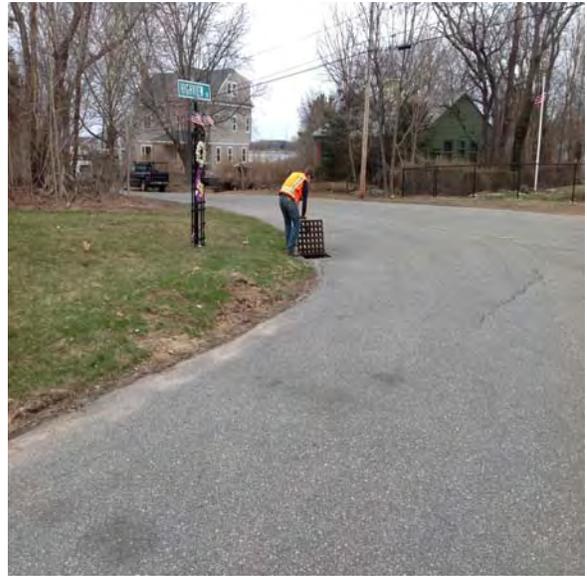
GENERAL SITE INFORMATION	RETROFIT DETAILS	
Site Contact Info:	Project Candidate: Yep, Love It	
Ownership: Public	Retrofit of existing or new BMP: New BMP	
Land Use: Road	Proposed Retrofit Practices: Bioretention	
Existing BMP on site? No	Non-Structural Controls: Impervious Cover Removal	
Is site a hotspot? No	Maintenance Burden: Low	
Pollutants Observed: No	Benefits: Storage: YES Water Quality: YES Recharge: NO Demo: YES Repair: NO	Conflicts: Soils: NO Access: NO Land Use: NO Utilities: NO Polluted: NO High WT: NO Wetlands: NO
Soils: Poor Infiltration		
SIZING INFO		
Drainage Area (ac): 0.44		
Impervious Area (ac): 0.44		
Practice Area Available (ac): 0.03		
Impervious Area Type: Street		
Existing Head Available? NO		

Date Assessed: Apr 7, 2014, 3:15 PM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 3:15 PM

Assessed by: MW KH



HINGHAM-WALTON'S COVE

Subwatershed: Fee Pond

Site ID:
FP-3

Name: Park Circle SE - Dry Swale

Site & Concept Description:

The runoff from this road discharges to the Fee Pond wetland complex. The concept is to construct a dry swale in the ROW to manage runoff.



Additional Notes/Feasibility:

Need buy-in from neighbors for this. Swale can either be grass and mown like the surrounding lawn, or it can be planted with native grasses, wildflowers, and shrubs.

GENERAL SITE INFORMATION	RETROFIT DETAILS	
Site Contact Info:	Project Candidate: Ok	
Ownership: Public	Retrofit of existing or new BMP: New BMP	
Land Use: Road	Proposed Retrofit Practices: Swale	
Existing BMP on site? No	Non-Structural Controls: Impervious Cover Removal	
Is site a hotspot? No	Maintenance Burden: Low	
Pollutants Observed: Sediment	Benefits: Storage: YES Water Quality: YES Recharge: NO Demo: NO Repair: NO	Conflicts: Soils: NO Access: NO Land Use: NO Utilities: NO Polluted: NO High WT: NO Wetlands: NO
Soils: Poor Infiltration		
SIZING INFO		
Drainage Area (ac): 0.34		
Impervious Area (ac): 0.34		
Practice Area Available (ac): 0.02		
Impervious Area Type: Street		
Existing Head Available? YES		

Date Assessed: Apr 7, 2014, 3:19 PM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 3:19 PM

Assessed by: MW KH



HINGHAM-WALTON'S COVE

Subwatershed: Fee Pond

Site ID:
FP-4

Name: Park Circle NW - Dry Swale

Site & Concept Description:

The runoff from this road discharges to the Fee Pond wetland complex. The concept is to construct a dry swale in the ROW to manage runoff. Some impervious cover reduction can be achieved at the intersection with Ocean View.



Additional Notes/Feasibility:

Need buy-in from neighbors for this. Swale can either be grass and mown like the surrounding lawn, or it can be planted with native grasses, wildflowers, and shrubs.

GENERAL SITE INFORMATION	RETROFIT DETAILS	
Site Contact Info:	Project Candidate: Ok	
Ownership: Public	Retrofit of existing or new BMP: New BMP	
Land Use: Road	Proposed Retrofit Practices: Swale	
Existing BMP on site? No	Non-Structural Controls: Impervious Cover Removal	
Is site a hotspot? No	Maintenance Burden: Low	
Pollutants Observed: Sediment	Benefits: Storage: YES Water Quality: YES Recharge: NO Demo: NO Repair: NO	Conflicts: Soils: NO Access: NO Land Use: NO Utilities: NO Polluted: NO High WT: NO Wetlands: NO
Soils: Poor Infiltration		
SIZING INFO		
Drainage Area (ac): 0.39		
Impervious Area (ac): 0.39		
Practice Area Available (ac): 0.02		
Impervious Area Type: Street		
Existing Head Available? YES		

Date Assessed: Apr 7, 2014, 3:22 PM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 3:22 PM

Assessed by: MW KH



HINGHAM-WALTON'S COVE

Subwatershed: Fee Pond

Site ID:
FP-5

Name: Park Circle at Ocean View - Bioretention

Site & Concept Description:

This intersection appears to be oversized. Pavement can be removed, and a bioretention area can be constructed within the ROW.



Additional Notes/Feasibility:

Existing site catchbasins can be utilized for basin overflow and bypass.

GENERAL SITE INFORMATION	RETROFIT DETAILS	
Site Contact Info:	Project Candidate: Ok	
Ownership: Public	Retrofit of existing or new BMP: New BMP	
Land Use: Road	Proposed Retrofit Practices: Bioretention	
Existing BMP on site? No	Non-Structural Controls: Impervious Cover Removal	
Is site a hotspot? No	Maintenance Burden: Low	
Pollutants Observed: Sediment	Benefits:	Conflicts:
Soils: Poor Infiltration	Storage: YES	Soils: NO
SIZING INFO	Water Quality: YES	Access: NO
Drainage Area (ac): 0.31	Recharge: NO	Land Use: NO
Impervious Area (ac): 0.31	Demo: NO	Utilities: NO
Practice Area Available (ac): 0.02	Repair: NO	Polluted: NO
Impervious Area Type: Street		High WT: NO
Existing Head Available? YES		Wetlands: NO

Date Assessed: Apr 7, 2014, 3:19 PM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 3:19 PM

Assessed by: MW KH



HINGHAM-WALTON'S COVE

Subwatershed: Fee Pond

Site ID:
FP-6

Name: Park Circle at Cul-de-Sac N - Bioretention

Site & Concept Description:
This cul-de-sac is oversized. Water service and sewer manholes are location in the driving lanes. The concept for this site is to remove excess pavement, creating a larger planted island and creating an easier access to utilities, while treating runoff with a bioretention area near the northern edge of the intersection with Park Circle. Should be designed with Site FP-7.



Additional Notes/Feasibility:
Need to confirm limits of ROW.

GENERAL SITE INFORMATION	RETROFIT DETAILS	
Site Contact Info:	Project Candidate: Ok	
Ownership: Public	Retrofit of existing or new BMP: New BMP	
Land Use: Road	Proposed Retrofit Practices: Bioretention	
Existing BMP on site? No	Non-Structural Controls: Impervious Cover Removal	
Is site a hotspot? No	Maintenance Burden: Low	
Pollutants Observed: Sediment	Benefits:	Conflicts:
Soils: Poor Infiltration	Storage: YES Water Quality: YES Recharge: NO Demo: NO Repair: YES Other: Traffic calming, easier access to other utilities	Soils: NO Access: NO Land Use: NO Utilities: NO Polluted: NO High WT: NO Wetlands: NO
SIZING INFO		
Drainage Area (ac): 0.42		
Impervious Area (ac): 0.42		
Practice Area Available (ac): 0.02		
Impervious Area Type: Street		
Existing Head Available? YES		

Date Assessed: Apr 7, 2014, 3:45 PM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 3:45 PM

Assessed by: MW KH



HINGHAM-WALTON'S COVE

Subwatershed: Fee Pond

Site ID:
FP-7

Name: Park Circle at Cul-de-Sac S - Bioretention

Site & Concept Description:
This cul-de-sac is oversized. Water service and sewer manholes are location in the driving lanes. The concept for this site is to remove excess pavement, creating a larger planted island and creating an easier access to utilities, while treating runoff with a bioretention area near the southern edge of the intersection with Park Circle. Should be designed with Site FP-6.

Additional Notes/Feasibility:
Need to confirm limits of ROW.



GENERAL SITE INFORMATION	RETROFIT DETAILS	
Site Contact Info:	Project Candidate: Ok	
Ownership: Public	Retrofit of existing or new BMP: New BMP	
Land Use: Road	Proposed Retrofit Practices: Bioretention	
Existing BMP on site? No	Non-Structural Controls: Impervious Cover Removal	
Is site a hotspot? No	Maintenance Burden: Low	
Pollutants Observed: Sediment	Benefits:	Conflicts:
Soils: Poor Infiltration	Storage: YES Water Quality: YES Recharge: NO Demo: YES Repair: NO Other: Traffic calming, easier access to other utilities	Soils: NO Access: NO Land Use: NO Utilities: NO Polluted: NO High WT: NO Wetlands: NO
SIZING INFO		
Drainage Area (ac): 0.34		
Impervious Area (ac): 0.34		
Practice Area Available (ac): 0.02		
Impervious Area Type: Street		
Existing Head Available? YES		

Date Assessed: Apr 7, 2014, 3:44 PM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 3:44 PM

Assessed by: MW KH



HINGHAM-WALTON'S COVE

Subwatershed: Fee Pond

Site ID:
FP-8

Name: Planter's Field Ln at Wompatuck Rd - Bioretention

Site & Concept Description:
There are several areas at this intersection with striped, unused pavement. The concept is to remove this pavement and use the area for bioretentions. This should also help to calm traffic at this major intersection.



Additional Notes/Feasibility:
Need to confirm that the pavement in these areas can be removed. May require realignment of the existing cross-walk.

GENERAL SITE INFORMATION	RETROFIT DETAILS	
Site Contact Info:	Project Candidate: Yep, Love It	
Ownership: Public	Retrofit of existing or new BMP: New BMP	
Land Use: Road	Proposed Retrofit Practices: Bioretention	
Existing BMP on site? No	Non-Structural Controls: Impervious Cover Removal	
Is site a hotspot? No	Maintenance Burden: Low	
Pollutants Observed: Sediment/Organics	Benefits:	Conflicts:
Soils: Poor Infiltration	Storage: YES Water Quality: YES Recharge: NO Demo: YES Repair: NO Other: Traffic calming at major intersection	Soils: NO Access: NO Land Use: NO Utilities: NO Polluted: NO High WT: NO Wetlands: NO
SIZING INFO		
Drainage Area (ac): 0.80		
Impervious Area (ac): 0.80		
Practice Area Available (ac): 0.06		
Impervious Area Type: Street		
Existing Head Available? YES		

Date Assessed: Apr 7, 2014, 3:50 PM

Assessed by: MW KH



ADDITIONAL PHOTOS/SKETCHES



Date Assessed: Apr 7, 2014, 3:50 PM

Assessed by: MW KH



Appendix B: Retrofit Ranking Spreadsheets

Retrofit Ranking Spreadsheet

Preliminary Sizing Calculations for Stormwater Retrofits:

Note: Water Quality Volume Required is based upon 1.0 inch of runoff times the contributing impervious area per MASWMS

Water Quality Volume (WQv)

#	Project	Imp. Area		WQv Required	WQv provided	Total Planning Level Cost \$	Wetlands/ Permitting	Access/ Utility Issues	Ownership Issues	Maintenance Burden	Public Education	other benefits runoff reduction	Other Partners
		ac	sf	cf	%								
WCOP1-1	Sewer Pump Station (Daley Road) - Bioretention	0.47	20,415	1,701	100.0	\$ 46,000	L	L	L	L	H	L	M
WCOP1-2	Sewer Pump Station (Downer Avenue) - Bioretention	0.11	4,988	416	100.0	\$ 11,000	L	H	L	L	H	H	M
WCOP1-3	Downer Ave South - Green Streets	0.33	14,533	1,211	100.0	\$ 43,000	L	L	L	M	H	H	H
WCOP1-4	Downer Ave at Grove St - Bioretention	0.11	4,613	384	100.0	\$ 10,000	L	L	H	L	L	H	L
WCOP1-5	Otis Street - Green Streets	0.47	20,685	1,724	100.0	\$ 61,000	L	L	L	M	H	H	L
WCOP1-6	Gvemor Andrew Road - Dry Swales	0.27	11,640	970	100.0	\$ 16,000	L	L	L	L	L	H	L
WCOP2-1	Downer Ave North - Green Streets	0.16	6,897	575	100.0	\$ 20,000	L	L	L	M	H	H	H
WCOP2-2	Causeway Road at Downer - Bioretention	0.25	10,896	908	100.0	\$ 25,000	L	L	H	L	M	H	L
WCOP2-3	Downer Ave at Whiton Ave - Bioretention	0.11	4,646	387	100.0	\$ 10,000	L	L	H	L	M	H	H
WCOP3-1	Causeway Road - Basin Retrofit	0.20	8,614	718	100.0	\$ 3,000	M	L	H	L	L	L	M
FP-1	Westview Circle Cul-de-Sac - Bioretention	0.43	18,677	1,556	100.0	\$ 42,000	L	L	L	L	L	H	H
FP-2	High View Dr at Ocean View - Bioretention	0.44	19,161	1,597	100.0	\$ 43,000	L	L	H	L	L	M	L
FP-3	Park Circle SE - Dry Swale	0.34	14,804	1,234	100.0	\$ 21,000	L	L	L	L	L	L	H
FP-4	Park Circle NW - Dry Swale	0.39	17,127	1,427	100.0	\$ 24,000	L	L	L	L	L	L	M
FP-5	Park Circle at Ocean View - Bioretention	0.31	13,344	1,112	100.0	\$ 30,000	L	L	L	L	L	L	M
FP-6	Park Circle at Cul-de-Sac N - Bioretention	0.42	18,304	1,525	100.0	\$ 41,000	L	L	L	L	L	M	M
FP-7	Park Circle at Cul-de-Sac S - Bioretention	0.34	14,791	1,233	100.0	\$ 33,000	L	L	L	L	L	M	M
FP-8	Planter's Field Ln at Wompatuck Rd - Bioretention	0.80	35,040	2,920	100.0	\$ 79,000	L	L	L	L	M	M	M

Ranking Results:

Site #	Project	1. Pollutant Removal Potential (possible 40 pts)			2. Cost (25 points)		3. Ease of Implementation (20 points)					4. Additional Benefits/Factors (15 points)				TOTAL
		Total WQv treated (20)	Pollutant Reduction (20)	#1 Score	Total Cost/WQv Treated	#2 Score*	Wetlands/ Permitting (5)	Accessibility (5)	Ownership (5)	Maintenance Burden (5)	#3 Score	Public Education/ Demonstration (5)	Addl SW Benefits (flood reduction, runoff reduction) (5)	Other Partner Involvement (5)	#4 Score	SCORE
WCOP1-1	Sewer Pump Station (Daley Road) - Bioretention	15.19	12.5	27.7	\$ 27	10	5	5	5	5	20	5	0	2.5	7.5	65.4
WCOP1-2	Sewer Pump Station (Downer Avenue) - Bioretention	10.12	12.5	22.6	\$ 27	10	5	0	5	5	15	5	5	2.5	12.5	60.3
WCOP1-3	Downer Ave South - Green Streets	13.26	12.5	25.8	\$ 35	5	5	5	5	2.5	17.5	5	5	5	15	63.3
WCOP1-4	Downer Ave at Grove St - Bioretention	10.00	12.5	22.5	\$ 27	10	5	5	0	5	15	0	5	0	5	52.7
WCOP1-5	Otis Street - Green Streets	15.28	12.5	27.8	\$ 35	5	5	5	5	2.5	17.5	5	5	0	10	60.3
WCOP1-6	Gvemor Andrew Road - Dry Swales	12.31	12.5	24.8	\$ 17	17	5	5	5	5	20	0	5	0	5	66.5
WCOP2-1	Downer Ave North - Green Streets	10.75	12.5	23.3	\$ 35	5	5	5	5	2.5	17.5	5	5	5	15	60.8
WCOP2-2	Causeway Road at Downer - Bioretention	12.06	12.5	24.6	\$ 27	10	5	5	0	5	15	2.5	5	0	7.5	57.3
WCOP2-3	Downer Ave at Whiton Ave - Bioretention	10.01	12.5	22.5	\$ 27	10	5	5	0	5	15	2.5	5	5	12.5	60.2
WCOP3-1	Causeway Road - Basin Retrofit	11.31	3.3	14.6	\$ 4	25	2.5	5	0	5	12.5	0	0	2.5	2.5	54.6
FP-1	Westview Circle Cul-de-Sac - Bioretention	14.62	12.5	27.1	\$ 27	10	5	5	5	5	20	0	5	5	10	67.3
FP-2	High View Dr at Ocean View - Bioretention	14.78	12.5	27.3	\$ 27	10	5	5	0	5	15	0	2.5	0	2.5	55.0
FP-3	Park Circle SE - Dry Swale	13.35	12.5	25.8	\$ 17	17	5	5	5	5	20	0	0	5	5	67.6
FP-4	Park Circle NW - Dry Swale	14.11	12.5	26.6	\$ 17	17	5	5	5	5	20	0	0	2.5	2.5	65.8
FP-5	Park Circle at Ocean View - Bioretention	12.87	12.5	25.4	\$ 27	10	5	5	5	5	20	0	0	2.5	2.5	58.1
FP-6	Park Circle at Cul-de-Sac N - Bioretention	14.50	12.5	27.0	\$ 27	10	5	5	5	5	20	0	2.5	2.5	5	62.2
FP-7	Park Circle at Cul-de-Sac S - Bioretention	13.35	12.5	25.8	\$ 27	10	5	5	5	5	20	0	2.5	2.5	5	61.1
FP-8	Planter's Field Ln at Wompatuck Rd - Bioretention	20.00	12.5	32.5	\$ 27	10	5	5	5	5	20	2.5	2.5	2.5	7.5	70.2

Min \$ 4.00 25
Max \$ 35.10 5

*This score is weighted with the lowest cost/acre receiving the highest score (30) and the highest cost/acre receiving the lowest score (1). The other sites receive scores based on cost/acre relative to the maximum and minimum.

Site Priority In Descending Order	
Site #	Score
WCOP1-6	67
WCOP1-1	65
WCOP1-3	63
WCOP2-1	61
WCOP1-2	60
WCOP1-5	60
WCOP2-3	60
WCOP2-2	57
WCOP3-1	55
WCOP1-4	53
FP-8	70
FP-3	68
FP-1	67
FP-4	66
FP-6	62
FP-7	61
FP-5	58
FP-2	55

Appendix C: Soil Test Pit Logs

C. On-Site Review

Deep Observation Hole Number: TP-1 12-May-14 12:00 p.m. Sunny, 85 degrees F
Date Time Weather

1. Location

Ground Elevation at Surface of Hole 58.2

Location (Identify on Plan) Downer Ave North, WCOP2-1 (See Plan)

2. Land Use: Road shoulder Yes 5%
(e.g. woodland, agricultural field, vacant lot, etc.) Surface Stones Slope (%)

Grass Drumlin Toeslope
Vegetation Landform Position on landscape (attach sheet)

3. Distances from: Open Water Body 200 Drainage Way 200 Possible Wet Area _____
feet feet feet

Property Line 10 Drinking Water Well _____ Other _____
feet feet

4 Parent Material: Compact till Unsuitable Materials Present: Yes No

If Yes: Disturbed Soil Fill Material Impervious Layer(s) Weathered/Fractured Rock Bedrock

5 Groundwater Observed: Yes No

If Yes: Depth Weeping from Pit none Depth Standing Water in Hole 55 inches

Estimated Depth to High Groundwater: 3 55.2
feet elevation (feet)

Deep Observation Hole Number: TP-1

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-5	FILL	-	-	-	-	FILL	30	-	MASSIVE	FIRM	Roadway dense-grade
5-22	B	5 Y 4/4	-	-	-	LOAMY FINE SAND	5	-	BLOCKY	FRIABLE	
22-55+	C	10 YR 4/3	22	2.5 YR 4/8	15	LOAMY COARSE SAND	15	15	MASSIVE	LOOSE	Contains large fraction of fractured, angular rock

Additional Notes Standing water at 55 inches Frimpter calculation yields a groundwater elevation of 3.0'.

C. On-Site Review

Deep Observation Hole Number: TP-2 12-May-14 8:00 a.m. Sunny, 70 degrees F
Date Time Weather

1. Location

Ground Elevation at Surface of Hole 58

Location (Identify on Plan) Walton's Cove Sewer Pump House, WCOP1-1 (See Plan)

2. Land Use: Lawn (Sewer pump station) Yes 2%
(e.g. woodland, agricultural field, vacant lot, etc.) Surface Stones Slope (%)

Grass Drumlin Toe
Vegetation Landform Position on landscape (attach sheet)

3. Distances from: Open Water Body 300 Drainage Way 300 Possible Wet Area _____
feet feet feet

Property Line 20 Drinking Water Well _____ Other _____
feet feet

4 Parent Material: Unknown Unsuitable Materials Present: Yes No

If Yes: Disturbed Soil Fill Material Impervious Layer(s) Weathered/Fractured Rock Bedrock

5 Groundwater Observed: Yes No

If Yes: Depth Weeping from Pit none Depth Standing Water in Hole 62 inches

Estimated Depth to High Groundwater: 3.6 54.4
feet elevation (feet)

Deep Observation Hole Number: TP-2

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-5	A (FILL)	10 YR 3/3	-	-	-	LOAMY SAND	5	0	GRANULAR	V. FRIABLE	Topsoil
5-34	B (FILL)	10 YR 5/3	26-34	2.5 YR 5/8	5	SANDY LOAM	15	15	BLOCKY	FIRM	Fill
34-46	C1	10 YR 3/2	34-46	2.5 YR 4/8	10	SILT CLAY LOAM	10	5	MASSIVE	V. FIRM	Fill. Moist at 34 in.
46-62+	Cr	5 GY 5/2	46+	10 R 4/8	50	WEATHERED ROCK	48	2	MASSIVE	LOOSE	Fill. Organics, bottles, & other buried debris. Highly redoxed.

Additional Notes Standing water at 62 inches. Frimpter calculation yields a groundwater elevation of 3.6'.

TP-3 at WCOP1-2 was not dug due to potential utility conflicts at front of property.

C. On-Site Review

Deep Observation Hole Number: TP-4 12-May-14 10:30 a.m. Sunny, 85 degrees F
Date Time Weather

1. Location

Ground Elevation at Surface of Hole 61.3

Location (Identify on Plan) Downer Ave South, WCOP1-3 (See Plan)

2. Land Use: Road shoulder Yes 5%
(e.g. woodland, agricultural field, vacant lot, etc.) Surface Stones Slope (%)

Grass Drumlin Toeslope
Vegetation Landform Position on landscape (attach sheet)

3. Distances from: Open Water Body 700 Drainage Way 270 Possible Wet Area _____
feet feet feet

Property Line 10 Drinking Water Well _____ Other _____
feet feet

4 Parent Material: Unknown Unsuitable Materials Present: Yes No

If Yes: Disturbed Soil Fill Material Impervious Layer(s) Weathered/Fractured Rock Bedrock

5 Groundwater Observed: Yes No

If Yes: Depth Weeping from Pit none Depth Standing Water in Hole _____

Estimated Depth to High Groundwater: 3.7 57.6
feet elevation (feet)

Deep Observation Hole Number: TP-4

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-4	FILL	10 YR 4/2	-	-	-	SAND	10	2	MASSIVE	LOOSE	
4-22	FILL	10 YR 3/3	-	-	-	LOAMY SAND	20	5	MASSIVE	LOOSE	Contains roots.
22-44	FILL	5 Y 4/4	-	-	-	FINE SANDY LOAM	10	10	BLOCKY	FRIABLE	Contains roots & misc. debris. Buried pavement at 30 inches.
44-59+	FILL	10 YR 5/4	44	2.5 YR 4/8	15	SANDY LOAM	10	10	MASSIVE	V. FIRM	

Additional Notes A 4" dia. drain pipe was struck at 34 inches. Pipe appeared to be running from 101 Downer Ave. Pipe appeared to be abandoned;
therefore, was not repaired. Pipe material was plastic connected to clay. Frimpter calculation yields a groundwater elevation of 3.6'.
Homeowner at 103 Downer Ave was generally interested and supportive of the project.

C. On-Site Review

Deep Observation Hole Number: TP-5 12-May-14 9:00 a.m. Sunny, 75 degrees F
Date Time Weather

1. Location

Ground Elevation at Surface of Hole 57.7

Location (Identify on Plan) Otis St at Downer Ave, WCOP1-5 (See Plan)

2. Land Use: Road shoulder Yes 1-2%
(e.g. woodland, agricultural field, vacant lot, etc.) Surface Stones Slope (%)

Grass Drumlin Toe
Vegetation Landform Position on landscape (attach sheet)

3. Distances from: Open Water Body 260 260
feet feet feet

Property Line 10 Drinking Water Well Other
feet feet

4 Parent Material: Organics/Dune Deposits Unsuitable Materials Present: Yes No

If Yes: Disturbed Soil Fill Material Impervious Layer(s) Weathered/Fractured Rock Bedrock

5 Groundwater Observed: Yes No

If Yes: Depth Weeping from Pit none Depth Standing Water in Hole

Estimated Depth to High Groundwater: 3.3 54.4
feet elevation (feet)

Deep Observation Hole Number: TP-5

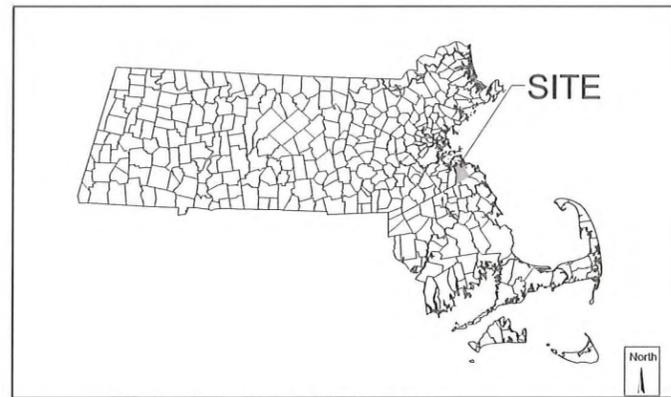
Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-7	FILL	10 YR 3/3	-	-	-	LOAMY SAND	5	-	MASSIVE	V. FRIABLE	Topsoil
7-21	FILL	10 YR 3/3		-	-	M/C SAND	25	10	MASSIVE	LOOSE	Fill
21-40	FILL	10 YR 4/2	23-40	10 R 4/8	10	SILT CLAY LOAM	10	5	BLOCKY	FIRM	Fill
40-45	Ab	10 YR 2/2	40-45	10 R 4/8	10	SILT LOAM	2	-	BLOCKY	Firm in place. Friable in hand.	Organic layer containing roots. Moist soils.
45-52	Bb	7.5 YR 5/4	-	-	-	LOAMY FINE SAND	2	-	MASSIVE	Firm in place. Friable in hand.	Moist soils
52-60	C1	10 YR 2/1	52-60	10 R 4/8	10	SILT LOAM	-	-	MASSIVE	FIRM	Black, highly organic layer. Very moist soils.
60+	C2	10 YR 4/2	60+	7.5 R 4/8	20	FINE SANDY LOAM	-	2	MASSIVE	V. FIRM	Soils are highly gleyed with some mottling.

Additional Notes Standing water not observed. Used Ab Horizon. Frimpter calculation yields a groundwater elevation of 3.0'.

Site is possibly buried salt marsh.

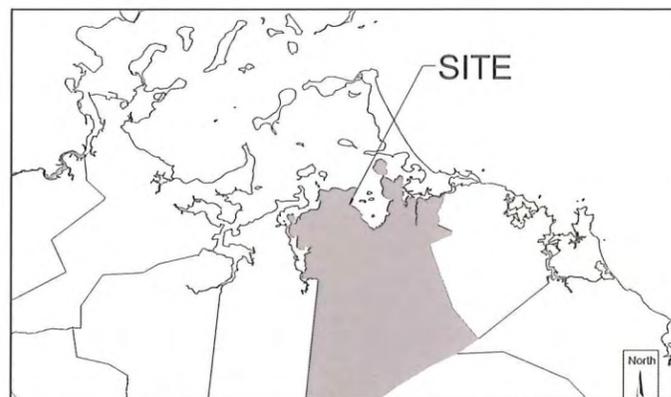
Appendix D: 30% Design Plans

WALTON'S COVE STORMWATER MITIGATION 30% CONCEPT PLANS HINGHAM, MASSACHUSETTS MAY 30, 2014



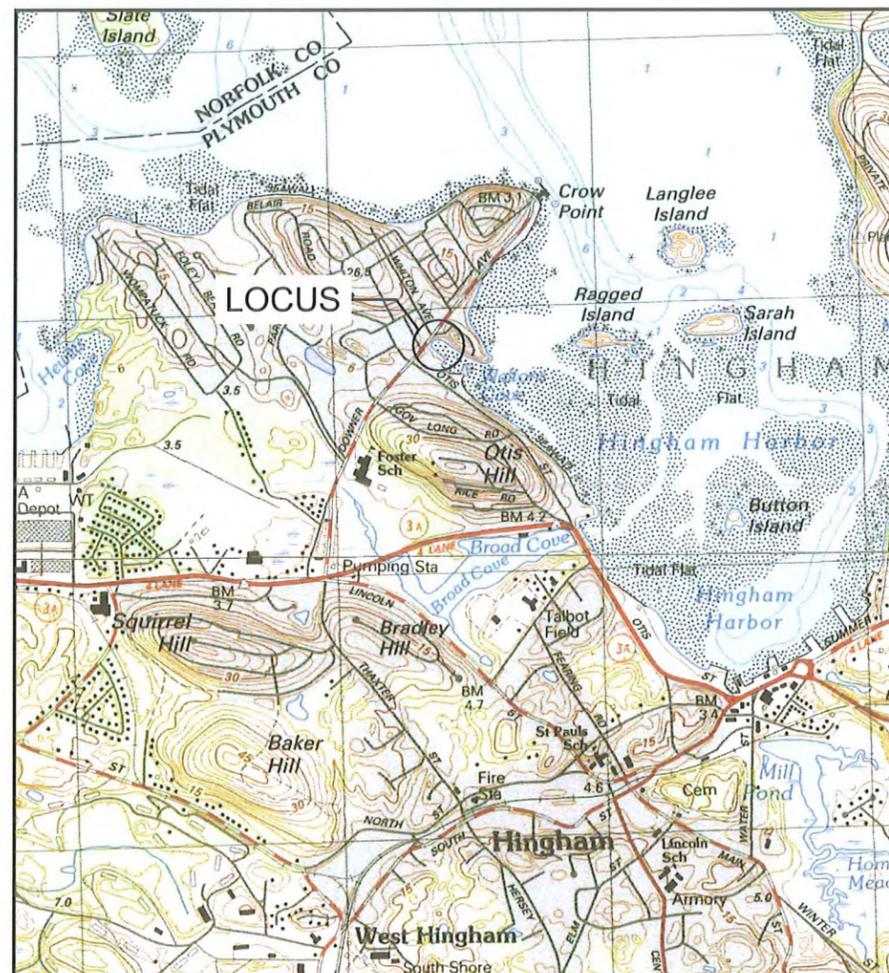
MASSACHUSETTS

Graphic Scale
0 100000
SCALE IN FEET
1:150000



TOWN

Graphic Scale
0 12000
SCALE IN FEET
1:12000



VICINITY MAP

Graphic Scale
1-inch = 1000-feet

Sheet List Table	
Sheet Number	Sheet Title
1	COVER SHEET
2	EXISTING CONDITIONS
3	GRADING & DRAINAGE
4	CONSTRUCTION DETAILS 1
5	CONSTRUCTION DETAILS 2

GENERAL NOTES:

1. THIS PLAN SET IS CONCEPTUAL ONLY AND NOT FOR CONSTRUCTION.
2. SURVEY CONDUCTED BY HORSLEY WITTEN GROUP (HW) ON MAY 13, 2014. ELEVATION DATUM IS ASSUMED.
3. PROPERTY LINES APPROXIMATE ONLY AND OBTAINED FROM TOWN OF HINGHAM GIS.
4. ABUTTER INFORMATION FROM ASSESSOR'S MAP.
5. HORIZONTAL DATUM IS MASS STATE PLANE COORDINATE SYSTEM. DATUM ESTABLISHED BY SCALING ORTHOMETRIC PHOTOS PROVIDED BY MASSACHUSETTS GEOGRAPHICAL INFORMATION SYSTEM (MA GIS).
6. MOST OF THE PROJECT AREA IS LOCATED WITHIN F.L.R.M. ZONE VE (ELEVATION 22' - NAVD 88) AS SHOWN ON MAP NO. 25023C0019J (PANEL 19 OF 650) DATED JULY 17, 2012.
7. THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AND STRUCTURES AS SHOWN ON THESE PLANS ARE BASED ON RECORDS OF VARIOUS UTILITY COMPANIES, AND WHEREVER POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THIS INFORMATION IS NOT TO BE RELIED UPON AS BEING EXACT OR COMPLETE. THE LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES SHALL BE VERIFIED IN THE FIELD PRIOR TO THE START OF ANY CONSTRUCTION. THE CONTRACTOR MUST CONTACT THE APPROPRIATE UTILITY COMPANY, ANY GOVERNING PERMITTING AUTHORITY IN THE TOWN, AND "DIGSAFE" (1-888-344-7233) AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION WORK IN PREVIOUSLY WALTERED AREAS TO REQUEST EXACT FIELD LOCATION OF UTILITIES.

Plan Set:
**WALTON'S COVE STORMWATER MITIGATION
30% CONCEPT PLANS
HINGHAM, MASSACHUSETTS**

Prepared For:

Town of Hingham
210 Central Street
Hingham, MA 02043
781 741-1445

Prepared By:

Horsley Witten Group, Inc.
Sustainable Environmental Solutions
www.horsleywitten.com



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Date Issued:

MAY 30, 2014

Designed By:

KMH

Drawn By:

KMH

Checked By:

RAC

**DRAFT
NOT FOR
CONSTRUCTION**

Revisions

Rev.	Date	By	Appr. Description

Project Number:

14035

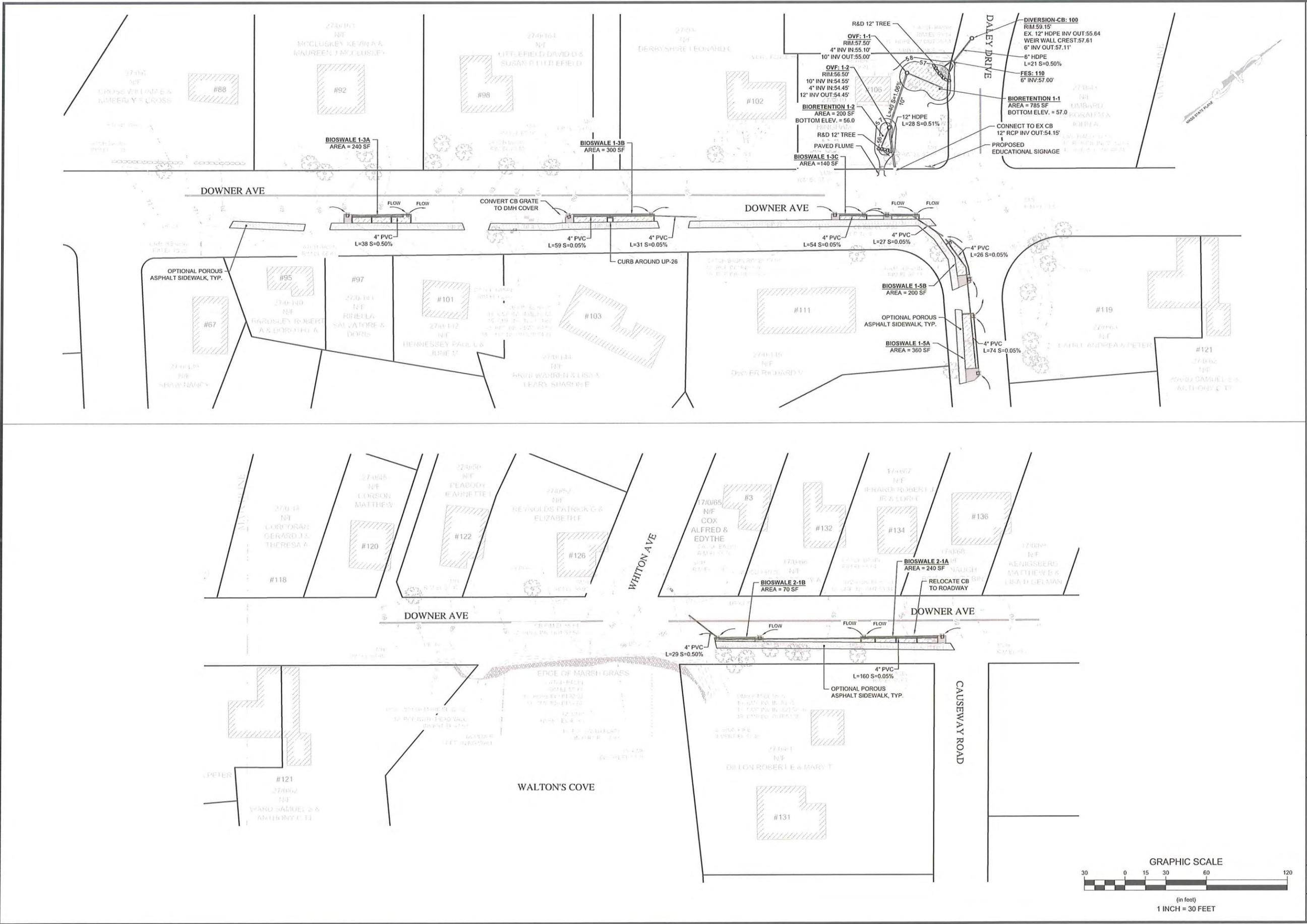
Sheet Number:

1 of 5

Drawing Number:

C - 1

last modified: 05/30/14 printed: 06/11/14 by sk H:\Projects\2014\14035 Hingham-Walton's Cove SW Mitigation\Drawings - 14035\14035-GD.dwg



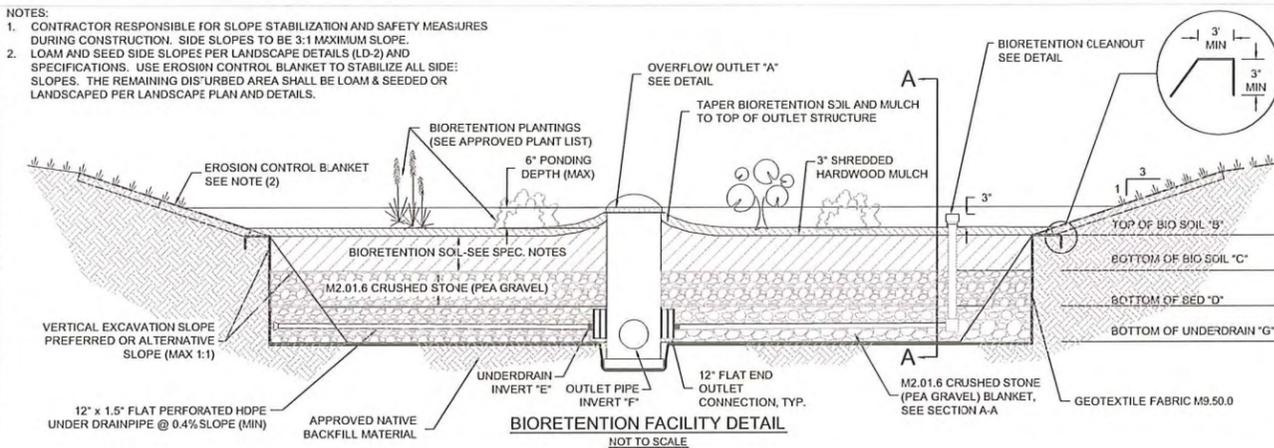
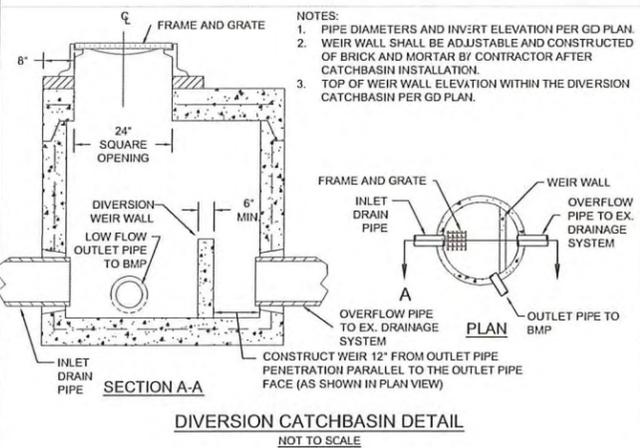
<p>Revisions</p> <table border="1"> <tr><th>Rev.</th><th>Date</th><th>By</th><th>Description</th></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>		Rev.	Date	By	Description																
Rev.	Date	By	Description																		
<p>Horsley Witten Group, Inc. 90 Route 6A Sandwich, MA 02563 Phone: (508) 833-3150 Fax: (508) 833-3150 Date: May 30, 2014</p>																					
<p>Plan Set: WALTON'S COVE STORMWATER MITIGATION 30% CONCEPT PLANS HINGHAM, MASSACHUSETTS</p>																					
<p>Prepared For: Town of Hingham 210 Central Street Hingham, MA 02043 Phone: 781 741-1445 Fax: —</p>																					
<p>Survey Provided By: Horsley Witten Group, Inc. 90 Route 6A Sandwich, MA 02563 Phone: (508) 833-3150 Fax: (508) 833-3150 Date: May 13, 2014</p>																					
<p style="text-align: center;">DRAFT NOT FOR CONSTRUCTION</p>																					
<p>Project Number: 14035</p>	<p>Sheet: 3 of 5</p>																				
<p>Sheet Number: C - 3</p>																					

MATERIAL SPECIFICATIONS

- BIORETENTION SOIL**
 - USDA UNIFIED SOIL CLASSIFICATION: LOAMY SAND CONSISTING OF A UNIFORM MIX, FREE OF NOXIOUS WEEDS AND FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN 1 INCH. A TEXTURAL ANALYSIS IS REQUIRED FOR CONFORMANCE TO THE SOIL COMPOSITION CRITERIA LISTED BELOW.
 - 65-85% MEDIUM SAND
 - 8-12% SOIL FINES (< 2% CLAY)
 - 3% ORGANIC MATTER (WELL AGED (6-12 MONTHS), WELL AERATED, LEAF COMPOST OR APPROVED EQUIVALENT)
 - PROVIDE A SOIL TEST OF THE BIORETENTION SOIL FOR CONFORMANCE TO THE FOLLOWING CRITERIA:
 - PH RANGE: 5.2-7.0
 - MAGNESIUM: MINIMUM 32 PPM
 - PHOSPHOROUS (P2O5): NOT TO EXCEED 69 PPM
 - POTASSIUM (K2O): MINIMUM 78 PPM
 - SOLUBLE SALTS: NOT TO EXCEED 500 PPM
 IF THE SOIL PH IS NOT WITHIN THE ACCEPTABLE RANGE, AMEND WITH LIME TO RAISE THE PH OR WITH IRON SULFATE TO LOWER THE PH AS NECESSARY. ALL TESTING SHOULD BE PERFORMED BY THE SAME TESTING FACILITY TO MAINTAIN CONSISTENT RESULTS. SUBMIT THE SOIL SAMPLE RESULTS TO THE ENGINEER REVIEW AND APPROVAL PRIOR TO DELIVERY TO THE PROJECT SITE.
 - VOLUME OF FILTER MEDIA BASED ON 100% OF PLAN VOLUME TO ACCOUNT FOR SETTLING OR COMPACTION.
 - DO NOT MIX, DUMP OR STORE ANY OTHER MATERIALS OR SUBSTANCES THAT MAY BE HARMFUL TO PLANT GROWTH OR PROVE A HINDRANCE TO THE PLANTING MAINTENANCE OR OPERATIONS WITHIN THE BIORETENTION AREA.
- MULCH**
 - FINE SHREDDED WELL AGED (6 MONTH MINIMUM) HARDWOOD MULCH. HARDWOOD MULCH IS PREFERRED TO PREVENT FLOATHING. IF HARDWOOD MULCH IS NOT AVAILABLE A FINELY DOUBLE SHREDED WELL AGED, ORGANIC DARK PINE MULCH MAY BE ACCEPTABLE ON A CASE BY CASE BASIS PER SAMPLE SUBMITTAL AND ENGINEER REVIEW.
 - A MULCH SAMPLE MUST BE SUBMITTED AND APPROVED BY THE ENGINEER PRIOR TO DELIVERY TO THE PROJECT SITE.
- FILTER FABRIC**
 - NON-WOVEN GEOTEXTILE FABRIC WITH FLOW RATE OF > 110 GALLON MINUTES/SQUARE FOOT.
 - CLASS 'C' APPARENT OPENING SIZE (ASTM-D-4751)
 - GRAB TENSILE STRENGTH (ASTM-D-4532) BURST STRENGTH (ASTM-D-4833)
- PEA GRAVEL**
 - 3/8" WASHED STONE
- UNDERDRAIN GRAVEL**
 - 3/4" CRUSHED WASHED STONE, CLEAN AND FREE OF ALL FINES AND MEETING AASHTO M-43
- PIPE**
 - UNDERDRAIN
 - 4" RIGID SCHEDULE 40 PVC PIPE, WITH 3/8" PERFORATIONS @ 6" O.C. MEETING ASTM 1785 OR AASHTO M-278
 - T'S AND Y'S FITTINGS AS REQUIRED FOR THE UNDERDRAIN CONFIGURATION INDICATED ON DRAWINGS
 - CONNECTIONS TO STORM DRAIN SYSTEM
 - UNDERDRAIN CLEANOUTS
 - NON PERFORATED SCHEDULE 40 PVC PIPE, PVC ELBOW, CAP, AND ALL ASSOCIATED FITTINGS
- EROSION CONTROL BLANKET (D-1 SIDE SLOPES ONLY)**
 - WOVEN, 100% BIODEGRADABLE JUTE FIBER 7.70 LBS/1000 SQFT, BICRET S1500M OR APPROVED EQUIVALENT.
- PLANTS**
 - AS INDICATED ON DRAWINGS.
- SEED (SIDE SLOPES ONLY)**
 - NEW ENGLAND CONSERVATION WILDLIFE MIX OR APPROVED EQUIVALENT.
 - APPLICATION RATE 25 LBS/ACRES OR PER SEED MANUFACTURER'S REQUIREMENTS
- OUTLET STRUCTURE**
 - SIZE AS INDICATED ON DRAWINGS.
 - FIBERGLASS REINFORCED PLASTIC MANHOLES OF SIZE INDICATED ON DRAWINGS.

STORMWATER FACILITY OPERATION & MAINTENANCE:

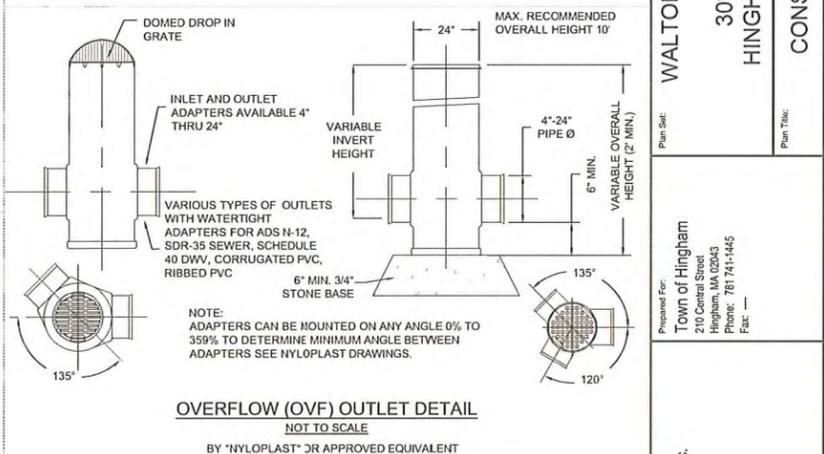
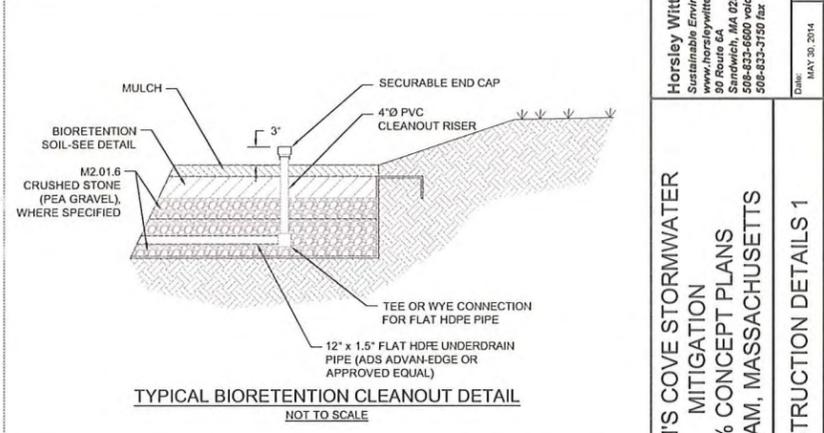
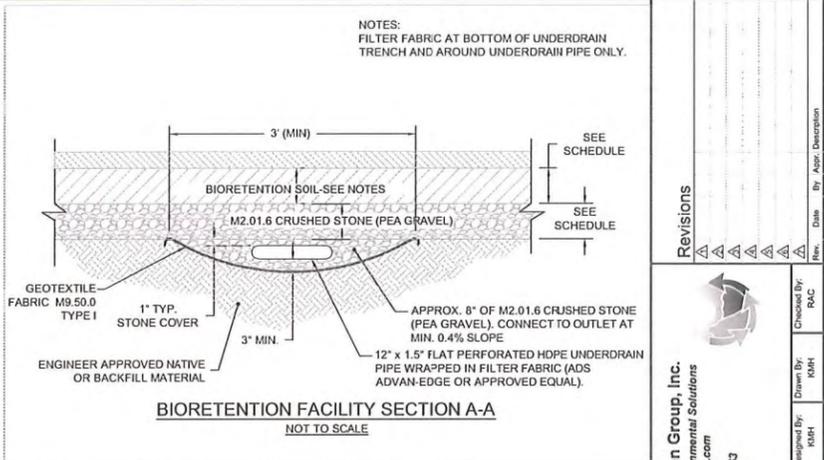
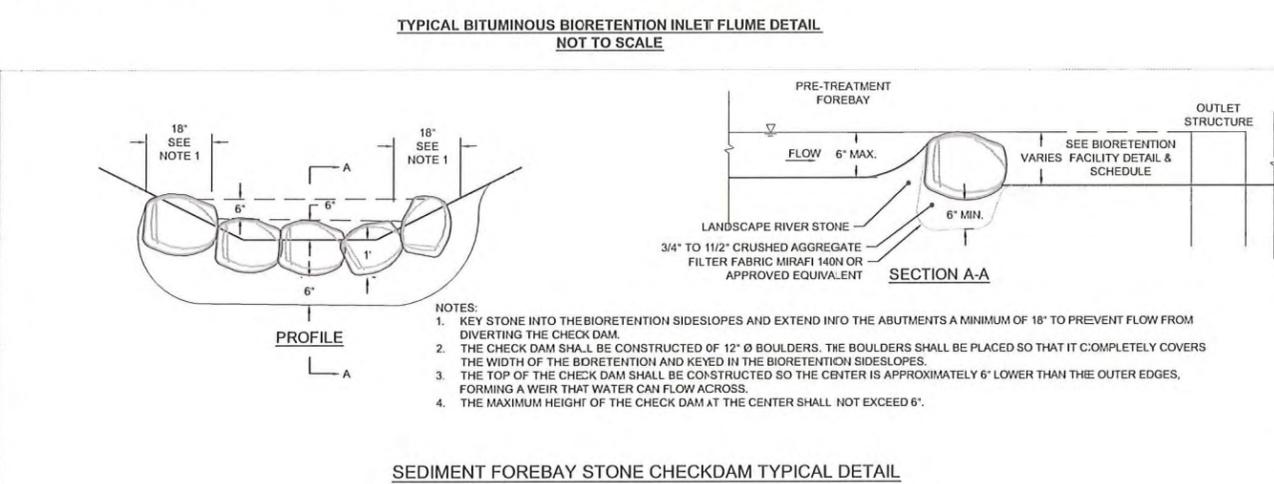
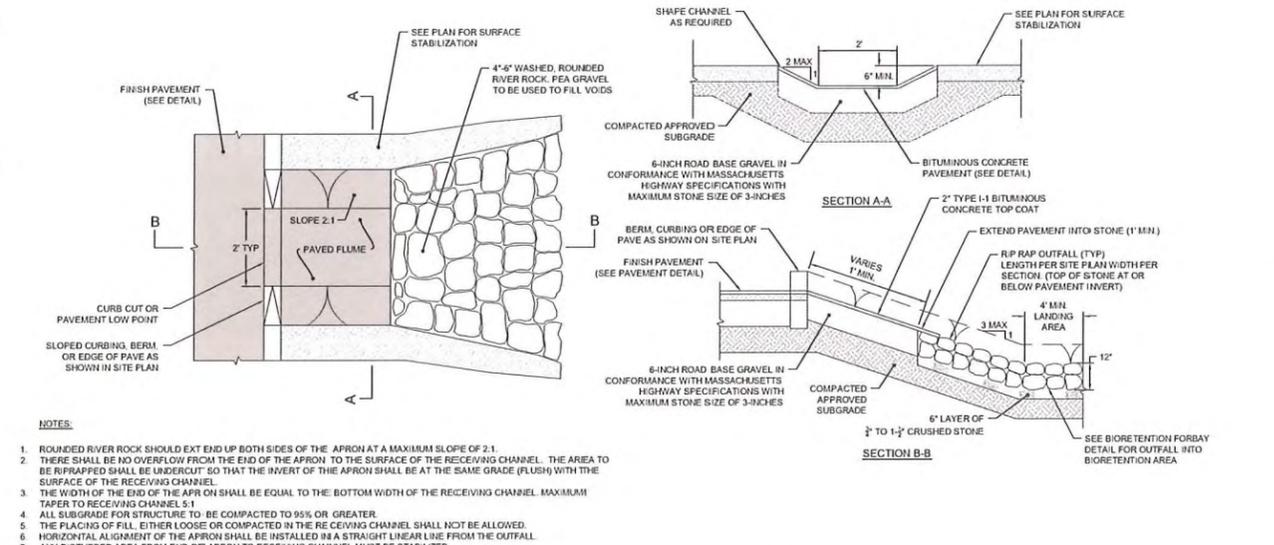
- SPECIFIC ANNUAL MAINTENANCE REQUIRED AS FOLLOWS:
 - DRAINAGE STRUCTURES (INLETS, MANHOLES & CATCHBASINS):** ALL DRAINAGE STRUCTURES WILL BE INSPECTED ANNUALLY TO MONITOR FOR PROPER OPERATION, COLLECTION OF LITTER OR TRASH, AND STRUCTURAL DETERIORATION. THE INLETS AND BASINS WILL BE CLEANED OF SEDIMENT (INCLUDING SUMPS) AS NECESSARY, AND REPAIRED WHEN REQUIRED.
 - RIP-RAP SLOPE PROTECTION:** INSPECT ANNUALLY AND REPAIR AS NECESSARY.
 - SEDIMENT FOREBAY:** INSPECT ANNUALLY TO ENSURE PROPER FUNCTIONING. REMOVE SEDIMENT BUILD-UP ON THE FLOOR OF THE FOREBAY AND PROPERLY DISPOSE OF ONCE EVERY TWO YEARS, OR MORE OFTEN AS NECESSARY TO LIMIT SEDIMENT BUILDUP TO LESS THAN 50 PERCENT OF THE DESIGN VOLUME.
 - BIORETENTION SYSTEMS, RAINGARDENS, AND BIOSWALES:** INSPECT TWICE ANNUALLY FOR THE FIRST YEAR OF OPERATION AND ANNUALLY AFTER THE FIRST YEAR, AND AFTER STORM EVENTS GREATER THAN OR EQUAL TO THE 1-YEAR, 24-HOUR PRECIPITATION EVENT. GENERAL MAINTENANCE OF BIORETENTION SYSTEMS FALLS UNDER LANDSCAPING PRACTICES. MONITOR THE PLANTING SOIL BED FOR PROPER PH, EROSION, AND AERATION. REPLACE MULCH BI-ANNUALLY, AND REMOVE AND REPLACE ESTABLISHED, DEAD OR SEVERELY DISEASED PLANTS ANNUALLY.
 - ROUTINE MAINTENANCE:** OTHER ROUTINE MAINTENANCE INCLUDES THE REMOVAL OF TRASH AND LITTER FROM PAVED AND PERIMETER AREAS, AND ANNUAL STREET SWEEPING AFTER THE SPRING THAW TO AVOID EXCESSIVE ACCUMULATION OF SEDIMENT IN THE DRAINAGE SYSTEM. INSPECT THE PIPES DRAINING THE PROJECT ANNUALLY FOR PROPER FLOW.
- NOTE: OPERATION AND MAINTENANCE CHECKLIST AVAILABLE UPON REQUEST



BIORETENTION SCHEDULE:

No.	Bottom Surface Area (sf)	ELEV. A		Ponding Depth (ft)	Bottom of Bio Area (ft)	Overflow Inlet Type & #	Depth Mulch (ft)	Top of Bio Soil (ft)	Bio Soil Depth (ft)	Bottom Bio Soil (ft)	Depth Pea Gravel (ft)	Bottom of Bed (ft)	Min. Underdrain Stone cover (in.)	Underdrain Pipe Size (in)	Underdrain Distal Inv (ft)	Length Underdrain (ft)	Slope Underdrain (ft/ft)	Underdrain Invert (ft)	Outlet Invert (ft)	Bottom of Stone (ft)	Distal Underdrain Stone Depth (ft)	Outlet Underdrain Stone Depth (ft)	Pipe Cover - Not Including Pipe Size (ft)
		Top of Berm (ft)	Overflow Inlet Rim (ft)																				
1	785	58.00	57.50	0.50	57.00	OV/F1-1	0.25	55.75	1.00	55.75	0.25	55.50	1.00	1.50	55.25	30	0.005	55.10	55.00	54.65	0.50	0.65	2.00
2	200	57.00	56.50	0.50	56.00	OV/F1-2	0.17	55.83	1.00	54.83	0.08	54.75	1.00	1.50	54.50	15	0.003	54.46	54.45	54.21	0.50	0.53	1.56

Notes:
 1 Bottom elevation = Surface of shredded organic layer (see detail)
 2 See pipe schedule for outlet pipe size



Revisions

Rev.	Date	By	Appr.	Description
1				
2				
3				
4				
5				

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 Sustainable Environmental Solutions
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 Sandwich, MA 02563
 Phone: (508) 833-3150
 Fax: (508) 833-3150

WALTON'S COVE STORMWATER MITIGATION 30% CONCEPT PLANS HINGHAM, MASSACHUSETTS

CONSTRUCTION DETAILS 1

Drawn By: KMH
 Checked By: RAC
 Date: MAY 30, 2014

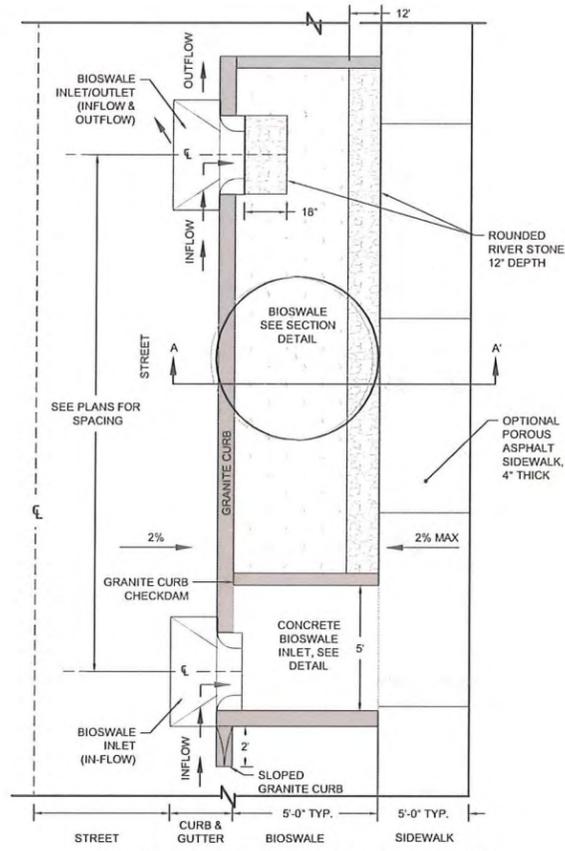
Project Number: 14035
 Sheet: 4 of 5

Registration:
DRAFT NOT FOR CONSTRUCTION

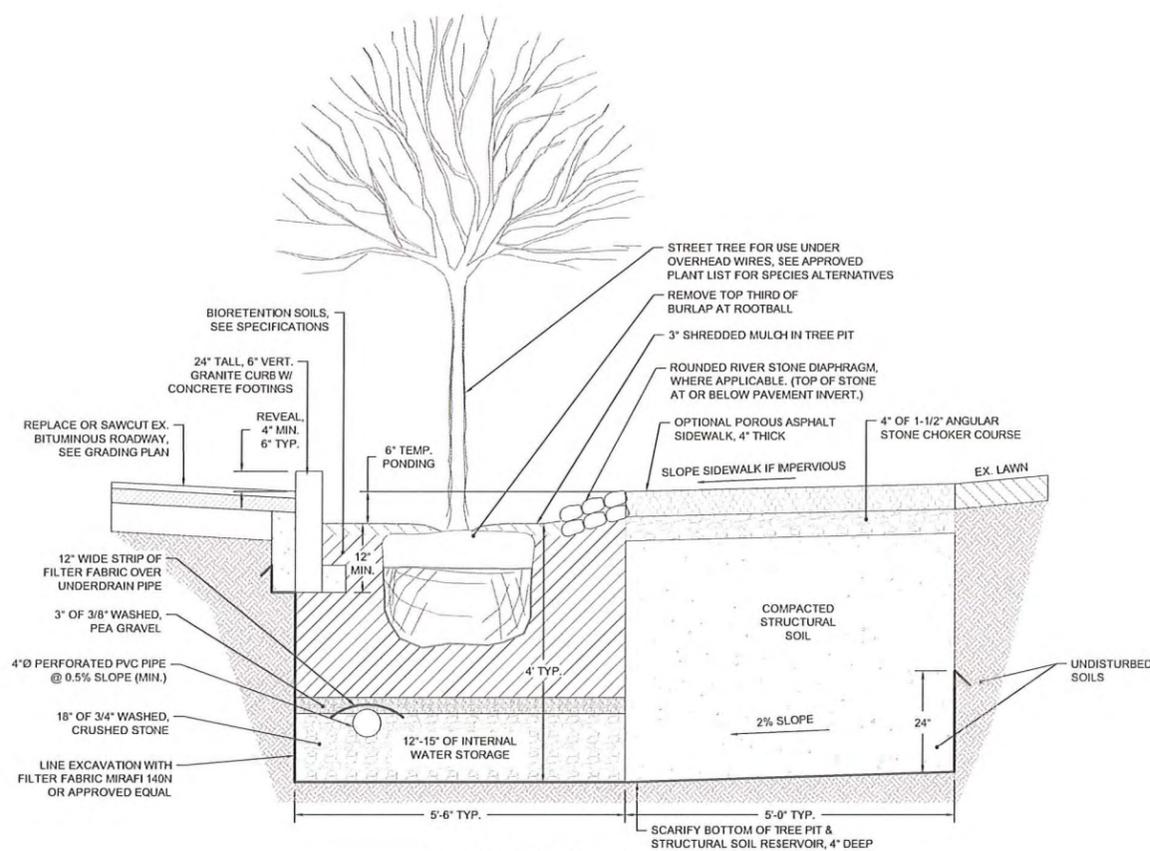
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last modified: 05/30/14 printed: 06/11/14 by sk H:\Projects\2014\14035 Hingham-Walton's Cove SW Mitigation\Drawings - 14035\14035-DE.dwg

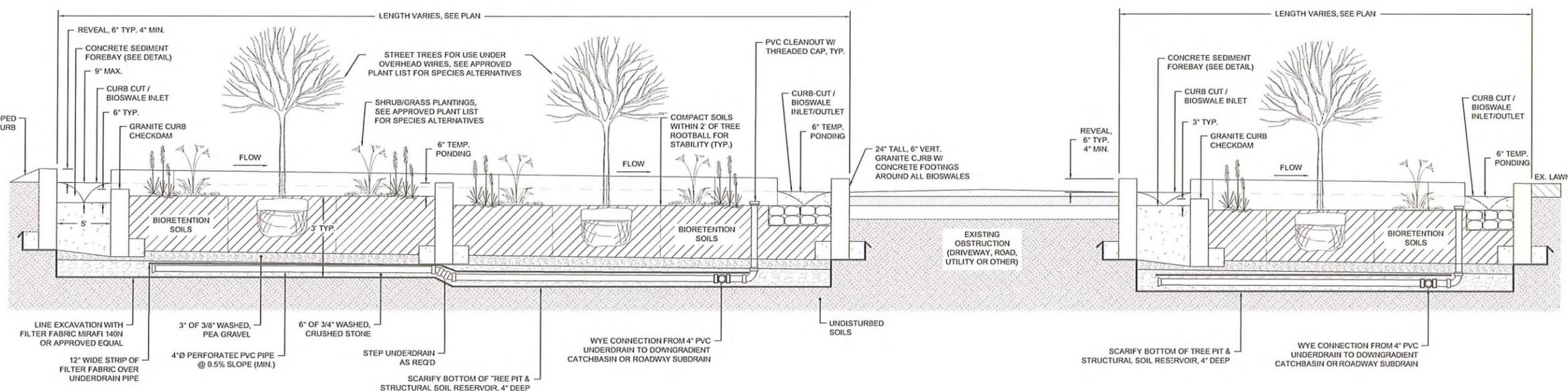


BIOSWALE / TREE TRENCH TYPICAL PLAN VIEW
NOT TO SCALE



BIOSWALE / TREE TRENCH TYPICAL SECTION A-A'
NOT TO SCALE

- APPROVED TREE LIST:**
1. AMELANCHIER CANADENSIS - SERVICEBERRY
 2. MAGNOLIA VIRGINIANA
 3. CHIONANTHUS VIRGINICUS
 4. SALIX MATSUDANA 'TORTUOSA'
 5. CARPINUS CAROLINA - AMERICAN HORNBEAM
 6. BETULA NIGRA 'LITTLE KING'
- APPROVED LOW MAINTENANCE PERENNIAL/GRASS LIST:**
1. DESCHAMPSIA CESPITOSA - TUFTED HAIRGRASS
 2. IRIS VERSICOLOR - BLUE FLAG IRIS
 3. RUDBECKIA SF. - BLACK EYED SUSAN
 4. AMSONIA HUBRICHTII - BLUE STAR
 5. JUNCUS EFFUSUS - SOFT RUSH
 6. ECHINACEA PLURIPUREA - PURPLE CONEFLOWER



BIOSWALE / TREE TRENCH TYPICAL SECTION B-B'
NOT TO SCALE

- NOTES:**
1. LONGITUDINAL SLOPE OF PLANTER MATCHES ROAD. FLAT AS POSSIBLE, 3% MAXIMUM.
 2. LONGITUDINAL AND CROSS SLOPE OF SOIL WITHIN PLANTER: NONE, FLAT AS POSSIBLE.
 3. SEE BIORETENTION/BIOSWALE SOIL SPECIFICATIONS AND PLANTING REQUIREMENTS.
 4. INSTALL WASHED, RIVER ROCK TO TRANSITION FROM SPLASH PAD TO SOIL.

<p>Revisions</p> <table border="1"> <thead> <tr> <th>Rev.</th> <th>Date</th> <th>By</th> <th>Description</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>		Rev.	Date	By	Description																								
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<p>Horsley Witten Group, Inc. Sustainable Environmental Solutions www.horsleywitten.com 50 Route 6A Sandwich, MA 02563 508-833-8600 voice 508-833-7150 fax</p>																													
<p>Walton's Cove Stormwater Mitigation 30% Concept Plans Hingham, Massachusetts</p>																													
<p>CONSTRUCTION DETAILS 2</p>																													
<p>Plan Set:</p>	<p>Drawn By: rdb Checked By: RAC Date: July 30, 2014</p>																												
<p>Prepared For:</p>	<p>Town of Hingham 710 Central Street Hingham, MA 02043 Phone: 781-741-1445 Fax: ---</p>																												
<p>Survey Provided By:</p>	<p>Horsley Witten Group, Inc. 100 Route 6A Sandwich, MA 02563 Phone: (508) 833-8600 Fax: (508) 833-7150 Date: May 13, 2014</p>																												
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Appendix E: Planning-level Construction Cost Estimates

**WALTON'S COVE STORMWATER RETROFIT
HINGHAM, MA**

Summary of Total Estimated Construction Costs for Three Proposed Retrofits
June 12, 2014

PROJECT PHASE	DESCRIPTION	PROJECT TASK COST
1	SEWER PUMP STATION DRAINAGE IMPROVEMENTS	\$45,000
2	DOWNER AVE. SOUTH DRAINAGE IMPROVEMENTS	\$242,000
3	DOWNER AVE. NORTH DRAINAGE IMPROVEMENTS	\$76,000

ESTIMATED TOTAL PROJECT COST

\$363,000

