

Stormwater Bioretention Retrofit Project and Grant Proposal



The Delaware Center for the Inland Bays (CIB) wishes to partner with the Town of Dewey Beach on a proposal to the State's FY 2018 Community Water Quality Improvement Grant (CWQIG) Program. The project to be proposed is a bioretention facility at the northeast corner of Coastal Highway (SR1) and Read Ave., next to the Little Store.

This project is one of the top priority stormwater controls identified in the Phase II Stormwater Planning Report, recently completed for the Town by RK&K Engineering with support from a Surface Water Matching Planning Grant. That report identifies areas of implementation for stormwater controls and a list of priority Best Management Practice (BMP) retrofit opportunities with general concept designs and cost estimates. Prioritizations were made with input from the Dewey Beach Town Manager and Council. The proposed BMPs included bioretention facilities and various permeable pavement and pavement removal options.

The next step for the Town is to begin implementing recommendations of the stormwater planning report, taking advantage of grants and leveraged funding as much as possible. Installation of this first bioretention facility as a demonstration project will allow residents to understand the look, function, and benefits of similar BMPs proposed for other areas in the Town.

Proposed Project:

This proposed project will include a combination of runoff reduction Stormwater BMP retrofits at the northeast corner of SR1 and Read Ave. (Figures 1 and 2).

The project design concept and project illustrations are shown in Figures 3 and 4. The stormwater BMP practices will include a small, *in-situ* bioretention facility within the existing grass island at the intersection. Space for the bioretention facility is limited at this location because of utility conflicts. Therefore, in order to maximize runoff reduction and treatment, an infiltration trench will be located adjacent to the bioretention facility, beneath the current stone walkway in front of the store along the north side of Read Avenue. The infiltration trench will include perforated pipes, which, when combined with the voids in the stone of the trench, will provide additional storage volume for treatment. Permeable pavement will cover the infiltration trench.

The bioretention facility and infiltration trench stone reservoir will include biochar as a soil amendment to reduce nitrogen leaching and increase water retention and infiltration rates. The biochar will also enhance growth of vegetation planted in the bioretention facility. Biochar, a charcoal-like material produced by the pyrolysis of waste biomass, can reduce nutrients and increase stormwater retention. The University of Delaware, with support from the Delaware Department of Transportation, has performed field scale testing that demonstrates the improvement from biochar amendment. Biochar was recently utilized as a soil amendment in the conversion of an existing failed dry pond to a bioretention facility at the Stockley Center in Georgetown.

Stormwater from both SR 1 and Read Avenue (east of SR 1) will be directed into the bioretention facility via two (2) curb inlet channels (trench drains). Pretreated runoff will be stored within the bioretention soil as well as the adjacent infiltration trench. Overflows will be

directed to the existing stormdrain inlet along SR 1 via an overflow riser and connection pipe. Existing concrete sidewalk that is removed by placement of the curb inlet channels and overflow riser connecting pipe will be replaced with permeable concrete.

Major elements of the design include:

- Construction of a bioretention facility within the existing grass area;
- Replacing the existing stone path along Read Avenue with permeable pavement;
- Infiltration trench with perforated pipe storage beneath the permeable pavement path; and
- Replacing existing sidewalk impacted by installation of trench drains and overflow riser connection pipe with permeable concrete.



Figure 1. Project location at intersection of Read Ave. and Coastal Highway.



Figure 2. Existing grass island at this corner that will be converted to a bioretention facility. Gravel walkway between the island and the store will become an infiltration trench with permeable pavers.

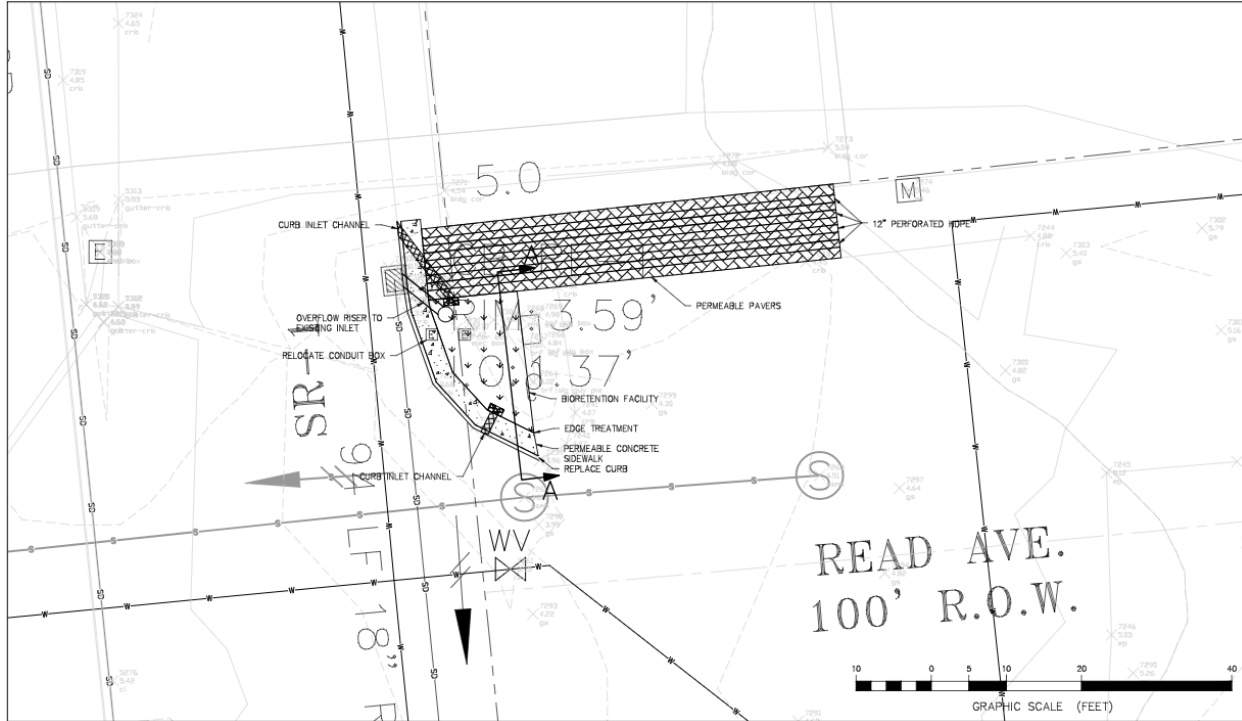


Figure 3. Placement and footprint of major design elements (landscaped bioretention area and infiltration trench with permeable pavers).

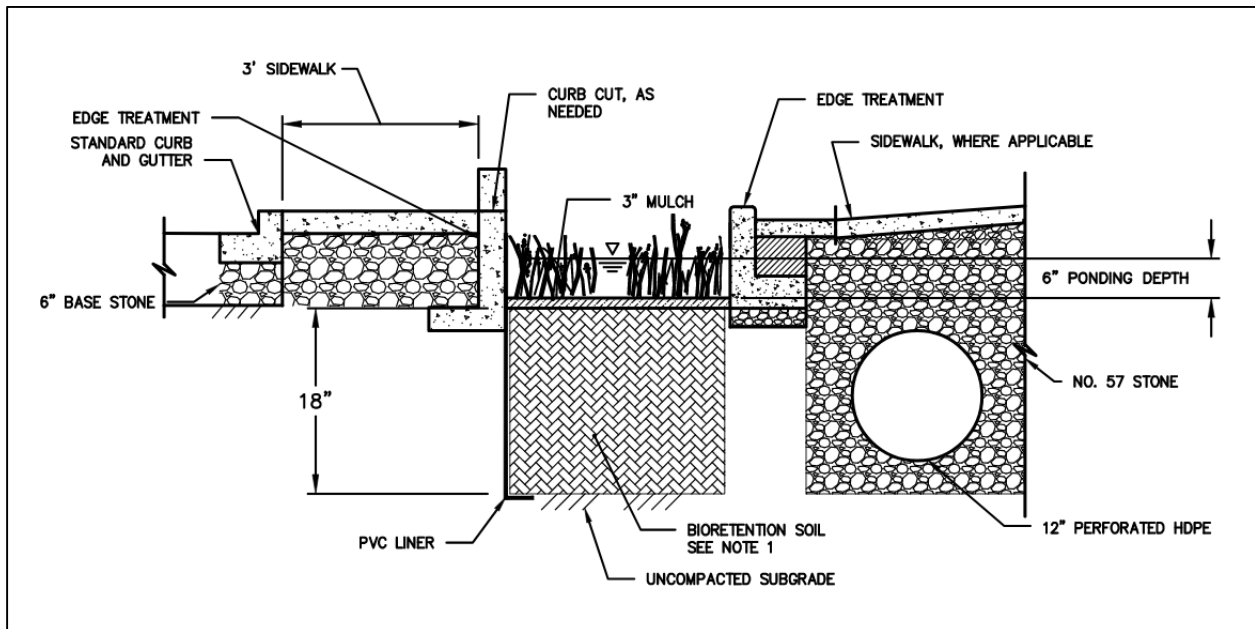


Figure 4. Illustration of design concept elements for reduction and treatment of stormwater runoff at this location.

Cost Estimate:

RK&K and the CIB developed a preliminary cost estimate for the project, using best information available as of 9/5/17. Final estimate to be included in the grant proposal may vary some from this as the final concept design is refined. **The estimated total, including engineering and permitting, materials, construction, traffic control (MOT), and CIB project management is \$104,660.** Details of the estimate are included in Table 1 on the next page.

The maximum grant award available through the CWQIG Program is \$75,000. A minimum 25% cash match to the grant award is required. We believe that DeIDOT may be willing to provide MOT services as an in-kind match (valued at \$5,200). Thus, the estimated amount of cash match needed from the Town of Dewey Beach is approximately \$25,000.

Grant award:	\$75,000
DeIDOT in-kind match:	\$5,200
<u>Cash match, Dewey Beach:</u>	<u>\$24,460</u>
<i>Total estimated cost of project:</i>	<i>\$104,660</i>

The grant proposal is due to DNREC's Nonpoint Source Program by close of business on September 20, 2017.

The CIB will write the proposal, with assistance from the Town, DeIDOT, and RK&K engineers. A letter of support from the Town will be required to be submitted with the proposal that includes commitment of matching funds. Concurrence of adjacent property owners will be needed as well. If awarded, the grant period most likely would begin in late winter and extend for two years.

Table 1. Details of cost estimate for design and construction of the proposed stormwater facility. Please note that this is a preliminary estimate and may change slightly in the final grant proposal, pending collection of additional site information.

Material Item (Furnish & Install)	Unit	Unit Cost	BR 5	
			Amount	Cost
A. General				
Mobilization	LS	VARIABLES	1	\$5,200.00
Construction Stakeout	LS	VARIABLES	1	\$2,100.00
Temp Orange Const. Fence	LF	\$3.00	70	\$210.00
B. Bioretention				
Excavation and Embankment Required	CY	\$25.00	58	\$1,450.00
Permanent site stabilization with seeding & mulching	SY	\$10.00	18	\$180.00
3" Hardwood Mulch	SY	\$10.00	18	\$180.00
Bio soil Mix	CY	\$100.00	9	\$900.00
Planting (material only)	SY	\$10.00	18	\$180.00
Curb Inlet Channel	EA	\$1,000.00	2	\$2,000.00
Overflow Riser	EA	\$1,000.00	1	\$1,000.00
Removal of Existing Curb	LF	\$15.00	45	\$675.00
Install Curb (inc. add'l)	LF	\$30.00	45	\$1,350.00
12" Perforated HDPE	LF	\$40.00	220	\$8,800.00
No. 57 Stone	TON	\$70.00	98	\$6,860.00
Sidewalk (permeable concrete)	SF	\$35.00	135	\$4,725.00
Permeable Pavers	SF	\$40.00	535	\$21,400.00
Edge Treatment	LF	\$30.00	55	\$1,650.00
PVC liner	SY	\$20.00	15	\$300.00
Utility relocation	LS	VARIABLES	1	\$3,000.00
E&S Controls	LS	VARIABLES	1	\$2,600.00
MOT	LS	VARIABLES	1	\$5,200.00
Subtotal				\$69,960.00
20% Contingency				\$21,000.00
Engineering				\$10,000.00
CIB Project Management				\$3,700.00
Estimated Project Total:				\$104,660.00