Blanchard Beach Water Quality Improvement and Wetland Restoration Project:
Final Report to Grant Agencies
November 15, 2012

This report details the various phases of the Blanchard Beach Water Quality Improvement and Wetland Restoration Project performed during the period beginning September 2011 through substantial completion on October 26, 2012.

The project team consists of Megan Moir (Stormwater Program Manager), Steve Roy (Project Engineer) and the Lakeside Environmental Team including Lakeside's team members from Watershed Consulting, Oakledge Environmental Services and Scott Mapes Engineering.

Project Deliverables:

Complete watershed mapping and source identification

Attachment 1 includes the overall watershed map for the Oakledge tributary as well as the logical sub-watershed delineations. Interestingly, the watershed for this little tributary extends south all the way to Industrial Ave whose runoff connects to the tributary via a railroad swale (206 acres total). For each sub-watershed, the team evaluated whether the stormwater from the sub-watershed was currently receiving any treatment and also documented the sub-watersheds with no stormwater treatment (sub-watersheds with cross hatching). While the scope of the implementation phase of this project was limited to practices that could be installed on City property, the watershed mapping and source identification helps provide information for potential retrofit targeting in the future as funds become available.

Feasibility

Once the watershed was mapped out, the team examined feasible solutions for water quality improvements. Feasibility variables included cost (available $), pollutant removal, regulatory feasibility, land ownership and available space. See Attachment 2: "feasibility report." After evaluation of several options, the team settled on the permutation discussed below. The following factors contributed to that final selection.

1) The size/extent of wetland restoration was limited by the ACOE determination that anything over 5000 s.f. of impact would be subject to an individual permit and possible mitigation. The team would have preferred to implement wetland restoration practices over much more of the wetland area, but ultimately was limited to the area show in the design below.
2) It was also determined (after a visit from the F&W scientist) that no on-stream practices would be allowed due to the fish population.
3) We spent a great deal of time trying to segregate the relatively cleaner water coming from sub-watershed OLP-4 (which passes through └ƒ└forested wetland) and also includes └ƒ└great deal of groundwater from the water coming from the lower parking lot, but ultimately decided to allow the commingling due to the potential cost and complexity (utility conflicts) of sequestering the flow.

Design/Water Quality Improvements

Please see the design documents in Attachment 3. For the purposes of this section, please see sheet 4. Previously, highly turbid runoff from the lower Oakledge parking lot and from the eroding roadside swale was entering the Oakledge tributary at CB 3. Additionally, runoff from Flynn Avenue was entering the wetland directly via a shallow catch basin.

The final design consists of the following improvements (see numbers on Sheet 4):

1) Re-grading and stabilization of the roadside swale along the east side of the Oakledge access road
    a. The swale was deepened and given more flow capacity to fully contain the runoff from up-gradient areas
    b. Erosion potential of the swale has been mitigated by the use of a turf reinforcement mat (VMAX SC250[1]). This mat is similar to an erosion control blanket, but contains a polypropylene matrix in addition to the coconut and straw fibers. This option allows for a vegetated, green surface which has a shear stress resistance similar to riprap. We did choose to line the bottom with stone only because the swale receives somewhat constant flow from groundwater sources and thus it was unlikely that the bottom would remain vegetated.
    c. This swale conveys flow via a new pipe to CB2which connects to the swirl separator (see item 3 below)
2) Installation of CB 2 which acts as
    a. A drop inlet structure to capture runoff from Flynn Avenue and from the Oakledge Access Road
    b. A flow diversion structure (see detail sheet 6) to direct the flow from the smaller, more frequent storms (~ 1.5 cfs or less) to the swirl separator and wetland and bypass flows from larger storms to CB 3 and to the main stream.
3) Installation of a 4' diameter Swirl Separator (Hydro International Downstream Defender) to provide treatment to stormwater runoff from the Water Quality Storm before discharging to the newly restored wetland.
4) Restoration of 5000 s.f. of previously degraded wetland
    a. Selective clearing of trees in the wetland to allow for sunlight to support the wetland plantings (see sheet 2)
    b. Removal of "urban" accumulation of asphalt, coarse sediment and debris
    c. Regrading of area into 3 connected wetland cells (see sheet 4)
    d. Wetland plantings (see sheet 5)
    e. Permanent pool storage in wetland cells and restricted orifice for slow release of the WQv (5000 c.f.)
5) Installation of CB 1 to capture flows from Flynn Ave and direct them to CB 2 for diversion to the Swirl Separator or bypass to CB 3
6) The swale to CB 3 was also re-graded and stabilized to provide a non-erosive conveyance for any surface flow during large storm events.

Please see Attachment 5 (Blanchard Beach Water Quality Improvement Project Summary) for a complete summary of methodologies and basis of design by the project consultants.

Results:
The Oakledge stream channel and wetland have experienced heavy sedimentation over the years as the result of untreated stormwater runoff (in some cases laden with sediment from the erosion of contributing areas such as the lower parking lot and eroding roadside swale). Heavy storm flows through the area have then incised through this sediment, transporting it a short distance away to Lake Champlain and a public beach.

[1] http://www.nagreen.com/erosion-control-products/vmax3-sc250-permanent-turf-reinforcement.php

As a result of this project (see project photos in Attachment 4), stormwater from 1.5 acres of previously un-treated impervious from Flynn Avenue and lower Oakledge Park impervious (subwatersheds OLP-1, OLP-2, FA-1, FA-2,) is now being treated prior to discharge to Lake Champlain. The bulk of the treatment (TSS and associated pollutant removal) occurs in the swirl separator, with the tortuous flow path, permanent pools, wetland plantings and extended release of the restored wetland providing additional pollutant removal before discharge back to the Oakledge Stream and shortly thereafter into Lake Champlain. Additionally, the stabilization of an actively eroding swale has reduced the sediment loading to the wetland area and stream channel. This project has also helped us identify a few other improvements that should be made:

1) Work with Parks and Recreation to redesign the Lower Oakledge Parking lot so that any runoff from the gravel parking lot goes through a grass filter strip before discharging to the swale and possibly to look for another, more stable surface for the parking lot
2) Approach property owners in CSWD-1 , IPW-1 and AP-1 watersheds about installing water quality improvements
3) Determine the feasibility of undertaking a stream restoration of the lower reach of the Oakledge Tributary

Final Cost:
A final cost analysis will be provided within 30 days (invoices for all work have not yet been received).