Item 5A.
BCWMC 11-18-15

Main Stem Channel Restoration Project

Golden Valley road to Irving Avenue North, Minneapolis
BCWMC Project Number 2012CR-M

FINAL REPORT
November 2015

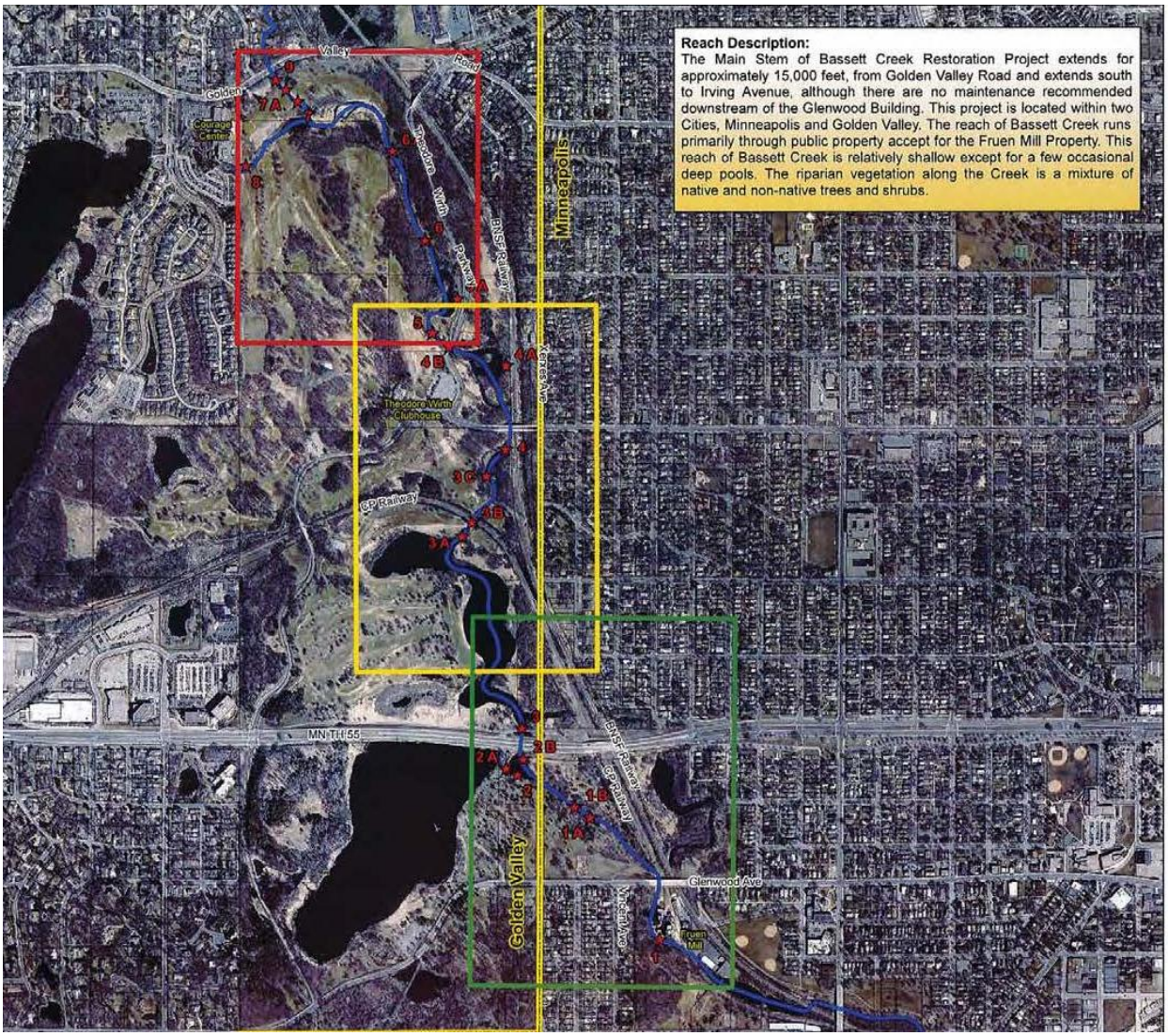
I. Project Timeline and Key Documents

- Amended BCWMC's Capital Improvement Program, September 2011, Resolution 11-08 http://www.bassettcreekwmo.org/Meetings/2011-September/SignedResolution11-08.pdf
- Feasibility report completed by Barr Engineering, June 2011 http://www.bassettcreekwmo.org/PlanAmendments/2011-MainStem-GV-to-IrvingAveNorth/Bassett%20Creek%20Restoration%20Project%20Feasibility%20Report_reduced.pdf
- Agreement between BCWMC and the city of Minneapolis approved, February 2012. http://www.bassettcreekwmo.org/Meetings/2012/2012-january/6A2-CooperativeAgreement-MainStemRestoration.pdf
- MPRB drafted Community Engagement Plan, February 2013 https://www.minneapolisparks.org/_asset/93cn6k/bassett_creek_CE_plan.pdf
- 50% Development Plans, September 2013 http://www.bassettcreekwmo.org/Meetings/2013/2013-September/Item%206E%20Bassett%20Creek%20Main%20Stem%20(CIP%202012%20CR)_50%25%20%20Memo.pdf
- 90% Development Plans, March 2014 http://www.bassettcreekwmo.org/Meetings/2014/2014-March/6A-Main%20Stem%20Project%2090%25%20Planset2-5-14.pdf
- Project construction milestones:
    - Begin Construction: October 2014
    - Substantial completion: Spring 2015
    - Project acceptance, final payment processed: November 2015
    - Final presentation to the Commission: September 2015
    - Maintenance and Monitoring: Continues for two years after construction completed.
- Dates and links to reimbursement requests to BCWMC
    - October 2014: $29,035.50 http://www.bassettcreekwmo.org/Meetings/2014/2014-November/4E-MPLS-reimbursement-request.pdf
    - May 2015: $25,006.00 http://www.bassettcreekwmo.org/Meetings/2015/2015-May/4F-MPLS-ReimbursementInvoiceC-35628-3withSupportingDocumentation.pdf
    - October 2015: $555,322.76 http://www.bassettcreekwmo.org/Meetings/2015/2015-October/4E-MPLS-InvoiceC-35628-4withSupportingDocumentation.pdf
    - November 2015: $123,547.79 – sent to Laura 11/5/2015

II. Project Area

The overall project area as proposed is a reach of the Bassett Creek Main Stem that extends approximately 15,000 feet from Golden Valley Road south to Irving Avenue North. The project is located within the cities of Golden Valley and Minneapolis and this section of the creek is primarily on public property owned by the Minneapolis Park and Recreation Board. As proposed, the project scope included work on the Fruen Mill property, on the south side of Glenwood Avenue North; however this work had access complications, and is now being anticipated to be completed as part of the proposed Bassett Creek Erosion Repair Project , 2017CR-M.

A map showing the project area is below:



III. Project Description and Outcomes

This section of eroded channel within the Bassett Creek Main Stem was stabilized and restored over the winter of 2014/2015. The purpose of this project was to improve water quality, prevent future erosion, protect existing public infrastructure, and improve the natural aesthetics and wildlife habitat in this section of Bassett Creek.

This project reach was originally identified in the 2005 Minneapolis Park and Recreation Board (MPRB) Erosion Site Survey. The problems identified in this report included degraded vegetative diversity and invasive species, areas of active bank erosion, and deposition of sediment.

Barr Engineering carried out the Feasibility Study. In 2011 Barr staff walked the reach and identified a total of eight critical sites that required stabilization to address bank erosion, scour, and/or bank failure. The total length of identified bank erosion was approximately 3,100 feet. The bank failures along this section of the creek were most likely caused by a combination of natural stream erosion processes and problems associated with the changed watershed runoff patterns due to historic development.

The project implemented a mixture of vegetative, or bioengineering practices, and hard armoring practices such as stone to stabilize the streambanks. The stabilization techniques included the following:

- Streambank slope shaping was used to flatten the streambanks to a 3:1 slope. This reduces the potential for erosion and provides a gentler slope that can be stabilized using vegetation.
- Bio-logs and live fascines were used to stabilize and protect the toe of the streambank in areas where creek velocities were low enough that rock was not needed. These techniques are used to stabilize the toe of the streambank with plantings on the upper banks to provide additional long term stabilization.
- Vegetated reinforced slope stabilization (VRSS) was used in some locations to provide slope stabilization in areas where there were steep, eroded banks. VRSS is a bioengineering technique that combines rock, geotextiles, soils, and plantings. It typically involves protecting layers of soil with a blanket or geotextile and vegetating the slope to provide long term stabilization.
- Fieldstone boulders that were about 30 to 34 inches in size and fieldstone rip rap that were about 12 to 18 inches in size were used in some locations to protect the toe of the streambank. Boulders and rip rap are most effective in shadier areas where planting would not be as effective and in stream locations with greater flow velocities and erosive potential.
- Rock vanes were installed in the creek to reduce erosion by redirecting the stream flow away from vulnerable stream banks and into the center of the channel.
- Establishment of native vegetation, including trees and shrubs was used throughout the project reach to provide a root mass that will stabilize the streambanks and provide improved wildlife habitat over the long term.

In addition, the following benefits and improvements were completed with this project, with cost participation by the City of Minneapolis and the Minneapolis Park & Recreation Board:

- Eight structures and storm sewer outfalls into Bassett Creek were stabilized and repaired. This work included reshaping slopes, shoring-up undermined structures, reinstalling pipe flared end sections, and reestablishing rip rap at the pipe outlets.
- Sediment deltas were removed from the creek at outfall locations.
- A side channel into Bassett Creek was dredged and stabilized. This was the historic main channel, before the Minnesota Department of Transportation rerouted the creek in the 1940s-50s to allow for widening of TH55 – Floyd B. Olson Memorial Highway.
- Trails within the MPRB property were repaired.

Completion of this project reduced the overall pollutant load to the Main Stem of the Bassett Creek. The feasibility report for the project estimated that the proposed work would reduce the total phosphorus load by about 60 pounds per year and the TSS load by about 105,000 pounds per year.

The City of Minneapolis and the Commission entered into an agreement for the project, with acknowledgment and approval by the City of Golden Valley. Subsequently the two cities entered into a Cooperative Agreement with the MPRB to carry out the project, with review and approval by the two cities, and with the City of Minneapolis acting as the fiduciary agent for the construction funds, as the MPRB is not a member of the Commission.

MPRB drafted a Community Engagement Plan for this project. This plan acted as a guide for the community engagement processes throughout the planning and construction of the project. MPRB identified the project stakeholders as the following: a technical advisory committee consisting of staff from BCWMC, Minneapolis, Golden Valley and MPRB, as well as a project advisory committee consisting of the attendees of the two public meetings. Public meeting were held on March 30, 2013 and on February 22, 2014. Information on those public meetings can be found on the MPRB website: https://www.minneapolisparks.org/park_care__improvements/park_projects/current_projects/bassett_creek_main_stem_erosion_repairs/#group_2_208387

IV. Funding

Bassett Creek Main Stem Restoration Project (2012CR-M):

$217,500	2012 Clean Water Grant Funds
$638,500	BCWMC CIP Levy

Additional work on the Park Board property and in some side channels of the main creek were completed as a part of this project. This additional work was completed with funding from the MPRB and the city of Minneapolis.

V. Lessons Learned

Communication with all stakeholders is important.
This project required cooperation among various departments/divisions of MPRB, the City of Minneapolis, the City of Golden Valley, and the BCWMC. Communication was vitally important to ensure that this project met the needs of the Commission to improved stream habitat and water quality and also met the city goals of improving and stabilizing infrastructure in and adjacent to the creek. Another important group of stakeholders were visitors to Wirth Park and nearby residents. It was important to identify a plan to engage all of these groups to complete a successful community project.

Establishing a maintenance plan for long term vegetation management should be considered as part of the project.
The key to a successful stream restoration project that relies heavily on native vegetation and plantings is to make sure that these plantings are well established during the first few years following the project and are continually maintained after that. Invasive species removal, additional plantings and spot correction of any erosion issues are part of the overall long term maintenance of the project.

Consider the appropriate time of year for construction.
Creek restoration projects are most successfully completed during the winter months. There is no flow within the creek channel to wash out disturbed soil and with the ground frozen there are limited impacts to any sensitive areas adjacent to the streambed.

Build enough time into the schedule for obtaining necessary permits from the US Army Corps of Engineers.
The Corps' approval process was unexpectedly long due to additional revisions and submittals to secure approval from the State Historic Preservation Office (SHPO). Identifying cultural resources that may fall under the purview of SHPO should be done early as part of the feasibility study to expedite Corps review and permitting. The BCWMC Resource Management Plan drafted by the Commission's engineer has developed protocols to work with the Corps and avoid long delays in the future.

VI. Maintenance

Following project completion there is a two year warranty period. During that time period the contractor will be responsible for ensuring that site erosion is controlled and vegetation is completely established. Maintenance of the newly planted vegetation and removal of invasive species is crucial to the long term success of the stabilization project. The MPRB will continue to inspect the creek through their property and will assume responsibility for routine maintenance such as tree removal, invasive species management, and the overall vegetation management.

Based on past project experience, very little maintenance will be required for the rock/hard armoring practices installed with this project.

VII. Photos


Site 9
Install two j-vanes
Install biologs and live stakes
Remove one tree
Site 7
Grade bank to 3:1 slope
Install four root wads, biolog and live stakes
Remove two trees
Replant with native vegetation and cease mowing to top of bank
Site 8
Install four root wads and live stakes
Grade banks to 3:1 slopes
Remove trees as needed
Plant native grasses and shrubs
Site 6
Grade bank to 2:1 slope
Install three j-vanes
Install biolog for toe protection
Remove trees as needed
Plant shrubs and trees
Site 5
Install three root wads
Grade bank to a 2:1 slope
Install biolog and live stakes
Remove one tree
Plant shade tolerant shrubs and grasses
Site 4
Grade bank to a 3:1 slope
Install two j-vanes for bank projection
Install biolog for additional toe protection
Remove trees as needed
Seed bank with native grasses and shrubs
Site 3
12" drawdown of pond for sediment consolidation and vegetation regrowth, invasive species control & monitoring
Site 2
Grade bank to a 3:1 slope
Remove trees as needed
Install biolog and live stakes for toe protection
Plant native shrubs and grasses
Site 1 East
Remove concrete slaps adjacent to creek
Excavate inside bank to widen creek
Install biolog for toe protection
Plant trees and shrubs
Site 1 West
Install riprap for toe protection
Grade bank to a 2:1 slope
Move trail higher on the hillside, above the riprap
Install shade tolerant shrubs
Remove trees as needed
Plymouth Ave
Olson Memorial Hwy
Glenwood Ave N
Oak Park Ave N
14th Ave N
9
7
8
6
5
4
3
2
1

Site 2 – 82+00 - BEFORE

Site 2 – 82+00 - AFTER

Site 4 – Parkway Bridge – 127+50 – DURING

Site 4 – Parkway Bridge – 127+50 – AFTER

Site 4 – Parkway Bridge – 127+50 – AFTER

Site 6 – 139+00 - BEFORE

Site 6 – 139+00 - AFTER

Site 6 – 139+00 - AFTER

Sites 7 and 7a – Golden Valley Road – DURING CONSTRUCTION

Sites 7 and 7a – Golden Valley Road – AFTER

Bassett Creek Side Channel and Trail Work (work paid for by MPRB and city of Minneapolis) - BEFORE

Bassett Creek Side Channel and Trail Work (work paid for by MPRB and city of Minneapolis) – AFTER

Bassett Creek Side Channel and Trail Work (work paid for by MPRB and city of Minneapolis) - BEFORE

Bassett Creek Side Channel and Trail Work (work paid for by MPRB and city of Minneapolis) – AFTER