Refinement Task 19 – Leavenworth Basin Search for Hybrid Alternatives

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Purpose

The purpose of this refinement task is to search for ways to enhance the benefits provided by the proposed Program alternative facilities identified in the Substantively Complete Long Term Control Plan (SCLTCP), while maintaining or increasing the overall cost-effectiveness of the controls, and by reducing Combined Sewer Overflow (CSO) rates and/or volumes.

TM Reviews

The PMT Refinement Task Team reviewed the *Leavenworth Basin Technology Screening TM (Dec. 29, 2006),* the *Alternatives Evaluation TM (Oct. 1, 2007)*, and the *Sewer Backups & Street Flooding Recommended Approach TM (Mar. 26, 2008)* to determine if any additional control technologies, not already incorporated in the Alternatives Evaluation TM or as part of the Program Alternative facilities, should be evaluated as part of this task. Consideration was also given to technologies that were previously eliminated by the Leavenworth (LV) Basin team, but that might be applicable to the Program Alternative facilities.

The Cross-Basin Alternative developed and incorporated into the SCLTCP by the PMT included Program facilities that had not been considered as part of the LV Basin alternatives. The incorporation of the deep tunnel, drop shafts, a new South Interceptor Force Main, and a new Leavenworth Pump Station all impact how the LV Basin CSO areas will function in the future.

As a result of the PMT Refinement Team review and based on recommended projects by the LV Basin team, the following "hybrid" project was identified for further evaluation by the PMT.

- CSO 109/121 – Coordination with the City of Omaha Parks and Recreation Department and incorporation of storm water source control Best Management Practices (BMP) in Hanscom Park and Lynch Park as identified in the Task 2 – Leavenworth Basin Green Solutions TM.

Hybrid Alternatives Evaluations

Hanscom Park (HY-109/121-1)

Hanscom Park currently functions as a park area offering recreational opportunities, such as outdoor baseball and soccer fields, tennis courts, pool, greenhouse, and picnic/playground areas for the public. An existing recreational pond is also available in the Park. Road drainage could be redirected at the northwest corner into a series of rain gardens. The northeastern areas of the site could be deepened to create a combination of terraced, constructed wetlands connected to a wet pond. Overflow from the northwestern rain gardens could feed the connected wetlands. At the southwestern area of the site, storm water could be redirected to flow into a wet pond. Overflow from the wet pond could be directed into a bioretention area located just west of the existing recreational pond.

Preliminary modeling of the proposed green solutions using the most recent version of the Infoworks model with the SC LTCP improvements estimated a reduction in peak flow at the end of system for the LV Basin from 226.3 MGD to 220.4 MGD during the Level 2 storm in the 1969 representative year with an associated volume reduction from 48.7 MG to 47.9 MG of 0.76 MG. While a minor impact, peak flow rate reduction and CSO volume reduction will also take place for the other 1969 representative storm flows as a result of the proposed site improvements. Based on this, we would not recommend altering the sizes of the currently proposed LTCP CSO facilities.

James F. Lynch Park (HY-109/121-2)

The Lynch Park site is an active recreational park located in a dense urban area. Current recreational features include baseball fields, a playground and tennis courts. The land slopes generally south to northeast with a large hill located at the southern extent of the site. Due to this rolling topography in the southern half of the site, it appears that this area has limited opportunity for incorporating green solutions. However, two sites within the central and northeast areas are relatively flat areas of the park and are undeveloped for the most part. The two areas depicted in the plan have adequate topography and space sufficient to create BMP technologies to effectively manage stormwater flows at the park site.

At the center of the site, immediately west of the central parking area, is an open area that could be retrofitted with a bioretention basin that could be sized to attenuate and infiltrate high frequency storm events. Runoff from the parking area and surrounding ball fields is proposed to be re-routed to the bioretention basin providing attenuation and treatment of the stormwater generated from the site that would have been collected in the combined sewer traversing the site from south to east.

At the north end of the site is an open area north and east of the baseball field. This area is proposed to be retrofitted with a large wetland area. Due to its size, this wetland could contain both deep water (3 to 7 feet) and emergent vegetation zones (12-inches or less). The high frequency storm event volume from the nearby drainage area adjacent to this area could be diverted to the constructed wetland for treatment and extended detention thereby providing peak reduction and treatment benefits.

Since this site was of a smaller size than Hanscom Park, model simulations were not performed to assess impacts on CSO peak flows and volumes. It was thus assumed that this site would not have a significant impact on reducing the magnitude, frequency or duration of CSO overflows.

Conclusion

Hanscom and Lynch Parks provide opportunties for positive and useful Green Solution Alternative projects for the Leavenworth Basin. Unfortunately, they cannot be considered as viable Hybrid Alternative solution to reduce CSO flow rates within the basin. However, the non-economic and teaching benefits of these alternatives are:

1. Providing green solutions to Hanscom and Lynch Parks along with enhancement of the parks.
2. Improving water quality of the combined sewer discharge to the Missouri River.
3. Providing green solution education opportunities to the public.

These proposed projects are discussed further in the Refinement Task 2 –Leavenworth Basin Green Solutions TM. Schematics that summarize the conceptual plan of the proposed storm water BMPs along with costs to implement are also included within that TM.

Acronym/Term	Definition
BMP	Best Management Practices
City	City of Omaha
CSO	Combined Sewer Overflow
CSS	Combined Sewer System
GIS	Geographic Information System
LTCP	Long Term Control Plan
LV	Leavenworth
MG	Million Gallons
MGD	Million Gallons per Day
NDEQ	Nebraska Department of Environmental Quality
PMT	Program Management Team
SCLTCP	Substantively Complete Long Term Control Plan
LV	Leavenworth
TM	Technical Memorandum