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BUILDING A BETTER WORLD

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October 1, 2012

Ms. Debra Hamlin
Senior Project Manager - Environmental
Bridgestone Retail Operations, LLC
333 E. Lake Street
Bloomingdale, IL 60108

RE: Woodland Park Options Evaluation

Dear Ms. Hamlin:

In accordance with a scope of work provided to Bridgestone Retail Operations, LLC (BRSO) on June 15, 2012, MWH Americas, Inc. (MWH) is pleased to present conceptual options in the following letter report for preventing trash and debris from entering Woodland Park in Houston, Texas.

BACKGROUND

As part of its One Team, One Planet environmental stewardship program, BSRO would like to offer assistance to the Friends of Woodland Park in their efforts to clean up Woodland Park, a recreational public park in Houston, Texas. Currently, trash and debris accumulates from a highway overpass and from flood waters in the Little White Oak Bayou section that is immediately upstream of the Woodland Park. The trash and debris from the bayou is carried under the highway overpass and into Woodland Park.

STUDY OBJECTIVE

The objective of this project was to identify and evaluate up to two conceptual options of structural upgrades or mitigation measures that would help prevent trash and debris from entering Woodland Park from Little White Oak Bayou. The evaluation included the following considerations:

- Maintenance requirements for removing trash and debris
- Permitting requirements
- Effect on stormwater conveyance through the area

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STUDY RESULTS

Tires, bottles, and general trash are thought to enter Woodland Park from culverts that run under Interstate 45 (I-45). It is proposed that some form of trash barrier be constructed either upstream or downstream of the culvert.

Option 1 – Downstream Net. One possible solution would be to install netting at the outlet of the culvert on the west side of I-45 to capture any trash before it enters the park proper. Our limited experience with outlet netting has been that they are difficult to clean and require frequent repair.

Option 2 – Downstream Trashrack. Another option would be to install a trashrack within Woodland Park downstream of the culvert outlet. However, some existing woodland would need to be cleared for the installation and maintenance of the trashrack, and the structure may be an aesthetically undesirable feature within the park.

Option 3 – Upstream Trashrack. The preferred alternative is a trashrack constructed near the inlet to the culvert, upstream of Woodland Park and east of I-45. The trashrack would be constructed some distance upstream the culvert entrance to avoid affecting the hydraulic capacity of the culvert.

Exhibit 1 shows one possible location for an upstream trashrack and Exhibit 2 shows an example trashrack. The site is in the flood plain (i.e., the land cannot be used for commercial or residential purposes since development is restricted in the floodplain) and is near both the interstate and several commercial buildings (i.e., aesthetics may not be a major concern). Finally, there appears to be available access to the site from a gravel road visible in the lower right corner of Exhibit 1.

Exhibit 1 – Location of Upstream Trashrack (Option 3)

The trashrack bar spacing can be set to capture the larger debris that is more problematic and allow smaller material to pass through uncaptured. This could reduce the routine maintenance costs considerably. The rack would be cleaned after each large storm event by hand raking from the front. Some low flow culverts could be installed in the channel to allow access to both sides of the creek.

Exhibit 2 –Upstream Trashrack Example

Source: http://bciconstruction.biz/projects/complete/1-mounds-creek-trash-rack

The height of the rack is then determined based on the flood levels and the levels of the adjacent ground. To capture the most trash, the rack should be made as high as possible. However, it cannot be constructed so high that it will interfere with the flow of flood waters, especially for the larger storm events.

Exhibit 3 shows the flood profile through the area of interest. Woodland Park is located between Wrightwood Street (Station 10+00) and I-45 (station 24+00) on the far left side of Exhibit 3. The proposed location of the trashrack is at about Station 33+00. At this location the 50-year, 100-year, and 500-year floods all pass over I-45 (at a depth of about 35 feet), while the 10-year flood is about 30 feet deep and passes under I-45. A rack about 25 feet tall would likely have little impact on the 10-year flow even if it were completely clogged with debris. A detailed hydraulic analysis may allow this height to be raised.

Option 1 – Cost. In order to meet the unique requirements of the Woodland Park site, the system must be designed to withstand flows of approximately 11,000 cfs and the nets must cover the full height of the box culverts in order to capture floatables in low-flow high-water conditions. Therefore, a custom-designed structure would be necessary to incorporate a series of stacked nets and hinged bypass flaps.

According to a United States Environmental Protection Agency study[1], a typical two-net stormwater outfall system produced by Fresh Creek Technologies (peak flows of less than 1,000 cfs) had a capital cost ranging from approximately $75,000 to $300,000 in 1999, depending on site conditions. Representatives from Fresh Creek Technologies provided the cost of their best comparison project which was designed for 5,000 cfs and cost $2.2 million for their equipment. Therefore, the estimated cost for a downstream net solution for Woodland Park would be expected to cost well over $2.2 million.

Option 2 – Cost. An upstream trashrack cost would be about $1 million and be constructed as tall as possible to prevent flows from passing over the rack during periods of high downstream water levels. A crest of El. 20 would be above the top of the downstream box culverts and also above the low cord on the bridge at Wrightwood Street. This should be high enough to prevent frequent over topping from downstream water levels and low enough to have relatively little effect on upstream water levels should the rack become completely blocked.

Permitting. All three options would require environmental permitting for construction of a structure within "waters of the United States" and within the floodplain. At a minimum, a joint federal/state permit through the Galveston District of the United States Army Corps of Engineers and a local floodplain construction permit would be required. Detailed design and detailed hydraulic analysis would be required for each of the three options.

CONCLUSIONS

Three options were explored for decreasing the amount of trash and debris entering Woodland Park from Little White Oak Bayou: (1) a downstream net, (2) a downstream trashrack, and (3) an upstream trashrack. Option 1 is not recommended due to the difficulty of long-term net maintenance. Option 2 would require clearing and construction within Woodland Park and would create an aesthetic distraction within the park. Option 3 is the preferred alternative. An upstream trashrack would be located in an area with decent access and fewer aesthetic concerns.

Sincerely,

Chris Daly
Project Manager

Wade Moore, P.E.
Principal Engineer

Encl.: Exhibit 3

[1] Combined Sewer Overflow Technology Fact Sheet: Netting Systems for Floatables Control (EPA 832-F-99-037)