2020 Crane Lake Improvement Project

March 21, 2019
Overview - Location Map

Figure 1: Preferred Alternative
Ridgedale Drive Improvements (S.A.P. 142-153-008)
City of Minnetonka, Minnesota
Primary Stormwater Objectives (refresher from September 2018)

- Identify BMP opportunities for inclusion with the roadway project
- Identify areas that are not currently being treated
- Determine if enhancing current treatment facilities would be beneficial
- Improve Crane Lake Biology
- Recommend BMPs to address TP/TSS as well as Chlorides
Feasibility Study

Figure 3: Water Quality Treatment Options
Ridgedale Drive Improvements (S.A.P. 102-153-008)
City of Minnetonka, Minnesota

Legend
- Not Recommended for Further Consideration as Part of This Project
- Recommended for Consideration

Text annotations on the diagram include:
- INSTALL RAPS (STREAM OF FAST RODD DETERMINED TO BE REDUNDANT)
- INSTALL RAPS UPSTREAM OF PIGEON RODD (DETERMINED TO BE REDUNDANT)
- OUTFLOW MODIFICATION & FILTERATION SYSTEM
- ALUM TREATMENT OF RODD
- RDD FILTER TO TREAT CHLORIDE CONC. EFFLUENT
- EVALUATE EMP OPTIONS TO TREAT DREDGED STORMWATER MUNICIPAL
- REMOVAL RECOMMENDATION DUE TO LACK OF WATER QUALITY BENEFIT
- REMOVAL RECOMMENDATION DUE TO HIGH CHLORIDE CONCENTRATIONS AND LIMITED AREAS FOR IRRIGATION
Proposed Improvements

Figure 4: Untreated Subwatershed and Treatment Options
Ridgesdale Drainage Improvements (D.A.P. 143-153-008)
City of Minnetonka, Minnesota

Legend
- **Pink**: Water Quality Treatment
- **Red**: Area without Treatment
- **Green**: Storm Sewer

Option 1: Construct underground treatment system in hotel parking lot.

Option 2: Construct underground treatment in park.

Option 3: Following pre-treatment by Option 2, construct sand filtration/ infiltration system in Park.
Proposed Improvements

Option 1:
- Underground pipe gallery in hotel parking lot with approx. 12,250 CF storage

Option 2:
- Underground pipe gallery in park with approx. 12,250 CF storage

Option 3:
- Underground pipe gallery in park with approx. 12,250 CF storage
- Small lift station (.05 to 0.7 cfs) for secondary filtration/infiltration treatment in park
- Sediment removal at existing outfall to Crane Lake
- Educational kiosks in the park regarding stormwater features
# Proposed Improvements

## Table 5: Features, Costs, and Benefits of Improvement Options

<table>
<thead>
<tr>
<th>BMP Improvement Options</th>
<th>Watershed Area (ac)</th>
<th>Targeted Pollutants</th>
<th>Raw Loading (lb/yr)</th>
<th>Existing Removal %</th>
<th>Proposed Removal %</th>
<th>Estimated Pollutant Removal (lb/year)</th>
<th>Estimated Total Project Cost</th>
<th>Annualized 80-Year Life Cycle Cost (for BMP only)</th>
<th>BMP’s Cost per lb of Pollutant Removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Construct underground treatment system in hotel parking lot</td>
<td>13.3</td>
<td>TSS</td>
<td>4800</td>
<td>0</td>
<td>59</td>
<td>2854</td>
<td>$472,027.00</td>
<td>$11,900.00³</td>
<td>$4.20</td>
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<tr>
<td></td>
<td></td>
<td>TP</td>
<td>17.9</td>
<td>0</td>
<td>35</td>
<td>6.2</td>
<td></td>
<td>$1,920</td>
<td></td>
</tr>
<tr>
<td>2. Construct underground treatment system in park</td>
<td>13.3</td>
<td>TSS</td>
<td>4800</td>
<td>0</td>
<td>59</td>
<td>2854</td>
<td>$500,027.00</td>
<td>$12,800.00²</td>
<td>$4.50</td>
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<tr>
<td></td>
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<td>17.9</td>
<td>0</td>
<td>35</td>
<td>6.2</td>
<td></td>
<td>$2,060</td>
<td></td>
</tr>
<tr>
<td>3. Construct underground treatment system in park plus secondary filtration/infiltration system</td>
<td>13.3</td>
<td>TSS</td>
<td>4800</td>
<td>0</td>
<td>72 to 75</td>
<td>3434 to 3599⁴</td>
<td>$582,837.00</td>
<td>$17,200.00²</td>
<td>$4.80-$5.00</td>
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<td></td>
<td></td>
<td>TP</td>
<td>17.9</td>
<td>0</td>
<td>47 to 60</td>
<td>8.4 to 10.7⁴</td>
<td></td>
<td>$1,600-$2,050</td>
<td></td>
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</tbody>
</table>

¹Assumes a 30-year maintenance cost of $150,000 (annual maintenance cost of $5,000 to clean the underground structure) – estimated costs are in 2019 dollars.

²Assumes a 30-year maintenance cost of $200,000 (annual maintenance cost of $5,000 to clean the underground structure and full replacement of filtration media twice at $25,000 per replacement) - estimated costs are in 2019 dollars.

³Treated the 13.3 acre, untreated drainage area (7.28 acres of impervious, 6.02 acres of pervious). The watershed PB model was provided and used by WSB to model and evaluate the BMP improvement options. The estimates shown were derived from PB.

⁴Based on anticipated soil conditions, filtration is more likely than infiltration, which is the lesser of the two numbers shown.
Recommendation

Option 3:

- Underground pipe gallery in park with approx. 12,250 CF storage
- Small lift station (.05 to 0.7 cfs) for secondary filtration/infiltration treatment in park
- Sediment removal at existing outfall to Crane Lake
- Educational kiosks in the park regarding stormwater features
# Construction Schedule

<table>
<thead>
<tr>
<th>Event</th>
<th>Date Range</th>
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</thead>
<tbody>
<tr>
<td>Council Consider Bid Award/Cooperative Agreements</td>
<td>May 2019</td>
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<tr>
<td>Start of construction</td>
<td>Jun. 2019</td>
</tr>
<tr>
<td>Construction Stage 1 (YMCA Ln to I-394 on-ramp)</td>
<td>Jun. – Nov. 2019</td>
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<tr>
<td>– Landscaping</td>
<td>Spring 2020</td>
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<tr>
<td>Construction Stage 2 (YMCA Ln to Plymouth Road)</td>
<td>Apr. – Sept. 2020</td>
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<tr>
<td>– Landscaping</td>
<td>Spring 2021</td>
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<tr>
<td>Final completion</td>
<td>Jul. 2021</td>
</tr>
</tbody>
</table>

Construction schedule is coordinated with construction of adjacent redevelopment sites.
Chlorides Update

- The City has contacted the Metropolitan Council Environmental Services (MCES) about using the sanitary sewer for disposal of chloride contaminated effluent (CCE).

- MCES established a “chlorides team” to review all sources of chlorides in the sewer system and present findings to their executive team in the spring of 2019.

- City will not be considering these options as part of this project, but may pursue chloride management options in the future.
Questions/Comments?