Using Technology and Partnerships to Manage Stormwater in Urban Areas

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Unique Characteristics of the RCWD

- Flat topography, high water table
- Most public drainage systems are the primary outlet for both agricultural and urban land uses
- One of the most rapidly urbanizing portions of the state
Impervious Surface in RCWD

CURRENT

2030

Impervious %

- 0 - 12
- 13 - 26
- 27 - 46
- 47 - 100
Floodplain in RCWD
Issue 😨

Drainage System Capacity

- Originally designed for agricultural use (2-year)
- Municipal stormsewer designed for 10-year event
- Capacity is insufficient for modified use
Issue

Flooding in Early Development Areas
Questions Related to Technology and Partnerships

- Where is it currently flooding?
  - Where are there opportunities to address this flooding?

- Where will it be flooding in the future?
  - Can the District Regulatory program prevent the future flooding problem?

- How is the District going to partner with local governments to build projects?
Result – 3 projects

- Future Conditions Modeling
- Lino Lakes restricted outlet planning
- Long Lake basic water management planning
ADDRESSING FUTURE FLOODING

Future Conditions Modeling Project

**Purposes**

- Engage cities on flooding issues and their planning process
- Identify how well current rule works
Water Planning and Projects – Collaboration with Cities

- Provide modeling and conclusions to City partners
- Early engagement on Local Stormwater Plans
- Cost-share funding
ADDRESSING FUTURE FLOODING
Future Conditions Modeling Project

Assumptions

• Modification of existing District Wide Model

• Used municipal zoning maps for projected land use

• Assumed current District Rule in place
Current District Rules

- Control 2-, 10-, and 100-year runoff rate
- Consider soil compaction in modeling
- Floodplain fill mitigation
- Volume control for 1.1” over impervious surface*

*Where feasible....otherwise provide other water quality treatment
Feasibility of Volume Control

Challenges

- High water table
- Clay soils
Future Conditions Modeling

Conclusions

- Rule is effective in dry sandy areas
- No problems in upper part of watershed
- Volumes (and flooding) will increase further downstream
- Need more than current rule
Flooding in Chain of Lakes
Can the problem be fixed with a new rule?

Options

- Infiltrate volume
  (no exceptions)
- Reduce post development flows by 20%
  - Ineffective in mitigating regional flooding
  - Costly
THE SOLUTION

DISTRICT TOOLS

Water Planning

Projects

Regulatory Program
City Water Master Planning
Anoka County Ditch (ACD) 55 (City of Lino Lakes)

- 8-18” tile is sole outlet for 930 acre watershed
- Imminent development
- Volume Constrained
ACD 55 Management Approaches

Short-term

• Address incoming flow/volume (allocate discharges)
ACD 55 Management Approaches

**Long-Term**

Address outgoing flow (new outlet)

- City-led project
- Regional ponding and conveyance
- Coordination with District through Comprehensive Stormwater Management Plan
- Technology – water gates
How do you fix it?

City Stormwater Master Planning
Ramsey County Ditch (RCD) 2, 3, & 5

- Agricultural ditch system in a highly urbanized area
- Development prior to District stormwater rules
Collaboration with Municipal Partners

- Petition by cities of New Brighton, St. Anthony Village, and Roseville
- Basic Water Management Project (M.S. 103D.705)
Four Phases in Process

1. Current Conditions, Challenges, & Opportunities
2. Regional, Multi-purpose Plan
3. Prioritization and Cost Allocation
4. Implementation
Phase 1 – Conditions, Challenges, and Opportunities

Document Flood Prone Areas
Phase 1 – Conditions, Challenges, and Opportunities

Identify Potential Project Locations
Phase 2 – Regional Multi-Purpose Plan

2

Storage
Conveyance

Balancing act
### Phase 3 – Who Pays?

#### Primary Goals

<table>
<thead>
<tr>
<th>Goals</th>
<th>Design Criteria</th>
<th>Does Proposed Concept Meet Criteria?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decrease phosphorus/TSS loading to Long Lake thereby reducing the</td>
<td>Decrease the annual average phosphorus loading to Long Lake by 235 lb/year</td>
<td>Partially. Estimated removal is 148-194 lb/year (63-83% of goal). Additional removals at this site</td>
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<tr>
<td>frequency of algal blooms and increase water clarity</td>
<td></td>
<td>will likely be very challenging.</td>
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<tr>
<td>Decrease flooding at Long Lake for a range of precipitation events</td>
<td>Remove volume from the inflow hydrograph within flood peak window for the runoff for the 100-year, 24-hour rainfall period event. Volume may be “removed” by expediting or delaying water movement (or volume reduction) through the system (conditioned on the subsequent goal)</td>
<td>Yes. Project removes over 16 acre-feet of volume from the 100-year, 24-hour rainfall peak window.</td>
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<tr>
<td>No measurable increase in flood risk and damage to adjacent buildings and infrastructure</td>
<td>No increase in the upstream 100-year, 24-hour rainfall event (where buildings are currently inundated by that event)</td>
<td>Yes</td>
</tr>
</tbody>
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#### Secondary Goals

<table>
<thead>
<tr>
<th>Secondary Goals</th>
<th>Improvements may include some of the following:</th>
<th>Does Proposed Concept Meet Criteria?</th>
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<tr>
<td>Improve functionality of recreational facilities in Hansen Park</td>
<td>• Decrease the period of inundation of trails and ballfields for the 2-year, 24-hour rainfall event.</td>
<td>Yes. Proposed concept includes several of these improvements, including trail lighting, vegetation management, park drainage, and decrease in period of inundation for some park features.</td>
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<td>• Improve lighting around facilities</td>
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<td>• Remove undesirable trees/vegetation</td>
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<td></td>
<td>• Improve soil stability and drainage under park features</td>
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<td></td>
<td>• Reconfigure park features (ballfields, trails) for usability</td>
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<td></td>
<td>• Increase acreage of upland in park</td>
<td></td>
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<td>Improve and/or repair City utility infrastructure</td>
<td>• Replace aged/failing storm sewer</td>
<td>No. Proposed concept does not include replacement of storm sewer or utility work.</td>
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<td></td>
<td>• Improve bedding and/or cover on utilities</td>
<td></td>
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<tr>
<td>Maintain City park services during construction</td>
<td>Maintain sufficient ballfield capacity in the City for “normal” summer leagues/operations.</td>
<td>TBD. Project will likely require, at a minimum, a reduction in ballfield capacity at Hansen Park, and may include permanent reductions.</td>
</tr>
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</table>

Identify which project components provide regional vs. local benefit.
Phase 4 – Construction!
Conclusions

Old Approach - Regulatory

New Approach - Balanced/Partnership

District → City → Project

City → District → Partnership → Project
Questions?