Target Field Station

Multimodal Transportation AND Industrial Stormwater Reuse?
How did that Happen?

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Outline

• Introducing the project and providing background information
• Setting the stage for stormwater reuse
• Highlighting key partnerships
• Discussing the stormwater reuse design and performance
• Summarizing the lessons learned
Target Field Station
(The Interchange)

A Multimodal Transportation Hub
Target Field Station

Challenges: Fast-Tracked Project and Modified Review Process

- July 2011 – Barr brought on to assist with the stormwater design and permitting
- December 2011 – Issuance of RFP
- July 2012 – Design-Build Team selected (Knutson Construction/Perkins Eastman – SEH site civil engineers)
- August 2012 – Construction begins
- May 2014 – Station fully operational
Challenges: Urban Site with Competing Demands

City of Minneapolis Stormwater Management Requirements

<table>
<thead>
<tr>
<th>Stormwater Parameter</th>
<th>Requirement</th>
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</thead>
<tbody>
<tr>
<td>Peak Discharges</td>
<td>No increase in the peak discharge from the site for the 2-, 10-, and 100-year design storm events</td>
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<tr>
<td>Water Quality</td>
<td>70 percent total suspended solids (TSS) removal from the 1.25-inch design storm event</td>
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<tr>
<td></td>
<td>No total phosphorus removal required (for discharges to the Mississippi River)</td>
</tr>
<tr>
<td>Stormwater Volume</td>
<td>Not required by the City of Minneapolis although encouraged if possible</td>
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### Stormwater Reuse Opportunity

**Hennepin Energy Recovery Center (HERC)**
- Burns nearly 365,000 tons of municipal solid waste generating enough electricity for 25,000 homes and steam for the downtown district energy system.
- Significant water user for cooling and other various processes in the facility.
- 24/7 operation.

Source: [http://whyfiles.org/](http://whyfiles.org/)

### Waste Heat Recovery Opportunity

**Hennepin Energy Recovery Center (HERC)**
- Utilize waste heat from the HERC to heat a glycol snowmelt system throughout the plaza and driveways.
- Reduces need for salt or sand in the winter months.
- Year-round operation of the stormwater reuse system.

Partnerships

Minneapolis
City of Lakes

Conceptual Design of the Stormwater Management System
Final Stormwater Management System

Great Lawn
Green Roofs
Porous Pavers
Tree Trenches
Cisterns
Bioretention swale

Final Design of the Stormwater Management System

Underground Storage
Stormwater Reuse

- Aboveground Cisterns
- Total capacity = 40,000 gallons
  - Optimized to capture up to the 90th Percentile Storm Event
- Year-round function (snowmelt system)

Snowmelt System

- Year-round runoff to the Cisterns
Challenges: (Lack of) Green Plumbing and Building Code for Stormwater Reuse

- Minnesota currently lacks plumbing and building code that directs stormwater reuse
- Worked with City of Minneapolis regulatory department and HERC operators
- Includes an air gap and a sand filtration unit before entering a process water tank

Challenges: Year-Round Operation and the Minnesota Climate

- Average daily high in January is 22° F
- Average daily low in January is 5° F
- Average winter snowfall is 54 inches/year
- Total snowfall last year was 69 inches

Reuse system winterized using heat tracing on pipes and the glycol snowmelt system incorporated into the cistern foundation.
**Challenges: Design Build Process**

- Project influx, constantly changing
- Snowmelt / No Snowmelt
- Schedule
- Winterization of Cisterns and Pump Vault
  - Supplier Contech has never “winterized” a cistern system
  - Options for heat
  - How to empty tanks and keep pumps primed
  - Eliminate stagnant water issues
  - Team effort

**Challenges: Construction**

- Highly-developed site w/ competing uses
- Fully-functioning industrial facility
  - 24/7 operation
  - 200 garbage trucks per day
Challenges: Construction

• Cistern delivery challenges
  – Winter weather
  – Bridge height restrictions
  – Size of tanks

Challenges: Construction

• Weather, Snow, Snow, Snow
Challenges: Construction

- More Snow

Maintenance Considerations

- Snow melt system ultimately reduces snow management efforts
  - Confined site = Lack of available snow storage areas
- Clearly defining maintenance activities and expectations
  - Safe access to perform maintenance
- End user buy off on the system and required maintenance
Performance of the Stormwater Management System

<table>
<thead>
<tr>
<th>Stormwater Requirement</th>
<th>Estimated Performance</th>
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</thead>
<tbody>
<tr>
<td>Peak Discharges – No increase in the 2-, 10-, &amp; 100-year events</td>
<td>Up to a 27% reduction in peak discharges</td>
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<tr>
<td>Water Quality – 70% TSS removal</td>
<td>97% TSS removal 62% TP removal</td>
</tr>
<tr>
<td>Stormwater Volume Reduction – No official requirement</td>
<td>Over 1 million gallons per year of stormwater runoff reused</td>
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</tbody>
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Lessons Learned

- Engage potential project partners early and communicate throughout the process
Lessons Learned

• Look for grant funding opportunities
• Stormwater reuse can help conserve water and achieve stormwater management goals

Lessons Learned

• Utilize a multidisciplinary team and include the end user in the system design process
• Tell the “Story” and take the opportunity to educate
Questions?
Thank you!