King County

Barton, Murray, Magnolia, and North Beach

CSO Facilities

Magnolia Basin Briefing

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1997 CSO Plan Set out improvements needed in --

- Barton Basin
- Murray Basin
- South Magnolia Basin
- North Beach Basin

Recommendations for South Magnolia

- 1.3 MG storage Tank in middle of basin,
- Or -- Rooftop separation of 900 homes

CSO Control Approach Investigation widened --

1. Store Peak Flows in Basin
2. Convey Peak Flows, Treat, and Discharge
3. Provide End of Pipe Treatment at CSO
4. Reduce Peak Flows, "Demand Management"
5. Combinations

Approach No. 1 - Storage

- Rectangular, cast-in-place concrete basins
- Below grade, depths up to 30 ft
- Fill by gravity, drain with submersible drainage pumps
- Washdown and odor control
- Severe siting constraints all basins

Approach No. 2 – Convey & Treat

- Requires Downstream Capacity
- Submersible PS for head < 200 ft (Barton/Murray, Magnolia)
- High Head PS for head > 200 ft (North Beach)
- Severe downstream capacity limits exist

Approach No. 3 – End of Pipe Treatment

- Remote facility installed at CSO location
  - HRC provides primary treatment
  - UV provides disinfection
- Designed for rapid, automated startup
- Mix of below grade tanks and above grade support facilities
- Siting and O&M issues constrain choice

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South Magnolia CSO Basin

- Siting constraints for storage or treatment in Magnolia limit choices

1A: Magnolia Upper Basin Storage

Pump and gravity to storage site, gravity sewer to ex. interceptor

- Assumptions:
  - 30% of basin above storage site.
  - 70% of basin below storage site.
  - New sewer needed to discharge tank to existing interceptor due to local flows downstream.
- Key Issues
  - Neighborhood impacts
  - PS, storage and FM siting/alignment
  - Need to upgrade SPU pump station or build new.

1A: Magnolia Upper Basin Storage

Pump and gravity to storage site, gravity sewer to ex. interceptor

1A: Magnolia Upper Basin Storage

Pump and gravity to storage site, gravity sewer to ex. interceptor

- Summary and Initial Conclusions
  - May not be feasible due to proposed land use.
  - Only one site available.
  - 70% of flow must be pumped to storage.
  - SPU pump station upgrade may be problematic due to siting and permits.

1B: Magnolia storage at CSO site

Move storage down the hill, gravity sewer to ex. interceptor

- Assumptions:
  - 77% of basin above storage site
  - 23% of basin below storage site.
  - SPU PS capacity may need increase.
- Key Issues
  - Neighborhood impacts
  - PS, storage and FM siting/alignment
  - Need to upgrade SPU pump station.

1B: Magnolia storage at CSO site

Move storage down the hill, gravity sewer to ex. interceptor

1B: Magnolia storage at CSO site

Move storage down the hill, gravity sewer to ex. interceptor

- Summary and Initial Conclusions
  - Site in ravine constrained by topography.
  - Site has to be west of local connections.
  - Less pumping required – all gravity?
  - SPU pump station upgrade may be problematic due to siting and permits.

1C: Magnolia storage near Marina

Storage east of Marina

- Assumptions:
  - Pressure or gravity sewer to new storage.
  - SPU PS may be upgraded or replaced.
- Key Issues
  - PS, storage and MT siting/alignment.
  - MT feasibility due to land and geology.
  - Need to upgrade SPU pump station.

1C: Magnolia storage near Marina

Storage east of Marina

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Storage east of Marina

- Summary and Initial Conclusions
  - Geotechnical conditions for microtunneling need investigation.
  - Easements/ROW/property must be acquired from Seattle Parks.
  - SPU pump station upgrade may be problematic due to siting and permits.

2A: Magnolia Convey and Treat

Replacement interceptor to Interbay PS then to West Point

- Assumptions:
  - Replace existing interceptor to Interbay.
  - Available capacity at Interbay for increased flow of 10.6 mgd.
  - SPU PS may be upgraded or replaced.
- Key Issues
  - Capacity at Interbay
  - MT siting/alignment.
  - MT feasibility due to land and geology.
  - Need to upgrade SPU pump station.

2A: Magnolia Convey and Treat

Replacement interceptor to Interbay PS then to West Point

- Summary and Initial Conclusions
  - Unlikely 10 mgd capacity available at Interbay PS
  - Geotechnical conditions for microtunneling new interceptor need investigation.
  - SPU pump station upgrade may be problematic due to siting and permits.

2A: Magnolia Convey and Treat

Replacement interceptor to Interbay PS then to West Point

2B: Magnolia Convey and Treat

Parallel interceptor to Interbay PS then to West Point

3A: Magnolia End of Pipe Treatment

Pump and gravity to treatment

- Assumptions:
  - Land available
  - Existing infrastructure has adequate capacity for peak flows.
  - SPU PS may need upgrade.
- Key Issues
  - Land must be acquired from Seattle Parks.
  - Neighborhood impacts.
  - Need to upgrade SPU pump station.

3A: Magnolia End of Pipe Treatment

Pump and gravity to treatment

3A: Magnolia End of Pipe Treatment

Pump and gravity to treatment

- Summary and Initial Conclusions
  - Geotechnical conditions for treatment plant need investigation.
  - SPU pump station upgrade may be problematic due to siting and permits.

4A: Magnolia Demand Management

Reduce impervious area to reduce storage by 50%

- Assumptions:
  - 29 ac roofs can be disconnected (50%)
  - 3,000 ft, 8-ft. diameter tunnel storage in lieu of tank.
  - SPU PS must be upgraded for higher head.
- Key Issues
  - Easement must be acquired from Seattle Parks.
  - Neighborhood impacts.
  - Need to upgrade SPU pump station.

4A: Magnolia Demand Management

Reduce impervious area to reduce storage by 50%

4A: Magnolia Demand Management

Reduce impervious area to reduce storage by 50%

- Summary and Initial Conclusions
  - Disconnection of all rooftops would not eliminate storage requirement.
  - Most expensive due to tunnel storage.
  - Demand management in combination with Option 1B may be least expensive option.

Summary of Magnolia Alternatives

Alternative	Cost Rankings	Feasible
~~1A: Upper Basin Storage~~	~~2.0~~	~~?~~
1B: Storage at CSO Control Point	1.5	Yes
1C: Storage near Marina	1.9	Yes
~~2A: Convey and Treat (New sewer)~~	~~1.0~~	~~No~~
~~2B: Convey and Treat (Parallel sewer)~~	~~1.2~~	~~No~~
3A: End of Pipe Treatment	1.3	Yes
4A: Demand Management	2.1+	?

Approach No. 4 – Demand Management – Two approaches

- In Barton/Murray and Magnolia
  - Targeting roof drain disconnects within 100 ft of storm drain inlets
  - Roof areas and connections determined from SPU GIS
  - Limited field investigation to verify GIS data

Demand Management – Two approaches (cont'd)

- In North Beach Basin
  - Targeting roof drain disconnects
  - Roof areas and connections determined from SPU GIS
  - Limited field investigation to verify GIS data
  - I/I investigation and reduction

Demand Management – Two approaches (cont'd)

- Approach offers promise
- Stormwater control an issue
- Cooperative effort with SPU required

Demand Management Initial Look

- GIS analysis of Basin
  - 2,537 houses within 100-feet of SD inlet
  - About 65 acres of roof area
  - Large houses
  - Mature Landscaping
  - Careful study needed

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END OF PRESENTATION

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