Brightwater Conveyance System
University of Washington
October 24, 2008
HDR

King County Regional System
- 420 square mile service area
- Serves 32 cities & 2 million people
- 2 regional treatment plants
- 2 combined sewer overflow treatment plants
- 1 small treatment plant on Vashon Island
- 330 miles of conveyance pipe
- 42 pump stations
- 19 regulator stations

Need for the Brightwater project
- Growth and economic development
  - At capacity by 2010
  - 1 million new people by 2030
  - 56 mgd capacity needed by 2030
- Recycle opportunities
  - Reclaimed water, biosolids & methane
- Brightwater Treatment System cost $1.6 billion dollars

Brightwater Siting Process
- Four year process - 3 phases
  - Identify potential plant locations & evaluate using siting criteria
  - Identify systems (plant, conveyance system, & outfall)
  - Environmental review of 2 selected alternatives (EIS)

Final Conveyance Routes

HDR North America Office Locations
ONE COMPANY / Many Solutions
Portal Screening

- Screen out sensitive areas
- Focus on:
  - Public
  - Undeveloped
  - Large lots
- Minimize commercial/residential
- Minimize impacts to community

The Executive’s Decision

- In December 2003, the King County Executive selected the final alternative
  - Treatment plant at the Route 9 site
  - Influent and effluent tunnels
  - An outfall located off Pt. Wells

Brightwater System Specifics: Treatment Plant

- Treatment Plant
  - Plant site: 114 acres
  - Plant footprint: 43 acres
  - Membrane treatment plant with enhanced clarification for peak flows
  - Capacity:
    - 36 mgd by 2010
    - 54 mgd – Phase 2
    - Peak flows 170 mgd (Based on I&I)

Route 9 Site – Prior to Construction

Route 9 Site - Proposed
Conveyance Alignment

- Influent – 4.9 miles
- Effluent – 12.7 miles
- Total 14.9 miles includes 2.7 miles combined tunnel
- 170 MGD

Tunnel Construction

Typical Working Shaft

Shafts
Pre-cast Segmental Liners

Segment Placement

Segment Tunnel Rings

- Segments 4’ in length
- Annular space grouting

Breakthrough

Conveyance Alignment

Tunnel Profile
Tunnel Geology

Sand/Gravel
Silt and Silty Sands
Silt Clay (ill)

HGL
Groundwater

4.0 Miles
3.8 Miles
2.2 Miles
2.7 Miles

Conveyance Alignment

Portal 19
Portal 5
Portal 44
Portal 41
Portal 46

Treatment Plant Portal

- Includes:
  - Termination of combined tunnel
  - Connection to treatment plant
  - Effluent Drop Structure

Tunnel Cross Section

48" 66" 84" 27"
Conveyance Alignment

North Creek Portal

- Includes:
  - Odor control facility
  - 170 mgd Pump Station
  - Influent surge structure
North Kenmore Portal

- Includes:
  - Odor control facility
  - Reclaimed water connection
  - Air release point

Tunnel Cross Section

- 126”
- 14’ – 4”
Conveyance Alignment

- Portal 19
- Portal 5
- Portal 44
- Portal 41
- Portal 46

Includes:
- Odor control facility
- Reclaimed water connection
- Air release point

Point Wells Portal

Includes:
- Sampling Station
- Effluent Dechlorination facility
- Outfall connection
- Isolation valves

Ballinger Way Portal

Includes:
- Odor control facility
- Reclaimed water connection
- Air release point
Point Wells Marine Outfall

- 5,420 feet
- Twin 63-inch HDPE
- 520-foot diffusers
- 600 feet deep

Regulatory Process

- Permitting involves:
  - 4 federal agencies
  - 5 state agencies
  - 2 counties
  - 6 cities
  - 3 Indian tribes
- Permitting started in early 2003
- More than 100 permits/approvals required
- EIS developed to meet State Environmental Policy Act requirements (4-year process)
Award Winning Public Involvement

- Intensive, far-reaching program
  - Continuous involvement of stakeholders
  - Community process
  - Public technical seminars
  - Quarterly newsletter
  - Public website
- Project advisory committees
  - Siting Advisory Committee (24 members)
  - Committee of Component Agencies (34 members)

Incorporating Art & Architecture

It takes a Team

- Project Initiation – King County
- Planning & Initial Routing – HDR, BC, Herrera, CH2M Hill
- Environmental Impact Statement (EIS) – Adolfson
- Treatment Plant Preliminary & Final Design – CH2M Hill, BC
- Conveyance System Predesign – HDR
- Conveyance System Final Design – MWH, Jacobs Associates, HDR
- Geotechnical – CDM
- Construction Management – Jacobs Civil

Deliverables (or Outcomes)

- Environmental Impact Statement (EIS)
- Planning documents, routing study, predesign report, basis of design report
- Geotechnical reports
- Contract Documents:
  - Engineering drawings or plans
  - Specifications

Questions?