Reclaimed Water - Is it worth it?

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What are we talking about?

- What is reclaimed water
- Why do we care
- What should we care about

Disclaimers

Tom Fox Opinions

- Reclaimed water is NOT a substitute for conservation
- Maximize water use efficiency to minimize diversions
- Put the water back in as good or better condition than you found it
- Reclaimed water is NOT disposal

Definitions

- Reclaimed water is wastewater that has been treated to a sufficient quality so that it can be put to a beneficial use

Definitions cont.

- Indirect nonpotable
  - Discharge to intervening stream/aquifer for later diversion for nonpotable use
- Direct nonpotable
  - Used directly from the treatment source for nonpotable purpose
- Indirect potable
  - Discharge to intervening stream/aquifer for later diversion for potable use
- Direct potable
  - Used directly from the treatment source for potable purpose

Definitions cont.

- **Scalping/Skimming**
  - Reclaimed water production plant located on a sewer line taking out sewage treating it, sending the reclaimed water for beneficial use, and putting the solids back into the sewer line
- **End-of-Pipe**
  - Stand alone treatment plant
- **Centralized**
  - Generally large treatment plant connected to regional collection system
- **Decentralized**
  - Generally smaller systems serving limited geographic area, can include a wide variety of treatment including community septic tank to small scale MBR
- **Membrane Biological Reactor**
  - Form of treatment technology using artificial membranes to retain biological floc

What can you do with it?

- Irrigation
  - Landscapes
  - Recreation - play fields
  - Crops
- Industrial
  - Cooling
  - Process

Why do we do it?
(or why do some people do it)

- They don’t live along the ocean
  - Places without ocean discharges have to meet higher treatment standards therefore their treated wastewater is or is close to reclaimed water quality
- They don’t live west of the Cascades
  - In water short areas, the demand for water generally means that all water is valuable

Why do we care?

- Plans for future waste treatment are frequently linked to Reclaimed Water
- Claims that we need reclaimed water to meet climate change
- Costs

Costs? It's not free?

- Additional treatment of the wastewater to reclaimed water standards
- Need new pipes to deliver reclaimed water from production to users
- Need to retrofit users to accommodate reclaimed water (separate system)

What should we care about?

- What problems we are trying to solve
- Is the proposed solution the right one for the problem
- How much does it cost and is the purchase price the only consideration

Framework for Analysis

- WateReuse Foundation has funded the development of framework process for conduction Full Cost Analysis for Reclaimed Water Projects

Full Cost Analysis

- Ten steps
  1) Define baseline conditions, what is the problem and what problems need to be solved
  2) Define the project and other projects or actions that will solve the problem
  3) Identify the benefits and costs for each of the actions that will solve the problem
  4) Separate identified benefits into (3) categories:
     - Quantitative analysis is feasible
     - Quantitative analysis is not feasible but requires qualitative discussion
     - Impacts that can be deleted (not significant)

Continued

5 and 6) Define units and assign values for quantified values

7) Evaluate and rank the qualitative benefits and costs

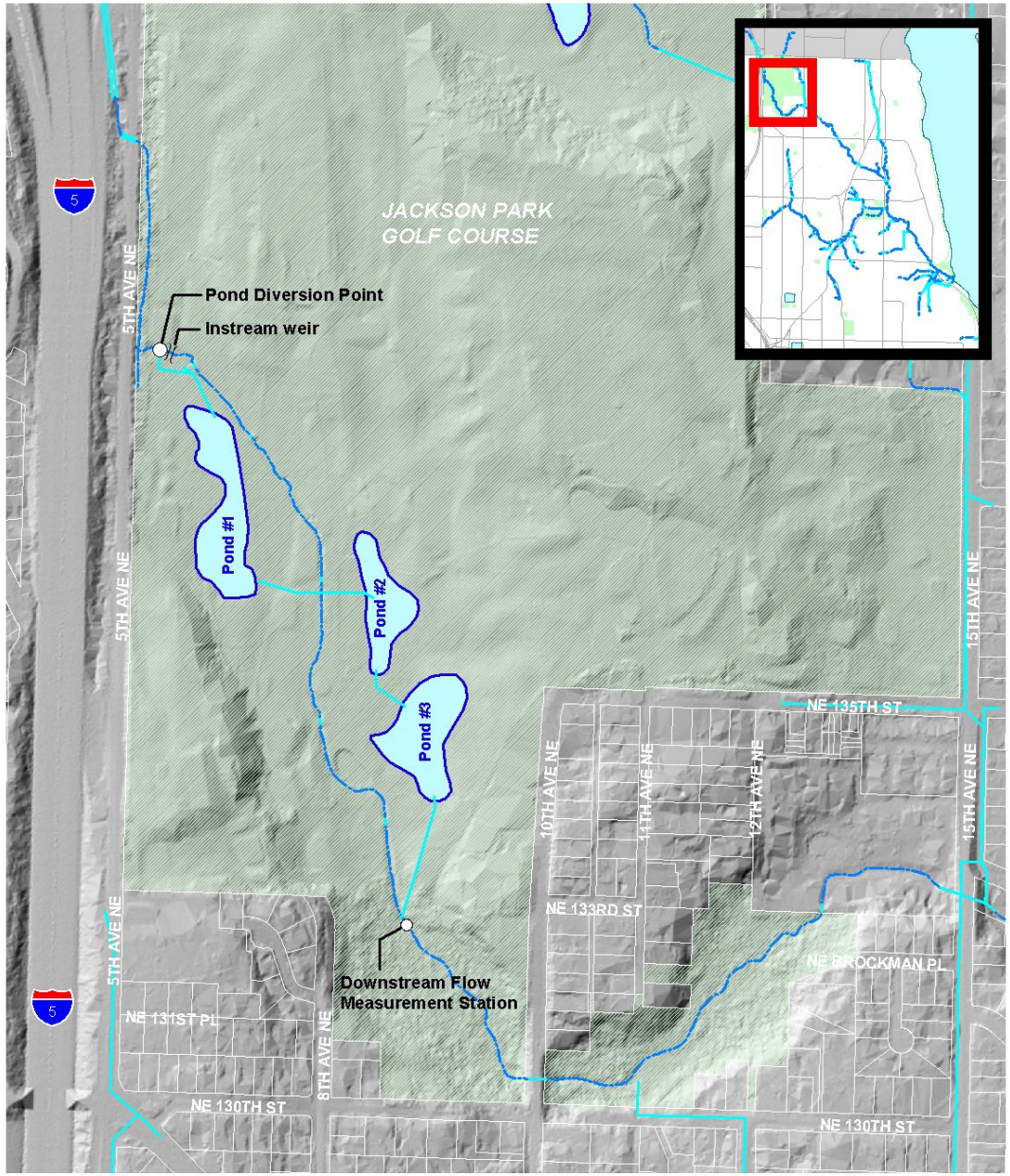
8) Summarize

9) Describe uncertainties, biases, omissions

10) Present the NPV benefits (present value benefits minus present value costs)

Example - Jackson Park GC

- Problem
  - reduce diversions of water in summer for irrigation by finding substitute to improve fish habitat
- Solutions
  - Provide an alternative source of water to replace creek diversions



Seattle Public Utilities

Produced by the City of Seattle
December 22, 2005

N

0 100 200 300 Feet

Figure 1. Jackson Park Golf Course Flow Monitoring Sites

STREAMS

Open Channel

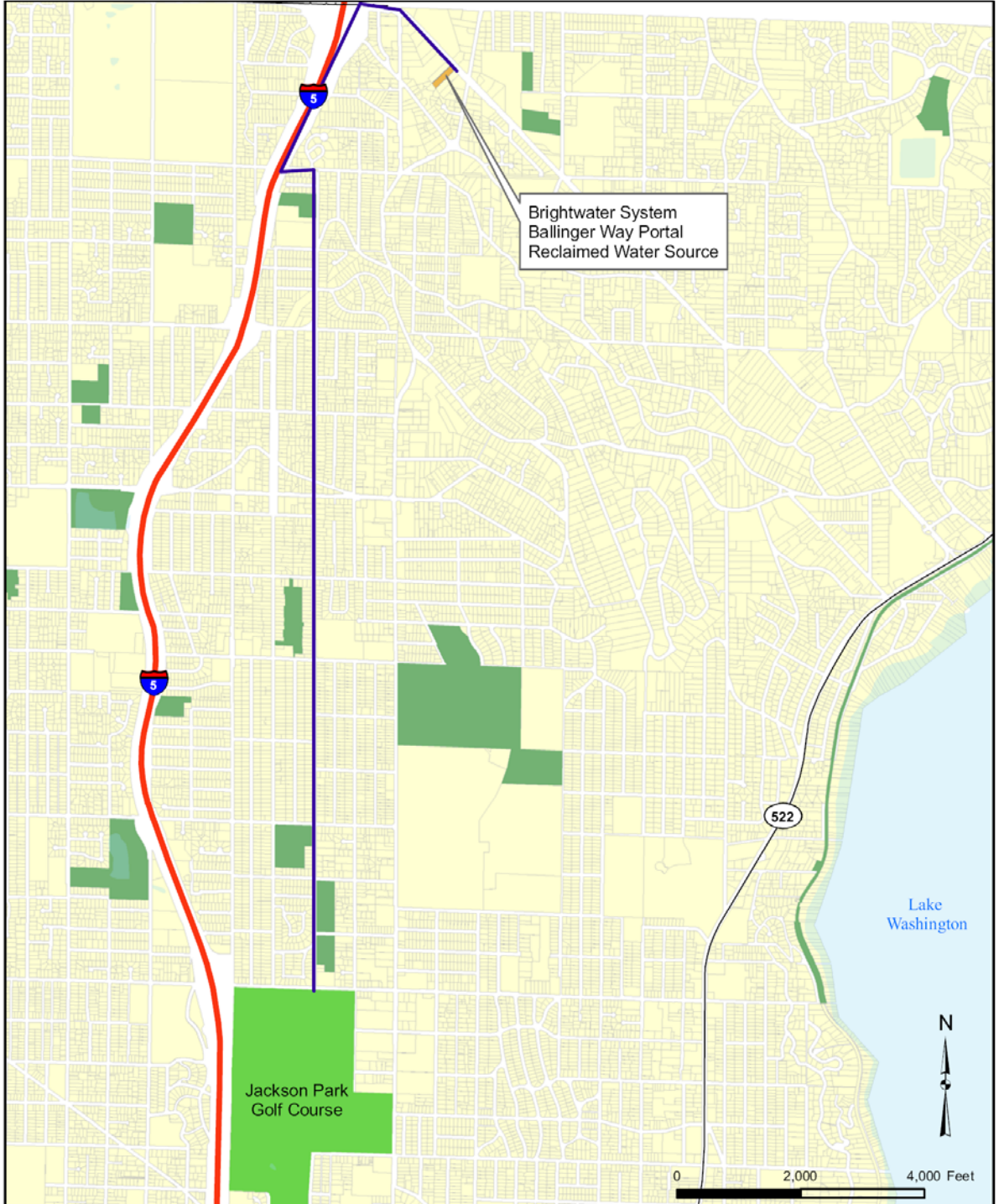
Culvert/Stormdrain

Detention Pond

Park

Project Analysis

- Project Alternatives (3)
  - Reclaimed Water
  - Potable without conservation
  - Potable with conservation


Brightwater System
Ballinger Way Portal
Reclaimed Water Source
5
5
522
Lake
Washington
Jackson Park
Golf Course
N
0
2,000
4,000 Feet

Reclaimed Water Project Description

- Construct pumps and pipes from Brightwater Effluent tunnel to Jackson Park GC
- In 2012 tap into Brightwater Effluent tunnel and pump reclaimed water into pipeline for delivery 3.6 mi to GC for summer irrigation

Quantified Benefits and Costs Reclaimed Water

- $10,000 fish improvement
- Capital Cost $10 Million
- O&M $70,000 per year

Unquantified Benefits and Costs Reclaimed Water

- Improved Aquatic Habitat
- Reduced Stream Temperature
- Reduced Discharge of 22 mg/year
- Concern of potential EDC effect on creek

Potable Supply without Conservation

- By 2008, tap into existing nearby potable line for summer irrigation

Quantified Benefits and Costs Potable without Conservation

- $10,000 fish improvement
- Capital Cost $460,000
- O&M <$6,000 per year
- Consumption of 22 million gallons per year of potable water

Unquantified Benefits and Costs Potable without Conservation

- Improved Aquatic Habitat
- Reduced Stream Temperature
- Concern of chlorinated runoff effect on creek
- Impact on potable supplies

Potable Supply with Conservation

- Install conservation equipment on Jackson and three other city owned golf courses to reduce water consumption to same amount as Jackson would increase consumption

Quantified Benefits and Costs Potable with Conservation

- $10,000 fish improvement
- Capital Cost $1,000,000
- O&M $0 per year

Unquantified Benefits and Costs Potable with Conservation

- Improved Aquatic Habitat
- Reduced Stream Temperature
- Concern of chlorinated runoff effect on creek

Analysis Summary

- Cost effectiveness analysis looks at three options that can solve the same problem
- Potable W/O Conservation is lowest cost
- Since the unquantified cost of impact on potable supplies is potentially a factor, the Potable with conservation is the recommended project and can be started several years sooner than reclaimed water

Couple of Observations

- In reclaimed water, it is Location, Location, Location
- In areas with limited water supplies and requirements for high quality effluent, the full cost analysis is seldom necessary
- Selection of potable in this example does not preclude reclaimed water later if it becomes cost effective

Questions?

- Since I have been asking the questions, now it is your turn….