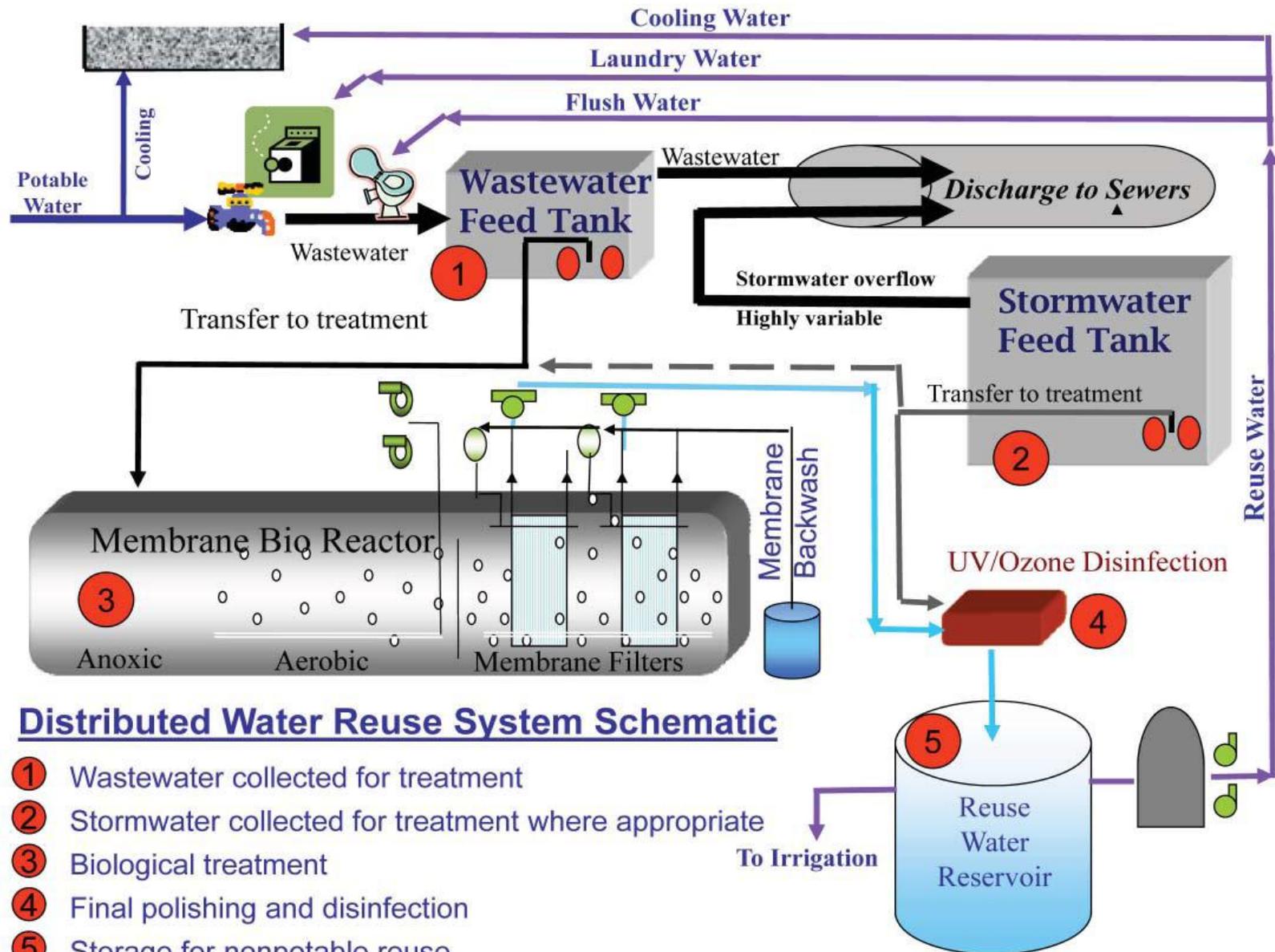
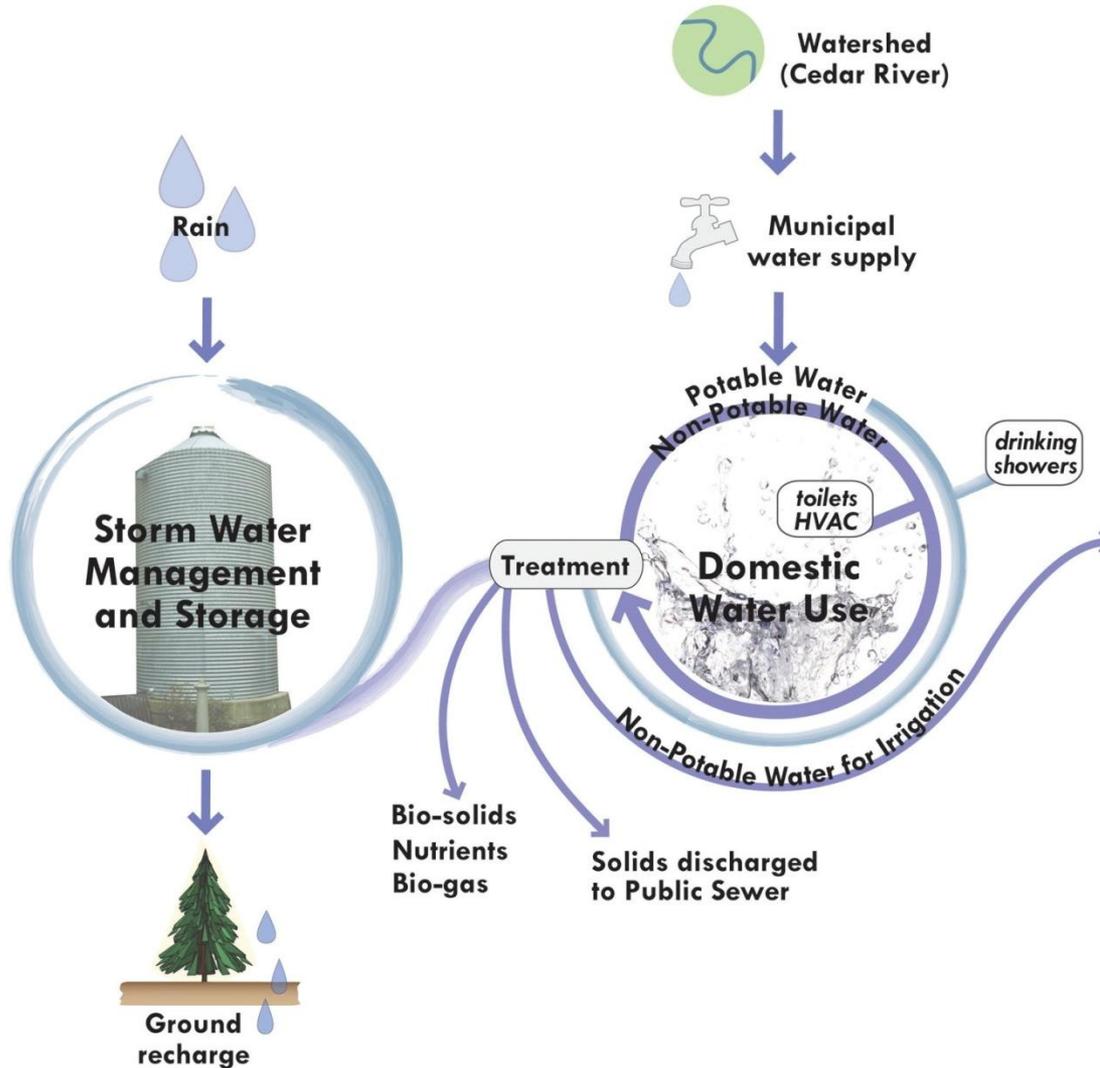


District Water Reuse Concept



District Water Reuse





Yesler Terrace



Seattle Housing Authority (SHA)

- Public corporation chartered to build and manage low-income housing.
- Approximately 27,000 people housed in Seattle through SHA programs.
- Average annual resident income is less than \$15,000 per year.

Housing Programs

- SHA owns roughly 5,200 units of Public Housing in
 - High Rise Buildings
 - Family Units (3+ bedrooms)
 - Senior Housing
- Provide over 8,000 Section 8 vouchers

Previous Redevelopments

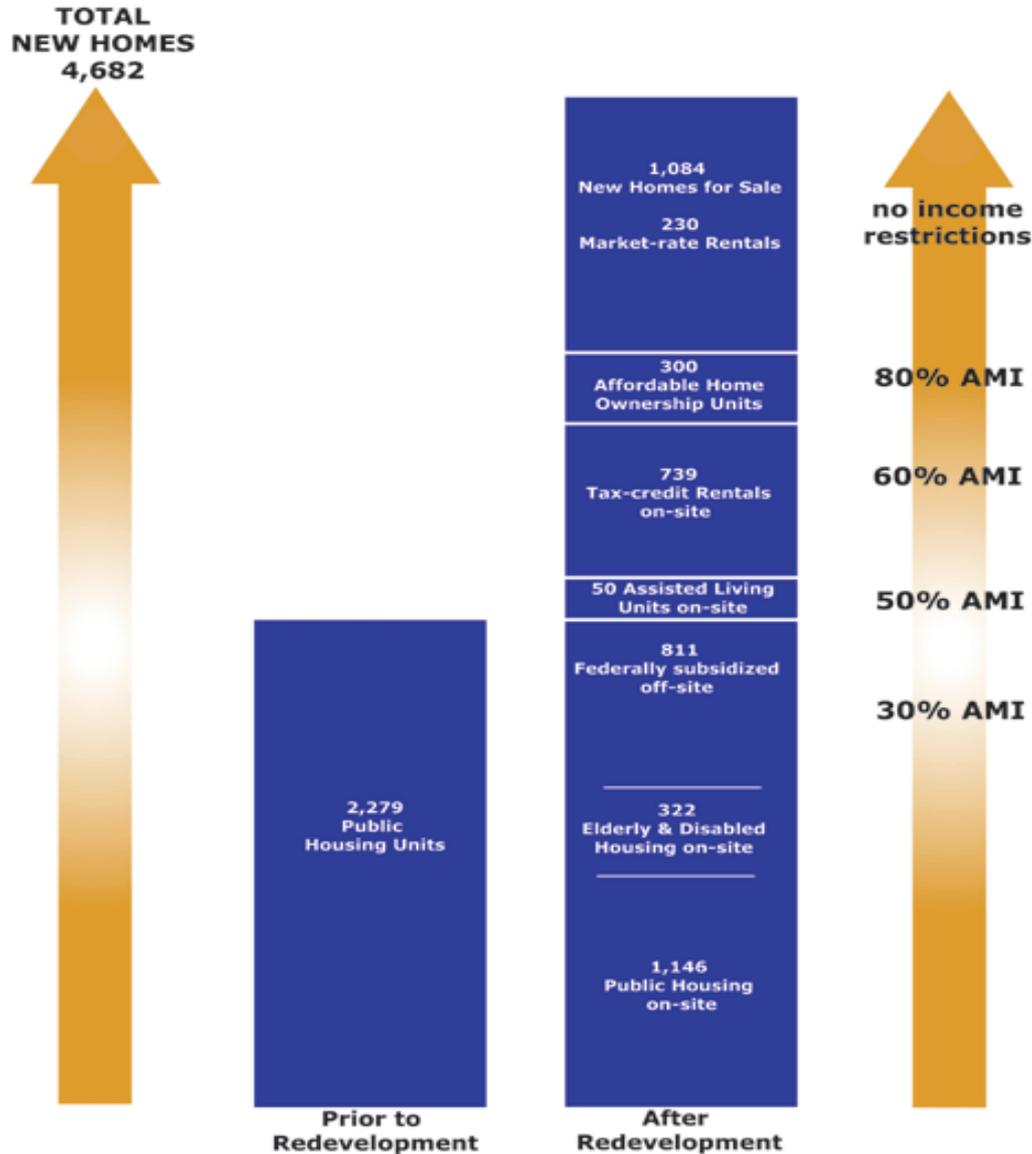
- Holly Park/New Holly: '95-'07
- Rainier Vista: '99-Present
- High Point: '00-Present

Key Features

- ❖ Increased Open Space
- ❖ Community Gardens
- ❖ Rationale Street Grid
- ❖ Natural Stormwater Drainage/Pervious Pavement
- ❖ “Breathe Easy” homes for asthma sufferers

Housing Added by Redevelopment

Adding Housing through SHA's Redevelopments



Yesler Terrace Today



- 561 housing units on 36 acres
- 1,200 residents
- Second oldest operating public housing development in U.S.
- Buildings have reached useful life. Not cost effective to rehab.
- Original infrastructure still in use, but failing.





Citizen's Review Committee



- Membership includes stakeholders, neighboring institutions, service providers
- Expanded membership with additional residents
- Continues to monitor planning efforts to ensure Guiding Principles are followed

Core Values & Guiding Principles

Guiding Principles:

- Social Equity
- Economic Opportunity
- Environmental Stewardship & Sustainability
- One-for-One Housing Replacement

Low-income housing program

- 561 replacement units:
30% of Area Median Income (AMI) = up to \$26,050/year for a family of four
- 100 additional 30% units
- 290 very low income units:
30 - 60% AMI = up to \$52,080/year for a family of four
- 850 low income/workforce units:
60 - 80% AMI = up to \$64,200/year for a family of four

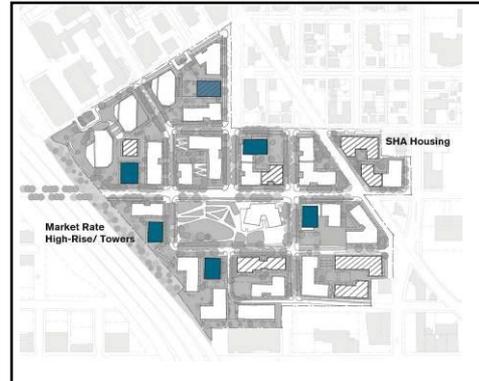
Zoning



- Yesler Terrace is currently under original L3 zoning, which limits building height to 30 feet
- Building heights for Yesler will promote a more dense & urban environment than any of the previous SHA redevelopments
- SHA currently working with City on zone change process

Site Concept Key Elements

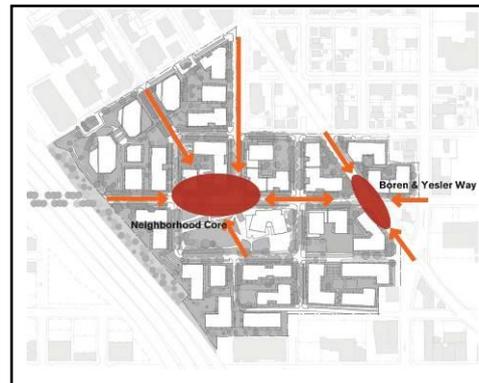
- **Integrated Housing:**
Low-income housing and towers proportionately located
- **Multi-modal Transit Options:** streetcar, bus, bicycle
- **Parks throughout**
- **Neighborhood Retail**
- **Office Uses**
- **Natural drainage**
- **Community Gardens**



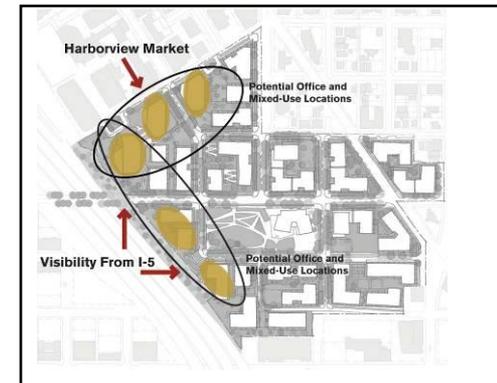
Housing Massing and Distribution



Neighborhood Parks

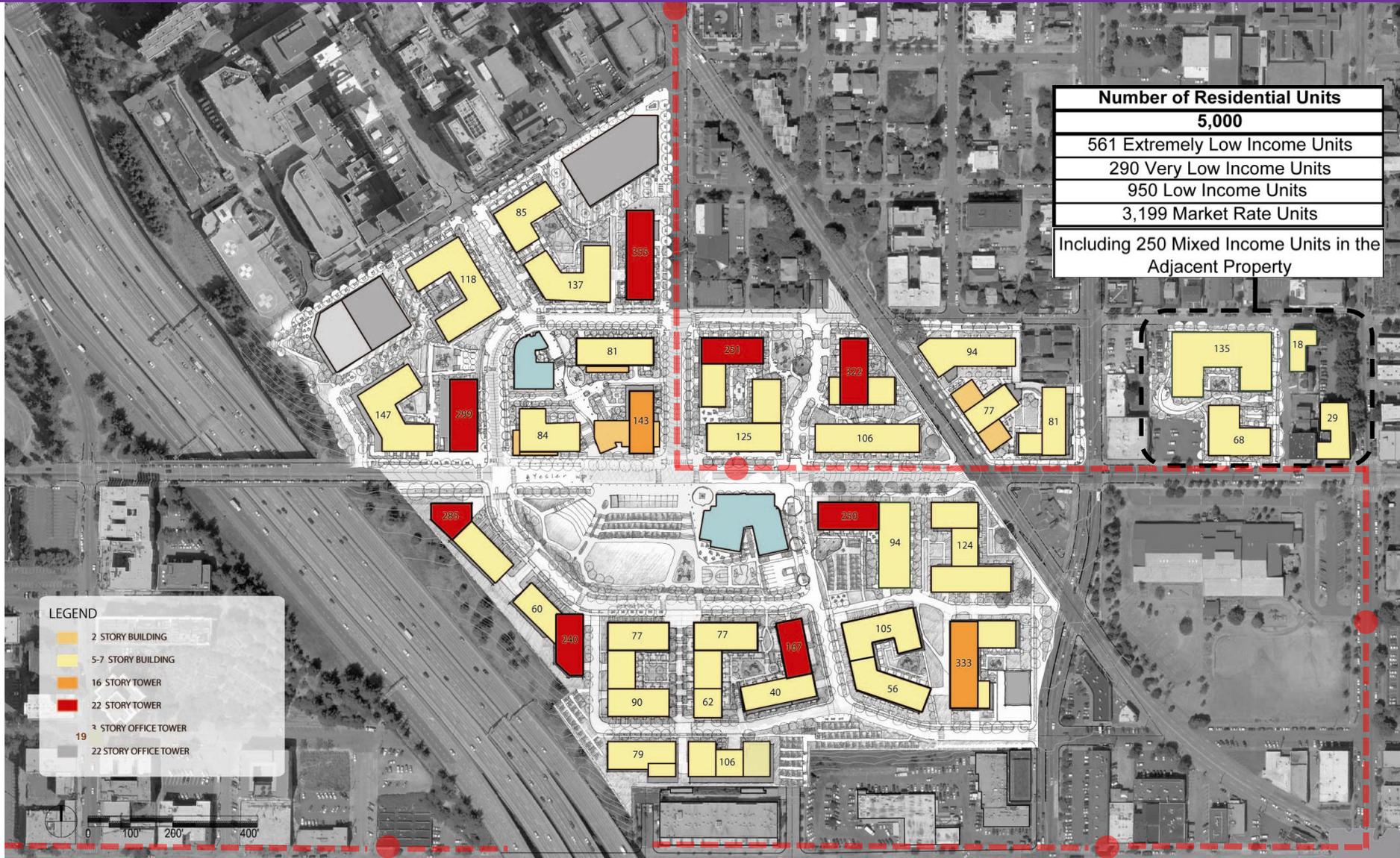


Neighborhood Retail



Office

Housing



Office, Retail, & Institutional

Office
Square Footage
900,000

**Neighborhood
Commercial**
Square Footage
88,000

**Neighborhood
Services**
Square Footage
65,000

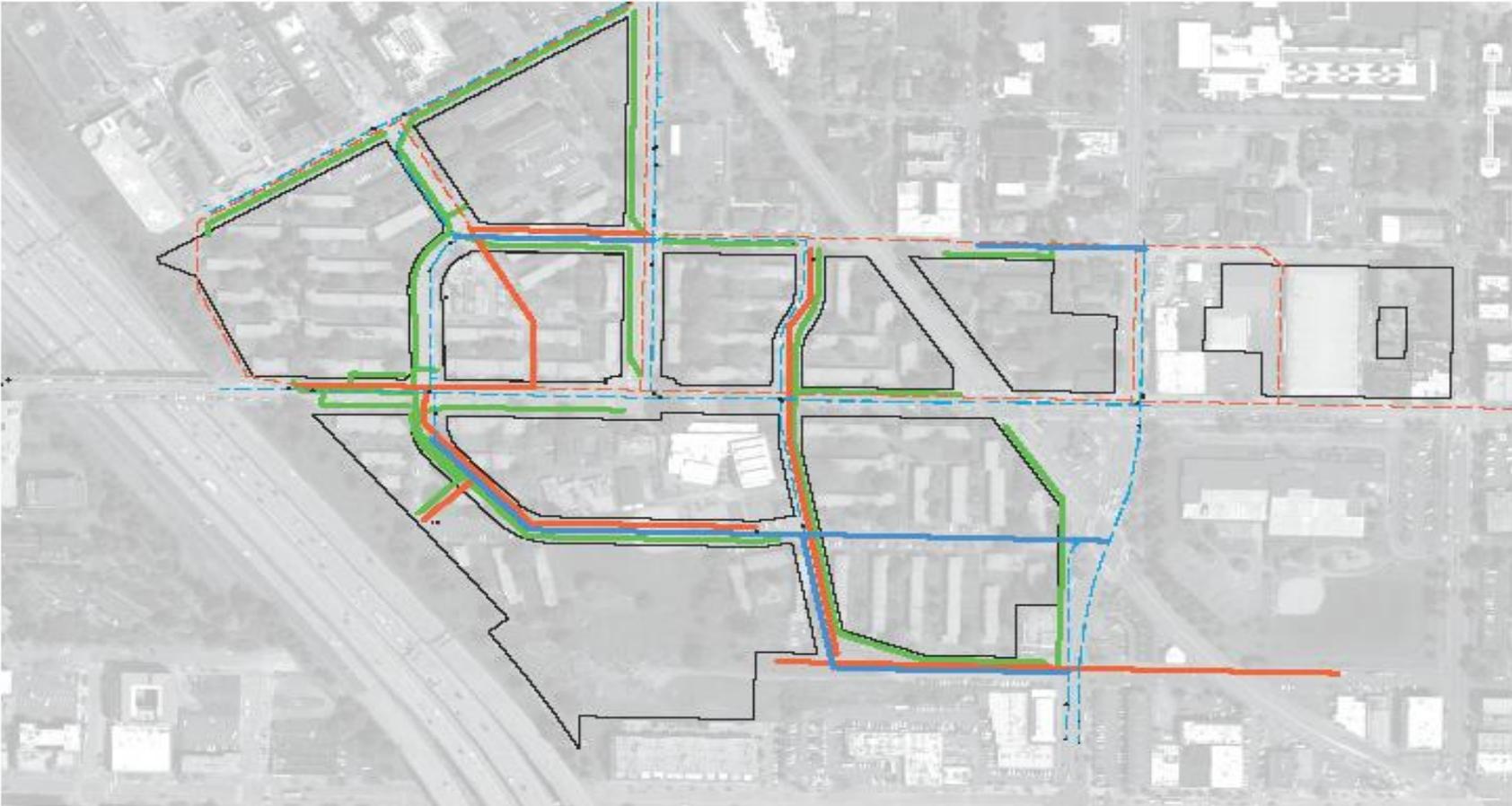
LEGEND

- NEIGHBORHOOD COMMERCIAL
- NEIGHBORHOOD SERVICES
- OFFICE

0 100' 200' 400'



Water, Sewer, & Storm Facilities



— NEW WATER MAIN
- - - EXISTING WATER MAIN

— NEW COMBINED SEWER
- - - EXISTING COMBINED SEWER TO REMAIN

— NEW STORMWATER FACILITY

Financial challenges

- No sources currently identified to replace existing public housing
- Cost to replace existing public housing estimated at \$200M
- Cost of new infrastructure & open space estimated at \$80M
 - Includes extensive bicycle & pedestrian improvements
 - Most efficient infrastructure that can be financed
 - Significant open space improvements

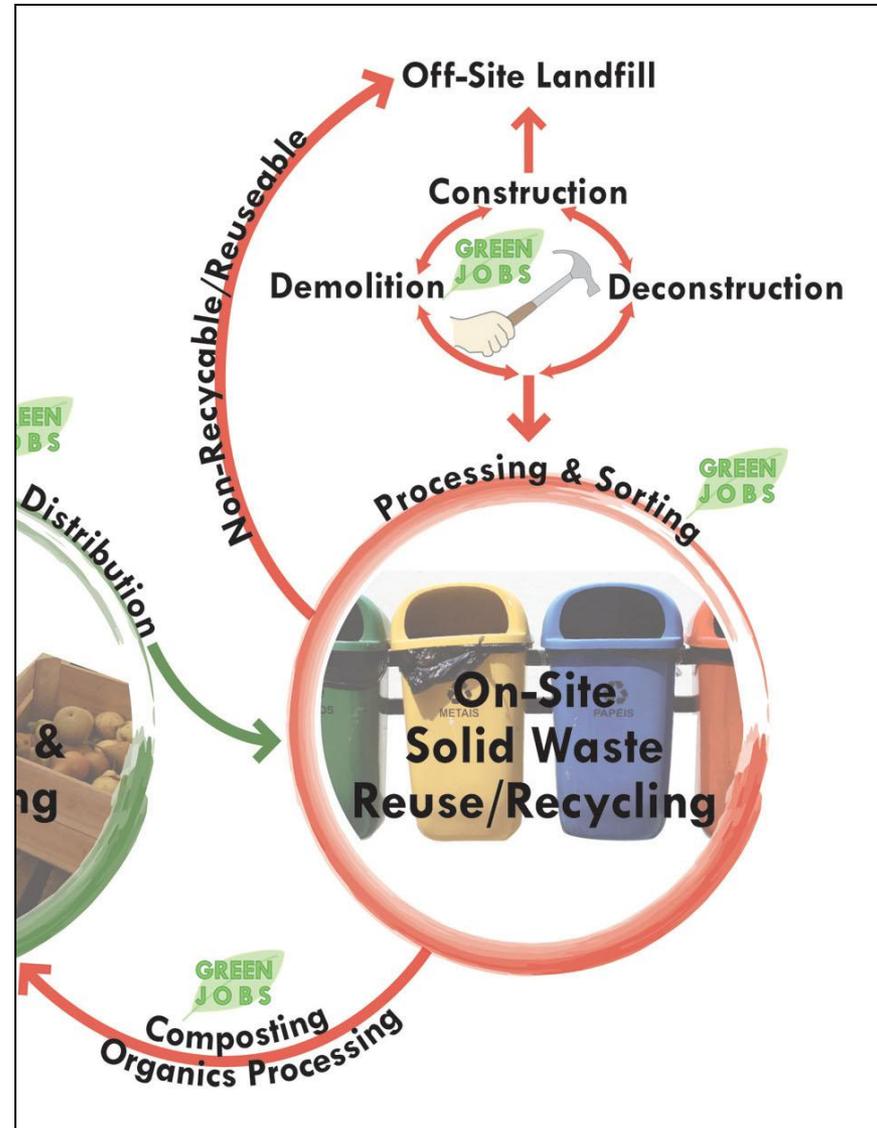
Sustainable District Study

- Evaluation of neighborhood/district scale opportunities for infrastructure, energy, and transportation needs with respect to greatest possible efficiency.
- Measured benefit, and commensurate cost, of such systems against traditional, or minimum code required approaches.
- Evaluated everything from stormwater collection & management systems to building material performance, with emphasis on designs that promote conservation.

Sustainable District Study

Also evaluated:

- The most effective method of reducing the project's carbon footprint
- Ways to reduce operational costs for individual buildings
- Best approaches to maximizing infrastructure Investment
- How integrating different types of systems enhances efficiency



Assumptions

Energy

- Energy code upgrades over next 20 years assumed to reduce demand by 25% over current code reqs. This reduction was considered as the baseline/business as usual.
- Baseline energy use/demand = 28,000 megawatts

Water

- Total potable water demand estimated at 600K+ gallons/day
- Sewer flows at 500K+ gpd.

Water Findings

- Stormwater runoff reuse by itself would not provide enough water to meet demand.
- Greywater (sinks, showers, & laundry) reuse would meet flushwater demands, but would not provide enough water to meet total demand.
 - Additional collection & distribution lines not cost effective.
Might as well collect and reuse all wastewater.
- Total wastewater (sinks, showers, laundry, & flushwater) reuse could reduce demand for:
 - Potable water by 51%
 - Sewer discharge by 60%
- Annual savings from potable water use and sewer discharge currently est. at \$300K+.

Energy Findings

- Biomass as fuel source problematic due to storage space needed for storage.
- Wind not considered viable given the site's location.
- Photo-Voltaics not considered feasible as a power/plug load source due to cost of panels at this time.
- Sewer heat recovery not fully evaluated due to lack of available data regarding Harborview Hospital's demand and discharge rates.

Energy Findings

CCHP (Combined Cooling, Heat, and Power):

- Would provide sufficient heat, cooling, and power for all demand, including plug loads.
- Would produce substantial amount of excess heat and power that could be sold back to the grid.
- Site constraints limit opportunity to use renewable fuel sources due to limitations on storage.
- Would require a 10,000sf central plant/site.
- Not considered scalable under this scenario. Would prove problematic due to project phasing.
- Upfront costs estimated between \$102-109M depending upon fuel source (natural gas, biogas, anaerobic digestion).

Energy Findings

Geo-Exchange/Solar Hot Water System preferred:

- Would provide heat, but not power.
- Allow for 25% reduction in energy use beyond baseline. 40% reduction in peak demand.
- Reduction in GHG of 4,200 metric tons of CO₂/year.
- Smallest land use requirement for installation of equipment and operation.
- Least expensive upfront capital cost (\$70M), scalable over time to coincide with demand and phasing.

What did SHA learn?

- Due to the upfront capital costs involved, SHA by itself is not in a position to attempt to finance and own any of the systems evaluated.
- City of Seattle utilities (SPU & SCL) not interested in owning these systems.
- Private utilities potentially will be interested in financing and owning both the water reuse and heating systems.
- Allowing the private market to determine and develop system is the solution at this time.
- Significant reductions in energy and water use are feasible for the project and partnership w/hospitals would only improve economics.