STEVENSON
WASHINGTON

the evergreen state college
Center for Sustainable Infrastructure

COMMUNITY GENERATED ALTERNATIVE SOLUTIONS: **STEVENSON, WASHINGTON**

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EXECUTIVE SUMMARY

The Need

The City of Stevenson Washington needs to upgrade the city's wastewater treatment system. Until that happens it is in a moratorium for new non-residential connections that do not pretreat wastewater to residential strength. The estimated cost to meet projected wastewater flows over the next 30 years is $12 million to $14 million. None of the rate options to raise that kind of money seemed broadly acceptable.

Value Planning Workshop

The City and the Economic Development Board of Skamania County secured funding to conduct a value planning charrette (a concentrated community-based design process). Key community leaders worked together creatively to generate and consider a broad range of options and pathways forward. The charrette was possible because of matching funds made available by the Washington State Department of Ecology in collaboration with an EDA-funded team called Infrastructure NEXT.

Goals

The over-arching goal of the value planning workshop was to generate alternative solutions to the wastewater treatment challenge that would:

- Speed the lifting of the development moratorium
- Decrease biochemical oxygen demand (BOD organic loading received by the wastewater treatment plant
- Bring about fair and affordable sewer rates

Success Criteria

During the value planning charrette the participants outlined criteria to define the characteristics of successful solutions:

- Meets or exceeds regulatory requirements
- Affordable to community
- Adaptable to changing conditions
- Recovers resources
- Effective
- Provides capacity for growth
- Educates and conserves
- Meets public approval
- Has high aesthetics
- Resilient and robust application
- Replicability for other communities
- Innovative

Results: 5 Key Strategies

The concepts generated during the charrette suggest that **the community may be able to achieve regulatory compliance and future capacity while reducing costs.** The key to the community developing these innovative strategies is to reduce organic and liquids loading before they get into the system and identify strategies that can be implemented over time while adding additional value to the community.

There are five major interrelated strategies that emerged from the dozens of alternatives generated during the charrette:

1. **Side-Streaming and Resource Recovery**
2. **Satellite Treatment Systems**
3. **Upgrade Wastewater Treatment Plant to Increase BOD Removal and Meet Regulatory Requirements**
4. **Botanical Garden**
5. **Waterfront Brewery District**

Next Steps

While design, engineering, and construction cost are still to be determined, preliminary results suggest that Stevenson may be able to add economic developments and increase capacity for the future at a price that is significantly less expensive than the plan now on the table.

This new approach is designed around a number of incremental steps that help the community address wastewater permit issues in the near term while providing for incremental growth in capacity as needed. Next steps include developing refined estimates of the relative contribution, costs, savings, and phasing of these strategies.

STEVENSON VALUE PLANNING WORKSHOP: June 6th, 2018

On June 6, 2018 in Stevenson, WA representatives of government, business, and the civic community gathered with the InfrastuctureNEXT team to conduct a value planning charrette.

The charrette was the result of a desire by members in the community to come together to mutually address financial and technical challenges they face to meet pollution limits required of the city's wastewater treatment plant.

The plant is 27 years old. It is rated to handle a biological oxygen demand (BOD) of 600 pounds per day. That was the capacity calculated by the design engineer as the capability of the system to support biological organisms to reliably treat the wastewater prior to release to Rock Creek.

In the last few years the organic loads to the system have exceeded that rating. Best practice is to begin to consider upgrades when a plant consistently meets 85% of it rated performance. The plant operators report that in 2018 in the months of March, April, and May that BOD loading was significantly in excess of the plant's rated capacity:

	MARCH	APRIL	MAY
BOD (in pounds per day)	1,793	804	991
Rated plant capacity	600	600	600
Percent over rated capacity	**299%**	**134%**	**165%**

Figure 1 Infrastructure NEXT is a project of the Center for Sustainable Infrastructure and The Willamette Partnership with funding from the Economic Development Administration. Infrastructure NEXT provides technical expertise to rural communities in Oregon and Washington.

Wastewater treatment plants treat a dilute mix of pollutants that is conveyed to the plant by water. If the amount of liquids is too high the treatment plant can be overwhelmed. If the organic loads within the liquid are too high, then the capacity of the plant to reduce those organics to safe levels can also be overwhelmed.

A typical response is to increase the capacity of the wastewater treatment system when liquids or organic loads exceed the rated capacity of the plant. Another option is to reduce the flows of liquids or organic loadings into the system by diversion or pre-treatment. Most utilities do a blend of both.

See Figures 1 and 2 for a representation of relative contributions of flows and organic loadings to the Stevenson Wastewater Treatment Plant. The actual gallons or pounds per day can change daily and over time based on practices or changes in technologies that may be used by the contributors to the wastewater system.[1]

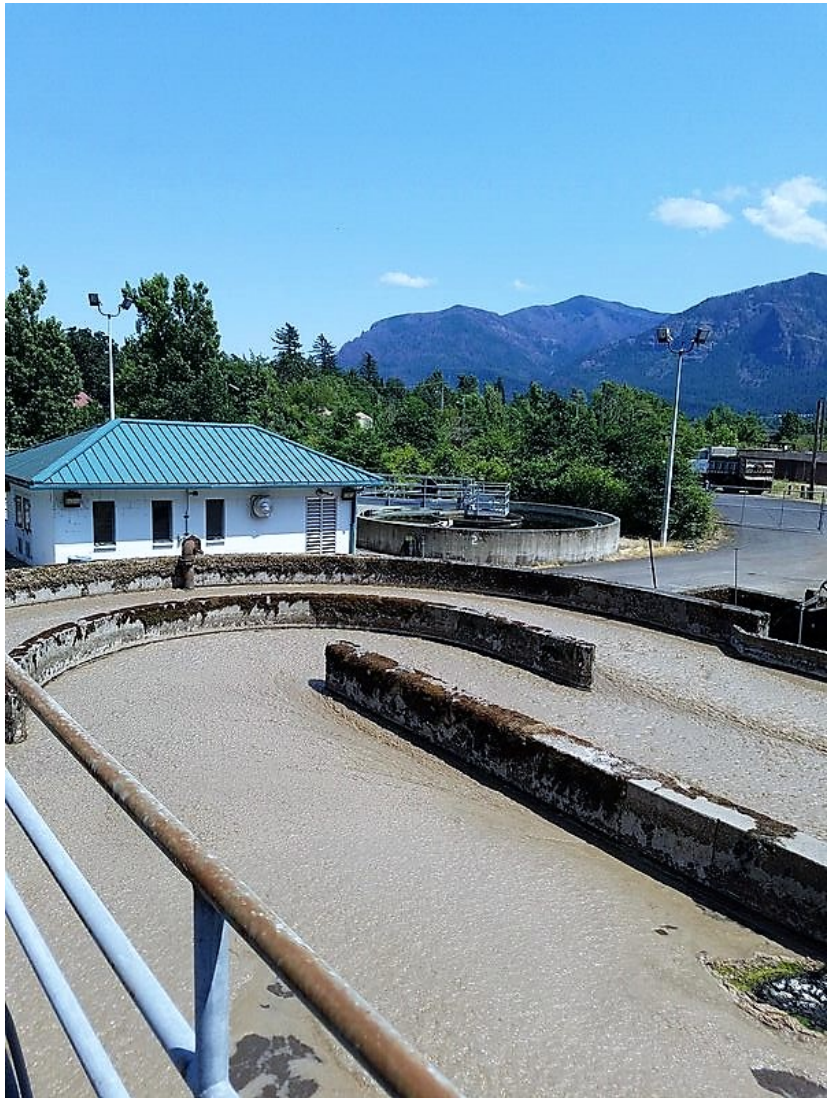


Figure 2 City of Stevenson, WA wastewater treatment plant.
Photo: Steve Moddemeyer, 2018

[1] As of this writing the relative contributions information in Figure 3 is currently being updated and is subject to change based on that new data.

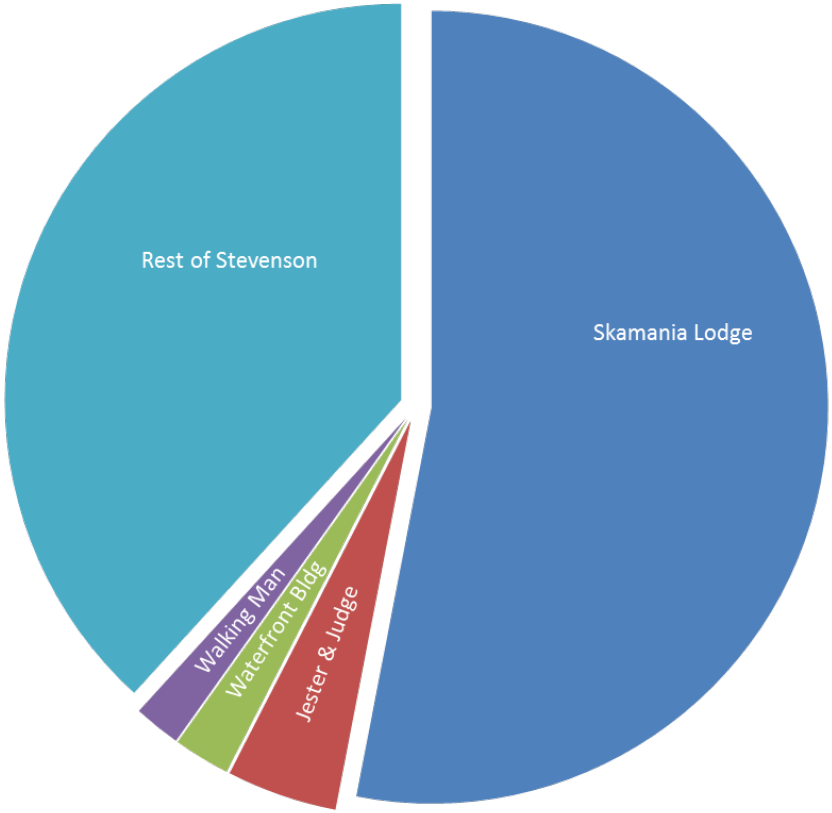


Figure 3. Relative contributions of flow

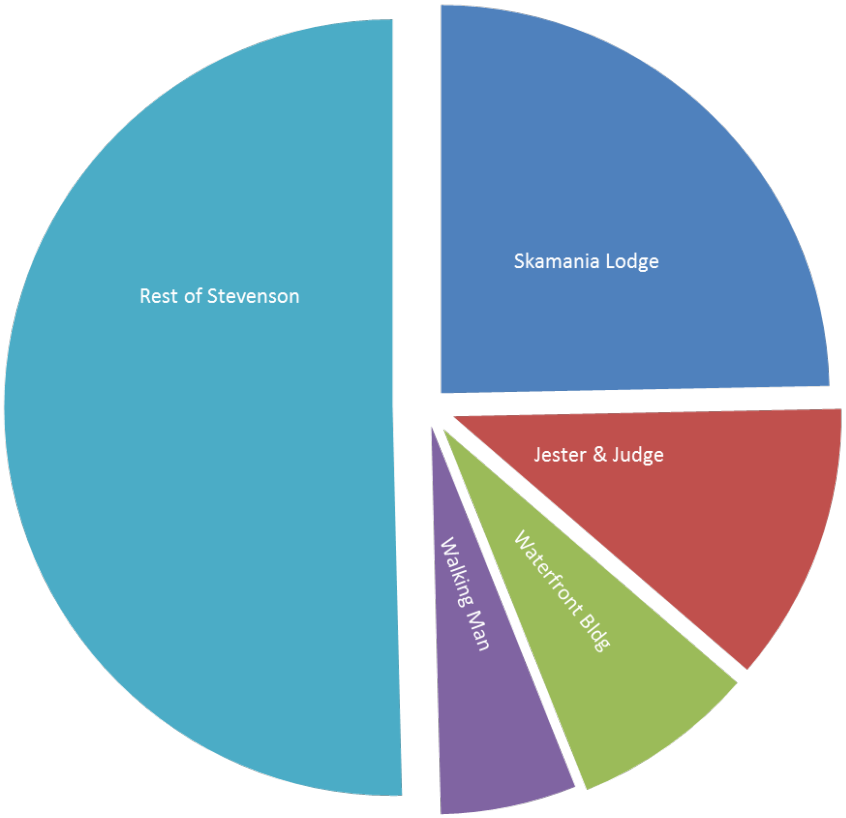


Figure 2. Relative contributions of organic loadings

Funding was secured from the Department of Ecology to allow the city in 2016 to hire an engineering firm to evaluate possible solutions. An initial presumption at the time was to increase the capacity of the city's wastewater treatment plant located on SW Rock Creek Drive. Based on estimates of current and future demand that included new growth in number of homes, jobs, and new collection areas served by onsite septic systems, the newly remodeled plant would have a capacity of 3,000 pounds of BOD per day. This would be an increase of over 500 percent. However, at$12 million to $14 million, the price tag for this additional capacity was a shock for a city of 1,500 people in 600 homes[2] and a large hotel that had been in operation for 27 years. It seemed expensive for this rural community of limited means.

Given the wastewater system's organic loadings beyond permitted limits, city officials have enacted a defacto moratorium for any new business contributors to the city's wastewater system.[3]

It is typically recommended by the state regulators that the businesses that contribute higher concentrations of organics into the system should pay for pre-treatment and/or for their impact on the city system. The City of Stevenson has been considering this approach but is concerned about the impact on major employers in the beverage and hotel industry.

Sudden new costs can have ongoing financial impact to businesses. Concerns about fairness of these proposed method of calculation is also a concern given the lack of detailed information about flows and organic loads from each firm.

While working on this issue the Economic Development Board (EDB) for Skamania County became aware of a new program supported by the federal Economic Development Administration (EDA) Region 10. The recently funded project, Infrastructure Next, is a collaboration of the Center for Sustainable Infrastructure (CSI) and the Willamette Partnership. Working together CSI and the Partnership won an EDA grant to offer advanced infrastructure strategies to struggling rural communities in Oregon and Washington. In collaboration with EDA support and a planning grant from the Washington Department of Ecology, the City of Stevenson and the EDB hosted the Infrastructure Next design charrette that is documented in this report.

Community-based design charrettes engage a broad range of stakeholders in a creative exercise to identify alternative solutions to complex infrastructure and community challenges. To broaden the possible solutions Infrastructure NEXT recruits additional content experts and a professional facilitator to guide the community's business and government leaders through the process. This report documents the process that was used to generate the five interrelated strategies.

[2] Current number of residential and commercial accounts is 437 per Utility Director Eric Hansen.

PREPARATION

In preparation for the charrette representatives of the Infrastructure NEXT met several times with city officials and EDB staff. They then assembled a full team and available information for use during the charrette. This information was published in a briefing book that included information on all aspects of the community from land use to housing, from landslide areas to adopted plans for future growth.

Once preparations and invitation lists were complete, the one and a half day design charrette was scheduled for June 5-6, 2018.

THE TOUR

On the first afternoon the participants in the charrette took a tour of the wastewater treatment plant, local beverage industries, and the Skamania Lodge.

Figure 4 Bottling line at Jester and Judge facility in Stevenson, WA.

Following the tour, the Skamania Lodge hosed an informal reception to allow participants a chance to get to know each other. The next morning all assembled for the full day charrette process.

THE CHARRETTE

After initial introductions the group was guided by facilitator Andrea Ramage to develop shared goals, outcomes, and understanding the challenge, and success criteria. These were then used to frame the rest of the day with the intent to stay aligned around these shared interests.

GOALS

- Right-size the solution by looking at the system holistically rather than primarily within the wastewater treatment plant (WWTP) boundaries.
- Achieve broad community consensus on a way forward, bring the City, industry, businesses and residents together; build buy-in and inclusion.
- Achieve WWTP compliance for the long-term
- Achieve fiscally sustainable solutions for the community
- Transparency and reliability tied to fairness on rates that will be charged.

Participants agreed that the purpose of the workshop was to stimulate new ideas and to develop a portfolio of alternative solutions.

Participants then developed desired outcomes:

DESIRED OUTCOMES

- Community-generated alternative solutions to joint pre-treatment
- New ways to reduce inputs (BOD & flows) to the WWTP
- Solutions at the same or lower cost, but with benefits that serve all of us better
- Innovative systems and strategies that can be leveraged to support community goals beyond WWTP compliance
- Feeling empowered to solve this challenge *together*

Finally, working together the participants developed the "Essence of the Challenge:"

ESSENCE OF THE CHALLENGE

- How can we connect beverage industry wastewater streams into economic value in ways that reduce the burden in the system?
- How does building a big plant (extra capacity) interact with acceptable rate increases?
- Can we engage individual behavior by instilling a sense of personal responsibility to reduce waste from homes?
- What fee structure is both fair and uses market forces to encourage cost-effective load reduction?
- How does the city resolve the conflict with intergenerational equity (social justice) between growth, debt, today's rates, and future rates?
- Are there solutions like composting that benefit the community and reduce the burden the WWTP?
- How can we deal with waste while creating new markets?

The group then developed the following statements:

How can we ***improve the environment*** while…

1. Remaining affordable
2. Maximizing value from each dollar
3. Creative a replicable model for turning challenges into opportunities as a community
4. Making businesses more competitive than any on the West Coast

In what ways can we…

- Buy the time to get this right, becoming a model "case study" for other communities…
- Double economic growth
- Make the treatment plant a profit center
- Avoid building a complete new plant
- Fund improvements without pricing residents and businesses away

… while meeting regulatory requirements!

CREATIVE MANIFESTO

One of the tools facilitator Andrea Ramage used during the charrette was the "Creative Manifesto." She proposed that the group use it as guidance for the day's work. The participants agreed to:

- Choose an attitude of curiosity instead of certainty or defensiveness
- Release ownership of my ideas so they can mingle and expand with other ideas
- Listen deeply to others because they will spark my own creativity
- To honor diversity of thought, experience and opinion as the source of truly innovative solutions
- Be OK with stepping out of my comfort zone even if it makes me uncomfortable
- Focus on possibilities: "We can if…" and "How can we…"
- AND have fun!

SUCCESS CRITERIA

Development of success criteria was also a group effort. The criteria are used to evaluate the community developed alternatives generated during the charrette.

- Lower-cost solution that is affordable to community over its lifecycle
- Meets or exceeds environmental regulations
- Provides capacity for community growth
- Plans for the future (succession) including new emerging technologies
- Replicability for other communities
- Has a financial plan
- Ability to adapt to changing conditions (e.g. loading, environmental standards, business climate)
- Resource recovery
- Aesthetics
- Effective diversions (source control measures)
- Education and conservation
- Local industry approval
- Public approval, meets community values
- Operational resilience and robustness (overall operability)
- Innovative approach

As the creative portion of the day unfolded a range of alternative solutions were generated. Some seemed a bit wild and others seemed pretty sensible.

As the ideas were generated, charrette participants were guided to develop them further. After lunch there were several tables and teams working together to understand how different areas of the city could participate in solving the challenges of the existing wastewater system.

CONCLUSION

As the charrette drew to a close, there was a sense of accomplishment in the room.

"I used to say that no good ideas ever come from Stevenson. This has been a day filled with great ideas. We have actionable items that collectively will add up and make an impact in the short term as we move forward on a longer term solution."

"A key insight for me was that at the onset in deciding on a plan we thought that we would need to do it all inside the walls of the plant. Today we learned about new technologies and satellite pre-treatment systems. It has changed our preconceived notions on the negatives. This is going to increase our options and will hopefully translate into a smaller bill and get us up and running sooner and hopefully stretch out the time frame for a solution."

"I enjoyed looking at the residential side of this. There are impacts on the residential side and people would be interested in being part of the solution on the residential side."

NO.	STRATEGY	STRATEGY COMPONENTS	ROM CAPITAL COST ESTIMATES RATE-BASED	NOTES
1	**Side-Streaming and Resource Recovery**	Develop collaborative diversion program for industrial beverage and commercial food businesses. Identify possible recipients of food wastes such as farms, compost, fertilizer or bio-digestion for fuels, livestock feed, or other uses.	$25,000	Let brewers brew. Convene business council to guide and provide advice. Provide local match and seek additional funding
		Create incentive program to provide match for cost-effective equipment upgrades to reduce organic loadings.	$200,000	Create a 50/50 match (or whatever seems fair) to buy equipment or facilitate diversion by system customers if the project reduces sufficient BOD loadings to the system and is cost effective.
		Investigate residential food waste diversion program	$25,000	Use as a match and seek additional outside funding. If everyone contributes to a diversion program then everyone can benefit from lower costs for future wastewater treatment.
		Create education program at schools		Already in operations budget
		Continue and enhance fats, oils, and grease (FOG) source control		Already in operations budget
		Consider equalization tank to even out peaks in BOD loading at the central plant. Facility should be closed loop and have high air quality treatment to avoid odor problems	$75,000	May require additional expense for plumbing, operations, and/or permitting.
		Subtotal:	**$325,000**	

NO.	STRATEGY	STRATEGY COMPONENTS	ROM CAPITAL COST ESTIMATES RATE-BASED	NOTES
2	**Satellite Treatment Systems**	Reduce BOD and liquid flows to central plant with satellite facilities	$1 million to $3 million	Like a bead on a string, a satellite system can be located anywhere convenient along the collection line. There are several technologies that can be effective in reducing BOD contribution to the wastewater system. Membrane bioreactors offer higher levels of treatment at higher capital and operating cost. Any pretreatment system will have ongoing operational costs that could be mosdest or rise to reach $100,000 per year for the most advanced systems. The challenge of securing a new outfall for the satellite system is avoided by sending the effluent of the satellite system to the existing centralized plant. If a new outfall is the goal, proponents should presume several additional years of technical studies with no guarantee that an additional outfall would be permissible. If effluent is to be treated and reused onsite for toilet flushing or irrigation then treatment to Class A water quality will be required. This higher level of treatment is reflected in the top range of costs. Satellite systems can be co-located with a Botanical Garden, Columbia Gorge Interpretive Center, or Waterfront Brewery District strategies assuming concerns about odor control are addressed.
		Continue downspout disconnection program		Already in operations budget
		Investigate storm drain incentives to reduce inflow and infiltration		Already in operations budget
		Subtotal:	**$1 million to $3 million**	

NO.	STRATEGY	STRATEGY COMPONENTS	ROM CAPITAL COST ESTIMATES RATE-BASED	NOTES
3	**WWTP Upgrades to Increase BOD Rating**	Add upgraded headworks with grit removal, second oxidation ditch and UV disinfection.		Adds redundancy to existing facility and additional BOD removal capacity. Coupled with side-streaming and liquid waste reductions could allow for rerating upward the effective capacity of the facility.
		• Upgraded Headworks with Grit Removal	$639,000	Note: These costs do not include contingency, design, and other soft costs.
		• Add second Oxidation Ditch	$1,628,000	
		• UV Disinfection (assumed for one channel with two banks per channel)	$336,000	
		• Third Clarifier	$1,150,000	A third clarifier may be needed within 10 years.
		Add SCADA and electronic controls	$530,000	Better real-time information and controls can allow for increased performance of facilities.
		Consider onsite laboratory for local testing and possible income generation	$300,000 to $425,000 or more	Cost depends on the size and sophistication of the facility. Requires market analysis to determine if possible income is sufficient to make a business case for the facility.
		Subtotal:	**$4.6 million to $4.7 million**	***NOTE:*** *This number does not include additional costs for collection system upgrades that were identified and included in the General Sewer Plan and Facilities Plan budget estimates.*

NO.	STRATEGY	STRATEGY COMPONENTS	ROM CAPITAL COST ESTIMATES RATE-BASED	NOTES
4	**Columbia Gorge Botanical Garden**	Co-locate greenhouse facility in beautiful setting to attract and educate residents and visitors.	$1 million +/-	Greenhouses can serve as an essential element of a satellite treatment facility or as a polishing step for treated effluent. Consider partnerships with various conservation entities, private foundations, or other community groups to attract both public and private funding.
		Subtotal:	**$1 million +/-**	
5	**Waterfront Brewery District**	Create new mixed use brewery district on Port property along SW Cascade Ave.		Rate impacts to be determined. However, with this concept the majority of the funding would be from a combination of developers, outside economic development funding entities, the Port, and public/private partnerships.
		Creates supporting shared infrastructure for industrial beverage producers	*tbd*	Shared infrastructure financed as part of a larger redevelopment could lower impact to existing tenants
		Increase available industrial capacity for existing customers in phased construction		Make better use of the available square footage to increase the footprint for industrial user growth. Create phasing to allow for minimal disruption to existing tenants.
		Use street frontage along SW Cascade for new retail and restaurant facilities integrated with tourist and tasting rooms		Will create jobs and additional value in community as a vibrant waterfront district unfolds.
		Create new third story for workforce residential and possible river view hotel		Consider seeking subsidies for workforce house (tenants able to afford rent for incomes at 80% of annual mean income) on the Cascade Avenue side. Consider hotel or market rate housing for river view units.
		Subtotal:	***tbd***	*Impacts to wastewater rates may be minimal as a combination of private developers, outside economic development funding entities, the Port, and public/private/partnerships would be essential to finance the project.*

1 SIDE-STREAMING AND RESOURCE RECOVERY

The first strategy is to "side-stream" food waste and industrial beverage wastewater rather than allowing it drain into the sewer. For the City 's healthy and growing beverage industry, side-streaming means providing technical, financial, and operational assistance in collecting spillage and excess product and spoils by seeking ways to convert them into value-added byproducts or other beneficial uses. For the Skamania Lodge and other commercial kitchens it means a program where kitchen scraps and fats, oils, and greases are collected separately and diverted to other beneficial uses. For residential it means a community program to reduce us of food grinders and a new food waste collection program. By collaborating together as a community a majority of the organic loading can be diverted from the system.

Side-streaming will require an accelerated investment in staff, program development and equipment to facilitate participation throughout the community. A draft program budget would be in a range of $200,000 to $375,000.

OVERVIEW:

A. Develop **Industrial Side-streaming collaborative diversion program** for industrial beverage and commercial food businesses. Identify possible recipients of food wastes such as farms, compost, fertilizer or bio-digestion for fuels, livestock feed, or other uses.– includes hiring coordinator 0.5 FTE or contractor
B. Create **Incentive Program** to provide match for cost-effective equipment upgrades to reduce organic loadings.
C. Investigate **Residential Food Waste** diversion program to engage the entire community in reducing BOD loadings to the wastewater treatment plant
D. Create **education program** at schools
E. Continue and enhance fats, oils, and grease **(FOG) source control**
F. Consider **equalization tank** to even out peaks in BOD loading at the central plant. Facility should be closed loop and have high air quality treatment to avoid odor problems

INDUSTRIAL SIDE-STREAMING WITH CONCIERGE SERVICES

During the Value Planning Workshop, participants showed interest in exploring the concept of a "side-streaming concierge" program that would consolidate the collection and management of the waste products from multiple businesses.

An essential element of the program is to reduce the burden of industrial and commercial ratepayer so that it is easy and routine for everyone to contribute. Typical tasks might be:

- Convene a business advisory group to provide advice and guidance to the program
- Work with industrial and commercial business owners to develop cost effective strategies that divert organic loadings from the wastewater system

- Identify resource feedstock options for recipients of food wastes such as farms, compost, fertilizer or bio-digestion for fuels, livestock feed, or other uses
- Develop cost estimates for various program elements
- Explore outside funding options to enhance program development
- Facilitate a possible RFQ to establish bidding system on recovered resources (every 2-3 years?)
- Develop a replicable training model for use by industry partners for new employees
- Develop program monitoring and metrics to deliver and improve on performance.

INDUSTRY SIDE-STREAMING PROGRAM

Core function is the collection and disposal or sale of production waste products (wort, spent grain, yeast, hops, distilled heads/tails, and finished beverage products); It would be designed to be convenient for the beverage industry; and It could focus only on beverage industry waste. In the future it could expand to include other materials that also drive loading to the plant (e.g., food waste; fats, oils, and grease) or have revenue potential on their own or when combined with the other materials (e.g., to fuel a methane digester).

The main benefits are:

- Reduced flow and BOD loading to the plant, reducing the scale (and cost) of needed upgrades and enabling more predictability and regularity in plant operations;
- Consolidating side-streaming program under one roof allows for a concentration of expertise and economies of scale;
- Reduced the burden on each business individually to develop markets or alternative disposal mechanisms for each waste stream (let the brewers brew); and
- Opportunity to better build or access markets for these waste products by operating at a larger scale.

KEY CONSIDERATIONS:

Who will build the program? An estimate for designing and starting up a side-streaming program is ½ half FTE for approximately one year. The ideal candidate(s) will need to be creative, business savvy, and be able to develop strong relationships with the City staff, local and regional businesses, and the public. Options for program development include:

- City staff: Allocation of part of a city staff member's time.
  - (+) Highest level of coordination with City staff
  - (+) Creates a direct line of communication between the businesses and the City, allowing for greater coordination between multiple City programs (e.g., starting up a composting program) and the wastewater treatment plant (e.g., providing notice when the plant can expect higher flows or loads).
  - (+?) Potentially a lower cost option compared with hiring a consultant.
  - (-) Creates a burden on the City's capacity
  - (-) It may be difficult to get approval or recruit talented individuals for limited term positions.
- Consultant: The City would develop a Request for Proposals for either the theoretical design or design and start-up of the program.
  - (-) Lose opportunity to use the program development process to strengthen relationships with the businesses, other City programs.
  - (-) City staff will have a learning curve and need to establish their own relationships if they chose to take on program administration.
  - (-) Potentially less staff time or higher cost.
  - (+) Creates the opportunity to bring in a multifaceted team and high level of expertise
  - (+) Does not distract staff from other priorities or reduce capacity.
- University partnership: A graduate student or student group may be able to take on the program design. Portland State University,

among others, has strong programs around sustainability, public administration, business administration, and integrated environmental management. The University's Institute for Sustainable Solutions can coordinate a multifaceted team pulling from their Masters in Business Administration, Public Administration, Environmental Engineering, and Planning programs. PSU has partnered on similar programs, like a waste reduction program with the Port of Portland. Local community colleges may also see this as an exciting opportunity.

- (+) Students are able to access a huge range of expertise via professors, coursework, access to scientific literature, and their peers.
- (+/-) Costs are likely to be lower when compared with a consultant, however, a student may need greater guidance from City staff (e.g., 0.1 FTE) than a consultant.
- (-) University programs operate on an academic calendar, which doesn't always line up with ongoing work schedules.
- (-) Lose opportunity to use the program development process to strengthen relationships with the businesses, other City programs.

Who will administer the program? Once the core markets and relationships are identified, administration of a program could be more time efficient..

- City staff: Estimated at 0.1 FTE, this person would be a liaison between the City, beverage industry businesses, logistics/hauling/disposal, and buyers for the side-streamed resources.
  - (+) Creates a nexus between the City and industry to increase coordination and strengthen trust.
  - (+) Highest level of coordination with other City programs and able to identify opportunities for the City itself to leverage the side-streamed resources.
  - (-) Burdens City capacity.
- Consultant: City hires out the program administration to a private entity.
  - (+) Does not distract staff from other priorities or reduce capacity.
  - (-) Lessen or lose the opportunity for coordination, identifying new opportunities, and strengthening relationship with businesses.
  - (-) May be difficult to identify willing and qualified parties for so little time/budget.

What will it cost? Key program costs include staff time for development, staff time for administration, hauling of wastes, disposal of resources that cannot be repurposed or where markets are not identified. Some side-stream resources may have revenue potential.

- Program development:
  - Personnel costs estimated at 0.5 FTE in City staff (~$50,000) for one year
  - Consultant: Assuming $100-125/hour, $50,000= 400-500 hours (0.2-0.25FTE). To get the equivalent of 0.5 FTE (1040 hours), the cost would be $108,000-130,000.
  - University: Early estimates for a PSU research team could range from $20,000-40,000 to develop a business plan and the same again to begin implementation and work out the kinks.
- Program administration: Personnel costs estimated at 0.1 FTE (~$10,000)
- Equipment and other expenses: Totes or other storage vessels for target liquid and solid wastes (purchase and repair/replacement), hauling of liquid and solid waste, replacing storage vessels, disposal costs where a market cannot be identified or is temporarily unavailable.

How will the program be funded? There are a number of options for funding the program development and ongoing administration.

- Sewer rate: City leaders would have the option to consolidate these costs in rate increases for larger organic loading businesses or spread them across the entire rate-payer base.
- Incentive Shifting to Fee: Start with incentives funded by the rate and switch to BOD charges after several years. This approach gives the side-streaming program time to be developed and will establish how effective the diversion program will be. After two years of side-streaming operations, the city could begin to phase in a BOD fee. This incentivizes businesses to accelerate diversion and allows those who choose not to divert to plan for the fees as an ongoing cost of doing business..
- Voluntary service subscription fee: If the program provides a more convenient option for the beverage industry businesses, and particularly if there is an incentive to reduce loading (sewer rate reduction), this may be an attractive option that has more carrot and less stick. It also creates risk in the program's funding model.
- Revenue from side-streamed resources: The ideal outcome from program design and administration is that the end users of the side-streamed resources will be willing to pay for them or that the resulting revenue will make the program cost effective. This cannot be guaranteed, particularly in the first year.
- Funding sources like EDA and Dept. of Ecology can be explored.

Develop an overall program and side-streaming concierge to focus on resource recovery through diversion of organics from the collection system. This position would likely require at least a 0.5 FTE or a contracted position based around a similar number of hours.

INCENTIVE PROGRAM

Incentives are often developed by utilities to encourage cost-effective solutions by the customers of the utility. Thus electric utility customers might be offered incentives to install insulated windows as the cost for the windows is less than it would cost to develop new sources of energy. Likewise, for water and wastewater utilities some investments that customers can make will be more cost-effective than upsizing the city's treatment plant.

Once the economic value of diverting materials from the wastewater treatment system is determined, cash discount incentives can be priced appropriately. For example, if a new piece of equipment can reduce the organic loadings to the plant and the value of the savings exceeds the cost of treatment and reserve capacity, then an incentive might be developed to provide a cash match to encourage adoption of the new equipment. A $50,000 machine that cost-effectively saves $50,000 in capacity at the plant would qualify for a 50/50 match. This saves costs for the utility and saves costs the customer who might otherwise have passed for the improvement.

A. Residential Food Waste

Reducing organic loadings to the wastewater treatment plant is an essential element of the strategy to reduce facility costs. Engaging the residential community to divert food waste allows everyone to contribute to the solution. Food grinders in kitchen sinks add to the organic loading at the plant. Yet if this food were instead collected from the homes, then the organics can be usefully processed to become compost for gardens, ingredients in commercial fertilizers, or even as a new energy source.

A food waste collection program could include educational programs, designated drop-off locations, and curbside collection of food.

A creative blend of low-tech and advertising can reinforce a conservation mindset of a food waste program. For example, Impact Bioenergy is a small startup company that turns "half-eaten burgers, spoiled milk, and spent yeast from a brewery into electricity and fertilizer." Their story is told in this short video **https://youtu.be/9t56pxAcj8c.** While their technology may or may not be an appropriate solution for Stevenson, Impact Bioenergy collects

food wastes with an electric cargo bike that has the program name painted on the side. Once collected the food it is ground into a slurry and then brewed in a digester that turns it into liquid fuel. That fuel runs the generator that charges the bicycle. They claim that the bicycle runs one mile for each pound of food waste collected.

Perhaps a local business in Stevenson would sponsor an electric food waste collection bike.

Figure 5 This electric cargo bike used for waste food diversion program runs 1 mile per pound of food waste according to Impact Bioenergy.

B. Education Program

A compliment to the industrial, commercial and residential programs would be an education program for the schools. The program coordinator could partner with interested local teachers and students to create design ideas for collection bins, or to name the side-streaming program, or to create lessons plans about composting and natural processes that turn leaves and needles into topsoil for the vast forests that surround Stevenson.

C. FOG Source Control

FOG is fats, oils, and grease. This highly concentrated "brown grease" is already collected separately to reduce the organic loadings at treatment plants. The City of Stevenson's ongoing FOG program works with restaurants and commercial kitchens to divert FOG from the system. The program requires on-going investment and attention to keep the program continuously effective.

Once collected, FOG can also become used as an energy source. For example, Clean Water Services in Hillsboro, OR uses 70,000 gallons of FOG delivered weekly from local restaurants as feedstock to produce energy at their Durham wastewater treatment facility in Tigard, OR.

D. Equalization Tank

Wastewater treatment plants have normal daily cycles of higher inputs. One peak is in the morning as people prepare for the day ahead of them. The other is in the evening as they prepare for dinner. Industrial users may also have higher or lower cycles of inputs to the wastewater system that correspond to the processes and orders they fulfil. If these high input cycles happen to align, the operations at the plant can be stressed.

The idea of an equalization tank was proposed during the value planning charrette as a way for the industrial contributions to be metered out and timed to off-peak loadings at the wastewater treatment plant. This does not help with meeting the BOD permit requirements, but it does help with the operation of the treatment plant to get better use of existing facilities.

The size and location of any equalization tank has not been determined but would need to be somewhere near the current industrial beverage industries. Concerns about visual impacts and odor are essential concerns that will have to be addressed before any such facility is to be implemented.

2 SATELLITE TREATMENT SYSTEMS

The second strategy is to reduce inputs of liquid waste by augmenting the existing centralized wastewater treatment plant with satellite treatment systems. More than half the flow into the city plant comes from a wastewater collection pipe that drains the west side of town. This includes the Skamania Lodge hotel and the county fairgrounds. At some point along that pipe a satellite treatment system can be deployed to reduce BOD loadings and reduce flow where appropriate. The treated water can be diverted to the treatment plant or with additional steps used for irrigation and other non-potable uses.

Satellite plants contribute to the first strategy as they can be built where growth occurs to reduce loading to the main plant, and capital costs can be passed on the land developer. Capital and operating costs will be more expensive than to expand the amin plant in the order of 15 to 30 percent higher depending on the complexity of the treatment technology used and the desired water quality (i.e whether the treated wastewater will be reused or discharged to the sewer).

LOCATION

Location of satellite plants has become non-controversial as technology allows for compact facilities that are aesthetically located with virtually no impact on livability for nearby residents. For example, Natural Systems Utilities, an Infrastructure NEXT External Technical Advisory Team member, owns, designs, and operates multiple satellite facilities in high impact areas such as the basement of luxury apartment houses in **Battery Park City** in Manhattan or the New School on Fifth Avenue in New York City..

The flexibility and range of technical solutions for satellite plants means that facilities can be located in various locations along the main collection lines of the existing wastewater system. Locations identified during the charrette ranged from the Skamania Lodge, to the Columbia Gorge Interpretive Center, to the new fire station being considered along Rock Creek Road. Other sites not identified during the charrette are also possible. A shared facility could be located at the waterfront as it redevelops or additional redevelopment sites in the city could also be plausible.

Wherever it is located the facility must be aesthetically designed and located. Appropriate odor control would be included in any system. Natural Systems Utilities (NSU) reports that their MBRs are routinely placed inside luxury apartment buildings without complaints. Locating it close to the Lodge or waterfront redevelopment allows for irrigation use of the reclaimed water and the potential to recapture the heat from the hotel's effluent that through heat exchangers that can pre-heat the next day's hot water demands.

COST

Membrane bioreactors are one particular treatment option but certainly not the only one. We are including capital costs for a membrane bioreactor unit large enough to treat all of the flows from the Skamania Lodge as an upper end estimate. Other less expensive treatment options can also be considered.

A draft proposal based on preliminary information prepared by NSU estimated that equipment and construction cost for a facility handling 60,000 gallons of wastewater a day would be around $2 million. Trained operators are required to maintain the system although any staff trained to operate the central plant can also be trained to operate and maintain a satellite system. Many expect operational costs for an MBR to be close to $100,000 per year for time of a trained operator, chemicals, electrical demand and parts.

Whatever technology is selected, the net present value of capital, operating costs, and reliability are likely to the determinative factor.

DISCUSSION

To avoid a lengthy and possibly contentious permitting process for a new outfall any satellite system would most likely prefer to send any effluent directly into the existing collection system.

The satellite plant can be sized to match the demand for BOD reduction or for Class A reclaimed water. Demand for a golf course would be

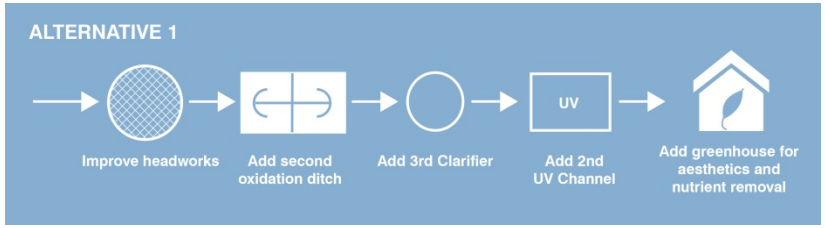
seasonal, but a greenhouse botanic garden would have additional year round flow requirements. If appropriately zoned land is within reach, legal indoor grow operators might also be interested customers for additional reclaimed water from the system.

An alternative only briefly raised during the charrette considered the benefits of using reclaimed water for the county fairgrounds. Given that the fairgrounds are adjacent to the centralized plant, an advanced filtration process located at the central plant could provide water for: 1) irrigation of a botanical greenhouse, 2) irrigation of the fairgrounds landscapes, 3) washout water for livestock stables and stalls, and 4) as high quality effluent that would improve the secondary treatment system effluent entering Rock Creek.

NEXT STEPS

A follow-on analysis would dive deeper into the specifics in regards to seasonal demand for reclaimed water, permitting requirements, and alternative locations for a satellite facility.

3 UPGRADE WASTEWATER TREATMENT PLANT TO INCREASE BOD RATING



Upgrading the treatment facility so that all components have redundancy would involve adding a second oxidation ditch and a second Ultra-Violet disinfection unit, along with additional screening equipment for the oxidation ditch. Some worn mechanical components, including the rotors serving the existing oxidation ditch, will also have to be replaced; however, the existing structural components (e.g. oxidation ditch concrete tanks) are considered to be in good condition.

Although not required at this time, a third clarifier will also need to be considered at some point as the flows increase. The current NPDES conditions rates the existing facility at 0.367 MGD, whereas the maximum-month flow for 2016 was 0.290 MGD.

The duplication of the oxidation ditch would double the existing NPDES permitted load to 1200 ppd, and would allow the design load to be re-rated to a higher capacity based on the performance records, potentially up to 1800 ppd.

Tetra Tech's General Sewer Plan and Wastewater Facilities Plan Update – Final Report (Nov. 2017) indicates the following current costs, including an allowance for contractor O&P, Mob/Demob and site work:

Second oxidation ditch:
$1,628,000

Third clarifier including splitter & RAS pumps:
$1,150,000

Headworks (domestic strength pretreatment) without grit removal:
$639,000

Replacing oxidation ditch brush aerators:
$ 250,000

UV Disinfection (1 additional channel):
$336,000

Cost of the second oxidation ditch, the third clarifier, and the headworks modifications at the central plant were described during the charrette as about $3 - $4 million. While the second oxidation ditch is required in the first three years, it may be possible to delay installation of a third clarifier for up to a decade or longer. This can stretch out initial costs for upgrading the plant.

Note the above costs do not include allowances for contingency, engineering design, services during construction, taxes, and inflation to the time of construction. The Tetra Tech report suggests these extra costs could amount to as much as 78 percent more than the amounts shown above.

ELECTRONIC CONTROLS

The current wastewater treatment plant in Stevenson was constructed before industrial process controls were common. The ability to monitor, gather, and process real-time data is valuable in managing complex wastewater systems. The Tetra Tech report indicates the cost to add a SCADA (supervisory control and data acquisition) system to the wastewater treatment plant is estimated at about $530,000.

ONSITE LABORATORY

An onsite laboratory for local testing and income generation was also discussed during the charrette. Cost depends on the size and sophistication of the facility; however, based on a modest lab space of 400 sq ft and a cost of $300 per square ft, the Tetra Tech report suggests the costs for a laboratory, including $100,000 in equipment and installation costs, would be about $425,000. A market analysis is required to determine if sufficient income could be generated to make a business case for offering commercial laboratory services to the community.

DISCUSSION

The Department of Ecology's Criteria for Sewage Works Design recommends using 0.2 pounds of BOD per day per capita. The Tetra Tech report indicates the base loading with pretreatment to the single existing wastewater treatment oxidation ditch in 2016 was 488 pounds per day (ppd) with a maximum month of 658 ppd and a peak day of 1,294 ppd. The projected equivalent future BOD loads for 2040 were 724, 1,003, and 1,916 ppd, respectively. While the current flows are within the facility's National Pollutant Discharge Elimination System (NPDES) permit limits, the maximum-month effluent load is 92 ppd, which based on a treatment rating of 85% equates to a maximum influent BOD load of 613 ppd, which was exceeded seven times in 2016. Despite exceeding the maximum-month loading limit, the facility has demonstrated an ability to remove more than 85% of the load, and has been meeting it's effluent permit limits. However, Ecology have refused to consider re-rating the BOD removal capacity in the facility's NPDES permit unless the facility complies with current equipment redundancy design criteria requiring a minimum of two units for each treatment component.

Although satellite treatment can reduce BOD loading to the treatment facility, the wastewater flows will gradually increase until they also exceed the maximum discharge under the current NPDES permit. Consequently, at some point the treatment equipment redundancy requirement will have to be met. The NPDES permit loading is based on a secondary effluent BOD concentration of 30 mg/L and an 85-percent BOD removal rating for a maximum-month flow of 0.367 MGD. Even if side-streaming and satellite treatment systems can reduce the maximum-monthly BOD load to the central plant to less than 613 ppd, unless separate NPDES permits are obtained for the satellite facilities, the flows to the treatment plant will eventually exceed the maximum-monthly rated flow of 0.367 MGD. The data presented in the Tetra Tech report indicates this has already been exceeded in 2010, 2012 and 2015. Even if water conservation measures are implemented in an attempt to reduce wastewater flows, the effect will be to increase the wastewater strength. Consequently, it is expected the central treatment plant will need to meet Ecology's equipment redundancy requirements sooner rather than later.

Implementing Alternative 3 as a short-term strategy will:

- Enable the central treatment plant to be re-rated by Ecology and allow the City to realize the true treatment capability of the plant;
- Will address the community's need to provide wastewater treatment services to accommodate economic development pressures; and
- Will provide time to evaluate and develop effective side-stream and satellite implementation strategies to accommodate continued growth.

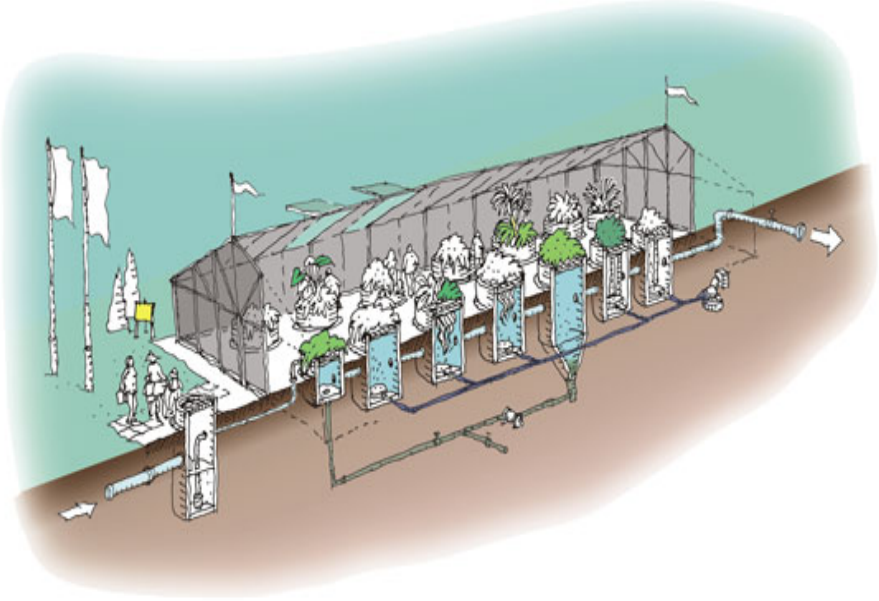
4 CREATE COLUMBIA GORGE BOTANICAL GARDEN

The idea of wastewater treatment facilities could look like greenhouses – captured the imagination of the participants of the value planning charrette. The current central wastewater treatment facility is located in a public works yard along the waterfront adjacent to the fairgrounds, and consists of a number of concrete tanks extending above ground.

In contrast, there are a number of wastewater treatment facilities that have considerably greater visual appeal and aesthetics, appearing to be greenhouses. While their underlying treatment technologies are based on very conventional bacteria-based treatment processes, the plants and greenhouse structure above the conventional infrastructure convey a considerably superior impression to visitors and nearby property owners.

This impression is evidenced by the above photo of the Sechelt “Water Resources Centre”, demonstrating that conventional ugly-looking sewage treatment plants can be presented in such a manner as to have neighbors across the street from the treatment facility feel their property values have increased. Treatment is achieved using a conventional sequencing-batch-reactor (SBR) enclosed within an appealing greenhouse environment. In addition to meeting the most stringent reclaimed water standards in the province, the treatment process also incorporates ultrafiltration membrane and granulated activated carbon filters that remove pharmaceuticals, endocrine disruptive compounds, and other unregulated contaminants that are of emerging concern, and recovers thermal energy from the treated water before being released from the treatment facility. The Sechelt facility gets numerous requests for groups to have receptions in the building’s conference area that overlooks the greenhouse area. What visitors are unaware of is that the plant roots dangle into tanks containing wastewater that is undergoing bacterial treatment.

The concept of a “greenhouse” or “plant-based” treatment process began with Dr. John Todd who started two companies based on his hypothesis that treatment carried out by diverse ecosystems would improve the quality of treatment. Despite the general perception and



advertising claims that these wastewater treatment processes result in a higher quality effluent due to their ecologically superior characteristics to conventional treatment systems, they are all fundamentally conventional activated sludge treatment systems that rely on bacteria for treatment. However, they can be designed to even higher standards. While there is some evidence that wetlands and marshes retain complex contaminants, allowing more time for bacteria to degrade them, the plants in commercially available greenhouse-style treatment processes are not in contact with the wastewater undergoing bacterial treatment long enough to have a measurable effect on water quality, other than to extract some nutrients for plant growth. However, in addition to being more acceptable to neighboring property owners, these systems can have a significant educational impact as the community is visually reminded that chemicals and other materials they may waste to sewer through toilets and sink drains could have an impact on the plants, representing the environment. These greenhouse-style wastewater treatment systems can play an important and critical sustainable role in changing public behavior with respect to preventing waste materials from being discharged to sewer.

As noted there are several greenhouse style treatment technologies commercially available including: 1) Solar Aquatics; 2) Living Machines; and 3) Organica. The Solar Aquatics and Living Machines systems have been constructed in educational settings. A Solar Aquatics treatment plant was installed within a glassed-wall area at the entrance to the Center for Interactive Research on Sustainability (CIRS) building at the University of British Columbia where it reclaims wastewater generated within the building, as well as wastewater extracted from the campus sewer, and reuses the water for toilet and urinal flushing within the building as well as landscape and green-roof irrigation. A Living Machines treatment system serves the Islandwood Center outdoor school located on Bainbridge Island, where it is used as part of the educational program to illustrate how wastewater is renovated in the environment. A Living Machines treatment system is also the focal point of the lobby at the entrance of the Missouri Department of Conservation building in Kansas City where it treats the wastewater generated within the building before releasing it to the natural wetlands surrounding the building and eventually the nearby watercourse. The Sechelt Water Resource Centre was designed to achieve an extremely high quality reclaimed water and incorporates a number of advanced treatment

components including: tertiary filtration using ultra-filtration membranes; activated carbon filters to remove endocrine disrupting compounds, pharmaceuticals and other emerging contaminants; and effluent thermal heat recovery. Rather than building a conventional wastewater treatment plant, the community has constructed a Water Resource Center that provides the community with a source of high quality source of water that can be used to off-set limited potable water demands – of particular importance now that the community is routinely facing severe drought conditions during the summer.

All of the installations described above have an impact on waste management behavior, enabling visitors and building occupants to better understand the relationship between their waste discharge habits and potential impacts on the environment. Although the greenhouse structures are placed above or surrounding the mechanical bacterial-mediated treatment systems, aside from the visual aesthetic advantage of covering over the ugly mechanical processes, the greenhouse structure could be constructed adjacent to the mechanical plant, and the plants could still take advantage of the nutrients hydroponically, or a greenhouse growing environment could be incorporated into virtually any conventional treatment process, including an oxidation ditch (with some creativity).

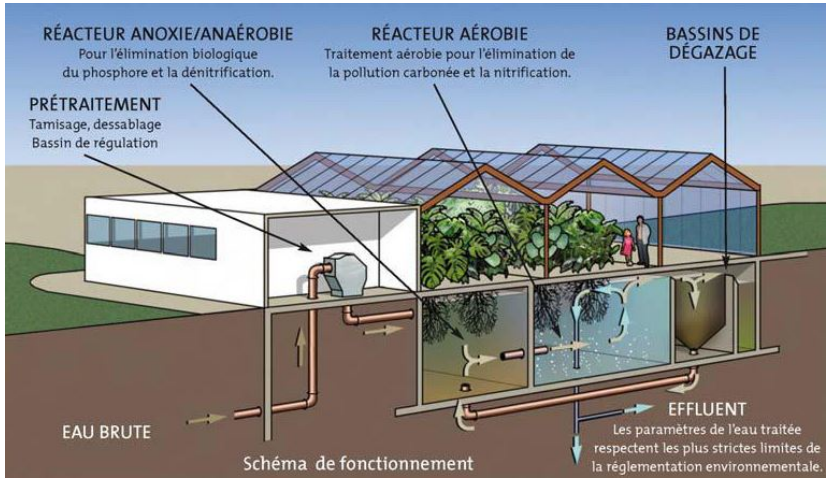
The ability to have a greenhouse facility in either direct or indirect association with a mechanical treatment process, and the ability to grow a wide range of attractive plants within a greenhouse environment brought forth the concept of that environment being a botanical garden that could have tourism value. For example, the water quality achieved by the Sechelt facility meets the most stringent EPA Class A reuse standard, as well as removing micro-pollutants that most treatment plants are incapable of effectively removing. This quality of reclaimed water would be well suited to a botanical garden environment that was open to the general public. The Sechelt experience demonstrates such a facility can meet stringent performance specifications included meeting zero odor and zero noise impacts on the surrounding residential area, and that a treatment facility can be constructed within a residential neighborhood with minimal impact and in an economical, and sustainable manner.

COSTS

The additional costs to incorporate a greenhouse-style treatment process greatly depends on whether a proprietary name such as Solar Aquatics, Living Machines or Organica is desired, the climate and suitability of greenhouse structures to that climate, and whether the comparable conventional mechanical technology needs to be enclosed. There is also the additional operating costs associated with maintaining a greenhouse and cultivating and managing plants. Offsetting those costs could include the value of the plants that are harvested, public accessibility, aesthetics, neighboring property owners' acceptance, changes in waste management behavior in the community and concurrent receiving environment benefits, and whether the educational benefits are capitalized on. It is difficult to place a monetary value on these social and other intangible benefits. The additional cost to the Sechelt Water Resource Centre is estimated to be about 25 percent, increasing the capital cost from about US $13.5 M to $17 M for treating 1.06 MGD; however, a significant amount of the additional cost was due to the high quality tertiary Class A reclaimed water quality and the ultrafiltration membranes, granular activated carbon filters, and heat recovery equipment; components that would not normally be included in a conventional secondary treatment process.

The question was posed at the charrete:

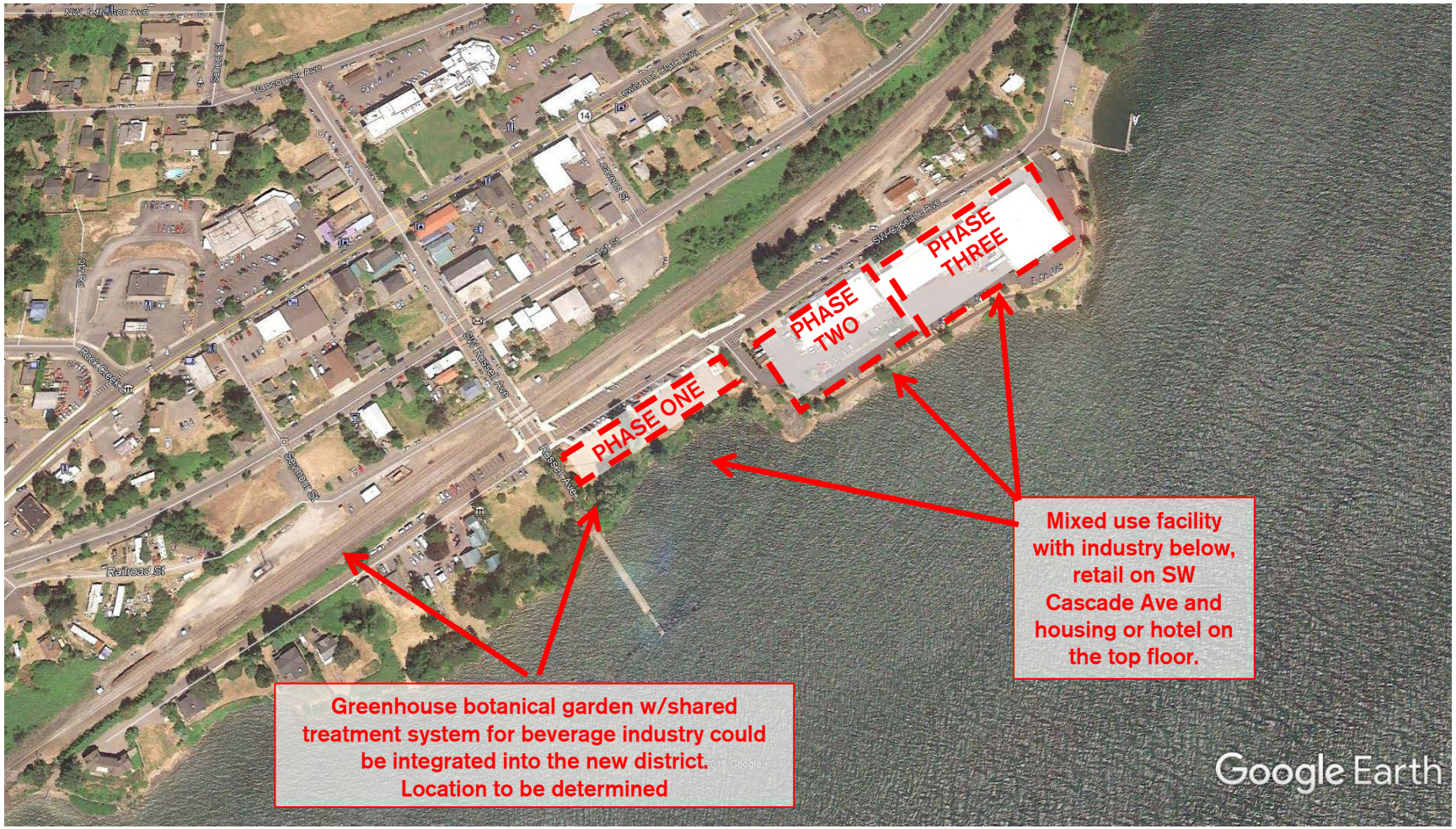
"Could the City of Stevenson host a Columbia Gorge Botanical Garden that would provide multiple benefits from water quality to education, from tourism to a new community amenity?"



	Date of completion	Design Flow	PE capacity	Type of wastewater treated	Capacity	Reuse	Influent BOD	Measured Effluent BOD	Influent TSS	Effluent TSS	Other
Solar Aquatics											
Harwich, MA SAS Pilot University of British Columbia (CIRS)	1990	1,200 gpd		Raw septage	-	N/A	1740 mg/L	6.74 mg/L	5780 mg/L	19.8mg/L	
Living Machines											
Port of Portland Headquarters	2010			All wastewater from building (500	5,000 gpd	Toilet flushing	600 mg/L	1.0 mg/L	400 mg/L	2.6 mg/L	
Evergreen Western Wayne County Schools	2011				7,000 gpd	Toilet flushing and irrigation	185 mg/L	1.56 mg/L			
San Francisco Public Utilities Program	2012			All waste water from employees	5,0000 gpd	Flush toilets and irrigate park	600 mg/L	Below detection			
Islanwood- Bainbridge Isle, WA Marine Corps Recruit Department	2012				10,000 gpd	Irrigation	400 mg/L	Below detection			
Organica											
Sechelt Water Resource Center, BC	2015		14,000 people (Currently serving 6,000)	Municipal wastewater	580,000 gpd	Suitaible for irrigation, Class A solid compst. Using ocean outfall					Active use park on site. Odorless, botanical-like facility
South Pest WWTP- Budapest, Hungary	2012						381 mg/L avg.		144 mg/L avg		
Gallicoop Food Processing Co.- Szarvas, Hungary	2008			Industrial, meat processing	290,000 gpd		(COD) 526 mg/L	(COD) 50mg/L			

Figure 6 Comparison of greenhouse wastewater treatment systems

5. CREATE A NEW BREWERY DISTRICT ON PORT PROPERTY ON SW CASCADE AVENUE



Quite a lot of interest was generated during the value planning charrette to an idea first proposed by Port of Skamania County Executive Director Pat Albaugh. The concept is to create a brewery district that is designed to provide shared facilities for pre-treatment of wastes and other common facilities for tenants. The concept could expand to include brewpubs, tourist activities and perhaps other mixed uses if the economic demand justified the investment.

While the original idea was to locate the facility on the Port's 42 acres in North Bonneville, WA, a compelling alternative is to create a waterfront brewery district right in Stevenson on SW Cascade Avenue on the 1,350 lineal feet of street and river frontage owned by the Port.

As visitors walk along Cascade Avenue they will access new restaurants, brew pubs along street level with housing above. Industrial users could occupy the lower floor of the facility.

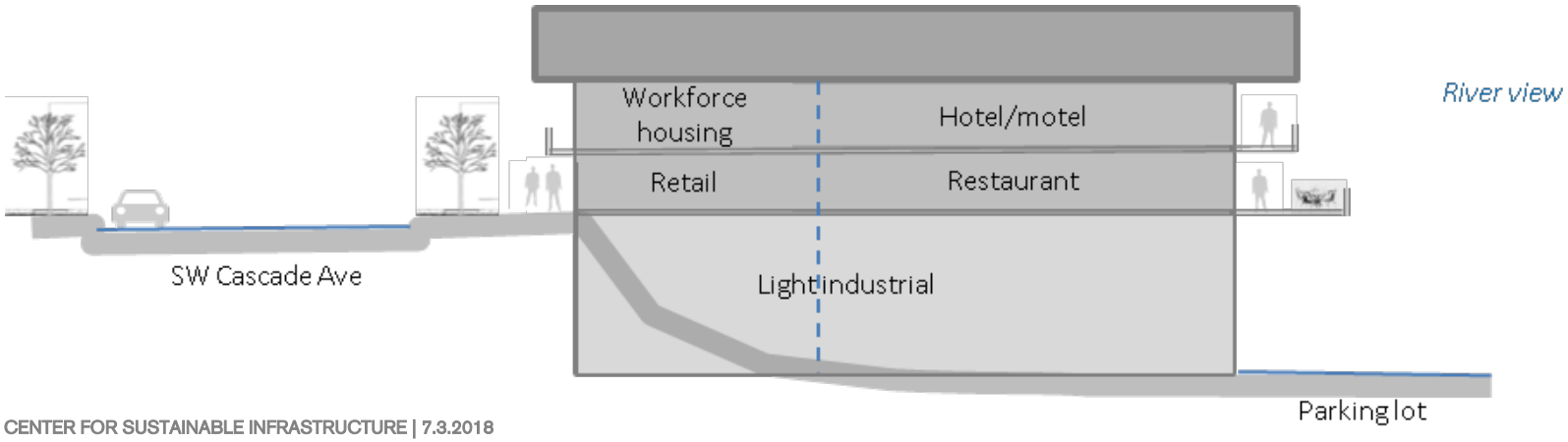
At just an acre, a Phase One portion of the parcel directly east of the riverboat dock. This first site would be a tailored redevelopment to provide shared waterfront beverage industry facilities for existing tenants. Once Phase One is complete and ready for occupancy, existing tenants in the waterfront buildings could move into the new facilities with minimal moving distance. That would allow a Phase Two redevelopment to continue the concept to the east. It would also expand industrial facilities on the lowest grade, add new retail and restaurant on the Cascade Street level with new housing and or hotel on the third levels overlooking the street on one side and the river on the other.

DISCUSSION OF ADVANTAGES AND DISADVANTAGES

The rentable space in a concept like this is significant. A completed two or three phase project could have over 180,000 square feet of industrial space the lowest grade and another 180,00o square feet of mixed use spaces for each additional floor of the redevelopment.

Simply stated, over 500,000 square feet of industrial, commercial and mixed use space is a lot of real estate and opportunity for economic development. As each phase is developed this project would remake and enhance the waterfront experience in Stevenson, create many new jobs, new government revenues and capacity to accept new growth – from housing to restaurants, to river-view office space, to new hotels.

Because this development would have a treatment system integrated into the facility, it could be built to handle the new growth and would be able to tap a combination of private and public capital to build the facilities.



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Tabatha Wiggins – General Manager, Walking Man

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Thanks also to **David Dunn**, WA Dept. of Ecology and **Frances Sakaguchi,** US Economic Development Administration for funding support.

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John Mobly and A&J Select Market for providing breakfast
The Hegewald Center for hosting our workshop
Pat Albaugh and Port of Skamania
Mayor Scott Anderson

And thanks to all the business owners who graciously allowed us to tour their facilities:

Walking Man
Backwoods Brewing
Skunk Brothers Spirits
LDB Beverage
Skamania Lodge

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THE INFRASTRUCTURE NEXT PARTNERSHIP

The Center for Sustainable Infrastructure (CSI), Willamette Partnership, and Portland State University have formed the Infrastructure Next Partnership aimed at innovative investments and job skills for infrastructure in the Pacific Northwest.

CENTER FOR SUSTAINABLE INFRASTRUCTURE

The Center for Sustainable Infrastructure (CSI), based at The Evergreen State College, champions a new public works paradigm, practice, and investment discipline in the Pacific Northwest and beyond. CSI links regional innovators, advocates sustainable best practices, and develops skilled professionals who will put these principles to work in infrastructure development. We envision a future where sustainable, resilient, and affordable infrastructure systems provide vital services accessible to all, supporting healthy, prosperous, beautiful, and cohesive communities.

WILLAMETTE PARTNERSHIP

With more than 20 years of experience convening partners and developing market-based conservation solutions, Willamette Partnership continues to help others create incentives for investing in conservation and restoration throughout the West. They believe it is increasingly important to do this work in a way that cares for people – making communities more resilient by solving environmental problems that improve health, social, and economic outcomes.

Willamette Partnership is working to increase the pace, scope, and effectiveness of restoration and conservation to create benefits for both natural and human communities. They envision a world in which people create resilient ecosystems, healthy communities, and vibrant economies by investing in nature.

POTENTIAL FUNDING SOURCES

CERB (Community Economic Revitalization Board)

- Supports economic development in WA to local governments for public infrastructure that supports: private business growth and expansion. Eligible projects include wastewater, storm water, industrial water, public buildings and port facilities.
- They will not finance projects that: result in retail development or displace jobs from one place to another
- Several programs under CERB, most applicable is:
  - CPP (Committed Partnership Program)
    - Loans and grants for construction of public infrastructure for private business expansion
    - Requires private business commitment (evidence of development) as part of the public government's application. It must generate a significant amount of jobs that exceed the countrywide median hourly wage.

- http://www.commerce.wa.gov/building-infrastructure/community-economic-revitalization-board/cerb-application-page/

EDA (US Economic Development Administration)
- Supports disaster recovery efforts.
- Relevant program: Disaster Supplemental FY18.
    - Disaster supplemental projects should be located in an area of a federally-declared natural disaster in calendar year 2017
    - Supports creation of new jobs and industry, economic diversification strategies towards affected workers. Supports resiliency projects for future potential disasters.
- https://www.eda.gov/funding-opportunities/

WA Investment Board
- Very general investing, focused on generating a stable income stream by strategically investing in a mix of asset classes- their goal is diversification in investments for strong returns
    - As a result, they invest in a wide array of assets including Amazon, breweries, bonds, stocks, real-estate etc… their annual holdings list goes on and on (very general/diversified)
- They manage investments of 17 retirement plans for public employees with the goal of "maximizing returns and minimizing risk"
    - Stevenson would likely have to prove to be a worthy investment with minimal risk and promising returns
- https://www.sib.wa.gov/financial/pdfs/annual/ar17.pdf

Washington State Department of Ecology
- OSS (On-site Sewage Systems Program)
    - Loan program to repair or replace failing private septic systems (thinking Skamania Lodge with their failed food disposal system)- unfortunately Skamania County not specifically listed for loan availability
        - https://ecology.wa.gov/About-us/How-we-operate/Grants-loans/Find-a-grant-or-loan/Water-Quality-grants-and-loans/On-site-sewage-projects
    - Centennial Clean Water Program Grants
        - Limited to wastewater infrastructure projects that supports financially distressed communities, supports on-site repairs, replacement, education and outreach!
        - https://ecology.wa.gov/About-us/How-we-operate/Grants-loans/Find-a-grant-or-loan/Water-Quality-grants-and-loans
    - Clean Water State Revolving Funds
    - Low-interest and forgivable principal for wastewater projects and eligible "Green" projects
    - There's also a related Stormwater Financial Assistance Program grants

RCO (WA Recreation and Conservation Office)
- Land and Water Conservation Fund (LWCF)
    - Supports development of public outdoor recreation areas (Potential for greenhouse/wetland)
    - This option and others would have to be in the vein of public park/recreation
- https://www.rco.wa.gov/grants/find_grants.shtml

Tiered SDC (System Development Charges)
- Cities establish and charge a system development charge (sometimes used interchangeably with "connection charge")
    - The fee has two components: reimbursement (value of existing system) and improvement (based on anticipated future cost, including improvements)
    - The "tiered" aspect would suggest varying costs for different entities (ex: flat-rate method for residential and measured method for non-residential)
- https://www.orcities.org/Portals/17/Premium/SDC_Survey_Report_2013.pdf
- https://www.co.washington.or.us/boc/meetings/upload/ro-exhibit-a-cws-rates-and-charges-2017-18.pdf

CDBG (Community Development Block Grants- Washington State Department of Commerce)

- Improves economic, social and physical space to enhance low to moderate-income residents. Can fund sewer and water infrastructure, business development, public services, infrastructure in support of affordable housing
- General Purpose Grant (March-June 2019 application period)
  - Available for wastewater facilities and economic development in small cities
- Economic Opportunity Grant
  - Year-round application acceptance
  - Supports small cities following disasters with documented economic impact (landslide?)

http://www.commerce.wa.gov/serving-communities/current-opportunities-2/community-development-block-grants/