COUNCIL REPORT

Subject: Progress Update of the Public-Private Partnership (P3) Project to Build, Design, Finance, Operate, and Maintain a New Wastewater Treatment Facility in the Foothills Area.	
Meeting Date: October 5, 2021	**Staff Member:** Anthony Hooper, Deputy City Manager **Department:** City Manager's Office
Action Required ☐ Motion ☐ Public Hearing ☐ Ordinance ☐ Resolution ☒ Information Only ☐ Council Direction ☐ Consent Agenda	**Advisory Board/Commission Recommendation** ☐ Approval ☐ Denial ☐ None Forwarded ☒ Not Applicable **Comments:**
Staff Recommendation: For information purposes only.	
Recommended Language for Motion: N/A	
Project / Issue Relates To: ☒Council Goals/Priorities ☐Adopted Master Plan(s) ☐Not Applicable	

BACKGROUND

The existing Tryon Creek Wastewater Treatment Plant (TCWTP) was built in 1964 and is owned and operated by the Portland Bureau of Environmental Services (BES). It is aging and parts of the plant are at the end of their useful life cycle.

The facility needs significant investments to continue to reliably meet current and potentially more stringent Oregon Department of Environmental Quality (ODEQ) permit requirements and protect it against climate change. The cities of Lake Oswego and Portland are actively exploring the option of designing, building, financing, operating, and maintaining a new wastewater treatment facility to replace the existing Tryon Creek plant under an innovative progressive public-private partnership (P3). It is anticipated that the proposed new facility will deliver significant added benefits for the community at a similar annual cost to that of operating the old plant with new upgrades.

The project was initiated by Council back in December 2018 with the authorization of a special procurement to enter into a competitive procurement process to select a private firm to be

contracted under the terms of a P3 project. Since that time, the City staff project team has provided updates and presented action items to the Council a total of 9 additional times.

The last two times that staff has come to Council were (1) in May 2021, where Council authorized EPCOR Foothill Water Partners (EFWP) to begin the first phase of work (Preliminary Services) towards advancing a new Wastewater Treatment Plant; and (2) in July 2021, where the City Council approved a special procurement for Carollo Engineers to provide technical advisory services and oversight of the deliverables resulting from the Preliminary Services Agreement with EPCOR Foothills Water.

Since those meetings, the project team has accomplished the following items of note:

- Technical Selection Memorandum;
- Project Management Plan;
- Risk Register;
- Conceptual Project Financing Plan;
- Water Infrastructure Finance and Innovation Act (WIFIA) Letter of Interest (LOI) Package;
- Flow and Loading Study;
- Geotechnical Report and Phase One Environmental Studies on the Proposed Site;
- Noise Study;
- Residuals Management Plan;
- Permitting Plan;
- Preliminary Estimates for Capital and O&M;
- Preliminary Affordability Cap Analysis;
- Council Schedule;
- Community Outreach Plan; and
- Basis of Design Report (BODR) and 15% Design.

There are a few items that need to be highlighted in more detail, such as project site information, affordability threshold, Council Meeting schedule, and community outreach.

Project Site

After favorable initial geotechnical analysis and the first phase of environmental studies, the project is moving forward with additional analyses and is anticipating designing the project with the location as shown in the visual below.

Visual 1: Potential Project Site

Affordability Threshold

The Affordability Threshold is based on the projected impact to rates from the estimated cost of continuing to upgrade, modify, operate and maintain the existing TCWTP over the next 30 years to meet NPDES permitting requirements. To meet the Affordability Threshold, the life-cycle costs associated with the design, construction, financing, operations and maintenance of the replacement plant over a similar period will need to fall within this threshold such that the cost of the new plant will have no impact on rates beyond those projected for upgrading, maintaining and operating the existing TCWTP. Nevertheless, there are three additional Project elements that were not originally considered as part of the plant replacement and are being considered as separate elements, outside the Affordability Threshold: (1) demolition and remediation of the existing plant, (2) building a new residuals treatment facility, and (3) providing reclaimed water to irrigate Foothills Park and/or George Rogers Park. Council will be asked to weigh-in around June of 2022.

With early estimates completed, the project appears to be on pace to meet the Affordability Threshold; however, it is still too early in the design and cost-estimating process to be entirely certain. Further financial structuring is also needed, including consideration of long-term financing options. Moreover, tightening credit markets with higher interest rates could impact the ability to meet the affordability threshold, although this risk would be partially mitigated if the Project were to be accepted into the EPA Wastewater Infrastructure Finance and Innovation Act (WIFIA) Program. The City should know whether the project is accepted into the WIFIA program by Oct. 31.

Council Meetings

The project is currently on schedule and Visual 2 shows the tentative schedule for check-ins.

Visual 2: Council Meeting Schedule

Council Meeting Details	Date
Council Study Session: 30% design, permitting update, and cost estimating.	January 18, 2022
Council Study Session: 60% design, price submittal, demolition and remediation information for the existing plant, and more.	May 17, 2022
Council Study Session (Prior to "Go/No Go" Decision): Sharing information on the definitive project pricing, the terms of the Project Agreement (PA) with EPCOR, the details of the Intergovernmental Agreement (IGA) with Portland, and information on the real estate transactions for the site of the new facility.	June 14, 2022 (Special Meeting)
Council "Go/No Go" Decision; if "Go," move into the pre-construction Phase: Consider approving PA with EPCOR, IGA with Portland, & real estate transactions.	June 21, 2022 or July 5, 2022
Council Presentation on the Development Review Commission's (DRC) Decision: Assumes DRC land use approval and no Council appeal.	September 6, 2022
Council to Consider Contract for Engineering Oversight during Construction.	September 20, 2022

Public Outreach and Involvement

As part of the project, the team is conducting a robust public involvement and outreach plan that includes multiple opportunities for the public to provide input and share feedback at key milestones throughout the design process.

Our first major opportunity for public input will be a virtual Community Information Session on October 13. The project team will be sharing information, seeking feedback, conducting polling, and holding open discussions.

Other public outreach and communications activities that have been underway include:

- Creating a project website www.lakeoswegowastewaterfacility.org, including an e-listserv for project updates/newsletters and a project specific contact email address: info@wastewatertreatmentfacility.org;
- Sharing information through communication channels, including Hello LO, LODown, website and social media; and
- Providing project updates and presentations to the Lake Oswego Sustainability Network in August and the Lake Oswego Chamber of Commerce in September.

Additional planned activities include:

- Project videos;
- Community survey;
- Online open house;
- Neighborhood meetings/Open Houses ;
- Special interest group presentations (e.g. Sustainability Advisory Board, LOSN, Chamber, neighborhood associations); and
- Ongoing updates on the project website and City's communications channels.

Visual 3: Public Outreach Schedule

Activity	Date
Community Information Session - Virtual	October 13, 2021
Neighborhood Meeting	Early 2022
Online Open House & Community Survey	Early 2022
Community Information Session/Open House	Spring 2022

DISCUSSION

Sustainability

At previous Council meetings, the Council gave direction to make sustainability a priority. The project team is committed to making the new treatment facility as sustainable as possible within the constraints of land area and technological limits. There are many sustainability-related questions that have been examined by our project team, some of which are addressed below.

Will the new treatment facility be NetZero (and what is NetZero)?

There are three categories for NetZero, which are Water, Energy, and Waste.

- *NetZero Energy* means producing, from renewable resources, as much energy on site as is used over the course of a year.
- *NetZero Water* is where the total amount of water used is returned to the original water source.
- *NetZero Waste* means reducing, reusing, and recovering waste streams to convert them to valuable resources with zero solid waste sent to landfills over the course of the year.

NetZero is rare for wastewater treatment plants for any of the three categories. The small size of the plant and the project constraints will not allow for the new facility to be NetZero in any of the categories; however, the core technology is energy efficient and there are many sustainability elements that are being developed and will be considered as design progresses in the next 8 months.

The design process is committed to reducing the Project's water, energy, and waste footprints to the extent reasonably practical. The objective is to foster sustainability and resilience by meeting the environmental objectives of clean air and water, and reducing waste sent to landfill.

Why is it not feasible to achieve NetZero Energy?

The largest constraint is that the proposed site is six acres and that there is not enough room to add additional large scale energy generating components to the site. Second, the plant is small, and economies of scale are massively important in achieving NetZero energy. The good news is that the AquaNereda technology is the most energy efficient compact technology on the market. The only other technology that would fit on the proposed 6 acres is Membrane Bioreactor (MBR), and this technology uses 50% to 60% more energy. The small size of the technology will allow us to fully enclose the treatment processes and design the site so that it looks like commercial buildings.

Are there any examples of NetZero Energy Wastewater Treatment Plants in Oregon?

Yes, Gresham's wastewater treatment plant is the only example. In fact, Gresham was only the second wastewater treatment plant in the United States to meet NetZero Energy thresholds when they accomplished it in 2015. Gresham's plant was constructed in 1954 and was significantly expanded in late 1990's. Gresham has an activated sludge plant that is very similar to that of the existing Tryon Creek Wastewater Treatment Plant; however, Gresham's plant is more than double

the size. Gresham was able to get to NetZero Energy by doing the following over a period of a decade:

- Installing 1.25 acres of solar panels on the ground, which equates to a 420-kw solar system.
- Reducing plant consumption by installing and upgrading cogeneration engines with a modern biogas scrubbing system;
- Adding and expanding a fats, oils, and grease (FOG) receiving program to increase biogas production by taking in liquid waste from commercial haulers.

The FOG digestion system was mostly how Gresham achieved NetZero Energy. This system includes 30,000 gallons of storage tanks that receive waste hauled in large pump trucks by commercial haulers that collect fats, oils, and greases from restaurants and commercial kitchens. The delivered FOG is high in energy content and is injected into the anaerobic digesters where it is converted into biogas and biosolids. The biogas is then treated to remove impurities and pumped through pipes into two cogeneration engines. The electricity generated reduces the plant's power bill and the heat recovered is used to heat the anaerobic digesters. There is revenue generated from the tipping fees hauling contractors pay to dispose of the FOG waste removed from restaurant and commercial kitchen grease traps. These fees are used to off-set the program cost.

Gresham's plant does not meet NetZero Water or NetZero Waste.

Visual 4: Gresham's Fats Oils and Grease Receiving Station

Credit for Image: Gresham's Website

If a FOG digestion system helped make Gresham NetZero Energy, why can't this be done for the new plant?

The AquaNereda technology is compact, which is absolutely necessary for Lake Oswego as there are very limited choices of where to build a new plant in Foothills and six acres is the maximum amount of continuous land available that is near the existing plant. The size of the preferred site restricts the technologies and processing equipment that can be fit onto the site. AquaNereda is

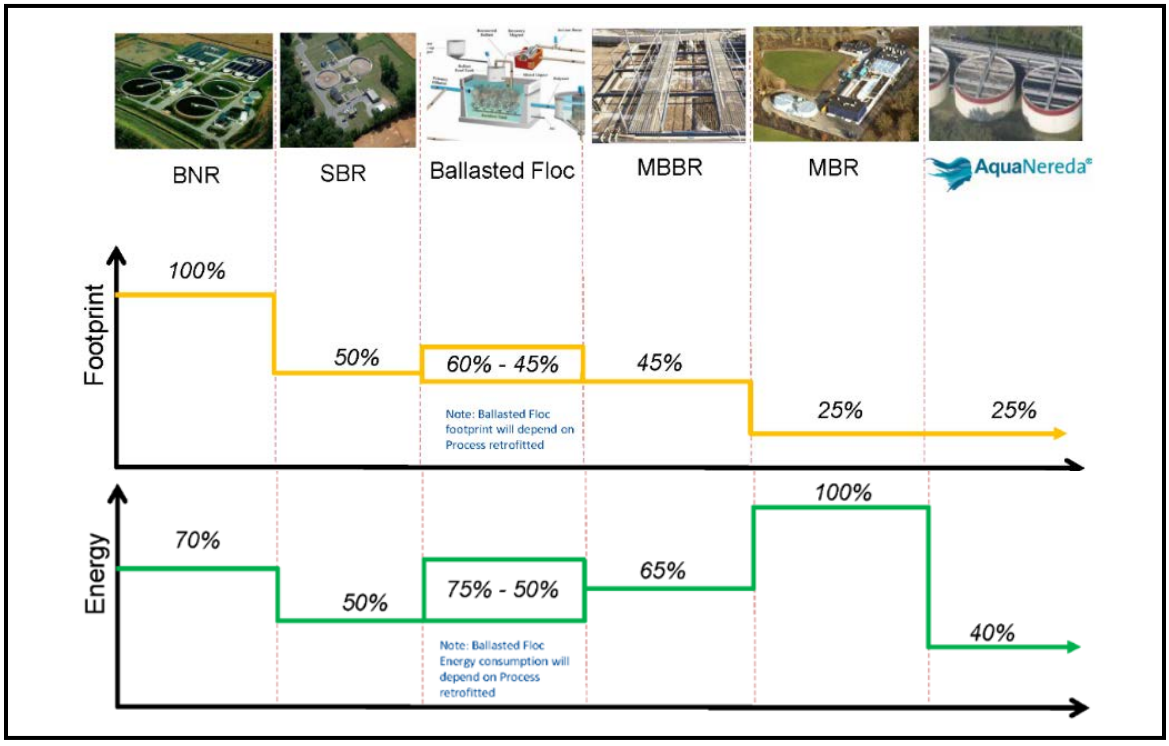
the only technology on the market that is both compact and energy efficient. The technology that the Gresham plant uses is similar to the existing Tryon Creek plant, which is located on a site more than triple the size of the preferred site, which is why Gresham can perform solids processing on the site. The ability to create electricity on-site requires that biogas be generated from the solids and assumes that there will be enough solids generated to create enough biogas. The biogas is created through the digestion process, which requires large digesters to be constructed. Because large digesters process the biosolids, Gresham has the ability to add FOG to the process to make it more energy intensive. Without each of these requirements, generation of electricity on-site at Lake Oswego's new Wastewater Treatment Facility is not possible.

The AquaNereda technology allows for the plant to be energy efficient from the start through thoughtful design, and for it to be compact enough that it can be enclosed in buildings, which will blend into the surrounding community. Moreover, the new plant will be small in terms of liquid and solid stream output and as a result it doesn't generate enough residuals, so even adding a FOG program to supplement them is problematic. For at least three years after the plant is operation, the residuals will instead be transported to the City of Portland's Columbia Plant, which has anaerobic digesters and is building a system to treat the biogas to natural gas pipeline quality standards and sell the gas as vehicle fuel.

Is the chosen technology for this project energy efficient?

Yes. AquaNereda is the chosen technology and it is the most energy efficient compact technology on the market. A priority for this project was to choose a technology that has as small a footprint as possible since there is a maximum of six acres of contiguous property available near the existing Tryon Creek Plant. With this constraint, the only mainstream choices are Membrane Bioreactor (MBR) or AquaNereda. As shown in the graphs on the next page, AquaNereda is about 50% to 60% more energy efficient as compared to MBR.

Visual 5: Wastewater Treatment Plant Technologies



The existing Wastewater Treatment Plant takes up about 13 acres (and needs to expand to 14 acres with the upgrades) and is categorized as a conventional activated sludge treatment plant. AquaNereda is a type of Sequencing Batch Reactor (SBR) that improves on a conventional SBR process by developing a dense granular sludge that settles at a massively higher rate, which allows for very efficient processing of wastewater. These efficiencies allow an AquaNereda process plant to only take up six acres.

Why is it not feasible to achieve NetZero Water?

For wastewater treatment plants, NetZero Water is principally achieved through water reclamation projects that involve treating the water and then recycling it to customers through the installation of a new pipe system for either potable reuse or irrigation. Under Oregon regulations, potable reuse is not allowed, but recycled water could be used for irrigation, groundwater recharging, commercial and industrial uses, fire suppression, and gray water for non-residential buildings.

A citywide reclamation project for irrigation use or other uses is far outside the scope of this project and is currently not feasible given site and financial constraints. The reality is cost and impact: a project of that scope and size would be enormous, as it would involve installing water storage tanks, pumping stations, and brand new "purple pipe" in parallel next to existing drinking water pipelines throughout Lake Oswego. To install this new "purple pipe" to customers' homes and businesses, construction crews would need to dig up and open up roadways throughout the entire City. Installing the new pipe would be extremely impactful from a construction standpoint – it would have extensive noise and traffic impacts and there would be impacts to pavement quality as we would be cutting into streets throughout the city. The cost and impact of the pipe installation is really the biggest challenge with a water reclamation project.

From a big-picture perspective, the plant is not of a large enough scale and there is simply not enough recycled water to achieve a citywide project. Recycled water is primarily used in arid climates in Arizona and California where the facility has a year-round dedicated user for the recycled water. Bend has a recycled water system that they use during the summer to irrigate a golf course. Moreover, it is important to note that the time of year when there is excess flow to reuse for reclamation in our area is typically during the rainy times of year, when there is more rainwater making its way into our wastewater system to treat and reuse, and this is precisely when there is not a need for residents to irrigate. During dry summer months, there are low flows in the wastewater system, which means less water to recycle, and this is when people want to irrigate the most. In the summer, water reclamation infrastructure would not be as helpful for customers citywide, as there is less reclaimed water available to circulate around the entire city.

In addition, there is not sufficient space to build required infrastructure on-site. The site for the new facility is only six acres. In fact, the existing Tryon Creek facility utilizes almost 13 acres. It is possible that if the project proceeds, and we demolish the existing plant and remediate the land, that there may be some space for a future expansion of the facility to accommodate future needs. However, as mentioned above, building a reclamation facility in the future is really only the minor part of a reclamation project. The necessary piping throughout town is the extremely expensive

aspect of a water reclamation project. The cost and scope of a citywide reclamation project would make the wastewater treatment facility project look quite small in comparison.

The project team is exploring the feasibility of a much smaller scale project, which would be to use reclaimed water to irrigate Foothills Park and/or George Rogers Park. EPCOR has extensive experience in designing, building, operating and maintaining wastewater treatment facilities all over the US and Canada, including using reclaimed water for some processes and irrigating city parks and other public spaces in areas like Arizona.

Why is it not feasible to achieve NetZero Waste?

At the end of the wastewater treatment process, there are residuals that are leftover as a result of removing them from wastewater during the treatment process. These are in a variety of forms of sludge, from partially liquid to solid. Under the future IGA with the City of Portland, it is envisioned that the new plant's residuals will be reusable by thickening it on site and then transported to the Columbia Plant where it will be treated in anaerobic digesters and transformed into biosolids or "cake" that will be land-applied to farms as fertilizer to stimulate crop growth. While as much as possible of the waste will be reused, not all waste can be trucked to Portland's Columbia Plant and some will need to go a landfill. One example is that "disposable wipes," which are not dissolvable, are removed during the screening process (beginning of treatment process) and these need to go to the landfill since "disposable wipes" cannot be transformed into biosolids via bio processes.

Lastly, the AquaNereda technology does have an additional advantage to other treatment technologies in that its processes allow for treatment of wastewater with minimal use of chemicals.

Will the Wastewater Treatment Facility generate methane gas?

No. No methane will be generated on-site. The biosolids will be transported to Portland's Columbia Wastewater Treatment Plant. The Columbia Plant will capture and beneficially reuse methane gas.

The Columbia Plant currently beneficially uses approximately 75% of biogas produced and will have a biogas treatment processes in place in spring 2022 that will allow for 96% methane recovery.

Lastly, it would not be possible for the new plant to replicate what the Columbia Plant is doing with producing and treating biogas since the preferred site for the new facility is not large enough to accommodate digesters, which the Columbia Plant is utilizing. Theoretically, even if enough land was available, the new digesters would likely need to be two tanks that are 90 feet in diameter, 25 feet above ground, and 20 feet below grade just like at the Tryon Creek Plant and would not meet the goal of trying to blend into the surrounding community. Moreover, the new plant is not planned to include primary clarifiers, which generate many of the volatile solids that are so effective for digesting. The quantity of biosolids is considered too low to generate enough biogas, even if digesters existed, to drive any beneficial use of the biogas. This makes an arrangement with Portland an ideal solution to treat residuals at their Columbia Plant since methane gas can be captured by a plant that is massively bigger in size and scope, which allows for economies of scale.

Visual 6: Drone View of Existing Tryon Creek Wastewater Treatment Facility on 12.7 acres to Show Size of Clarifiers (Round Pools) and Digesters (White Round Tanks)

Credit for Image: Dave Arpin

Aren't the emissions from trucking residual waste to the Columbia Plant bad for the environment?

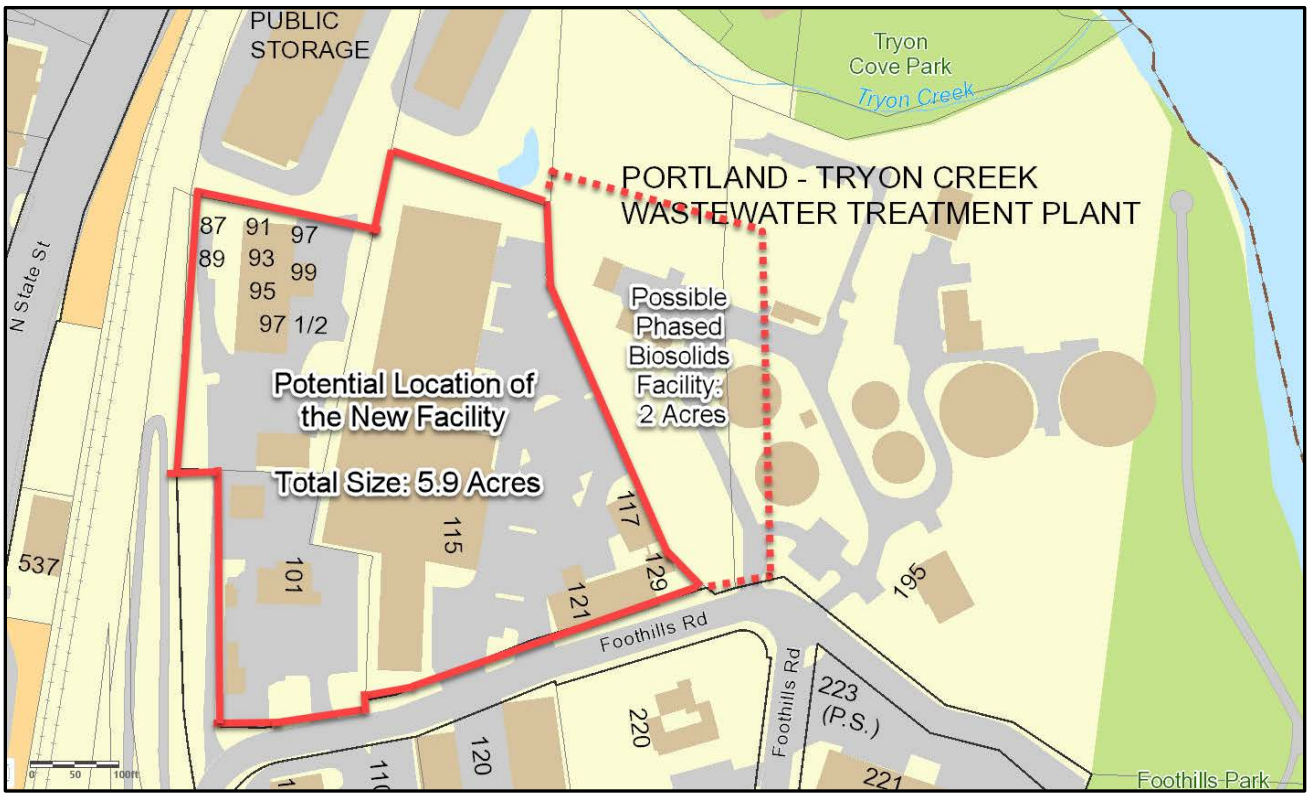
Currently, the Tryon Creek Wastewater Treatment Plant uses about 3 to 4 trucks per day to transport the residuals to the Columbia Plant, which currently run on Compressed Natural Gas (CNG). Once the biogas upgrading system at Columbia Blvd. is operational in spring 2022, these trucks will be fueled with Renewable Natural Gas (RNG), lowering GHG emissions and improving air quality. The same amount of trucking is anticipated for the new plant. Even if residuals were treated on-site, which is not feasible due to space constraints, there would still need to be trucking, such as delivering materials to treat the biosolids, e.g., lime to be stored in a 50-foot silo, and then trucking off the treated biosolids to be land-applied in farms.

What about future-proofing by allowing space for residuals treatment on-site in the future?

While there is no available space on the current proposed site, the strategy is that Portland and Lake Oswego will reserve the option to build an on-site residual facility on one to three acres of the adjacent Tryon Creek Wastewater Treatment Plant site after the existing plant has been

demolished and the site remediated. EPCOR will be generating a cost proposal for the demolition and remediation of the existing site in the early summer of 2022.

Visual 7: Possible Phased On-Site Residuals Treatment (Biosolids) Facility



If the Lake Oswego decides to pursue this with EPCOR, then the existing site is anticipated to be demolished and remediated somewhere around 2026. A biosolids facility would need to be designed and built sometime afterward, should Lake Oswego and Portland decide that this was the best way to go. A decision would be deferred until 2025 or 2026 on whether to build a residual treatment facility on-site and stop trucking residuals to the Columbia Plant once the new residual treatment facility is built. There are several advantages to deferring a decision for about four years: there will be more information to base decisions, as the new facility will be in operation, and the City will have more precise knowledge of the residuals actual makeup, and better knowledge of future needs. In addition, there are evolving regulations and opportunities for "Class A" reuse that will be better known in 4-5 years, which will help us make a decision on what type of biosolids facility to pursue. "Class A" reuse is currently rare in Oregon as there sufficient land application opportunities for "Class B" biosolids but this will likely not be the case forever.

Moreover, EPCOR found that it was more expensive on an on-going basis to treat biosolids on-site via the recommended solution of alkaline and dry lime treatment than to haul the residuals to the Columbia Plant. It would cost an estimated $8.2 million (with a 30% contingency) to build an on-site residual treatment facility that uses dry lime to treat to a "Class B" biosolid compared to $0.9 million (with a 30% contingency) to thicken the residuals to truck them to the Columbia Plant. In addition, the dry lime technology would necessitate having silos that would be about 50 feet tall,

which would not blend into the Foothills neighborhood. As discussed earlier, there would also need to be between one to three acres of additional land to accommodate any future residual treatment facility outside the current targeted site.

Visual 8: City of Portland's Columbia Plant on 140 acres

Credit for Image: City of Portland's Website

Will the Wastewater Treatment Facility generate nitrous oxide?

Yes, but it will be largely mitigated. At a global scale, wastewater treatment plants account for about three percent of nitrous oxide emissions compared to agriculture's 80 percent. The new treatment facility will be designed to limit nitrous oxide emissions through enclosed buildings and odor control mechanisms that capture odious gases. The existing plant is not enclosed and does not have odor control measures in place.

What sustainability measures are the project envisioning?

While it still very early in the project (15% design completed), we are discussing numerous sustainability elements, such as solar panels on the roofs and on-site reuse of reclaimed water. There will also be an analysis of whether it is feasible to have a small-scale reclamation project to reuse treated water to irrigate Foothills Park and/or George Rogers Park. In addition, energy efficient mechanical and electrical equipment is being selected based on life cycle costs over 30 years, not based on lowest capital cost.

There will be much more information available in about four months as the design and engineering progresses further.

What climate resiliency elements are you considering?

The chosen technology is better able to deal with peak instantaneous flows caused by extreme weather events. In fact, up to 53 million gallons per day would be able to be fed through the treatment basins at the proposed facility (over 6 times average day flow).

In addition, the plant will be designed with redundancy and back-up systems. There will also be stand-by power in the event of power loss due to storms.

Lake Oswego is in a seismically active area. There will be the following site-specific measures that will be taken:

- Excavating and removing soft soils and replacing them with dense non-liquefiable soils.
- Treating the soft soils in-situ by densification.
- Supporting the building foundation on deep piles that bear upon dense soil or bedrock at depth.

Lastly, the current wastewater treatment plant was partially flooded during the 1996 floods. There will be significant flood mitigation and the new site will be designed so that the main treatment units and buildings will be built to withstand a 100 year flood event. The main electrical room will be built to withstand a 500 year flood event.

FISCAL IMPACT

On May 4, 2021, the Council authorized the preliminary services agreement, which is projected to cost about $7 million. As of August 31, about $2.7 million of work has been completed. EPCOR is paying for these costs out-of-pocket; these costs will be rolled into the overall project cost if the project is a "Go" in June or July of 2022. If the project does not move forward, then EPCOR will need to be reimbursed depending on the context and reasons for cancelling the project.

In addition, the Council also authorized $1.4 million in City consulting services over the 14-month Preliminary Services Agreement (PSA) period in May 2021. The current and projected contract totals come to $1.34 million during the PSA period. Portland shares in the cost per the terms of the Interim IGA. The updated table of consultant spending is included in attachment 1.

As a caveat, the Hawkins, Delafield & Wood contract will need to be amended to add approximately $230,000 to cover developing the final P3 Project Agreement with EPCOR, to move on to the pre-construction, construction and O&M phase, and help the City in creating a new intergovernmental agreement with the City of Portland. The new contract total is estimated to be $824,000. This additional amount was already anticipated into the amount that was previously approved by Council.

ATTACHMENT

1. Consultant Spending

Attachment 1: Consultant Spending on Wastewater Treatment Facility Project

Consultant	Function	Total Contract Amount	Total Paid Since the Start of Project	Total Amount Remaining on Contract	Total Invoiced since EPCOR Agreement (May through end of August)
Illuminati Infrastructure Advisors *(Jill Jamieson)*	Owner's Representative & Financing Advisor	$287,000	$181,000	$106,000	$47,000
Carollo Engineers	Technical Advisor	$1,132,000	$241,000	$891,000	$54,000
Hawkins, Delafield & Wood	Legal Advisor	$594,000	$519,000	$75,000	$0
Jones Lang LaSalle (*Jill Jamieson*). *The contract has been terminated.*	Owner's Representative & Financing Advisor	$100,000	$88,000	N/A	N/A
WCX *(No longer in Business)*	Owner's Representative	$10,000	$4,000	N/A	N/A
Argent Management *(Completed)*	2018 Feasibility Study	$150,000	$150,000	N/A	N/A
FCS Consulting *(Completed)*	Wastewater Rate Model Update	$8,000	$8,000	N/A	N/A
	Total	**$2,281,000**	**$1,191,000**	**$1,072,000**	**$101,000**