

Unit Process	Tryon Creek Wastewater Treatment Plant Existing Deficiencies/Failure Points for the 30 year Facilities Plan			Consequence of Failure	Unmet Levels of Service
	Performance (Process and Hydraulic Capacity)	Physical Condition (and potential for Continued Utilization)	Physical/Site Constraints		
Preliminary Treatment (Screening)	<p>The existing screens do not have sufficient hydraulic capacity to pass peak flows if any blinding on the screenfield occurs.</p> <p>The existing bypass channel does not have capacity to bypass peak flows and marginal capacity to bypass half of peak flow.</p> <p>Screen opening size is not consistent with current industry fine screening approach and is insufficient for some potential secondary process solutions.</p>	<p>Existing headworks screens are nearing their end of their useful life and are in need of replacement or major rebuild.</p> <p>Headworks components are exposed to the atmosphere, causing operational problems in cold weather and odor problems in warm weather.</p> <p>Installation does not meet current code classification and poses some potential safety concerns.</p> <p>Continued utilization requires complete replacement of all mechanical and electrical components, as well as enclosing the facility to provide odor control and prevent further deterioration due to the weather.</p>	<p>Constructing an enclosure around the existing headworks would require significant sequencing and coordination requirements.</p> <p>A new headworks facility must be located so as to allow the existing headworks to remain in service during construction. The two influent pipelines determine the practical locations of a new headworks facility.</p> <p>Raising the HGL of the Headworks would require replacement of the pumps associated with the Tryon Creek Pump Station. Increasing the HGL to the point where the PE Pump Station could be eliminated may require pumping of Tryon Creek interceptor flows.</p>	<p>The expected impact of failure of the screening facility is the potential for short-term overflows at that facility, as well as complete loss of that unit process function. If one screen were to fail during low or dry weather flows, the remaining screen would likely be able to keep up with incoming flow, however, one screen is inadequate for peak flows.</p> <p>Current code classifies the headworks area as Class 1, Div 1 - using propane torches to keep machinery operating in freezing weather is potentially dangerous if flammable material were accidentally introduced into the collection system.</p>	<p>Provide preliminary treatment for 25-yr storm</p> <p>Control offensive odors to < 5 complaints/year</p> <p>Provide for visual mitigation that screens the plant from adjacent uses</p> <p>Non-compliant with current codes</p>
Primary Clarification	<p>The primary clarifiers perform well under most conditions, but do not have sufficient capacity for flows greater than 35 mgd (assuming representative flow split as a function of surface area).</p> <p>Due to a different hydraulic gradeline between primary clarifiers 1-3 and 4-5, flow split to the five primary clarifiers is poor and difficult to control effectively, especially during peak flows. This further reduces the unit process capacity.</p>	<p>The basin structure shows significant signs of wear; there are numerous visible concrete cracks in the clarifiers, as well as corrosion on the walkways and handrails. Ongoing maintenance and investment in the structure is necessary to maintain condition over the 30-year planning horizon.</p> <p>Replacement of clarifier equipment and effluent weirs and launders has maintained mechanical condition.</p> <p>Continued utilization requires enclosing the facility to provide odor control and upgrade of electrical systems to meet current code classification.</p>	<p>Retrofit of the clarifiers themselves is possible due to the ability to take basins offline in the dry season. Retrofit of common influent channels will likely require bypass pumping of portions of the channels.</p> <p>There is limited area for expansion of the existing structures in their current location.</p> <p>The primary clarifiers are located in the flood plain and subject to additional flooding should river levels increase as a result of climate change.</p>	<p>A mechanical failure of clarifier mechanisms requiring a clarifier to be taken offline could be managed under most flow conditions.</p> <p>A structural failure would likely take the form of leakage from one of the tanks, introducing the potential for a spill. Regular monitoring and evaluation is necessary to maintain condition.</p>	<p>Provide primary treatment for 25-yr storm</p> <p>Control offensive odors to < 5 complaints/year</p> <p>Non-compliant with current codes</p>
Primary Sludge Pumping	<p>The raw and thickened primary sludge pumps have capacity for the projected flows.</p>	<p>The raw sludge pumps are relatively new or are in the process of being replaced. They are well maintained, but prone to plugging. The thickened sludge pumps were rebuilt in 2007, but require constant maintenance.</p> <p>Continued utilization requires upgrade of electrical systems to meet current code classification.</p>	<p>The equipment in this facility is difficult to maintain as the workspace is very crowded and there are limited egress options for removing equipment.</p> <p>The pump station is located in the flood plain and subject to inundation.</p>	<p>There is redundancy in this system; a single pump failure would have limited impact on the operations of this system.</p> <p>Inordinate maintenance costs are a consequence of aging components.</p>	<p>Non-compliant with current codes</p> <p>Utilize processes and equipment that optimize labor costs</p>

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Primary Sludge Thickening/Degritting	The Primary Sludge Gravity Thickeners and Grit Classifiers meet the required process capacity.	<p>The primary sludge gravity thickener inner coating has deteriorated and investigation into remaining concrete cover over rebar is recommended. The mechanical equipment shows signs of rust and may need to be replaced during the planning period.</p> <p>The grit classifiers show severe corrosion on the top panels, though this corrosion has not affected performance.</p> <p>Continued utilization will require concrete repair and recoating as well as replacement of grit classifiers during the planning period.</p>	<p>Retrofit of these facilities are feasible due to system redundancy.</p> <p>These facilities may need to be contained to provide odor control. Current practice is to have a dump truck available for loadout of grit, which is also an odor source.</p> <p>There is limited available area for expansion or construction of a containment building as the facility is sandwiched between the primary clarifiers and solids handling building.</p>	<p>Failure of the thickener would cause thinner sludge to be sent to the anaerobic digesters which would reduce the SRT in the digester. Since the sludge is transferred to CBWTP for final digestion and disposal the only consequence would be increased hauling in the short term.</p> <p>Failure of the grit classifier would increase the amount of grit in the sludge system which would result in increased maintenance?</p>	Control offensive odors to < 5 complaints/year
Primary Effluent Pump Station	The Primary Effluent Pump Station has a firm capacity of ~41 mgd and a total capacity of 48.4 mgd. The firm capacity is insufficient for the 25-yr storm, and marginally sufficient for the 5-yr storm.	The pumps and drives were upgraded or rebuilt recently and are in good physical condition. With the current pump configuration it is difficult to turn down pumps sufficiently to meet low flow demands, so it is recommended that a lower capacity pump be added for continued utilization.	Expansion of the PEPS may be possible to the South, but expansion is limited in other directions due to Tryon Creek, Primary Clarifiers, and Aeration Basin Blower Building.	The PEPS includes redundancy, so the risk of failure is low. It is a critical component of the liquids process train as it moves all flow from the primary clarifiers to the secondary system and disinfection facilities. Failure of some or all of the PEPS would result in a discharge of non-disinfected, primary effluent to the Willamette River.	<p>Provide disinfection for 25-yr storm</p> <p>Provide secondary treatment for 5-yr storm</p>
Secondary Treatment (Aeration Basins, Secondary Clarification, RAS/WAS PS)	<p>The secondary system has excess dry weather capacity and wet weather capacity up to ~25 mgd under stable (non-nitrifying) conditions.</p> <p>The secondary system can hydraulically pass flows up to the 25 year storm, however, v-notch weirs and flow split flumes are submerged during this condition.</p>	Both the aeration basins and secondary clarifiers are in good physical condition, but some mechanical components are starting to show signs of corrosion and wear and may need reconditioning or replacement during the planning period. The concrete in both facilities is in good condition; seams and joints should be monitored and repaired as required.	<p>Expansion of the existing ABs to the east is possible - though that area is within the Willamette Greenway. There is space for one additional clarifier to the south of the existing clarifiers.</p> <p>Retrofit of the existing ABs is feasible during the dry season by taking one train out of service.</p>	Poor secondary process performance during peak flows results in an increase in the volume of diversion around the secondary process.	<p>Provide secondary treatment for 5-yr storm</p> <p>Comply with EPA Class I Reliability requirements (Secondary Clarifiers)</p>
Disinfection and Outfall	<p>The existing chlorine contact volume has severe hydraulic restrictions due to excessive outfall headloss and limited differential between high river levels and the HGL at the end of the plant. Overtopping and flooding of the structures occurs at peak flows and river flood stages.</p> <p>The basins do not have sufficient contact time to treat the 25-yr storm.</p>	The chlorine contact chambers are in good physical condition; the hypochlorite injection system is in the middle of a repair project to replace brittle feed and discharge piping. The hypochlorite storage tanks need to be inspected for potential deterioration. The disinfection facilities can continue to be utilized in the short term, if hydraulic issues and flooding potential are addressed.	There is some opportunity to relocate the disinfection facilities to a higher elevation, taking advantage of the significant drop in head between the existing secondary clarifier weirs and the high river level. Footprint is limited at higher elevations.	<p>A failure of the disinfection system would result in an NPDES permit violation for e coli and fecal coliforms.</p> <p>Flooding of the disinfection facilities during a high river level event would also result in an NPDES permit violation.</p>	Provide disinfection for 25-yr storm

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Solids Stabilization (Digestion)	<p>The anaerobic digestion system is used to partially stabilize primary sludge prior to being trucked to CBWTP for final stabilization and disposal.</p> <p>The existing tanks have sufficient capacity for the current operating practice since final digestion happens at CBWTP.</p>	<p>The digestion tanks have some minor exterior cracks that should be monitored and repaired as required. The mechanical equipment are in various stages of being rebuilt and there was rust and corrosion apparent on several pieces of pipe and equipment.</p> <p>Continued utilized as a partial stabilization digester is feasible with continued investment in equipment maintenance.</p> <p>Facility does not meet current code requirements.</p>	<p>The existing digesters are easily visible from the surrounding area.</p> <p>Access for truck loadout must be maintained so long as the digesters are used for storage and/or digestion.</p>	<p>The risk of mechanical system failure is high, given the maintenance requirements, however the consequence of mechanical failure is low since full digestion is not required.</p> <p>Risk of failure of the tanks themselves is quite low. If a tank needed to be taken out of service, the consequences are minimal due to the fact that there are two tanks and sufficient storage to produce a Class B solid in not required.</p>	<p>Non-compliant with current codes</p> <p>Provide for visual mitigation that screens the plant from adjacent uses</p>
Solids Handling & Loadout	<p>The Gravity Belt Thickener (GBT) and solids loadout facility has sufficient capacity for projected flows and loads.</p> <p>There is no redundancy within the Gravity Belt Thickener.</p>	<p>The Gravity Belt Thickener (GBT) is in good condition, however mechanical upgrades are necessary over the planning horizon to keep it operating reliably.</p> <p>The valve shed at the liquid biosolids loadout facility is in very poor condition and is a very challenging environment for O&M activities. There is no freeze protection and the valve sump often contains water at the bottom. The loadout controls shed is functional, but is beginning to show it's age.</p> <p>Continued utilization of the valve shed is not recommended for safety and ease of access for O&M staff.</p>	<p>Since the GBT process is not self-contained, odor control is provided for the entire building, relying on operators closing doors and actively maintaining the ventilation and odor control for that facility.</p> <p>There is no room within the existing GBT facility for expansion if additional redundancy is required.</p> <p>The loadout facility is visible from the surrounding area and very industrial in it's appearance.</p> <p>Access for truck loadout must be maintained.</p>	<p>The failure of the GBT would result in increased hauling while the GBT is out of service, once in-plant capacity to store solids is exhausted.</p> <p>The risk of failure of a single component at the loadout facility is fairly high, however the components are readily replaceable/repairable and there is redundancy within the system.</p>	<p>Control offensive odors to < 5 complaints/year</p> <p>Provide for visual mitigation that screens the plant from adjacent uses</p> <p>Ensure the safety of employees.</p>
Electrical Systems	<p>The existing electrical system does not provide backup power to meet EPA Class 1 Reliability requirements.</p>	<p>Useful life for electrical equipment is much shorter than other infrastructure. Much of the backbone of the electrical infrastructure was installed in 1977. Spare parts and add-ons are not available for this equipment and many of the wiring methods and electrical devices in classified spaces do not meet current codes.</p> <p>The backup generator is in excellent condition but is connected to the main switchboard via an obsolete automatic transfer switch that should be replaced.</p>	<p>The plant currently has one power feed and utilizes a backup generator to meet power reliability requirements.</p> <p>Future facility upgrades (i.e., UV disinfection or tertiary treatment) may trigger significant upgrades for primary power to the plant.</p>	<p>Failure of any portion of the electrical equipment carries significant consequences. These are extremely critical components, and failure may result in loss of power to portions or all of the treatment process units. The resulting impact is an overflow and/or potential NPDES permit violation. If facilities are not powered, adequate treatment can not be provided.</p>	<p>Comply with EPA Class I Reliability requirements.</p> <p>Non-compliant with current codes</p>