

Activated sludge related projects are briefly described below:

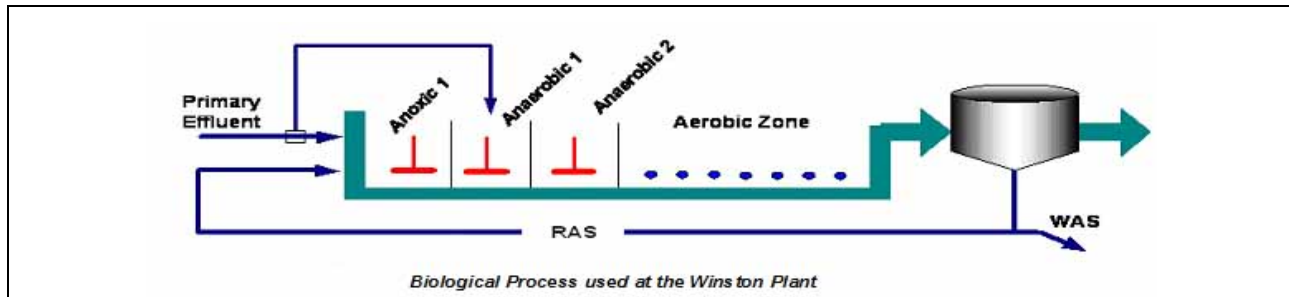
Projects Leading to Design of New or Expanded Activated Sludge Facilities		
<p>1. City of Burbank, CA, Concept, Predesign and Design Assistance. Served the City of Burbank as manager on projects for over 4 years. Projects ranged from initial upgrade concepts to predesign. John also consulted on the final design and plant startup. Modernizing the 8.0 mgd Burbank Water Reclamation Facility (WRF) has allowed the WRF to operate with a six-fold increase in mean cell residence time and allows the WRF to nitrify. Effluent ammonia concentration averaged 21 mg/L before the upgrade and now averages 0.5 mg/L.</p> <p>John's evaluations led to upgrading an aged facility that was designed for BOD/TSS removal only, into one that is able to achieve biological nutrient removal (BNR). This upgrade was done without the construction of additional aeration basins, secondary clarifiers or air blowers. John's work ranged from process choices to upgrading the aeration equipment.</p> <p>A complete change in biology has resulted in improvements of sludge quality. The sludge volume index (SVI), which is a measure of settleability, had previously been poor (SVI = 200) but since the upgrade sludge has exhibiting excellent settling quality (SVI = 60).</p>		
		
<p>Baffles being installed for anoxic selectors.</p>	<p>Newly upgraded aeration basins.</p>	<p>Modernized rectangular secondary clarifiers.</p>

2. Winston Green Sanitary District, OR , Facility Planning and Predesign. Manager or lead engineer on initial studies through the design of a 1.8 mgd activated sludge plant that removes phosphorus biologically (Bio-P) in Winston, Oregon. The final design includes use of both anoxic and anaerobic selector zones to meet stringent phosphorus limits without the addition of chemicals. The upgraded facility is capable of operating several Bio-P processes including side-stream predenitrification. The plant generally achieves less than 0.5 mg/l P and less than 10/10 mg/l BOD/TSS without effluent filtration.

The project included:

- Added a 65-ft. dia secondary clarifier and a sodium bisulfite system for dechlorination.
- Built a gravity belt thickener and anaerobic digester to stabilize and concentrate solids.
- Upgrading the gaseous chlorination system to initiate compliance with fire codes.
- Refurbishing effluent filter Wheeler bottom underdrain and added an air scour system.

A major challenge in serving Winston and Green Sanitary District was meeting budgetary constraints while designing for stringent discharge requirements.



3. City of Tillamook, OR Selector Activated Sludge.

Served the City of Tillamook through numerous projects for over 25 years. One project included completion of a wastewater facility plan with evaluations of both collection and treatment facilities. Recommended upgrading to a 0.9 mgd hybrid activated sludge process including oxidation ditch and selector features (Photo, Rt). The basin is a wrap-around design with both nitrification and denitrification features. The new units included secondary clarifiers, disinfection facilities, and an anaerobic digester.



New Selector and Oxic Zones

4. Nevada City, CA, Conversion of SBR Reactors.

Completed a preliminary system evaluation report and analysis of 0.7 mgd sequencing biological reactor (SBR) plant. Results of this work showed that year-round nitrification-denitrification was not possible with the SBR as designed. Further predesign/design led to conversion of the SBRs to a continuous flow selector activated sludge system. Improvements included adding selectors to the SBR basins, new clarifiers, automated fine screening and a new disk filter are designed to increase clarification efficiency.



SBR basins before upgrade

5. Makena, HI, New Extended Air Activated Sludge.

Project engineer on predesign and basis of design for 1.6 mgd extended aeration activated sludge plant serving the Maui Prince Hotel and future planned developments in the Makena area. Designed was a 0.70 mgd *wastewater reclamation facility* using complete mix extended aeration activated sludge process.. New units included lined earthen extended air basins, secondary clarifiers, sand filters facultative sludge lagoons, UV disinfection and land application



Lined Earthen Aeration Basins

6. Kona International Airport, HI, Oxidation Ditch.

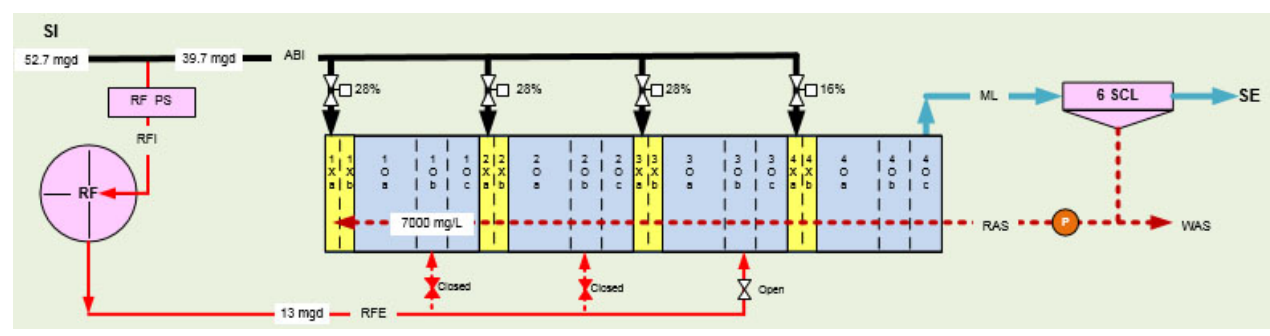
Basis of design for 130,000 gpd oxidation ditch plant for the Kona International Airport. Unusual feature was limited land (landscape irrigation) and denitrification. The oxidation ditch process was selected because of its ability to remove nitrogen which allowed greater irrigation.

The WWTP included screens, equalization basin, oxidation ditch, secondary clarifier, effluent filter, decant tank, facultative sludge basin, ultraviolet disinfection system .



New Circular Oxidation Ditch

7. Honouliuli WWTP, HI, Step Feed Activated Sludge Plant. Provided design assistance in sizing and equipment selection in the 52 mgd step feed activated sludge plant. Honouliuli WWTP with full secondary treatment. The evaluation included a full array of secondary treatment alternatives ranging from trickling filter to selector activated sludge. The study resulted in a staged design that phases out the existing trickling filters and will result in a step feed activated sludge treatment facility (schematic below).



Assessments, Evaluations and Planning of Activated Sludge Facilities

Design Build Evaluation, Waimea, Kauai, Hawaii Waimea WWTP

Served as a subconsultant to Kiewit as part of their design build team for upgrading the 2.0 mgd activated sludge system owned and operated by the County of Kauai. Prepared was a technical approach which considered both selector activated sludge and moving bed biofilm reactors.

Facility Plan Development, The City of Klamath Falls

Klamath Falls, OR Developed alternatives for upgrading an existing 6 MGD activated sludge plant for the City of Klamath Falls, Oregon. Process alternatives included selector activated sludge (AS), step feed AS, integrated fixed film AS, customized oxidation ditch AS, and membrane bioreactor (MBR) AS. Unique design features included meeting stringent nutrient limitations.

Capacity Analysis and Process Comparison, Clackamas County Service District # 1, OR

Provided an independent evaluation of treatment capacity, costs and alternatives for upgrading/replacing the 10 mgd Kellogg WWTP. Alternative included comparing 7 different treatment scenarios for liquid and solid handling. Technology evaluations were completed for: selector activated sludge, membrane bioreactors, odor control, biological nutrient removal, both gaseous chlorine and UV disinfection, anaerobic digestion, sludge thickening/dewatering and effluent filtration/reuse.

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Upgrade of SBR Facility City of Arlington, WA

Arlington WWTP Evaluation of a 1.5 mgd sequencing batch reactor (SBR) plant which include a review of actual to design loadings. The interaction of loading and solids yield, and their impact on solids handling and the ability to remove ammonia was studied.

Process Evaluation Pima County, Tucson, AZ

Evaluation of a 1.1 mgd oxidation ditch with recommendations to convert a flow equalization basin to a biological selector.

Engineering Plans & Specifications City of Woodburn, OR

Project coordination on development of engineering drawings and procurement specifications for a 1.5 mgd submersible pump at the Mill Creek Pump Station.

Process Evaluations City of Battleground, WA

Feasibility study of constructing a new 2.0 mgd wastewater treatment plant. Besides conventional treatment, alternatives considered included effluent reuse, filtration and membrane bioreactors (MBRs).

Upgrade of SBR Washoe County, NV. Cold Springs WWTP

Evaluation of methods for restoring treatment capacity to a 0.35 mgd sequencing batch reactor (SBR) plant. Work resulted in the conversion of the SBR to aerobic digesters and constructing an oxidation ditch activated sludge plant.

Feasibility Study Washoe County, NV Spanish Springs WWTP

Feasibility study for construction on a new 2.0 mgd wastewater treatment plant. Oxidation ditch followed by effluent treatment suitable to produce water quality of reuse quality was recommended.

Lagoon Upgrade Nevada County, CA Lake of the Pines WWTP

Evaluation of methods for upgrading a plant with aerated lagoons followed by sand filtration of secondary effluent. Final recommendations included upgrading using membrane bioreactors.

Upgrade to BNR City of Camarillo, CA

Analysis of a 3.5 mgd facility with two activated sludge plants onsite that needed to upgrade to biological nutrient removal. Recommendations were given for operation and facility changes.

Process Evaluation City of Glendale, CA

Process evaluation and value engineering at the 20 mgd Glendale Water Reclamation Facility. Services included a peer review of recommended improvements by other engineering firms.

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Facility Planning City of Winlock, WA

Completion of a facility plan including studying both collection and wastewater treatment alternatives. The recommended upgrade included preceding the existing rotating biological contactors with a trickling filter.

Process Evaluation City of Lebanon, OR

Evaluation of a 2.7 mgd conventional activated sludge plant for use in combination with wetlands treatment prior to river discharge.

Process Analysis City of Susanville, CA

Study of simultaneous nitrification/denitrification at a 1.2 mgd oxidation ditch plant. Results of the study were used to add cyclic aeration capability.

Evaluation of SBR Upgrade Rancho CA Water District Santa Rosa , CA

Water Reclamation Facility Study of a 5.0 mgd sequencing biological reactor (SBR) plant designed to remove both nitrogen and phosphorus.

Facility Planning Shady Cove, Oregon

Evaluation and report assessing capacity and improvements to 300,000 gpd extended aeration plant. Work included quick-fix improvements of installing a vertical screen sludge thickener.
