INDUSTRIAL WASTERWATER TREATMENT PLANT
Project Description

Completion Date: The project was completed in August 2016

*Just in time for the Fall crush at the existing winery!*

Industrial Wasterwater Treatment Plant with view of Red Mountain
INTRODUCTION

The City of West Richland, population of 14,340, is primarily a “bedroom community” that is ideally located between the Tri-Cities and the world-renowned Red Mountain American Viticulture Area (AVA). In 2008, with the country in a recession, winery and tourism were two of only a few economic sectors with positive job growth and industry expansion. The City of West Richland wanting to take advantage of this unique economic development opportunity, retain the two existing large scale wine production facilities, Vinmotion Wines that produces 600,000 cases of wine per year and Red Mountain Wine Estates that produces 165,000 case of wine per year, and retain southeastern Washington’s first distillery, Black Heron Distillery, while attracting new ‘boutique’ style and large scale wine production facilities by constructing a sustainable, centrally located, environmentally friendly and cost effective solution to the treatment and disposal of the processed water from these types of industrial facilities.

Continuing to utilize the City’s existing municipal Wastewater Treatment Plant (WWTP) that was expanded in 2009 would not be a sustainable solution for winery production effluent treatment, and the plant would reach capacity in less than 10 years rather than 20 years with the burgeoning Washington State wine industry production growth and strong residential development growth within the City. The West Richland City Council and staff realized the potential economic and job creation benefits of a cost effective, centrally located and operated industrial processed water treatment facility specifically designed to treat and dispose of winery processed water. The facility is critical for the existing wineries to expand, attracting additional wineries and attracting other related industries.

The City secured a low interest loan for the Industrial Wastewater Treatment Plant (I-Plant) through the Washington State Public Works Trust Fund (PWTF). This loan was one of the last disbursements made from the PWTF.

The design process began with a vendor procurement advertisement to select an equipment package to prepare a detailed design package around. Cloacina was selected as the vendor and the design team worked on completing construction plans and specifications around the Cloacina Membrane Bio-Reactor (MBR) package. The system includes an influent lift station, screening, influent storage tanks, modular tanks providing biological treatment, effluent storage tanks, and solids dewatering. All of the equipment fits neatly inside of a pre-engineered metal building designed to allow expansion of the plant in the future.
Influent and effluent storage tanks were incorporated into the design to offer maximum flexibility - the storage will allow operators to store flows and discharge them at night time during low demand periods in the sewer collection system and at the existing municipal Wastewater Treatment Plant. This creative solution minimizes the impact on the existing plant and maximizes utilization of an existing asset. Moreover, the effluent storage will provide flexibility to put the treated effluent to beneficial use, like land application – if the City decides to pursue that in the future.

The industrial wastewater treatment plant (I-Plant) and associated industrial sewer collection system was designed to specifically treat and properly dispose of the unique characteristics of winery process wastewater water from the annual production of up to 2.5 million cases of premium wine with the ability to be expanded in the future to handle 5 million cases of premium wine.

**CONSTRUCTION SCHEDULE, MANAGEMENT, AND CONTROL TECHNIQUES**

The City of West Richland Public Works staff provided construction management (CM) services for the project. Construction scheduling and management was key for this project in order to fulfill requirements from the funding agency but also to ensure that the plant was operational for the 2016 crush season. Construction occurred over an 8-month period. City Staff led construction coordination meetings in order to ensure that the project remained on schedule. City Staff also provided full-time on-site construction observation in order to ensure the quality of the construction as well as to facilitate resolution of any issues that occurred during construction.

Groundwater was known to be an issue during construction and contingency
plans were prepared for the management and disposal of groundwater pumped for dewatering of underground infrastructure.

Utilizing a pre-engineered metal building was key in order to meet the aggressive schedule as well as provide expandability in the future. Also, selecting a vendor that provided skid-mounted and packaged treatment solutions was vital in order to meet the schedule. The selected and City supplied system fit easily inside of the small building and assembly of the equipment proceeded with ease.

As described in the introduction, the City secured a low-interest loan to finance the project. The City has established a special sewer fee for the industrial facilities that send waste to the I-Plant and those fees are intended to contribute significantly towards repayment of the loan as well as eliminate the up-front costs to the winery facilities. In addition, this facility is scalping high-strength waste that was otherwise being sent to the municipal wastewater treatment plant. The addition of the I-Plant has freed up reserve capacity that will provide at least another ten years of residential, industrial, and commercial growth for the community.

SAFETY PERFORMANCE

Ensuring safety at the work site was a priority to the Contractor and the City. There were zero lost time injuries per 1,000 man-hours worked during the entire project. The contractor held regular on-site safety meetings where upcoming work and potential hazards were identified.

ENVIRONMENTAL CONSIDERATIONS

The I-Plant is a state of the art Membrane Bio Reactor (MBR) wastewater treatment facility that is dedicated solely to the treatment of industrial wastewater. The City’s existing municipal WWTP was sized based upon typical residential strength wastewater, and the high-strength wastewater from wineries caused operational difficulties and consumed valuable biological capacity. The I-Plant is designed specifically to treat the high-strength wastewater from wineries and does so inside of one building that is housed on a compact one-acre site. This provides immediate relief to the existing municipal WWTP and allows it to continue the streak of receiving five consecutive, Outstanding Performance Awards from the Washington State Department of Ecology for the WWTP and the City’s NPDES permit.

Influent and effluent storage tanks provide flexibility for the operators to store and treat wastewater on a schedule that works best for the municipal wastewater plant. For example, the treated water can be stored and released during the night-time when the existing collection system and WWTP typically experiences low demand.
The City is also evaluating options to reuse the effluent from the I-Plant and put it to beneficial use on parks or other suitable land.

The HVAC unit was designed with a unique Energy Recovery Ventilation (EVR) system which utilizes the normally exhausted air to precondition the incoming air. This has resulted in improving indoor air quality while reducing total HVAC equipment capacity and saving energy.

High efficiency LED lighting was used throughout the interior and exterior of the plant to reduce power consumption. The use of LED lighting dovetails nicely with the recent 100% conversion of City street lights from High Pressure Sodium to energy efficient LED lights, saving 70% to the street light budget.

COMMUNITY RELATIONS

The City of West Richland used a multi-year public involvement process to ensure community input and support – starting with a study that quantified the economic impact of the project. This collaboration resulted in the completed project being received positively by the community and users of the facility. The available capacity gained at the municipal WWTP will ensure room for growth for years to come.

The entire MBR treatment facility is enclosed in a non-descript building that matches the look of the industrial area that it will serve. Odor control is included in order to mitigate the small amount of odor that the MBR facility generates.

"The construction of the iPlant will be a great asset not only for the City of West Richland and its residents, but also for the Tri-City community as a whole. It will generate jobs, additional tax base, tourism, and supports the thriving expansion of the world renowned Red Mountain wine industry."

- Mayor Brent Gerry
UNUSUAL ACCOMPLISHMENTS UNDER ADVERSE CONDITIONS

There were a number of adverse conditions that were effectively addressed as part of the project. These ranged from property acquisitions, to securing funding, and easements, to making changes to the design team, to permitting State highway crossings, to building positive community and stakeholder relations that had been degraded due to a variety of historical factors.

In 2008, the West Richland City Council and staff discussed the potential economic and job creation benefits of a cost effective, centrally located and operated industrial processed water treatment facility specifically designed to treat and dispose of winery processed water. The proposed facility was critical for the existing wineries to expand, attracting additional wineries and attracting other related industries. With the recent expansion of the City’s existing Biolac Wastewater Treatment Plant, while not ideal and/or sustainable for the long-term, there was interim capacity to handle pending winery production facilities processed water while a sustainable Industrial Waste Water Treatment Plant (I-Plant) was designed, permitted, and constructed.

Securing funding for the I-Plant became one of the top strategic focus areas for the City of West Richland. In October 2009, technical and financial information received from the Infrastructure Assistance Coordinating Council’s Conference was instrumental in West Richland obtaining a $40,000 grant for the US Department of Commerce Economic Development Administration to complete a formal study to confirm the potential economic and job creation benefits if an industrial wastewater treatment plant were to be constructed.

In March 2010, the completed study confirmed the construction of a dedicated industrial wastewater treatment plant, specifically designed to treat and properly disposal of winery processed water from the annual production of up to 2.5 million cases of premium wine, that is expandable in the future to handle 5 million cases of premium wine, the City of West Richland would be able to fully realize the following economic impacts:

1. Generate capital investments of $26.8 million to the region with business revenues estimated to be approximately $289.5 million per year.
2. Create an estimated 75 direct jobs and 1,185 revenue-generated jobs with a payroll totaling $35.3 million per year.
3. Fiscal impacts would include approximately $2.2 million in a one-time sales tax (during construction) and $7.4 million annually generated by anticipated direct worker spending and $292,800 in annual property taxes to state and local jurisdictions.

The study also confirmed utilizing the City’s existing Biolac Wastewater Treatment Plant that was just expanded in 2008/2009 would not be a sustainable solution for...
winy production effluent treatment and would reach capacity in less than 10 years rather than 20 years with the burgeoning Washington State wine industry production growth and strong residential development growth within the City. The City’s existing Biolac Wastewater Treatment Plant is a patented aerated activated sludge wastewater treatment system that is an ideal for effectively and economically treating residential strength wastewater (Biochemical Oxygen Demand (BOD) concentrations less than 200 mg/l), but was not designed to treat industrial wastewater or winery processed water with BOD concentrations of more than 7,000 mg/l and/or the large seasonal volume variations during crush and barrel racking operations.

In May 2010, West Richland applied for a $2,000,000 Public Works Trust Fund (PWTF) loan to design, permit and construct an industrial wastewater treatment plant and associated industrial sewer collection system with an initial capacity to specifically treat and properly dispose of the unique characteristics of winery processed/ wastewater water from the annual production of up to 2.5 million cases of premium wine with the ability to be expanded in the future to handle 5 million cases of premium wine. The industrial wastewater treatment facility was initially planned to be centrally located on 20 acres of donated land which would be buffered within a master-planned mixed-use 325-acre wine production industrial and retail park known as the Red Mountain Center.

Information gathered from the October 2009 IACC Conference was utilized to successfully secure a $2,000,000 PWTF loan for the project.

In September 2011, the West Richland City Council authorized the execution of the $2,000,000 PWTF Loan for the $2,400,000 project. The project had gained a lot of momentum from the original vision back in 2008 and with funding secured staff was ready to hire an engineering consultant to complete the facility’s design.

The project was going to be constructed on a parcel of property to be donated to the City, but the ownership of the property changed between the application and execution of the PWTF loan. After more than a year of negotiations with the new property owner for the acquisition of the property, the City was not successful. In May 2013 the project seemed to have new life, the City partnered with the Port of Kennewick to explore the idea of locating the proposed facility on the Port’s 92-acre former Tri-City Raceway property. City and Port staff worked diligently together on the project for the next year, but in the end could not overcome the one fatal flaw with the site, the Port’s property was not within the West Richland’s urban growth boundary, and amending West Richland’s urban growth boundary in a timely manner was too risky with a September 2016 PWTF loan deadline to design, permit and construct the project.
At this point it had been nearly two years since the PWTF loan had been executed and all the options for acquiring a 20 acre site for the I-Plant had been thoroughly exhausted. In January of 2014 the next step for the project seemed clear for many; the City needed to return the $2,000,000 PWTF loan, but the City’s Mayor, Council and staff still believed in the project and was not ready to throw in the towel.

During the previous two years, City staff had toured various facilities and technologies in central California that treated effluent from winery production facilities. Many of the facilities in California were privately owned systems on small footprints, typically less than an acre, due to high land values and utilized a membrane bio-reactor (MBR) system for treatment or similar technology. Initially West Richland’s project was going to use aerated lagoons and evaporation ponds for treatment because a 20-acre parcel was proposed to be donated. City staff began to review the potential of using a similar MBR treatment system and the ability to acquire a one acre site. Preliminary analysis showed the City could acquire a one acre site, design and construct a MBR treatment system within the original project budget of $2,400,000 while still meeting the project’s goal of treating winery processed/wastewater water from the annual production of up to 2.5 million cases of premium wine with the ability to expand to handle 5 million cases.

The project once again gained momentum and in June 2014, staff was finally able to secure the acquisition of a privately owned piece of property for the facility at a below fair market rate. The 2-1/2 years’ worth of delays and issues with securing a site for the facility nearly ended the project before it even got started, but in the end the newly acquired one-acre site was superior to the previous site and expanded the I-Plant’s potential gravity service area from 325 acres to more than 500 acres of industrially zoned land.

Given the delays and issues with the site acquisition phase of the project and only 2-1/2 years to complete the project, a
new consultant was hired in June 2014. The consultant selection was based on prior experience, qualifications of employees and the ability to meet aggressive project milestones and the PWTF loan’s deadline of completing construction by September 2016. Unfortunately, the selected consultant was not able to meet specific project milestones, or desires of the City hence their contract was terminated in January 2015 and a new consultant team, Wallace Group and J-U-B Engineers, were hired in April 2015.

Wallace Group and J-U-B Engineers were able to hit the ground running and complete the facility design, procurement of a membrane bio-reactor (MBR) treatment system from Cloacina, and oversee the successful completion of construction of the Industrial Wastewater Treatment Plant by August 2016; just in time for the 2016 crush season.

Obtaining a biological seed in order to get the biological treatment process up and running during start-up was another challenge. Because this facility was to treat purely industrial wastewater (no sanitary sewer), seed sludge from the City’s municipal WWTP could not be used. Fortunately, a neighboring french fry food processing facility (Lamb Weston) was willing to provide some seed from their industrial wastewater treatment plant. A large tanker truck was then tracked down to help with transporting approximately 5,000 gallons of seed sludge which was used to start-up the new I-Plant facility in order to have the plant ready to accept winery wastewater.

**ADDITIONAL CONSIDERATIONS**

Multiple wineries, breweries, and distilleries are popping up throughout the Pacific Northwest, and the cumulative effect that high-strength wastes have on municipal WWTPs are beginning to take its toll. Residents of these communities should not be forced to subsidize these industries in the form of higher sewer rates in order to fund expansions necessary to handle the high strength waste. This project is an example of growth paying for growth as well as a “build it and they will come” approach. The City developed a mechanism to charge these industries for the higher-strength waste to ensure that they are paying their fair share of the cost as well as eliminating the up-front costs to the wineries for on-site treatment. The City of West Richland temporarily accommodated some initial industrial wastewater while developing a proactive approach to build this facility that will be dedicated to treating industrial wastewater.

With the successful completion of the Industrial Wastewater Treatment Plant and the ability to treat process water/wastewater from not only winery production facilities, but also from...
breweries and creameries, the predictions from the 2010 Economic Development Study are becoming a reality. The City of West Richland just issued a building permit for the construction of a $6 million winery production facility that will initially produce 40,000 cases that is expandable to over 100,000 case of wine with several pending land sales for the construction of additional winery production facilities near the I-Plant. West Richland also has regained 10 years of treatment capacity within the existing Biolac Wastewater Treatment Plant providing sewer capacity for residential, industrial and commercial development through 2029.

You can view an article about the project in the National Public Works Magazine here: http://www.pwmag.com/water-sewer/wastewater/make-way-for-wine as well as in the January publication of the magazine.

**ECONOMIC IMPACTS**

The City of West Richland has traditionally been known as a bedroom city for the remainder of the Tri-Cities Area (Richland, Kennewick, Pasco) and has historically experienced a low tax base. The addition of this I-Plant allows the City of West Richland to add family wage jobs at industrial facilities located within their urban growth boundary. The addition of industrial companies to the tax base will have a lasting impact to the City for generations to come. Without the addition of the I-Plant, these large industrial wine producers (as well as future), would have located to other areas in the region.

Entire Plant fits neatly inside one building.