



Project Highlights e-Book



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Performance

Easiest MBR O&M

Robust Design

Value



Smith & Loveless Inc.

TITAN MBR™ Project Highlights e-Book

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Packaged MBR Treatment with the Easiest O&M and Water Reuse

The packaged **TITAN MBR™** Membrane BioReactor (MBR) is the most cost-effective solution for enhanced wastewater treatment and water reuse for private developers, industrial facilities and federal / military installations. Enhanced to make operation more automated and simpler, and regular maintenance safer and less frequent than any other membrane system, the **TITAN MBR™** features compact models with the ability to efficiently achieve customized effluent goals, including water reuse, side-stream scalping and green certifications such as LEED and Title 22.

Easy to Install. Robust Plant Designs

TITAN MBR™ systems utilize S&L flat-sheet membranes to meet or exceed the most stringent regulatory standards for direct

discharge and secondary reuse. Designed with rugged stainless steel componentry and pre-wired cable trays, designs have been simplified for a truly factory-built plug-and-play system. The only thing installed on site is a fine screen. Pre-engineered systems range in capacity from 1,000 GPD (3.8 m³/d) to 0.1 MGD (1,890 m³/d).

Complete Project Support

From the beginning stages through design, delivery and start-up, we are there to assist you with complete project support, including design calculations, drawings, process selections, start-up and after market service. Smith & Loveless pioneered single-source responsibility for wastewater equipment more than 65 years ago, and we look forward to serving our customers for decades to come.

TITAN MBR™ Benefits

- Complete project support by S&L
- Robust plant design
- Plug and play installation
- Extremely space-efficient
- Models as narrow as 8' (2.4m) deep
- Easiest O&M of any MBR



TITAN
MBR

TITAN MBR™ Market Applications

Military / Defense



Application: Military / Defense
Requirements: Modular Design,
Water Reuse / Reclamation
Flow: 22,000 GPD
(114 CMD)

Food Processing



Application: Food Processing - Nut Processing
Requirements: Minimal Land Usage,
High Quality Effluent
Peak Flow: 10,000 GPD
(38 CMD)

Residential



Application: Private Development
Requirements: Minimal Land Usage,
Water Reuse / Reclamation
Peak Flow: 101,000 GPD
(382 CMD)

Residential



Application: Private Development
Requirements: Minimal Land Usage,
Water Reuse / Reclamation
Peak Flow: 101,000 GPD
(382 CMD)

Casino



Application: Lucky Eagle Casino
Requirements: Effluent Quality
Flow: 100,000 GPD
(378.5 CMD)

Personal Health Care



Application: Health Care / Nursing Home
Requirements: Minimal Land Usage,
Nitrogen Reduction
Peak Flow: 22,300 GPD
(84 CMD)



Naval LEED Project Includes TITAN MBR™ for Water Reuse



Application: Military / Federal Gov't.

Product: **TITAN MBR™**
Membrane Bioreactor System

Requirements: Modular design,
Water reuse/reclamation

Avg. Flow: 22,000 GPD
(114 CMD)

Influent BOD: 425 mg/L

Influent TSS: 250 mg/L

Design Effluent: Less than 5 BOD / TSS

When the U.S. Navy's Naval Facilities Engineering Command (NAVFAC) proposed building 32,000 sq. ft / (2973m²) of new barracks to serve 106 sailors at the Naval Auxiliary Landing Field, San Clemente Island, Ca. (SCI), it heavily emphasized the use of innovative construction practices and sustainable technologies.

NAVFAC designed the two buildings to be the first permanent modular barracks in the Navy. This type of design not only reduced the logistical challenges of construction on an offshore island, but also allowed for improved quality control and sustainability. The latter is fundamental for achieving the project's planned LEED Gold certification.

Historically, water used at SCI must be hauled from the San Diego coast 75 miles from the shore. To further meet LEED standards and reduce water usage and hauling, NAVFAC specified a 30,000 GPD pre-engineered **TITAN MBR™** wastewater treatment system provided by Smith & Loveless. Because the packaged MBR system will achieve California TITLE 22 standards, S&L also supplied two modular water booster systems for distribution following treatment.

The modular design of the **TITAN MBR™** system aligned with the construction principles of the project, and the system's high quality treatment performance allows sustainable practice of reusing water for irrigation and other uses on the island.



S&L Assists Food Processor with Treatment Plant Solution



Application:	Food Processing Facility Hawaii	Peak Flow:	10,000 GPD (38 CMD)
Product:	TITAN MBR™ Membrane Bioreactor System	Influent BOD:	2,520 mg/L
Requirements:	High Quality Effluent, Minimal land usage,	Influent TSS:	1,000 mg/L
Avg. Flow:	8,500 GPD (32 CMD)	Effluent BOD/TSS:	Less than 60 mg/L
		Dimensions:	31' X 12' (9.4 m x 3.7 m)

The macadamia nut is indeed favored by many as a high quality nut, evidenced by its extensive use in desserts or simply as a premium stand-alone snack. One of the world's leading producers of these delicious nuts produces more than 15 million pounds each year from its Hawaii processing plant.

Producing the nuts is a rather meticulous process that involves multiple steps, including collection, high-strength cracking, cleaning and dehydration. High-strength wastewater is primarily generated from the nut-cleaning stage, in this case more than 10,000 gallons per day (38 CMD) with 2,500 mg/L BOD and suspended solids greater than 1,000 mg/L resulting from shell residuals collected in the cleaning process.

To meet permit guidelines, the producer selected a Smith & Loveless **TITAN MBR™**. The 31' X 12' (9.4 m x 3.7 m) pre-engineered system, featuring S&L flat-plate membrane technology with a complete, yet compact process design, easily meets the effluent requirements while minimizing precious land use at the processing facility. The unique S&L design begins with a robust and stable process scheme that minimizes daily operation requirements. The system's flat-plate membranes remain submerged within the aeration zone (a key in reducing plant footprint), and they only require seasonal chemical cleaning for just a few hours. This efficient cleaning cycle can be accomplished while the plant remains in operation, enabling plant resources to remain more focused on producing those tasty nuts.



S&L Assists Local Developers with Water Reuse MBR Solution



Application:	Private Development Indian Beach, NC	Peak Flow:	101,000 GPD (382 CMD)
Product:	TITAN MBR™ Membrane Bioreactor System	Influent BOD:	250 mg/L
Requirements:	Minimal land usage, Water reuse/reclamation	Influent TSS:	250 mg/L
Avg. Flow:	60,000 - 80,000 GPD (227 - 302 CMD)	Influent TKN:	45 mg/L
		Dimensions:	48' x 12' (14.6 m x 3.7 m)

When developers of a condominium complex sourced wastewater treatment systems, it did so with two primary requirements: efficient land utilization and high effluent quality to meet stringent guidelines.

Located in the quaint fishing village of Indian Beach, North Carolina, the planned development included more than 200 condominium units near oceanside property. Land costs were extremely high on this coveted property and developers required a system that would minimize land usage to keep project costs down.

State regulators advised the developers to discuss combining its wastewater system with the owner's association of an adjacent housing development, whose existing wastewater treatment system was aging and required augmentation. Its subsurface disposal field necessitated

a treatment system capable of producing high quality effluent that could be reused/reclaimed.

The parties agreed and selected the **TITAN MBR™** wastewater treatment system provided by Smith & Loveless. The combined scheme required 101,000 GPD / (382 m³/d) treatment system with screening that could meet the local guidelines for subsurface discharge.

Likewise, the **TITAN MBR™** system's modular design allowed for minimal land usage. With the robust S&L process design and flat-plate membrane performance, the project was successfully permitted and installed, where today it continues to meet the needs of the residential communities.



Private Development MBR Meets Environmental and Space Requirements



Application: Private Development
Lake Gaston, NC

Product: **TITAN MBR™**
Membrane Bioreactor System

Requirements: Minimal land usage,
Water reuse/reclamation

Avg. Flow: 60,000 - 80,000 GPD
(227 - 302 CMD)

Peak Flow: 101,000 GPD
(382 CMD)

A Smith & Loveless **TITAN MBR™** Membrane Biological Reactor treatment system was chosen, designed and permitted for water reuse standards for a private development adjacent to Lake Gaston, North Carolina. The project included a 101 residential lot development along with several multi-family condominium units. The MBR's modular design allows for an efficient installation with a minimum footprint crucial to the overall land use for the development.

Wastewater disposal options for this development also required a focused review because of the challenge to permit maximum land utilization while meeting the environmental requirements tied to the reservoir that is used for drinking water. It meets reuse/reclaim effluent and utilizes spray fields for disposal.





Lucky Eagle Casino Expansion Includes TITAN MBR™ Bioreactor



Application:	Lucky Eagle Casino Rochester, WA	Influent BOD:	350 mg/L
Product:	TITAN MBR™ Membrane Bioreactor System	Influent TSS:	350 mg/L
Avg. Flow:	100,000 GPD (378.5 CMD)	Influent TKN:	70 mg/L
		Design Effluent:	< 3 BOD / TSS/TKN

The Lucky Eagle Casino and Hotel, which soars at 1,000 feet / 305m in Rochester, Wash., is owned and operated by the historical Chehalis Tribe. When the Lucky Eagle decided to spread its wings to include more restaurants and bars, the resort needed to upgrade its wastewater treatment to a compact system with minimal operational costs.

Seven restaurants and bars, including a steakhouse and national coffee bar, provide hotel and casino guests with plenty of opportunities to wine and dine. The expansion brought 171 more hotel rooms, necessitating a complete wastewater treatment system like the Smith & Loveless **TITAN MBR™** to capably handle the variable flows generated by the facility and produce high quality effluent for subsurface discharge.

In just eight months all of the steps from the planning process to installation were completed. The entire system was pre-assembled and shipped ready for installation. The compact Smith & Loveless **TITAN MBR™** system was designed to treat an average daily flow of 100,000 GPD / (379m³/d).

The **TITAN MBR™** uses submerged S&L Flat-Plate membrane technology which results in high-quality treatment performance, a long-lasting design and minimal operational requirements. Membranes are cleaned in place, requiring less chemicals, equipment and operator time. Maintenance can take place without shutting down system operation so the Lucky Eagle can continue running smoothly.



TITAN MBR™ Efficiently Assists Health Care Facility with Total Nitrogen Reduction



Application: Health care / Assisted Living
Centerville, MA

Peak Flow: 22,300 GPD
(84 CMD)

Product: **TITAN MBR™**
Membrane Bioreactor System

Requirements: Minimal land usage,
Nitrogen reduction (<10 mg/L)

When an assisted-living health care facility in the Village of Centerville, Mass., needed to expand its capacity, it's permitting required adding a wastewater treatment facility that could meet stringent nitrogen reduction. The addition of resident beds added to an already tight space, so it was important that the treatment system be compact as well.

The approved design called for a packaged MBR treatment system to handle a groundwater discharge of treated effluent peak flow of 22,350 gpd. This design included a combination of flow equalization, anoxic, aeration tank with flat-plate membranes, pump chamber and subsurface leaching facilities. The facility also includes UV disinfection technology before discharge. The plant is designated as a Massachusetts Grade 4 plant and is operated by certified operators from a regional contract operation firm. Performance data indicates

routine BOD and Total Nitrogen removals of less than 5 mg/l (and other parameters as non-detectable), easily meeting the discharge limits, including for Total N (<10 mg/l).





*Delivering the Best MBR Experience
... Packaged for You.*



Smith & Loveless Inc.

**Begin Your TITAN MBR™ Experience at
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