

FEATURE



Out of Sight, Top of Mind

The importance of efficient and reliable wastewater treatment for tourism facilities

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There is little doubt that tourists will once again return to visiting their favorite local and global beach resorts, mountain retreats, and picturesque destinations sometime in the future. When, exactly, is up for debate, but it is certain that the guest experience will feel different than before the COVID-19 pandemic. Health and safety will be at the forefront of customer experience planning, and this focus will extend to wastewater treatment, an important — but often ignored — consideration that greatly affects tourism.

Prior to the pandemic, tourism was growing annually by as much as 6% in 2018, according to the United Nations World Tourism Organization. In addition to traditional tourist spots, travel-specific TV programs reveal new and exotic destinations around the globe, while information on once-forbidden locations is now accessible via the internet and social media. Unique, customer-focused experiences that were unimaginable decades before are now readily available, ranging from eco-retreats centered on wellness and sustainability to adventure travel in remote destinations that some governments would caution against visiting. A growing and wealthier population, along with travel being more accessible to and affordable for a larger percentage of the populace, have added to this heightened thirst for travel.

Unfortunately, this global increase in tourism can negatively affect the environment, as not all facilities are prepared to accommodate such a growth spurt. With a current pause on global tourism, the time is ripe for hotel and resort owners to explore tourism's effects on the local environment and examine how they can better address health and safety needs as they prepare for the much-anticipated return of their guests.

Definitions

This article defines *tourism facility* broadly as a lodging accommodation that caters to a wide spectrum of vacationing guests. These facilities range from remote mountain retreats in the wilderness of Canada to secluded tropical beach resorts in the South Pacific. They include campgrounds, national and regional parks, golf courses and wellness communities, and other tourism-related lodging.

These properties have a large degree of "seasonality" to them — a high season in the peak months, where they may have nearly 100% occupancy, and greatly reduced occupancy for the remainder of the year. This seasonal variation means the amount of wastewater flow fluctuates throughout the year. Wastewater flow rates correlate to occupancy levels, meaning the water resource recovery facility (WRRF) will be at full capacity during peak occupancy. Besides varying seasonally, flows can also change weekly as venues play host to events such as weddings, corporate retreats, and seminars. Both seasonal and weekly fluctuations present challenges that facilities must be prepared to overcome.



Treatment Plant Goals

Having a well-functioning WRRF aligns with the overall goals of tourism facilities. To start, the facility needs to remain compliant with regulations so the property can stay open for business and generate revenue. But once compliance is achieved, the goal of any tourism facility — especially during the pandemic — should be to maintain the health and safety of its guests in all aspects. This includes proper operation, maintenance, and oversight of the wastewater treatment to ensure that no disruptions negatively affect guest experience. As simple as it sounds, this is not always achieved, as evidenced by news stories about wastewater problems in global tourist hotspots.



Unseen & Unscented

An accommodation that's clean and sanitary, with a WRRF that is invisible to guests, is critical to any tourism experience. For this reason, a major goal of most facility owners is keeping the WRRF "out of sight, out of mind" for guests. The ultimate hope is that guests never notice that there's a working wastewater facility operating during their stay. This means the WRRF must be well concealed, operate quietly, and not

emit any bad odors.

Well-hidden WRRFs can be installed in parking lots, basements, locally inspired decorative buildings, or tucked away in the property's green space. As property reviews and travel blogs are the go-to resources for many travelers, creating and maintaining a positive guest experience is critical. Any online reviews that reference problems with the wastewater system can directly affect future travelers' lodging choices and a property's profitability.



Sustainability Considerations

In contrast to the above, some tourist facility owners may choose to highlight their property's commitment to sustainability, including the wastewater facilities. This can be a selling feature to attract environmentally conscious tourists. Many guests understand the effect of their carbon footprint when traveling, and they look for a lodging experience where that effect will be minimized. We are all familiar with the signs in guest rooms that explain the property's procedure on reusing the bath towels or bed sheets. This recycling concept also can apply to water reuse where — after undergoing advanced secondary treatment and disinfection — treated wastewater can be reused for irrigation, toilet flushing, vehicle washing, dust control, etc.

Effect on Potable Water Supplies

The benefits of reusing treated effluent are financial, as well. Tourism facilities can consume water at very high rates, especially those properties that include pools, spas, fountains, and heavy irrigation (golf courses). Studies show that the average tourist can consume up to 10 times more water than locals while on vacation. This is especially true in the developing world, where per capita water consumption is normally quite low.

Facilities in water-scarce areas often pay a premium for the potable water they consume, while other properties have expensive desalination systems to provide this much-needed supply. In both cases, the amount a property pays for potable water is quite significant and, frequently, policies are put in place to reduce or restrict the amount of water consumption. The reuse of treated effluent is a proven method to reduce this overall consumption and preserve expensive potable water for critical uses throughout the entire facility.

Simplified Operation & Maintenance

The final major goal for property owners is to keep the overall cost of operating and running the WRRF as low as possible and avoid any unnecessary additional investment. In remote areas where electricity is expensive (and sometimes generated on site), having a wastewater treatment system that's extremely energy

efficient or solar-powered can result in significant annual savings. Resource and labor needs are also important considerations. It is expensive for properties located far from population centers to obtain parts and find/retain service personnel. Some treatment systems consume large amounts of chemicals and require significant attention to solids management, both of which can be costly and labor-intensive. Having a well-designed treatment system that requires very little maintenance and has minimal moving parts reduces operation and maintenance costs.

Finally, the realistic life cycle of treatment systems should be carefully reviewed. For example, a facility situated in a tropical climate near the ocean requires extra attention to materials of construction, as tanks and parts made of certain metals may corrode quickly in the salt air, dramatically shortening their life.



Flow Fluctuations

The fluctuation of influent flow described above is one of many wastewater challenges that a tourism facility must be prepared to manage. Accommodating wide ranges of flow — whether weekly or seasonal — is not simple and is a critical factor to consider during design. Treatment systems with a shortened hydraulic retention

time have difficulty meeting effluent requirements when flows are greater than anticipated. This is because the system lacks adequate treatment time and excessive solids can build up quickly.

On the other hand, when flows are much lower than expected, systems may struggle to find a balance in maintaining the proper mixed liquor suspended solids concentration, sludge age, and energy consumption. Designing a system that accommodates for wide, unpredictable flow fluctuations is critically important.

Phased Development

Larger tourism facilities, such as luxury resorts and golf courses within planned communities, are frequently developed in stages over time. From both cashflow and design perspectives, it is ideal when infrastructure has the ability to expand as each phase is constructed. Wastewater collection, piping, and treatment is no exception, and should be designed to be modular and flexible as growth occurs. Without such modularity, investors are stuck paying for the entire wastewater infrastructure up front, leaving very little room for flexibility down the road. Also, in the early stages of property development, fully built-out treatment systems with low flows can be difficult to operate.

A multi-stage, modular build-out was necessary at the Jalousie Plantation (now known as "Sugar Beach, A Viceroy Resort") on the island of St. Lucia. The original treatment facility was destroyed by Hurricane Tomas in October of 2010. Four weeks from initial contact, Orenco[®] was able to quickly provide a first-stage, "emergency" treatment system consisting of two AX-Mobile units to meet initial needs, while incorporating that infrastructure into the resort's second-stage treatment design when the hotel was able to return to full occupancy. The fact that the treatment facility could be constructed for both the first-stage emergency flow as well as future expansion put the owners at ease and spread out their capital investment over time.

Trained Staff & System Monitoring

The operation and maintenance of WRRFs is an often-overlooked component of tourism facility processes. Failure to have such processes in place can result in

headaches and negative financial effects. This is especially the case for hotels and resorts built in remote areas, where the importance of having a reliable and simple-to-operate solution is accentuated.

Far too often, businesses are sold on highly advanced, complicated technology without understanding the skill set required to manage and maintain such a system. The reality is that many properties simply cannot afford to hire and train full-time wastewater treatment operators. Thus, responsibility to manage the system falls on general maintenance employees, hotel engineers, part-time employees, and/or third-party service providers. Operators may change jobs frequently and, in some cases, multiple individuals are responsible for the system's day-to-day operations, which leads to additional confusion. Given these realities, it's extremely important that the treatment system is easy to understand, simple to operate, and maintenance friendly. Without proper operation or maintenance, performance is in jeopardy and can lead to both regulatory non-compliance and negative guest experiences. Also, a treatment facility that requires frequent service and maintenance can hinder a property's long-term profitability.



In cases where WRRF operation is expected to be challenging, investing in a user-

friendly telemetrybased control system is a good way to mitigate risks. These advanced systems allow individuals outside the property, such as consultants, service providers, original equipment manufacturer treatment providers, and distributors, to assist with real-time with troubleshooting and alarm notifications and make minor changes to system operation.

One such example is the Wirib Tourism Park in the Northern Territory of Australia. Due to its isolated location and the lack of skilled maintenance personnel in the area, project stakeholders agreed to replace its failing treatment plant with a highly reliable wastewater system that includes remote monitoring and control. An AdvanTex[®] AX100 system and integrated, SCADA-compatible TCOM™ telemetry control panel were selected, monitored remotely yearround through Orenco's representative for the area. By installing the TCOM panel, property owners were put at ease knowing that their system is being looked after, even without having a full-time operator on duty.

Additional Challenges to Consider

Other unique obstacles that tourism property owners face include locations where severe weather disruptions such as hurricanes, tropical storms, flooding, blizzards, ice storms, or high winds are annual occurrences. In these harsh environments, WRRFs must be resilient and well-built to hold up to Mother Nature.

Another issue that many facilities face are the sources of the wastewater itself. Not only do these systems receive waste from the guest rooms, but they may also collect wastewater with changing flows and characteristics from other onsite facilities (restaurants, laundries, pool bars, shops, and other non-domestic sources). Lastly, the property may be located in an ecologically sensitive region, such as a natural reserve or protected zone, where effluent discharge standards are very rigid and difficult to achieve. In this case, a wastewater system that is capable of consistently meeting these requirements is of the utmost importance.

As difficult as it can be for tourist locations to remain profitable during a global pandemic, all facets of the customer experience must be reviewed to serve the inevitable wave of tourists that will return. This new norm will accentuate the importance of securing and maintaining all aspects of guest safety and health, and

the proper design, operation, and maintenance of WRRFs is no exception.

Whether a property chooses to highlight their environmental focus or keep the treatment system creatively concealed, they face a challenging task. A properly designed, well-maintained, and successfully operated wastewater treatment system will yield a positive effect on a property's bottom line, its environmental profile, and its guest experiences.

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