

FLORIDA KEYS SANCTUARY ADVISORY COUNCIL WHAT WILL OUR WASTEWATER LEGACY BE?

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As the stewards of our Florida Keys, you need to be aware of the system being installed in the Cudjoe Regional Wastewater System (CRWS), the risks associated with it and the questions that are unanswered.

We are not asking you to intervene in the attempt to reduce or eliminate the Low Pressure System (LPS) in the CRWS, we are asking you to be aware of the risks this system faces, demand environmental monitoring, and be fully prepared with response plans for when accidents occur. This system is built by humans, it will fail. It is up to you to demand that the damages be minimized.

This is the last and most complex wastewater collection system of all those installed in the Florida Keys. About 10,000 homes and businesses on six different Keys will have their sewage pumped through almost 300 miles of 1-1/4" to 16" pressurized HDPE plastic pipe through a 30 mile long HDPE transmission line that runs from the north end of Big Pine Key to Lower Sugarloaf Key and empties into the treatment plant on Cudjoe Key. Currently E-1 grinder pumps will be used by 1,500 homes and businesses and about 300 lift stations (with up to 5 E-1 pumps each) pump effluent into the 30 mile long transmission line where booster pumps then assist the pumping. Dozens of waterways and roads will be crossed, including a one mile, line being tunneled 75' under the coral seabed of Niles Channel. This appears to be the largest and most complex Low Pressure System (LPS) system ever installed in the United States. It far exceeds the design model limits of the supplier, Enviro-one and its Marathon based distributor, Water Resource Technologies (WRT) which is supplying the grinder pumps and lift station pumps through a sole source contract. It also seems to be contrary to decisions made by other coastal communities, which when faced with using a pressurized system opted for gravity or vacuum.

Have all of the risks of this system been examined? No!

Has a probabilistic risk analysis been conducted? No!

Have the public or our County officials been given accurate information on the specific risks of individual subsystems? No!

Has a system of this complexity, this size and in this fragile an environment ever been built before? No!

Does the design conform to all FLDEP construction requirements? No!

What do we know? Cape Coral, FL did a very comprehensive study of wastewater technology alternatives. Conclusion! LPS with grinder pumps is the least environmentally desired of all alternatives for replacing septic systems. In fact, inside

the study it shows that LPS performs slightly worse than a well working aerobic septic system. **Cape Coral rejected the use of LPS! So are we replacing our septic systems with an environmentally unfriendly system?**

Comparative Rankings of Alternatives

Alternative	Cost ²	Environment	Reliability	Permitting	Homeowner
Gravity	4	1	1	1	1
Vacuum	2	3	4	1	2
Small Diam.	3	2	3	6	3
LP – Grinder	6	5	6	1	6
LP – STEP	5	4	5	1	3
On-Site	1	6	1	5	5

Note: 1 = Best Rank and 6 = Worst Rank

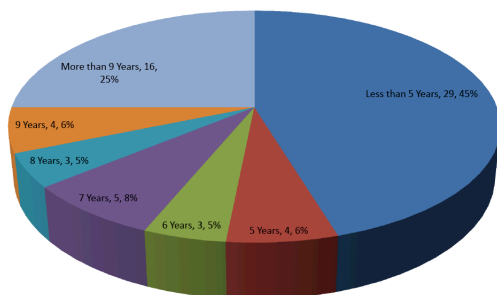
Based on equivalent annual cost including the amortized construction costs, O&M costs, impact fees, and salvage values.

Note: Small diameter refers to a small diameter gravity system which is not allowed in Florida.

Evaluation of Wastewater, Collection Alternatives, [Alternative Wastewater Systems Study](#), City of Cape Coral, Florida, Department of Public Works, June 2007 by Greely and Hansen Engineers;
<http://www.news-press.com/assets/pdf/A476189611.PDF>

Will homeowners get a system that is reliable and assure uninterrupted service? No! Despite the rhetoric and exaggerations of the pump manufacturer and our County Engineer, the only comprehensive survey we have found provides real data to the contrary. Data from Sewer Fairness Alliance of Chelmsford, Massachusetts was assembled in October 2013 and shows that **only 25% of grinder pumps make it past nine years without service calls.** (See web site and links <http://sfa-chelmsford.org/>) In fact, almost half fail in five years, and this is not the Florida Keys environment.

Grinder Pump Failures by Age



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There are other problems unique to the Keys. The E-1 pumps are not designed to be left un-operated for extended periods. E-1 warns that homes unused for two weeks or more should have the system flushed on a regular basis. Some subdivisions in the CRWS have large numbers of part-time residents. Part time use also raises questions about minimum flow requirements needed to keep the small diameter lines from

plugging. **FKAA is already experiencing problems with plugged forcemain lines at the State Park on Long Key.** There are issues with required easements and a potential legal question on the impact on mortgage documents as well as the impact on property values since homes for sale with grinder pumps must have that information disclosed.

What about the two underground ocean channel crossings? Because the original Wastewater Master Plan was aborted in favor of a single central sewage treatment plant, raw septic sewage will be pushed underneath two major ocean channels. The original design called for a protective casing around the sewer forcemain pipe under these navigable channels. That design was aborted in favor of no casing at all. The reason given for not using a casing was that the casings on similar projects had worn through due to vibration and movement. Now that there is no casing at all, the forcemain itself will be rubbing on rock and there will be no way to discover a leak and no way to pull a replacement pipe through. When a leak occurs, the forcemain will be injecting sewage of a lower specific gravity than the salt water, so it will rise through porous coral strata into the channels with their strong tidal currents to distribute the untreated waste with its nutrients and pathogens. A thorough read of the engineering recommendation on the channel crossing does not give one great confidence. The Niles Chanel crossing is 5,200', significantly longer than the 4,000' previous longest pull using this method.

Perhaps our greatest concern is that the effort to improve our environment through an improved sewage collection and treatment system may actually be a failure. The hundreds of miles of pipe and the thousands of grinder containment units are made of High Density Polyethylene (HDPE), with pipes ranging in size from 1.25" to 16" that will be buried 2' to 4' under the surface with pressures up to 73 psi and 30" by 84" vessels that are buried in the salt water aquifer. There will be thousands of pipe welds in the field, each requiring, per the manufacturer, dry and clean conditions for the thermal weld to be successful. Also, it is a fact, confirmed by the Plastic Pipe Institute of America itself that all HDPE pipe will get brittle over time, particularly when exposed to chlorine and salts. Just 50 microns of surface oxidation depth is enough to cause HDPE catastrophic failure due to its crystalline-like structure. Sodium laurel sulphate (shampoo, detergent, etc) is aggressive on the anti-oxidants in HDPE. When a pipe or vessel in the pressure system cracks or breaks it is almost impossible to identify the leak. The porous limestone makeup of the Lower Keys and the water table that is only a few feet below the surface will cause any leaking sewage to go right to our local waters. **Gravity and vacuum systems are also made of HDPE but they are fail safe in that when they leak,** the water flows into the system not out. It is inevitable that there will be leaks from cracking and breaks due to sink holes, road vibration, accidental drilling, and the incredible force on lift stations and grinder units during a tidal surge.

The pumping flow rates of the LPS are not adequate to resuspend solids and grease that separate from the waste stream and stick to the walls of the many forcemains, both collector and transmission mains. The forcemains were designed to achieve a minimal

scouring velocity during peak flow periods, but even then, because the flow is intermittent, solids and grease will come out of suspension, and a stronger flow than is possible with the selected pumps is necessary to resuspend deposits. USEPA's Wastewater Technology Fact Sheet, Sewers, Pressure says "GP [grinder pump] systems must attain at least three to five feet per second at least once per day"

Likewise, the flow velocity is not adequate to carry along sewer gasses that will be generated. Gasses will accumulate wherever the forcemains run downhill or dive under roads, culverts, or water mains where there is not an air release valve on the upstream side. These locations are many, and when these forcemains air-lock, there will be an artificial excessive head condition created. The E-1 grinders specified are capable of pressures exceeding the test pressure of the piping, but even if the pumps do not burst the pipes, the service crews may do so in their efforts to push through the blockage. When the pipe splits, the gravel bedding will take the flow, becoming a French drain for raw sewage to seek our treasured waters. The service crew may be oblivious to the fact they have broken the pipe - they see a pressure drop and presume they have cleared the blockage. They will have actually established a long cesspit trench that will contaminate the environment for many years to come with nutrients and pathogens in an undetectable manner. A grinder pump based low pressure sewer is not suitable for the Florida Keys.

Members of the SAC. Be skeptical of what you are told by our experts. Trust your own instincts. Demand answers and preparation for failures. You are the stewards and guardians of our treasured environment.

Many of the articles and analysis performed can be found on the Sir Isaac Newton Coalition web site www.newtoncoalition.com or the Dump the Pumps site: www.dumpthepumps.com

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