

Wastewater Basics – by David Price

We all get the dreaded notices from time to time: Development inevitably encroaches into new areas. The desirable riparian habitat, and environs, is a beautiful place. People want to be there. It is calming. It is pretty. It calms the soul in all of us. But with development comes the need for infrastructure. Water, electric, drainage, roads and – one of our not-so-pleasant things: wastewater. Sewage. Crap.

Basically, sewage is either handled by an On Site Sewage Facility (OSSF) – aka “septic system”, or a larger central plant. The larger plants collect the sewage through pipes, and goes into a large plant, where it is treated (mostly through aerobic digestion, whereby air is bubbled through the sewage, and bacteria digests it, outputting water, gas, and some minor by-product. A septic system starts with a tank that captures the raw sewage, it is then separated into solids and liquids, and the treatment process happens. Like a central plant, one option is to blow air through this mixture (known as Aerobic Treatment Units, or ATUs). If the process is done slowly, the by-product is clean enough to actually spray on the ground (with disinfection to kill viruses), or dispose of with subsurface methods of drip irrigation, which is very similar to the drip irrigation system you hopefully are using in your garden.

The other commonly used ground disposal type of OSSF is the “pipe and gravel” system. The liquid portion of the effluent is sent to a series of trenches via a piping system (under pressure is best, with fields that automatically switch locations, when the pump is actuated), whereby bacteria growing on the gravel similarly digests the organics in the liquid portion of the sewage (the solids stay in the tank, and slowly decompose. These tanks require pumping every 3-5 years to remove stuff that does not decompose).

So why is all of the above important? Glad you asked!

OSSFs are generally used on lots of more than 1 acre. Different counties have different rules that modify the rules set under the Texas Administrative Code. Each county has a person that is known as a Designated Representative, or DR (acting on behalf of the Texas Commission on Environmental Quality, or TCEQ) to permit such systems on these lots. These DRs can legally permit such systems up to 5,000 gallons per day. This equates to about 20 3-bedroom homes. No State permits are required, and the effluent remains totally on the lots. There is no discharge to the Surface Waters of the State.

Central plants generally collect more than 5,000 gallons per day. These are often used where they are high concentrations of people, such as high-density subdivisions, or where there are many people at once. This could be things like Retreat Centers, hotels, Summer Camps, etc. These systems are permitted by the State, under a section of the Texas Administrative Code. Here is where it gets interesting (I know, you were wondering if it was going to get interesting, or not).

The real question in the design and permitting phase is - does the plant discharge to a river or creek, or not?

Wastewater Treatment Plants can either be a discharge plant, or a non-discharge plant. Quite simply, if a plant discharges to the waters of the State, it has to be pretty clean. You hear terms like 5/5/2/1/6, which means BOD5, TSS, NH3, PO4, DO. These numbers have to do with the components in the wastewater quality that exits the plant. The Biochemical Oxygen Demand (BOD5) is a measurement of the organics in the water. The Total Suspended Solids is just that. The Nitrogen (ammonia) is harmful to fish, if too high. The Phosphorous (PO4) can lead to excess nutrients.

To do a discharge, the water is supposed to be very, very clean. These permits require public hearings, extensive engineering, and expensive construction. Developers are always concerned with dollars. How QUICK can they get something permitted, and how quick can they make money, or get their project going? Discharge permits can take years (and years) to obtain. But alternatives exist.

A non-discharge permit generally can be done much more quickly. Wait, you're "allowing" a wastewater plant!!!??? Hold on, buckaroo, they are legal. BUT, with a non-discharge permit, ALL of the treated effluent goes into a ground disposal system, away from any surface drainage that could wind up in the river. This effluent doesn't have to be as clean, and therefore it doesn't take as big a treatment plant, doesn't require as much electricity to operate, and – more importantly – does NOT discharge into a waterway (ditch, creek, and ultimately a river).

So why should we care? Why should you care? Well, a couple of reasons, actually. The creeks and river systems are being impacted by chemicals. Our once-pristine areas – places where I regularly swam as a kid – are being clogged with algae blooms. These nutrients being legally discharged into the waterways are increasing nutrient loads, which in turn lead to a decrease in the dissolved oxygen (DO). Less DO, less critters that can live in the water. More algae. We all know many local rivers that just aren't what they used to be.

So what to do? First, it is difficult for TRPA to get "party status" on a permit application if some individual is not directly impacted (i.e. owner of property near the proposed discharge point). Second, it is far better to have a non-discharge plant than one that discharges. If a developer follows the current Texas Administrative Code, and follows all of the engineering parameters, it is hard to stop the plant from being built.

HOWEVER, the alternative to do a non-discharge plant is a viable option, as the effluent is cheaper to treat on the front end (and the wastewater treatment plant, aka WWTP), the engineering is cheaper to do, the permit is far quicker to obtain, and the water is being put back in the ground (much is used by plants and grasses). This very water can be used for landscape irrigation, grey-water uses (toilets, etc.), and helps lead to less depletion of water sources, either surface waters or wells.

So, it is really a win-win for everyone.

So how do I know all of this? Well, I am a Registered Professional Engineer who designs and builds such systems. In every instance, I have been able to convince Property Owners of the time, economics, and good water stewardship that such systems bring – in a beneficial manner – to everyone. Two years ago, I designed and built a system for a Christian Camp near

Rocksprings, on the headwaters of the Nueces River. This system treats and disposes of 38,000 gallons per day. The river went from a clogged mess, with a pending discharge permit (that was withdrawn), to a zero discharge system, with drip irrigation, that resulted in the water and nutrients not going into the river. The massive amounts of algae disappeared. We were able to permit the system within 3 months. The downstream property owners were happy. The site owners were happy. The fish were happy.

My suggestion? We, as an organization cannot stop the development. However, we can show the developers a better way to do it that protects our rivers and waterways, and actually saves them time and money. Now, if we can just them to buy us a fleet of canoes (I think a covey of canoes sounds better) with all their savings of time and money.

On a final note, we can also ask the State to increase setbacks from streams, rivers and lakes on the OSSF systems. Current regulations say they should be 25 feet away from water. The Lower Colorado River Authority tightened their own rules, and require 150 foot setbacks on such lakes as LBJ. Malfunctioning OSSF systems are an issue, too, especially older systems. Collectively, we need to ensure harmful wastewater by-products are also not entering our waterways via malfunctioning systems.

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