

I & I Overview

The staff at Orange County Water Control & Improvement District No. 1 (Water District) feels a certain amount of dread when they hear a weather forecast that includes significant amounts of storm activity. We all need rain to survive, and our area is blessed with plentiful rainfall on an annual basis. So why would your Water District dread the approach of storm events? It is because heavy rainfalls place a large strain on the Water District's wastewater collection and treatment system due to storm runoff finding its way into our sanitary sewer system.

Extraneous water entering a collection system is referred to as Inflow & Infiltration, or "I & I" for short. I & I overloads the collection system, backs up private sewer lines, creates poor or "slow" flushing of toilets, and taxes the ability of the wastewater treatment plant to effectively treat and process the wastewater before it is returned to the environment.

Aren't sanitary sewer systems supposed to be separate from storm water drainage systems? Yes, they are intended to be completely separate and sealed against inflow of storm water. So what's the problem? Why does storm water runoff enter our sanitary sewer system? The problem consists of many elements. Gravity pulls water downhill and doesn't care if it is clean rainwater or used wastewater. If there is an opening into any pipe, structure, or ditch downhill from the ground surface, storm water will be attracted to flow there. Just as seawater surrounds a submarine and will find its way into the vessel through any size crack, hole, or opening in the hull, storm runoff and groundwater will leak into a sanitary sewer system at every opportunity. What are those opportunities? Here is a list of some of the common sources of leaks:

1. Cracks and breaks in main sewer lines that form over time.
2. Damaged manholes either at the surface, in the sidewall, or deep down where sewer lines connect to the manhole.
3. Poorly made or deteriorated tap connections on the main lines for individual services to customers.

4. Private sewer service lines, normally 4" in diameter, at individual homes that have cracks, holes, deteriorated joints, open-ended lines, or open cleanouts. These leaks can occur either inside the public right-of-way (Water District jurisdiction) or on private property between the right-of-way line and the customer (property owner jurisdiction).
5. Private, illegal drainage connections intentionally draining storm water from private properties into Water District facilities (e.g., roof gutters and low spots in yards connected to sewer service lines). Open cleanouts in yard lines are a direct (and illegal) path for storm water into the sanitary sewer system and are especially problematic.

Two factors aggravate the problem caused by leaks in sewer lines - 1) deterioration due to the age of the collection system, and 2) high amounts of rainfall. The oldest parts of the Water District's collection system were built in mid-1950, over 60 years ago. Newer service areas added later are now decades old, as well. In addition, the average rainfall in our five-county area of Southeast Texas is the highest in the state of Texas - over 60 inches per year.

Would additional treatment plant capacity solve the problem? Increased treatment capacity is almost always necessary for management of I & I, but it is only a part of the solution. The Water District has already replaced its antiquated group of five smaller treatment plants that had been constructed over many years with a single, modern, and efficient treatment facility. That treatment plant came on line in late 2013 at a completion cost of just under \$14 million. The large lift stations and force mains necessary to transport the wastewater from the former treatment plants to the new treatment facility were constructed at a cost of \$5 million and completed in 2015. The Water District now has sufficient treatment capacity to handle a fairly large surge of I & I as well as support substantial new development without the burdensome regulatory performance deficiencies previously connected with the multiple small treatment units.

Can the collection system leaks be repaired? Yes they can, but at great expense, and not all leaks are within the Water District's jurisdiction. In the oldest portion of the collection system lying north of Old Hwy 90 and south of Tram Road, the

Water District contracted to have 90,000 feet of main sewer line rehabilitated by replacement of the main line along with the individual service line connections up to the customers' property lines in 2014 and 2015 at a cost of approximately \$6 million. That project touched less than one third of the total collection system, but represented the sewer lines in the worst condition in the District. The project did not replace private service lines, which are thought to be large contributors to the I & I problem, because those lines are on private property and public funds cannot be used to repair them. Even after spending \$6 million for sewerline rehabilitation to seal that area of the collection system a significant I & I problem still exists there because leaking private sewer lines convey enough extraneous storm water into the system to continue the overloading situation.

The next step in the process of I & I reduction, especially in the central part of our community, is to press for private property owners to limit the water they deliver to the collection system to wastewater only. This, in effect, means that private sewer service lines must be sealed against I & I, requiring the repair, or more likely, the replacement of most residential and commercial service lines, also referred to as "yard lines". These upgrades, as noted above, cannot be funded by public funds (with the exception of grant funds) because they are privately owned and the responsibility of private land owners. In order to cause the necessary upgrades in private sewers to be made, the Water District would probably have to use its authority to refuse to continue to receive customer discharges that include illegal I & I. In fact, the Water District is entering into an agreement with the Texas Commission on Environmental Quality (TCEQ) that will require the District to enforce its own ordinance prohibiting customer discharge of storm water into the sanitary collection system. The replacement of private sewer service lines will be a very difficult, burdensome, and expensive program, which is why it has not been undertaken before in this community. It will require that homeowners replace their yard lines at their own cost. It has been done, however, in other communities throughout the country, so it can be done here, as well.

The Water District believes the best first step in achieving reduction of I & I coming from private properties is to utilize State of Texas grant funds to pay for the repair or replacement of individual service lines for qualifying homeowners.

Qualification for receiving these funds is based on family household income. Only low-to-moderate income (LMI) households are eligible for these grant-funded benefits. This approach would have two major benefits - 1) It would provide savings of up to \$2,000 for homeowners who may otherwise not be able to pay for required improvements, and 2) It would serve as a demonstration project to develop the methods and controls for efficiently conducting a combination private/public rehabilitation effort that could be applied to the remainder of the community of households that do not qualify for grant funds. Non-LMI households will ultimately benefit, as well, from the experience gained by Water District personnel in the execution of such a program. Since grant applications can only be submitted by cities and counties, the Water District has arranged for the City of Vidor to sponsor the applications. The Water District has agreed to contribute the \$55,000 in required matching funds for the project to be eligible. So far, one grant has been awarded to the City of Vidor/Water District for 2017 and an application for 2018 funds has been developed and submitted.

For this project to now move forward it will be necessary to identify the individual recipients of the grant benefits. Homeowners must complete grant fund applications to be considered for these benefits. For a household to be eligible two conditions must exist - 1) There must be documented private sewer line leaks that need to be repaired, and 2) The household income must qualify as low-to -moderate.

Sewer line leaks are difficult to find because it all happens underground and out of sight. Blowing smoke (non-toxic smoke designed specifically for this purpose) into the lines helps identify leaks where smoke blows out through holes or breaks in the pipes. The Water District had its rehabilitation contractor smoke test the completed lines to ensure they were leak tight and to identify leaks in private homeowner service lines. These private sewer leaks were documented by video for this very type of project. In general, private service lines connected to older homes are decades old and will very likely experience leaks. As individual homeowners apply for grant benefits the Water District will evaluate their sewer lines for leaks by reviewing the existing smoke test videos and performing

individual service line smoke tests if necessary. To determine financial eligibility a homeowner must provide answers to simple income questions.

To learn more about benefiting from this important grant project please call the Water District and speak to the General Manager, Norman Blackman, or Director of Finance and Office Administration, Chris Serres.