

# Don't Let Your Town Get Sump-Pumped into a New Wastewater Treatment Facility

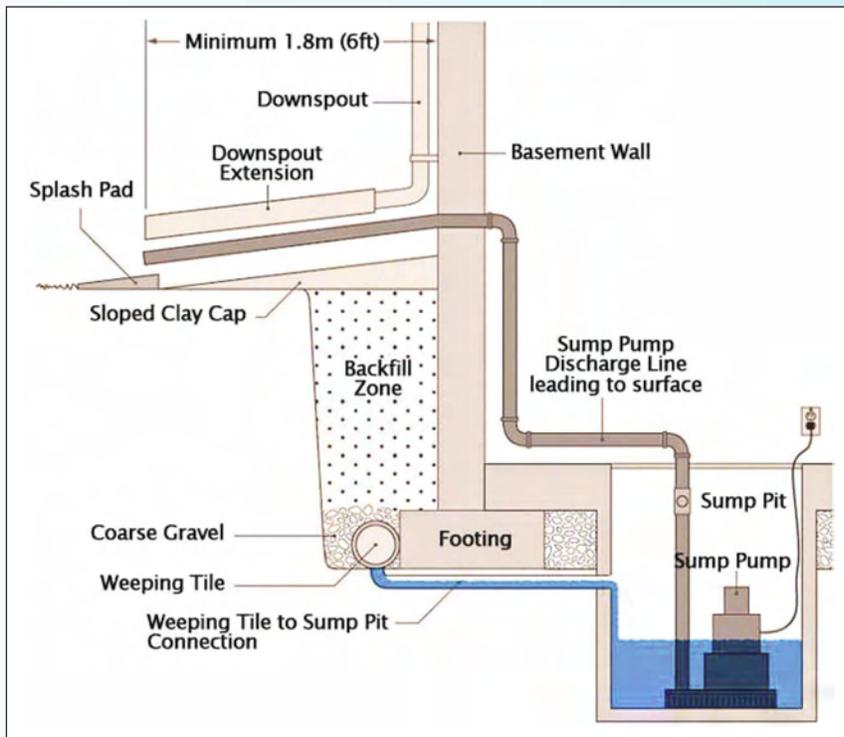
In the July 2020 issue of *The Kansas Lifeline* I began the conversation of Inflow and Infiltration (I and I) and how it is a critical problem for wastewater sanitary sewer systems. As described in that article, I and I is excess water that enters into the sewer collection system. I and I water is “clean” water that does not need to be treated by the wastewater treatment facility. I and I water can flow into and infiltrate the sewer collection system from precipitation events. It may also be pumped illegally into the sewer system through a sump pump like my sister’s house. The issue with the excess water (I and I) in the wastewater treatment facility is it can shorten detention time in both a lagoon or mechanical wastewater treatment facility or flush out solids and bacteria necessary for wastewater treatment in a mechanical facility. This usually results in compliance issues with the effluent limits.

While working at Kansas Rural Water Association (KRWA) as a technical assistant, much of my work has been providing assistance to small towns who are out of compliance with their National Pollution Discharge Elimination System (NPDES) permit. Primarily the “out of compliance status” is due to exceeding the permit effluent limit for Biochemical Oxygen Demand (BOD) or Total Suspended Solids (TSS) or the combination.

Thus far the dominating cause of the effluent violations is excessive I and I.

During data review for technical assistance one of the initial variables I review is the compliance sampling data for influent.

I have yet to pin down exactly what a “normal range” is for influent BOD of domestic sewage. Research shows numbers anywhere from 100 mg/L to 400 mg/L with varied opinions. For the sake of using it simply as an indicator of potential issues, I generally use 150 to 250 mg/L.



**This diagram illustrates the proper method of a sump pump installation and discharge to the outside of a home. Sump pumps should not be connected to the community wastewater system.**

Influent BOD numbers below this range may indicate I and I. The majority of the assistance I provide to wastewater systems is to cities that sample quarterly or once every three months. Using this data can be challenging because weather conditions are not listed on the monitoring data. A city may have influent data that falls within the range of several sampling cycles, but often I will see a quarter where the BOD is less than 50 mg/L. I recently worked with a city that had a sample result of 9 mg/L and the following quarter, it was 14 mg/L as the influent BOD. These numbers indicate to me I and I because the water is “clean” rainwater or groundwater and does not have the BOD strength of domestic sewage.

Using a lift station’s hour meters to monitor run-times can help determine how much I and I is coming from an area.

The goal then becomes trying to identify the source and location of the I and I.

For this article I will continue to emphasize what I believe is often an overlooked source of I and I. I am aware of two towns that have recently completed multimillion dollar projects in Kansas to eliminate I and I that still have I and I that enters the collection system. The common factor in both towns is the illegal sump pump connections were not disconnected.

In some smaller communities the illegally pumped gallons of water can quickly exceed the design capacity of the wastewater treatment system, causing compliance issues with the effluent limits.

As I described in the previous article the average household 1/3 horsepower sump pump is capable of pumping up to 2500 gallons per hour. The design capacity of wastewater lagoon systems is generally based on approximately 100 gallons per person per day. As an example, a town with a population of 400 would have a design capacity of 40,000 gallons per day. One sump pump can pump this amount of water in 16 hours if pumping continuously. That is one sump pump. What if ten percent of the population had sump pumps and they operated for one hour in a 24-hour period? That is 100,000 gallons per day of essentially rain water that flows into the 40,000-gallon per day capacity lagoon system.

There are many potential sources of I and I. Smoke testing the sewer collection system, a service KRWA can provide, can help identify many I and I issues. However, a smoke test generally will not show illegal connections like sump pumps.

During the most recent smoke test I could see the disappointment in the city superintendent when I explained this to him. He was confident that one area of the town was going to have smoke bellowing from every home from illegally connected sump pumps. The lift station run times in this area of town more than quadrupled during rain events. When we did the smoke test almost no smoke showed anywhere. The superintendent seemed disappointed. It took me a while to explain that by no smoke in this area

the excess run times was most likely illegally connected sump pumps. Now the issue is to determine which homes are the culprits.

### How to identify illegal sump pumps . . .

How is the city supposed to identify those houses that have sump pumps illegally connected to the sewer collection system?

In the July article I described how it was determined that my sister's sump pump was connected to the city sewer

**In smaller communities the illegally pumped gallons of water can quickly exceed the design capacity of the wastewater treatment system, causing compliance issues with the effluent limits.**

**Chemicals, Equipment and Service for  
Safe, Clean Water**

**HAWKINS WATER TREATMENT GROUP**

- Potable Water
- Raw Water Clarification
- Swimming Pools
- Wastewater Treatment
- Bioaugmentation Solutions
- Sludge De-Watering
- Waste Settling Aids
- Collection Systems

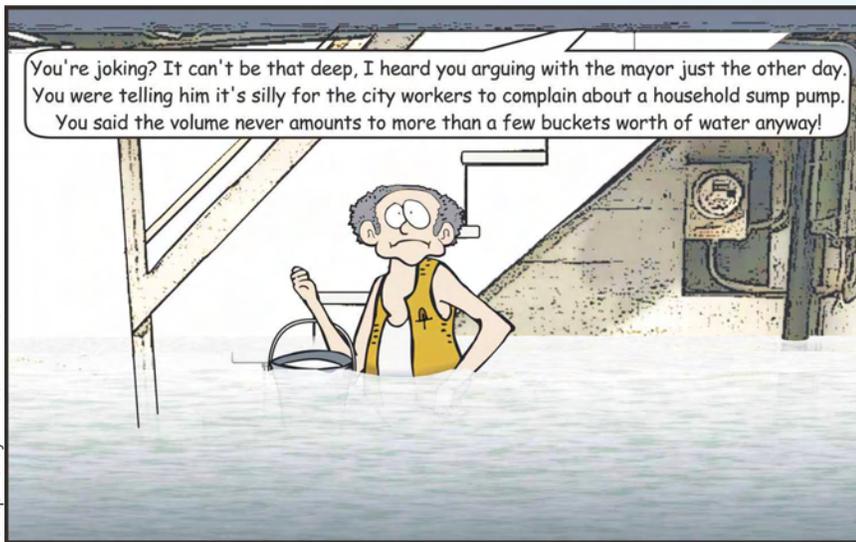
**Equipment**

- Chemical Injection Pumps
- Control and Monitoring Systems
- Chlorination Control Systems
- Chemical Feed Equipment

Garnett, KS  
785.448.1610

[www.hawkinsinc.com](http://www.hawkinsinc.com)  
800.328.5460

Tulsa, OK  
918.341.4564



system. The city would probably have never known of the connection had the city not been rehabilitating the collection system. Not because the city or any other city is negligent, rather the connections may have been made when the city wastewater treatment system was a straight pipe to the local creek or river and didn't have effluent limits.

Sump pump water should be pumped onto the ground outside of the home or directed to the city stormwater drainage system. The cost of materials and the labor to disconnect the sump pump from the city's sewer collections system could be minimal, if you know what you are doing. If a local plumber is hired it may cost you more than your fair share of a new lagoon cell.

I can count on one finger the amount of times I have asked a city how many sump pumps are in town and was given a number that was accurate. Very seldom do towns know the number or even think of them as a potential source of I and I. Getting the number of connections by simply asking the public to voluntarily give this information is unlikely.

A few years ago, a town added a cell to a lagoon system. The price tag was pretty hefty especially for a dwindling small town. When the town continued to have compliance issues, I explained to the operator that sump pumps could be what was causing the compliance issues. He told me he was going to "kick in every dam door in town" and find out who had sump pumps.

Short of kicking in doors, public outreach may be another way to have citizens disconnect the sump pumps. More than likely until money is part of the public outreach discussion, very few will voluntarily get disconnected. Explaining that adding a one-acre cell to the lagoon system can easily cost \$300,000 and that cost will be divided amongst all citizens, may get results.

**Sump pump water should be pumped onto the ground outside of the home or directed to the city stormwater drainage system.**

One small town identified sump pumps as the most significant contributor of I and I to the wastewater lagoon treatment system. For the city to maintain compliance with effluent limits a new cell would need to be added to the wastewater lagoon system. The city council voted to give each home a \$100 stipend toward the disconnection of the sump pumps. In this very small community, the local plumber said he would do the disconnect and redirect the sump pump water outside the home for \$150. Essentially the homeowner was on the hook for \$50.

The complexity of the issue doesn't stop there. Even if the city identifies the number of sump pump illegal connections or knows of the illegal connections, getting them disconnected is the real challenge.

The city must use its sewer use ordinance that will almost positively state that the sump pump is considered an illegal connection. As I stated in the previous article it's not proving that the connection is illegal it is enforcing the ordinance. This is where it can get ugly in a short order.

Does the city make the homeowner disconnect at the homeowner's cost? And what are the consequences if the homeowner refuses? I have seen this exact scenario played out in many different manners by mayors and city councils. I have watched towns build a new mechanical plant or add cells to lagoons rather than address the I and I. Not all of the I and I is from illegal connections, but as a couple of towns I previously mentioned, it was the majority of the I and I. They will be paying for the rehabilitation for many years when potentially the issue could have been resolved by disconnecting the illegal sump pump connections.

If any wastewater operator or other municipal official wants more discussion on this topic, I encourage you to call KRWA or you may call me at 620/203-9302 or just email to [jason@krwa.net](mailto:jason@krwa.net). We're ready to have discussion on this or any other water or wastewater utility topic.

*Jason Solomon works primarily as a wastewater tech at KRWA. He previously was District Environmental Administrator at the Kansas Department of Health and Environment southeast Kansas office in Chanute, Kansas.*





# ALEXANDER

## PUMP & SERVICES INC.

### Complete Well Service

Well remediation

Well reconstruction

Digital video well inspection

Consulting services with surge blocks with brushes and sand buckets

Rebuilding and restoring pumps and motors

New pump and motor sales

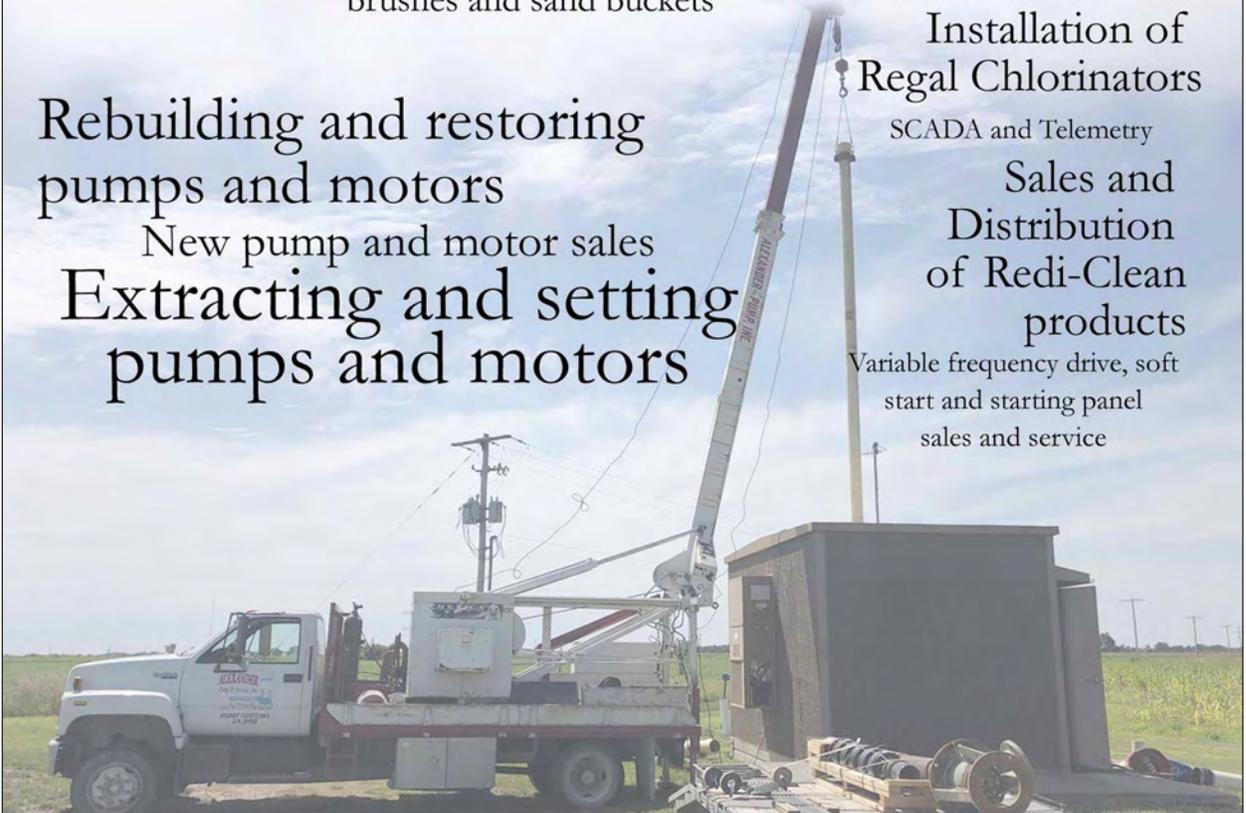
Extracting and setting pumps and motors

Distribution and Installation of Regal Chlorinators

SCADA and Telemetry

Sales and Distribution of Redi-Clean products

Variable frequency drive, soft start and starting panel sales and service



**ALEXANDER**  
PUMP & SERVICES INC.

785-383-2435 (Darren)  
aps@alexanderpump.com

785-383-2021 (Dallas)  
www.alexanderpump.com