Design Challenges with Liquid Effluent Collection

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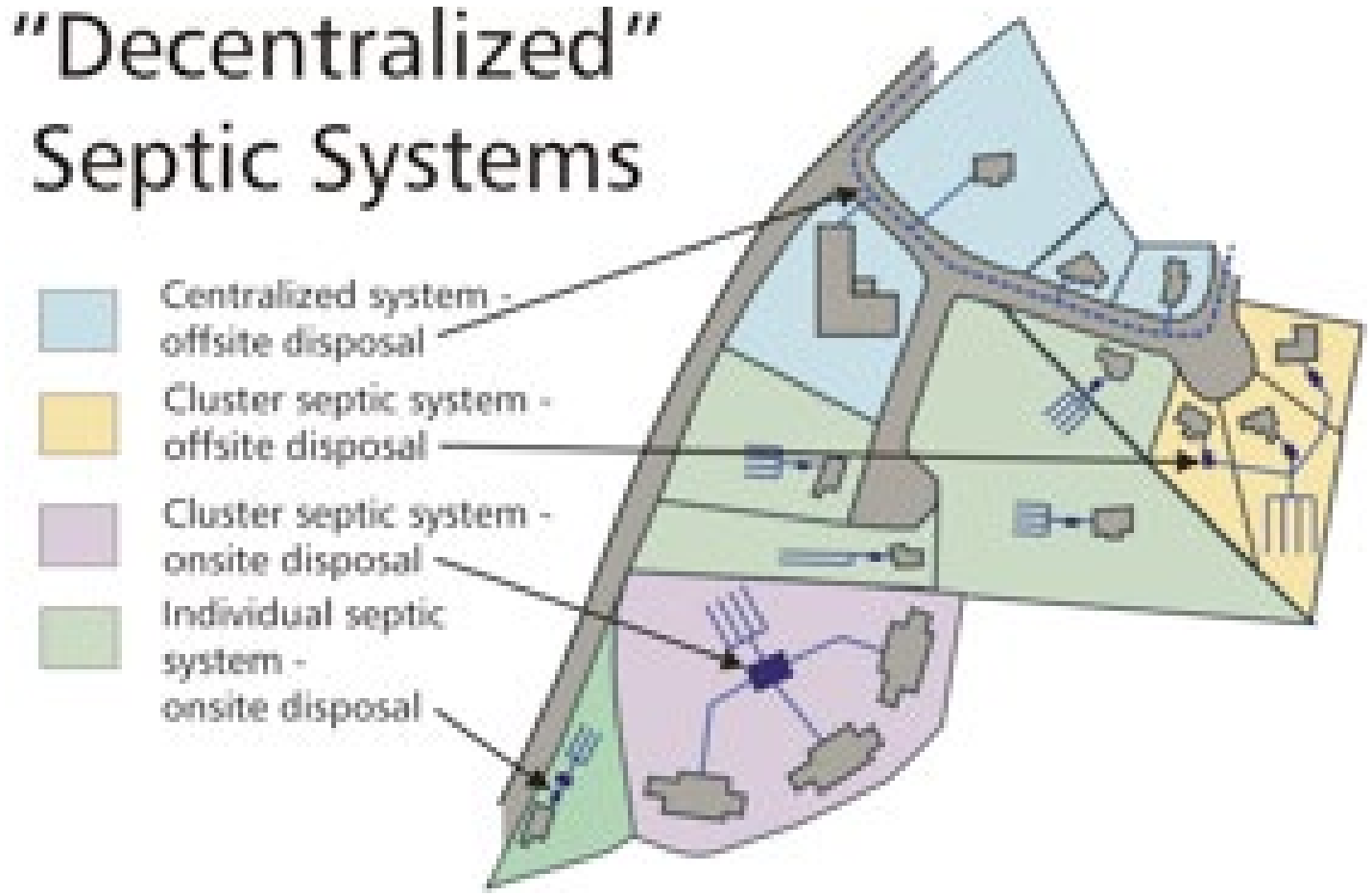
Current Options



Why Decentalized Systems

Why Decentalized Systems

Colored Dissolved Organic Matter

Topics

STEG – Septic Tank Effluent Gravity

STEG – Septic Tank Effluent Pump

LP-Grinders – Low Pressure / Grinders

Advantages

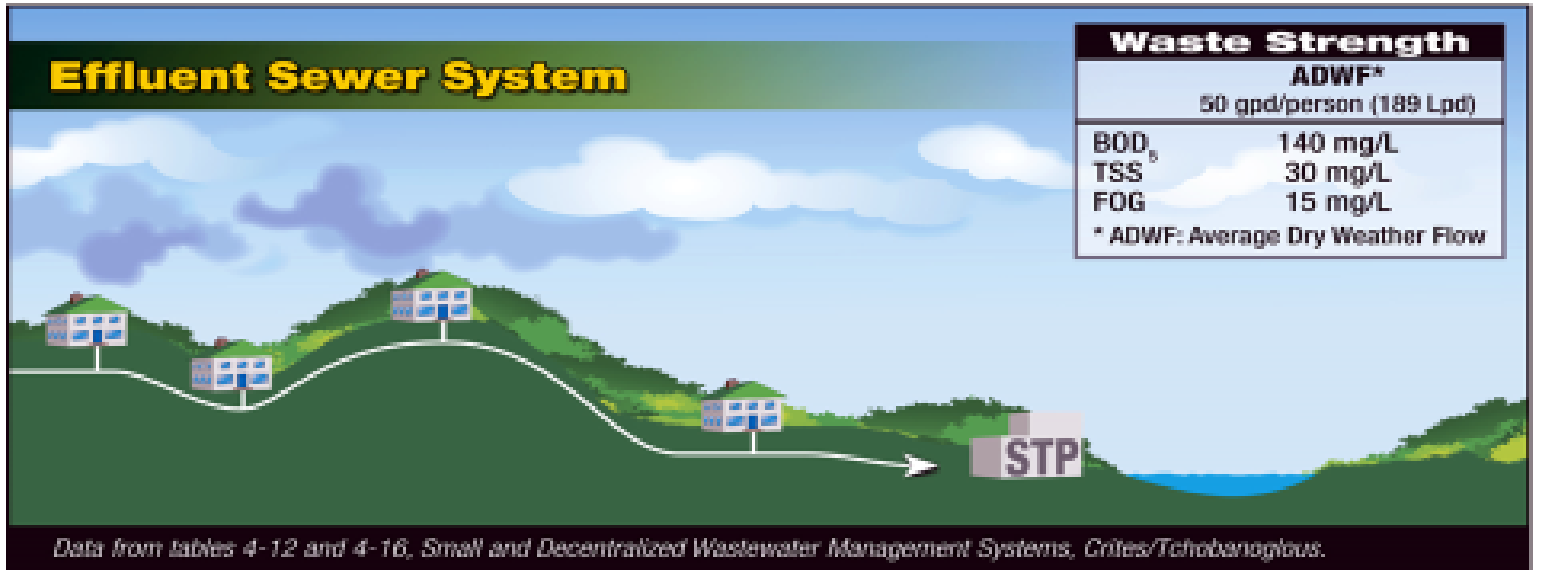
1. Pressure effluent systems are < expensive than conventional gravity.
2. Network layout does not depend upon ground contours.
3. Pipe sizing and depth requirements are reduced.
4. Manholes are eliminated.
5. I and E are greatly reduced. Resulting in reduced pipe sizing.
6. Tank size reductions.
7. Allows point source trouble shooting
8. Treatment begins before process center, providing enhanced effluent quality

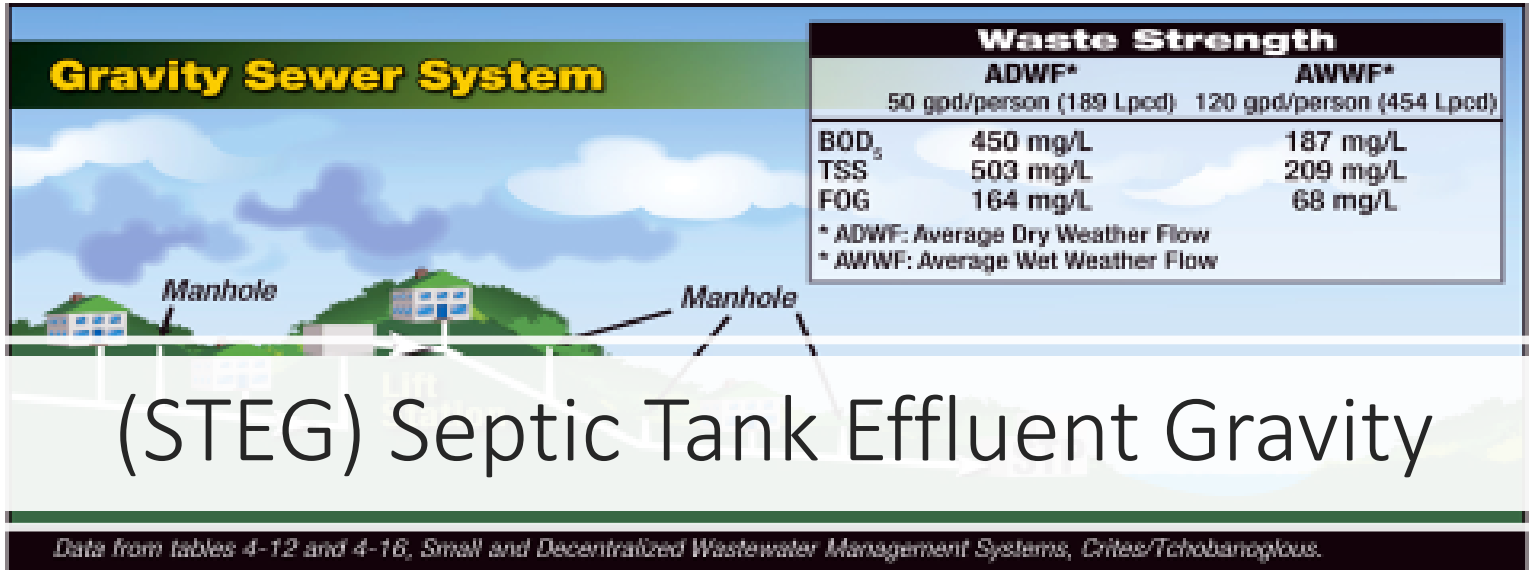
Disadvantages

1. User pays the electric bill.
2. User may incur additional operational costs.
3. Higher level of institutional involvement.
4. Higher O& M costs than a conventional gravity system.
5. Yearly preventative calls for unlocked components.
6. Pubic education is necessary

Design Challenges

Liquid Effluent Coleciton vs Gravity Collection





(STEG) Septic Tank Effluent Gravity

STEG

Design Example

Example from Arizona:

Requires 2.1 X the daily flow for septic tank requirements;

20,000 gpd X 2.1 = 42,000 gallons needed for tankage,

1st tank = 27,720 gallons capacity

2nd tank = 14,280 gallons capacity by regulation

In order to service the primary septic tank it would require a minimum of 10 pump trucks

Design Challenges

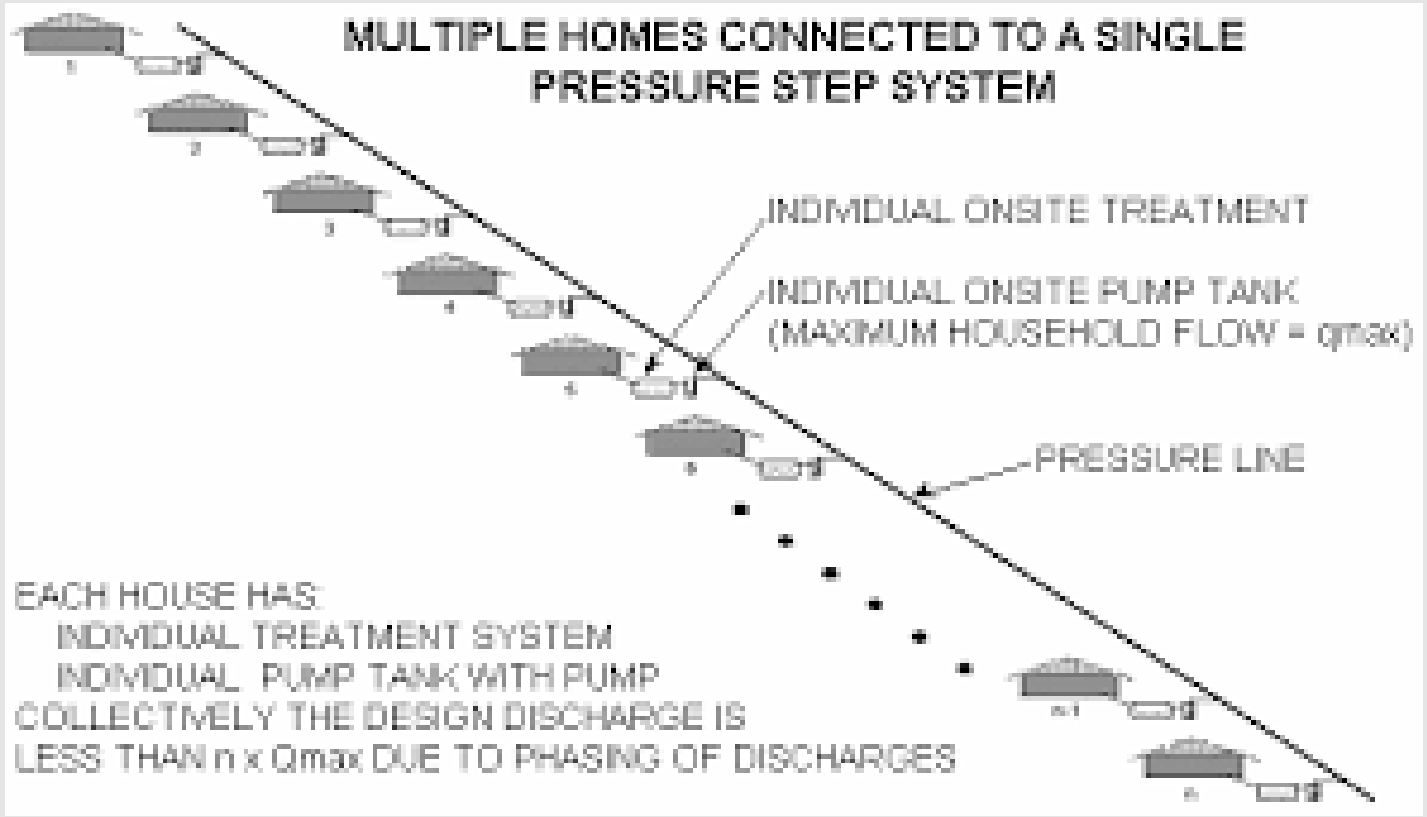
Tankage

30,000 gallon septic tank being serviced

STEG

Breaking up the tankage requirement and providing multiple tanks for some development will enhance the reduction of sedimentation, blockage and erosion throughout a planned development. Pipe and pump sizing assure that an adequate scour flow of 1-fps is maintained.

(STEP) Septic Tank Effluent Pump



EPA Example with two tanks

Design Challenges

Performance

This is enhanced with the use of Effluent Collection System methods. Unlike the currently prescribed methods, the use of Effluent Conveyance allows development to provide multiple tank locations that would be adequately sized as opposed to one large process center. The use of smaller sized tanks in the collection system will allow for achievable operation and manageable maintenance. Pipe and pump sizing assure adequate effluent flow.

Performance

With smaller, properly sized components and operator will have the ability to effectively manage and operate a Effluent Conveyance System. Systems may be evaluated more closely, and problems more readily pinpointed as opposed to one large flow.

Protects water quality through minimization of Infiltration and Exfiltration (INE) losses from the system. An operator has a better opportunity to identify and correct exfiltration losses through management of multiple components that are accessible as opposed to one large flow. The system is a closed system from the exit of the pump tank to the exit of the LECS into a treatment facility, thus there are no direct openings to the land surface as are present in gravity sewer lines

Performance- tankage

Multiple tanks that are adequately sized for the wastewater delivered to the system will allow enhanced inspection maintenance, testing, visibility, and accessibility as opposed to the current tankage requirements.

Tankage can be more efficiently managed with smaller capacity tanks that can be visually monitored and maintained as opposed to huge tanks that are not capable of being properly serviced. Velocity and pressure loss can also be remotely monitored to facilitate quick response to unexpected interruptions of flow.

Performance- Tankage

Smaller, adequately sized tanks for the volume of wastewater delivered to them will work more efficiently as designed as opposed to the large tanks that cannot be properly evaluated. Pipe and pump sizing assure that an adequate scour flow of 1-fps is maintained, thus eliminating any possibility of septic conditions. Additionally, there is no additional oxygen available in this environment since the ECS is a closed system from the exit of the pump tank to the exit of the ECS into a treatment facility.

Questions - Discussion

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