

SECTION 13

REGIONAL WASTEWATER PLANNING

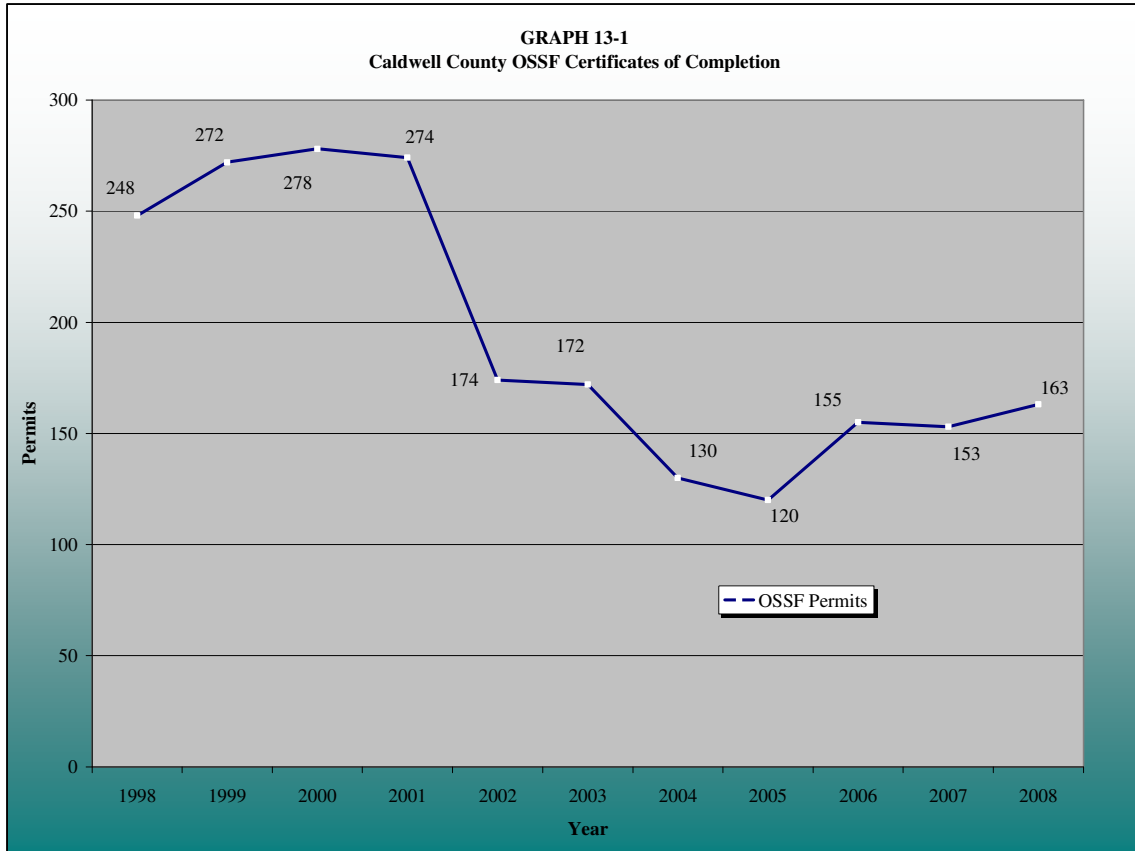
13.1 Introduction

Regional wastewater planning is needed with the expected growth in Caldwell County. Evaluation of several options regarding collection treatment systems was necessary to provide recommendations for planning and implementation. Identifying the existing facilities in the county was a task necessary to understand the current systems and identify needed improvements or changes.

13.2 Existing Wastewater Collection Systems

Lockhart and Luling are the two municipalities that currently provide wastewater collection services. The remainder of the county is rural with septic systems in use. As previously mentioned, Lockhart has two facilities that treat a combined flow of 2.6 MGD and Luling also has two plants that treat a combined flow of 1.1 MGD. Three of the four treatment plants discharge into Plum Creek. One plant from Luling discharges into the San Marcos River.

Areas outside city limits and in unincorporated areas utilize on-site sewage facilities (OSSF) also known as septic systems. Septic system use in Caldwell County for urban regions and undeveloped portions of the county is typical and has steadily risen since 2005. The Director of Sanitation for Caldwell County provided the data shown in *Table 13-1* and *Graph 13-1*. The numbers of Septic System Certificates of Completion are listed for the last ten years.



Year	Permits
1998	248
1999	272
2000	278
2001	274
2002	174
2003	172
2004	130
2005	120
2006	155
2007	153
2008	163

13.3 Wastewater System Planning

The development of wastewater facilities will be based on growth and land topography. A gravity flow systems is the expected design. Assumptions of land development are made based on typical patterns that occur along corridors. *Exhibit 13-1* illustrates the general areas that were considered in the evaluation of future growth. Steep elevation zones, floodplains, and drainage basins were the governing factors for determining the locations of the regional facilities and the decentralized systems.

It will be expected that as the population grows, the areas between San Marcos, Luling, Lockhart, and Mustang Ridge will become densely populated. Area 2 as shown in the exhibit is expected to show the initial growth with development following in areas 1 and 3. Areas 4 and 5 are not expected to grow as rapidly and become as densely populated. The construction of SH 130 will bring about a change in the land development for the area.

13.4 Wastewater Collection System Service Areas

The location of collection systems were based on the naturally occurring drainage basins. There are three major drainage basins in the county which can be utilized to develop systems transported by gravity. Gravity systems require very little energy and are typically less costly to develop and maintain than systems that require pumping. Evaluations of the service areas, as shown in *Exhibit 13-2*, were defined as follows:

1. The Lockhart Regional Facility Area - This service area will include Lockhart and the northern area of the county that will develop as SH 130 develops from Mustang Ridge.

2. The Martindale Regional Facility Area – This service area will include Martindale and the area west of Lockhart. It is expected that this segment of SH 130 will bring development and growth.
3. The Luling Regional Facility Area – This service area will include Luling and the area north of Luling. This service area will also include the portion of Caldwell County that is in the San Marcos Drainage Basin.
4. The Peach Creek Regional Facility Area – This service will include the Peach Creek Drainage Basin areas in Caldwell County. This area is not expected to develop at significant rates. This area was established in this study for the purpose of providing a facility in every drainage basin represented.

13.5 Wastewater Collection System Options

Regional facilities and decentralized systems, which include package treatment facilities and OSSF's, were considered in the evaluation of wastewater treatment facilities. The recommended facilities were based on:

1. Population projections developed in this study
2. Wastewater return flows were based on 150 gpcd of water
3. 68% return flow rate
4. Wastewater treatment would be provided for 100% of population
5. Service plan does not include individual connections (lateral)

13.5.1 On-Site Sewage Facilities (OSSF) / Septic Systems

Upon evaluation of septic systems use in the county, septic systems were not considered to be an appropriate alternative to serve a growing community. Installation of these systems in an already impaired watershed could prove to be

more costly financially and environmentally in long-term planning. Discharge of these systems cannot be monitored and evaluated on a regular basis to ensure the discharge meets standard requirements. Homeowners, in most cases, are not concerned or aware of problems until the issues become visible. Remediation efforts due to the contribution of failing OSSF's are unnecessary if appropriate planning measures are implemented to limit these systems. Larger lot sizes and buffer zones can decrease the loads imposed by OSSF.

Development of more stringent ordinances and preferences should be established to regulate private sewage facilities. The county has a position to take on these systems in areas expected to develop. Provisions need to be made for private owners in isolated rural areas that are not planning to develop the property and are not within 300 feet of a sewer line.

13.5.2 Regional Treatment Facilities

Regional treatment facilities have traditionally been implemented in regional planning efforts. Economies of scale have been the motivating factor for the "bigger is better" selection rationale. Larger treatment facilities do provide cost effective solutions for wastewater treatment. Communities typically have an expectation of safer and better quality standards due to the municipal oversight. Federal regulations and funding have also been oriented toward centralized collection and delivery of point source discharges.

The regionalization of wastewater systems for the county does provides the benefit of minimizing the number of decentralized systems, including OSSF. Minimizing the number of point source discharges have the additional benefit of ensuring regulation and monitoring by municipalities or river authorities.

13.5.3 Decentralized Treatment Facilities

Multiple treatment facilities within a service area can be described as decentralized systems. The Turner Crest WW treatment facility is an example of a

decentralized system providing sewer services to the subdivision it would develop.

A shift in paradigm is occurring where decentralized systems are being considered more feasible, environmentally friendly, and aesthetically pleasing if designed, constructed, and operated properly.

As permanent components of infrastructure, it would be in the best interest of the public for the facilities to be managed by a public utility.

The smaller footprint of a decentralized system impacts the environment minimally. The system would require less land and minimize or eliminate effluent discharges. Recycling 100% of the discharge can also provide monetary benefits and reduce per capita water demands. The systems in the communities can be landscaped to be appealing and provide an aesthetic value to the area. The systems can also allow for development in rural areas where sewer service is not available. Energy use of a decentralized system can be substantially lower than a regional facility. Lastly, air quality issues are minimized.

The decentralized systems would be sized and located to serve smaller watersheds and communities. Placement of these facilities would require analysis of smaller regions. An example of these system locations at the regional level are shown in *Exhibit 13-3*.

13.5.4 Package Treatment Facilities

Package treatment plants are pre-assembled and factory installed treatment facilities that effectively utilize energy and mechanical, biological, chemical or physical treatments processes. They offer minimal on-site construction cost, fast plant start-up and cost efficient operation and maintenance (O&M). O&M is simple and requires minimal supervision.

Unfortunately, the simplicity of O&M has reportedly caused some plants to be out of compliance. The results of these facilities being managed incorrectly can cause detriment and degradation to the surrounding environment. For this reason, it will be recommended for these facilities to be operated by trained personnel.

Typical applications are in land development subdivisions, small cities, mobile home parks, and recreational areas. These package treatment facilities may be beneficial to apply as growth develops in urban areas and then to replace as the life of the system expires. These systems would act as decentralized systems and are recommended to be operated by public utilities to provide a service for the public health.

13.6 Proposed Wastewater Collection Facilities

The proposed regional and decentralized facilities are recommended to reuse 100% of the effluent. With stringent treatment levels for all collection facilities, the treated wastewater can be reused within the community it is serving. There is opportunity for reuse in both centralized and decentralized systems. The reuse water can serve to irrigate developments in nearby communities. Hospitals, schools, theaters, manufacturers, industries, and other facilities that require large amounts of water for irrigation and cooling of buildings are target customers of reclaimed water.

Although the recommendation is to reuse 100% of the wastewater, it may not entirely be feasible for utilities to provide this service in existing facilities. The cost may exceed the benefits. Also, development and design of new facilities should employ this strategy with further investigation into the effects of instream flows and current laws.

The proposed regional collection facilities are to provide sewer services to the Lockhart, Martindale, Luling, and Peach Creek service areas as discussed earlier.

The projected flows developed in Section 9 and found in *Table 9-3* were further evaluated to determine wastewater flows for the service areas mentioned. A percentage of the expected population was assigned to each service area to estimate a wastewater flow for that service area. The percentages and expected wastewater flows are shown in **Table 13-2**. Lockhart was expected to produce 40%, Luling 35%, Martindale 20% and Peach Creek 5% of the projected wastewater flows.

Table 13-2					
Service Areas Projected Wastewater Flows					
Total Projected Wastewater Flows (MGD) in given Year		2010	2020	2030	2040
		4.723	6.636	8.864	10.200
Service Area	Percentage	Wastewater Flows for Service Areas			
Lockhart	40%	1.889	2.654	3.546	4.080
Luling	35%	1.653	2.323	3.102	3.570
Martindale	20%	0.945	1.327	1.773	2.040
Peach Creek	5%	0.236	0.332	0.443	0.510

13.6.1 Option 1 - Regional Facilities

The regional facilities option is to develop one regional facility in the four determined service areas. This option reduces the number of treatment systems with an anticipated lower unit cost of treatment. However, with a 100% reuse distribution system, this may prove to be more costly than other options. Reuse lines in a regional facility may be limited.

13.6.2 Option 2 - Decentralized/ Package Treatment Systems

It is suggested by other industry professionals to consider implementing systems delineated by smaller drainage basins to serve local subdivisions and commercial/industrial sites. Having a smaller community collection and reuse distribution system can provide environmental benefits that outweigh other

associated costs. Efficient and functional planning of these facilities with planned community development is necessary to be cost-effective.

This alternative also considers phasing out ineffective systems that are not functional. The collections systems can be removed and lines extended to connect to a network in place. Connection to a sewer main will route the wastewater to a regional facility. These systems should be strategically placed in locations that allow for the option to be phased out.

13.6.3 Option 3 - Combined Facilities

Decentralized systems, in combination with regional facilities, can work together to provide load reductions in streams and rivers. Decentralized systems can collect, treat the wastewater and enable local reuse of the water. This approach promotes reuse of treated wastewater. The unusable sludge slurry can be piped to a regional treatment plant and treated at that plant prior to disposal.

13.7 Proposed Regional Wastewater Facilities

The recommended regional wastewater facilities for Caldwell County are presented in *Exhibit 13-4* and include:

- Lockhart Regional Wastewater Treatment Plant in 2040 is expected to treat 4.1 million gallons per day receiving 40% of the total wastewater produced in the county. Approximately 32 miles of main wastewater collection lines are proposed for this treatment plant.
- Luling Regional Wastewater Treatment Plant in 2040 is expected to treat 3.6 million gallons per day receiving 35% of the total wastewater produced in the county. Approximately 33 miles of main wastewater collection lines are proposed to service this treatment plant.

- Martindale Regional Wastewater Treatment Plant in 2040 is expected to treat 2.1 million gallons per day receiving 20% of the total wastewater produced in the county. Approximately 11 miles of main wastewater collection lines are proposed to service this treatment plant.
- Peach Creek Regional Wastewater Treatment Plant in 2040 is expected to treat 0.6 million gallons per day receiving 5% of the total wastewater produced. Approximately 9 miles of main wastewater collection lines are proposed to service this treatment plant.

Table 13-3 presents estimated cost for each regional treatment plant based on a plant cost of \$3.75 per gallon of treatment capacity and in-place wastewater main cost of \$125 per linear foot of pipeline. Appendix M presents additional information on the wastewater cost estimates

TABLE 13-3				
Regional Wastewater Collection and Treatment Plant Cost Estimates				
Item	Estimated Cost in Millions of Dollars			
	Lockhart Plant	Luling Plant	Martindale Plant	Peach Creek Plant
	4.1 mgd	3.6 mgd	2.1 mgd	0.6 mgd
Plant Cost	\$15.3	\$13.4	\$7.7	\$1.9
Main Collection Lines	\$21.1	\$20.1	\$7.0	\$5.7
Total	\$36.4	\$33.5	\$14.7	\$7.6

