

City of Weatherford Regional Compost Study & Implementation Plan Summary Report

Prepared for the City of Weatherford Sanitation
Division



Final

April 2023

Prepared by

Risa Weinberger & Associates, Inc.

R. Alexander Associates, Inc.

WEATHERFORD REGIONAL COMPOSTING
FEASIBILITY AND IMPLEMENTATION
PLAN
SUMMARY FINAL REPORT
APRIL 2023

This study was funded through a solid waste management grant provided by TCEQ through NCTCOG. This funding does not necessarily indicate endorsement of the study findings and recommendations.

Report Summary

The City of Weatherford Sanitation Division has a mission to reduce the environmental impacts associated with municipal solid waste generation and disposal. One of the MSW streams generated by the City is sludge generated from the City’s wastewater treatment facility. Processing sludge and other organic wastes, including wood waste, offers an opportunity to eliminate the need for landfilling this material and to produce a beneficial and valuable compost product. This report aims to address the institutional and fiscal feasibility of City-only and regional compost operations.

The Weatherford Regional Composting Feasibility Study and Implementation Plan is designed to determine if a regional compost facility can reduce reliance on landfill disposal and demonstrate that cooperative programs result in more cost-effective services.

Three scenarios are evaluated in this report. The “Weatherford Only” scenario assumes that the City implements its own composting program without sludge from outside the City. The “Small Regional” scenario includes those cities that rely on haulers who do not currently own or manage a municipal solid waste landfill. The “Large Regional” facility includes all sludge generated in the Western Region with the exception of Tarrant County cities. Each scenario assumes that adequate bulking agent in the form of brush wood will be available from Weatherford or elsewhere.

Based on the following analysis, a small regional facility is the recommended approach at this time.

Weatherford Only	Small Regional	Large Regional
<ul style="list-style-type: none">• City generated sludge	<ul style="list-style-type: none">• Sludge from limited number of cities	<ul style="list-style-type: none">• Sludge from most local governments in the Western Region

Current Management Practices and the Western Region

Wastewater collected by cities is treated to remove contaminants and treats the wastewater so that it can be safely returned to the water cycle. One of the byproducts of this treatment

process is sludge. There are a number of ways that sludge can be properly managed, depending on the treatment process and the characteristics of the sludge. For larger, complex treatment processes, the sludge can be land applied to farmland. This material is environmentally acceptable if application rates follow Texas Commission on Environmental Quality (TCEQ) regulations. The sludge has a high nutrient value and does improve crop yields. However, for smaller wastewater treatment facilities, including ones operated by Weatherford, Mineral Wells, Granbury, Glen Rose and other Western Region cities, sludge cannot be land applied. Currently sludge generated by these communities is hauled to one of the several landfills in the region. Weatherford’s sludge is hauled to the Turkey Creek Landfill. Figure E-1 illustrates tons per year of sludge from cities to the various regional landfills.

Material Availability

The City of Weatherford generates 6,569 cubic yards per year (5,357 tons per year) of sludge from its wastewater operations. Before 2021, the City was able to haul this material a short distance to the Progressive Weatherford Landfill. However, this landfill closed operations in 2022, and sludge is now hauled 53 miles to the Turkey Creek Landfill. Scenario 1 (Weatherford Only) reflects composting only sludge from the City of Weatherford with its own wood waste and mulch from other sources,



The closure of the Weatherford Landfill also affected several other local governments in the Western Region of the North Governments.

A local government survey conducted for this Study revealed that there are approximately 14,735 tons of sludge generated in the Western Region. This material is being disposed at landfills as far south as Alvarado Central Texas Council of and as far north as Wichita Falls. There is interest on the part of other local governments to participate in a regional compost project. However, with the exception of Weatherford, all surrounding communities rely on private companies to haul and dispose of sludge. These companies have multi-year contracts with local governments and have a high degree of flexibility as to which landfill is utilized. Because of this, the City may have to negotiate contracts with these haulers to deliver sludge to the Weatherford Compost Facility (WCF). Haulers that do not also own landfills will be much more likely to utilize the WCF than haulers that are affiliated with a landfill and may realize a loss in landfill revenues. Scenario 2 (Small Regional Facility) reflects composting sludge from

the City of Weatherford plus from other Cities who contract with haulers who are not affiliated with their own landfills, with an appropriate amount of mulch from the City and other sources. Scenario 3 (Large Regional Facility) reflects an operation that composts all sludge generated in the Western Region plus an appropriate amount of imported mulch.

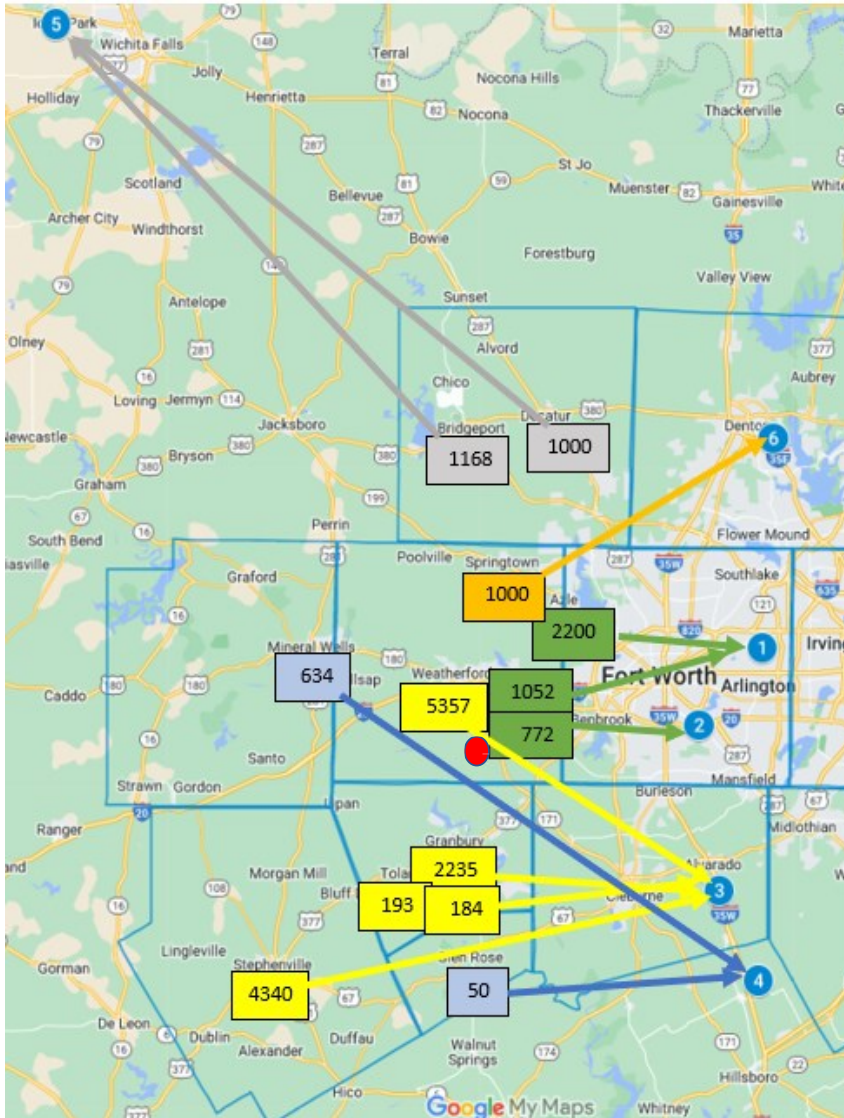


Figure 1 Sludge Flows in Western Region (tons per year)

- 1- Arlington Landfill
- 2- Fort Worth SE Landfill
- 3- Waste Connections Turkey Creek Landfill
- 4- Republic Itasca Landfill
- 5- Waste Connections Buffalo Creek Landfill
- 6- City of Denton Landfill
- 7- ● Proximate location of generation centroid

To properly compost sludge, the City will need to secure wood waste or other similar bulking agents. The City, itself, does not generate sufficient wood waste from its solid waste and utility operations to meet the demands of the compost operation under the assumption of a basic, turned windrow form of operation. Local governments, including counties, have significant waste wood available for the facility. Also, utilities, tree trimming, landscaping, and land development companies are currently paying for the material to be ground and hauled long distances. Local tree trimming companies have expressed support for the development of the WCF. Based on an initial review, there is sufficient wood waste to properly compost sludge under the Weatherford Only and Small Regional Facility scenarios. There is also sufficient wood waste available for the near and mid-term timeframe for the Large Regional Facility. It may take a significant effort to identify sources of wood waste for the Large Regional Facility to meet the WCF's needs.



Table 1 presents the estimated material feedstock availability for the three scenarios reviewed in this report. The table also includes the estimated amount of compost that can be produced at these levels of operation.

Table 1 Estimated Material Availability			
	Scenario 1	Scenario 2	Scenario 3
Sludge Input (cy)	6,569	11,332	24,322
Waste Wood / Mulch Input (cy)	19,710	33,996	72,966
Compost Produced (cy)	11,824	20,397	40,093

Facility Sizing

It is recommended that the City identify a site for the WCF. For both the Weatherford Only and Small Regional Facility options, at least 30 acres is recommended. For the Large Regional Facility, a 100-acre site is recommended, if possible. More intensive process management could somewhat reduce the size of the processing area required. The site must address TCEQ location restrictions which are designed to protect groundwater and surface water resources, and limit the potential for impacts on surrounding land uses.

Based on a review of sludge generation data, the sludge generation centroid is approximately located south and east of the City. However, the actual sludge generation centroid will be determined once the City understands the sources of materials it can expect to receive from private haulers. Therefore, as part of the initial site review, it is recommended to identify more than one option, if possible.



Figure 1 City of Wichita Falls Compost Facility

SWOT and Risk Assessment

City staff and the RWA Team conducted a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis of the project. Several issues were identified through this process. Some of the key issues identified through the SWOT and risk management assessment include the following.

Supply of materials – The City has a guaranteed supply of sludge, and local tree trimming and landscaping firms have sufficient wood material for the Weatherford-Only or Small Regional Facility. For the Large Regional Facility, the City will need to gain cooperation from either cities in the region or local haulers, or both, to secure sufficient wood waste. In the near and mid-term, there is

- Key SWOT Issues
- **Supply of Materials**
- **Site Selection & Permitting**
- **Regulatory Issues**
- **Construction and Operations**
- **Product Marketing**
- **Environmental Benefit**

sufficient wood waste in the region for the Large Regional Facility. One of the key tasks for the marketing lead person is to identify feedstocks for the compost, in addition to marketing final products.

Site Selection and Permitting – Identifying a site for any type of waste management activity, including composting, can generate public opposition. The City should identify candidate sites that not only address TCEQ requirements but also take into account surrounding land uses and access.

Regulatory. The WCF will require a TCEQ-approved, Registration-tier of authorization. This is not a complicated process. There are regulations related to PFAS (Per- and Poly-Fluoroalkyl Substances) that may result in risks for the compost industry. The US Environmental Protection Agency is now in the process of reviewing rules that would determine whether these materials, which are found in sludge and compost are to be regulated as hazardous substances. This determination may affect liabilities associated with managing waste streams in wastewater treatment plants and solid waste management facilities. This has been identified through the SWOT process as a significant risk. Final rules are scheduled to be issued in two years. The City may be responsible for PFAS regardless of how its sludge is managed.

Construction and Operations. Composting sludge is not a new process. If operated properly, these facilities can produce compost with minimal impacts on the environment and low nuisance. It is important that to minimize risks, the City has trained staff responsible for the construction and operation of the facility. The City may also want to evaluate public-private partnerships as a means of reducing construction, operating, and marketing risks.

Product Marketing. In order to be a cost-effective operation, the material produced must be sold. There are several different markets for compost as a soil amendment including use in stormwater management, in landscaping, in horticulture and in agriculture. Efforts are underway to further develop markets in the Texas agriculture industry. Wood waste requirements for composting are determined to be just adequate to process a given amount of sludge. However, if additional wood waste is identified in the future, the sale of mulch may present another revenue stream. The City must develop and continually maintain a comprehensive marketing program throughout the operation of the facility. Marketing is required for both feedstocks and products.

Facility Site Selection and Permitting

Biosolids compost facilities are subject to Chapter 332.26 (location standards). This study does not include a specific site selection task. The City has the responsibility to review TCEQ regulations, consider additional site selection criteria, and work with a real estate agent to identify specific site options for the WCF.

Per TAC 332.26, compost facilities shall meet criteria associated with all of the following factors.

- Floodplains
- Wetlands
- Water wells
- Surface waters
- Buffer zones

Other site selection criteria should include the following.

- Surrounding land uses
- Sufficient acreage
- Access
- Near the generation centroid
- Available infrastructure
- Access to markets
- Proximity to the workforce

Project Economics

Figure 2 illustrates the project’s economic model. Revenues are generated at the front-end of the process through material tip fees and at the back end through the sale of compost. There are also cost benefits from not having to haul sludge to the Turkey Creek Landfill. Project costs include capital expenses and operating costs.

Figure 2
WCF Revenue / Cost Model



Upfront Revenues & Avoided Costs

Sources of up-front revenues include tipping fees charged from the disposal of:

- Sludge
- Wood waste
- Food waste
- Other potential feedstocks

Cities that responded to the local government survey reported sludge disposal costs ranging from \$38 to \$45 per ton. Brush disposal costs provided by one respondent were equal to \$25 per ton. Discussions with local tree service companies indicated significant interest in participating in a project to reduce their hauling and disposal costs for wood wastes.

For many municipalities, the operation of a compost facility also has the benefit of eliminating disposal costs for sludge generated by City operations. In Weatherford's case, the City has negotiated a zero tip fee at the Turkey Creek Landfill from Progressive as part of the overall collection service agreement between Progressive and Weatherford. However, the City does have to pay for hauling the sludge from the City to the Turkey Creek Landfill which is located 53 miles from Weatherford.

Project Costs

Project costs are divided into capital costs and operating costs. Major capital costs include land, site improvements and equipment. Operating costs include labor, equipment operation and maintenance, marketing and miscellaneous expenses such as material testing. Factors affecting these costs include the quantities of materials managed at the site, permit conditions and the level of effort devoted to material marketing.

Compost Sales

Some of the key findings of a preliminary market assessment are presented below.

Potential competitors operate facilities located within a reasonable haul distance (50 to 75 miles) and produce compost, as well as mulch and blended soils. No large-scale commercial composters are within 20 to 30 miles of Weatherford, providing it with an excellent local competitive edge. Overall, the quality of regionally manufactured compost is quite good. Again, the primary feedstock being composted is vegetative (brush, yard trimmings and wood), but some food waste, manure, and biosolids are also composted.

Typically, the biosolids and manure composts possess a greater nutrient content than the composts made from vegetative material, only. Composters are selling compost to professional customers for \$15 to \$35 per cubic yard, picked up, with \$25 to \$30 per cubic yard being typical. Retail prices are approximately \$10 per cubic yard higher. Purchasing in larger truckload volumes can sometimes allow for additional pricing discounts.

Excellent experience exists within the landscaping (and retail lawn/garden) sectors regarding compost usage. Weatherford should be able to readily access landscaper, resellers including soil blenders and, if chosen, retail customers in the local area. Further, its target geographical market would be a 50-mile radius (encompassing Parker and its surrounding counties). Marketing to the east, toward Fort Worth, allows for greater access to retail and professional customer bases. However, marketing it will require Weatherford to compete with two well-established composters (Silver Creek Materials and Living Earth). Although some biosolids biases exist in the state, none was identified during the market research project, and as such, should be manageable. While it is expected that Weatherford should be able to market either the 15,000 or 36,000 cubic yard volumes of compost, also offering a natural mulch and blended soil (containing compost and/or overs) will help to assure these efforts. It will be important to produce a low-odor product, so that its smell does not remind buyers of its source. The product should be marketed for \$10 to \$20 per cubic yard (plus delivery charges) in large truckload volumes. Hiring an internal salesperson should be considered if a larger volume of product is

generated. Based on the Marketing Study performed for this Study, a range of sale prices for various quantities of generation (Table 2).

Table 2 Compost Value at Various Production Levels		
	Realistic High Price Average	Realistic Low Price Average
15,000 CY Produced	\$20/CY	\$17.50/CY
25,000 CY Produced	\$15/CY	\$12.50/CY
35,000 CY Produced	\$10/CY	\$7.50/CY

Project Costs and Revenues Summary

Based on the assumptions used in the financial analysis, the Large Regional Facility generates considerable revenues. While revenues significantly exceed costs, it should be recognized that this magnitude of operation requires significantly more attention to issues of securing feedstocks, marketing final products, and managing site construction and operations. A review of the costs/revenues for the three scenarios shows a significant benefit for regionalizing the project. Table 3 presents the estimated capital costs for site development and equipment. This includes land, site improvements and equipment.



Table 4 presents estimated revenues from the sale of compost and the projected costs of operation. The results show that a Weatherford Only operation is unlikely to generate sufficient revenues to pay for the cost of the facility over a 20-year life-cycle. One of the key factors in the Weatherford Only scenario is that there are no avoided costs for the disposal of sludge, which typically would be approximately \$200,000 per year for the City. The Small Regional scenario is very close to the breaking even and the Large Regional scenario does support a profitable operation.

Key factors in determining the cost-effectiveness of the operation include the following.

- Cost of land to secure a site for the facility
- Negotiated tip fees for the disposal of wood waste and sludge
- Sale price for compost and mulch
- Cost of equipment

The costs presented in Table 5 assume a range of +/- 15%. Revenues assume a low price and high price range.

The Small Regional scenario shows to have a positive payback over the course of the project. Key factors will be the sale price of the compost, tip fees for sludge and wood waste. The City may wish to initiate discussions with haulers to determine interest in the project.

(refer to Table 3). The findings show that for the Weatherford Only scenario, the short-term and long-term costs of the project exceed revenues generated. One of the key reasons for the negative outcome is that there are no avoided costs for the disposal of Weatherford sludge (except for haul costs). The Small Regional scenario does show to have a positive cash flow. The final outcome will be determined by how much revenues can be generated from the sale of compost and tip fees negotiated with local haulers. The Large Scale scenario doesn't have the returns associated with the Small Regional scenario due to the lower projected sale price of compost. If the City were to secure a \$20 per ton value for the compost under the Large Scale scenario, the NPV would be over \$10.0 million.

Table 3 Capital Cost			
	Scenario 1	Scenario 2	Scenario 3
Capital Costs (Land, Improvements, Equipment)	\$ 1,878,416	\$ 1,878,416	\$ 5,124,564

Table 4 Program Costs and Revenues in Year 1			
	Scenario 1	Scenario 2	Scenario 3
Revenues (Compost sales, tipping fees, avoided sludge haul to Turkey Creek)	\$ 369,000 – \$399,000	\$ 565,000 – \$598,000	\$1,059,000 - \$1,433,000
Operating Costs (equipment, labor, grinding, sludge haul, and debt service)	\$ 438,000 – \$592,000	\$ 555,000 – \$751,000	\$ 1,048,000 - \$1,419,000
Net Revenues including debt service, operations & revenues	\$(224,000) – \$(40,000)	\$ (22,000) – \$224,100	\$ (230,000) - \$254,000
Net Revenue / Cubic Yard of Compost	\$ (18.90) - \$(3.40)	\$(1.10) - \$10.99	\$ (5.25) - \$5.79
Net Present Value (positive value = net revenues) (over 20 years)	\$(1,186,300) - \$ (620,000)	\$1,798,600 - \$2,698,500	(\$401,600) - \$1,695,000
Revenues are assumed to be \$17.50 to \$20.00 per cubic yard for Weatherford Only and Small Regional and \$7.50 - \$10.00 for Large Regional.			

To help reduce costs, the City may consider the following options.

- Hold discussions with Waste Connections to determine the possible value of not having to manage sludge at the Turkey Creek Landfill. This may include discussions regarding Waste Connections committing to delivering a defined quantity of sludge to the WCF at a negotiated tipping fee. This should also recognize significant haul cost savings for Waste Connections.
- Identify potential grant opportunities. This Study was funded by the NCTCOG solid waste grant program. The City should consider this and other sources of grant funds to reduce program costs. One of these sources may be the US EPA's recycling infrastructure grant program which may fund eligible compost facilities. The program is in the first of a five-year cycle. Grants can range from \$500,000 to \$2,000,000. This is a national program and there is likely to be a large number of communities seeking grants.
- Consider partnership with either other local governments or the private sector to help in funding the project. This may reduce some of the financial benefits of the project, but it can also reduce some of the risks as well.

Partnerships

As demonstrated in the financial assessment of the project, there are definite benefits of approaching the project on a regional basis. These partnerships can either be the City of Weatherford with other surrounding municipalities or with private entities such as waste haulers, feedstock generators, and experienced operators.

Key issues to consider regarding potential partnerships include the following.

- Long-term commitment to the project
- Material specifications
- Material acceptance
- Cost and potential revenue sharing
- Environmental Risks



Recommended Next Steps

The evaluation of the three scenarios demonstrates the benefits of approaching the WCF as a regional facility. Aside from the economic benefits, a regional approach will also have the benefits of removing more sludge from landfills and producing more environmentally sustainable and renewable resources including compost and possibly mulch. While there are definite advantages, a regional approach is more complex and requires participation from several stakeholders including other cities, private haulers, local tree-trimming firms, and markets for compost.

The following are recommended next steps for the City.

