

Southeast Tennessee Municipal Solid Waste Planning Region

BRADLEY COUNTY

Tennessee Department of Environment and Conservation
Division of Solid Waste Management

Solid Waste Needs Assessment

Prepared
By
Southeast Tennessee Development District



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INTRODUCTION

The Solid Waste Management Act of 1991 (SWMA) was written to avert extreme financial hardships that could have occurred if small local governments were suddenly required to upgrade landfills to meet Resource Conservation and Recovery Act (Subtitle D) regulations. Rules were promulgated by the Tennessee Department of Environment & Conservation to implement Subtitle D included provisions requiring landfill operators to line facilities with impermeable clay and synthetic materials; install leachate collection systems and monitoring wells; and provide thirty years of post-closure care. These were, at the time, extremely expensive changes in the development and operation of disposal facilities, and there was fear in the legislature that some counties would not have a disposal option.

In order to ensure that local governments were protected from high costs and lack of disposal capacity, the SWMA promoted regional landfills, an attempt to guide small counties into alliances with other counties. Theoretically, small counties would form a regional board that would then settle on a disposal site, and each local government would share in the cost of operation. The law even has a provision that would allow local governments to require all entities within their respective jurisdictions to dispose of their waste at the regional landfill. The premise behind the latter concept proved to be unconstitutional (see *Carbone vs Clarkstown*, U.S. Supreme Court, May 1994). While acknowledging that the flow control provision existed, no county in the State was willing to pledge public funds to facilities that may not receive enough waste to garner the tipping fees needed to meet costs.

During the same period in the early 1990s, the Tennessee Valley Authority was exploring ways to integrate solid waste into fuel supply systems at power plants that had the existing technology to properly combust waste material. One of these plants was located in Kingston, and local officials became interested in combining their respective waste streams, closing most of their landfills, and hauling everything to a waste-to-energy facility.

Engineers working with TVA had prepared studies for other power plants and suggested the Watts Bar site as an alternative because two moth-balled fossil fuel plants are located there. The engineers recommended installing a companion boiler system that would utilize existing infrastructure and reduce the haul distance for all southeast Tennessee counties. Other infrastructure planned for the site included a materials recovery facility (MRF), which would have diverted enough material to meet the SWMA waste reduction goal. This situation was the catalyst for the formation of the Southeast Tennessee Municipal Solid Waste Planning Region, which includes all of the counties within the Southeast Tennessee Development District: Bledsoe, Bradley, Grundy, Hamilton, Marion, McMinn, Meigs, Polk, Rhea, and Sequatchie. Without the flow control provision, commitments from all counties and cities were vital in bringing this project to fruition.

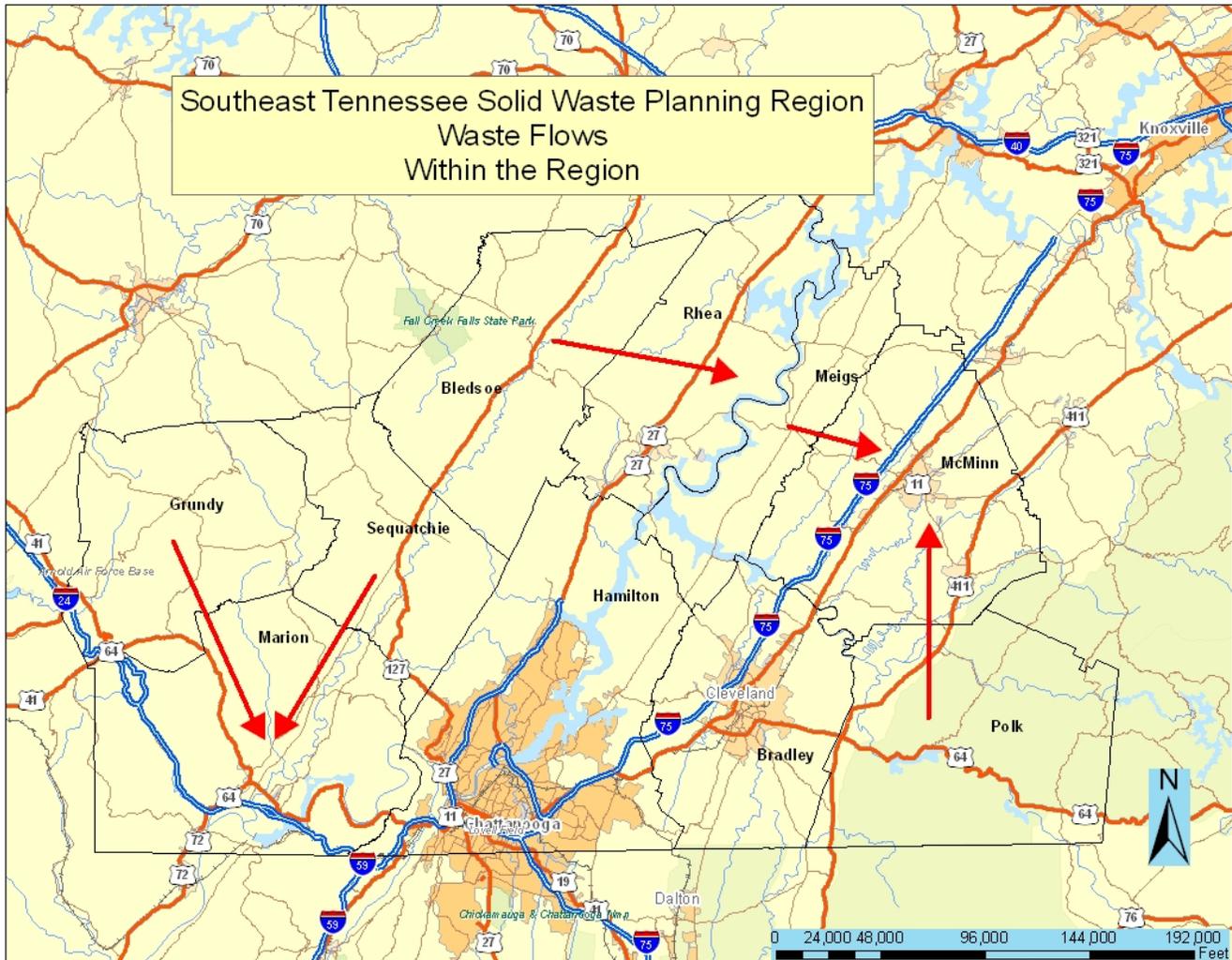
After the completion of studies funded by TVA, the utility lost interest in the project. No official reason was ever conveyed, but the decision was probably based on the fact that any

emissions from the proposed plant would have a potential impact on the Cherokee National Forest and the Smokey Mountain National Park. TVA's involvement in the project was crucial because the utility had existing infrastructure and would have bought the steam produced by the plant. Tipping fees would have been a reasonable \$35 per ton, including MRF operations. Without TVA, the Board could not finance a stand-alone facility because tipping fees would have reached \$100 or more, far above existing landfill disposal costs.

The failure to implement the waste-to-energy project did not deter the Board from remaining a regional planning entity. Board members were comfortable with the situation and wished to remain together in the event that other regional opportunities arose.

Saving landfill space was a primary goal of the SWMA. Many experts believed early on that the cost per ton of garbage would be in the \$40 - \$90/ton range at Class I facilities. Consequently, recycling, waste diversion, and saving landfill space became paramount goals. High tipping fees failed to materialize, however, as competition and economies of scale drove down development costs. Subsequently, many cities and counties found themselves with expensive recycling and waste diversion programs. Studies by several jurisdictions showed costs of \$280+ to recycle a ton of waste material versus \$25-\$28 dollars to simply dump it in the landfill. It is no surprise that many cities dropped their recycling programs (they weren't required by law to have one in any case) and shifted most of the burden to county governments, which were required to meet SWMA goals. There was no crises, no shortage of landfill space, and most of the landfill operators were marketing their space to any and all, inside of Tennessee or out, in the region or not. The more waste coming into the landfill, the more money is made for the operators. Few landfill operators were (or are) working diligently to save space; they are generally selling as much space as possible for the best price.

In Southeast Tennessee there are six (6) operating Class I Landfills. SANTEK Environmental, Inc. operates two of these facilities for Bradley and Rhea Counties respectively. SANTEK can generally landfill all of the waste that it can attract to either landfill. In return, the counties get reduced or no disposal costs, income from disposal operations, and assistance with programs, including the State's Household Hazardous Waste collection events. There are considerable benefits to all parties in this relationship, especially to the county taxpayers.



Meadow Branch, a private landfill located in McMinn County, provides disposal for several counties in East Tennessee, including several outside of the region. McMinn County receives a host fee for Meadow Branch, and operates its own landfill, which also accepts waste from outside the region.

Marion County’s landfill is operated by an Authority. Like the other landfills, waste is accepted from any source. In the past, landfill operators have received waste from Dade County, Georgia, Jackson County, Alabama, and both Hamilton and Franklin Counties in Tennessee. The landfill routinely accepts all of Grundy and Sequatchie County’s waste.

Chattanooga operates the sixth landfill in the region. It is a facility that originally belonged to Hamilton County, but when the city’s Summitt Landfill was closing, the city and county came to an agreement that allowed Chattanooga to own and operate the landfill. This landfill could accept waste from other areas, but there are currently no customers. A large proportion of the Chattanooga/Hamilton County waste stream, over 200,000 tons annually, goes to an Allied Waste landfill located in northern Alabama.

The following is a detailed description of Bradley County's waste collection, diversion, and disposal system and how these programs function in relation to other parts of the Region. Every attempt has been made to provide an objective assessment of the County's infrastructure and program needs based on the legal requirements of the SWMA.

SECTION 1: DEMOGRAPHIC INFORMATION

Provide a table and chart showing the region's population for the last ten (10) years with a projection for the next five (5) years. Provide a breakdown by sub-table and sub-chart, or some similar method to detail all county and municipality populations. Discuss projected trends and how it will affect solid waste infrastructure needs over the next five (5) years.

Table 1.1 Historic Population

As the following table indicates, growth has been consistently robust, only faltering during the 1980-1990 period, which was characterized by a recessionary trend.

Year	Population	Increase	% Change
1950	32,338	N/A	N/A
1960	38,324	5,986	15.6%
1970	50,686	12,362	24.4%
1980	67,547	16,861	25.0%
1990	73,712	6,165	8.4%
2000	87,965	14,253	16.2%
2010	98,963	10,998	12.5%

Source: U.S. Census Bureau

So far in this decade, the population has grown by an estimated 2.1% (or 2,171 residents). For this analysis, projection figures will be used under the assumption that the county should plan for the maximum possible volume of waste that must be handled.

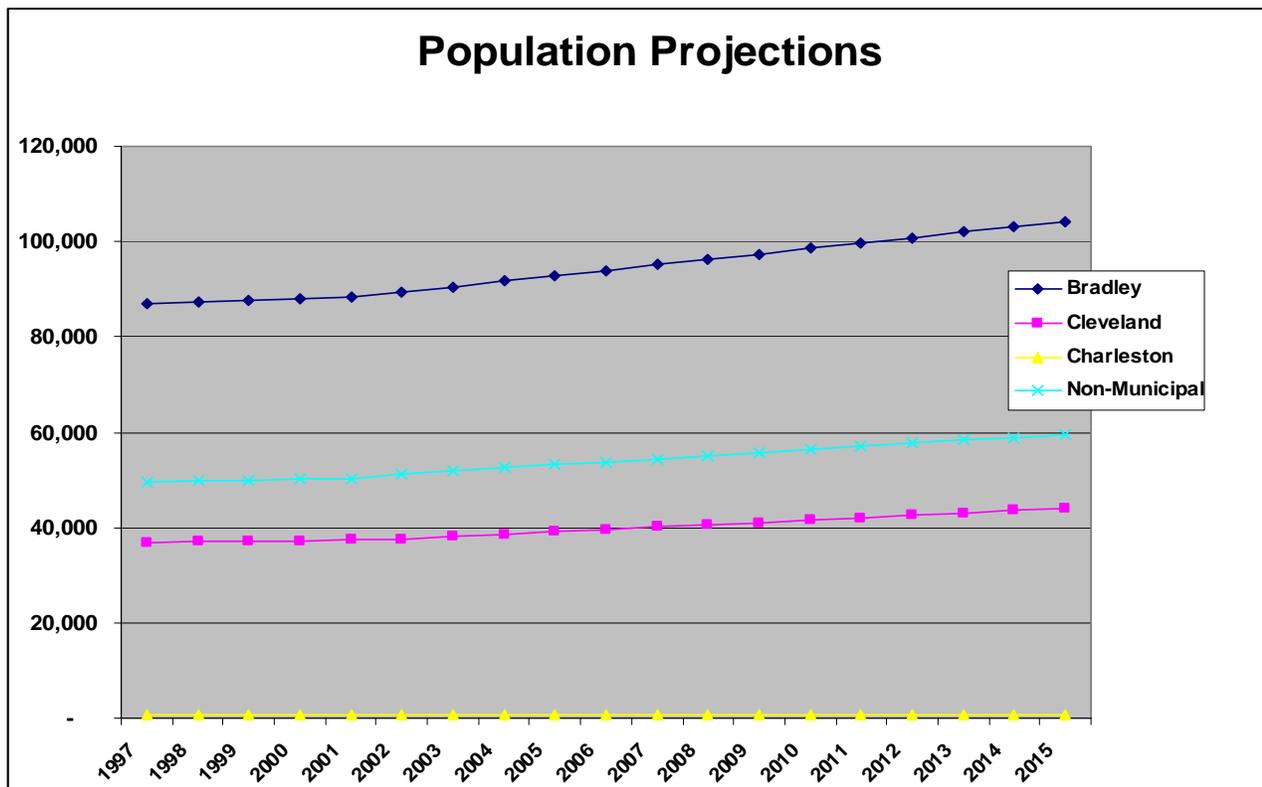
Table 1.3 Population Projections

Year	Bradley	Cleveland	Charleston	Non-Municipal
1997	87,021	36,778	625	49,618
1998	87,328	36,980	626	49,722
1999	87,525	37,009	627	49,889
2000	87,965	37,192	630	50,143
2001	88,229	37,309	634	50,286
2002	89,375	37,518	629	51,228
2003	90,521	38,027	625	51,869
2004	91,668	38,536	621	52,511
2005	92,814	39,045	617	53,152
2006	93,960	39,553	613	53,793
2007	95,106	40,062	609	54,435
2008	96,252	40,571	605	55,076
2009	97,398	41,080	601	55,718
2010	98,963	41,285	651	57,027
2011	99,893	41,673	657	57,563
2012	100,823	42,061	663	58,099
2013	101,753	42,449	669	59,023
2014	102,683	42,837	675	59,171

2015	103,615	43,225	682	59,708
2016	104,576	43,626	688	60,262
2017	105,537	44,027	694	60,816
2018	106,948	44,428	700	61,820
2019	107,459	44,829	706	61,924
2020	108,423	45,231	713	62,479

Sources: Historic statistics are derived from U.S. Census Bureau data. Projections are derived from a least squares model of population growth.

Bradley County’s population has been growing rapidly over the last decade. This steady growth is primarily due to the vibrant economic activity that has occurred in and around the City of Cleveland. After the 2000 census, Cleveland and Bradley County were deemed large enough to become a Metropolitan Statistical Area. This Census Bureau designation means that the county has a more regional influence, and it allows the county and its municipalities to access entitlement funds through the U.S. Department of Housing and Urban Development.



With the current economic down, Bradley County’s economy has suffered stresses, but it is in a much stronger position than surrounding rural areas. The industrial base that makes up a significant portion of the local economy is geographically compact, which means that the local workforce can still afford transportation costs to and from work, even with high fuel prices,

Over the past several years, many retired people have found that southeast Tennessee is a great retirement area. Those who moved from northern states to Florida have become

increasingly concerned about high insurance rates associated with Florida’s location in the tropical storm belt, and they miss the change of seasons. This area is ideal because the climate is temperate, taxes are low, and people moving into the area can get much more for their housing dollar. All southeast Tennessee counties have benefited from the so called “half-back” immigrants: People who move from northern, snow-belt states to Florida and then move half way back.

Population growth will likely increase the amount of residential waste produced in the county, but that will depend on growth in the economy to maintain the capacity to purchase goods. A downturn in the economy can and will negate additional waste generation, which is partly driven by the commercial and industrial sectors.

SECTION 2: ECONOMIC PROFILE

Provide a table and chart showing the region’s economic profile for all county and municipalities for the last ten (10) years with a projection for the next five (5) years.

Although growth trends are apparent over time for employment, income, and other economic indicators, these trends may not carry forward in a linear manner. Changes occurring in global markets inject a great deal of uncertainty into job creation. One of the primary factors is recent increases in shipping costs. As the following news article states:

The soaring price of oil has dramatically increased the cost of moving goods around the globe, posing a major threat to price stability and overseas manufacturing, finds a new report from CIBC World Markets.

"Exploding transport costs may soon remove the single most important brake on inflation over the last decade – wage arbitrage with China," says Jeff Rubin, chief economist and chief strategist at CIBC World Markets. "Not that Chinese manufacturing wages won't still warrant arbitrage. But in today's world of triple-digit oil prices, distance costs money."

The report finds that the cost of shipping a standard 40-ft. container from East Asia to the North American east coast has already tripled since 2000 and will double again as oil prices head towards US\$200 per barrel. These soaring energy costs are threatening to offset decades of trade liberalization and force some overseas manufacturing to return closer to home.

Source: Canadian Transportation & Logistics by Adam Ledlow

Should high fuel prices or a severe recession associated with high fuel prices force manufacturing to relocate closer to home, Bradley County would likely benefit since it has a significant manufacturing base that engenders enough synergy to attract returning industry. However, extremely high energy costs can and will have dampening effect on existing industry that also must ship goods, even if the distances are not as great as the trans-Pacific route referred to in the foregoing article.

Table 2.1 Economic Profile

					Per	Retail	Total Bank
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Year	Total	Employment	Unemployed		Capita Income	Sales (\$1,000's)	Deposits (millions \$)
			Total	Percent			
1997	42,180	39,870	2,310	5.5%	21,323	800,224	840
1998	43,590	41,920	1,670	3.8%	21,985	804,668	836
1999	43,840	42,280	1,560	3.6%	22,698	862,972	885
2000	45,670	44,020	1,650	3.6%	22,724	890,399	925
2001	44,960	43,070	1,890	4.2%	24,573	898,758	984
2002	44,850	42,630	2,220	4.9%	24,814	900,629	902
2003	45,190	42,820	2,370	5.2%	25,843	981,622	1,061
2004	45,990	43,650	2,340	5.1%	27,232	1,079,516	1,117
2005	46,490	44,050	2,440	5.2%	28,400	1,073,737	1,246
2006	48,010	45,630	2,380	5.0%	21,744	1,135,977	1,379
2007	47,650	45,490	2,160	4.5%	22,515	1,151,634	1,494
2008	48,248	45,799	2,449	5.1%	25,753	1,189,595	1,442
2009	48,738	46,228	2,509	5.1%	26,048	1,227,556	1,505
2010	49,227	46,658	2,569	5.2%	26,342	1,265,516	1,569
2011	49,717	47,088	2,629	5.3%	26,637	1,303,477	1,632
2012	50,206	47,517	2,689	5.4%	26,931	1,341,438	1,696
2013	50,708	47,992	2,715	5.5%	27,200	1,354,852	1,712
2014	51,215	48,472	2,743	5.6%	27,472	1,386,400	1,730
2015	51,727	48,956	2,770	5.7%	27,747	1,382,084	1,747
2016	52,244	49,446	2,798	5.7%	28,024	1,395,905	1,764
2017	52,767	49,940	2,826	5.8%	28,304	1,409,864	1,782
2018	53,294	50,440	2,854	5.8%	28,587	1,423,963	1,800

Sources: Historic employment data, U. S. Dept. of Labor; Per capita income data, U.S. Bureau of Economic Analysis; Retail data, Tenn. Dept. of Revenue; Bank deposits, FDIC.

All state and local area dollar estimates are in current dollars (not adjusted for inflation).

Projections of employment from 2013 to 2018 assume a linear progression that follows a slight upward trend. All things being equal, the unemployment numbers should remain fairly low considering that Cleveland and Bradley County have a stable industrial base. The trend apparent from the preceding table is one of robust economic activity. As the following table indicates, manufacturing accounts for more than a quarter of the jobs in the county.

Annual Industry Distribution of Jobs and Avg. Wage in 2010 (NAICS)	Establishments	Jobs	Pct Dist. in County	Annual Average Wage Per Job	Rank in U.S.
Total Covered Employment and Wages	1,693	36,803	100.0%	\$33,734	729
Private	1,661	32,573	88.5%	\$33,947	661
Agri., forestry, hunting	14	0	0.0%	\$0	1,663
Mining	1	0	0.0%	\$0	1,152
Construction	158	1,501	4.1%	\$33,564	1,282
Manufacturing	129	9,569	26.0%	\$42,619	771
Wholesale trade	117	1,737	4.7%	\$33,995	1,530
Retail trade	286	4,095	11.1%	\$23,282	548
Transportation, warehousing	69	124	0.3%	\$50,664	145
Utilities	7	33	0.1%	\$75,752	183
Information	22	245	0.7%	\$34,947	1,118
Finance and Insurance	145	1,227	3.3%	\$40,100	824
Real Estate, rental, leasing	63	306	0.8%	\$23,708	1,168
Professional, technical services	139	830	2.3%	\$41,752	879
Mgmt. of companies, enterprises	8	291	0.8%	\$65,683	388
Administrative, waste services	78	2,596	7.1%	\$36,556	148
Educational services	14	0	0.0%	\$0	1,875
Health care, social assistance	171	0	0.0%	\$0	2,175
Arts, entertainment, recreation	16	179	0.5%	\$13,078	1,417
Accommodation and food services	136	2,885	7.8%	\$11,393	948
Other services, exc. public admin.	108	1,127	3.1%	\$24,701	582
Public administration	15	1,089	3.0%	\$33,390	1,418

Source: US Bureau of Labor Statistics (BLS)

D = Not shown to avoid disclosure of confidential information.

N/A = This item is not available.

Note: Average wage may not match published numbers due to rounding.

To provide a point of perspective for the preceding table, there are 3,077 counties in the U.S. (including parishes in Louisiana and boroughs in Alaska). The ranking for manufacturing of 771 means that Bradley County has more manufacturing jobs than 75% of all counties in the U.S. This, of course, makes Bradley County one of primary economic engines of the regional economy.

2010 Employment	Tennessee	Bradley County	County Rank
Total Employment All Industries	2,685,491	37,523	13th
Natural Resources and Mining	0.4%	0.3%	20th
Construction	4.5%	3.7%	16th
Manufacturing	15.2%	26.5%	9th
Trade, Transportation and Utilities	22.1%	18.0%	16th
Information	1.8%	0.6%	25th
Financial Activities	5.2%	4.0%	15th
Professional and Business Services	11.6%	11.7%	12th

Education and Health Services		11.8%	10.8%	12th
Leisure and Hospitality		9.8%	7.9%	14th
Other Services		2.6%	3.0%	11th
Government		14.8%	13.4%	15th
	Federal	1.8%	0.6%	23rd
	State	3.2%	1.1%	11th
	Local	9.8%	11.7%	11th

Source: Tennessee Advisory Commission on Intergovernmental Relations.

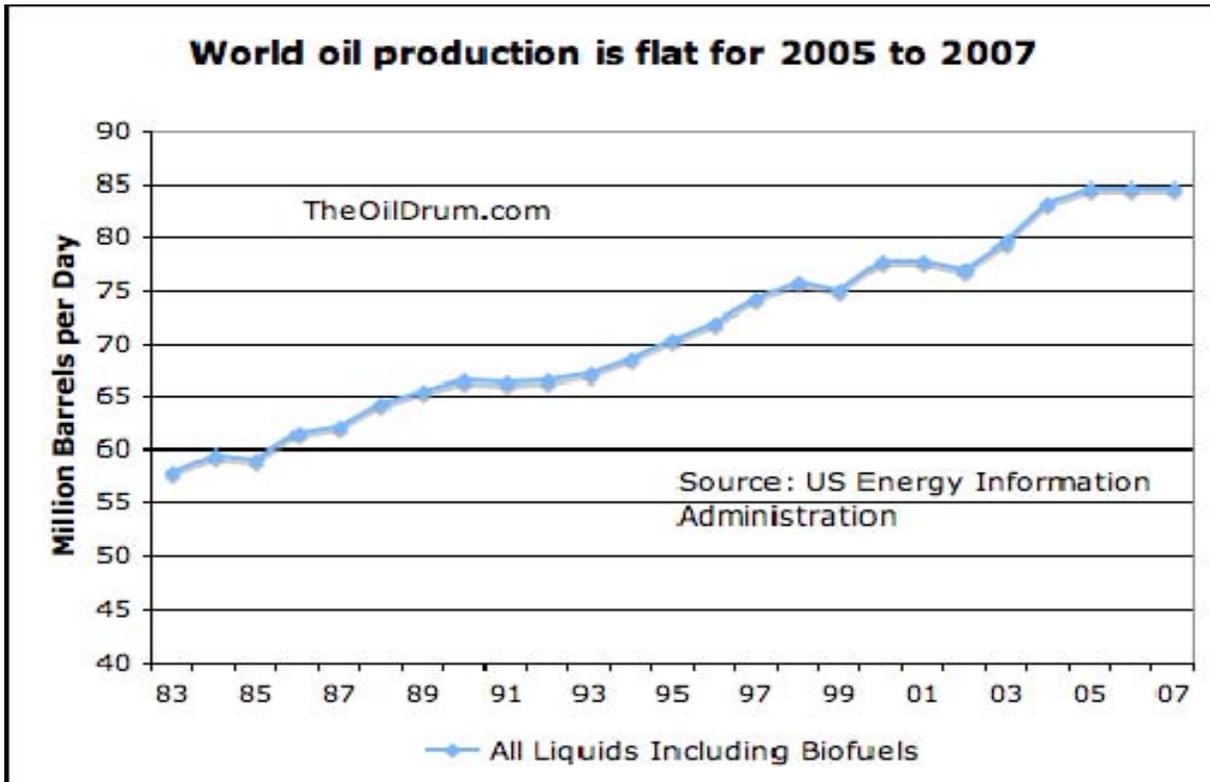
Within Tennessee, Bradley County ranks ninth in manufacturing capacity. Although there are larger industrial concentrations in the more populous municipalities, Cleveland and Bradley County have plenty of expansion potential with few environmental problem areas; direct access to a major interstate system; port facilities on the Hiwassee River; and access to a major rail line. In addition, there is a direct route from Cleveland to Dalton, Georgia, which is a primary carpet manufacturing center, and there is a close relationship with the economic centers located in the Chattanooga/Hamilton County metropolitan area. All of these factors point to continued industrial expansion and a concomitant increase in population.

The primary economic problems on the horizon are disruptions in the home mortgage markets and energy supplies. As previously discussed, the home mortgage problems will likely curtail near-term investment in new homes, especially by retirees moving into the region. More problematic (and at a basic level, related) is the increasing cost of energy. It is becoming more apparent that liquid fuels production is not keeping pace with world-wide demand.

Oil depletion is the primary culprit as some of the largest oil fields in the world begin to decline. Statistics published by the International Energy Agency (IEA), the Energy Information Agency (US), and the BP Statistical Abstract indicate that crude oil production has not increased above mid-2005 levels. This reflects decline rates in several oil provinces such as the North Sea oil fields (UK and Norway) which are experiencing a 15-18% loss in production annually. Greater declines – more than 30% annually - are occurring at Cantarell in Mexico, which is the second largest oil field in the world and a primary source of supply for the U.S. Even OPEC, previously the final arbiter of world oil prices, has lost production capacity in the last few years.

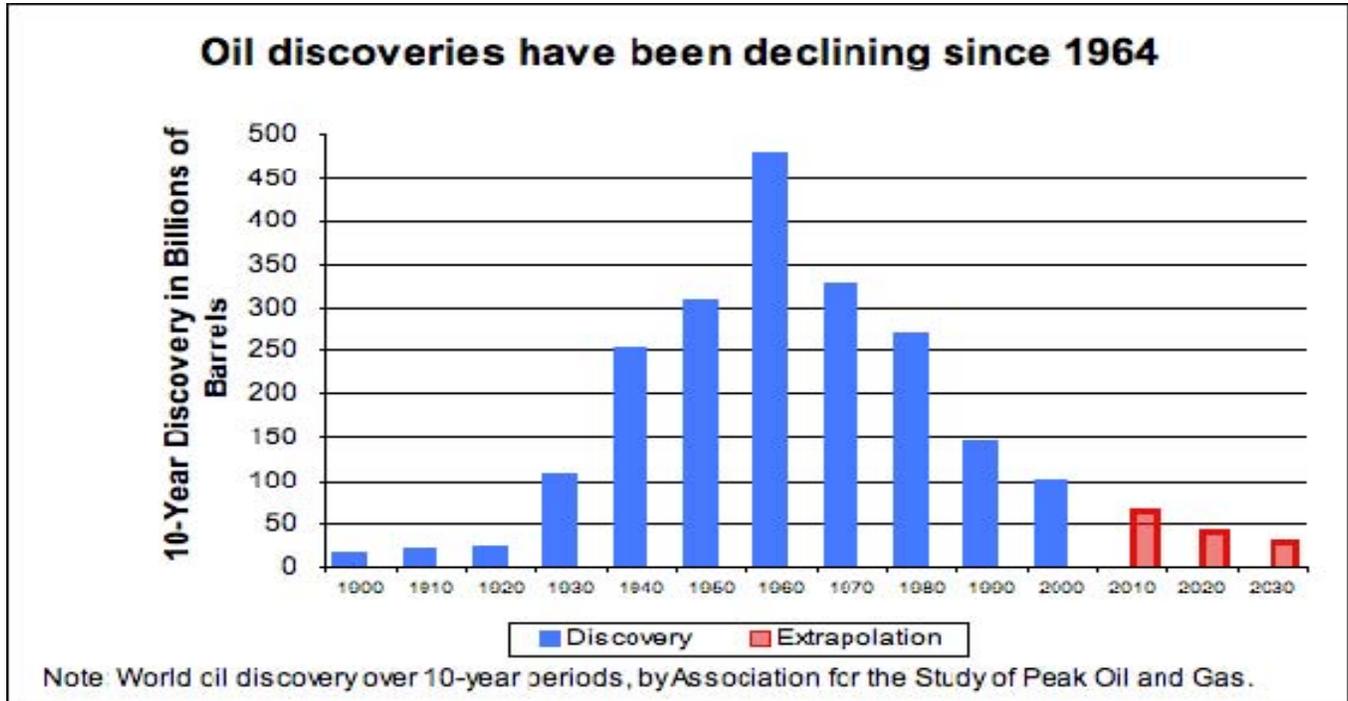
The IEA “World Economic Outlook” warns of an oil supply crunch between now and 2015 due to increasing demand from China and India; a sharp decline in production from existing oil fields; and a lack of new production. Fatih Birol, IEA Chief Economist, states that there is a shortfall of 12.5 million barrels per day, about 15% of the global oil demand (Real Politik, 06/08).

Figure 2.2



As the previous graph illustrates, the current production is at a plateau, which may become permanent. No large oil fields have been discovered since the 1970's, and promising geological structures are in areas that present significant difficulties for recovery. For example, Chevron Oil's last major attempt at adding reserves – the "Jack" well – is located 27,000 feet below the surface of the Gulf of Mexico. Bringing oil to production at such depths has never been attempted and will require new technology to deal with extreme pressures and heat. This project will also require investments in the billions of dollars. The basic message that projects like this convey is that the cheap oil has been found; from now on we have to contend with much higher energy costs.

Figure 2.3



The impact of high energy costs is currently being felt by most local governments. Fuel for school buses, road paving, and of course, garbage collection, will likely require more funding. These increased costs will have a negative impact on all county operations.

For planning purposes, it would be prudent to assume a moderate increase in the amount of waste produced in the county, based on economic activity. According to the preceding analysis, it is unlikely that the economy can produce large increases in the waste stream, but a reduction in economic activity can also affect the volumes of waste that get reused: Any marginal recycling programs will probably become unviable. That material would again become waste and act to counter reductions associated with economic distress

SECTION 3: SOLID WASTE STREAM

Elaborate on the entire region's solid waste stream. Compare today's waste stream with anticipated waste stream over the next five (5) years. How will the total waste stream be handled in the next five (5) years? Include in this discussion how problem wastes like waste tires, used oil, latex paint, electronics and other problem wastes are currently handled and are projected to be handled in the next five (5) years. What other waste types generated in this region require special attention? Discuss disposal options and management of these waste streams as well as how these waste streams will be handled in the future. Include in this discussion how commercial or industrial wastes are managed. Also provide an analysis noting source and amounts of any wastes entering or leaving out of the region.

Several waste characterization studies conducted in various parts of the country may be used to estimate waste stream components in the southeast Tennessee region. There are no known contemporary studies that were performed in Tennessee but studies from other states should provide a reasonable source for extrapolating waste generation attributes to local populations. The following table provides a comparison of some studies in relatively comparable states as well as the nationwide EPA estimate.

Table 3.1

Waste Characterization Studies

Material	Georgia 2004	Iowa 2005	Ohio 2005	EPA 2006
Paper	38.7	33	41	33.9
Plastics	15.8	14.9	16	11.7
Metals	5.3	4.7	4	7.6
Glass	3.7	1.7	5	5.3
Yard Waste		1.6	9	12.9
Food Waste		10.6	15	12.4
Wood		8		5.5
C & D	5.9	5.5		
Durable		5.1		
Textiles & Leathers		4.9	6	7.3
Diapers		2.4	4	
Rubber		0.5		
HHMS		0.4		
Other		6.8		3.3
Organics	27.2			
Inorganic	3.4			
Total:	100	100.1	100	99.9

As is obvious from the table, different states use different definitions for the material types. From observation of the Bradley County waste stream, the Iowa percentages appear to be more representative because they more closely mirror Bradley County urban/rural population percentages: 33.9% rural and 66.1% urban. The Environmental Protection Agency's numbers are generally accepted for most areas in the U.S., but they tend to be heavily weighted toward large metropolitan areas because that is where most of the population lives and where most of the waste is produced. As the following table illustrates, Iowa and Tennessee have a similar urban/rural mix, which is considerably different from U.S. and Ohio percentages. Georgia's percentage is within 6 points of Tennessee's, but Iowa's percentage is within about 5 points.

Table 3.2**Population Comparison**

	Georgia	Iowa	Ohio	Tennessee	United States
Total:	8,186,453	2,926,324	11,353,140	5,689,283	281,421,906
Urban:	5,864,163	1,787,432	8,782,329	3,620,018	222,360,539
Rural	2,322,290	1,138,892	2,570,811	2,069,265	59,061,367
Urban Percent	72%	61%	77%	64%	79%
Rural Percent	28%	39%	23%	36%	21%

Source: U.S Census 2000

Using composite percentages based on random observation of the waste stream, Figure 3.4 provides a rough illustration of waste volumes by type of material. This probably does not reflect the impact of Class II facilities (Table 3.3) operated by large manufacturers in the area. This includes Bowater, Inc.'s large paper manufacturing plant located in McMinn County, which is just across the Hiwassee River from Charleston and draws a significant portion of its workforce from Bradley County.

Table 3.3 Class II Landfills

IDL060000040	ALLIED BENDIX CORPORATION LANDFILL
IDL060000041	OLIN CORPORATION - CHARLESTON PLANT BRINE SLUDGE LANDFILL
IDL060000052	ARCH CHEMICALS, INC.
IDL540000067	BOWATER SOUTHERN PAPER LANDFILL
IDL540000079	BOWATER NEWSPRINT LANDFILL

Very little change is expected in waste stream composition over the next five (5) years unless one of the Class II facilities closes, and that waste goes to a public landfill in the region. This could (and has) happened without the knowledge of county officials, so that there are spikes in Class I waste. Class II materials have never been quantified, and there is no requirement for industries to disclose that information. Consequently, there could be huge variations in the waste stream of a county that has a significant industrial base, and that increase could, within a short period of time, nullify all waste reduction efforts.

	Charleston provides waste collection	Branch landfill in McMinn County			
Business	Contracts with private haulers and self-service by business/industry.		In-house programs and contractors	In-house programs and contractors.	Commercial generation of hazardous waste is regulated by TDEC.

Currently, there are no programs available to handle electronics or used paint.

SECTION 4: REGIONAL COLLECTION SYSTEMS

Describe in detail the waste collection system of the region and every county and municipality. Provide a narrative of the life cycle of solid waste from the moment it becomes waste (loses value) until it ceases to be a waste by becoming a useful product, residual landfill material or an emission to air or water. Label all major steps in this cycle noting all locations where wastes are collected, stored or processed along with the name of operators and transporters for these sites.

Bradley County has one convenience center strategically located to maximize access to all residents (see attached map). The center is located at the Bradley County Landfill, and is open Monday through Friday, 7:00 a.m. to 4:30 p.m. and on Saturday from 7:00 a.m. to 3:00 p.m. Two other recycling centers are located in the City of Cleveland.

The following materials were collected and marketed by SANTEK Environmental:

Recycling	Corrugated	Newspaper	Glass	Aluminum	Batteries	Oil (Gallons)	Tires (Number)	White Goods	Mixed Paper
Landfill Convenience Center	100,000	253,296	29,980	1,480	146	10,151	46,036	59,000	
Peerless Recycling Center	93,320		66,890	16,940					342,140
Urbane Recycling Center	98,640		70,240	17,230					331,830
Total Lbs.	291,960	253,296	167,110	35,650	146	75,117		59,000	673,970
Tons:	146	127	84	18	0	38	460	30	337

Private contractors operate waste collection services that cover a large part of the county. The City of Cleveland contracts with Waste Services for residential collection, and the City of Charleston provides waste collection service to its residents.

The minimum number of convenience centers required is calculated using the formula that determines a reasonable number by land area rather than population. With a current non-municipal population of about 57,027, the minimum required number of centers would be five (5) using the TDEC formula of dividing the population by 12,000. However, much of this population is served by local haulers.

Table 4.1 – Required Waste Collection System: Convenience Center

	Total Square Miles	Collection Service Provided	Difference	Required Centers	Existing Centers
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Bradley	327				
Cleveland		24.95			
Charleston		0.98			
Public Lands		37.49			
Total:	327	63.42	263.58	1.46	1

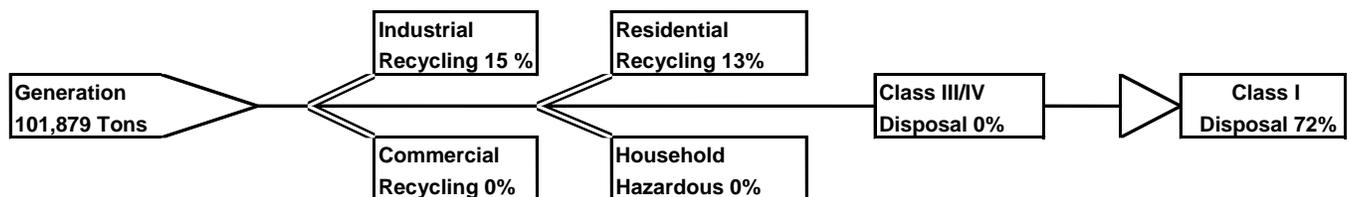
The above formula subtracts the area where municipal service is provided and the resulting figure is divided by 180 square miles (TDEC formula) to arrive at a reasonable waste-shed area. This area includes forest areas used exclusively for silviculture, parks, and other public lands that are not populated and therefore can be deducted from the total square miles of potential service area. Using this formula, Bradley County barely meets the requirements of the law. However, the waste collection contributions of the large number of private haulers in the county are not factored in to the formula (see Table 6.2).

Regional Solid Waste Flow and Life-Cycle

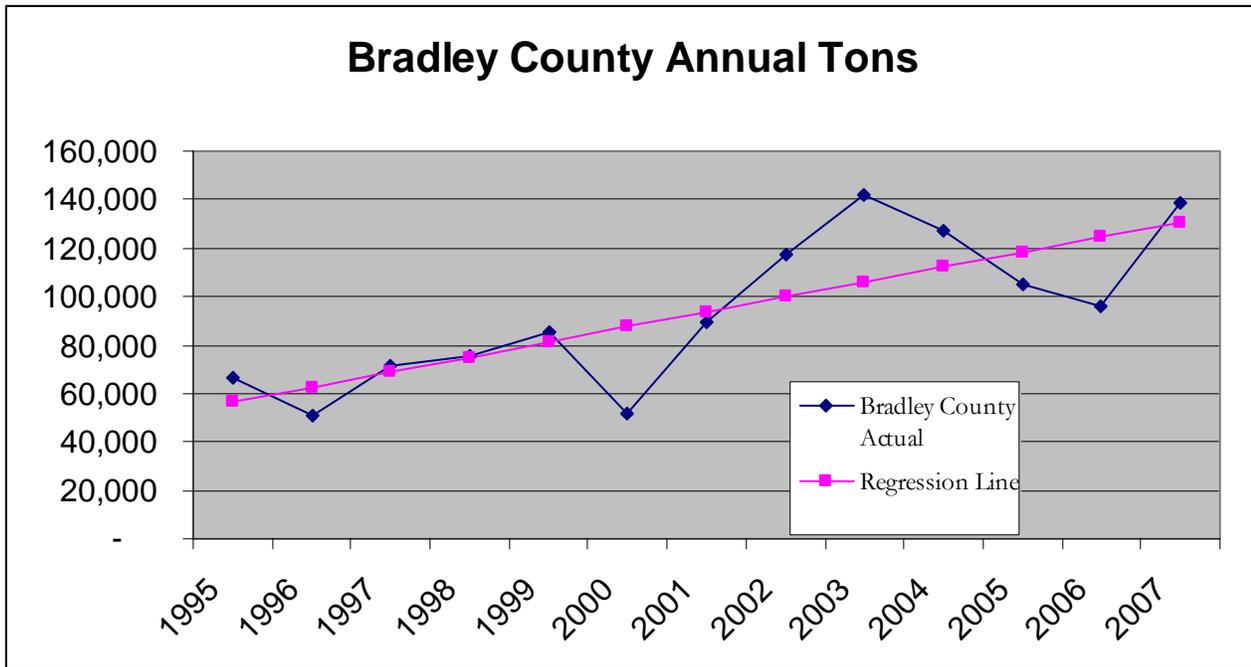
The following chart represents data collected for Bradley County for the 2012 Annual Report:

Table 4.2 - Waste Generation 2013

Category	Tons
Total Waste	101,879
Residential Recycling	12,769
Industrial Recycling	15,000
Household Hazardous Waste	0
Class III/IV	0
Class I	74,110



For 2012, Bradley County had a Class I disposal tonnage of 74,110. As is apparent from the following chart, there were major fluctuations in the volumes of waste recorded for Bradley County. Much of this fluctuation is probably due to the dynamic economy that has produced consistent growth over the last decade.



Source: Southeast Tenn. Municipal Solid Waste Planning Region Annual Reports, 1995–2012.

SECTION 5: WASTE REDUCTION

The Solid Waste Management Act of 1991 states that all regions must reduce the amount of waste going into Class I landfills by 25%. Amendments to the Act allow for consideration of economic growth, and a “qualitative” method in which the reduction rate is compared on a yearly basis with the amount of Class I disposal. Provide a table showing reduction rate by each goal calculation methodology. Discuss how the region made the goal by each methodology or why they did not. If the Region did not meet the 25% waste reduction goal, what steps or infrastructure improvements should be taken to attain the goal and to sustain this goal into the future.

The following table generated by the Re-Trac™ program indicates that the county increased the amount of per capita waste but shows a substantial “real time” reduction. This contradiction can only be resolved by the assumption that more waste existed (or came into existence) than was accounted for in previous studies. Unfortunately, we cannot go back to the base year and determine what the actual quantities were, so meeting that goal may be an impossibility if the original numbers were inaccurate.

Table 5.1

	MSW % Reduction Compared to Base Year	MSW % Reduction Pop Ratio	MSW % Reduction Using Pop Econ Ratio	MSW % Reduction Real Time Comparison
Bradley	-72.1	-72.1		40.1
Total:	-72.1	-72.1		40.1

The base year per capita waste generation rate was 1.3886 tons. Assuming a 2012 population of 100,823, Bradley County's waste generation rate was 1.0104 tons per person annually (101,879 tons/100,823). That amounts to a 0.3781% decrease in per capita waste from the base year figure.

Most of the waste reduction gains have come from the inclusion of Class III/IV waste and industrial, in-house programs. As long as these programs remain permissible methods of waste reduction, the county will be able to meet the "real time" reduction goal.

SECTION 6: COLLECTION AND DISPOSAL CAPACITY

A. Provide a chart indicating current collection and disposal capacity by facility site and the maximum capacity the current infrastructure can handle at maximum through put. Provide this for both Class I and Class III/IV disposal and recycled materials. Identify and discuss any potential shortfalls in materials management capacity whether these are at the collection or processor level.

Table 6.1: Regional Landfills in Tennessee

Site Name(s)	2012-Tons Bradley County	Permit Number	Current Capacity	Maximum Capacity	Projected Life of Facility
Bradley County Landfill	66,997	SNL 06-0006	350 tpd	1,000 tpd	10
Bradley Co. Class III/IV	0	DML 06-0114	200 tpd	1,000 tpd	20
Meadow Branch Landfill	194	SNL 54-0174	N/A	N/A	N/A
Total:	67,191				

N/A = Not available due to private ownership/operation.

Note: Capacity limits are estimates. Landfills are capable of handling all local waste plus large volumes of waste hauled from other counties. Projected life estimates are based on current disposal volumes, which can change considerably in short time periods.

All waste collected at the Bradley County convenience center is deposited in the regional landfill, which is on the same site. Waste Connections collects all waste in the City of Cleveland and hauls it to the Meadow Branch Landfill near Athens or to other landfills. The Class III/IV landfill is adjacent to the Bradley County Class I facility. Adequate capacity exists for the next ten year period assuming waste volumes remain within current peak parameters.

Both Class I facilities accept large volumes of waste from outside the region and, at times, outside the state. As a result, landfill life could be impacted by importation decisions. However, there is little doubt that there is sufficient space for all of Bradley County's waste for at least ten (10) years.

B. Provide a chart or other graphical representation showing public and private collection service provider area coverage within the county and municipalities. Include provider's name, area of service, population served by provider, frequency of collection, yearly tons collected, and the type of service provided.

Table 6.2: Regional Collection Systems

Provider of Service	Service Area	Population Total Under This Service	Frequency of Service (Weekly, Bi-weekly, on call, etc.)	Annual Tonnage Capacity	Type Service (Curbside, Convenience Center, Green Box)
Bradley County	County-wide drop-off	54,762	As Needed	40,000*	Convenience Center
C & M Disposal	Unincorporated Area	Not Available	Weekly	Not Available	Curbside
Crawford's Garbage	Unincorporated Area	Not Available	Weekly	Not Available	Curbside
D & N Disposal	Unincorporated Area	Not Available	Weekly	Not Available	Curbside
Good's Disposal	Unincorporated Area	Not Available	Weekly	Not Available	Curbside
J & F Disposal	Unincorporated Area	Not Available	Weekly	Not Available	Curbside
Mitchell's Disposal	Unincorporated Area	Not Available	Weekly	Not Available	Curbside
Parks Disposal	Unincorporated Area	Not Available	Weekly	Not Available	Curbside
River City Disposal	Unincorporated Area	Not Available	Weekly	Not Available	Curbside
City of Charleston	City Limits	673	Weekly	500	Curbside
City of Cleveland	City Limits	39,375	Weekly	28,750	Curbside

*Essentially unlimited because the convenience center is at the landfill.

SECTION 7: FINANCIAL NEEDS

Complete the chart below and discuss unmet financial needs to maintain current level of service. Provide a cost summary for current year expenditures and projected increased costs for unmet needs.

The City of Cleveland contracts with Waste Connections for waste collection, but no recycling or waste reduction services are provided under that contract. All recycling services are supported through a joint Cleveland/Bradley County program.

Bradley County is in a unique position of receiving income from its solid waste program rather than allocating funding toward it. Most of its solid waste needs are met through its contractual relationship with Santek Environmental, Inc. The county owns the landfill, but Santek operates the facility, convenience center, and recycling operation. Santek also handles the annual household hazardous waste event.

Table 7.1 Expenditures and Revenues

BRADLEY COUNTY BUDGET 2012-2013

Revenues	\$ 561,537
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Expenditures	\$ 1,182,840
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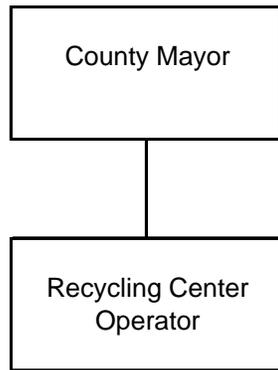
Source: Bradley County budget, FY 2012-2013

SECTION 8: ORGANIZATION, STAFFING AND FACILITIES

Provide organizational charts of each county and municipality's solid waste program and staff arrangement. Identify needed positions, facilities, and equipment that a fully integrated solid waste system would have to provide at a full level of service. Provide a scale county level map indicating location of all facilities including convenience centers, transfer stations, recycling centers, waste tire drop-off sites, used oil collection sites, paint recycling centers, all landfills, etc. Identify any short comings in service and note what might be needed to fill this need.

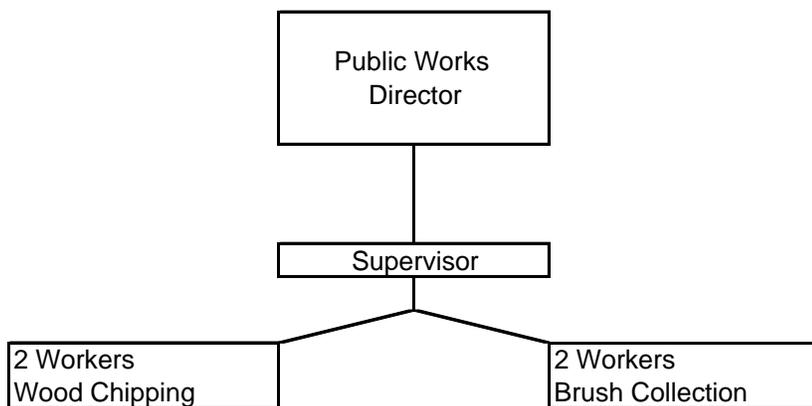
Solid Waste Staffing

The organization chart for Bradley County's waste collection and disposal system is as follows:



As is apparent from the diagram, the Bradley County system is very simple. There is only one employee who opens and mans the recycling centers. All other solid waste programs are operated by the county contractor.

The City of Cleveland provides more services since it is a municipal government. Actual waste collection and disposal is provided by Waste Connections, LLC. Cleveland provides collection for bulky items and yard waste. All wood waste, yard waste, and other organic material is chipped.



The attached maps provide a view of solid waste facilities located in Bradley County. In general, there are enough facilities available to handle all Class I, recycling, and waste reduction activities. Used oil collection points are somewhat concentrated within the City of Cleveland. Additional collection points on the north and south ends of the county are probably not absolutely necessary, but more centers in peripheral areas would likely capture more used oil.

SECTION 9: REVENUE

Identify all current revenue sources by county and municipality that are used for materials and solid waste management. Project future revenue needs from these categories and discuss how this need will be met in the future.

Revenue for solid waste operations is derived from tipping fees at the county landfill (see Table 7.2 Revenues). The county also receives an annual waste tire grant and another annual grant from the Department of Transportation for litter control and education. Bradley County contracts with Santek to operate the Class I and Class III/Class IV landfills, man and operate the recycling center, and provide other solid waste services. Landfill tipping fees pay for the contractor's services, and provide enough for additional income that is returned to the county.

The county's budget for fiscal year 2012-2013 indicates expected expenditures of \$561,537 and revenues of \$1,182,840 with a total ending fund balance of \$977,774 which has been increasing annually.

Since Bradley County has income from its solid waste system, there should be sufficient funds accrued in the fund balance to accommodate future needs. Most of these needs are being met under the existing contractual relationship with the landfill operator. Recycling, waste diversion, household hazardous waste events, and disposal programs are handled by the contractor.

SECTION 10: EDUCATION

Describe current attitudes of the region and its citizens towards recycling, waste diversion, and waste disposal in general. Where recycling is provided, discuss participation within the region. Indicate current and on going education measures to curb apathy or negative attitude towards waste reduction. Are additional measures needed to change citizen's behaviors? If so, what specific behaviors need to be targeted and by what means?

The following newspaper article was recently published in the *Cleveland Banner*. This provides a snapshot of efforts spearheaded by the local Keep America Beautiful affiliate with extensive support from Bradley County and the City of Cleveland. There is obviously widespread community support for recycling, waste reduction, and general improvement to the local environment. KAB's efforts are on-going, and the results of these initiatives are detailed below.

Great American Clean-up 2008 was biggest yet

[William Wright](#)

Cleveland Banner Staff Writer
Friday, Jun 27, 2008

Cleveland/Bradley Keep America Beautiful released its 2008 Annual Great American Clean-Up Wrap-Up Report with commendation for increasing community and business support and cooperation.

The campaign, March 1 to May 31, saw 1,225 volunteers from two communities perform 7,350 hours of community service during 51 events in the Great American Clean-Up around Bradley County. This represented a significant increase in volunteers, hours and events from last year.

Joanne Maskew, executive director of KAB, said she was amazed when she started to put the totals together.

"I was blown away with the number of events and participation of household hazardous waste collection," said Maskew. "Almost 700 households participated. I am very, very pleased with this. It gets better every year."

KAB President George Campbell said he couldn't believe how much trash was collected and disposed of during the clean-up campaign.

"Citizens really need to know we have a very good volunteer group and good board members who want to keep Cleveland clean. That's what it's all about. We're working together to keep Bradley County clean," Campbell said.

According to the report, more than 50,000 pounds of litter, debris and bulky waste were removed while 278 miles of streets, roads and highways were being cleaned and beautified.

At least 12 acres of parks, public lands and open spaces were cleaned, with six miles of hiking/biking nature trails and six playgrounds and community recreation areas were cleaned or improved.

An illegal dump site was cleaned and two underwater areas, two miles of rivers, lakes and shorelines, and two acres of wetlands were cleaned or improved and two miles alongside railroad tracks were cleaned.

The report also included 215,000 pounds of paper and newspapers recycled, 10,652 pounds of electronics recycled, 1,620 pounds of aluminum and steel cans recycled, 15 junk cars removed and collected for recycling, 90 pounds of wireless phones, 60 pounds of clothing and 315 batteries recycled.

Cheryl Dunson, executive vice president of marketing at Santek Environmental and secretary for KAB, praised Maskew and her volunteers for their diligent efforts in cleaning up the community and spreading the word about environmental education, litter and recycling.

"Household Hazardous Waste Collection Day was an absolute success. We've never had such a great turn out like that. I think Joanne does a great job," said Dunson.

Of the 690 households that participated in the hazardous waste collection, 40,880 pounds of paint, 1,762 pounds of flammable liquid, 1,716 pounds of non hazardous liquid, 1,073 pounds of aerosols and a total of more than 3,500 pounds combined of other poisonous pesticides, flammable, oxidizing, corrosive or mercury containing materials were disposed.

KAB Past President Jack Tapper said it is remarkable Cleveland/Bradley Keep America Beautiful is having such success in getting enough volunteers to produce the kind of results that are impacting the community.

"The work is exceptional," said Tapper. "It's something that the public should be aware of in terms of what we need to do to cut down on the litter and waste that is constantly produced."

In addition to clean-up efforts, volunteers planted 300 flowers, bulbs and shrubs, 125 trees and created six garden, landscape, Xeriscape and green spaces.

Volunteers are invited to join 25 Student Life Volunteers from Texas who will join local KAB efforts in a special Blythe Avenue Neighborhood Clean-up June 30 and July 1 from 10 a.m. to 3 p.m.

Although the newspaper article indicates wide-spread support for recycling operations, the City of Cleveland abandoned curbside recycling because participation was extremely low and costs were very high: about \$280 per ton to recycle versus \$28 per ton to landfill. City leaders decided to develop a drop-off center to complement existing public centers as an alternative. Currently, ownership of the programs has changed and Bradley County operates all of the centers.

As previously discussed, only three percent of the county's waste is recovered from residential recycling, and 80 percent of that was wood waste, yard waste, and composted sewage sludge collected or processed by Cleveland and Cleveland Utilities. Actual material deposited at recycling centers amounted to 1,193 tons in 2007, which is only about 2.5 percent of the residential waste stream.

SECTION 11: PLANNING

Discuss this region's plan for managing their solid waste management system for the next five (5) years. Identify any deficiencies and suggest recommendations to eliminate deficiencies and provide sustainability of the system for the next five (5) years. Show how the region's plan supports the Statewide Solid Waste Management Plan.

Waste disposal facilities have sufficient space to handle all of the county's waste for more than ten years. There are at least two facilities that currently handle Bradley County waste and both are well maintained. No improvements are necessary. The recycling program is operated in an efficient manner, there is a concerted effort to collect household hazardous waste, and there are ample methods available to divert materials from the Class I facility.

The City of Cleveland provides a valuable service for its citizens and the residents of other cities in the region by operating a cooperative program to chip wood waste. This is a program that has a significant positive effect on two other counties in the planning region. The chipper has been in operation for several years, and maintenance problems are becoming acute.

No programs exist to deal with paint and electronics. Actions need to be taken to develop programs and find end-users for these materials.

Problems with waste reduction strategies could arise in the future if Class III/IV landfills are no longer accepted as diversion alternatives. Should this occur, Bradley County would no longer meet the waste reduction goal. Consequently, plans should be in place to mitigate this possibility.

Recommendations

Education

Recommendation 1: Include more specific information on the County's website to stress waste reduction, recycling, and available options for diversion.

Action Item: Update website

Recommendation 2: Make recycling centers more visible to the public

Action Item: Increase signage

Facilities and Programs

Recommendation 1: City of Cleveland - New chipper for the regional program

Action Item: Pursue grant funds and evaluate loan options

Funding Source: Tennessee Municipal League, USDA Rural Development grant/loan funds.

Recommendation 2: Establish school-based recycling programs, including cooking oil Recovery.

Action Item 1: Enlist help of teachers/student organizations

2: Request grant funds from the Solid Waste Management Fund

Recommendation 3: County and city jointly establish a paper recycling program for all government offices.

Action Item 1: Develop a Memo of Understanding with the City of Cleveland to assist with the implementation of the project.

Action Item 2: Purchase low-cost collection bins for all government offices that will participate in the program.

Action Item 3: Allocate labor and transportation resources for the program.

FACILITY PHOTOS



Entrance, Peerless Road Recycling Center



Exterior: Peerless Road Recycling Center



Interior: Peerless Road Recycling Center



Urbane Road Recycling Center



Entrance: Bradley County Landfill and Recycling Center

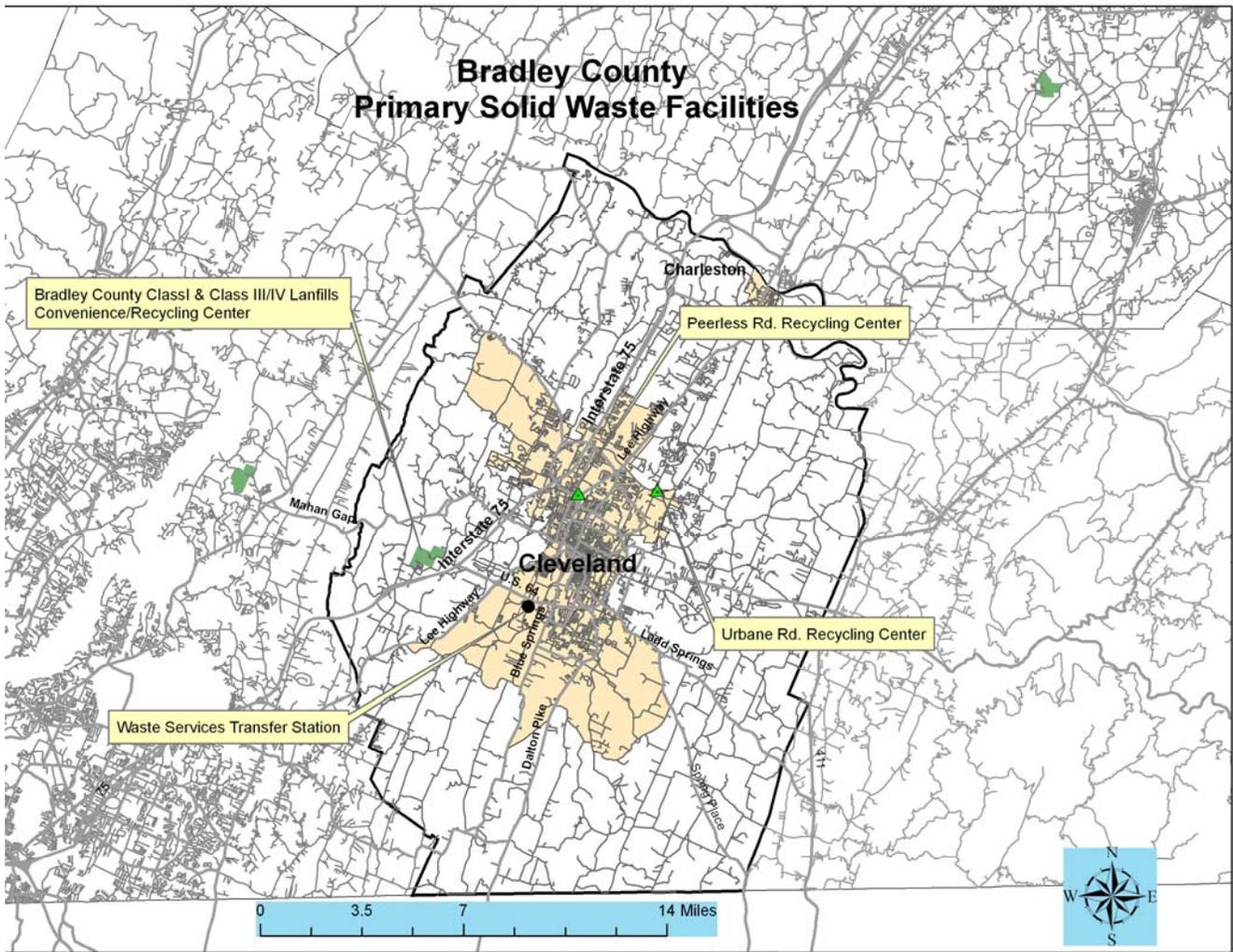


Recycling Equipment at the Landfill Recycling Center



Recycling Containers & Used Oil Collection Tank at the Landfill Recycling Center

Bradley County Primary Solid Waste Facilities



Bradley County Used Oil Collection Locations

