R·W·BECK

Final Report

Regional Solid Waste Management Analysis

Region 2000 Regional Commission

April 2005

April 15, 2005

Mr. Robert White
Deputy Director
Region 2000 Regional Commission
915 Main Street, Suite 202
Lynchburh, VA 24504

Re: Regional Solid Waste Management Analysis - Final Report

Dear Mr. White:

R. W. Beck is pleased to submit our final report to the Region 2000 Regional Commission (Commission) of the "Regional Solid Waste Management Analysis" that we have completed.

The analysis and recommendations presented in this study would not be possible without the assistance of staff from the Commission and each of the participating communities. We would like to express our sincere appreciation to those who participated in the conduct of this analysis.

If you have any questions concerning the enclosed final report please call me at (512) 450-0991.

Sincerely,

R. W. BECK, INC.

Scott Pasternak
Manager

cc: Ms. Teresa Nuckols, Amherst County
Mr. Clarke Gibson, City of Bedford
Mr. Clif Tweedy, Campbell County
Ms. Susan McSwain, Nelson County
Mr. Dave Owen, City of Lynchburg

R. W. BECK
Regional Solid Waste Management Analysis

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Section 1
Executive Summary

1.1 Introduction

As a part of its Strategic Planning initiative, the Region 2000 Regional Commission (the Commission) identified regional solid waste management as a concept that should be investigated as a part of its effort to promote regional cooperation and more effective provision of public services within the Region 2000 community. In 2004, the Commission and a Working Group, comprised of local community representatives, conducted preliminary evaluations of the regionalization concept. This preliminary evaluation identified the following three regional alternatives:

Â Joint use of existing facilities;

Â Waste-to-Energy; and

Â Transfer Station.

Based on the initial analysis, the Commission and Working Group recognized potential benefits in the regional concept, and recommended that these issues be studied in further detail by a solid waste management consulting firm. The following local governments within and adjacent to Region 2000 participated in the study:

Â Amherst County;

Â Campbell County;

Â City of Bedford;

Â Nelson County;

Â City of Lynchburg.

Â Appomattox County[1]; and

Â Bedford County.[1]

Following a competitive selection process, the Commission retained the services of R. W. Beck, Inc. (R. W. Beck) in January 2005 to complete a regional solid waste management analysis.

[1] While Appomattox and Bedford Counties decided not to formally participate in the effort, the Commission did identify the need to evaluate the feasibility for these counties to be included in a regional approach. However, the Commission also understood that the analysis of these communities would need to be evaluated on a preliminary basis, since they would not provide direct information or input into the analysis.

1.2 Project Purpose

The purpose of this analysis was to conduct a more in-depth investigation of the regional solid waste management concept. R. W. Beck conducted this analysis in a manner that will determine whether it would be in the best interest of the participating communities to further consider the feasibility of regionalization. If this investigation concludes that regionalization is potentially viable, the Commission and participating communities will have the opportunity to further evaluate appropriate regional alternatives. However, if the analysis concludes that regionalization may not be in the best economic interest of the participating communities, there will not be a need to conduct further analysis.

1.3 Planning Level Financial Review

The Commission and participating communities directed R. W. Beck to develop an analysis that would provide a fundamental understanding of whether any of the regional alternatives would be potentially viable or could be eliminated from consideration. In other words, the direction was to determine whether there were any "fatal flaws" associated with any of the regional alternatives.

In order to develop the analysis within the timeline and budget established by the Commission, R. W. Beck completed a preliminary or planning level economic analysis of the regional alternatives. Along these lines, the economic and financial analyses included in this report should be considered for planning level decisions, as opposed to the development of actual budgets or rates. If the Commission and participating communities decide that there is an interest in examining any of the regional alternatives in more detail, further analyses would need to be conducted to provide more specific cost estimates.

1.4 Waste Stream Analysis

Section 2 estimates the quantities of solid waste that will require disposal over the next ten years, from fiscal year (FY) 2006 to FY 2015.[2] To develop these projections, R. W. Beck reviewed historical disposal quantities from the past five years. R. W. Beck compared these trends to population changes to determine an appropriate growth rate for future disposal quantities. Based on this review, R. W. Beck projected that future disposal quantities will increase at the same rate as population, which is 0.25 percent annually.

[2] The fiscal year for Region 2000 is from July 1 to June 30.

1.5 Cost Analysis of Existing Transfer/Disposal Operations

R. W. Beck completed a cost analysis of existing disposal operations for the participating communities. Based on this analysis, R. W. Beck calculated the total annual cost and the average cost per ton of disposal for each of the participating communities. This information was reviewed and approved by each participating community. R. W. Beck also completed an analysis for Appomattox and Bedford Counties based on data provided by the Commission.

For each of the participating communities, R. W. Beck also estimated how their cost per ton would change if BFI would stop sending waste to the participating communities' disposal facilities.[3] The specific reason for conducting this analysis was to evaluate the impact that would occur without having waste from BFI. R. W. Beck specifically conducted this analysis since BFI is considering developing and operating a transfer station in Appomattox County, which would likely mean that BFI's waste would go directly to this transfer station instead of existing facilities in Region 2000.

Section 3 summarizes the financial analysis for each of the participating communities over the next ten years, starting in FY 2006, and includes summary tables for each community. Each summary table provides the costs per ton based on two scenarios: (1) status quo; and (2) without any waste from BFI. Table 1-3 summarizes the per ton disposal costs from FY 2006 to FY 2015 for each community.

1.6 Regional Alternative: Joint Use of Existing Facilities

Section 4 evaluates the feasibility of the participating communities using existing facilities together via regionalization. Under this scenario, all of the participating communities would send all solid waste from their communities to one of the landfills (e.g. Amherst County, Campbell County and City of Lynchburg) in Region 2000. This would mean that only one of the three landfills in Region 2000 would operate at a single time. The other two landfills would be inactive, or "mothballed," for a period of time and used individually in sequence when the first landfill reaches capacity. This approach provides an opportunity to maximize the use of resources and increase economies of scale. Under this approach, the landfills would have approximately 20 years of capacity assuming waste from BFI is disposed of within Region 2000 landfills, and 27 years without the inclusion of BFI waste. Tables 1-1 and 1-2 provide a summary of this regional alternative for each entity, as compared to the current operations. Table 1-1 assumes waste from BFI is disposed within Region 2000 and Table 1-2 assumes the waste from BFI is disposed outside Region 2000.

On a preliminary basis, staff from the Virginia Department of Environmental Quality (DEQ) indicated that this approach would be allowed from a regulatory perspective, as

[3] BFI is also known as Allied. The company is in the process of changing its name from BFI to Allied on a national basis. The company is referred to as BFI in this report.

long as steps are taken to "to prevent threats to human health and the environment.[4]" To address this issue, R. W. Beck included expenses for environmental monitoring and cover in the cost analysis. R. W. Beck would emphasize that our review on this issue was preliminary in nature, as the purpose was to determine whether this option would be possible. If the participating communities decide to pursue this option further, R. W. Beck recommends the conduct of a more detailed evaluation of this and other (e.g. permits) regulatory issues.

In developing the cost analysis for this alternative, R. W. Beck estimated the additional costs, which would include the following:

- Increasing the operational capacity of each landfill to process all waste from the participating communities (e.g. approximately 900 tons per day).
- Regulatory considerations (e.g. environmental monitoring and cover) and improvements at the landfills that would be used in sequence.
- Incremental transportation costs that participating communities would incur from needing to send waste collected by that entity to a different landfill.
- Administrative costs that would continue to be incurred by the participating communities with landfills, but could not be recovered in the future through disposal fees.

Table 1-4 summarizes the projected per ton disposal costs for each participating community over the next ten years based on two scenarios: (1) including BFI tonnage and (2) excluding BFI tonnage.

The joint use of existing facilities regional alternative represents a viable option for the participating communities to seriously consider. Under this scenario, each community would be able to reduce its disposal costs. If there is an interest in this regional alternative, R. W. Beck would recommend that the participating communities consider the establishment of a regional authority or board to serve as the entity to manage the region's disposal system. Section 7 of this analysis details the reasons for a regional authority, as well as the legal process and steps to create an authority.

1.7 Regional Alternative: Waste-to-Energy

Section 5 evaluates the feasibility of waste-to-energy (WTE). Municipal waste combustion projects, commonly referred to as WTE facilities, entail the combustion of municipal solid waste (MSW) to create electricity. For this analysis, it was assumed that the regional WTE facility would utilize mass burn in electric generation. Mass burn facilities process waste without any separation of materials other than non-processible waste (such as white goods, carpet, propane tanks, etc.) before combustion.

The WTE analysis accounts for all costs and revenues that such a facility would incur. Costs associated with a WTE facility include capital costs, operating and maintenance costs, and costs relating to the disposal of the ash generated by the facility. Revenue

[4] According to Virginia Solid Waste Management Regulations 9 VAC 20-80. Section 250 E.4

earned from the facility is contingent upon MSW tipping fees and the average price per kilowatt-hour that can be obtained in the wholesale electric market and the number of kilowatt-hours generated by the facility.

Table 1-5 summarizes the per ton disposal costs over the next ten years with costs based on two scenarios: (1) including BFI tonnage and (2) excluding BFI tonnage. Including tonnage from BFI, disposal costs per ton range from $71 per ton in 2006 to $81 per ton in 2015. These costs are driven up by large capital and operating and maintenance costs. R. W. Beck also calculated facility costs without the inclusion of BFI tonnage. Under this scenario, capital costs are assumed to remain constant relative to the previous scenario. All costs operating and maintenance and ash disposal costs per ton were assumed to remain the same.

Given the high costs associated with WTE, R. W. Beck would not recommend consideration of this regional option at this time. This option could be reevaluated in the future when landfills in Region 2000 are closer to reaching capacity.

1.8 Regional Alternative: Transfer Station

Section 6 evaluates the feasibility of a transfer station. A transfer station is a facility where solid waste collection vehicles discharge their loads into a receiving area; then the waste is placed into larger hauling vehicles for travel to a disposal site such as a landfill or waste-to-energy facility. Among the participating communities included in this analysis, Nelson County has owned and operated a transfer station for a number of years and the City of Bedford is in the process of constructing a transfer station that it

1.9 Creation of a Regional Authority or Board

If any of the participating communities have an interest in implementing the regional concepts addressed in this analysis, there could be a need to establish a regional authority or board. Section 7 of the report discusses the reasons to consider a regional authority or board, the legal process to establish a regional authority or board and the steps required to develop such an authority or board.

1.10 Key Findings and Recommendations

Section 8 summarizes the economic comparison of each regional alternative. Based on this summary, and R. W. Beck's overall evaluation, we have included recommendations for the region and each participating community. The section concludes with a discussion of several additional opportunities for the regionalization of solid waste management in Region 2000.

1.10.1 Key Findings

Throughout this report R. W. Beck has evaluated the economic feasibility of multiple regional alternatives. Based on this analysis, R. W. Beck has concluded that the joint use of existing facilities represents the most viable disposal option for all of the participating communities. For all communities, this option is better than both the status quo and the other two regional alternatives: waste-to-energy and transfer station. The reason for this is that the disposal costs for waste-to-energy and transfer station are significantly higher than the status quo or the joint use of existing facilities.

Based on this analysis, R. W. Beck developed preliminary estimates for each participating community to compare the status quo to the joint use of existing facilities. R. W. Beck has estimated that each participating community with a landfill (e.g. Amherst County, Campbell County and City of Lynchburg) would be able to reduce its cost of service for internal customers (e.g. residents, county/city departments) and generate excess revenue from external customers (e.g. private haulers and businesses). Savings for internal customers would occur by reducing the cost of service per ton from the status quo cost of service per ton. Table 1-1 summarizes these cost savings for each community from FY 2006 through FY 2015.

Another benefit of the joint use alternative would be that it would provide an opportunity to generate excess revenue for the regional authority or board from external customers by charging them a market-based rate. Table 1-2 summarizes the excess revenue contribution to a regional landfill from FY 2006 through FY 2015.[5]

For the purpose of this analysis, R. W. Beck assumed the total costs for each community under current operations would remain constant if the waste from BFI is

[5] As a part of the effort to establish the regional authority or board, efforts would need to occur to evaluate how this excess revenue could be shared in an equitable manner among the participating communities. For example, a basis for this sharing could be based on how much air space each participating community contributes to the regional system.

excluded from the waste stream. Each community may be able to reduce operating costs if waste from BFI is no longer accepted. However, given the fixed-cost nature of solid waste disposal systems, any such cost reductions are likely to be immaterial.

Table 1-1
Summary of Cost of Service Decrease (2006- 2015)

Participating Community	With Tonnage from BFI	Without Tonnage from BFI
Amherst County	$3,740,259	$4,275,064
Campbell County	$3,523,901	$3,178,744
City of Lynchburg	$1,843,380	$6,009,470
Total	$9,107,540	$13,463,278

Table 1-2
Summary of Excess Revenue Contribution to Regional Landfill (2006- 2015)

Participating Community	With Tonnage from BFI	Without Tonnage from BFI
Amherst County	$1,360,317	$344,260
Campbell County	$2,938,533	$1,333,812
City of Lynchburg	$15,578,948	$3,408,090
Total	$19,877,798	$5,086,162

1.10.2 Recommendations

The following represents the regional recommendations. Please refer to Section 8 for the key findings and recommendations for each participating community.

1. Since all of the participating communities would benefit from the joint use of existing facilities, R. W. Beck recommends that each community seriously consider this regional alternative.
2. The analysis included in this report should be considered preliminary. R. W. Beck would recommend that further analyses be conducted to refine the findings in greater detail. Section 7.4 describes the subsequent steps that would need to occur to complete the next phase.
3. Creation of a regional authority or board would represent a viable institutional system for the joint use of existing facilities. Section 7 provides further detail on this issue.
4. The benefits of regionalization would become even more apparent if BFI decides to develop and use a transfer station in Appomattox County. Without BFI's waste, each community that receives significant tonnage from BFI would experience a material increase in its per ton disposal cost. However, by pursuing the joint use of existing facilities alternative, the communities would be able to minimize the potential impact from the loss of BFI's waste.
5. R. W. Beck recommends that each participating community delay the purchase of any new equipment or other capital expenses and contractual agreements while considering the regional alternative.
6. Local governments should consider the adoption of a generator fee as a means to ensure that they can recover all of the costs associated with disposal operations (refer to Section 8.4 for further details).

Table 1-3
Current Disposal Costs per Ton (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Including Tonnage from BFI										
City of Lynchburg	$24.03	$24.33	$24.64	$24.96	$25.29	$25.62	$25.96	$26.31	$26.67	$27.04
Campbell County	$32.21	$32.78	$33.36	$33.95	$34.56	$35.18	$35.82	$36.47	$37.14	$37.82
Amherst County	$33.51	$34.11	$34.73	$35.35	$36.00	$36.65	$37.33	$38.02	$38.72	$39.44
City of Bedford	$88.13	$90.11	$92.13	$94.20	$96.31	$98.47	$100.68	$102.94	$105.25	$107.62
Nelson County	$56.68	$57.95	$59.25	$60.58	$61.94	$63.33	$64.75	$66.21	$67.69	$69.21
Excluding Tonnage from BFI										
City of Lynchburg	$38.42	$38.90	$39.40	$39.90	$40.43	$40.96	$41.51	$42.06	$42.64	$43.22
Campbell County	$36.06	$36.70	$37.35	$38.01	$38.69	$39.39	$40.10	$40.83	$41.58	$42.34
Amherst County	$40.60	$41.33	$42.08	$42.84	$43.62	$44.41	$45.23	$46.06	$46.92	$47.79
City of Bedford	$88.13	$90.11	$92.13	$94.20	$96.31	$98.47	$100.68	$102.94	$105.25	$107.62
Nelson County	$63.28	$64.70	$66.15	$67.64	$69.16	$70.71	$72.29	$73.92	$75.58	$77.27

Table 1-4
Disposal Costs per Ton for Joint Use of Existing Facilities (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Including Tonnage from BFI										
City of Lynchburg	$21.61	$21.90	$22.19	$22.49	$22.79	$23.11	$23.43	$23.76	$24.92	$25.29
Campbell County	$20.44	$20.67	$20.93	$21.20	$21.48	$21.76	$22.05	$22.35	$22.66	$22.97
Amherst County	$18.32	$18.52	$18.74	$18.96	$19.19	$19.42	$19.66	$19.90	$20.15	$20.41
City of Bedford	$77.18	$78.56	$79.96	$81.40	$82.86	$84.37	$85.90	$87.47	$89.08	$90.72
Nelson County	$40.05	$40.59	$41.14	$41.70	$42.28	$42.87	$43.47	$44.09	$44.73	$45.37
Excluding Tonnage from BFI										
City of Lynchburg	$29.03	$29.14	$29.55	$29.97	$30.40	$30.84	$31.29	$31.76	$33.55	$34.07
Campbell County	$25.85	$25.85	$26.19	$26.53	$26.88	$27.24	$27.62	$27.99	$28.38	$28.78
Amherst County	$23.53	$23.51	$23.79	$24.08	$24.38	$24.69	$25.00	$25.32	$25.65	$25.98
City of Bedford	$82.26	$83.41	$84.88	$86.38	$87.91	$89.48	$91.09	$92.73	$94.42	$96.14
Nelson County	$46.90	$47.25	$47.90	$48.58	$49.26	$49.97	$50.69	$51.42	$52.18	$52.95

Table 1-5
Expense Summary of WTE Facility (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Including Tonnage from BFI										
Cost per Ton	$70.98	$72.01	$73.08	$74.17	$75.29	$76.44	$77.63	$78.84	$80.09	$81.38
Excluding Tonnage from BFI										
Cost per Ton	$85.16	$86.16	$87.18	$88.24	$89.33	$90.45	$91.60	$92.78	$93.99	$95.24

Table 1-6
Expense Summary of Transfer Station (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Including Tonnage from BFI										
Cost per Ton	$39.07	$40.02	$40.99	$41.98	$43.00	$44.05	$45.12	$46.22	$47.35	$48.50
Excluding Tonnage from BFI										
Cost per Ton	$39.52	$40.46	$41.43	$42.43	$43.45	$44.49	$45.56	$46.66	$47.79	$48.94

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Section 2
Waste Stream Analysis

2.1 Introduction

The purpose of this section is to estimate the quantities of solid waste that will require disposal over the next 10 years from fiscal year (FY) 2006 through 2015. R. W. Beck completed this analysis based on tonnage data provided by the participating communities, as well as population forecasts provided by the Commission. R. W. Beck developed waste stream projections for the following three categories:

- Participating Communities (Amherst County, City of Bedford, Campbell County, City of Lynchburg and Nelson County)
- BFI (within the solid waste facilities of participating communities)
- Appomattox and Bedford Counties

2.2 Historical Tonnage Amounts

R. W. Beck reviewed historical tonnage amounts from 1999 through 2003 to gain a better understanding how much solid waste was disposed of during this time period.

2.2.1 Participating Communities

R. W. Beck evaluated historical tonnage data provided by each of the communities included in the study. Table 2-1 summarizes the amount of solid waste disposed of from 1999 through 2003 by each of the participating communities. Over this time period, total tonnage from the participating communities increased from 265,740 tons in 1999 to 268,038 tons in 2003. This equals an average annual increase of 0.17 percent. Based on the amount from 2003, these communities disposed of approximately 1,031 tons per day based on an operation of five days per week[1] and 859 tons per day based on an operation of six days per week. Based on these amounts, R. W. Beck assumed that a regional facility would need a disposal rate of 900 tons per day.

[1] R. W. Beck calculated the tons per day based on a five day per week basis to provide an understanding of peak waste flows. For example, while facilities may be open Monday through Saturday, they will typically receive higher quantities of waste during weekdays.

Table 2-1
Participating Communities' Landfill Disposal (Tons) 1999-2003

	Amherst County	Campbell County	City of Lynchburg	City of Bedford	Nelson County	Total
1999	25,647	50,134	163,770	17,333	8,856	265,740
2000	25,956	53,142	170,900	11,730	9,310	271,039
2001	26,883	47,835	155,418	9,743	9,863	249,742
2002	27,192	47,044	153,749	8,694	10,812	247,491
2003	29,355	38,531	177,837	10,322	11,992	268,038
Average Annual Increase	2.74%	-5.13%	1.66%	-9.85%	6.25%	0.17%
Tons per Day						
5 days per week	113	148	684	40	46	1,031
6 days per week	94	123	570	33	38	859

Note: Tons per day based on 2003 tonnages.

2.2.2 BFI

R. W. Beck estimated the amount of solid waste disposed of by BFI at each of the participating communities' solid waste facilities in cases where BFI is disposing of a significant quantity of waste that is outside of any contact that a local government may have with BFI. Table 2-2 summarizes these amounts from each community that accepted a minimum of 1,000 tons per year from BFI. Average tons per day for disposal is 240 assuming an operation of five days per week and 200 assuming an operation of six days per week. Based on these amounts, R. W. Beck assumed that BFI is disposing of approximately 220 tons per day.

Table 2-2
BFI within Region 2000 Landfill Disposal (Tons) 2000-2003

	Amherst County	Campbell County	City of Lynchburg	City of Bedford	Nelson County	Total
2000	5,393	6,248	50,251	N/A	N/A	61,893
2001	5,923	4,905	50,468	N/A	N/A	61,296
2002	4,728	2,682	48,197	N/A	N/A	55,607
2003	4,868	2,207	57,937	N/A	1,405	65,012
Average Annual Increase	-2.53%	-22.91%	3.62%	N/A	N/A	1.24%
Tons per Day						
5 days per week	20	15	199	0	5	240
6 days per week	17	13	166	0	5	200

Note: Tons per day based on 2003 tonnages.

2.2.3 Appomattox and Bedford Counties

R. W. Beck also calculated the amount of solid waste that Appomattox and Bedford Counties disposed of during this same period of time. This information is included in Table 2-3. Based on the amount from 2003, Appomattox and Bedford Counties disposed of approximately 46 and 163 tons per day, respectively, based on an operation of five days per week. These counties disposed of 38 and 136 tons per day based on an operation of six days per week.

Table 2-3
Appomattox County and Bedford County Landfill Disposal (Tons) 1999-2003

	Appomattox County	Bedford County	Total
1999	11,672	37,639	49,311
2000	11,225	40,469	51,694
2001	10,954	42,167	53,121
2002	11,374	41,601	52,975
2003	11,967	42,450	54,417
Average Annual Increase	0.50%	2.43%	1.99%
Tons per Day			
5 days per week	46	163	209
6 days per week	38	136	174

Note: Tons per day based on 2003 tonnages.

2.3 Population Forecast

Table 2-4 presents a regional population growth forecast through 2020. The participating communities historically experienced 0.5 percent average annual growth from 1990-2000. Population growth is expected to slow over the next twenty years to a rate of approximately 0.25 percent per year.

Table 2-4
Participating Communities' Historic and Projected Population Forecast (1990-2020)

	Amherst County	Campbell County	City of Lynchburg	City of Bedford	Nelson County	Total	Average Annual Increase
1990	28,578	47,572	66,049	6,073	12,778	161,050	
2000	31,894	51,078	65,269	6,299	14,445	168,985	0.48%
2010	32,900	53,600	65,300	6,500	15,100	173,400	0.26%
2020	33,900	56,100	65,300	6,600	15,900	177,800	0.25%

Source: Data provided by Region 2000.

2.4 Projected Tonnage Amounts (2006–2015)

The following section forecasts tonnage amounts from FY 2006 through FY 2015. These projections are all based on assumptions relating to the base year of FY 2005. Base year figures are based on historic figures or conversations with staff from the participating communities. Tables 2-5 and 2-6 present all base year data used in forecasting.

Table 2-5
2005 (Base Year) Assumptions for Participating Communities

	Amherst County	Campbell County	City of Lynchburg	City of Bedford	Nelson County
Tonnage with BFI	30,075	47,574	165,158	4,000	13,500
BFI Tonnage	5,254	5,082	61,844	0	1,409
Tonnage without BFI	24,821	42,492	103,314	4,000	12,091

Note: Figures for Lynchburg and Campbell County are based on five-year 1999-2003 averages inflated at .25% per year. Figures for Bedford and Nelson County are per Staff. Figures for Amherst County are per Staff as of 2004 inflated at .25% per year.

Table 2-6
2005 (Base Year) Assumptions for Appomattox and Bedford Counties

	Appomattox County	Bedford County
Tonnage	12,027	43,663

Note: Figures for Appomattox and Bedford Counties are based on 2003 figures inflated at .25% per year.

2.4.1 Participating Communities with BFI Forecast

Landfill disposal growth rates typically correlate highly with population growth rates. From 1999 through 2003, this generalization proved to be true as it related to the participating communities. During this time period, regional population growth was approximately 0.5 percent per year while annual waste generation grew at a similar rate of 0.17 percent. Given that population growth is forecast to increase at a rate of about 0.25 percent over the next decade, landfill disposal growth rates over the same time period were projected to remain consistent relative to population growth at 0.25 percent. The figures shown in Table 2-7 are derived from a forecast annual waste generation growth rate of 0.25 percent for each participating community.

Table 2-7
Projected Region 2000 Landfill Disposal (Tons) 2006-2015 with BFI

Year	Amherst County	Campbell County	City of Lynchburg	City of Bedford	Nelson County	Total
2006	30,150	47,693	165,570	4,010	13,534	260,958
2007	30,226	47,812	165,984	4,020	13,568	261,610
2008	30,301	47,932	166,399	4,030	13,602	262,264
2009	30,377	48,052	166,815	4,040	13,636	262,920
2010	30,453	48,172	167,232	4,050	13,670	263,577
2011	30,529	48,292	167,650	4,060	13,704	264,236
2012	30,605	48,413	168,070	4,071	13,738	264,896
2013	30,682	48,534	168,490	4,081	13,772	265,559
2014	30,758	48,655	168,911	4,091	13,807	266,223
2015	30,835	48,777	169,333	4,101	13,841	266,888

2.4.2 Participating Communities without BFI Forecast

Table 2-8 presents landfill disposal ton projections net of any BFI disposal. The figures included in the table assume a 0.25 percent per year growth rate for both BFI disposal and for each participating community's annual waste generation growth.

Table 2-8
Projected Region 2000 Landfill Disposal (Tons) 2006-2015 without BFI

Year	Amherst County	Campbell County	City of Lynchburg	City of Bedford	Nelson County	Total
2006	24,883	42,598	103,572	4,010	12,122	187,185
2007	24,945	42,705	103,831	4,020	12,152	187,653
2008	25,007	42,811	104,091	4,030	12,182	188,122
2009	25,070	42,918	104,351	4,040	12,213	188,592
2010	25,133	43,026	104,612	4,050	12,243	189,064
2011	25,195	43,133	104,873	4,060	12,274	189,536
2012	25,258	43,241	105,135	4,071	12,305	190,010
2013	25,322	43,349	105,398	4,081	12,335	190,485
2014	25,385	43,458	105,662	4,091	12,366	190,961
2015	25,448	43,566	105,926	4,101	12,397	191,439

2.4.3 Appomattox and Bedford Counties Forecast

Consistent with the previous forecasts, landfill disposal for Appomattox and Bedford Counties is forecast to increase at 0.25 percent per annum over the next decade. Table 2-9 presents projected landfill disposal tons through 2015.

Table 2-9
Projected Appomattox County and Bedford County Landfill Disposal (Tons) 2006-2015

Year	Appomattox County	Bedford County	Total
2006	12,057	42,769	54,827
2007	12,087	42,876	54,964
2008	12,118	42,983	55,101
2009	12,148	43,091	55,239
2010	12,178	43,198	55,377
2011	12,209	43,306	55,515
2012	12,239	43,415	55,654
2013	12,270	43,523	55,793
2014	12,301	43,632	55,933
2015	12,331	43,741	56,073

Section 3
Cost Analysis of Existing Transfer/Disposal Operations

3.1 Introduction and Methodology

R. W. Beck completed a cost analysis of existing disposal operations for the participating communities and for Appomattox and Bedford Counties. The cost analysis for the participating communities was based on the following:

Â Interviews with staff; and

Â Review of operational and financial data.

Based on this analysis, R. W. Beck calculated the total annual cost and the average cost per ton of disposal for each of the participating communities. R. W. Beck developed these estimates based on total costs that are incurred during a typical year of operations. R. W. Beck worked with staff from each local government to make any changes to costs that are not expected to recur on an annual basis. By making these adjustments, R. W. Beck was able to develop a "Test Year" that will be used as the basis for forecasting expenses for FY 2006 through FY 2015. After developing the revenue requirement for the "Test Year," R. W. Beck worked with local government staff to project future cost changes due to inflation. R. W. Beck would emphasize that these estimates were developed at a planning level to allow each local government to compare costs based on its current operations to the regional alternatives evaluated in this analysis.

R. W. Beck also estimated total annual and per ton disposal costs for Appomattox and Bedford Counties based on a similar methodology. However, R. W. Beck relied on existing, unverified data that was provided by the Commission for this portion of the analysis.

3.2 Cost Analysis for Participating Communities

This section summarizes the financial analysis for each of the participating communities. R. W. Beck has included summary tables for each community at the end of this section. Each summary table provides the costs per ton based on two scenarios: (1) status quo; and (2) without any waste from BFI.

3.2.1 Amherst County

Amherst County currently owns and operates a landfill. Table 3-1 summarizes the projected costs for the operation of the landfill.

3.2.2 City of Bedford

The City of Bedford currently owns and operates a landfill, but is in the process of building a transfer station that the city will use as its primary method to dispose of its solid waste. The city expects to begin using the transfer station in 2006. The city is currently planning to transport the waste to a landfill located outside of Region 2000. Table 3-2 summarizes the projected costs for the operation of the transfer station, including tipping fees and costs for hauling waste from the transfer station to a landfill.

3.2.3 Campbell County

Campbell County currently owns and operates a landfill. Table 3-3 summarizes the projected costs for the operation of the landfill.

3.2.4 City of Lynchburg

The City of Lynchburg currently owns and operates a landfill. Table 3-4 summarizes the projected costs for the operation of the landfill.

3.2.5 Nelson County

Nelson County owns and operates a transfer station. Table 3-5 summarizes the projected costs for the operation of the transfer station, including tipping fees and costs for hauling waste from the transfer station to a landfill.

Table 3-1
Summary and Projection of Expenses for Amherst County (2006-2015)

	Test Year	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Labor	$114,517	$117,379	$120,314	$123,322	$126,405	$129,565	$132,804	$136,124	$139,527	$143,015	$146,591
Equipment	$60,000	$61,500	$63,038	$64,613	$66,229	$67,884	$69,582	$71,321	$73,104	$74,932	$76,805
Operations	$482,725	$494,793	$507,163	$519,842	$532,838	$546,159	$559,813	$573,809	$588,154	$602,858	$617,929
Maintenance	$21,792	$22,337	$22,895	$23,468	$24,054	$24,656	$25,272	$25,904	$26,551	$27,215	$27,896
Administrative	$7,655	$7,847	$8,043	$8,244	$8,450	$8,661	$8,878	$9,100	$9,327	$9,561	$9,800
Capital	$120,000	$123,000	$126,075	$129,227	$132,458	$135,769	$139,163	$142,642	$146,208	$149,864	$153,610
Closure/PC	$183,511	$183,511	$183,511	$183,511	$183,511	$183,511	$183,511	$183,511	$183,511	$183,511	$183,511
Total	$990,201	$1,010,368	$1,031,039	$1,052,228	$1,073,946	$1,096,206	$1,119,024	$1,142,412	$1,166,384	$1,190,956	$1,216,142
Cost including tonnage from BFI											
Annual Tons	30,075	30,150	30,226	30,301	30,377	30,453	30,529	30,605	30,682	30,758	30,835
Cost per Ton	$32.92	$33.51	$34.11	$34.73	$35.35	$36.00	$36.65	$37.33	$38.02	$38.72	$39.44
Cost excluding tonnage from BFI											
Annual Tons from BFI	5,254	5,267	5,281	5,294	5,307	5,320	5,334	5,347	5,360	5,374	5,387
Remaining Annual Tonnage	24,821	24,883	24,945	25,007	25,070	25,133	25,195	25,258	25,322	25,385	25,448
Cost per Ton	$39.89	$40.60	$41.33	$42.08	$42.84	$43.62	$44.41	$45.23	$46.06	$46.92	$47.79

Table 3-2
Summary and Projection of Expenses for City of Bedford (2006-2015)

	Test Year	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Labor	$87,101	$89,278	$91,510	$93,798	$96,143	$98,546	$101,010	$103,535	$106,124	$108,777	$111,496
Equipment	$10,500	$10,763	$11,032	$11,307	$11,590	$11,880	$12,177	$12,481	$12,793	$13,113	$13,441
Operations	$168,560	$172,774	$177,093	$181,521	$186,059	$190,710	$195,478	$200,365	$205,374	$210,508	$215,771
Maintenance	$5,600	$5,740	$5,884	$6,031	$6,181	$6,336	$6,494	$6,657	$6,823	$6,994	$7,168
Administrative	$36,050	$36,951	$37,875	$38,822	$39,792	$40,787	$41,807	$42,852	$43,923	$45,022	$46,147
Capital	$36,969	$37,893	$38,840	$39,811	$40,806	$41,827	$42,872	$43,944	$45,043	$46,169	$47,323
Closure/PC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	$344,779	$353,399	$362,234	$371,290	$380,572	$390,086	$399,838	$409,834	$420,080	$430,582	$441,347
Cost including tonnage from BFI											
Annual Tons	4,000	4,010	4,020	4,030	4,040	4,050	4,060	4,071	4,081	4,091	4,101
Cost per Ton	$ 86.19	$ 88.13	$ 90.11	$ 92.13	$ 94.20	$ 96.31	$ 98.47	$100.68	$102.94	$105.25	$107.62
Cost excluding tonnage from BFI											
Annual Tons from BFI	0	0	0	0	0	0	0	0	0	0	0
Remaining Annual Tonnage	4,000	4,010	4,020	4,030	4,040	4,050	4,060	4,071	4,081	4,091	4,101
Cost per Ton	$ 86.19	$ 88.13	$ 90.11	$ 92.13	$ 94.20	$ 96.31	$ 98.47	$100.68	$102.94	$105.25	$107.62

Table 3-3
Summary and Projection of Expenses for Campbell County (2006-2015)

	Test Year	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Labor	$289,706	$296,948	$304,372	$311,981	$319,781	$327,775	$335,970	$344,369	$352,978	$361,803	$370,848
Equipment	$160,558	$164,572	$168,686	$172,903	$177,226	$181,657	$186,198	$190,853	$195,624	$200,515	$205,528
Operations	$127,704	$130,897	$134,169	$137,523	$140,961	$144,485	$148,097	$151,800	$155,595	$159,485	$163,472
Maintenance	$40,000	$41,000	$42,025	$43,076	$44,153	$45,256	$46,388	$47,547	$48,736	$49,955	$51,203
Administrative	$62,194	$63,749	$65,343	$66,976	$68,651	$70,367	$72,126	$73,929	$75,778	$77,672	$79,614
Capital	$529,000	$542,225	$555,781	$569,675	$583,917	$598,515	$613,478	$628,815	$644,535	$660,649	$677,165
Closure/PC	$296,807	$296,807	$296,807	$296,807	$296,807	$296,807	$296,807	$296,807	$296,807	$296,807	$296,807
Total	$1,505,969	$1,536,198	$1,567,182	$1,598,942	$1,631,495	$1,664,862	$1,699,064	$1,734,120	$1,770,053	$1,806,884	$1,844,636
Cost including tonnage from BFI											
Annual Tons	47,574	47,693	47,812	47,932	48,052	48,172	48,292	48,413	48,534	48,655	48,777
Cost per Ton	$31.66	$32.21	$32.78	$33.36	$33.95	$34.56	$35.18	$35.82	$36.47	$37.14	$37.82
Cost excluding tonnage from BFI											
Annual Tons from BFI	5,082	5,095	5,108	5,121	5,133	5,146	5,159	5,172	5,185	5,198	5,211
Remaining Annual Tonnage	42,492	42,598	42,705	42,811	42,918	43,026	43,133	43,241	43,349	43,458	43,566
Cost per Ton	$35.44	$36.06	$36.70	$37.35	$38.01	$38.69	$39.39	$40.10	$40.83	$41.58	$42.34

Table 3-4
Summary and Projection of Expenses for City of Lynchburg (2006-2015)

	Test Year	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Labor	$650,528	$666,791	$683,461	$700,547	$718,061	$736,012	$754,413	$773,273	$792,605	$812,420	$832,731
Equipment	$537,286	$537,286	$537,286	$537,286	$537,286	$537,286	$537,286	$537,286	$537,286	$537,286	$537,286
Operations	$991,087	$1,015,864	$1,041,261	$1,067,292	$1,093,975	$1,121,324	$1,149,357	$1,178,091	$1,207,543	$1,237,732	$1,268,675
Maintenance	$267,613	$274,303	$281,161	$288,190	$295,395	$302,780	$310,349	$318,108	$326,061	$334,212	$342,567
Administrative	$442,403	$453,463	$464,799	$476,419	$488,330	$500,538	$513,052	$525,878	$539,025	$552,500	$566,313
Capital	$784,725	$784,725	$784,725	$784,725	$784,725	$784,725	$784,725	$784,725	$784,725	$784,725	$784,725
Closure/PC	$246,320	$246,320	$246,320	$246,320	$246,320	$246,320	$246,320	$246,320	$246,320	$246,320	$246,320
Total	$3,919,962	$3,978,753	$4,039,013	$4,100,781	$4,164,092	$4,228,986	$4,295,502	$4,363,681	$4,433,565	$4,505,196	$4,578,618
Cost including tonnage from BFI											
Annual Tons	165,158	165,570	165,984	166,399	166,815	167,232	167,650	168,070	168,490	168,911	169,333
Cost per Ton	$23.73	$24.03	$24.33	$24.64	$24.96	$25.29	$25.62	$25.96	$26.31	$26.67	$27.04
Cost excluding tonnage from BFI											
Annual Tons from BFI	61,844	61,998	62,153	62,309	62,464	62,621	62,777	62,934	63,091	63,249	63,407
Remaining Annual Tonnage	103,314	103,572	103,831	104,091	104,351	104,612	104,873	105,135	105,398	105,662	105,926
Cost per Ton	$37.94	$38.42	$38.90	$39.40	$39.90	$40.43	$40.96	$41.51	$42.06	$42.64	$43.22

Table 3-5
Summary and Projection of Expenses for Nelson County (2006-2015)

	Test Year	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Labor	$88,917	$91,140	$93,418	$95,754	$98,147	$100,601	$103,116	$105,694	$108,336	$111,045	$113,821
Equipment	$12,904	$13,226	$13,557	$13,896	$14,243	$14,599	$14,964	$15,338	$15,722	$16,115	$16,518
Operations	$575,031	$589,407	$604,142	$619,245	$634,727	$650,595	$666,860	$683,531	$700,619	$718,135	$736,088
Maintenance	$22,500	$23,063	$23,639	$24,230	$24,836	$25,457	$26,093	$26,745	$27,414	$28,099	$28,802
Administrative	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Capital	$49,006	$50,231	$51,487	$52,774	$54,093	$55,446	$56,832	$58,253	$59,709	$61,202	$62,732
Closure/PC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	$748,357	$767,066	$786,243	$805,899	$826,047	$846,698	$867,865	$889,562	$911,801	$934,596	$957,961
Cost including tonnage from BFI											
Annual Tons	13,500	13,534	13,568	13,602	13,636	13,670	13,704	13,738	13,772	13,807	13,841
Cost per Ton	$55.43	$56.68	$57.95	$59.25	$60.58	$61.94	$63.33	$64.75	$66.21	$67.69	$69.21
Cost excluding tonnage from BFI											
Annual Tons from BFI	1,409	1,412	1,416	1,419	1,423	1,426	1,430	1,433	1,437	1,441	1,444
Remaining Annual Tonnage	12,091	12,122	12,152	12,182	12,213	12,243	12,274	12,305	12,335	12,366	12,397
Cost per Ton	$61.89	$63.28	$64.70	$66.15	$67.64	$69.16	$70.71	$72.29	$73.92	$75.58	$77.27

3.3 Cost Analysis for Appomattox and Bedford Counties

This section summarizes the financial analysis for Appomattox and Bedford Counties. Again, this analysis was based on existing, unverified data that was provided to R. W. Beck by the Commission. R. W. Beck has included summary tables for each county within this section.

3.3.1 Appomattox County

Appomattox County currently owns and operates a landfill. Table 3-6 summarizes the disposal costs for Appomattox County from 1999 through 2003 based on limited data provided by the county to the Commission.

Table 3-6
Disposal Cost Summary for Appomattox County (1999-2003)

	1999	2000	2001	2002	2003	Average
Operations Cost	$597,812	$1,238,110	$606,402	$697,540	$647,771	$757,527
Tons	11,672	11,225	10,954	11,374	11,967	11,438
Cost per Ton	$51.22	$110.30	$55.36	$61.33	$54.13	$66.23

Based on a telephone interview with Appomattox County landfill staff, they estimated that the disposal cost will be $68.32 per ton starting in 2006, when the county completes a landfill expansion that is currently in the permitting stage. R. W. Beck projected that disposal costs would increase at an inflation rate of 2.5 percent, as presented in Table 3-7.

Table 3-7
Disposal Cost Summary for Appomattox County (2006-2015)

Year	Disposal Cost per Ton
2006	$68.32
2007	$70.03
2008	$71.78
2009	$73.57
2010	$75.41
2011	$77.30
2012	$79.23
2013	$81.21
2014	$83.24
2015	$85.32

3.3.2 Bedford County

Bedford County currently owns and operates a landfill. R. W. Beck estimated the disposal cost at $61 per ton based on information included in the "Region 2000 Solid Waste Management Study" that was completed by the Commission. R. W. Beck was not able to calculate an independent cost per ton due to the lack of available financial data. R. W. Beck projected that disposal costs would increase at an inflation rate of 2.5 percent, as presented in Table 3-8.

Table 3-8
Disposal Cost Summary for Bedford County (2006-2015)

Year	Disposal Cost per Ton
2006	$61.00
2007	$62.53
2008	$64.09
2009	$65.69
2010	$67.33
2011	$69.02
2012	$70.74
2013	$72.51
2014	$74.32
2015	$76.18

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Section 4
Regional Alternative: Joint Use of Existing Facilities

4.1 Overview

This regional alternative focuses on how the participating communities could jointly use existing facilities in a cost-effective manner. Based on R. W. Beck's recommendation, the Commission and participating communities agreed with using the following assumptions as the basis for the cost analysis:

- There are three landfills with significant remaining capacity in Region 2000 (e.g. Amherst County, Campbell County and City of Lynchburg). Under this alternative, only one of the three landfills would accept significant waste quantities at a time. For this analysis, all waste generated by the five participating communities would go to one of these landfills at a single time. This would mean that the other two landfills would not actively accept waste at this time. However, these other two landfills would not close from a regulatory perspective.[1]
- Participating communities would create a regional authority for this alternative. Ownership of the three landfills would be transferred to the regional authority, and each of the three landfill communities would be compensated in an equitable manner for the sale of its landfill.[2]
- When one landfill is being used, the other four participating communities would send their waste to the facility via direct haul (e.g. Amherst County, Campbell County and City of Lynchburg) or transfer station (e.g. City of Bedford and Nelson County).
- The City of Lynchburg's landfill would be the first facility to serve as the region's landfill until it reaches capacity. R. W. Beck made this decision since this landfill has the greatest operational capacity at this time, and could accept additional waste quantities without significant operational changes.
- Once the first landfill (e.g. Lynchburg) reaches capacity, all waste would go to the landfill in either Campbell or Amherst County. Once this facility reaches capacity, the third landfill would be used.
- This sequencing would allow for the most efficient use of the facilities. Together, as detailed in Table 4-1, these landfills would provide approximately 20 years of

[1] Closure and post-closure are processes that a landfill goes through after it stops receiving waste. The goal of closure is to design and construct a final cover system that minimizes the percolation of precipitation into the waste. Post-closure is the process which is used to allow a landfill to stabilize; during this period, the landfill is carefully and routinely monitored.

[2] Refer to Section 7 for further detail concerning a regional authority.

disposal capacity for the region assuming that BFI continues to send waste, and approximately 27 years assuming that BFI does not send its waste to landfills in Region 2000, based on the waste forecast developed in Section 2.

Â Inflation rates in the future would increase at a rate of 2.5 percent annually.

Table 4-1
Remaining Landfill Life

Landfill	Remaining Capacity in 2005 (Tons)	Remaining Life including BFI Tonnage (Yrs)	Remaining Life excluding BFI Tonnage (Yrs)
City of Lynchburg	2,153,276	8	11
Campbell County	1,884,012	7	10
Amherst County	1,203,490	5	6
Total	5,240,778	20	27

4.2 Regulatory Considerations

The feasibility of sequential use of existing Region 2000 landfill capacity is largely contingent upon State of Virginia regulations concerning the required timing of landfill closure. This issue is addressed in the Virginia Solid Waste Management Regulations 9 VAC 20-80. Section 250 E.4. It states that closure of a "unit' is required to begin "no later than 30 days after the date on which the unit receives the known final receipt of wastes, or if the unit has remaining capacity and there is a reasonable likelihood that the unit will receive additional wastes, no later than one year after the most recent receipt of wastes." Most importantly, this section goes on to state that "Extensions beyond the one-year deadline for beginning closure may be granted by the director if the owner or operator demonstrates that the unit has the capacity to receive additional wastes and the owner or operator has taken and will continue to take all steps necessary to prevent threats to human health and the environment from the unclosed unit." This language appears to confirm that the temporary "mothballing" and sequential filling of individual Region 2000 landfills does not immediately trigger the closure process and is allowable under the law.

To ensure that this interpretation of the above referenced section of the Solid Waste Management Regulations is correct, R. W. Beck contacted regional solid waste staff with the Virginia Department of Environmental Quality (DEQ). Staff provided their unofficial interpretation of the law by confirming that the proposed scenario was acceptable as long as all of the area to be used for disposal of waste constituted one "unit" (i.e. a discrete (and contiguous) area of land used for the management of solid waste). This issue is addressed in further detail in the following cost analysis section.

R. W. Beck would emphasize that our review on this issue was preliminary in nature, as the purpose was to determine whether this option would be possible. If the participating communities decide to pursue this option further, R. W. Beck recommends the conduct of a more detailed evaluation of this and other regulatory issues (e.g. permit changes).

4.3 Cost Analysis

This cost analysis focused on what the cost would be for operating one landfill within Region 2000 at a single time. The analysis accounted for landfill operations and the incremental transportation costs that communities would incur to send their waste to any of the three landfills, as compared to their existing practice.

4.3.1 Landfill Operations Cost with BFI Tonnage

R. W. Beck focused this analysis on costs for any of the three landfills to begin meeting the disposal needs of all participating communities. R. W. Beck primarily focused this analysis on the incremental costs that the Lynchburg regional landfill would incur based on increasing its waste stream to approximately 900 tons per day, which assumes that waste from BFI would be included. R. W. Beck has also included costs that will be required in the future to allow the other two landfills in Region 2000 to meet the disposal needs of the participating communities.

R. W. Beck estimated the incremental costs based on interviews with staff from the participating communities and R. W. Beck's industry experience. The following discussion provides information regarding R. W. Beck's assumptions regarding the incremental costs of operating a regional landfill, inclusive of the tonnage from BFI.

Labor

According to staff from the participating communities, the additional tonnage associated with operating the regional landfill would require one additional equipment operator at the Lynchburg landfill. R. W. Beck also provided for two additional employees that would each be responsible for monitoring each of the inactive landfills and managing the citizens' convenience stations. The regional landfill would also need to operate one hour longer each day. R. W. Beck increased the number of hours worked by the heavy equipment operators.

Equipment

According to staff from the participating communities, one of the compactors would need to be upgraded to a larger model. In addition, the additional tonnage would require the purchase of an additional track loader, a Caterpillar D6 or equivalent.[3]

Operations

As mentioned, the regional landfill would need to operate one additional hour per day. Since the heavy machinery would also be in operation longer each day, R. W. Beck proportionally increased the fuel cost.

Maintenance

R. W. Beck assumed that the increased equipment operation would result in incrementally more maintenance and repair of the equipment.

[3] This equipment could be provided from one of the other landfills that would not have a need for this equipment following the transition to a regional system.

Administrative

Based on discussion with the staff of the Region 2000 communities, R. W. Beck assumed there would be approximately $200,000 in administrative costs associated with the regional landfill. These costs would pay for expenses that would be required with the transition to an independent authority, such as billing, legal, information technology, human resources and management. R. W. Beck has already incorporated a portion of these future administrative costs into the analysis by including 3.0 full-time equivalent administrative employees in our labor cost estimates. Any administrative costs associated with the City of Lynchburg have been removed.

Capital

Since increasing the tonnage accepted at the first location of the regional landfill will decrease the remaining life, the development costs (e.g. new cell construction) for the remaining portion of the landfill will have to be paid on an accelerated schedule. R. W. Beck also assumed any debt would need to be paid off before the closure of the Lynchburg Landfill. Since these costs would have to be paid in a shorter time frame, R. W. Beck provided for the incremental annual cost increase of these expenses.

Closure and Post-Closure

Similar to the capital expenses, R. W. Beck assumed the financial assurance for closure and post-closure would have to be attained in a shorter number of years, thus there is an incremental increase in the annual expense associated with closure and post-closure.

Other

R. W. Beck factored in costs that would need to occur in the future when disposal operations would move from the Lynchburg Landfill to one of the other two in Region 2000 (e.g. Amherst or Campbell County). Generally, the operational costs associated with the Lynchburg Landfill would be similar to the costs associated with operating the other two landfills in scenarios where they are accepting similar quantities of waste. R. W. Beck has identified the following costs that need to be accounted for in the analysis based on two separate moves:

- Move equipment and scales from the Lynchburg Landfill.
- Engineering and site work for additional facilities and/or scales at the other landfills.
- Placement of new signs and public information concerning the move.

R. W. Beck has addressed the inactive landfill issue by ensuring that reasonable costs associated with taking “all steps necessary to prevent threats to human health and the environment from the unclosed unit” are accounted for in the analysis of this alternative. R. W. Beck has specifically identified costs for environmental monitoring and leachate collection. These costs include continuing environmental monitoring and leachate collection expenses included in the budgets for the Campbell and Amherst

County landfills. As mentioned in the labor section, R. W. Beck has also included two staff that would be responsible for maintenance and upkeep at these landfills.

In addition, some degree of cover will be required at the Campbell and Amherst County landfills. At this time, it is our understanding that DEQ would likely require some form of intermediate cover, as opposed to cover that is required during closure. However, in order to keep our cost estimates conservative, R. W. Beck has included the costs required for closure, based on current closure costs and the amount of waste in place. These costs are approximately $1.2 million for Campbell County and $500,000 for Amherst County. Since expenditures ensuring the continued disposal capacity would benefit this regional alternative, R. W. Beck has accounted for these costs by amortizing them over the remaining life of disposal capacity for the region, 20 years. This amount is $109,500 per year, which would add $0.42 per ton to the disposal cost in 2006. If the participating communities decide that this alternative is worthy of further consideration, R. W. Beck recommends that this issue should be further studied by a solid waste engineer to develop more specific cost estimates. If this future analysis indicates that the costs could be lowered, it would provide an opportunity to decrease the cost per ton.

While R. W. Beck has developed this cost analysis in the most comprehensive manner possible, it is important to emphasize that this analysis was completed in order to develop planning level cost estimates. Given the complex nature of this regional alternative, there may be additional costs that would be incurred that can not be reasonably predicted at this time. To keep this cost analysis relatively financially conservative, R. W. Beck has included a contingency amount that is equal to 20 percent of all of the incremental operational costs discussed in this section.

4.3.2 Landfill Operations Cost without BFI Tonnage

R. W. Beck considered how costs would change if BFI would not send its waste to the landfill in Region 2000, but the participating communities would. Staff from the City of Lynchburg stated that they would expect that they could accept the waste from the participating communities without a significant change in their current operational costs. Since this would create a net increase in tonnage at the landfill, the cost per ton would decrease from the current level.

R. W. Beck accounted for the two additional employees that would monitor the inactive landfills, the $200,000 administrative cost associated with the Regional Authority, and the costs associated with transferring operations between landfills and the regulatory costs of de-activating two landfills.

4.3.3 Costs Concerning Appomattox and Bedford Counties

If either Appomattox and/or Bedford Counties would send their waste to the Region 2000 landfill, it would provide an opportunity to further reduce operational costs on a per ton basis. Since current disposal rates for both Appomattox and Bedford Counties are greater than $60 per ton, there could be an opportunity for these counties to reduce their disposal costs. However, transportation costs could decrease the cost savings that would be realized from lower disposal costs.

Table 4-2
Summary and Projection of Expenses for Regional Landfill including BFI Tonnage (2006-2015)

	Test Year	Baseline FY 2006	Incremental Cost	Cumulative FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Labor	$650,528	$666,791	$116,938	$783,729	$803,322	$823,405	$843,990	$865,090	$886,717	$908,885	$931,607	$954,897	$978,770
Equipment	$537,286	$537,286	$28,500	$565,786	$565,786	$565,786	$565,786	$565,786	$565,786	$565,786	$565,786	$565,786	$565,786
Operations	$991,087	$1,015,864	$10,252	$1,026,116	$1,051,769	$1,078,063	$1,105,015	$1,132,640	$1,160,956	$1,189,980	$1,219,730	$1,250,223	$1,281,479
Maintenance	$267,613	$274,303	$24,891	$299,195	$306,675	$314,341	$322,200	$330,255	$338,511	$346,974	$355,649	$364,540	$373,653
Administrative	$0	$0	$200,000	$200,000	$205,000	$210,125	$215,378	$220,763	$226,282	$231,939	$237,737	$243,681	$249,773
Capital	$784,725	$784,725	$174,383	$959,109	$959,109	$959,109	$959,109	$959,109	$959,109	$959,109	$959,109	$959,109	$959,109
Closure/PC	$246,320	$246,320	$54,345	$300,665	$300,665	$300,665	$300,665	$300,665	$300,665	$300,665	$300,665	$300,665	$300,665
Other[1]	$0	$0	$483,790	$483,790	$489,255	$494,858	$500,600	$506,485	$512,518	$518,702	$525,040	$531,537	$538,196
Total	$3,477,559	$3,525,290	$1,093,099	$4,618,389	$4,681,581	$4,746,352	$4,812,743	$4,880,793	$4,950,545	$5,022,040	$5,095,323	$5,170,437	$5,247,430
Cost including tonnage from BFI													
Annual Tons	165,158	165,570	95,387	260,958	261,610	262,264	262,920	263,577	264,236	264,896	265,559	266,223	266,888
Cost per Ton	$21.06	$21.29	N/A	$17.70	$17.90	$18.10	$18.30	$18.52	$18.74	$18.96	$19.19	$19.42	$19.66

(1) Includes intermediate cover, leachate control, and environmental monitoring at the Amherst County Landfill and the Campbell County Landfill. This amount also includes an annualized cost to account for transferring equipment and operations between landfills as each reaches capacity. In addition, R. W. Beck included a contingency to account for other incidental costs associated with the joint use of existing facilities option.

Table 4-3
Summary and Projection of Expenses for Regional Landfill excluding BFI Tonnage (2006-2015)

	Test Year	Baseline FY 2006	Incremental Cost	Cumulative FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Labor	$650,528	$666,791	$53,977	$720,768	$683,461	$700,547	$718,061	$736,012	$754,413	$773,273	$792,605	$812,420	$832,731
Equipment	$537,286	$537,286	$0	$537,286	$537,286	$537,286	$537,286	$537,286	$537,286	$537,286	$537,286	$537,286	$537,286
Operations	$991,087	$1,015,864	$0	$1,015,864	$1,041,261	$1,067,292	$1,093,975	$1,121,324	$1,149,357	$1,178,091	$1,207,543	$1,237,732	$1,268,675
Maintenance	$267,613	$274,303	$0	$274,303	$281,161	$288,190	$295,395	$302,780	$310,349	$318,108	$326,061	$334,212	$342,567
Administrative	$0	$0	$200,000	$200,000	$205,000	$210,125	$215,378	$220,763	$226,282	$231,939	$237,737	$243,681	$249,773
Capital	$784,725	$784,725	$0	$784,725	$784,725	$784,725	$784,725	$784,725	$784,725	$784,725	$784,725	$784,725	$784,725
Closure/PC	$246,320	$246,320	$0	$246,320	$246,320	$246,320	$246,320	$246,320	$246,320	$246,320	$246,320	$246,320	$246,320
Other[1]	$0	$0	$483,790	$483,790	$489,255	$494,858	$500,600	$506,485	$512,518	$518,702	$525,040	$531,537	$538,196
Total	$4,109,563	$4,173,094	$737,767	$4,263,057	$4,268,469	$4,329,344	$4,391,740	$4,455,696	$4,521,251	$4,588,444	$4,657,318	$4,727,913	$4,800,274
Cost excluding tonnage from BFI													
Annual Tons	103,314	103,572	83,613	187,185	187,653	188,122	188,592	189,064	189,536	190,010	190,485	190,961	191,439
Cost per Ton	$39.78	$40.29	N/A	$22.77	$22.75	$23.01	$23.29	$23.57	$23.85	$24.15	$24.45	$24.76	$25.07

(1) Includes intermediate cover, leachate control, and environmental monitoring at the Amherst County Landfill and the Campbell County Landfill. This amount also includes an annualized cost to account for transferring equipment and operations between landfills as each reaches capacity. In addition, R. W. Beck included a contingency to account for other incidental costs associated with the joint use of existing facilities option.

4.3.4 Incremental Costs

For this analysis, R. W. Beck evaluated several incremental costs that will need to be considered by each community as they evaluate the feasibility of this option.

Incremental Transportation

For the incremental transportation costs, R. W. Beck focused on how expenses for participating communities would change based on where collected waste would need to be transported for disposal. R. W. Beck limited this analysis to waste that is collected directly by each participating community.

For Campbell County and Amherst County, this analysis focused on the added costs that would be incurred for hauling roll-off containers from the citizens' convenience centers. R. W. Beck reviewed existing contracts in place for these two counties and relied on our internal database of roll-off hauling costs to complete this analysis. R. W. Beck assumed that the incremental cost would be approximately $75 per hour. Table 4-4 summarizes this analysis.

Transportation costs vary with distances traveled and thus are affected as the active regional landfill changes locations. For Campbell and Amherst counties, there is no cost when the community uses the local landfill and reach a maximum when the landfill is located at the community furthest away. R. W. Beck used the transfer cost from each community to the next closest landfill in the analysis. Since costs range from zero to a cost higher than this, R. W. Beck felt this would represent a good "average."

The City of Lynchburg would not incur any incremental transportation costs until the Lynchburg Landfill reaches capacity in approximately eight years. At this time, the City of Lynchburg would likely need to add one residential collection route, which would increase costs by approximately $100,000 annually. In addition, there would be a need to allow residents to drop-off waste at a citizens' convenience center that would be located at the Lynchburg landfill. City staff estimated there would be approximately 10 roll-off bins per week, which would total approximately $52,000, assuming a cost of $100 per roll-off collection.

R. W. Beck calculated the difference between the status quo and the joint use of the regional landfill scenario to analyze the costs for the City of Bedford and Nelson County. For each of these communities, R. W. Beck compared the total costs of transportation and disposal. Tables 4-5 and 4-6 summarize this comparison.

Administrative Cost Analysis

Each of the participating communities also needs to evaluate costs that are currently included in the landfill budget that would not be eliminated. These costs are typically for administrative functions since each participating community will still need to fund these costs. R. W. Beck has accounted for these costs in the cost analysis for City of Lynchburg, Campbell County, and Amherst County. In addition to the incremental transportation costs, Table 4-4 also provides a summary of the administrative costs for these three communities.

R. W. Beck did not analyze the administrative costs for the City of Bedford and Nelson County. Instead, the project team compared the relevant expenses, transfer and disposal, which R. W. Beck has provided in Tables 4-5 and 4-6.

4.3.5 Cost Summary

Tables 4-2 and 4-3 provide the "baseline" cost summaries for the regional landfill. These cost summaries do not include the incremental costs incurred by each community, which must be considered in addition to this "baseline" cost to determine the total cost for each community.

Table 4-7 provides the total cost summary for each community including the tonnage currently contributed by BFI. Table 4-8 provides the same information without the tonnage from BFI. For the City of Lynchburg, Amherst County, and Campbell County, Tables 4-7 and 4-8 take into account the costs in Tables 4-2, 4-3 and 4-4. For Nelson and Bedford Counties, Tables 4-7 and 4-8 use the information presented in Tables 4-2, 4-3, 4-5 (Nelson) and 4-6 (Bedford).

Section 8 compares the total costs for the joint use of regional facilities to the current costs for each community.

Table 4-4
Summary of Incremental Expenses (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Administrative Costs										
City of Lynchburg	$453,463	$464,799	$476,419	$488,330	$500,538	$513,052	$525,878	$539,025	$552,500	$566,313
Campbell County	$63,749	$63,749	$65,343	$66,976	$68,651	$70,367	$72,126	$73,929	$75,778	$77,672
Amherst County	$7,847	$7,847	$8,043	$8,244	$8,450	$8,661	$8,878	$9,100	$9,327	$9,561
Transportation Costs										
City of Lynchburg	$0	$0	$0	$0	$0	$0	$0	$0	$140,116	$143,619
Campbell County	$67,072	$68,748	$70,467	$72,229	$74,035	$75,885	$77,782	$79,727	$81,720	$83,763
Amherst County	$10,860	$11,132	$11,410	$11,695	$11,987	$12,287	$12,594	$12,909	$13,232	$13,563
Total Incremental Costs										
City of Lynchburg	$453,463	$464,799	$476,419	$488,330	$500,538	$513,052	$525,878	$539,025	$692,617	$709,932
Campbell County	$130,821	$132,498	$135,810	$139,205	$142,685	$146,252	$149,909	$153,656	$157,498	$161,435
Amherst County	$18,707	$18,978	$19,453	$19,939	$20,438	$20,949	$21,472	$22,009	$22,559	$23,123
Incremental Costs per Ton including BFI Tonnage										
City of Lynchburg	$2.74	$2.80	$2.86	$2.93	$2.99	$3.06	$3.13	$3.20	$4.10	$4.19
Campbell County	$2.74	$2.77	$2.83	$2.90	$2.96	$3.03	$3.10	$3.17	$3.24	$3.31
Amherst County	$0.62	$0.63	$0.64	$0.66	$0.67	$0.69	$0.70	$0.72	$0.73	$0.75
Incremental Costs per Ton excluding BFI Tonnage										
City of Lynchburg	$4.38	$4.48	$4.58	$4.68	$4.78	$4.89	$5.00	$5.11	$6.56	$6.70
Campbell County	$3.07	$3.10	$3.17	$3.24	$3.32	$3.39	$3.47	$3.54	$3.62	$3.71
Amherst County	$0.75	$0.76	$0.78	$0.80	$0.81	$0.83	$0.85	$0.87	$0.89	$0.91

Table 4-5
Summary of Transportation and Disposal Costs for Nelson County (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Status Quo										
Transportation	$205,000	$210,125	$215,378	$220,763	$226,282	$231,939	$237,737	$243,681	$249,773	$256,017
Disposal	$356,264	$365,171	$374,300	$383,658	$393,249	$403,080	$413,157	$423,486	$434,074	$444,925
Region 2000 Regional Landfill - Including BFI Tonnage										
Transportation	$96,670	$96,911	$97,154	$97,396	$97,640	$97,884	$98,129	$98,374	$98,620	$98,867
Disposal	$239,518	$242,796	$246,155	$249,598	$253,127	$256,745	$260,452	$264,253	$268,149	$272,142
Total Annual Savings	$225,076	$235,589	$246,370	$257,426	$268,764	$280,390	$292,313	$304,540	$317,077	$329,934
Savings per Ton	$16.63	$17.36	$18.11	$18.88	$19.66	$20.46	$21.28	$22.11	$22.97	$23.84
Region 2000 Regional Landfill - Excluding BFI Tonnage										
Transportation	$86,584	$86,800	$87,017	$87,235	$87,453	$87,671	$87,891	$88,110	$88,331	$88,551
Disposal	$276,067	$276,418	$280,360	$284,400	$288,542	$292,787	$297,139	$301,599	$306,170	$310,856
Total Annual Savings	$198,614	$212,078	$222,302	$232,785	$243,536	$254,561	$265,865	$277,458	$289,345	$301,535
Savings per Ton	$16.38	$17.45	$18.25	$19.06	$19.89	$20.74	$21.61	$22.49	$23.40	$24.32

Table 4-6
Summary of Transportation and Disposal Costs for City of Bedford (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Status Quo										
Transportation and Disposal	$143,500	$147,088	$150,765	$154,534	$158,397	$162,357	$166,416	$170,576	$174,841	$179,212
Region 2000 Regional Landfill - Including BFI Tonnage										
Transportation and Disposal	$99,611	$100,654	$101,721	$102,813	$103,931	$105,075	$106,246	$107,445	$108,672	$109,928
Total Annual Savings	$43,889	$46,434	$49,044	$51,721	$54,466	$57,282	$60,170	$63,131	$66,169	$69,283
Savings per Ton	$10.94	$11.55	$12.17	$12.80	$13.45	$14.11	$14.78	$15.47	$16.17	$16.89
Region 2000 Regional Landfill - Excluding BFI Tonnage										
Transportation and Disposal	$119,969	$120,157	$121,532	$122,941	$124,383	$125,860	$127,372	$128,920	$130,505	$132,129
Total Annual Savings	$23,531	$26,931	$29,232	$31,593	$34,014	$36,497	$39,044	$41,656	$44,336	$47,083
Savings per Ton	$5.87	$6.70	$7.25	$7.82	$8.40	$8.99	$9.59	$10.21	$10.84	$11.48

Table 4-7
Summary of Total Expenses including BFI Tonnage (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Total Costs										
City of Lynchburg	$3,383,706	$3,435,136	$3,487,851	$3,541,885	$3,597,269	$3,654,038	$3,712,226	$3,771,869	$3,973,119	$4,039,284
Campbell County	$974,887	$988,112	$1,003,263	$1,018,792	$1,034,709	$1,051,024	$1,067,747	$1,084,888	$1,102,457	$1,120,466
Amherst County	$552,301	$559,873	$567,831	$575,988	$584,349	$592,918	$601,702	$610,706	$619,935	$629,394
City of Bedford	$309,510	$315,800	$322,246	$328,851	$335,620	$342,556	$349,665	$356,949	$364,413	$372,063
Nelson County	$541,990	$550,654	$559,529	$568,621	$577,934	$587,475	$597,248	$607,261	$617,518	$628,027
Total Costs per Ton										
City of Lynchburg	$20.44	$20.70	$20.96	$21.23	$21.51	$21.80	$22.09	$22.39	$23.52	$23.85
Campbell County	$20.44	$20.67	$20.93	$21.20	$21.48	$21.76	$22.05	$22.35	$22.66	$22.97
Amherst County	$18.32	$18.52	$18.74	$18.96	$19.19	$19.42	$19.66	$19.90	$20.15	$20.41
City of Bedford	$77.18	$78.56	$79.96	$81.40	$82.86	$84.37	$85.90	$87.47	$89.08	$90.72
Nelson County	$40.05	$40.59	$41.14	$41.70	$42.28	$42.87	$43.47	$44.09	$44.73	$45.37

Table 4-8
Summary of Total Expenses excluding BFI Tonnage (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Total Costs										
City of Lynchburg	$2,812,276	$2,826,607	$2,871,910	$2,918,345	$2,965,941	$3,014,727	$3,064,733	$3,115,988	$3,308,642	$3,365,995
Campbell County	$1,100,975	$1,103,883	$1,121,049	$1,138,644	$1,156,679	$1,175,164	$1,194,112	$1,213,533	$1,233,440	$1,253,845
Amherst County	$585,404	$586,395	$594,961	$603,742	$612,742	$621,967	$631,423	$641,116	$651,050	$661,233
City of Bedford	$329,868	$335,303	$342,057	$348,979	$356,072	$363,341	$370,790	$378,424	$386,247	$394,263
Nelson County	$568,453	$574,165	$583,597	$593,261	$603,162	$613,305	$623,696	$634,343	$645,251	$656,426
Total Costs per Ton										
City of Lynchburg	$27.15	$27.22	$27.59	$27.97	$28.35	$28.75	$29.15	$29.56	$31.31	$31.78
Campbell County	$25.85	$25.85	$26.19	$26.53	$26.88	$27.24	$27.62	$27.99	$28.38	$28.78
Amherst County	$23.53	$23.51	$23.79	$24.08	$24.38	$24.69	$25.00	$25.32	$25.65	$25.98
City of Bedford	$82.26	$83.41	$84.88	$86.38	$87.91	$89.48	$91.09	$92.73	$94.42	$96.14
Nelson County	$46.90	$47.25	$47.90	$48.58	$49.26	$49.97	$50.69	$51.42	$52.18	$52.95

4.4 Advantages and Disadvantages

The following section describes the advantages and disadvantages associated with the joint use of existing facilities. This analysis is based on R. W. Beck's evaluation and analysis included in the "Region 2000 Solid Waste Management Study Summary Report."

Advantages

- Decreases disposal costs by increasing economies of scale.
- Combining operations reduces the importance of waste from third parties, such as BFI.
- Existing landfills would not compete against each other for waste volumes from third parties as is currently the case.
- Overall disposal capacity would still be approximately 20 years for the entire region.

Disadvantages

- Existing landfills would be responsible for closure and post-closure costs that have been incurred to date based on the quantity of waste in place. This would primarily affect Amherst and Campbell Counties, as the City of Lynchburg has a reserve fund in place for these costs.[4]
- There would be an increase in some costs for communities that have existing landfills. These costs could include transportation due to longer hauling distances and administrative costs that need to be funded through other city/county operations.
- Some landfills would fill-up sooner under the joint use of operations scenarios as compared to operating individually.
- Each community with a landfill would not have as much control concerning landfill operations in the future, but would have meaningful representation at the regional authority.

4.5 Industry Trends

Since the implementation of Federal landfill laws (Subtitle D) in the 1990's, landfills have become more sophisticated and expensive to operate. Consequently, the number of facilities has decreased while the size of remaining landfills has increased. As

[4] Based on the amount of waste in place at each landfill, R. W. Beck has developed a preliminary estimate of how much should have been saved to date to fund future closure and post-closure costs. This amount totals approximately $963,000 for Amherst County and $1,753,000 for Campbell County. Of this amount $548,355 and $1,214,030 are for closure, respectively. While beyond the scope of this initial analysis, opportunities could be evaluated in subsequent studies to determine options for the accounting of these costs within the context of a regional authority purchasing these landfills.

existing facilities reach capacity and there are fewer suitable sites for landfills, future facilities will need to be regional in nature.

4.6 Conclusion

The joint use of existing facilities regional alternative represents a viable option for the participating communities to seriously consider. Under this scenario, each community would be able to reduce its disposal costs. If there is an interest in this regional alternative, R. W. Beck would recommend that the participating communities consider the establishment of a regional authority to serve as the entity to manage the region's solid waste disposal system. Section 7 of this analysis details the reasons for a regional authority, as well as the legal process and steps to create an authority.

Section 5
Regional Alternative: Waste-to-Energy

5.1 Overview

Municipal waste combustion projects, commonly referred to as waste-to-energy (WTE) facilities, entail the combustion of municipal solid waste (MSW) to create electricity. For this analysis, it was assumed that the regional WTE facility would utilize mass burn in electric generation. Mass burn facilities process waste without any separation of materials other than non-processible waste (such as white goods, carpet, propane tanks, etc.) before combustion.

The following WTE analysis accounts for all costs and revenues that such a facility would incur. Costs associated with a WTE facility include capital costs, operating and maintenance costs, and costs relating to the disposal of the ash generated by the facility. Revenue earned from the facility is contingent upon MSW tipping fees and the average price per kilowatt-hour that can be obtained in the wholesale electric market and the number of kilowatt-hours generated by the facility. Additional revenues can be obtained through the sale of recovered ferrous and non-ferrous metals.

This waste to energy analysis relied on the following assumptions:

- The WTE facility will be built on property owned by one of the participating communities.
- The facility will be located in close proximity to the three existing landfills, which minimizes transportation costs.
- Ash generated in the WTE process will be disposed of at one of the existing landfills or will be hauled to another disposal facility.
- Amherst County, Lynchburg, and Campbell County would all send waste to the WTE facility via direct haul while the City of Bedford and Nelson County would send waste to the facility via a transfer station.
- The WTE facility will be able to process approximately 900 tons per day of waste.
- The actual amount of material processed on an annual basis will be equal to the total forecast waste generation of the participating communities in that given year.
- Additional revenue that could be generated by the sale of metals were not included in this analysis because R. W. Beck does not believe metal sales would be significant.

5.2 Cost Analysis

The following is an analysis of costs that would be incurred through the use of a WTE facility under three distinct scenarios. In the base case scenario, tonnage combusted at the facility is assumed to be equal to the total projected waste generation of the participating communities, including BFI tonnage. Alternate scenarios examine costs that would be associated with the facility if BFI tonnage were excluded or if additional tonnage from Appomattox or Bedford Counties were to be combusted.

5.2.1 WTE System Cost with BFI Tonnage

This analysis accounts for all costs and revenues associated with a WTE facility assuming that all of the refuse of the participating communities (including all BFI tonnage) is processed at the facility.

Capital

R. W. Beck estimated that a WTE facility that would process 900 tons per day of refuse would have a capital cost of approximately $117 million. Based on financing this cost with a 20-year bond at an interest rate of 5 percent, the annual debt service would total $9.4 million.

Operations and Maintenance

Operations and maintenance costs for a WTE facility would be expected to be in the range of $30 to $35 per ton based on R. W. Beck's industry experience. In an effort to develop fiscally conservative cost estimates, R. W. Beck has used the rate of $35 per ton in 2006. R. W. Beck inflated operations and maintenance cost at 2.5 percent per year from 2006 to 2015. Based on an annual tonnage generation figure of 260,598 in 2006 (including BFI tonnage), total operations and maintenance costs in this year are forecast to be $9.1 million.

Ash Disposal

It is assumed that the combustion of the waste will generate ash approximately equal to 25 percent of the tonnage of waste originally combusted.[1] The ash would need to be disposed of in either a Subtitle D MSW landfill or a double-lined cell known as a monofill, which is regulated under Subtitle C. The disposal site would be subject to closure and post closure rules. Given these facts, R. W. Beck assumed that ash would be disposed of at a cost of approximately $40 per ton in 2006. R. W. Beck inflated ash disposal cost at 2.5 percent per year from 2006 to 2015. Based on an annual ash generation of 65,239 tons, residue disposal costs are forecast to be $2.6 million.

[1] R. W. Beck used tonnage, as opposed to volume, as the basis to calculate ash quantities in order to keep our cost estimates conservative. On a volume basis, ash disposal is typically 10-15 percent of waste originally combusted.

Revenue from the Sale of Electricity

For this analysis, it was assumed that each ton of waste generates 500 net kilowatt-hours of electricity. Wholesale electricity generally sells within the region for between $0.02 per kilowatt-hour and $0.04 per kilowatt-hour. Within this analysis, R. W. Beck assumed a wholesale electric price of $0.02 per kilowatt-hour to be fiscally conservative. However, any price per kilowatt-hour assumption within the $0.02 to $0.04 range yields relatively small total revenue amounts. Table 5-1 presents a sensitivity analysis of revenues by through variation of tonnage and price data.

Table 5-1
Annual Revenue Sensitivity

Annual Tonnage	$0.02/kwh	$0.03/kwh	$0.04/kwh
260,000	$2,600,000	$3,900,000	$5,200,000
270,000	2,700,000	4,050,000	5,400,000
280,000	2,800,000	4,200,000	5,600,000

Summary

Table 5-2 summarizes the cost of running the WTE facility assuming BFI tonnage is processed at the facility along with waste generated by participating communities. Disposal costs per ton range from $71 per ton in 2006 to $81 per ton in 2015. These costs are driven up by large capital and operating and maintenance costs. As Table 5-1 shows, even if a best-case scenario were assumed with respect to revenue per kilowatt-hour, revenues generated would not even cover the facility's operating and maintenance costs.

5.2.2 WTE System Cost without BFI Tonnage

R. W. Beck also calculated facility costs without the inclusion of BFI tonnage. Under this scenario, capital costs are assumed to remain constant relative to the previous scenario. All costs operating and maintenance and ash disposal costs per ton were assumed to remain the same. As Table 5-3 shows, costs per ton associated with the operation of this facility would exceed those incurred under the previous scenario.

5.2.3 Costs Concerning Appomattox and Bedford Counties

Any increase in tonnage that could be obtained by combusting waste from Appomattox and Bedford Counties would help to offset capital costs on a per ton basis. However, even if all of the refuse from these counties was disposed of at the WTE facility, costs on a per ton basis would not shift significantly because capital and operating and maintenance costs would remain high relative to revenue generated from electricity sales. Even under this scenario, WTE per ton disposal costs would be extremely expensive relative to other disposal options considered during this analysis.

5.3 Incremental Cost Analysis

The cost analysis discussed in Section 5.2 concluded that WTE would not be feasible since the cost per ton is higher than any of the other scenarios, including the status quo for each participating community. Therefore, R. W. Beck did not complete an incremental cost analysis for the WTE scenario since any incremental expenses would only further increase the cost of WTE.

5.4 Advantages and Disadvantages

The following section describes the advantages and disadvantages associated with WTE. This analysis is based on R. W. Beck's evaluation and analysis included in the "Region 2000 Solid Waste Management Study Summary Report."

Advantages

- Facility generates revenue from electric sales.
- Occupies less space than a landfill.
- Reduces the amount of waste going into current landfills, thereby extending the lives of current landfills and reducing the demand for additional landfills.

Disadvantages

- Capital requirements for the construction of the facility are extremely large, significantly driving up cost per ton figures relative to alternatives.
- Operations and maintenance expenses for WTE are high compared to those of landfills.
- Revenues from electricity sales are not significant enough to reduce operating costs to levels competitive with landfilling.
- Facility should be centrally located to minimize transportation costs.
- Facility will generate additional air pollution within region, raising environmental concerns.
- Certain WTE facility designs require large amounts of water to make up for evaporation losses.
- Operations will produce substantial tonnages of ash which must be tested and landfilled.
- A large waste stream must be dedicated to the facility for a long period of time.
- The WTE program may divert waste from composting and recycling programs.

5.5 Industry Trends

WTE facility construction within the United States has been stymied over the past decade due to increasing regulatory requirements and the construction of new regional

landfills. In addition, pressure from environmental groups concerned about pollution and low landfill disposal fees in much of the country has limited the development of new projects. No new WTE facilities have been built in the U.S. in recent years. There are a number of companies touting the benefits of emerging WTE technologies, such as gasification and plasma arc. However, based on analysis that R. W. Beck has completed for other clients, these technologies are untested in scenarios where they would process approximately 900 tons per day.

5.6 Conclusion

Given the high costs associated with WTE, R. W. Beck would not recommend consideration of this regional option at this time. This option could be reevaluated in the future when landfills in Region 2000 are closer to reaching capacity.

Table 5-2
Expense Summary of WTE Facility including BFI Tonnage (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Expenses										
Capital	$9,388,383	$9,388,383	$9,388,383	$9,388,383	$9,388,383	$9,388,383	$9,388,383	$9,388,383	$9,388,383	$9,388,383
Operating and Maintenance	$9,133,514	$9,385,257	$9,643,938	$9,909,749	$10,182,886	$10,463,552	$10,751,954	$11,048,304	$11,352,823	$11,665,736
Ash Disposal	$2,609,575	$2,681,502	$2,755,411	$2,831,357	$2,909,396	$2,989,586	$3,071,987	$3,156,658	$3,243,664	$3,333,067
Total Expenses	$21,131,472	$21,455,141	$21,787,731	$22,129,488	$22,480,665	$22,841,521	$23,212,323	$23,593,346	$23,984,870	$24,387,186
Revenue from Electricity Sales	($2,609,575)	($2,616,099)	($2,622,640)	($2,629,196)	($2,635,769)	($2,642,359)	($2,648,965)	($2,655,587)	($2,662,226)	($2,668,882)
Total Expenses Net of Revenue	$18,521,897	$18,839,042	$19,165,092	$19,500,292	$19,844,896	$20,199,162	$20,563,359	$20,937,759	$21,322,644	$21,718,304
Annual Tonnage	260,958	261,610	262,264	262,920	263,577	264,236	264,896	265,559	266,223	266,888
Cost per Ton	$70.98	$72.01	$73.08	$74.17	$75.29	$76.44	$77.63	$78.84	$80.09	$81.38

Table 5-3
Expense Summary of WTE Facility excluding BFI Tonnage (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Expenses										
Capital	$9,388,383	$9,388,383	$9,388,383	$9,388,383	$9,388,383	$9,388,383	$9,388,383	$9,388,383	$9,388,383	$9,388,383
Operating and Maintenance	$6,551,469	$6,732,043	$6,917,595	$7,108,262	$7,304,183	$7,505,505	$7,712,375	$7,924,947	$8,143,379	$8,367,831
Ash Disposal	$1,871,848	$1,923,441	$1,976,456	$2,030,932	$2,086,909	$2,144,430	$2,203,536	$2,264,271	$2,326,680	$2,390,809
Total Expenses	$17,811,699	$18,043,867	$18,282,434	$18,527,576	$18,779,475	$19,038,317	$19,304,293	$19,577,601	$19,858,441	$20,147,022
Revenue from Electricity Sales	($1,871,848)	($1,876,528)	($1,881,219)	($1,885,922)	($1,890,637)	($1,895,364)	($1,900,102)	($1,904,852)	($1,909,614)	($1,914,388)
Total Expenses Net of Revenue	$15,939,851	$16,167,339	$16,401,215	$16,641,654	$16,888,838	$17,142,954	$17,404,192	$17,672,749	$17,948,827	$18,232,634
Annual Tonnage	187,185	187,653	188,122	188,592	189,064	189,536	190,010	190,485	190,961	191,439
Cost per Ton	$85.16	$86.16	$87.18	$88.24	$89.33	$90.45	$91.60	$92.78	$93.99	$95.24

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Section 6
Regional Alternative: Transfer Station

6.1 Overview

A transfer station is a facility where solid waste collection vehicles discharge their loads into a receiving area; then, the waste is placed into larger hauling vehicles for travel to a disposal site such as a landfill or waste-to-energy facility. Among the participating communities included in this analysis, Nelson County has owned and operated a transfer station for a number of years and the City of Bedford is in the process of constructing a transfer station that they will own and operate.

The following transfer station analysis accounts for all costs that would be associated with such an operation. Costs associated with a transfer station include capital costs, operations and maintenance costs, hauling costs from the transfer station to disposal site and tipping fees at the disposal site. This transfer station analysis relied on the following assumptions:

- Â The facility will be located in close proximity to the three existing landfills, which minimizes transportation costs.
- Â Amherst County, the City of Lynchburg, and Campbell County would all send waste to the transfer station via direct haul. The City of Bedford and Nelson County would send waste to the disposal facility via their own transfer stations.[1]
- Â R. W. Beck based the capital and operating expenses on a transfer station that would process approximately 900 tons per day. However, the actual amounts processed would likely be closer to 850 tons per day since the City of Bedford and Nelson County would not use the transfer station. The transfer station would initially process approximately 243,414 tons annually.
- Â The actual amount of material processed on an annual basis will be equal to the total forecast waste generation of the participating communities in that given year.

6.2 Cost Analysis

The following is an analysis of costs that would be incurred through the use of a transfer station under three distinct scenarios. In the base case scenario, tonnage at the facility is assumed to be equal to the total projected waste generation of Amherst County, the City of Lynchburg, and Campbell County, including BFI tonnage.

[1] If this approach is implemented, the City of Bedford and Nelson County could participate by coordinating with the other participating communities to combine their waste stream when negotiating contracts in an effort to achieve the lowest possible price per ton.

Alternate scenarios examine costs that would be associated with the facility if BFI tonnage were excluded or if additional tonnage from Appomattox or Bedford Counties were to be transferred.

6.2.1 Transfer Station System Cost

This analysis accounts for all costs associated with a transfer station assuming that all of the refuse of Amherst County, the City of Lynchburg, and Campbell County (including all BFI tonnage) is processed at the facility.

Capital

R. W. Beck estimated that a transfer station facility that would process 900 tons per day of refuse would have a capital cost of approximately $2.35 million. Based on financing this cost with 20-year and 7-year bonds at an interest rate of 5 percent, the annual debt service would total $258,546. Table 6-1 provides a summary of the capital costs estimates for the transfer station. R. W. Beck assumed the transfer station would be located at one of the existing Region 2000 landfills. Because of this assumption, R. W. Beck did not include costs associated with a scale house, scale, or administration building. R. W. Beck also assumed the land acquisition cost to be zero.

Table 6-1
Transfer Station Capital Costs

Item	Cost	Useful Life	Amortized
Construction			
Construction Cost	$1,330,000	20	$106,723
Engineering	$199,500	20	$16,008
Admin	$66,500	20	$5,336
Construction Subtotal	$1,596,000		$128,067
Equipment			
Front-End Loader (2)	$600,000	7	$103,692
Bobcat	$50,000	7	$8,641
Yard Goat	$80,000	7	$13,826
Misc Equipment	$25,000	7	$4,320
Equipment Subtotal	$755,000		$130,479
Total	$2,351,000		$258,546

Operations and Maintenance

Based on industry experience, R. W. Beck developed operating and maintenance costs for a transfer station that would process approximately 900 tons per day. Using an

annual tonnage generation figure of 243,414 in FY 2006 (including BFI tonnage), total operations and maintenance costs in this year are forecast to be $390,843.

Table 6-2
Transfer Station O&M Costs

Item	Annual Cost
Labor	$255,584
Equipment O&M	
Fuel	$48,196
Maintenance & Repair	$37,750
Utilities	$13,523
Facility Maintenance	$31,920
Administrative	$3,870
Total	$390,843

Hauling and Disposal

R. W. Beck evaluated hauling and disposal costs together since their costs are connected. To complete this analysis, R. W. Beck evaluated hauling and disposal costs for three commercially operated landfills in Virginia, as presented in Table 6-3.

Table 6-3
Hauling and Disposal Costs

	Amelia Landfill	Allied Old Dominion Landfill	Allied Brunswick Landfill
Annual Hauling Cost	$2,774,935	$4,162,402	$4,856,136
Annual Tonnage[1]	243,414	243,414	243,414
Hauling Cost per Ton	$11.40	$17.10	$19.95
Disposal Cost per Ton	$25.00	$40.00	$25.00
Total Hauling and Disposal per Ton	$36.40	$57.10	$44.95

(1) Estimated disposal tonnage in FY 2006 for City of Lynchburg, Campbell County, and Amherst County including tonnage from BFI.

Based on this analysis, the Amelia Landfill represents the least expensive option at a cost of $36.40 per ton. Even if the Amelia Landfill would offer a less expensive rate of $20 per ton, the total hauling cost of $31.40 would be significantly higher than the costs for the joint use of existing facilities.

Summary

Table 6-4 summarizes the cost of operating the transfer station in FY 2006 assuming BFI tonnage is processed at the facility along with waste generated by the three

participating communities. The estimated FY 2006 tonnage from the three communities used for this per ton analysis is 243,414. Table 6-8 provides the cost per ton for FY 2006 through FY 2015, assuming the waste is disposed at Amelia Landfill.

Table 6-4
Summary of Transfer Station Scenario including BFI Tonnage

Cost Item	Amelia Landfill	Allied Old Dominion Landfill	Allied Brunswick Landfill
Transfer Station Capital Cost per Ton	$1.06	$1.06	$1.06
Transfer Station Operating Cost per Ton	$1.61	$1.61	$1.61
Hauling Cost per Ton	$11.40	$17.10	$19.95
Disposal Cost per Ton	$25.00	$40.00	$25.00
Total Cost per Ton	$39.07	$59.77	$47.62

As a comparison, Table 6-5 provides a summary of the estimated per ton costs for each community in FY 2006. This information is also located in the summary tables in Section 3.

Table 6-5
Per Ton Cost for Status Quo in FY 2006 including BFI Tonnage

Community	Status Quo Cost per Ton	Cost per Ton for Joint Use of Facilities
City of Lynchburg	$25.20	$20.44
Campbell County	$32.21	$20.44
Amherst County	$33.51	$18.32

6.2.2 Cost without BFI Tonnage

Facility costs without the inclusion of BFI tonnage were also calculated. The estimated FY 2006 tonnage from the three communities, excluding the BFI tonnage, used for this per ton analysis is 171,053. Without the BFI tonnage, the per ton costs remain constant except for the capital cost. As Table 6-6 shows, costs per ton associated with the operation of this facility would exceed those incurred under the previous scenario. Table 6-9 provides the cost per ton for FY 2006 through FY 2015, assuming the waste is disposed at Amelia Landfill.

Table 6-6
Summary of Transfer Station Scenario excluding BFI Tonnage

Cost Item	Amelia Landfill	Allied Old Dominion Landfill	Allied Brunswick Landfill
Transfer Station Capital Cost per Ton	$1.51	$1.51	$1.51
Transfer Station Operating Cost per Ton	$1.61	$2.28	$2.28
Hauling Cost per Ton	$11.40	$17.10	$19.95
Disposal Cost per Ton	$25.00	$40.00	$25.00
Total Cost per Ton	$39.52	$60.90	$48.75

As a comparison, Table 6-7 provides a summary of the estimated per ton costs for each community in FY 2006 excluding the tonnage from BFI. This information is also located in the summary tables in Section 3.

Table 6-7
Per Ton Cost for Status Quo in FY 2006 excluding BFI Tonnage

Community	Status Quo Cost per Ton	Cost per Ton for Joint Use of Facilities
City of Lynchburg	$40.29	$27.15
Campbell County	$36.06	$25.85
Amherst County	$40.60	$23.53

6.2.3 Costs Concerning Appomattox and Bedford Counties

Any increase in tonnage that could be obtained by transferring waste from Appomattox and Bedford Counties would help to decrease costs on a per ton basis.

Currently Appomattox and Bedford Counties pay approximately $68 and $61 per ton, respectively, for disposal. Assuming the transfer station would haul the waste to the Amelia Landfill, Appomattox and Bedford Counties would benefit from using the transfer station if they could get the waste to the transfer station for less than $24 and $17 per ton, respectively.[2]

6.3 Incremental Cost Analysis

The cost analysis discussed in Section 6.2 concluded that a transfer station would not be feasible since the cost per ton is higher than any of the other scenarios, with the exception of waste-to-energy. Therefore, R. W. Beck did not complete an incremental cost analysis for the transfer station scenario since any incremental expenses would only further increase the cost of a transfer station.

[2] For Appomattox County: $68 - $44 = $24. For Bedford County: $61 - $44 = $17.

6.4 Advantages and Disadvantages

The following section describes the advantages and disadvantages associated with transfer stations. This analysis is based on R. W. Beck's evaluation and analysis included in the "Region 2000 Solid Waste Management Study Summary Report."

Advantages

- Occupies less space and fewer environmental issues than a landfill.
- Reduces the amount of waste going into landfills in Region 2000, thereby reducing the demand for additional landfills in the region.
- Communities in Region 2000 will eventually need a transfer station once their existing landfills reach capacity.
- Lower capital investment than compared to landfills.

Disadvantages

- Facility must be located in the center of the region.
- Currently premature to develop a major transfer station given the remaining disposal capacity in the existing landfills.
- The potential exists for high hauling and disposal costs since these services would be contracted with private companies.
- Loss of control over future price increases.
- Difficult to recover costs for existing debt service and unfunded closure and post closure costs with existing landfill operations.
- Represents a serious change in how solid waste services are provided within Region 2000.

6.5 Industry Trends

Relying on transfer stations continues to represent a need for communities as they either fill up their existing landfills or rely on landfills that are located further distances from their collection areas. Key trends specific to transfer stations currently involve selecting appropriate compaction technologies for maximizing payloads and consideration of various transportation networks (e.g. trucks, railways and barges).

6.6 Conclusion

At this time it is premature to consider the construction of a transfer station for Amherst County, the City of Lynchburg, and Campbell County since these communities have significant remaining capacity in their landfills. However, as landfills within Region 2000 reach capacity, there will be a need to consider some form of transfer station system. The evaluation completed in this section can provide a baseline of information concerning the future costs that may be associated with a transfer station system.

Table 6-8
Summary of Transfer Station Scenario including BFI Tonnage (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Capital	258,546	258,546	258,546	258,546	258,546	258,546	258,546	258,546	258,546	258,546
O&M	390,843	401,616	412,685	424,060	435,748	447,758	460,100	472,781	485,812	499,202
Hauling Costs	2,774,935	2,851,419	2,930,011	3,010,769	3,093,754	3,179,025	3,266,647	3,356,684	3,449,203	3,544,271
Disposal Costs	6,085,345	6,253,072	6,425,423	6,602,523	6,784,505	6,971,503	7,163,655	7,361,104	7,563,994	7,772,477
Total Expenses	9,509,669	9,764,653	10,026,665	10,295,899	10,572,553	10,856,833	11,148,948	11,449,115	11,757,555	12,074,497
Annual Tonnage	243,414	244,022	244,632	245,244	245,857	246,472	247,088	247,706	248,325	248,946
Cost per ton	$39.07	$40.02	$40.99	$41.98	$43.00	$44.05	$45.12	$46.22	$47.35	$48.50

Table 6-9
Summary of Transfer Station Scenario excluding BFI Tonnage (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Capital	258,546	258,546	258,546	258,546	258,546	258,546	258,546	258,546	258,546	258,546
O&M	274,655	282,226	290,005	297,998	306,211	314,651	323,324	332,235	341,393	350,802
Hauling Costs	1,950,018	2,003,765	2,058,994	2,115,745	2,174,060	2,233,982	2,295,557	2,358,828	2,423,843	2,490,650
Disposal Costs	4,276,327	4,394,194	4,515,309	4,639,762	4,767,645	4,899,054	5,034,084	5,172,836	5,315,412	5,461,918
Total Expenses	6,759,547	6,938,730	7,122,853	7,312,050	7,506,463	7,706,233	7,911,510	8,122,445	8,339,194	8,561,917
Annual Tonnage	171,053	171,481	171,909	172,339	172,770	173,202	173,635	174,069	174,504	174,941
Cost per ton	$39.52	$40.46	$41.43	$42.43	$43.45	$44.49	$45.56	$46.66	$47.79	$48.94

Section 7
Creation of a Regional Authority or Board

7.1 Introduction

If any of the participating communities have an interest in implementing the regional concepts addressed in this analysis, there could be a need to establish a regional authority or board. This section of the report discusses the reasons to consider a regional authority or board, legal process to establish a regional authority or board and the steps required to develop such an authority or board.

Another option could be to establish a regional board as a part of the Region 2000 Regional Commission

7.2 Reasons to Consider a Regional Authority or Board

If the participating communities decide that any of the regional alternatives evaluated in this analysis merit further consideration and potential implementation, the need may exist to create a regional authority or board. Using a regional authority or board as the entity to manage the disposal system would offer the following advantages:

- Provides framework for the establishment of a long-term relationship between multiple local governments.
- Having the participation of multiple local governments provides the opportunity to increase economies of scale, which can reduce costs on a per ton basis.
- Improves the opportunity for coordination between local governments as all participating communities would have fair representation with an authority.
- Eliminates the possibility that currently exists where landfills in Region 2000 must compete against each other for the waste stream.
- Provides the opportunity for participating communities to share in the decision making, rewards and risks of a regional disposal system.
- Communities can be compensated for the fair value of their solid waste assets (e.g. landfills, equipment, etc.).

7.3 Legal Process

The following serves as a summary of key portions of the process to establish an authority, but is not intended to describe the entire legal process.[1] The Virginia Water and Waste Authorities Act (§ 15.2-5100 et seq.) allows one or more localities to create an authority. Authorities that can be created under this legislation can include any combination of the following:

- Â water authority;
- Â sewer authority;
- Â sewage disposal authority;
- Â stormwater control authority; and/or
- Â refuse collection and disposal authority.

The governing body of a locality may by ordinance or resolution, or the governing bodies of two or more localities may by concurrent ordinances or resolutions or by agreement, create an authority. The name of the authority shall contain the word "authority." The authority shall be a public body politic and corporate. The ordinance, resolution or agreement creating the authority shall not be adopted or approved until a public hearing has been held on the question of its adoption or approval, and after approval at a referendum if one has been ordered pursuant to this chapter.

Another option would be to establish a regional board through the Region 2000 Regional Commission. Based on discussions with staff from participating communities and the Commission, this should be a legal option and viable organizational structure for a regional entity. Further research would be needed to detail the process for this option.

If the participating communities decide to move forward with the creation of a regional authority or board, R. W. Beck would recommend that the Commission and/or each community retain legal counsel to initiate and complete the legal process.

7.4 Next Steps to Develop a Regional Planning Authority or Board

Preceding sections of this report have provided information on a planning level as to whether regionalization should take place. The following is a description of next steps that would need to be taken in the development of a regional solid waste planning authority or board.

[1] A complete copy of the Virginia statute is available on the Internet at http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+15.2-5100

7.4.1 Operational Analysis

The operational analysis involved in this step would build greater detail around the operational analysis provided in sections of this study that evaluate the regional alternatives. This analysis would entail the determination of facilities to be used and programs to be implemented by the regional entity. This step would involve a detailed evaluation of how to implement the preferred regional approach. This analysis would also need to examine the regulatory issues associated with the use of each landfill in sequence.

7.4.2 Financial Valuations of Existing Solid Waste Assets and Liabilities

The financial value of the various assets and liabilities each city and county would contribute to the regional solid waste system would first need to be determined. This valuation would be limited to landfills that would become part of the regional system. A valuation of assets would focus on the following types of resources:

1. Facilities
2. Land
3. Buildings
4. Equipment
5. Permits

For each asset, the value should be calculated based on valuation criteria typically used in the solid waste industry and be based on the asset's remaining useful life.

Similarly, the value of each community's solid waste liabilities would need to be calculated. A valuation of liabilities may include the following:

1. Closure costs
2. Post-closure costs
3. Existing debt service

The total value of a community's liabilities contributed would be applied against the value of assets contributed, yielding a net asset (or net liability) contribution figure. This approach would serve as the basis for each community's net asset contribution valuation.

7.4.3 Compensation Scenarios

There would be a need to determine how each community would be compensated for (1) the net assets that would become part of the new regional system and (2) potential excess revenue that would not be generated by individual facilities when a regional system is created. Such compensation could be provided via a number of methodologies including the development of rate structures for each community that reflect the net value of their respective net solid waste assets contributed or the

development of a single rate structure for all communities that reflects any new debt the new regional entity would issue to compensate each community for their respective net solid waste assets. To the extent that excess revenue will be generated in the future, there will be a need to determine how to allocate these funds to the communities with landfills.

Note that in the event any community's liabilities contributed exceed its assets, the first scenario could be employed in its present form to compensate other communities. If the second scenario were to be used under such a circumstance, a surcharge should be added to the rate of the net liability contributing community to enable the other communities to recover the amount of this net liability.

7.4.4 Financial Analysis

After determining the specific operational plan for the regional authority or board, there would be a need to complete a thorough financial analysis. This analysis would build from the evaluation completed in this report. This evaluation would provide a more detailed understanding of the costs that would be associated with the regional authority or board.

7.4.5 Staffing Issues

It is likely that some reduction in the total number of solid waste staff will be necessary with a regional authority or board since fewer employees will be required to run the new regional disposal facility than are currently being employed at existing disposal sites. Employees for the new regional facility would be selected from the current pool of staff employed by participating landfills. Any existing staff not employed by the new regional facility should be considered for vacancies within the local governments.

7.4.6 Further Steps in the Formulation of the Regional Entity

Further steps in the formulation of a regional entity include the consolidation of assets, strategic planning, the development of communications, and implementation. The following are steps that must be taken before a regional entity is formed:

- Identify and address any additional consolidation issues
- Establish benchmarks and milestones
- Prepare management and business plans that take into account future capital improvements in accordance with increasing waste generation
- Develop a financing plan for any potential new investments
- Prepare a strategic plan that addresses the solid waste needs of the participating communities within a regional framework
- Develop a methodology for the potential participation of additional communities and associated growth issues

- Communicate the establishment of the regional authority or board to the public
- Navigate the Virginia regulatory approval process successfully (see Section 7.1.1)
- Develop and execute an initial implementation strategy

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Section 8
Economic Comparison and Recommendations

8.1 Introduction

The purpose of this section is to summarize the economic comparison of each regional alternative. Based on this summary, and R. W. Beck's overall evaluation, we have included recommendations for the region and each participating community. The section concludes with a discussion of several additional opportunities for the regionalization of solid waste management in Region 2000.

8.2 Economic Comparison of Regional Alternatives

Throughout this report R. W. Beck has evaluated the economic feasibility of multiple regional alternatives. Based on this analysis, R. W. Beck has concluded that the joint use of existing facilities represents the most viable disposal option for all of the participating communities. For all communities, this option is better than both the status quo and the other two regional alternatives: waste-to-energy and transfer station. The reason for this is that the disposal costs for waste-to-energy and transfer station are significantly higher than the status quo or the joint use of existing facilities.

Based on this analysis, R. W. Beck developed preliminary estimates for each participating community to compare the status quo to the joint use of existing facilities. R. W. Beck has estimated that each participating community with a landfill (e.g. Amherst County, Campbell County and City of Lynchburg) would be able to reduce its cost of service for internal customers (e.g. residents, county/city departments) and generate excess revenue from external customers (e.g. private haulers and businesses). Savings for internal customers would occur by reducing the cost of service per ton from the status quo cost of service per ton. Table 8-1 summarizes these cost savings for each community from FY 2006 through FY 2015.

Another benefit of the joint use alternative would be that it would provide an opportunity to generate excess revenue for the regional authority or board from external customers by charging them a market-based rate. Table 8-2 summarizes the excess revenue contribution to a regional landfill from FY 2006 through FY 2015.[1]

For the purpose of this analysis, R. W. Beck assumed the total costs for each community under current operations would remain constant if the waste from BFI is

[1] As a part of the effort to establish the regional authority or board, efforts would need to occur to evaluate how this excess revenue could be shared in an equitable manner among the participating communities. For example, a basis for this sharing could be based on how much air space each participating community contributes to the regional system.

excluded from the waste stream. Each community may be able to reduce operating costs if waste from BFI is no longer accepted. However, given the fixed-cost nature of solid waste disposal systems, any such cost reductions are likely to be immaterial.

Table 8-1
Summary of Cost of Service Decrease (2006- 2015)

Participating Community	With Tonnage from BFI	Without Tonnage from BFI
Amherst County	$3,740,259	$4,275,064
Campbell County	$3,523,901	$3,178,744
City of Lynchburg	$1,843,380	$6,009,470
Total	$9,107,540	$13,463,278

Table 8-2
Summary of Excess Revenue Contribution to Regional Landfill (2006- 2015)

Participating Community	With Tonnage from BFI	Without Tonnage from BFI
Amherst County	$1,360,317	$344,260
Campbell County	$2,938,533	$1,333,812
City of Lynchburg	$15,578,948	$3,408,090
Total	$19,877,798	$5,086,162

Concerning the City of Bedford and Nelson County, R. W. Beck estimated the cost savings that each community would realize based on decreases in transportation and disposal costs. Table 8-3 summarizes these cost savings for each community from FY 2006 through FY 2015.

Table 8-3
Summary of Cost of Service Decrease (2006- 2015)

Participating Community	With Tonnage from BFI	Without Tonnage from BFI
City of Bedford	$561,588	$353,917
Nelson County	$2,757,480	$2,498,079
Total	$3,319,068	$2,851,996

To provide each community with an understanding of how its costs would change over the next ten years, R. W. Beck has included two tables for each participating community, based on two scenarios: (1) including and (2) excluding waste from BFI. These are included as tables 8-4 through 8-13.

Table 8-4
City of Lynchburg Decrease in Cost of Service Comparison (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Including Tonnage from BFI										
Status Quo Rate per Ton	$24.03	$24.33	$24.64	$24.96	$25.29	$25.62	$25.96	$26.31	$26.67	$27.04
Joint Use Rate per Ton	$20.44	$20.70	$20.96	$21.23	$21.51	$21.80	$22.09	$22.39	$23.52	$23.85
Internal Customer Tonnage	50,102	50,227	50,352	50,478	50,605	50,731	50,858	50,985	51,112	51,240
Decrease in Cost of Service	$180,061	$182,733	$185,472	$188,280	$191,157	$194,107	$197,130	$200,229	$161,006	$163,202
Excluding Tonnage from BFI										
Status Quo Rate per Ton	$38.42	$38.90	$39.40	$39.90	$40.43	$40.96	$41.51	$42.06	$42.64	$43.22
Joint Use Rate per Ton	$27.15	$27.22	$27.59	$27.97	$28.35	$28.75	$29.15	$29.56	$31.31	$31.78
Internal Customer Tonnage	50,102	50,227	50,352	50,478	50,605	50,731	50,858	50,985	51,112	51,240
Decrease in Cost of Service	$564,268	$586,485	$594,450	$602,613	$610,981	$619,558	$628,349	$637,360	$578,817	$586,590

Note: The decrease in cost of service represents a reduction in expenses and may not result in additional funds being made available to each community.

Table 8-5
City of Lynchburg Excess Revenue Contribution to Regional Landfill (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Including Tonnage from BFI										
Market Rate per Ton	$31.40	$32.19	$32.99	$33.81	$34.66	$35.53	$36.41	$37.32	$38.26	$39.21
Joint Use Rate per Ton	$20.44	$20.70	$20.96	$21.23	$21.51	$21.80	$22.09	$22.39	$23.52	$23.85
External Customer Tonnage	115,469	115,758	116,047	116,337	116,628	116,919	117,212	117,505	117,799	118,093
Excess Revenue (Regional)	$1,265,926	$1,329,993	$1,395,917	$1,463,753	$1,533,555	$1,605,380	$1,679,286	$1,755,333	$1,735,866	$1,813,939
Excluding Tonnage from BFI										
Market Rate per Ton	$31.40	$32.19	$32.99	$33.81	$34.66	$35.53	$36.41	$37.32	$38.26	$39.21
Joint Use Rate per Ton	$27.15	$27.22	$27.59	$27.97	$28.35	$28.75	$29.15	$29.56	$31.31	$31.78
External Customer Tonnage	53,471	53,604	53,738	53,873	54,007	54,142	54,278	54,413	54,549	54,686
Excess Revenue (Regional)	$227,099	$265,977	$290,141	$315,031	$340,669	$367,076	$394,276	$422,291	$378,809	$406,721

Note: The excess revenue would be realized by the regional authority or board and efforts would need to occur to evaluate how this excess revenue could be shared in an equitable manner among the participating communities.

Table 8-6
Campbell County Decrease in Cost of Service Comparison (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Including Tonnage from BFI										
Status Quo Rate per Ton	$32.21	$32.78	$33.36	$33.95	$34.56	$35.18	$35.82	$36.47	$37.14	$37.82
Joint Use Rate per Ton	$20.44	$20.67	$20.93	$21.20	$21.48	$21.76	$22.05	$22.35	$22.66	$22.97
Internal Customer Tonnage	26,231	26,297	26,363	26,428	26,495	26,561	26,627	26,694	26,760	26,827
Decrease in Cost of Service	$308,721	$318,488	$327,624	$336,987	$346,585	$356,422	$366,505	$376,841	$387,435	$398,294
Excluding Tonnage from BFI										
Status Quo Rate per Ton	$36.06	$36.70	$37.35	$38.01	$38.69	$39.39	$40.10	$40.83	$41.58	$42.34
Joint Use Rate per Ton	$25.85	$25.85	$26.19	$26.53	$26.88	$27.24	$27.62	$27.99	$28.38	$28.78
Internal Customer Tonnage	26,231	26,297	26,363	26,428	26,495	26,561	26,627	26,694	26,760	26,827
Decrease in Cost of Service	$268,003	$285,292	$294,279	$303,490	$312,931	$322,609	$332,528	$342,696	$353,117	$363,799

Note: The decrease in cost of service represents a reduction in expenses and may not result in additional funds being made available to each community.

Table 8-7
Campbell County Excess Revenue Contribution to Regional Landfill (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Including Tonnage from BFI										
Market Rate per Ton	$31.40	$32.19	$32.99	$33.81	$34.66	$35.53	$36.41	$37.32	$38.26	$39.21
Joint Use Rate per Ton	$20.44	$20.67	$20.93	$21.20	$21.48	$21.76	$22.05	$22.35	$22.66	$22.97
External Customer Tonnage	21,462	21,516	21,569	21,623	21,677	21,732	21,786	21,840	21,895	21,950
Excess Revenue (Regional)	$235,205	$247,828	$260,096	$272,721	$285,711	$299,078	$312,832	$326,984	$341,547	$356,530
Excluding Tonnage from BFI										
Market Rate per Ton	$31.40	$32.19	$32.99	$33.81	$34.66	$35.53	$36.41	$37.32	$38.26	$39.21
Joint Use Rate per Ton	$25.85	$25.85	$26.19	$26.53	$26.88	$27.24	$27.62	$27.99	$28.38	$28.78
External Customer Tonnage	16,367	16,408	16,449	16,490	16,531	16,572	16,614	16,655	16,697	16,739
Excess Revenue (Regional)	$90,908	$103,955	$111,915	$120,111	$128,551	$137,241	$146,188	$155,401	$164,887	$174,654

Table 8-8
Amherst County Decrease in Cost of Service Comparison (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Including Tonnage from BFI										
Status Quo Rate per Ton	$33.51	$34.11	$34.73	$35.35	$36.00	$36.65	$37.33	$38.02	$38.72	$39.44
Joint Use Rate per Ton	$18.32	$18.52	$18.74	$18.96	$19.19	$19.42	$19.66	$19.90	$20.15	$20.41
Internal Customer Tonnage	21,671	21,725	21,779	21,834	21,889	21,943	21,998	22,053	22,108	22,163
Decrease in Cost of Service	$329,244	$338,659	$348,169	$357,916	$367,907	$378,148	$388,644	$399,404	$410,432	$421,736
Excluding Tonnage from BFI										
Status Quo Rate per Ton	$40.60	$41.33	$42.08	$42.84	$43.62	$44.41	$45.23	$46.06	$46.92	$47.79
Joint Use Rate per Ton	$23.53	$23.51	$23.79	$24.08	$24.38	$24.69	$25.00	$25.32	$25.65	$25.98
Internal Customer Tonnage	21,671	21,725	21,779	21,834	21,889	21,943	21,998	22,053	22,108	22,163
Decrease in Cost of Service	$370,110	$387,250	$398,243	$409,510	$421,059	$432,897	$445,030	$457,467	$470,215	$483,282

Note: The decrease in cost of service represents a reduction in expenses and may not result in additional funds being made available to each community.

Table 8-9
Amherst County Excess Revenue Contribution to Regional Landfill (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Including Tonnage from BFI										
Market Rate per Ton	$31.40	$32.19	$32.99	$33.81	$34.66	$35.53	$36.41	$37.32	$38.26	$39.21
Joint Use Rate per Ton	$18.32	$18.52	$18.74	$18.96	$19.19	$19.42	$19.66	$19.90	$20.15	$20.41
External Customer Tonnage	8,479	8,500	8,522	8,543	8,564	8,586	8,607	8,629	8,650	8,672
Excess Revenue (Regional)	$110,922	$116,131	$121,434	$126,888	$132,499	$138,270	$144,207	$150,314	$156,595	$163,057
Excluding Tonnage from BFI										
Market Rate per Ton	$31.40	$32.19	$32.99	$33.81	$34.66	$35.53	$36.41	$37.32	$38.26	$39.21
Joint Use Rate per Ton	$23.53	$23.51	$23.79	$24.08	$24.38	$24.69	$25.00	$25.32	$25.65	$25.98
External Customer Tonnage	3,212	3,220	3,228	3,236	3,244	3,252	3,260	3,268	3,277	3,285
Excess Revenue (Regional)	$25,289	$27,941	$29,691	$31,493	$33,347	$35,256	$37,220	$39,241	$41,321	$43,462

Note: The excess revenue would be realized by the regional authority or board and efforts would need to occur to evaluate how this excess revenue could be shared in an equitable manner among the participating communities.

Table 8-10
Nelson County Cost Comparison including BFI Tonnage (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Status Quo										
Total Cost	$767,066	$786,243	$805,899	$826,047	$846,698	$867,865	$889,562	$911,801	$934,596	$957,961
Tonnage	13,534	13,568	13,602	13,636	13,670	13,704	13,738	13,772	13,807	13,841
Cost per Ton	$56.68	$57.95	$59.25	$60.58	$61.94	$63.33	$64.75	$66.21	$67.69	$69.21
Joint Use of Regional Facility										
Total Cost	$541,990	$550,654	$559,529	$568,621	$577,934	$587,475	$597,248	$607,261	$617,518	$628,027
Tonnage	13,534	13,568	13,602	13,636	13,670	13,704	13,738	13,772	13,807	13,841
Cost per Ton	$40.05	$40.59	$41.14	$41.70	$42.28	$42.87	$43.47	$44.09	$44.73	$45.37
Total Annual Savings	$225,076	$235,589	$246,370	$257,426	$268,764	$280,390	$292,313	$304,540	$317,077	$329,934

Table 8-11
Nelson County Cost Comparison excluding BFI Tonnage (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Status Quo										
Total Cost	$767,066	$786,243	$805,899	$826,047	$846,698	$867,865	$889,562	$911,801	$934,596	$957,961
Tonnage	12,122	12,152	12,182	12,213	12,243	12,274	12,305	12,335	12,366	12,397
Cost per Ton	$63.28	$64.70	$66.15	$67.64	$69.16	$70.71	$72.29	$73.92	$75.58	$77.27
Joint Use of Regional Facility										
Total Cost	$568,453	$574,165	$583,597	$593,261	$603,162	$613,305	$623,696	$634,343	$645,251	$656,426
Tonnage	12,122	12,152	12,182	12,213	12,243	12,274	12,305	12,335	12,366	12,397
Cost per Ton	$46.90	$47.25	$47.90	$48.58	$49.26	$49.97	$50.69	$51.42	$52.18	$52.95
Total Annual Savings	$198,614	$212,078	$222,302	$232,785	$243,536	$254,561	$265,865	$277,458	$289,345	$301,535

Table 8-12
City of Bedford Cost Comparison including BFI Tonnage (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Status Quo										
Total Cost	$353,399	$362,234	$371,290	$380,572	$390,086	$399,838	$409,834	$420,080	$430,582	$441,347
Tonnage	4,010	4,020	4,030	4,040	4,050	4,060	4,071	4,081	4,091	4,101
Cost per Ton	$88.13	$90.11	$92.13	$94.20	$96.31	$98.47	$100.68	$102.94	$105.25	$107.62
Joint Use of Regional Facility										
Total Cost	$309,510	$315,800	$322,246	$328,851	$335,620	$342,556	$349,665	$356,949	$364,413	$372,063
Tonnage	4,010	4,020	4,030	4,040	4,050	4,060	4,071	4,081	4,091	4,101
Cost per Ton	$77.18	$78.56	$79.96	$81.40	$82.86	$84.37	$85.90	$87.47	$89.08	$90.72
Total Annual Savings	$43,889	$46,434	$49,044	$51,721	$54,466	$57,282	$60,170	$63,131	$66,169	$69,283

Table 8-13
City of Bedford Cost Comparison excluding BFI Tonnage (2006-2015)

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Status Quo										
Total Cost	$353,399	$362,234	$371,290	$380,572	$390,086	$399,838	$409,834	$420,080	$430,582	$441,347
Tonnage	4,010	4,020	4,030	4,040	4,050	4,060	4,071	4,081	4,091	4,101
Cost per Ton	$88.13	$90.11	$92.13	$94.20	$96.31	$98.47	$100.68	$102.94	$105.25	$107.62
Joint Use of Regional Facility										
Total Cost	$329,868	$335,303	$342,057	$348,979	$356,072	$363,341	$370,790	$378,424	$386,247	$394,263
Tonnage	4,010	4,020	4,030	4,040	4,050	4,060	4,071	4,081	4,091	4,101
Cost per Ton	$82.26	$83.41	$84.88	$86.38	$87.91	$89.48	$91.09	$92.73	$94.42	$96.14
Total Annual Savings	$23,531	$26,931	$29,232	$31,593	$34,014	$36,497	$39,044	$41,656	$44,336	$47,083

8.3 Key Findings and Recommendations

This section provides recommendations for the region as a whole, as well as for each participating community.

8.3.1 Regional Key Findings and Recommendations

1. Since all of the participating communities would benefit from the joint use of existing facilities, R. W. Beck recommends that each community seriously consider this regional alternative.
2. The analysis included in this report should be considered preliminary. R. W. Beck would recommend that further analyses be conducted to refine the findings in greater detail. Section 7.4 describes the next steps that would need to be completed to complete the next phase.
3. Creation of a regional authority or board would represent a viable institutional system for the joint use of existing facilities. Section 7 provides further detail on this issue.
4. The benefits of regionalization would become even more apparent if BFI decides to develop and use a transfer station in Appomattox County. Without BFI's waste, each community that receives significant tonnage from BFI

Amherst County still has a need to replace the unit, the county should consider options such as rebuilding the existing unit, purchasing a used compactor or having the contractor provide the compactor.

8.3.3 City of Bedford Recommendations

1. As the City of Bedford develops its transfer station system, it should consider hauling and disposing of waste at a Region 2000 landfill. The landfills in Region 2000 are much closer than other commercial landfills, which should provide opportunities for significant hauling cost decreases. The city could accomplish this by the following means (in ranked order):
    a. Participate in development of a regional authority or board.
    b. Negotiate an interlocal agreement with a Region 2000 landfill or future regional authority or board.
    c. Invite communities with landfills in Region 2000 to participate in future RFPs.
2. When the city negotiates costs for hauling services from the transfer station, the city should obtain costs for multiple landfill destinations. The city should also coordinate with other local governments (e.g. Nelson County) that also have a need for hauling services to issue future RFPs together in an effort to obtain more competitive pricing.

8.3.4 Campbell County Recommendations

1. Campbell County should seriously consider participating in the development of a regional authority or board, including the transfer of its landfill to the authority or board.
2. Campbell County is in the process of developing a request for proposals (RFP) for the servicing of its citizens' convenience center roll-off units. Given the recommendation for Campbell County to participate in the joint use of regional facilities, R. W. Beck recommends that Campbell County consider the following:
    a. Renew the existing contract or bid the next contract on a short-term basis (e.g. one year).
    b. Develop the RFP to include an option for hauling to the Region 2000 landfill.
    c. For future bids, consider developing an RFP with other communities in Region 2000 that have similar needs.

8.3.5 Nelson County Recommendations

1. R. W. Beck would recommend that Nelson County undertake the following action:

a. Terminate its current hauling and disposal contract as soon as practical under the existing contract.

b. Negotiate another hauling and disposal contract to go to one of the landfills in Region 2000.

c. Participate in the development of Region 2000 regional authority or board, and send its waste to the Region 2000 landfills in the future.

8.3.6 City of Lynchburg Recommendations

1. The City of Lynchburg should seriously consider participating in the development of a regional authority or board, including the transfer of its landfill to the authority or board.

8.4 Additional Opportunities for Regionalization

During the course of this analysis, R. W. Beck identified several additional opportunities for the regionalization of solid waste management in Region 2000. As the participating communities consider regionalization in the future, R. W. Beck would recommend evaluating the feasibility of the following opportunities.

8.4.1 Recycling and Diversion

Regionalization has the potential to have a significant positive impact on recycling and waste diversion in the Region 2000 area by allowing more cost effective implementation and operation of recyclable material collection and processing infrastructure. R. W. Beck understands that existing recycling infrastructure within Region 2000 is limited, incurs costs that are difficult to justify to rate payers, and does not have a significant impact on total waste disposed. Individual jurisdictions do not typically generate enough recyclable material to justify investment in collection and processing equipment required to aggregate and process quantities of material sufficient to take advantage of today's high market values.

The aggregation of loose materials at widely dispersed drop-off centers throughout the region requires paying private sector waste haulers or material buyers the same hauling fees as for waste. Moreover, the hauler often charges for processing material; e.g. baling it, despite the fact that materials such as plastic and aluminum are currently worth $500 and $1,000 per ton, respectively. A regional solid waste authority or board offers the opportunity to consider the following:

Â Taking advantage of economies of scale in every activity related to recycling.

Â Standardizing containers at collection centers to allow more cost effective collection.

Â Purchasing or using existing publicly owned collection vehicles to service all recyclables drop-off centers.

Â Procuring private collection and processing services jointly.

- Establishing an intermediate processing facility (IPF) for baling all recyclable materials, aggregating truckload quantities, and thereby being able to sell all materials at their full market value.
- Promoting recycling and educating residents in a uniform manner across the Region.

Lastly, it is highly likely that transfer and disposal services procured under a regional authority would be priced on a per ton basis. Under these circumstances the incremental savings for each ton of waste that is diverted through recycling would be equal to the total transfer/disposal cost per ton diverted.

8.4.2 Transfer and Hauling Costs

Servicing of convenience centers and transportation of consolidated wastes from community transfer stations comprise a significant portion of existing and projected future solid waste management costs. With the exception of the City of Lynchburg, all of the Region 2000 project communities currently (or will soon) procure private sector hauling services to transport waste and recyclables from these facilities to their ultimate destination. Joint procurement of these services would be facilitated by regionalization and has the potential to significantly reduce the cost to individual communities. Operational efficiencies inherent to a larger customer service base and the sharing of administrative costs allow service contractors to provide these services at a lower cost per unit. Moreover, the higher value of the joint contract has the potential to increase the number of competitors and their willingness to reduce profit margins.

Contracts for servicing convenience centers and transfer stations are likely to be bid separately due the differences in the types of services and equipment involved. However, in the separate procurements for both of these services Region 2000 communities can maximize the probability of obtaining the lowest practicable bids by structuring them in such a way that bidders may bid on all or any combination of Region 2000 communities. Finally, regionalization and the use of a common service contractor facilitates the implementation, cost allocation and servicing of consolidated convenience centers that can be used by residents of more than one community.

Regionalization also provides the option for consideration of the economic feasibility of regional authority provision of convenience center and/or transfer station operation and servicing. In addition to the potential for reduced costs, direct regional authority operations provide more flexibility for changes in service to be considered and implemented in an expeditious and less contentious manner. Collection equipment used to service convenience centers could also be used to transport recyclables.

8.4.3 Citizens' Convenience Centers

In an effort to facilitate disposal opportunities for all residents, Amherst, Campbell, and Nelson Counties operate extensive convenience center networks that are geographically distributed throughout each county. Some sites on the northeast and southern ends of Amherst County are close to residents of Nelson and Campbell

County residents respectively. In addition, the convenience centers on the southwest side of Nelson County are more accessible to some Amherst County residents than their own. Thus, regionalization provides the opportunity for these three counties to actually increase resident access to convenience centers while at the same time reducing the total number and overall service costs. Inclusion of Bedford County in a regional system would afford the same opportunities for joint convenience center use with Campbell and Amherst Counties, the City of Bedford Transfer Station, and the City of Lynchburg landfill.

8.4.4 Potential Impacts of Regionalization on Solid Waste Planning

Under present circumstances each participating community devotes resources to solid waste management planning to meet its own needs. Moreover, each community is required under state law to develop and submit a formal plan to the state every ten years. Regionalization provides the opportunity to develop and implement solid waste plans that take advantage of economies of scale and result in more cost effective provision of all solid waste management and recycling services. Instead of developing individual plans, the regional authority could develop one regional solid waste management plan.

8.4.5 Household Hazardous Waste (HHW) Collection

Convenient options for environmentally responsible disposal of household hazardous waste are needed to reduce the motivation for residents to improperly discard them with their normal refuse. Opportunities for residents of Region 2000 communities to dispose of household hazardous wastes are currently limited to the provision of a few collection days in each community. Regionalization provides the opportunity to increase HHW disposal opportunities through joint use of existing City of Lynchburg facilities. The frequency of collection days could be significantly increased with costs paid for through generator fees (see earlier discussion) or allocation of costs based on individual community usage.

8.4.6 Potential Impacts of Regionalization on Wood Waste Processing

All of the Region 2000 project communities recover one or more types of vegetative matter to reduce the consumption of landfill capacity. Most of these communities rely on outside contractors to provide this service, while the City of Bedford owns and operates a grinder for processing of wood wastes into mulch. Regionalization would provide the opportunity evaluate whether options exist to provide for more efficient

provision of this service. These options could range from joint procurement to using the City of Bedford's equipment.[2]

8.5 Waste Generation Assessments as a Cost Recovery Tool

Region 2000 communities will continue to face the task of funding solid waste infrastructure either alone or on a regional basis. Tipping fees have been the traditional cost recovery mechanism of choice to provide the revenue to cover operating costs and outstanding debt when communities had the ability to control the flow of wastes. However, since the Supreme Court finding that flow control was unconstitutional, Region 2000 and communities nationwide have found that waste typically follows the path of least resistance, i.e. lowest cost. Whenever external forces motivate the flow of waste to non-governmental infrastructure, communities are left with debt payment requirements and uncertain revenue streams with which to cover debt and other fixed operating costs. Due to competitive forces from within the private waste management sector, there is reasonable probability that Region 2000 communities will face such cost recovery challenges in the not too distant future.

Several alternatives to the use of tipping fees have been used successfully by communities to achieve the objective of ensuring adequate funds for maintaining solid waste management infrastructure. One alternative that has been used widely across the country, including in Prince William County, VA, is the assessment of a waste generation fee. Typically an assessment is made on residential and commercial properties that attempts to equitably allocate service costs based on such parameters as property square footage and the nature of the establishment. Assessment of a fee at the source of waste generation ensures maintenance of a steady and predictable source of revenue that can be used to cover disposal only or all publicly provided solid waste management services. Assessment of an equitable fee by Region 2000 communities to cover transfer and disposal costs would have the effect of driving waste to existing infrastructure since disposal would "already have been paid for." Under this scenario private waste management firms would continue to charge residential and commercial customers for collection, but would sinUndPstructure.335 -1.145 Tdo distant future. d