CDM

Cape Cod Commission

Evaluation of Future Disposal Alternatives for Municipal Solid Waste

April 2010

Final Report

Contents

Executive Summary

Section 1 - Introduction

1.1 Introduction....1-1
1.2 Scope of Work....1-1
1.3 MSW Disposal in Massachusetts....1-2
1.3.1 MSW Disposal in Southeastern Massachusetts....1-3

Section 2 - Background Information

2.1 Introduction....2-1
2.2 Solid Waste Practices in Study Communities....2-1
2.2.1 Existing MSW Tonnages....2-1
2.2.2 Current MSW Hauling Practices in Cape Communities....2-4
2.2.3 Current MSW Hauling Practices for Off-Cape Communities....2-8
2.2.4 Summary of Hauling Methods....2-9
2.2.5 Summary of Other Information Collected from Study Communities....2-9
2.2.5.1 Changes in Local Methods to Handle Solid Waste....2-10
2.2.5.2 Concerns with Current Waste Acquisition Agreements....2-10
2.2.5.3 Other Alternatives to be Evaluated....2-11
2.3 Alternative MSW Disposal Facilities....2-11
2.3.1 Bourne Landfill....2-13
2.3.2 Crapo Hill Landfill....2-15
2.3.3 Rochester Environmental Park Transfer Station....2-16
2.3.4 SEMASS Waste-to-Energy Facility....2-17
2.3.5 Long-Distance Rail and Truck Haul....2-17

Section 3 - Evaluation of SEMASS MOU

3.1 Introduction....3-1
3.2 Proposed MOU for Cape Cod Communities....3-1
3.3 Proposed MOU for Off-Cape Communities....3-3
3.4 Comments on the MOU....3-3
3.4.1 Current Availability of MOU....3-3
3.4.2 Disposal Tipping Fees....3-3
3.4.3 Insuring Market Rates for Future Disposal Costs....3-4
3.4.4 Liquidated Damages....3-5
3.4.5 Mechanism for Extension Agreement....3-5
3.5 Proposed and Projected MSW Disposal Tipping Fees....3-5
3.5.1 Market Rates at Other Area Waste-to-Energy Facilities....3-7
3.5.1.1 Covanta Haverhill....3-7

3.5.1.2 Wheelabrator North Andover 3-8
3.5.1.3 Wheelabrator Saugus 3-9
3.5.1.4 Wheelabrator Millbury 3-10
3.5.1.5 Recent Municipal Contracts Executed With SEMASS 3-10
3.5.2 Projected Market Rate in 2015 3-12
3.6 Long-Term Viability of SEMASS Facility 3-12
3.6.1 Future Change-in-Law Requirements 3-14
3.6.2 SEMASS Permits and Regulatory Compliance 3-14
3.7 Key Contract Considerations 3-15
3.8 Evaluation of Financial Considerations of MOU 3-18
3.8.1 Communities with Current Tip Fee of $37 per Ton 3-21
3.8.1.1 SEMASS MOU - $37 per ton Communities 3-22
3.8.1.2 Estimated Future Disposal Costs at Market Rate of $80 per Ton 3-23
3.8.1.3 Estimated Future Disposal Costs at 2015 Market Rate of $90 and $100 per Ton 3-25
3.8.2 Communities with Current Tip Fees of $20 per Ton 3-27

Section 4 - Evaluation of Alternative Disposal Sites

4.1 Introduction 4-1
4.2 Comparative Cost Analysis 4-1
4.2.1 Comparative Costs – Handling and Hauling MSW 4-3
4.2.1.1 Comparative 2015 Haul Costs – Cape Communities 4-4
4.2.1.2 Comparative 2015 Haul Costs – Off-Cape Communities 4-6
4.3 Comparative Analysis of Non-Cost Considerations 4-7
4.3.1 Comparative Greenhouse Gas Emissions Analysis 4-7
4.3.1.1 Overall Approach 4-7
4.3.1.2 Alternatives Evaluated 4-11
4.3.1.3 Comparative Analysis of Transportation 4-13
4.3.1.4 Comparative Analysis of Disposal Methods 4-13
4.3.1.5 Conclusions 4-14
4.3.2 Comparative Truck Trips 4-15
4.3.3 Metals Recycling 4-15
4.3.4 Electricity Generation 4-16

Appendices

Appendix A - Background Information
Appendix B - Information on Disposal Facilities
Appendix C - Representative Recent Municipal Waste-to-Energy Contracts
Appendix D - Detailed Cost Tables for Evaluation of MOU
Appendix E - Detailed Haul Cost Estimates to Alternative Disposal Facilities
Appendix F - Back-up for Greenhouse Gas Emission Calculation
Appendix G - Comments on Draft Report and Response Summary

Figures

Figure 2-1 - Summary of Current Hauling Methods to SEMASS Facility.....2-6

Figure 2-2 - Tonnages Currently Hauled by Different Methods to SEMASS Facility 2-9

Figure 3-1 - Disposal Tipping Fees for Study Communities Currently Paying Approximately $37 Per Ton under Proposed SEMASS MOU 3-22

Figure 3-2 - Disposal Tipping Fees for Study Communities Currently Paying Approximately $37 Per Ton Proposed SEMASS MOU and No MOU at $80 Per Ton 2015 Market Rate 3-24

Figure 3-3 - Disposal Tipping Fees for Study Communities Currently Paying Approximately $37 Per Ton Proposed SEMASS MOU and No MOU at $90 Per Ton 2015 Market Rate 3-25

Figure 4-1 - Summary of Current Hauling Methods to SEMASS Facility.....4-2

Figure 4-2 - Comparative Average Costs for Alternative Disposal Facilities with Current Hauling Methods 4-5

Figure 4-3 - Comparative Average Costs for Alternative Disposal Facilities with Current Hauling Methods - Off-Cape Communities.....4-6

Figure 4-4 - Total Round Weekly Truck Trips at Roads Near Cape Cod Canal and Crossing the Sagamore and Bourne Bridges for Alternative Disposal Facilities.....4-15

Tables

Table 1-1 - Study Communities 1-1

Table 1-2 - Summary of Regional Existing MSW Disposal Facilities in Southeastern Massachusetts 1-4

Table 2-1 - Summary of Existing Solid Waste Tonnage and Collection Methods – Cape Code 2-2

Table 2-2 - Estimated Average Daily Tonnages Handled by Groups of study Communities Based on Five Day Work Week 2-5

Table 2-3 - Summary of Cape Communities Currently Served by Regional Transfer Stations 2-7

Table 2-4 - Per Ton Rail Rates to Haul MSW from Regional Transfer Stations to SEMASS 2-7

Table 3-1 - Summary of Proposed Tipping Fees for the Last Five Years of the Existing Waste Acquisition Agreements and Projected Tipping Fees During the 15-Year Extension Period 3-6

Table 3-2 - Summary of Tipping Fees Offered to Former NESWC Communities at Covanta's Haverhill Waste-to-Energy Facility 3-8

Table 3-3 - Summary of Tipping Fees Offered to Former NESWC Communities at Wheelabrator's North Andover Waste-to-Energy Facility 3-9

Table 3-4 - Summary of Tip Fees Offered to the City of Revere at Wheelabrator's Saugus Waste-to-Energy Facility 3-10

Table 3-5 - Summary of Recent Municipal Contracts Executed by SEMASS 3-11

Table 3-6 - Summary of Future Tipping Fees for Study Communities under Existing WAA and Proposed MOU 3-19

Table 3-7 - Disposal Tipping Fees for Representative Years Under SEMASS MOU Study Communities Currently Paying Approximately $37 Per Ton 3-22

Table 3-8 - Disposal Tipping Fees for Representative Years Study Communities – Do Not Sign MOU and 2015 Market at $80 Per Ton 3-23

Table 3-9 - Disposal Tipping Fees for Representative Years Study Communities – Do Not Sign MOU and 2015 Market at $90 and $100 Per Ton 3-25

Table 3-10 - Disposal Tipping Fees for Representative Years Towns of Plymouth and Wellfleet 3-26

Table 4-1 - Estimated Comparative per Ton Haul Costs (2015) for Cape Communities to Alternative Disposal Facilities 4-4

Table 4-2 - Estimated Comparative per Ton Haul Costs (2015) for Off-Cape Communities to Alternative Disposal Facilities 4-6

Table 4-3 - GHG Emissions by Disposal Option (metric tons of CO2e per ton of MSW disposed) 4-12

Table 4-4 - Summary of Relative Electricity Generation Rates per Ton of MSW 4-16

Executive Summary
Evaluation of Future Disposal Alternatives for Municipal Solid Waste – Cape Cod Commission

Camp Dresser & McKee Inc. (CDM) was retained by the Cape Cod Commission to evaluate long-term alternatives for the disposal of Municipal Solid Waste (MSW) from 14 Cape Cod and four off-Cape communities (collectively known as the "Study Communities"). All of the Study Communities have existing long-term Waste Acquisition Agreements with the SEMASS waste-to-energy facility located in Rochester, Massachusetts for the receipt of the MSW collected by the municipality. These Agreements have provided the Study Communities with reliable disposal of MSW at rates that are currently significantly below the current market for solid waste disposal in Massachusetts.

During 2009, the operators of the SEMASS facility approached the Study Communities with a proposed Memorandum of Understanding (MOU) that had been negotiated with a group of similar municipalities with long-term disposal agreements. In general, the MOU proposed to incrementally increase the per ton disposal tipping fees over the remaining five years of the current agreements (e.g. from 2010 to 2015) and then continue to accept waste for an additional 15-years (e.g. until 2030) at a below-market tip fee. An evaluation of this MOU by the Study Communities was completed by CDM as part of this study.

Based on the review of anticipated future solid waste disposal market conditions and the proposed SEMASS MOU, CDM does not recommend that most of the Study Communities sign the MOU and negotiate an extension to the existing Waste Acquisition Agreements. Most of the Study Communities have current disposal costs based on a $37 per ton tipping fee and the Present Value analysis of the proposed upfront cost increases over the next five years does not offset the future return (after 2015) for the estimated market rate disposal fee between $80 and $90 per ton. Two of the Study Communities, Plymouth and Wellfleet, have current disposal tipping fees that are significantly less and, after the proposed increase, will still be significantly below the anticipated 2015 market. However, these communities should review the proposed extension agreement to insure that the contractual conditions including the change-in-law provisions are adequately protective.

As part of this study, CDM also evaluated other potential disposal facilities where the Study Communities could potentially dispose of their MSW once the SEMASS agreements end. This evaluation concluded that three alternatives – the Bourne Landfill, the Rochester Environmental Park (REP) Transfer Station and long-distance rail haul – are potentially viable for some or all of the Study Communities.

Because the current SEMASS agreements expire several years in the future, CDM was not able to obtain firm pricing for the disposal of MSW in 2015 from any of the alternative facilities. However, a review of the relative costs for hauling to each facility as well as the non-cost impacts including greenhouse gas emissions, potential for energy generation, recycling of metals, and truck traffic around the Cape Cod Canal bridges is presented in the report.

During the investigations conducted for this study, CDM identified two potential alternatives for the Study Communities through regional approaches. The first is the potential to utilize the Bourne site as a regional publicly operated facility with both the existing landfill and another waste reduction or disposal facility to handle some or all of the waste generated by the Study Communities. This would be modeled on the public district comprised of New Bedford and Dartmouth that operates the Crapo Hill Landfill. This District has provided its member communities with reliable and highly cost-effective MSW disposal for over 15 years.

The second regional opportunity is the development of a Request for Proposals (RFP) as a group for the long-term disposal of the MSW. The responses to the RFP and the subsequent negotiations of contract terms and cost can be significantly less than each community completing similar work individually.

Finally, Massachusetts' approach to solid waste management is constantly changing. Statewide Solid Waste Master Plans establish goals for reduction, reuse and recycling of portions of the waste stream while establishing moratoriums on new combustion based facilities, including waste-to-energy. Large regional commercial landfills such as the existing Taunton and Fall River sites will likely shut-down before 2015 while transportation to out-of-state disposal sites is expected to significantly increase over the same timeframe. CDM understands that the Commission is proposing to conduct a study of waste recycling on Cape Cod. This portion of the evaluation of MSW alternatives is vital to both control costs and provide flexibility to the Study Communities into the future.

Section 1
Introduction

1.1 Introduction

In the late 1980's, communities in southeastern Massachusetts were faced with the closure of their unlined municipal landfills under Massachusetts Department of Environmental Protection (MassDEP) regulations. Many of these communities entered into long-term agreements with the SEMASS waste-to-energy facility (SEMASS facility or "SEMASS") in Rochester, Massachusetts for disposal of their municipal solid waste (MSW). The communities constructed an infrastructure including local and regional solid waste transfer stations to transport their MSW to the SEMASS facility. The infrastructure and SEMASS agreements have provided reliable, cost-effective and environmentally sound disposal of the communities' MSW for over 20 years.

Most of the communities' initial contracts (known as "Waste Acquisition Agreements" or "WAAs") with SEMASS are due to expire in 2015. To address an anticipated significant increase in MSW disposal tipping fees at that time, a group of communities entered into discussions with the operators of the SEMASS facility to negotiate an extension to the existing Waste Acquisition Agreements. From this process, the SEMASS operators provided a Memorandum of Understanding (MOU) to the group of municipalities that had signed the initial agreements when the facility was being constructed (referred to as the "Tier I Communities"). This MOU proposed to revise the existing disposal agreements and extend them until 2030. The revisions included a schedule for increasing the MSW disposal tipping fee payments over the remaining life of the existing Waste Acquisition Agreements to a set per ton cost starting in 2015 for most of the communities. A generic copy of the proposed MOU is provided in Appendix A.

Table 1-1
Study Communities

Cape Cod Communities	*Off-Cape Communities*
Barnstable	Hanson
Brewster	Kingston
Chatham	Norwell
Dennis	Plymouth
Eastham	
Falmouth	
Harwich	
Mashpee	
Orleans	
Provincetown	
Sandwich	
Truro	
Wellfleet	
Yarmouth	

Working through the Cape Cod Commission (Commission), Camp Dresser & McKee Inc. (CDM) was retained to evaluate the SEMASS MOU as well as other alternatives available to the communities for disposal of their MSW once the existing Waste Acquisition Agreements with the operator of the SEMASS facility expire. This report summarizes the results of this study.

1.2 Scope of Work

The study evaluated the future alternatives for disposal of MSW for a total of 18 municipalities - fourteen on Cape Cod (all but Bourne) and four off-Cape. The communities that are part of this study are listed on Table 1-1 and will be referred to as the "Study Communities."

The purpose of this study is to evaluate disposal alternatives for the MSW controlled by the Study Communities once the existing agreements with SEMASS expire. To evaluate future alternatives for disposal of MSW, the Commission requested that the following areas be evaluated as part of CDM's scope of work:

- Collect existing information on solid waste tonnages and methods for collection of the portion of the total MSW stream that is currently controlled by the municipalities;
- Review the proposed SEMASS MOU to evaluate whether the proposed upfront payments and 2015 disposal tipping fees are likely to be below market rates for the term of the proposed extension; and
- Evaluate MSW disposal alternatives for the 18 Study Communities including the SEMASS facility, Bourne Landfill, long-distance rail haul and Rochester Environmental Park transfer station. Evaluation will include costs (hauling and disposal) and non-cost items such as greenhouse gas emissions, truck traffic around the canal bridges, and potential for electricity generation from waste disposal.

This report focuses on the MSW tonnages that are controlled by the Study Communities based on information supplied to the Commission. It is likely that any long-term contract for waste disposal that the Study Communities enter into will include guaranteed minimum tonnages that the disposal facility will require be delivered for disposal. CDM recommends that individual communities review their tonnages to determine what portion may be either generated or collected by commercial entities and could be diverted from municipally operated facilities, if less expensive options are available.

This report only focuses on the portion of the MSW stream that is currently sent for disposal at the SEMASS facility – not the portion that is recycled, composted or the difficult-to-manage wastes that are not acceptable for processing at SEMASS. The Commission is pursuing funds for a subsequent study to evaluate current and future methods to improve municipal recycling rates.

1.3 MSW Disposal in Massachusetts

Since 1990, the MassDEP has implemented an ongoing master planning process that establishes policies and goals related to the disposal and recycling of all solid waste generated in the Commonwealth. The process includes the periodic publishing of Solid Waste Master Plans (SWMP) that update the Commonwealth's goals for recycling and waste disposal. The most recent update was released in 2006 and it is anticipated that a new Master Plan will be released by MassDEP in 2010.

From MassDEP documents, the following is a summary of the status of solid waste management in Massachusetts[1]:

- The solid waste policies must be based on "environmental performance of the waste management system, as measured by progress toward reducing water pollution, local and regional air pollution and greenhouse gas emissions from the waste stream."

- In 2006, Massachusetts disposed of approximately 6.6 million tons of solid waste in landfills and incinerators and recycled approximately 47% of the waste stream, according to MassDEP estimates.

- Approximately 1.4 million tons of Massachusetts' solid waste is disposed of at out-of-state facilities each year. With reduced capacity available at in-state landfills, more Massachusetts waste will be exported in the future. By 2014, exports are expected to rise to between 2.5 and 4.1 million tons annually. While some of this waste is disposed of in facilities such as the Turnkey landfill in Rochester, New Hampshire located in other New England states, an increasing amount is transported out-of-state to distant facilities by rail and truck.

- Massachusetts established a moratorium on the permitting of new waste-to-energy plants in Massachusetts 1990. In December 2009, the Commonwealth announced that it will extend this moratorium on incineration of mixed MSW.

- There was a similar moratorium on the disposal of MSW in landfills established in prior Master Plans. This moratorium was lifted several years ago and allowed facilities such as the Bourne Landfill to transition from the disposal of construction and demolition and difficult-to-manage waste streams to MSW disposal.

The Master Plan update anticipated for 2010 is expected to continue the Commonwealth's goal to reduce, reuse, recycle, and recover wastes while minimizing the amount that is landfilled.

1.3.1 MSW Disposal in Southeastern Massachusetts

Historically, there have been several regional solid waste disposal facilities in southeastern Massachusetts that have competed for municipal and commercial solid waste. The existing disposal facilities and their daily permitted tonnage limits are summarized in Table 1-2. In addition to these local disposal facilities, there are a number of commercial regional transfer stations that can accept waste from the Study Communities for transportation to disposal facilities located further away including out-of-state.

[1] "Draft SWMP Framework and Stakeholder Discussion Questions," MassDEP (November 2008). Copy included in Appendix A.

Table 1-2
Summary of Regional Existing MSW Disposal Facilities in Southeastern Massachusetts

Facility and Location	*Permitted Daily Tonnage*[1]	*Annual Tons Accepted (2008)*[1]	*Reported Year Capacity Remaining Until*[1]
BFI Fall River Landfill Fall River, Massachusetts	1,950	376,420	2009
Bourne Landfill[2] Bourne, Massachusetts	700	94,116	2024
Crapo Hill Landfill[2] Dartmouth, Massachusetts	425	94,721	2020
Middleborough Landfill Middleborough, Massachusetts	173	35,690	2029
SEMASS Waste-to-Energy Facility Rochester, Massachusetts	2,700	1,216,945	Not Applicable[3]
Taunton Landfill Taunton, Massachusetts	685	119,431	2014

Notes

1. Daily and annual tonnages and remaining life for landfills taken from 2008 Annual Reports for the facilities as presented by MassDEP.
2. Conversations with landfill operators at both the Bourne and Crapo Hill Landfills indicate potential additional life beyond that presented.
3. Waste-to-energy plants do not have a finite capacity remaining and can continue to operate if properly maintained.

For the reasons discussed in Section 2, CDM does not believe that new disposal facilities will be able to obtain the necessary permits by the 2015 date when most of the Study Communities' contracts expire or will fall under the recently extended incinerator moratorium. However, as shown on Table 1-2, there is a significant amount of existing landfill disposal capacity in Taunton and Fall River that is likely to cease operating before the Study Communities require renewed disposal contracts. The closure of these facilities will leave only two significant regional facilities in southeastern Massachusetts with the capacity to dispose of most of the waste from the Study Communities – the Bourne Landfill and SEMASS.

Section 2
Background Information

2.1 Introduction

The information used to develop this study was collected from representatives of the Study Communities either by the Commission, in public meetings or during meetings at various disposal facilities. This report section summarizes the background information collected that forms the basis of the evaluation conducted for the remainder of the project. This information includes current solid waste quantities and practices in each of the Study Communities and descriptions of the regional disposal facilities and transfer stations.

2.2 Solid Waste Practices in Study Communities

The Study Communities all currently deliver their MSW to the SEMASS facility in Rochester, Massachusetts for disposal under a series of Waste Acquisition Agreements signed in the 1980's. All of the communities have developed their solid waste collection infrastructure including local and regional transfer stations to support the delivery of MSW to the SEMASS facility.

To develop information on each of the Study Communities, the Commission contacted a representative of each community to determine the:

- tonnage of MSW that the town would guarantee for disposal under a new waste disposal agreement in the future,
- methods for collection of the MSW,
- current approach to delivering the waste from the town to SEMASS; and
- concerns or issues with the existing agreements with SEMASS.

This information formed the baseline for the evaluation conducted by CDM of both the SEMASS MOU and the potential for alternative facilities for solid waste disposal.

2.2.1 Existing MSW Tonnages

Based on the information provided to the Commission or from other sources, CDM assembled the anticipated tonnages that each of the Study Communities proposed to guarantee to a disposal facility in a long-term agreement. This information, along with the total tonnage reported by the towns as being handled at their transfer stations, the current disposal tipping fee at SEMASS and the method for hauling to the SEMASS facility is summarized on Table 2-1. The methods employed to haul from the towns to the SEMASS facility are discussed further below.

Table 2-1
Summary of Existing Solid Waste Tonnage and Collection Methods
Cape Communities

Town	*Current Tipping Fee at SEMASS*	*Proposed Annual MSW Guaranteed Tonnage*	*Annual Tonnage Handled at Local Transfer Station (2008)[5]*	*Hauling Method to SEMASS*
Barnstable	$37.51	49,000	17,752	Yarmouth-Barnstable Regional Transfer Station (Rail)
Brewster	$37.51	6,600	8,236	Direct Haul from Local Transfer Station (Truck)
Chatham	$37.51	6,000	9,407	Direct Haul from Local Transfer Station (Truck)
Dennis	$37.51	12,322	14,095	Direct Haul from Local Transfer Station (Truck)
Eastham	$37.51	4,000	5,204	Direct Haul from Local Transfer Station (Truck)
Falmouth	$36.76	18,500	12,228	Upper Cape Regional Transfer Station (Rail)
Harwich	$37.51	7,500	17,645	Direct Haul from Local Transfer Station (Truck)
Mashpee	$36.76	7,500	6,166	Upper Cape Regional Transfer Station (Rail)
Orleans	$37.51	5,497	5,847	Direct Haul from Local Transfer Station (Truck)
Provincetown	$37.91	4,000	4,418	Direct Haul from Local Transfer Station (Truck)
Sandwich	$37.26	10,519	12,815	Upper Cape Regional Transfer Station (Rail)
Truro	$37.51	2,200	2,714	Direct Haul from Local Transfer Station (Truck)
Wellfleet	$18.15	2,600	3,913	Direct Haul from Local Transfer Station (Truck)
Yarmouth	$37.51	27,500	25,723	Yarmouth-Barnstable Regional Transfer Station (Rail)
Totals		**163,738**	**146,163**	

Notes:

1. Current Tipping Fee provided by SEMASS.
2. Tonnage Handled at Local Transfer Station from MassDEP 2008 database as reported by the Towns
3. Proposed Annual Tonnages provided by Study Communities or used current guaranteed annual tonnage to SEMASS.
4. All Cape Towns operate local transfer stations to collect MSW from residences. Falmouth also collects MSW at curbside.
5. Tonnages reported to MassDEP at transfer stations may include other solid waste such as construction and demolition waste.

Table 2-1 (Cont'd)
Summary of Existing Solid Waste Tonnage and Collection Methods
Off-Cape Communities

Town	*Current Tipping Fee at SEMASS*	*Proposed Annual MSW Guaranteed Tonnage*	*Tonnage Handled at Local Transfer Station (2008)*[5]	*Collection Method from Residents*	*Hauling Method to SEMASS*
Hanson	$34.52	2,600	3,297	Local Transfer Station	Direct Haul from Local Transfer Station
Kingston	$34.52	5,000	6,255	Local Transfer Station	Direct Haul from Local Transfer Station
Norwell	$34.52	4,000	Not Applicable	Curbside Collection	Direct Haul in Curbside Collection Vehicles
Plymouth	$22.53	14,000	1,690	Cedarville Transfer Station	Direct Haul from Local Transfer Stations
			8,908	Manomet Transfer Station	
			8,416	South Street Transfer Station	
Totals		**25,600**	**28,566**		

Notes:

1. Current Tipping Fee provided by SEMASS.
2. Tonnage Handled at Local Transfer Station from MassDEP 2008 database as reported by the Towns
3. Proposed Annual Tonnages provided by Study Communities or used current guaranteed annual tonnage to SEMASS.
4. All Cape Towns operate local transfer stations to collect MSW from residences. Falmouth also collects MSW at curbside.
5. Tonnages reported to MassDEP at transfer stations may include other solid waste such as construction and demolition waste.

For the 14 Cape communities, the total proposed guaranteed MSW tonnage is 163,738 tons per year. Of this total tonnage, over 58% comes from three towns – Barnstable, Falmouth and Yarmouth. As a basis for comparison to the daily permitted limits often established by MassDEP for disposal facilities, CDM prepared Table 2-2 that indicates the annual tonnages for groups of communities and the daily tonnage based on a five-day work week. For the Cape communities, the daily tonnage will fluctuate seasonally.

For this study, CDM focused on the annual tonnage that the individual communities proposed to guarantee to the disposal facility through the information collected by the Commission. Other tonnages currently handled at the transfer stations include commercial haulers or private entities that collect from residents under a subscription service and may not continue to deliver to the municipal facilities in the future. Individual communities should review the tonnages that they reasonably control and can guarantee delivery of prior to entering into any future agreements for disposal.

2.2.2 Current MSW Hauling Practices in Cape Communities

All fourteen of the Cape communities participating in this study provide their residents with a local transfer station to drop-off their recyclables and MSW for disposal. In all of these communities, residents can subscribe their MSW collection to local haulers that collect the waste and deliver it either to the local transfer station or one of the regional transfer stations or directly to SEMASS. Of the Cape communities, only Falmouth provides town-wide curbside collection of MSW for its residents.

The current methods to transport MSW from the 14 Cape communities to SEMASS fall into the following three groups:

- Communities that haul directly from their municipally operated transfer stations to SEMASS;
- Falmouth, Mashpee and Sandwich haul their MSW from local transfer stations (or from Falmouth curbside collection vehicles) to the Upper Cape Regional Transfer Station located on the Otis Air Force Base Property where the waste is hauled by rail to SEMASS; and
- Barnstable and Yarmouth collect MSW at local drop-off centers and haul it to a regional transfer station located in Yarmouth for delivery by rail to SEMASS.

Commercial subscription haulers may also utilize the local and regional transfer stations. The existing procedures used to haul waste from the communities to the SEMASS facility are shown graphically on Figure 2-1.

Table 2-2
Estimated Average Daily Tonnages Handled by Groups of Study Communities Based on Five Day Work Week

Communities	*Regional Grouping*	*Total Annual Tonnage[1]*	*Estimated Daily Tonnage [4]*
Barnstable and Yarmouth	Regional Transfer Station in Yarmouth	76,500	294
Falmouth, Mashpee and Sandwich	Regional Transfer Station at Otis AFB	36,519	140
Other Cape Communities [2]	None - Deliver waste directly from local transfer stations	50,719	195
Totals - All Cape Communities		**163,738**	**629**
Off-Cape Communities [3]	No regional group	28,566	110
Totals – All Study Communities		**192,304**	**739**

Notes

1. Total annual tonnages are from information collected from individual communities.
2. Other Cape communities are Brewster, Chatham, Dennis, Eastham, Harwich, Orleans, Provincetown, Truro and Wellfleet.
3. Off-Cape Communities are Hanson, Kingston, Norwell and Plymouth.
4. Estimated Daily Tonnage based on five days per week, 52 weeks per year operations. Will fluctuate seasonally for Cape Communities.

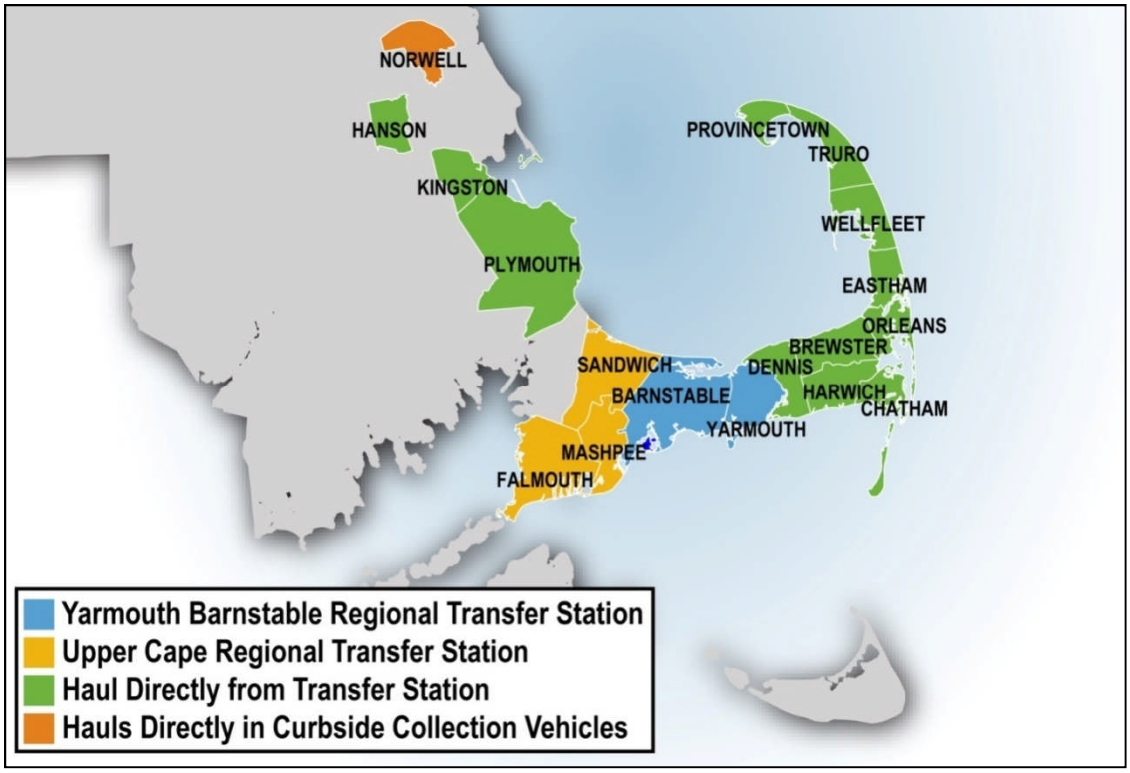


Figure 2-1
Summary of Current Hauling Methods to SEMASS Facility

The Upper Cape Regional Transfer Station as well as the Yarmouth-Barnstable regional transfer station are constructed and operated as inter-municipal districts comprised of their participating communities. The Town of Bourne is also a member of the Upper Cape facility but does not currently send MSW to the facility. The regional transfer stations each have an agreement with Mass Coastal Railroad to provide the rail cars and hauling from their facilities to the SEMASS facility. The SEMASS facility has a specialized dumping area to accept the rail cars and unload them onto their tipping floor. Each of the regional transfer stations can be modified to load transfer trailers should the rail not be available or if hauling by truck is determined to be preferable. A summary of the tonnages handled at each of the regional Cape transfer stations is shown on Table 2-3.

Table 2-3
Summary of Cape Communities Currently Served by Regional Transfer Stations

Facility	*Member Towns*	*Proposed Annual Tonnage[2]*	*Tonnage Handled at Local Transfer Station[3]*	*Tonnage Handled at Regional Transfer Station[3]*
Yarmouth-Barnstable Regional Transfer Station	Barnstable	49,000	17,752	82,662
	Yarmouth	27,500	25,723	
Totals		**76,500**	**43,475**	**82,662**

Facility	*Member Towns[1]*	*Proposed Annual Tonnage[2]*	*Tonnage Handled at Local Transfer Station[3]*	*Tonnage Handled at Regional Transfer Station[3]*
Upper Cape Regional Transfer Station	Falmouth	18,500	12,228	35,216
	Mashpee	7,500	6,166	
	Sandwich	10,519	12,815	
Totals		**36,519**	**31,209**	**35,216**

Notes

1. Bourne is also a member town of the Upper Cape Regional Transfer Station but does not deliver tonnage to the facility.
2. Annual tonnages are from information collected from individual communities.
3. Tonnages handled at transfer stations are from MassDEP annual reports for 2008.

Based on conversations with Mass Coastal Railroad, during the slower winter and late- fall and early-spring months, trains are run typically three days per week from each regional transfer station. During the busier summer months trains are typically run five days per week from the Yarmouth-Barnstable and four to five days per week from the Upper Cape facility. Each of the regional transfer stations has a sliding per ton rate based on the total number of tons committed and delivered. The range of hauling rates per ton for the representative years of 2010 and 2015 for each of the regional transfer stations as provided by Mass Coastal Railroad are provided on Table 2-4. The term sheets for each of these facilities are provided in Appendix A.

Table 2-4
Per Ton Rail Rates to Haul MSW from Regional Transfer Stations to SEMASS

	Year and Range of Per Ton Rail Rates			
Regional Transfer Station	*2010*		*2015*	
Yarmouth-Barnstable	$10.36	$12.25	$11.72	$13.86
Upper Cape Regional	$9.19	$9.55	$11.07	$11.19

The Towns of Yarmouth and Barnstable entered into an amended agreement with the SEMASS facility related to the operation of their regional transfer station. The significant terms of this agreement, a copy of which is included in Appendix A, include:

- SEMASS pays all costs for transportation of waste from the regional transfer station to SEMASS whether by railroad or by truck, if the railroad is not available;
- SEMASS reimburses the Town of Yarmouth for the remaining debt service for construction of the transfer station (the debt service for the transfer station has reportedly been paid off and this condition no longer applies);
- The towns are paid $7.00 per ton for the first 59,000 tons of MSW that is received at the transfer station that is other than "Yarmouth-Barnstable MSW," which is defined as the MSW collected from each town's local residential drop-off transfer station; and
- The towns are paid $5.00 per ton for all tons in excess of the 59,000 tons (other than the "Yarmouth-Barnstable MSW");

MSW that is collected by the private contractors in the towns can be delivered to the regional transfer station for disposal at the SEMASS facility but the private contractors are invoiced separately by SEMASS and do not fall under the guaranteed annual tonnages and the corresponding disposal tip fee. The agreement has several other provisions related to changes-in-law; term; termination when the existing Waste Acquisition Agreements between the towns and SEMASS expire; and general legal conditions.

As shown on Table 1-3, a total of 82,662 tons of MSW was transferred through the Yarmouth-Barnstable regional facility in 2008 but only 43,475 tons of MSW was received through the two regional drop-off center transfer stations operated by each of the towns. The two towns provided the Commission with a combined guaranteed annual tonnage of 76,500 tons per year or 33,025 tons per year more than the tonnage handled at their local transfer stations in 2008.

Based on conversations with the Yarmouth-Barnstable regional transfer station, another community that proposed to utilize the facility would be required to pay the per ton rail haul rates to the railroad as well as a handling fee to the regional facility. This handling fee was anticipated to be approximately $5.00 per ton but would have to be negotiated.

2.2.3 Current MSW Hauling Practices for Off-Cape Communities

Three of the off-Cape communities (Hanson, Kingston and Plymouth) haul directly from local transfer stations to the SEMASS facility. The individual tonnages collected from each of these communities as well as the 2008 tonnage reported to MassDEP as being handled at their transfer stations, if applicable, are summarized on Table 2-1

above. The proposed guaranteed annual tonnages are all less than the quantity of MSW currently handled at their transfer stations. CDM notes that there is a significant tonnage collected by private haulers in Plymouth that is not included in the proposed guaranteed tonnages.

Norwell collects MSW from residents through a municipal curbside collection program. This MSW is hauled directly from the town to the SEMASS facility in the curbside collection vehicles.

2.2.4 Summary of Hauling Methods

As shown on Figure 2-2, approximately 58% of the MSW tonnage guaranteed by the Study Communities is hauled by rail to the SEMASS facility through the two regional transfer stations. For the Cape communities alone, approximately 69% of the total MSW quantity proposed to be guaranteed is hauled to SEMASS by rail.

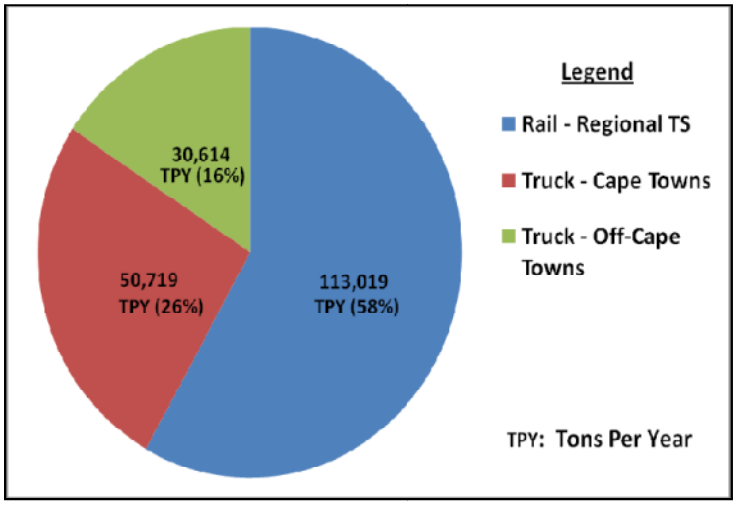


Figure 2-2
Tonnages Currently Hauled by Different Methods to SEMASS Facility

For the Cape communities, the two regional transfer stations are physically capable of handling the increased tonnage that could potentially be delivered by the nine Cape communities that are not currently participating in a regional transfer station. The operators of these facilities would have to review their permits from MassDEP to determine if they require modification to accept the increased tonnage and the corresponding truck trips. If a long-distance alternative was selected by the off-Cape communities, they could also haul to the Upper Cape Transfer Station to consolidate their waste into rail cars.

2.2.5 Summary of Other Information Collected from Study Communities

As part of the process undertaken by the Commission to collect existing information from the Study Communities, the following three questions were asked:

- Are there any plans to change how the town handles solid waste in the near future such as Pay-as-You-Throw?
- Is there anything in the current Waste Acquisition Agreements that concerns you?

- Are there any alternatives other than those that have already been identified that need to be assessed?

The results of the three questions that are not related to the MSW tonnage and transportation information are summarized below.

2.2.5.1 Changes in Local Methods to Handle Solid Waste

The first question related to any plans to change how the town handles solid waste in the near future that could impact a new disposal agreement. For this item, many communities responded that they were considering implementing "Pay as You Throw" systems where residents purchase bags or stickers to dispose of individual units of waste. The intent of these systems that have been implemented in numerous Massachusetts communities is to utilize the financial incentive of minimizing an individual's waste disposal cost by diverting more materials to recycling programs. If implemented by a community, this system could significantly decrease the total MSW requiring disposal. As discussed further, any long-term agreement entered into by the Study Communities should allow for any decrease in annual tonnage that can be demonstrated to be caused by increased recycling to count towards any guaranteed annual tonnages.

Other communities responded to this question generally stating that with the anticipated increase in costs for MSW disposal, additional capacity will have to be built into their transfer stations for recyclables or supplemental programs will have to be put in-place to increase recycling. There was also a general acknowledgement that the current fee structures will have to be modified to account for the additional costs for MSW disposal. Finally, several communities mentioned evaluating changing from the use of local transfer stations as the primary method of waste collection to town-wide or regional curbside collection programs.

As noted previously, the Commission is intending to conduct a supplemental study to evaluate current and future recycling programs for the Study Communities.

2.2.5.2 Concerns with Current Waste Acquisition Agreements

The second question related to any concerns with the existing terms of the Waste Acquisition Agreement with SEMASS that has been in place for approximately 20 years. The following are the specific concerns raised both in response to the questions from the Commission as well as at the public meetings at the Commission's offices:

- The change-in-law provisions were noted as a concern by many of the communities. These provisions allow for the disposal-tipping fee to be increased if there is a change in a law or regulation that increases the cost to operate and/or maintain the SEMASS facility. With the current and future attention to greenhouse gas emissions both from waste-to-energy facilities and landfills, there is a potential for significant changes in environmental laws and regulations over the terms of the next disposal contract. The changes in cost for MSW disposal required by these provisions also have to align with the communities' budget fiscal years. The

specifics of the change-in-law provisions of any contract should also be reviewed so that additional costs are not just paid by the municipal contracts but spread among all facility users.

- Some communities noted that annual increases in the per ton tipping fee by the Consumer Price Index (CPI) are problematic because of the difficulties of incorporating them within the constraints of municipal budget processes.

- There was some concern about the repairs to the rail car tipper mechanism at the SEMASS facility and that the responsibility to repair it in a timely manner fell to the SEMASS operator.

- Control of the minimum and maximum tonnages guaranteed to the disposal facility were noted.

These items will be carefully considered as part of the negotiation of any future solid waste disposal agreement with the Study Communities and will require detailed review by qualified legal counsel.

2.2.5.3 Other Alternatives to be Evaluated

At a public presentation, a preliminary list of alternative methods to handle the Study Communities' MSW was presented for discussion. This question attempted to determine if there were any other alternatives that required evaluation as part of this study. The responses to this question included a discussion of MSW composting as a potential long-term alternative; the potential for lifting the MassDEP moratorium on expanded and new waste-to-energy plants to allow for advanced thermal technologies to be implemented; and the evaluation of long-distance rail haul.

2.3 Alternative MSW Disposal Facilities

In conducting this study, CDM reviewed the solid waste disposal facilities that could provide disposal of the Study Communities MSW after the current Waste Acquisition Agreements with the SEMASS facility expire. While there are numerous facilities in Massachusetts that could accept the communities' MSW, CDM focused on existing disposal and transfer station alternatives located in Southeastern Massachusetts that could handle all or a significant portion of the Study Communities' total MSW stream. The review of existing facilities and options focused on the following alternatives:

- Bourne Landfill and associated Integrated Solid Waste Management facilities operated by the Town of Bourne;

- Crapo Hill Landfill located in Dartmouth, Massachusetts that is operated by the Greater New Bedford Regional Refuse District and is evaluating accepting up to 20,000 tons per year of MSW for disposal from communities outside of the District;

- Rochester Environmental Park Transfer Station located in Rochester, Massachusetts and operated by Casella Waste Systems. The operator indicated that MSW

delivered to this facility will be transferred to either their Maine Energy Recovery Incinerator (MERC) located in Biddeford, Maine or the landfill located at their Southbridge Disposal and Recycling Park in Southbridge, Massachusetts;

- SEMASS Waste-to-Energy Facility operated by Covanta Waste Systems and located in Rochester, Massachusetts; and

- Long-distance rail haul from the two on-Cape regional rail transfer stations with disposal at an out-of-state disposal facility, most likely a large commercial landfill.

Of the other disposal facilities currently operating in southeastern Massachusetts and summarized in Table 1-2, two of the large landfills (Taunton and Fall River) will likely cease accepting waste prior to 2015 and one (Middleborough Landfill) has a very low daily permitted tonnage (173 tons per day) and could only accommodate a few of the smaller Study Communities.

There was discussion at several of the public meetings about incorporating proposed solid waste disposal facilities and transfer stations into the evaluation. These facilities such as the proposed thermal disposal facility in Taunton, a food-waste composting operation in Dennis, and an undefined new regional disposal facility may provide alternatives for the Study Communities. However, any new significant solid waste disposal facility will have to complete an extensive and uncertain permitting process including:

- Filing of Environmental Impact Reports under the Massachusetts Environmental Policy Act (MEPA, 301 CMR 11.00) and any corresponding requirements of the Cape Cod Commission for facilities located on the Cape;

- The dual step siting process required under the Site Assignment Regulations for Solid Waste Management Facilities (310 CMR 16.00) that requires the MassDEP approval of a Site Suitability Report followed by an intensive hearing process overseen by the local Board of Health. These regulations also include stringent siting criteria that will severely limit the location of any large-scale facility;

- Permitting with the MassDEP under the Solid Waste Management Regulations (310 CMR 19.000) both prior to commencing construction and to receive authorization to begin operations; and

- Any local zoning, planning board or other permits that will have to be obtained.

Most of these permits require public comment and include a process for appeal. Based on CDM's experience, it is likely that a new disposal facility will not be able to both obtain all the necessary permits and complete construction and start-up by the 2015 date when most of the current SEMASS Waste Acquisition Agreements expire. However, the Study Communities should continue to monitor any new facilities and

perhaps limit the terms of any future Agreements to allow future consideration of any new facility that may come on-line.

CDM visited each of the facilities that are evaluated and was provided information by the operators on their long-term anticipated life, current status of permits and approvals, any regulatory non-compliance issues, and general ideas related to anticipated proposed disposal tipping fees and contract conditions. CDM also met with representatives of MassDEP's Southeast Regional Office in Lakeville to discuss this study and these facilities. This information is summarized below and forms the basis for the evaluation of the SEMASS MOU and the comparison of future alternatives outlined in Sections 3 and 4, respectively.

2.3.1 Bourne Landfill

The Bourne Landfill is located off MacArthur Boulevard (Route 28) approximately 1.5 miles south of the Bourne Bridge. The current operating area of the landfill is a state-of-the-art double-lined landfill with leak detection and leachate collection, stormwater management system, and a landfill gas collection system and flare for destruction. The Town operates the landfill as a regional disposal facility with a permit that allows the acceptance of an average of 600 tons of solid waste per day with a maximum of 700 tons per day and not to exceed more than 4,900 tons per week or 219,000 tons of solid waste for disposal per year[1]. The landfill accepted 94,116 tons of waste in 2008. The landfill is allowed to accept MSW, residual construction and demolition waste materials and other non-MSW materials such as difficult-to-manage and bulky wastes and other special wastes as approved in writing by MassDEP. The landfill is allowed by permit to operate seven days per week. A copy of the most recent MassDEP permit for the landfill is included in Appendix B.

The Town of Bourne operates several other operations adjacent to the landfill site including a residential drop-off for town residents, a baling building for consolidating recyclable materials, a leaf and yard waste composting area and a construction and demolition waste transfer station. There is also significant areas of additional land that could be utilized for a waste diversion facility such as co-composting of MSW and wastewater residuals. All of the operations combined at the site are allowed to accept up to 825 tons of waste materials per day.

The facilities at the landfill are operated by a Town through the Integrated Solid Waste Management (ISWM) Department. The ISWM Department works through an Enterprise Fund established by the Town and the State Legislature that funds the operations based on its revenues and allows the ISWM Department to reimburse Town Departments for services rendered as well as pay a Host Community Fee to the general Town budget. Funds for operations and construction at the site are paid for from the Enterprise Fund but require approval of the Bourne Town Meeting.

[1] "Permit Approval, Authorization to Operate Phase 2A/3A Stage 2 Lined Landfill Expansion, Bourne Integrated Solid Waste Management Facility, Transmittal number X226234," issued by MassDEP, dated September 2, 2009.

Currently, ISWM funds the following items or makes the following payments to the Town:

- Host Fee currently accrues at $3.18 per ton received at the landfill. This is approximately $300,000 per year. The Host Fee increases annually by the Consumer Price Index (CPI);
- ISWM reimburses the Town for approximately $1.75 million in solid waste related costs including approximately $1 million for townwide curbside collection of MSW and recyclables;
- ISWM provides the Town with other services including operations of an on-site drop-off center and leaf and yard waste composting area. ISWM estimates the value of these operations at approximately $350,000 per year; and
- approximately 6,000 tons per year of MSW from the Town is disposed of in the landfill at no cost to the homeowners.

Under MassDEP's Solid Waste Management Regulations (310 CMR 19.000), operators of facilities are required to maintain a financial assurance mechanism to insure that the MassDEP requirements for final closure and post-closure care of the landfills are met. ISWM has established a MassDEP approved method of setting aside $875,000 over the next three years to fund the next phase of final capping. ISWM has already set aside $1.32 million for the post-closure care period of the landfill. These costs will include site maintenance, continued operation of the landfill gas collection and flaring system and leachate collection and disposal for the 30-year period required by MassDEP.

ISWM provided CDM with estimates prepared by their third-party engineer of the remaining capacity of the site. Based on a survey dated September 22, 2009, there is a total remaining capacity of 3,894,000 cubic yards within the already permitted areas at the site. At a permitted maximum filling rate of 219,000 tons per year, CDM conservatively estimates that the landfill has at least 12 years of remaining capacity (e.g. until 2022). If all the Study Communities committed to the Bourn Landfill, it would have to accept a total of 189,338 tons of MSW per year plus Bourne's 6,000 tons per year.

Bourne has recently been pursuing agreements with communities in southeastern Massachusetts for disposal of their MSW. A copy of a proposed agreement between Bourne and another municipality is included in Appendix A. The current disposal tip fee quoted to these communities was $71 per ton delivered to the Landfill. In meetings with CDM as part of this study, ISWM personnel were not willing to provide a quote for a disposal fee beginning in 2015.

Recently, the landfill site has had a series of significant off-site odor problems. These odor problems have been an ongoing issue for ISWM for over a year and are largely

the result of the acceptance of processed construction and demolition waste materials historically at the landfill. These materials contain significant amounts of gypsum wallboard that when landfilled will generate high concentrations of highly odorous hydrogen sulfide gas. ISWM has undertaken an ongoing process including retaining a specialized consultant to assist their staff, installing additional landfill gas extraction wells and a treatment system to remove hydrogen sulfide from the gas and the installation of a temporary membrane cap over exposed portions of the landfill to control the fugitive emissions of gas. Based on discussions with MassDEP staff and CDM's experience, hydrogen sulfide emissions should decrease rapidly once processed construction and demolition waste is no longer received and the odor issues should subside.

Recent newspaper articles have reported that the Town has been approached by private vendors to take over operations of the landfill site from ISWM[2]. While the details of the various proposals and offers are not clear at this time, the Study Communities should continue to monitor any changes in the operational status of the Bourne site.

The Bourne Landfill and the appurtenant solid waste operations represent a viable long-term disposal alternative for some or all of the Study Communities. Acceptance of all the waste from the Study Communities may require a modification of the existing permitted daily tonnages but can be accommodated within the landfill's permitted maximum annual tonnage limit.

2.3.2 Crapo Hill Landfill

The Crapo Hill Landfill is located in Dartmouth, Massachusetts and is operated by the Town of Dartmouth and the City of New Bedford through the Greater New Bedford Regional Refuse District. A copy of the intermunicipal agreement that formed the District is included in Appendix B. Further discussion of the District finances and formation is provided in Section 4.

Since 1995, the District has provided cost-effective, environmentally sound solid waste disposal for the member communities. They operate a state-of-the-art double-lined landfill with leak detection, leachate collection, and a landfill gas-to-energy plant. Based on meetings with the operator, the landfill has at least ten years of remaining capacity and probably longer given the anticipated decrease in annual tonnages received.

Historically, the District has accepted all of the residential waste generated by Dartmouth and New Bedford and assessed each member community an annual fee. Additional waste tonnage was guaranteed from commercial haulers at market rates to help offset the costs for the member communities. With recent decreases in commercial disposal tipping fees, the District has not been able to attract the historical amounts of commercial waste. During a meeting with District personnel, they stated

[2] "Bourne Considers Proposal to Lease Landfill," Cape Cod Times, December 11, 2009.

that they are interested in entering into an agreement with another community to provide their MSW at market rates. The staff stated that they were looking for approximately 20,000 tons of MSW per year to be delivered at market rates (currently $71 per ton).

Because the amount of waste that can be accepted at the Crapo Hill Landfill only represents a portion of the total MSW generated by the Study Communities, CDM did not undertake a detailed review of the facility. The Landfill may be an appropriate alternative for one or more of the Upper Cape or off-Cape communities. However, the District may be looking for this waste stream in the short-term before the Study Communities' SEMASS Waste Acquisition Agreements expire.

2.3.3 Rochester Environmental Park Transfer Station

A potential alternative for the Study Communities is utilizing the Rochester Environmental Park (REP) transfer station operated by Casella Waste Systems, Inc. (Casella). The transfer station is permitted to accept up to 890 tons of solid waste per day and, based on conversations with Casella personnel, the Study Communities' waste would be transferred for disposal to either the Southbridge Landfill located in Southbridge, Massachusetts or the Maine Energy Recovery Incinerator (MERC) located in Biddeford, Maine. A copy of information provided by Casella is included in Appendix B.

The MERC facility has a permitted annual tonnage of 312,000 tons per year and accepts MSW from Maine, New Hampshire and northern Massachusetts. Given the difficulties of hauling northward through Boston, CDM does not see this as the likely significant outlet for the Study Communities' MSW.

Casella purchased the rights to the Southbridge Landfill and renegotiated the operations agreement with the Town of Southbridge, who owns the landfill site. At the time of the Casella acquisition, the Southbridge Landfill was only allowed to accept residuals from the processing of construction and demolition waste and a limited amount of MSW, primarily from Southbridge. The Landfill had a permitted capacity of 180,960 tons of waste per year.

As part of the renegotiated agreement with the Town of Southbridge, Casella is allowed to change the tonnage to accept all MSW for disposal and to a stepwise increase in the annual tonnage from 180,960 tons per year to 405,000 tons per year. In 2008, Casella undertook the permitting process, including modifications under the Site Assignment Regulations for Solid Waste Facilities (310 CMR 16.000), for the changeover to MSW and the increased tonnage at the Landfill. In June 2008, the Southbridge Board of Health voted to approve an incremental changeover to MSW and increase in tonnage. The Board of Health's decision was appealed by a group of residents and has been upheld through several appeals to date. Given the current status of the permitting process and the implementation of a new site access road, the Landfill should be prepared to accept MSW from the Study Communities by the time the current SEMASS agreements expire. Casella was not willing to provide a

proposed disposal-tipping fee in 2015 during discussion conducted as part of this study.

Given the existing infrastructure that the Study Communities have with the MSW already being on transfer trailers, it may not make sense to unload the waste at the transfer station and have it transferred directly onto another similar sized trailer. This will have to be evaluated as part of any future agreement to utilize the Rochester Environmental Park Facility.

2.3.4 SEMASS Waste-to-Energy Facility

The SEMASS facility has provided reliable, cost-effective, environmentally sound waste disposal to the Study Communities for approximately 20-years. The SEMASS facility consists of four processing lines and three combustion units and has a design capacity of approximately 3,000 tons per day. The processing lines are used to shred the waste and remove non-burnable components such as glass, grit and metals. Three of the processing lines and two of the combustion units began operation in February 1989. The fourth processing line and third combustion unit began operation in 1993 following expansion of the SEMASS facility. In 2008, the SEMASS facility processed 1,216,945 tons of MSW.

The SEMASS facility is currently in its 21st year of operation. Most of the Study Community disposal contracts expire on January 1, 2015 at which time the SEMASS facility will have been in operation for approximately 26 years. The proposed term of the extension agreement is 15 years which would mean that the SEMASS facility would be approximately 40 years old at the end of the extension agreement. Based on our knowledge of the past performance of the SEMASS facility and our experience in the waste-to-energy industry, it is CDM's opinion that the facility could reasonable operate through at least the term of the proposed 15-year extension agreements (2029-2030) provided that proper maintenance and repairs continue to be performed in a timely manner. Additional capital investment by Covanta will likely be needed on an ongoing basis to repair or replace individual components as they reach the end of their individual useful lives.

Detailed information on the SEMASS facility is provided in section 3.6. The MOU proposed by SEMASS is evaluated in detail in Section 3 of this report.

2.3.5 Long-Distance Rail and Truck Haul

According to MassDEP, approximately 1.4 million tons of Massachusetts' solid waste is disposed of at out-of-state facilities each year. With reduced capacity available at in-state landfills, more Massachusetts solid waste will be exported in the future. By 2014, exports are expected to rise to between 2.5 and 4.1 million tons annually. While some of this waste is disposed of in disposal facilities such as the Turnkey landfill in Rochester, New Hampshire located in other New England states, an increasing amount is transported out-of-state to distant facilities by rail and truck.

The two regional transfer stations on Cape Cod – the Upper Cape facility at the Otis Air Force Base and the Yarmouth-Barnstable transfer station are both rail haul facilities. Currently, the collected MSW is hauled a short distance to the SEMASS facility where it is unloaded onto the tipping floor by a specialized piece of equipment. However, these facilities could be retrofitted to accommodate a variety of larger rail cars as well as other modes of transporting waste by rail or large truck transfer trailers.

While the final disposal facility where the Cape's MSW will be transported to by rail will be distant in states such as Pennsylvania, Ohio and Virginia, the disposal tipping fee at these landfills is significantly lower than those proposed by New England disposal facilities ($15 to $20 per ton). While CDM was not able to obtain a written proposal from any one firm, the verbally quoted per ton cost of rail haul was estimated by several individuals to be between $60 and $80 per ton of MSW for hauling and disposal. It is important to note that the costs for long-distance truck and rail haul are highly dependent on fluctuations in fuel costs that could increase costs due to surcharges that are typically incorporated into agreements for this type of hauling and disposal contract.

Section 3
Evaluation of SEMASS MOU

3.1 Introduction

In 2009, the SEMASS Partnership that operates the SEMASS waste-to-energy facility, currently owned by Covanta, offered to enter into a Memorandum of Understanding (MOU) with each of the Study Communities. The MOU proposed to modify the existing Waste Acquisition Agreements (WAA) by extending the term for an additional 15 years at below market rates in exchange for increasing the tipping fee over the remaining five years of the current WAA.

The MOU was reportedly negotiated over a two year period with a "steering committee" made up of five communities that are part of the Council of SEMASS Communities (Council). The Council includes a total of 60 communities that have long-term contracts with SEMASS (29 Tier 1 and 31 Tier 2 communities) and serves to represent the interest of the communities. Two of the five members of the steering committee were Cape Communities (Barnstable and Orleans). A generic copy of the MOU as well as two versions for the Town of Sharon and Fairhaven are included in Appendix A. A discussion draft copy of the extension agreement proposed to the Town of Brewster in response to the MOU is also included in Appendix A.

This section provides a summary of the proposed MOU as well as an evaluation of the disposal tipping fees anticipated when the current Waste Acquisition Agreements expire. The intent is to evaluate whether each of the Study Communities should enter into the MOU and the subsequent negotiations of an extension to the existing Waste Acquisition Agreements.

3.2 Proposed MOU for Cape Cod Communities

CDM reviewed the MOU offered to the Town of Yarmouth by Covanta in June 2009. The basic terms of the MOU, which Covanta proposes to incorporate into an "Extension Agreement" that would be negotiated following execution of the MOU, include the following:

- ***Extension Timeframe.*** The WAA termination date for 13 of the Cape Communities would be extended from January 1, 2015 to January 1, 2029 and for one Cape Community (Wellfleet) from September 1, 2016 to September 1, 2031;

- ***Guaranteed Tonnages.*** The towns will have to continue to commit to a minimum and maximum tonnage of MSW to be delivered to SEMASS for disposal. Materials removed from the MSW for recycling would decrease the Community's minimum waste commitment;

- ***Upfront Payments.*** The tipping fee over the last five years of the current term of the WAA for all of the Cape Communities except Wellfleet would be increased by $40 per ton in accordance with the following schedule:

- $2.50 per ton increase taking effect five years prior to expiration of the current WAA (January 1, 2010),

- $7.50 per ton increase taking effect four years prior to the expiration of the current WAA (January 1, 2011),

- $10.00 per ton increase taking effect for each of the last three years prior to the expiration of the current WAA (January 1 of 2012, 2013 and 2014).

- ***Future Disposal Costs.*** The MSW disposal tipping fee effective January 1, 2015 (and annually thereafter) would be adjusted based on the Boston Consumer Price Index (CPI-U) up to a maximum of four percent per year. The current WAA does not provide for any automatic annual escalation.

- ***Wellfleet Costs.*** The Town of Wellfleet has a significantly lower per ton disposal tipping fee than the other Cape communities. For Wellfleet, the MOU proposed a total increase in tipping fees would be $45 per ton over the last five years of the current term of the WAA based on the following schedule:

  - A $5.00 per ton increase would take effect on September 1, 2011,

  - Additional $10.00 per ton increases taking effect on September 1 of 2012, 2013, 2014 and 2015.

Covanta advised CDM that they have offered two different MOUs to the Tier 1 communities. The terms of the MOUs are reportedly the same with the exception of the total tipping fee increase. Most of the Tier 1 communities with current tipping fees less than $34 per ton (like Wellfleet who has a current tipping fee of $18.15 per ton) were offered a total increase of $45 per ton over the last five years of the current term of the WAA while those communities with current tipping fees greater than $34 per ton were offered a total increase of $40 per ton.

To insure that the Study Communities were paying below market rates for their MSW disposal throughout the life of the extension agreement, the MOU proposed to offer the communities a periodic review of market conditions and a potential lowering of the per ton tipping fee if the market drops. Effective with the first year of the extension period and every five years thereafter through the duration of the 15-year extension period, the tipping fee charged to the Cape Communities would be a minimum of 10 percent below the average tipping fee charged to all non-Tier 1, non-host communities with similar long-term municipal disposal agreements. For 13 of the Cape Communities, the tipping fee evaluations would occur in 2015, 2020 and 2025 while the evaluations for Wellfleet would occur in 2016, 2021 and 2026.

Based on information provided at the three public meetings held as part of this study, the Town of Brewster was the only Cape Cod community to sign the MOU. Brewster was provided with a proposed Extension Agreement, a copy of which is included in

Appendix A. CDM comments on the proposed MOU are provided in Section 3.4 below.

3.3 Proposed MOU for Off-Cape Communities

Covanta also offered the same MOU to off-Cape communities that are also Tier 1 communities. This includes the four off-Cape communities of Hanson, Kingston, Norwell and Plymouth that are part of Study Communities. The total tipping fee increase for these four communities over the remaining five years of the current term of their WAAs would be $40 per ton.

The current tipping fee for Plymouth is $22.53 per ton while the current tipping fee for the other three off-Cape Communities is $34.52 per ton. With the proposed annual increases, the tipping fees entering the last year of the WAAs would $62.53 per ton for Plymouth and $74.52 per ton for Hanson, Kingston and Norwell. The estimated tipping fee on January 1, 2015 assuming a three percent annual Inflation factor would be $64.41 per ton and $76.76 per ton, for Plymouth and the other off-Cape towns, respectively.

Based on information discussed at the three public meetings held as part of this study, only Plymouth of the four off-Cape communities signed the MOU. CDM comments on the proposed MOU are provided below.

3.4 Comments on the MOU

Representatives of the Commission and CDM met with Covanta at the SEMASS facility on September 10, 2009 to review and discuss the proposed terms of the MOU offered to the Study Communities. A representative of the Town of Fairhaven (who currently chairs the Council and participated in the steering committee negotiations) and a representative of local rail company, Mass Coastal, also attended the meeting.

CDM has the following comments on the MOU based on our review of this document and additional information provided by Covanta during and after the September 10, 2009 meeting.

3.4.1 Current Availability of MOU

The MOU states that it would have no force or effect if it was not signed by both parties before June 30, 2009. However, Covanta indicated at the September 10, 2009 meeting that the MOU offer is still available to the Cape Communities. Only two of the Study Communities (Brewster and Plymouth) have reportedly executed the MOU as of the date of this report.

3.4.2 Disposal Tipping Fees

The current tipping fees for the 14 Cape Communities vary. Thirteen of the Cape Communities have current tipping fees ranging from $36.76 to $37.91 per ton and one Cape Community, Wellfleet, has a tipping fee of $18.15 per ton. Wellfleet's tipping fee is less than the other Cape Communities because the change in law provision for their

WAA is reportedly different than the other Cape Communities. With the proposed annual increases, the tipping fees entering the last year of the WAA would be approximately $77 per ton for 13 of the Communities and $63.15 per ton for Wellfleet. These tipping fees would be subject to a new escalation provision (Inflation Factor) of 100 percent of the Boston CPI-U (All Urban Consumers) or 4 percent, whichever was less. Annual escalation would take effect beginning on the first year of the extension period which would be January 1, 2015 for 17 of the Study Communities and September 1, 2016 for Wellfleet. As currently written, increases above 4 percent in any one year would be carried over to subsequent years.

The upper end of the proposed annual Inflation Factor is higher than the fixed annual escalation of 2.5 to 3.0 percent provided from in other similar agreements that have been recently signed with both Covanta and Wheelabrator as discussed further below. The average annual increase in the Boston CPI-U since the SEMASS facility commenced operation in 1989 has been 3.26 percent and the annual increase exceeded 4 percent in five of those 20 years. The proposed provision to carry over escalation in excess of 4 percent from one year to the next is unusual for long-term waste disposal agreements.

3.4.3 Insuring Below Market Rates for Future Disposal Costs

The basic premise of the MOU is that the disposal tipping fee charged to the Study Communities would be at least 10 percent below market rates on January 1, 2015 (and September 1, 2016 for Wellfleet) when the extension periods takes effect. While it is difficult to predict future disposal costs, the estimated tipping fees in 2015 (and 2016 for Wellfleet) do not appear to be below market rates based on recently signed waste disposal agreements at other waste-to-energy facilities in Massachusetts, with the exception of Plymouth and Wellfleet's tipping fee. The estimated tipping fee on January 1, 2015 for the Study Communities whose extension periods would commence on this date would be approximately $80 per ton assuming a three percent annual increase. Wellfleet's estimated tipping fee on September 1, 2016 would be approximately $65 per ton based on a three percent annual increase. By comparison, the tipping fees for communities that recently signed agreements with other waste-to-energy facilities located in eastern and central Massachusetts will be in the range of $74 to $78 per ton in the 2015-2016 timeframe as discussed further below.

While municipal contracts signed by SEMASS in the last two years suggest that the tipping fees of $80 per ton in the 2015 to 2016 timeframe will be significantly below the "market" rates, CDM does not consider this to be a true market rate. The provision in the MOU intended to make the tipping fee charged to the Study Communities at least 10 percent below the average tipping fee charged to all non-Tier 1, non-host communities with similar long-term municipal disposal agreements may not offer any real benefit as currently proposed. Covanta can avoid triggering this provision by making a business decision not to sign contracts longer than 5 years with other municipalities that would bring the average tipping fee below the Tier 1 communities (and result in a significant loss in tipping fee revenues from those Tier 1 communities) and instead sign shorter duration contracts and/or contracts with non-municipal sources such as private haulers to fill excess capacity. In fact, 60 percent of

the waste currently accepted at the SEMASS facility reportedly originates from non-municipal sources. As a result, the Study Communities may not actually realize enough cost savings to provide a reasonable return or payback period on the increased tipping fee payments they would be making over the last 5 years of the existing WAAs.

The only way to ensure that the Study Communities would actually benefit from this type of provision is to include both municipal and private contracts of any duration in the market rate analysis except for so-called "spot market" agreements where waste is only accepted at the then market price if the facility has available capacity. Long-term contracts theoretically should have lower costs since the contracting party commits to a longer term and also generally assumes the risk for changes in law that are typically not part of a short-term (i.e., less than 5 years) contract. However, shorter-term contracts can allow the contracting party to benefit from lower disposal costs that often occur during economic downturns as a result of reduced waste generation, as is currently the case. Also, if the contracts are based on delivery of waste to another location besides the SEMASS facility (e.g., Braintree Transfer Station) and the tipping fee includes hauling to the SEMASS facility, an appropriate haul cost should be deducted prior to inclusion in the analysis.

3.4.4 Liquidated Damages

The current language in the MOU related to payment of liquidated damages by Covanta is not clear as to what time period this provision applies. According to information provided by Covanta at the September 10, 2009 meeting, this provision only covers the increased tipping fee payments that the Communities agree to pay over the last five years of the existing WAAs. The basis for calculating the applicable liquidated damages is also not specified.

3.4.5 Mechanism for Extension Agreement

The MOU contains a basic outline of the intent of the proposed Extension Agreement. According to information provided by Covanta at the September 10, 2009 meeting, the Extension Agreement referenced in the MOU would actually take the form of an amendment to the existing WAA. Covanta has indicated that they would be open to discussing other specific changes that a community may want to make to the existing WAAs except for pricing. The specifics of this amendment would still need to be negotiated between the municipalities and Covanta.

3.5 Proposed and Projected MSW Disposal Tipping Fees

Table 3-1 is a summary of proposed tipping fees for the last five years of the existing WAAs for each of the Study Communities along with projected tipping fees during the 15-Year extension period, if the Study Communities sign for proposed MOU. This table assumes no further change in law adjustments to costs for both the remaining life of the current Waste Acquisition Agreements and any extensions. Three percent annual escalation has been assumed for the duration of the extension period.

Table 3-1
Summary of Proposed Tipping Fees for the Last Five Years of the Existing Waste Acquisition Agreements and Projected Tipping Fees During the 15-Year Extension Period

Study Communities With Waste Acquisition Agreement (WAA) Termination Dates of 1/1/2015										
	Current Tip Fee	*Proposed Tip Fee ($/Ton) [1]*						*Projected Tip Fee ($/Ton) [2]*		
Effective Date	***2009***	***1/1/2010***	***1/1/2011***	***1/1/2012***	***1/1/2013***	***1/1/2014***	***1/1/2015 [3]***	***1/1/2019***	***1/1/2024***	***1/1/2029 [4]***
Barnstable	$37.51	$40.01	$47.51	$57.51	$67.51	$77.51	$79.84	$89.86	$104.17	$120.76
Brewster	$37.51	$40.01	$47.51	$57.51	$67.51	$77.51	$79.84	$89.86	$104.17	$120.76
Chatham	$37.51	$40.01	$47.51	$57.51	$67.51	$77.51	$79.84	$89.86	$104.17	$120.76
Dennis	$37.51	$40.01	$47.51	$57.51	$67.51	$77.51	$79.84	$89.86	$104.17	$120.76
Eastham	$37.51	$40.01	$47.51	$57.51	$67.51	$77.51	$79.84	$89.86	$104.17	$120.76
Falmouth	$36.76	$39.26	$46.76	$56.76	$66.76	$76.76	$79.06	$88.99	$103.16	$119.59
Harwich	$37.51	$40.01	$47.51	$57.51	$67.51	$77.51	$79.84	$89.86	$104.17	$120.76
Mashpee	$36.76	$39.26	$46.76	$56.76	$66.76	$76.76	$79.06	$88.99	$103.16	$119.59
Orleans	$37.51	$40.01	$47.51	$57.51	$67.51	$77.51	$79.84	$89.86	$104.17	$120.76
Provincetown	$37.91	$40.41	$47.91	$57.91	$67.91	$77.91	$80.25	$90.32	$104.70	$121.38
Sandwich	$37.26	$39.76	$47.26	$57.26	$67.26	$77.26	$79.58	$89.57	$103.83	$120.37
Truro	$37.51	$40.01	$47.51	$57.51	$67.51	$77.51	$79.84	$89.86	$104.17	$120.76
Yarmouth	$37.51	$40.01	$47.51	$57.51	$67.51	$77.51	$79.84	$89.86	$104.17	$120.76
Hanson	$34.52	$37.02	$44.52	$54.52	$64.52	$74.52	$76.76	$86.39	$100.15	$116.10
Kingston	$34.52	$37.02	$44.52	$54.52	$64.52	$74.52	$76.76	$86.39	$100.15	$116.10
Norwell	$34.52	$37.02	$44.52	$54.52	$64.52	$74.52	$76.76	$86.39	$100.15	$116.10
Plymouth	$22.53	$25.03	$32.53	$42.53	$52.53	$62.53	$64.41	$72.49	$84.04	$97.42

Study Communities with Waste Acquisition Agreement (WAA) Expiration Dates of September 1, 2016										
	Current Tip Fee	**Proposed Tip Fee ($/Ton) (1)**					**Projected Tip Fee ($/Ton) (2)**			
Effective Date	**2009**	**9/1/2011**	**9/1/2012**	**9/1/2013**	**9/1/2014**	**9/1/2015**	**9/1/2016 (3)**	**9/1/2020**	**9/1/2025**	**9/1/2030 (4)**
Wellfleet	$18.15	$23.15	$33.15	$43.15	$53.15	$63.15	$65.04	$73.21	$84.87	$98.39

Notes:
1. Based on the terms of the proposed Memorandum of Understanding offered to the Towns by SEMASS.
2. Assumes 3 percent annual escalation beginning with the first year of the 15-year extension period.
3. First year of the 15-year extension period.
4. Last year of the 15-year extension period.
5. Assumes no change in law adjustments.

3.5.1 Market Rates at Other Area Waste-to-Energy Facilities

There are a total of seven waste-to-energy facilities operating in Massachusetts and all of these facilities are operated by either Covanta or Wheelabrator. Four of the facilities are located in eastern Massachusetts (Covanta SEMASS, Wheelabrator Saugus, Wheelabrator North Andover and Covanta Haverhill), one facility is located in central Massachusetts (Wheelabrator Millbury) and two significantly smaller facilities are located in western Massachusetts (Covanta Springfield and Covanta Pittsfield).

CDM has reviewed a number of solid waste disposal agreements that were recently executed by other Massachusetts communities with waste-to-energy facilities located in eastern and central Massachusetts. CDM has also reviewed information provided by SEMASS on long-term municipal contracts that they have executed over the last two years. This information that is presented below provides an assessment of the current and near-term market rates for waste disposal at Massachusetts waste-to-energy facilities. Representative copies of the waste disposal agreements discussed below are included in Appendix C.

3.5.1.1 Covanta Haverhill

Approximately half of the original 23 North East Solid Waste Committee (NESWC) communities jointly negotiated new solid waste disposal contracts with Covanta's Haverhill Massachusetts waste-to-energy facility in early 2009. The NESWC communities have historically disposed of their MSW at the Wheelabrator North Andover facility discussed below.

The new contracts for these communities with Covanta's Haverhill facility have an initial term of five years with an additional 5-year option and commence on July 1, 2010. CDM reviewed the contract that the Town of North Reading signed with the Covanta Haverhill facility. The contract includes the following conditions:

- Requires the Town to deliver all of the acceptable waste that it collects, or is collected on its behalf, but does not obligate the Town to deliver a specific quantity of waste (commonly referred to as Guaranteed Annual Tonnage or GAT).

- Includes a tipping fee schedule with fixed tipping fees for each year of the contract including the 5-year extension period. Annual escalation is fixed at $2.00 per ton which calculates to an average annual rate of approximately 2.7 percent over the 10-year period. The tipping fee schedule offered to these communities is listed below in Table 3-2 and the first year cost is $6.00 per ton less than the tipping fee that these communities are currently paying during the final year of a 5-year contract with the Wheelabrator North Andover waste-to-energy facility.

Table 3-2
Summary of Tipping Fees Offered to Former
NESWC Communities at Covanta's Haverhill Waste-to-Energy Facility

	Time Period	*Tipping Fee*
Initial 5-Year Term	July 1, 2010 - June 30, 2011	$67.00/ton
	July 1, 2011 – June 30, 2012	$69.00/ton
	July 1, 2012 – June 30, 2013	$71.00/ton
	July 1, 2013 – June 30, 2014	$73.00/ton
	July 1, 2014 – June 30, 2015	$75.00/ton
5-Year Extension Option	July 1, 2015 – June 30, 2016	$77.00/ton
	July 1, 2016 – June 30, 2017	$79.00/ton
	July 1, 2017 – June 30, 2018	$81.00/ton
	July 1, 2018 – June 30, 2019	$83.00/ton
	July 1, 2019 – June 30, 2020	$85.00/ton

- Tip fees are also subject to adjustment in the event that a change in law increases the cost of operating and maintaining Covanta's Haverhill facility during the term of the contract.

The communities of Melrose, Reading, Stoneham and Wakefield jointly negotiated 15-year disposal agreements with the Covanta Haverhill facility back in 1996. These agreements, which took effect in January 1997, are now in their 13th year. The initial tipping fee in January 1997 was $44.99 per ton and was subject to escalation each July 1st based on 75 percent of the annual increase in the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W). The current tipping fee is projected to be on the order of $60 per ton assuming an average annual escalation rate of 2.25 percent. These agreements also provide for adjustment of the tipping fee in the event that a change in law increases the cost of operating and maintaining Covanta's Haverhill facility during the term of the contract.

3.5.1.2 Wheelabrator North Andover

The other half of the original 23 North East Solid Waste Committee (NESWC) communities jointly negotiated new solid waste disposal contracts with Wheelabrator's North Andover waste-to-energy facility in early 2009. These contracts have a term of 5 years and commence on July 1, 2010. As an incentive to agree to the new 5-year contract, Wheelabrator North Andover offered to reduce each community's tipping fee during the last year of their existing 5-year year contracts (July 1, 2009 – June 30, 2010) from $73.00 per ton to $64.00 per ton or by $9.00 per ton. CDM reviewed the contract that the Town of Belmont signed with the Wheelabrator North Andover facility. Similar to the Covanta Haverhill agreements, the Wheelabrator North Andover contract requires Belmont to deliver all of the acceptable waste that it collects, or is collected on its behalf, but does not obligate the Town to deliver a specific quantity of waste.

These contracts also include a tipping fee schedule with fixed per ton rates for each year of the contract. Annual escalation is also fixed at $2.00 per ton which calculates to an average annual rate of approximately 3 percent over the 5-year contract term. The tipping fee schedule offered to these communities is listed below in Table 3-3. These tip fees are also subject to adjustment in the event that a change in law increases the cost of operating and maintaining Wheelabrator's North Andover facility during the term of the contract.

Table 3-3
Summary of Tipping Fees Offered to Former NESWC Communities at Wheelabrator's North Andover Waste-to-Energy Facility

	Time Period	*Tipping Fee*
Balance of Existing Term	July 1, 2009 – June 30, 2010	$64/ton
New 5-Year Term	July 1, 2010 - June 30, 2011	$66/ton
	July 1, 2011 – June 30, 2012	$68/ton
	July 1, 2012 – June 30, 2013	$70/ton
	July 1, 2013 – June 30, 2014	$72/ton
	July 1, 2014 – June 30, 2015	$74/ton

3.5.1.3 Wheelabrator Saugus

The City of Revere recently negotiated an amendment to their existing solid waste disposal contract with Wheelabrator's Saugus waste-to-energy facility that extended the initial 15-year term for an additional 5 year period. As an incentive to agree to the 5-year extension, Wheelabrator Saugus offered to reduce the City of Revere's tipping fee for the remaining six months of the original term (July 1, 2009 - December 31, 2009) from $78.06 per ton to $71.00 per ton and to hold this tipping fee steady for the first two years of the extension period. The contract requires the City of Revere to deliver all of the acceptable waste that it collects, or is collected on its behalf, and includes penalties if the City of Revere delivers less than 90 percent or more than 110 of the agreed to guaranteed annual tonnage.

The contract amendment includes a tipping fee schedule with fixed tipping fees for each year. Annual escalation for the third, fourth and fifth years of the extension period ranges from $2.00 to $2.50 per ton or approximately 2.7 to 3.3 percent. By comparison, the average annual escalation over the first 14 years of the contract based on the originally specified indices was approximately 2.8 percent. The tipping fee schedule offered to these communities is listed below in Table 3-4. These tipping fees are subject to adjustment in the event that a change in law increases the cost of operating and maintaining Wheelabrator's Saugus facility during the term of the contract.

Table 3-4
Summary of Tip Fees Offered to the
City of Revere at Wheelabrator's Saugus Waste-to-Energy Facility

	Time Period	Tipping Fee
Balance of Current Term	July 1, 2009 - December 31, 2009	$71.00/ton
5-Year Extension Period	January 1, 2010 – December 31, 2010	$71.00/ton
	January 1, 2011 – December 31, 2011	$71.00/ton
	January 1, 2012 – December 31, 2012	$73.00/ton
	January 1, 2013 – December 31, 2013	$75.00/ton
	January 1, 2014 – December 31, 2014	$77.50/ton

3.5.1.4 Wheelabrator Millbury

Thirty-six communities that make up the Central Massachusetts Resource Recovery Committee (CMRRC) jointly negotiated new 20-year solid waste disposal contracts with Wheelabrator's Millbury waste-to-energy facility in early 2006. These communities had been using this facility since it commenced initial operations in 1988 under 20-year contracts. CDM reviewed the new contract that the City of Worcester signed with the Wheelabrator Millbury facility. The contract requires the City of Worcester to deliver all of the acceptable waste that it collects, or is collected on its behalf, and includes penalties if the City of Worcester delivers less than 90 percent or more than 110 of the agreed to guaranteed annual tonnage.

The contract included a base tipping fee of $63.00 per ton as of January 2005 which is subject to annual escalation based of 75 percent of the Consumer Price Index Urban Wage Earners and Clerical Workers – Northeast. The current tipping fee is projected to be on the order of $69 per ton assuming an annual escalation rate of 2.25 percent. The tipping fee in 2015 is projected to be on the order of $78 per ton assuming an annual escalation rate of 2.25 percent. These tipping fees are subject to adjustment in the event that a change in law increases the cost of operating and maintaining Wheelabrator's Millbury facility during the term of the contract.

3.5.1.5 Recent Municipal Contracts Executed With SEMASS

Covanta provided CDM with some information on longer-term (i.e., five years or greater) contracts that they have entered into with non-Tier 1 communities over the past two years. This information is summarized in Table 3-5.

The average of the first year tipping fees for the seven contracts in Table 3-5 is $85.57 per ton. However, two of the five contracts are for MSW delivered to the Braintree Transfer Station and the tipping fee presumably includes the cost to haul the waste approximately 45 miles from the Braintree Transfer Station to the SEMASS facility. CDM estimates the haul cost for these two contracts to be between $10 and $15 per ton. Excluding the haul costs for these two contracts would reduce the average tipping to between $63 and $79 per ton. Escalating the adjusted average tipping fee by 3 percent per year would result in an average tipping fee of approximately $73 to $85 per ton in 2015. This projected tipping fee is consistent with the $80 per ton tipping fee projected for the Study Communities.

Table 3-5
Summary of Recent Municipal Contracts Executed by SEMASS

City/Town	Year Signed	Term (Yrs)	Delivery Location	First Year Tip Fee ($/Ton)	Annual Escalation	Guaranteed Annual Tonnage	Change In Law Provision
Boston	2009	5	Braintree [1]	$78.00	2.50%	Yes	Yes
Cohasset	2008	10	SEMASS	$80.00	100% CPI	Yes	Yes
Berkley	2009	5	SEMASS	$84.00	100% CPI	Yes	Yes
Halifax	2009	10	SEMASS	$86.75	2.90%	Yes	Yes
Lakeville	2008	12	SEMASS	$89.00	NA	Yes	Yes
Weymouth	2008	10	Braintree [1]	$89.75	2.90%	Yes	Yes
Scituate	2009	5	SEMASS	$91.50	100% CPI	Yes	Yes

Notes

1. SEMASS operates a transfer station in Braintree, Massachusetts
2. Information provided by SEMASS.

3.5.2 Projected Market Rate in 2015

As noted above, the basic premise of the MOU is that the Study Communities disposal tipping fees will be significantly below market rates in the 2015 timeframe when the extension periods commence. Recently signed solid waste disposal agreements with area waste-to-energy facilities provide a reasonable barometer on which to gauge near-term disposal fees. Based on our review of recently signed waste-to-energy contracts as discussed above, the market rate for solid waste disposal at waste-to-energy facilities in Central and Eastern Massachusetts in the 2015-2016 timeframe is projected to be on the order of $74-$78 per ton. By comparison the tipping fee for 13 of the Cape Communities would be approximately $80 per ton in 2015, three of the off-Cape Communities would be at approximately $77 per ton and Wellfleet and Plymouth would each be at approximately $65 per ton.

While municipal contracts signed by SEMASS in the last two years would suggest that tipping fees of $80 per ton will be below the "market" rates, we do not consider this to be reflective of the true market rate because it does not include short-term municipal contracts or contracts signed with non-municipal sources such as private haulers.

Solid waste disposal prices are tied closely to the local and regional economy. The significant downturn in the economy observed over the past year has resulted in a roughly 10 percent reduction in the market rate for solid waste disposal in Massachusetts. If the economy picks up substantially over the next five years, solid waste disposal costs in the 2015-2016 timeframe could be higher than the projected market range of $74 to $78 per ton.

3.6 Long-Term Viability of SEMASS Facility

The SEMASS facility consists of four processing lines and three combustion units and has a design capacity of approximately 3,000 tons per day. The processing lines are used to shred the waste and remove non-burnable components such as glass, grit and metals. Three of the processing lines and two of the combustion units began operation in February 1989. The fourth processing line and third combustion unit began operation in 1993 following expansion of the SEMASS facility. The SEMASS facility processes approximately 1,000,000 tons per year.

The initial bonds issued to finance the construction of most of the waste-to-energy facilities operating in the US were based on 20 to 25 year terms. However, the useful life of these facilities is expected to be significantly longer than 25 years with proper maintenance and periodic repairs and component replacement. Certain major facility components such as buildings, furnaces, boilers, turbine-generators and flue gas stacks can be expected to have useful lives in excess of 40 years with proper maintenance. Such maintenance will include the periodic replacement of system components (e.g., motors, pumps, boiler tubes, etc.) that have a more limited life. The oldest modern waste-to-energy facility in the United States is located in Saugus Massachusetts. This facility, which commenced operation in 1975 and is operated by

Wheelabrator, is currently in its 34th year of operation and is expected to continue to operate for the foreseeable future. Many utility power plants that operate with similar equipment have been in continuous operation for more than 40 years, as have various waste-to-energy facilities in Europe.

One of the best measures to evaluate the long-term performance of a facility of this type is the on line availability of the combustion units and turbine-generators. Consistently high on line availabilities indicate that required maintenance is being performed in a timely manner. Following the September 10, 2009 meeting, Covanta provided CDM with on line availability data for the SEMASS facility's boilers and turbine-generators over the past 10 years. With the exception of 2007 when the SEMASS facility was severely damaged by fire, the annual on line availabilities of the boilers and turbines have been higher than 88 percent and 94 percent, respectively. This is consistent with CDM's experience at similar waste-to-energy facilities in the United States and indicates that the SEMASS facility is being well maintained. Covanta also provided CDM with its 5-year repair and replacement plan for the SEMASS facility. CDM's review of this document suggests that the appropriate near term major maintenance is being planned and budgeted.

The SEMASS facility has operated reliably during its first 20 years with the exception of a major explosion and fire that occurred in April 2007. The explosion reportedly occurred in one of the hammer mill shredders and the resulting fire took nearly 24 hours to contain. A number of structures and pieces of equipment were severely damaged including the waste receiving building. This required that portions of the SEMASS facility be shut down for several months to undertake repairs and forced waste deliveries to be diverted for a 30 day period. The waste diversion plan put into place at that time included redirecting approximately 5,000 tons per day of waste to other transfer stations, landfills and waste-to-energy plants. The diversion plan reportedly went relatively smoothly and Covanta picked up all of the incremental costs incurred by their contract communities including the Study Communities. This was reportedly the only time during the first 20 years of operation of the SEMASS facility that waste needed to be diverted.

Due to the nature of operations at the SEMASS facility including storing large quantities of solid waste for extended periods and use of high speed hammer mill shredders, the potential exists for future explosions and/or fires which could impact the operation of the facility. Other events, such as operator error and/or natural disasters, also could impact the operation of the facility. The probability of these types of events is considered low provided that proper waste screening and operator training programs are in place.

CDM understands that the SEMASS facility cannot operate the boilers if the associated steam turbine-generator is not in operation. Any unexpected outages of either of the two turbine-generators would result in a reduction in the Facility's ability to process waste. Covanta is reportedly investigating installing additional equipment to allow steam to bypass the turbine-generators and be discharged directly to the air

cooled condensers. This feature, which is common at other similar facilities, would allow the Facility to continue to process waste in the event that the turbine-generators were not available.

The SEMASS facility is currently in its 21st year of operation. Most of the Study Community's disposal contracts expire on January 1, 2015 at which time the SEMASS facility will have been in operation for approximately 26 years. The proposed term of the extension agreement is 15 years which would mean that the SEMASS facility would be approximately 40 years old at the end of the extension agreement. Based on our knowledge of the past performance of the SEMASS facility and our experience in the waste-to-energy industry, it is CDM's opinion that the facility could reasonably operate through at least the term of the proposed 15-year extension agreements (2029-2030) provided that proper maintenance and repairs continue to be performed in a timely manner. Additional capital investment by Covanta will likely be needed on an ongoing basis to repair or replace components as they reach the end of their individual useful lives.

3.6.1 Future Change-in-Law Requirements

It is also possible that future changes in regulations and/or future changes in the manner in which municipal solid waste is managed could require modifications to the SEMASS facility and, as a result, require further capital investment by Covanta. If the Extension Agreement provided for additional compensation for changes-in-law as does the current WAA, the Communities could be responsible for their share of these increased costs. Four change-in-law events have occurred during the first 15 years of the WAA that affected the SEMASS facility. The increased capital and operating costs associated with these changes-in-law account for approximately $22.52 per ton of the current $37.51 per ton tipping fee paid by all of the Study Communities except Plymouth and Wellfleet.

Based on past history, it is highly probable that further changes-in-law will occur over the next 20 years although the magnitude of the additional costs is uncertain at this time. For example, the USEPA has promulgated regulations that will require a large number of facilities and sites, including waste-to-energy facilities, to monitor green house gas (GHG) emissions beginning in 2010. This will likely require installation of additional equipment at the SEMASS facility such as continuous flue gas flow monitors and carbon dioxide monitors assuming that they are not presenting installed as well as additional reporting.

3.6.2 SEMASS Permits and Regulatory Compliance

The SEMASS facility operates under a number of permits including the following major operating permits.

- ***Site Assignment*** – Local permit issue by the Rochester Board of Health under the Site Assignment for Solid Waste Facilities Regulations (310 CMR 16.000) that contains the requirements of acceptance of solid waste at the site;

- ***Title V Operating Permit*** - Federal air emission operating permit issued by the MassDEP that contains the air emission requirements for the facility;

- ***Solid Waste Operating Permit*** - State permit issued by the MassDEP under the Solid Waste Management Regulations (310 CMR 19.000) that contains the solid waste requirements for the facility; and

- ***National Pollutant Discharge Elimination System (NPDES) Permit*** – Federal permit issued by the MassDEP that contains the requirements for the management and discharge of stormwater from the facility site.

CDM contacted the MassDEP to inquire as to the permit compliance history of the SEMASS waste-to-energy facility. Based on these discussions, the SEMASS facility has been in material compliance with the terms of its operating permits since the facility began operation in 1989.

CDM accessed the permit compliance history for the SEMASS facility on the USEPA's Enforcement and Compliance History Online (ECHO) (www.epa.gov/echo/ compliance_reports.html) data base. This information indicated that there are no current violations and that only one Notice of Violation (NOV) had been issued in the preceding five years. This NOV was issued by the MassDEP on February 14, 2006 for failure to submit a Compliance Certification Report by the scheduled due date. This issue was resolved within two weeks of the issuance of the NOV. Following the September 10, 2009 meeting, Covanta provided CDM with a table of other regulatory actions involving the SEMASS facility going back to 1996. CDM has reviewed these actions and is of the opinion that they constitute relatively minor infractions. All of these issues were reportedly satisfactorily addressed by Covanta in a timely manner.

3.7 Key Contract Considerations

While the proposed disposal tipping fee is often the primary focus when considering the merits of any solid waste disposal contract, the Study Communities also need to consider the risks and potential additional costs associated with other factors. A number of key contract provisions are presented below that CDM recommends be carefully considered by the Study Communities and their legal advisors as part of any proposed solid waste disposal contract including extension of the existing Waste Acquisition Agreements.

As noted above, Covanta reportedly proposes to incorporate the terms of the MOU into an amendment to the existing WAA if a Community agrees to the MOU. Each Community should therefore review their WAA to determine if they are interested in potentially changing any of the existing terms and conditions. This review should include the following:

- ***Contract Term*** – Generally speaking, the longer the contract term the more competitive the pricing. However, due to the recent downturn in the economy, this is not always the case. Most of the recent municipal contracts with waste-to-

energy facilities in Eastern and Central Massachusetts have been for terms ranging from five to twenty years. The contract extension that Covanta has proposed to the Communities under the MOU has a term of 15 years. Communities that have signed disposal contracts with waste-to-energy facilities that have terms of 5 years or less have generally avoided responsibility for any increased costs resulting from changes in law. All of the existing WAAs for the Study Communities provide for pass through of costs associated with changes-in-law except for Wellfleet's WAA. It is unlikely that Covanta would agree to exempt the Communities from any increased costs resulting from changes-in-law for the proposed 15-year contract extension.

- ***Changes-In-Law*** – Most contracts with waste-to-energy plant operators provide for the pass through of incremental capital, operating and maintenance costs associated with a change-in-law to the customers. Pass through costs for changes-in-law are typically based on the customer's prorata share of the total amount of waste delivered. Change-in-law provisions should specifically state that any required capital costs be amortized over the full useful life of the capital improvement, which could be longer than the remaining term of the contract. Additionally, it is possible that waste-to-energy facilities including the SEMASS facility could qualify for additional payments from utilities under state and/or federal legislation such as renewable energy credits (RECs) and/or pollutant specific credits. The change-in-law provision should be written such that the communities receive a prorata share of any revenues that the SEMASS facility receives as a result any change-in-law that occurs during the term of the agreements.

  The proposed extension agreement provided to the Town of Brewster (who signed the MOU), included proposed revisions to the change-in-law provisions of the Waste Acquisition Agreements. A copy of this proposed extension agreement is included in Appendix A.

- ***Minimum Tonnage Commitments and Maximum Tonnage Deliveries*** – Many waste-to-energy contracts contain requirements that a customer deliver a minimum amount of waste, typically on an annual basis (e.g., guaranteed annual tonnage or GAT). Since the customer pays for the minimum tonnage commitment even if they deliver less waste, this clause is often referred to as a "put or pay" provision. Some waste-to-energy contracts also contain limits on the maximum amount of waste that can be delivered on an annual basis and assess additional charges if a customer delivers more than the maximum annual tonnage. It is unlikely that Covanta would agree to remove the guaranteed annual tonnage requirement from the WAA based on the proposed extension period of 15 years.

  The tonnage guarantee provision is of concern to the Study Communities because most of them do not offer town-wide curbside collection services and as such they do not have direct "control" of the residential waste stream. Residents either bring their waste to the transfer station or contract with a private collection company

(subscription service). Private haulers in most cases are not obligated to deliver the waste to the town's designated disposal site. In this case, a town must offer a competitive disposal fee to attract this waste (so called "economic flow control").

The MOU offered by Covanta allows for a community to count any waste that is recycled towards their annual tonnage commitment. CDM recommends that this provision be expanded to specifically include any food waste that is diverted to a compost program in the event that a community decides to manage this portion of the waste stream in this manner. Food waste composting is not specifically included in the definition of recycling under the existing WAAs.

- ***Force Majeure Events*** – Force Majeure Events include events such as acts of God and changes-in-law that are beyond the control of either contract party. Typical waste-to-energy contract language exempts a party from certain contract responsibilities and/or provides for additional compensation should a Force Majeure Event occur. Force Majeure provisions are standard in solid waste disposal agreements regardless of the duration of the contract except for reimbursement for changes-in-law which are sometimes specifically excluded in contracts with durations of 5 years or less. In a worst case scenario where the processing capacity of the waste-to-energy facility was adversely affected, Force Majeure provisions typically limit the operator's exposure (including payment of incremental costs associated with alternative disposal) to a specific period of time (e.g., typically 7 months) after which they can terminate the contract.

- ***Annual Tipping Fee Escalation*** – In the past, most waste-to-energy contracts provided for annual escalation of the tipping fee based on a index (or percentage thereof), typically the locally published Consumer Price Index (CPI). More recent municipal agreements have included a fixed annual percentage increase (typically 2.5 to 3.0 percent) to make it easier for communities to budget from year to year. As discussed above, the MOU offer by Covanta provides for annual escalation based on 100 percent of the Boston CPI-U up to a maximum of 4 percent per year. The potential increase is higher than other recently negotiated contracts with waste-to-energy plant operators. As stated previously, the existing WAAs do not provide for any automatic annual escalation. It is unlikely that Covanta would agree to a long-term contract extension that did not contain an escalation provision.

- ***Refuse Truck and Rail Car Waiting/Unloading Time*** – The time that it takes to empty a refuse truck can have a significant impact on the hauling costs. Some waste-to-energy agreements include limits on the maximum truck unloading time. In these cases, exceedance of the maximum truck unloading time subjects the facility operator to a penalty intended to cover the customer's additional costs. Unloading time should be calculated based on the time that a truck first enters the facility site until the time it departs from site since the longest wait often occurs prior to the scale house. Since the Cape Communities deliver a significant portion of their waste to the SEMASS facility via rail cars, it would also be reasonable to include provisions for timely unloading of rail cars.

- ***Requirements if Facility is Unable to Process Waste*** – While waste-to-energy facility operation is generally reliable, certain events such as fires can prevent or limit a facility's ability to process waste for a period of time. In these cases, the facility operator should be responsible for finding an alternative disposal site for the waste that cannot be processed and to pay for any incremental disposal and/or hauling costs incurred by the customer. This responsibility could also apply during Force Majeure events.

- ***Responsibility for Residue Disposal*** – Approximately 30 percent by weight of the incoming waste is left over as residue after the combustion process. This includes reagents such as lime and activated carbon that are added to control air emissions. SEMASS should be solely responsible for the transportation and proper disposal of all residue. The Study Communities should not be responsible for any increased costs associated with residue disposal including transportation, changes-in-law affecting the disposal site and the need to use an alternative disposal sites.

- ***Termination Provision if the Community Ceases Collecting/Managing Residential Solid Waste*** – Most communities provide for the collection and/or disposal of residential solid waste from their community. If there is a potential that a community may decide to cease collecting and/or managing the disposal of residential solid waste from their community in the future, they may want to consider including a termination provision in disposal contract, particularly if it is a long-term agreement.

3.8 Evaluation of Financial Considerations of MOU

As discussed above, the MOU proposed by SEMASS is based on the Study Communities making a series of increased tipping fee payments for the remaining five years of the existing Waste Acquisition Agreements to "lock-in" a below-market price for the subsequent 15 years. The anticipation is that this price will be at least ten percent below the market rate for the duration of the extension agreement.

As a basis for evaluating the financial implications of the proposed MOU, CDM prepared Table 3-6 that shows the current costs for MSW disposal for the Study Communities over the next five years under the current WAA and if all the communities signed the MOU and executed the proposed extension agreements . For the Cape communities, the MOU would represent an increase in disposal costs of approximately 55 percent over the next five years to an average tipping fee of $57.64 per ton for the current tipping fees of approximately $37 per ton. For Wellfleet with its current disposal tipping fee of $18 per ton, the increase in costs would be approximately 135 percent of their costs over the next five years. Similar percentages and increased costs will occur for the off-Cape communities.

Table 3-6
Summary of Future Tipping Fees for Study Communities under Existing WAA and Proposed MOU
Cape Communities

Town	Existing Agreement				Proposed MOU		
	Current Tipping Fee at SEMASS	Proposed Annual Tonnage	Annual Disposal Costs	Total Disposal Costs for Five Years	Increased Cost	Revised Disposal Costs for Five Years	Average Revised Tipping Fee
Barnstable	$37.51	49,000	$1,837,990	$ 9,189,950	$ 5,022,500	$14,212,450	$ 58.01
Brewster	$37.51	6,600	$247,566	$ 1,237,830	$ 676,500	$ 1,914,330	$ 58.01
Chatham	$37.51	6,000	$225,060	$ 1,125,300	$ 615,000	$ 1,740,300	$ 58.01
Dennis	$37.51	12,322	$462,198	$ 2,310,991	$ 1,263,005	$ 3,573,996	$ 58.01
Eastham	$37.51	4,000	$150,040	$ 750,200	$ 410,000	$ 1,160,200	$ 58.01
Falmouth	$36.76	18,500	$680,060	$ 3,400,300	$ 1,896,250	$ 5,296,550	$ 57.26
Harwich	$37.51	7,500	$281,325	$ 1,406,625	$ 768,750	$ 2,175,375	$ 58.01
Mashpee	$36.76	7,500	$275,700	$ 1,378,500	$ 768,750	$ 2,147,250	$ 57.26
Orleans	$37.51	5,497	$206,192	$ 1,030,962	$ 563,443	$ 1,594,405	$ 58.01
Provincetown	$37.91	4,000	$151,640	$ 758,200	$ 410,000	$ 1,168,200	$ 58.41
Sandwich	$37.26	10,519	$391,938	$ 1,959,690	$ 1,078,198	$ 3,037,887	$ 57.76
Truro	$37.51	2,200	$82,522	$ 412,610	$ 225,500	$ 638,110	$ 58.01
Wellfleet	$18.15	2,600	$47,190	$ 235,950	$ 318,500	$ 554,450	$ 42.65
Yarmouth	$37.51	27,500	$1,031,525	$ 5,157,625	$ 2,818,750	$ 7,976,375	$ 58.01
Totals		**163,738**	**$6,070,947**	**$30,354,733**	**$16,835,145**	**$47,189,878**	**$ 57.64**

Table 3-6 (Cont'd)
Summary of Future Tipping Fees for Study Communities under Existing WAA and Proposed MOU
Off-Cape Communities

	Existing Agreement				*Proposed MOU*		
Town	*Current Tipping Fee at SEMASS*	*Proposed Annual Tonnage*	*Annual Disposal Costs*	*Total Disposal Costs for Five Years*	*Increased Cost*	*Revised Disposal Costs for Five Years*	*Average Revised Tipping Fee*
Hanson	$34.52	2,600	$89,752	$448,760	$266,500	$715,260	$55.02
Kingston	$34.52	5,000	$172,600	$863,000	$512,500	$ 1,375,500	$55.02
Norwell	$34.52	4,000	$138,080	$690,400	$410,000	$ 1,100,400	$55.02
Plymouth	$22.53	14,000	$315,420	$1,577,100	$1,435,000	$ 3,012,100	$43.03
	Totals	**25,600**	**$715,852**	**$3,579,260**	**$2,624,000**	**$6,203,260**	$48.46

The additional upfront costs can be justified only if the future disposal tipping fees under the extension agreement are significantly below future anticipated market-rate disposal costs. To evaluate this potential, CDM reviewed the payback period for the upfront payments assuming market disposal tipping fees of $80, $90 and $100 per ton. The detailed tables for each Study Community are provided in Appendix D, CDM is only presenting the following alternatives here:

- Study Community who is currently paying $37.51 per ton – this represents the majority of the Cape communities; and
- Study Community who is currently paying $20 per ton – this is the approximate average of the disposal tipping fees of the towns of Plymouth and Wellfleet.

3.8.1 Communities with Current Tip Fee of $37 per Ton

To assess the financial aspects of the proposed SEMASS MOU, CDM compared the present value of the upfront payments over the remaining five years of the existing Waste Acquisition Agreements to the potential savings over the 15-year timeframe for the proposed Extension Agreement. CDM then estimated the number of years after the Extension Agreements become effective to return the funds paid upfront to the Study Communities.

For this analysis, CDM used present value analysis to estimate the value of payments in future years. This approach allows a comparison of multi-year alternatives in current (2010) dollars. The following are the general assumptions used to develop this analysis:

- Normalizing Discount Rate. Future costs are discounted to 2010 values using a normalizing discount rate of 4.2 percent per year.
- Escalation of Extension Agreement Tipping Fees. The proposed MOU allows for an escalation of future costs by the Consumer Price Index (CPI). For this analysis, CDM assumed that the disposal tipping fees escalate by an average annual CPI of 3 percent.
- Change-in-Law Cost Provisions. Since their applicability, magnitude and timing cannot be predicted, CDM did not incorporate any change-in-law costs into the analysis.

As discussed above, the length of time it takes to pay back the upfront payments is based on a comparison to future market solid waste disposal costs. CDM estimated the present value and future costs for the proposed SEMASS MOU and compare it to the Study Communities not signing the MOU and paying 2015 market rate tipping fees of $80, $90 and $100 per ton.

3.8.1.1 SEMASS MOU - $37 per ton Communities

The baseline for comparison of future alternatives is for the Study Communities signing the proposed MOU and making the upfront payments. The per ton disposal tipping fee costs for the Study Communities currently paying approximately $37 per ton for representative years are shown on Table 3-7, assuming they sign the MOU. The estimated tipping fees are shown graphically on Figure 3-1.

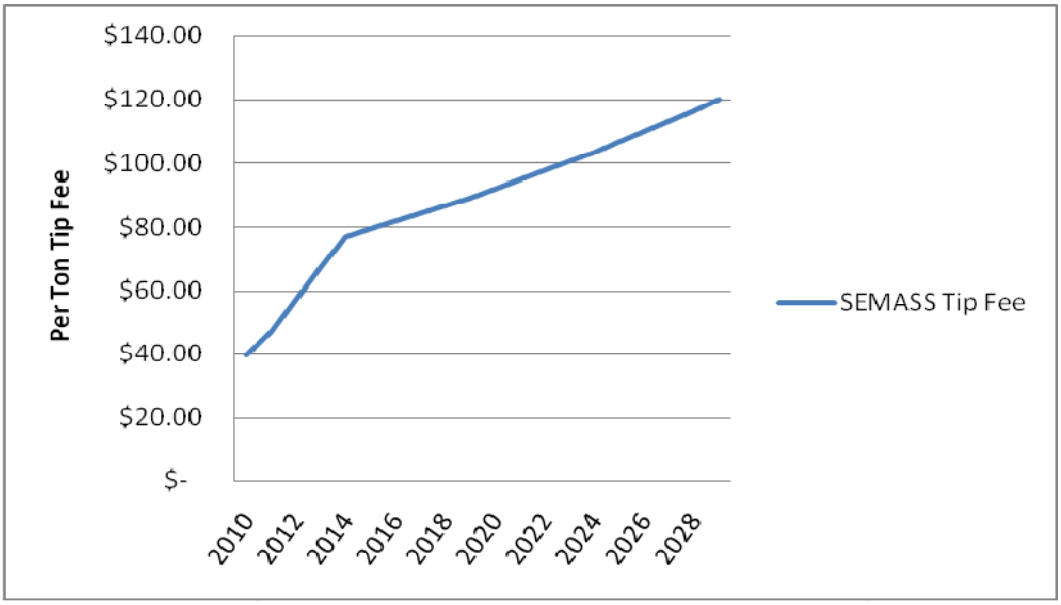
Table 3-7
Disposal Tipping Fees for Representative Years Under SEMASS MOU
Study Communities Currently Paying Approximately $37 Per Ton

Year	*Increase Over Prior Year*	*Estimated Per Ton Tipping Fee*
2010	$2.50	$39.50
2011	$7.50	$47
2012	$10.00	$57
2013	$10.00	$67
2014	$10.00	$77
2015	Increase by assumed CPI of 3 percent per year	$79
2020		$92
2025		$107
2029		$120

Notes

1. Tipping fees rounded to nearest dollar.
2. See Appendix D for full analysis.
3. Per Ton Tip Fees are estimated values in corresponding year.

Figure 3-1
Disposal Tipping Fees for Study Communities Currently Paying Approximately $37 Per Ton under Proposed SEMASS MOU



Under the SEMASS MOU, the Study Communities who currently pay approximately $37 per ton will have to pay a total of approximately $91 per ton more in present value (2010) over the next five years. This value will be compared to the present value of future alternatives to determine when the Study Communities would get a return on their upfront investment compared to different market rates.

3.8.1.2 Estimated Future Disposal Costs at Market Rate of $80 per Ton

Under this scenario, the Study Communities who currently pay around $37 per ton do not sign the SEMASS MOU and enter into a market-rate agreement when the current Waste Acquisition Agreements expire. This market rate contract is assumed to be $80 per ton in 2015.

As discussed above, under the proposed SEMASS MOU there is a re-set provision that allows the proposed tipping fee to be reset should the market rate (as established by a comparison to recent SEMASS municipal contracts) be at most 10 percent more than the communities' disposal tipping fee. If the market is established at $80 per ton in 2015, the disposal tipping fees would reset to 10 percent less than market or $72 per ton.

The per ton disposal tipping fee for this scenario, including the anticipated market reset, for representative years are shown on Table 3-8 and graphically on Figure 3-2. The figure also shows the anticipated tipping fees under the SEMASS MOU as outlined in section 3.8.1.1 above.

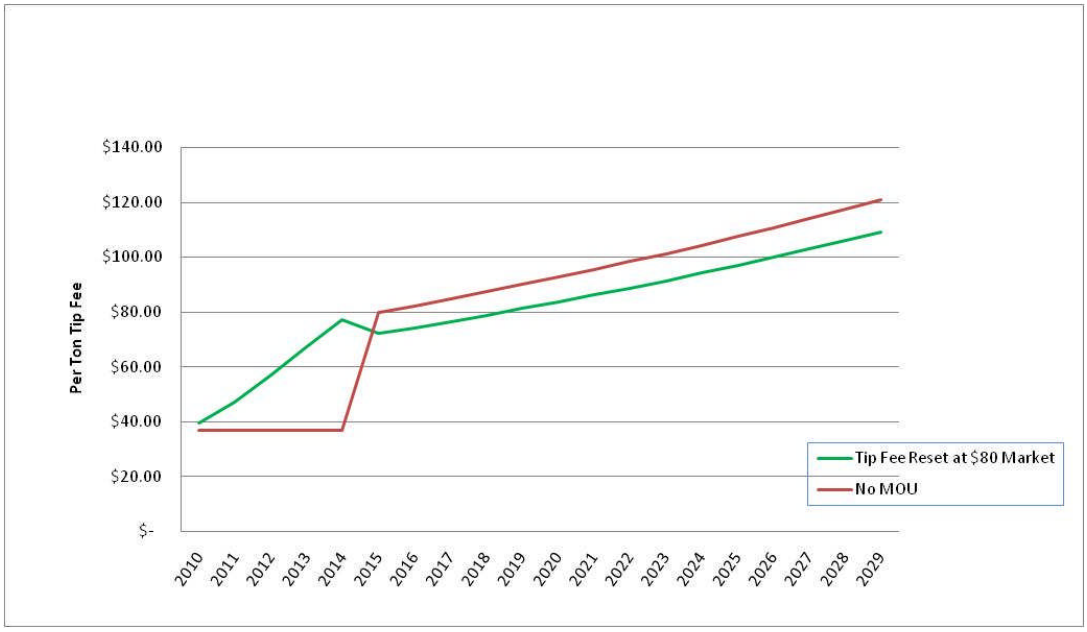
Table 3-8
Disposal Tipping Fees for Representative Years
Study Communities – Do Not Sign MOU and 2015 Market at $80 Per Ton

Year	*Increase Over Prior Year*	*Estimated Per Ton Tipping Fee – No MOU*
2010	No increase in Tipping Fee Under Current Agreement	$37
2011		$37
2012		$37
2013		$37
2014		$37
2015	Increase by assumed CPI of 3 percent per year	$80
2020		$93
2025		$108
2029		$121

Notes

1. Tipping fees rounded to nearest dollar.
2. See Appendix D for full analysis.
3. Per Ton Tip Fees are estimated values in corresponding year.

Figure 3-2
Disposal Tipping Fees for Study Communities Currently Paying Approximately $37 Per Ton
Proposed SEMASS MOU and No MOU at $80 Per Ton 2015 Market Rate



As mentioned above, the total present value of the increased tipping fees under the SEMASS MOU is approximately $91 per ton over the next five years for the Study Communities currently paying approximately $37 per ton. If the Study Communities signed the MOU with the re-set of the tip fee to ten percent below the assumed $80 per ton market rate ($72 per ton 2015 tip fee), it would take the entire length of the 15-year Extension Agreement to return the present value of the upfront payments.

3.8.1.3 Estimated Future Disposal Costs at 2015 Market Rate of $90 and $100 per Ton

Similar to the analysis conducted above, CDM evaluated the number of years it will take to return the upfront payments under the SEMASS MOU if the future market disposal rates in 2015 are $90 and $100 per ton of MSW. Since both of these potential market rates are more than ten percent above the anticipated tipping fees under the SEMASS MOU, there will not be any market re-set.

The future estimated tipping fees under these anticipated market rates for representative years are shown on Table 3-9 and on Figures 3-3 and 3-4 for $90 and $100 per ton, respectively.

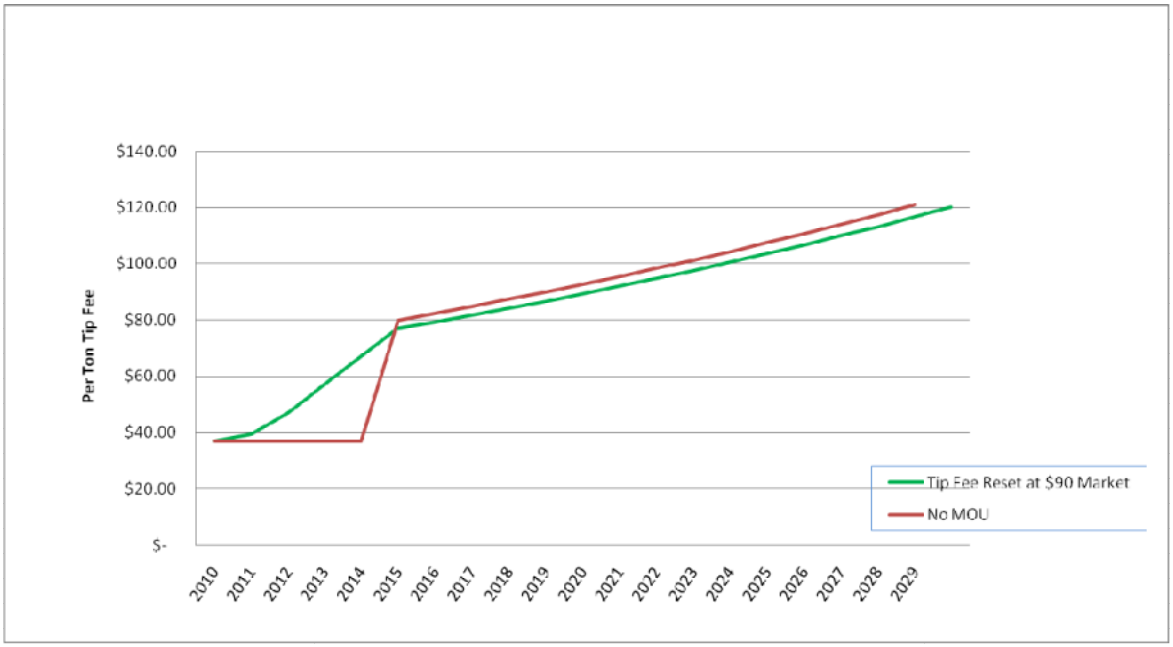
Table 3-9
Disposal Tipping Fees for Representative Years
Study Communities – Do Not Sign MOU and
2015 Market at $90 and $100 Per Ton

Year	*Increase Over Prior Year*	*Estimated Per Ton Tipping Fee $90 per ton market*	*Estimated Per Ton Tipping Fee $100 per ton market*
2010	No increase in Tipping Fee Under Current Agreement	$37	$37
2011		$37	$37
2012		$37	$37
2013		$37	$37
2014		$37	$37
2015	Increase by assumed CPI of 3 percent per year	$90	$100
2020		$104	$116
2025		$121	$134
2029		$136	$151

Notes

1. Tipping fees rounded to nearest dollar.
2. See Appendix D for full analysis.
3. Per Ton Tip Fees are estimated values in corresponding year.

Figure 3-3
Disposal Tipping Fees for Study Communities Currently Paying Approximately $37 Per Ton
Proposed SEMASS MOU and No MOU at $90 Per Ton 2015 Market Rate



In present value (2010), to return the upfront payment on the SEMASS MOU compared to a 2015 market contract starting at $90 per ton and escalating at the CPI, it will take approximately 11 years. For a 2015 market rate of $100 per ton, it will take a total of approximately four years from the start of the Extension Agreement.

3.8.2 Communities with Current Tip Fees of $20 per Ton

CDM conducted a similar analysis for the communities of Plymouth and Wellfleet who are currently paying $22.53 and $18.15 per ton, respectively. To provide a financial analysis for these two communities, CDM utilized an average tipping fee of $20 per ton. For these two towns, the estimated tipping fees under the SEMASSS MOU are summarized on Table 3-10. These costs were developed using the same general assumptions as described above for the remainder of the Study Communities.

Table 3-10
Disposal Tipping Fees for Representative Years
Towns of Plymouth and Wellfleet

Year	SEMASS MOU		No SEMASS MOU – Market Rate		
	Increase Over Prior Year	Estimated Per Ton Tipping Fee	$80 Per Ton	$90 Per Ton	$100 Per Ton
2010	$2.50	$22.50	$20	$20	$20
2011	$7.50	$20	$20	$20	$20
2012	$10.00	$40	$20	$20	$20
2013	$10.00	$50	$20	$20	$20
2014	$10.00	$60	$20	$20	$20
2015	Increase by assumed CPI of 3 percent per year	$62	$80	$90	$100
2020		$79	$93	$104	$116
2025		$83	$107	$121	$133
2029		$93	$121	$136	$151

Notes

1. Tipping fees rounded to nearest dollar.
2. Assumed current tip fee of $20 per ton (approximate average of Plymouth and Wellfleet)
3. See Appendix D for full analysis.
4. Per Ton Tip Fees are estimated values in corresponding year.

For these two communities, the return on the initial payment (present value of approximately $91 per ton) will be about six, four and three years in comparison to future market disposal tipping fees of $80, $90 and $100 per ton, respectively.

Section 4
Evaluation of Alternative Disposal Sites

4.1 Introduction

There are currently the following potential alternative disposal sites for the MSW generated by the Study Communities:

- Bourne Landfill and associated Integrated Solid Waste Management facilities operated by the Town of Bourne;
- Crapo Hill Landfill located in Dartmouth, Massachusetts that is operated by the Greater New Bedford Regional Refuse District and is evaluating accepting up to 20,000 tons per year of MSW for disposal;
- Rochester Environmental Park Transfer Station located in Rochester, Massachusetts and operated by Casella Waste Systems. The operator indicated that MSW delivered to this facility will be transferred to either the Maine Energy Incinerator (MERC) located in Biddeford, Maine or the landfill located at the Southbridge Disposal and Recycling Park in Southbridge, Massachusetts;
- SEMASS Waste-to-Energy Facility operated by Covanta Waste Systems and located in Rochester, Massachusetts; and
- Long-distance rail haul from the two on-Cape regional rail transfer stations with disposal at an out-of-state disposal facility, most likely a large commercial landfill.

Each of these alternatives is described in Section 2.

To evaluate each of these alternatives, CDM contacted the operators as well as other disposal facilities and solid waste companies operating in southeastern Massachusetts; visited and toured the local facilities; attempted to obtain information on anticipated future disposal tipping fees; evaluated additional costs for hauling MSW to facilities other than SEMASS and conducted an evaluation of non-cost impacts such as truck traffic around the two bridges that cross the Cape Cod Canal, potential for energy generation from waste-to-energy versus landfills, and compared estimated greenhouse gas emissions for alternatives. Because the Crapo Hill Landfill can only accept a limited percentage of the Study Communities' MSW and is seeking contracts prior to the expiration of the current Waste Acquisition Agreements, CDM did not conduct a detailed evaluation of it as an option. This section summarizes the comparative evaluation between each of these alternatives.

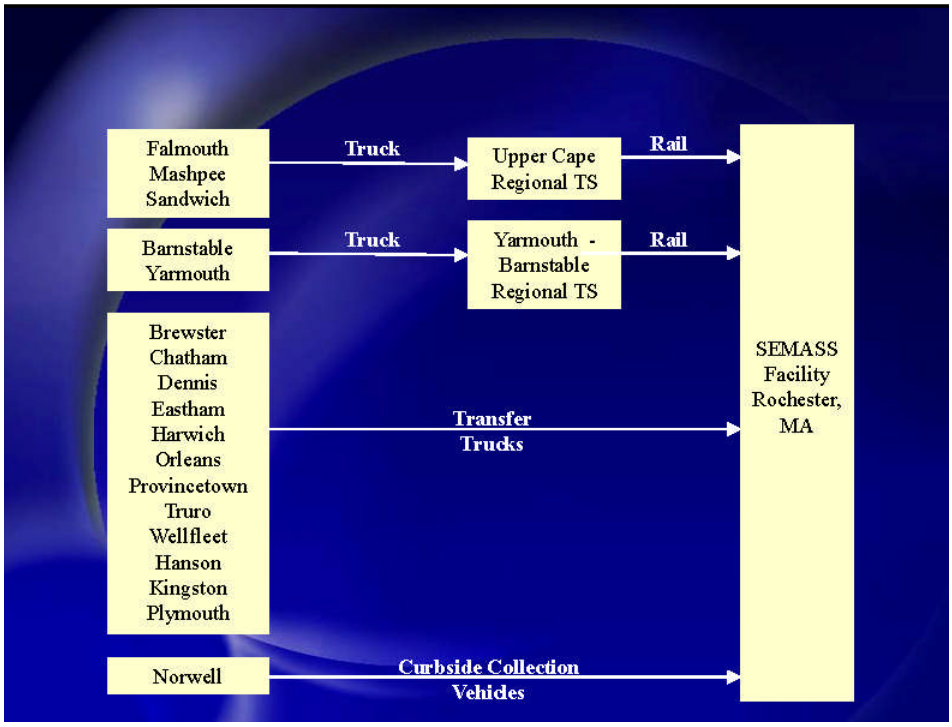
4.2 Comparative Cost Analysis

The cost for the Study Communities to haul MSW is comprised of three factors. The first cost item is the collection of the MSW from residents (and businesses in some communities) and its delivery to a central collection point such as a transfer station or

curbside collection vehicle. For comparison purposes, CDM has assumed that this portion of the collection will remain the same in the future regardless of the ultimate disposal location. This assumption is based on all of the potential disposal locations outlined above being in close proximity to the Study Communities and not requiring significant revisions to the methods used to collect MSW from residents.

The second cost item is to haul the waste from the point it is collected from either the local or regional transfer station to the disposal locations. All of the communities except Falmouth and Norwell transport their waste from local transfer stations to either larger regional transfer stations or directly to the SEMASS facility. Falmouth also operates a residential drop-off center that delivers waste to the Upper Cape Regional Transfer Station. The various methods used to haul MSW from the Study Communities to SEMASS (and in the future to other potential disposal facilities) are shown graphically on Figure 4-1.

Figure 4-1
Summary of Current Hauling Methods to SEMASS Facility



As discussed in Section 2, the Yarmouth and Barnstable have entered into an amendment to their Waste Acquisition Agreements that pays for their costs for rail transportation from their regional transfer station for the MSW that is collected at their local transfer stations. For the purposes of this evaluation, CDM ignored the conditions of the agreement and assumed that the MSW tonnages that each community proposed to guarantee for disposal will be hauled by their current method (e.g. collected a the local transfer station or by private curbside collection vendor, delivered to the regional transfer station and hauled by either by rail to

SEMASS or an out-of-town facility or truck to the Bourne Landfill or the Rochester Environmental Park transfer station).

As the Study Communities begin to review their alternatives for future MSW, they should evaluate their current methods for collecting MSW from residents and hauling it to the disposal facilities. This evaluation should be linked to future methods for collecting and handling recyclable materials and could include curbside collection and the viability of the two regional transfer stations.

The final cost component for MSW disposal is the tipping fee paid at the disposal facility. The only facility that was willing to provide a proposed tipping fee as part of this study was SEMASS through their proposed MOU. Given the timeframe before the current Waste Acquisition Agreements expire, it is unlikely that the Study Communities will be able to obtain confirmed pricing at this time. The waste disposal companies contacted by CDM cited the significant impact of the economy on current tipping fees but all stated that they anticipated total tipping fees for the Study Communities to be between $70 and $90 per ton in 2015. The very low tipping fees ($15 to $20 per ton) at large commercial out-of-state landfills are a limiting ceiling on local facilities. It should be noted that long-haul alternatives are volatile based on future fuel costs. For this reason, CDM was not able to obtain an estimated total cost (haul and disposal) for out-of-state large regional facilities.

4.2.1 Comparative Costs – Handling and Hauling MSW

The three local available disposal facilities – Bourne Landfill, Rochester Environmental Park Transfer Station and the SEMASS waste-to-energy facility are all located in close proximity to each other. To develop comparative costs for hauling the Study Communities' MSW to each facility, CDM assumed the following:

- Existing methods for hauling waste (e.g. by rail or truck) will remain in-place for disposal at the SEMASS facility;
- Hauling to the Bourne Landfill or the Rochester Environmental Park transfer station will be by truck;
- Costs will be developed for 2015 for comparison;
- Costs for accepting and handling waste at local or regional transfer stations are assumed to be same for all alternatives and are not incorporated into the estimates;
- Costs for hauling by rail from the two regional transfer stations will be the per ton cost from the current agreements between the facilities and the railroad;
- Costs for hauling by truck are based on an average of $3.75 per mile hauled for all trucks and distances in 2010. This cost was increased by a 3% per year to a rate of $4.49 per mile in 2015. The Study Communities have varying methods for hauling by truck (e.g. own vehicles, contracted haulers, use of regional bids);
- Time to unload upon arriving at each disposal facility will be the same;

- Truck containers can hold the following tonnage of MSW on average:

  - Transfer Trailers – 20 tons per trip
  - Roll-off Containers from Local Drop-offs – 10 tons per trip
  - Packer Trucks (Norwell) – 15 tons per trip

Actual tonnages per trip may vary based on ability to compact loads at transfer stations and hauling of partially filled containers but these assumed averages provide a basis to compare hauling costs for different alternatives.

4.2.1.1 Comparative 2015 Haul Costs – Cape Communities

The comparative per ton haul costs for each of the Cape communities from their local transfer stations to the alternative disposal facilities (SEMASS, Bourne Landfill and REP Transfer Station) is shown on Table 4-1. The average costs for each of the three potential disposal facilities from each of the three current methods for hauling is shown graphically on Figure 4-2.

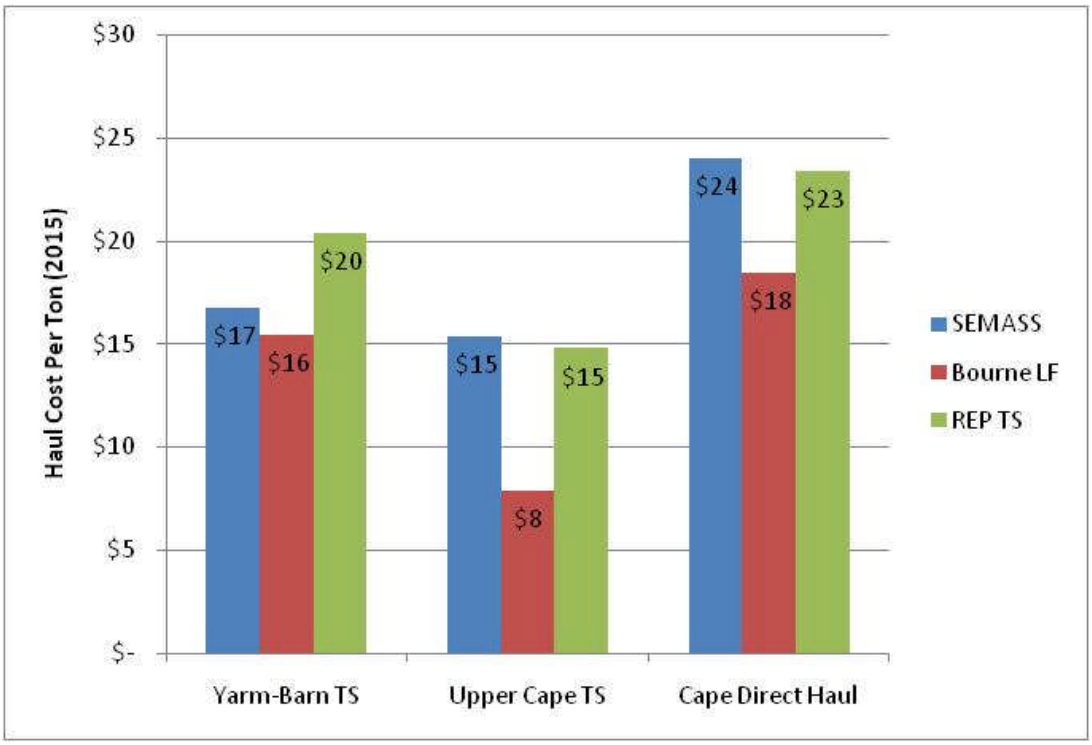
Table 4-1
Estimated Comparative per Ton Haul Costs (2015) for Cape Communities to Alternative Disposal Facilities

Town	*Annual Tonnage*	*Per Ton Comparative Hauling Costs to Disposal Facility*				
		SEMASS			*Bourne Landfill*	*REP Transfer Station*
		Truck Costs	*Rail Costs*	*Total*		
Yarmouth-Barnstable Regional Transfer Station						
Barnstable	49,000	$4.56	$13.86	$18.42	$17.14	$22.08
Yarmouth	27,500	N/A[1]	$13.86	$13.86	$12.58	$17.52
Average	**76,500**			**$16.78**	**$15.50**	**$20.44**
Upper Cape Regional Transfer Station						
Falmouth	**18,500**	$3.58	$11.07	$14.65	$6.50	$13.47
Mashpee	**7,500**	$4.43	$11.07	$15.50	$7.80	$14.32
Sandwich	**10,519**	$5.47	$11.07	$16.54	$9.58	$17.52
Average	**36,519**			**$15.37**	**$7.88**	**$14.81**
Cape Communities that Haul Directly						
Brewster	**6,600**	$22.47	N/A	$22.47	$17.07	$22.02
Chatham	**6,000**	$23.36	N/A	$23.36	$17.97	$22.92
Dennis	**12,322**	$18.87	N/A	$18.87	$13.48	$18.42
Eastham	**4,000**	$26.06	N/A	$26.06	$20.67	$25.61
Harwich	**7,500**	$21.12	N/A	$21.12	$15.73	$20.67
Orleans	**5,497**	$23.81	N/A	$23.81	$18.42	$23.36
Provincetown	**4,000**	$36.39	N/A	$36.39	$31.00	$35.95
Truro	**2,200**	$37.74	N/A	$37.74	$27.86	$32.80
Wellfleet	**2,600**	$30.10	N/A	$30.10	$24.71	$29.66
Average	**50,719**			**$24.08**	**$18.50**	**$23.44**

Notes

1. Yarmouth's local transfer station is located directly adjacent to regional transfer station and costs for hauling were not estimated.

Figure 4-2
Comparative Average Costs for Alternative Disposal Facilities with Current Hauling Methods



Based on this analysis, CDM provides the following conclusions:

- For the participating Upper Cape Regional Transfer Station communities (Falmouth, Mashpee and Sandwich), the cost for hauling waste is significantly less by truck to the Bourne landfill than it is either by rail to SEMASS or truck to the REP Transfer Station. If these communities select the Bourne Landfill as a long-term disposal location, they should individually evaluate the long-term cost-effectiveness of the Upper Cape facility. Also, these communities should evaluate hauling by rail or truck if they continue delivering their MSW to SEMASS;

- The hauling costs for Yarmouth and Barnstable are similar for both the Bourne Landfill and SEMASS with slightly higher costs for truck haul to the REP Transfer Station. However, as noted in Section 2, these communities have negotiated an agreement where the costs for hauling by rail from the regional transfer station to SEMASS is waived for MSW collected from the two towns' local transfer stations; and

- For the remaining Cape communities, the costs for hauling are directly proportional to the distance to the disposal facility. Bourne is the least expensive while hauling by truck to either SEMASS or the REP Transfer Station will be the same.

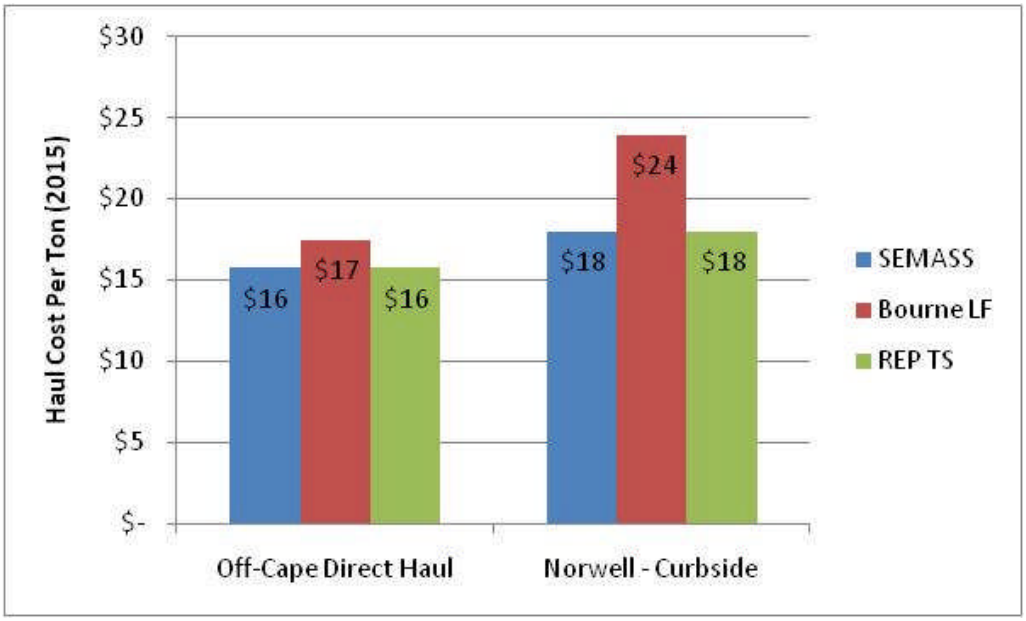
4.2.1.2 Comparative 2015 Haul Costs – Off-Cape Communities

Of the four off-Cape communities evaluated as part of this study, three (Plymouth, Hanson and Kingston) haul their MSW from local transfer stations to the SEMASS facility. The Town of Plymouth operates three separate local transfer stations that collect MSW from residents and deliver it to the disposal facility. The other community (Norwell) transports MSW in the curbside collection vehicles that collect from residents. A summary of the comparative costs for each of these communities is shown on Table 4-2 and as an average on Figure 4-3.

Table 4-2
Estimated Comparative per Ton Haul Costs (2015) for Off-Cape Communities to Alternative Disposal Facilities

Town	Annual Tonnage	Per Ton Comparative Hauling Costs to Disposal Facility			
		Location	SEMASS	Bourne Landfill	REP Transfer Station
Communities Hauling from Local Transfer Stations					
Hanson	2,600		$22.47	$31.45	$22.47
Kingston	5,000		$14.38	$20.22	$14.38
Plymouth	14,000	Cedarville TS	$18.87	$ 7.19	$18.87
		Manomet TS	$16.18	$13.48	$16.18
		South Street TS	$13.48	$16.18	$13.48
Community Hauling Directly in Curbside Collection Vehicles					
Norwell	4,000		$17.97	$23.96	$17.97

Figure 4-3
Comparative Average Costs for Alternative Disposal Facilities with Current Hauling Methods - Off-Cape Communities



In general, the costs for hauling are the same for both SEMASS and the REP Transfer Station and more for hauling to the Bourne Landfill due to the increased distance from all locations except the Cedarville Transfer Station in Plymouth.

4.3 Comparative Analysis of Non-Cost Considerations

In addition to the cost of hauling and disposal tipping fees, there are several other considerations that CDM evaluated as part of this study. For each alternative outlined above, CDM reviewed the following:

- Comparative emissions of greenhouse gases for the transportation and disposal of waste in each scenario;
- Number of truck trips on both the roads around the two bridges that cross the Cape Cod Canals and that will have to cross the bridges for each scenario;
- Recycling of metals as part of the process at the SEMASS facility; and
- Generation of electricity from either landfills or waste-to-energy facilities.

4.3.1 Comparative Greenhouse Gas Emissions Analysis

The transportation and disposal of MSW from the Study Communities will generate Greenhouse Gas (GHG) emissions to the environment. As requested, CDM prepared an assessment of the emissions from the transportation of MSW from the local transfer stations to the alternative disposal facilities and the anticipated emissions of GHG from either landfilling or waste-to-energy technologies evaluated as part of this study. The detailed analysis for GHG generation for each of the Study Communities is presented in Appendix F.

After initial presentations were made to the Cape Cod Commission, there were significant comments about CDM's comparative GHG analysis by the operator of the SEMASS waste-to-energy facility. Their comments are contained in a letter provided in Appendix G.

4.3.1.1 Overall Approach

CDM relied on numerous references for the development of the comparison of GHG emissions from each of the proposed alternatives. Primarily, the analysis was based on the Local Government Operations Protocol (LGOP)[1] which is published by The Climate Registry (TCR), a 501(c)(3) non-profit organization that was formed with the intent of improving the consistency and accuracy of GHG emissions reporting in North America. TCR is subscribed to by 41 U.S. states (including Massachusetts), 11 Canadian provinces and six Mexican states, and currently provides the leading unifying GHG inventory guidance in North America. A partnership of TCR, the

[1]California Air Resources Board, California Climate Action Registry, ICLEI-Local Governments for Sustainability, & The Climate Registry. *Local Government Operations Protocol*. The Climate Registry, September 2008.

California Air Resources Board, the California Climate Action Registry, and ICLEI – Local Governments for Sustainability (ICLEI) developed the LGOP.

There are a number of other protocols that have been developed for regulatory purposes such as those utilized by the U.S. EPA, the European Union, the Intergovernmental Panel on Climate Change (IPCC), the World Economic Forum, the United Nations Framework Convention on Climate Change. As stated in "Waste and Climate Change International Solid Waste Management Association's (ISWA) White Paper."

> "…the tools for the reporting and quantification of GHG emissions from waste management all have varying objectives, boundaries and scopes. The choice of accounting mechanism depends on the scope of reporting, but all rely on the same basic operational data generated by specific waste management technologies.
>
> However, GHG accounting alters substantially depending on whether upstream processes and downstream savings in the waste management chain are included. This naturally leads to different results; while all are likely to be fully justifiable, they should be compared with care."

It is CDM's opinion that the LGOP is the most appropriate for this analysis for the Study Communities, since Massachusetts has subscribed to it, it is based on internationally accepted protocols, and was developed specifically for GHG reporting and tracking by U.S. local governments (cities and towns).

For this analysis, CDM evaluated the following components of GHG emissions from the hauling and disposal of the MSW generated by the Study Communities:

- Transportation options including short-distance hauling by truck and rail, as well as long-distance rail transport. The GHG emissions are fossil-fuel-based emissions from trucks or train engines;
- GHG emissions related to MSW disposal at either a waste-to-energy (WTE) facility or a landfill with a landfill gas (LFG) collection system with a flare and the ability to convert collected gas to energy; and
- Electricity generation and resulting displaced GHG emissions from the existing electrical grid. It is assumed that both waste-to-energy facilities and landfills with gas-to-energy plants will generate electricity that will displace electricity generated from other sources in the local grid.

The source of GHG emissions from waste-to-energy facilities is that virtually all of the carbon in the MSW received at the facility is converted to carbon dioxide when burned. For GHG analysis, MSW is broken into two categories – biogenic and

anthropogenic. The biogenic portion of the MSW includes items such as food and paper that was generated from natural sources that utilized carbon dioxide in their growth. If they were not combusted, but allowed to decompose naturally (aerobically), this carbon dioxide would be released to the atmosphere anyway, completing that carbon cycle. The anthropogenic portion of the MSW stream is man-made carbon-containing items such as plastics that are primarily fossil-fuel based. CDM assumed, based on the default factor provided in the LGOP, that 35% of the carbon in the MSW is fossil-fuel based (e.g. anthropogenic) and the remaining 65% of the carbon is biogenic. Therefore, in calculating GHG emissions from a WTE facility, one categorizes 35% of the carbon dioxide as anthropogenic and 65% as biogenic in origin. The small amounts of other GHGs emitted are all assumed to be anthropogenic, because they would not have occurred without the human intervention of burning the waste.

Gas generated by landfills is approximately one-half methane, a potent GHG that has an impact of approximate 21 times that of carbon dioxide. However, the large landfills that are being considered for this study will have a landfill gas collection system that collects most of the generated methane (CDM assumed a collection efficiency of 75% of the generated methane could be collected and that no methane would be collected for two years after waste was placed). The collected methane will be converted to carbon dioxide and water vapor by either a flare and/or a gas-to-energy plant. Only a portion of the carbon-containing MSW will generate methane or carbon dioxide when placed in a landfill.

Although the MSW going to landfills has the same origin and constituents, that is about 35% is anthropogenic and 65% is biogenic, the LGOP applies a different standard for determining what portion of the GHGs generated are attributed to anthropogenic versus biogenic sources. For landfills, the guidance is to assume that all of the carbon dioxide emitted (both that in the gas, and that emitted from the flare after combustion of the gas) is biogenic, and that the methane portion of the gas is anthropogenic. The reasoning is that the carbon dioxide would have been liberated or emitted naturally by the waste as it undergoes aerobic decomposition. Methane, on the other hand, is emitted only because humans put the waste in a landfill, where anaerobic decomposition produces methane, which is a much more powerful GHG than is carbon dioxide.

The LGOP requires that both anthropogenic and biogenic GHG emissions be reported and tracked, but makes the following distinction between the two:

> "The combustion of biomass and biomass-based fuels (such as wood, wood waste, landfill gas, ethanol, etc.) emit [carbon dioxide] CO_2 emissions, but these CO_2 emissions are distinct from Scope 1 emissions generated by combusting fossil fuels. The CO_2 emissions from biomass combustion are tracked separately because the carbon in biomass is of a biogenic origin—meaning that it was recently contained in living organic matter—while the carbon in fossil fuels has been trapped in

> geologic formations for millennia. Because of this biogenic origin, the IPCC Guidelines for National Greenhouse Gas Inventories requires that CO_2 emissions from biomass combustion be reported separately."

Similarly, the U.S. Environmental Protection Agency's (EPA's) Mandatory Greenhouse Gas Reporting Rule (40 CFR 98) states that for sources required to report GHG emissions, they must calculate and report both anthropogenic and biogenic GHG emissions, but report them separately.

The SEMASS comment letter states that comparisons of GHG emissions from waste disposal practices should be based on anthropogenic emissions only. CDM does not agree that the biogenic emissions should be ignored. This would be inconsistent with EPA and LGOP requirements, and with guidance referenced in the remainder of the SEMASS letter. CDM interprets this guidance to say only that anthropogenic and biogenic GHG emissions should be reported separately. In addition, it is CDM's opinion that science dictates that both anthropogenic and biogenic emissions be included in order to compare the GHG contribution of different types of facilities on an "apples-to-apples" basis. Both are being emitted to the atmosphere, and if the GHG emissions generated from the disposal of a banana peel that was thrown away does not need to be reported because the banana came from a tree that was removing carbon from the environment, that theory should hold true whether the banana peel is combusted in a waste-to-energy facility or biodegraded in a landfill. Finally, the Massachusetts Environmental Policy Act (MEPA) Unit of the Executive Office of Energy & Environmental Affairs (EEA) has issued guidance for quantifying and evaluating GHG emissions from projects.[2] In interpreting this guidance for a landfill project, the MEPA Unit required that all feasible measures be evaluated to avoid, minimize or mitigate both the biogenic carbon dioxide emissions and anthropogenic methane emissions in the landfill gas. The MEPA Unit's explanation was that all GHG emissions from the project, whether they are of biogenic or anthropogenic origin, adversely affect the environment; control of both should be implemented wherever possible.[3]

In response to the SEMASS comment letter, CDM has presented its GHG emissions calculation results in two ways:

1) Anthropogenic and biogenic GHG emissions are shown separately for each of the alternatives; and a subtotal is provided for anthropogenic emissions alone; and

2) A total of the anthropogenic and biogenic emissions is also presented.

---

[2] EEA, *Revised MEPA Greenhouse Gas Emissions Policy and Protocol*, Effective Date: February 3, 2009. Available at: http://www.env.state.ma.us/mepa/ghg.aspx.
[3] A. McDevitt, Assistant Secretary and MEPA Director, EEA, conference call, February 16, 2010.

4.3.1.2 Alternatives Evaluated

Each of these emission sources was aggregated into the following four disposal options for comparative analysis:

- ***SEMASS WTE Facility*** - Emissions include the GHG emissions from the combustion of MSW – 35% of which are considered anthropogenic and 65% are biogenic. They include a GHG credit for assumed reduced emissions from power generated by SEMASS, rather than by regional electric generating facilities, many of which use fossil fuel. They also include short-distance hauling of the waste to the facility by truck and rail.

- ***Bourne Landfill*** - Emissions include the biogenic carbon dioxide (CO_2) from decomposition and combustion of LFG and the anthropogenic emissions from fugitive methane (CH_4) from decomposition. They includes the GHG emission reduction credit for generating electricity. Emissions include those from short distance waste hauling by truck. CDM notes that the Bourne landfill does not currently have a plant to convert landfill gas into electricity, but it is assumed that it would in 2015, the year of this analysis.

- ***Rochester Environmental Park Transfer Station*** - MSW is sent to the Rochester Environmental Park Transfer Station, and then to the Southbridge Landfill. GHG emissions in this scenario includes the biogenic CO_2 from decomposition and combustion from LFG and the anthropogenic emissions from fugitive CH_4 from decomposition. They include the GHG emissions reduction credit for generating electricity. They also include emissions from short-distance waste hauling by truck and rail. CDM notes that the installation of a landfill gas to energy plant at the Southbridge Landfill is pending. It is assumed that the Landfill would be generating electricity by 2015.

- ***Long-Distance Rail Haul*** - MSW is sent to the either the Yarmouth-Barnstable or Upper Cape Regional transfer stations and then to a landfill 700 miles out of state. GHG emissions include the biogenic CO_2 from decomposition and combustion from LFG and the anthropogenic emissions from fugitive CH_4 from decomposition. They include GHG emissions reduced by generating electricity, and they include emissions from short-distance waste hauling by truck and rail and long-distance waste hauling by rail.

Appendix F shows the detailed results for each of the Cape Cod communities. It can be used to develop comparative estimates of GHG for their waste streams. Summary Table 4-3 at the end of this section shows GHG emissions on a per ton basis.

Table 4-3
Comparative GHG Emissions by Disposal Option
(Metric Tons of CO_2 per ton of MSW Disposed)

Alternative	*Total Comparative GHG Emissions*[1]					
	Transportation	*Anthropogenic from Waste Disposal* [1]	*Avoided Electric*	*Subtotal Anthropogenic*	*Biogenic*	*Total Net Anthropogenic and Biogenic GHG Emissions*
SEMASS with existing rail and truck hauling system	0.01	0.32	(0.23)	0.10	0.59	0.70
Bourne Landfill – All truck hauling	0.01	0.28	(0.09)[2]	0.21	0.27	0.48
Rochester Environmental Park – All truck hauling	0.02	0.28	(0.09)[2]	0.22	0.27	0.49
Long-Distance Rail to out-of-state landfills from existing regional transfer stations	0.03	0.28	(0.09)	0.22	0.27	0.49

Notes
1. See Appendix F for detailed calculations and assumptions.
2. Bourne and Southbridge landfills do not currently have landfill gas to energy facilities but are anticipated to have hem by 2015 when Study communities may start to deliver MSW.

4.3.1.3 Comparative Analysis of Transportation

- For this GHG emissions analysis, CDM used the same truck and rail car type as the comparative hauling cost analysis discussed above, and developed several assumptions regarding the fuel usage of each mode of transportation. The assumptions used in both analyses:

- Transfer trailers were assumed to have an average load of MSW of 25 tons per trip and have a mileage of 5.8 miles per gallon of fuel.

- Trains were assumed to run at the frequencies provide by Mass Coastal from the two regional transfer stations and were assumed to have a fuel efficiency of 0.54 miles per gallon.

- Emission factors for trains and trucks were taken from The Climate Registry General Reporting Protocol.

The total estimate for each Cape Cod Community is presented in Appendix F. The results show that the transportation GHG emissions are small relative to the emissions generated at either the landfill or waste-to-energy facilities.

4.3.1.4 Comparative Analysis of Disposal Methods

The two disposal alternatives analyzed for the Cape Cod Study Communities are landfilling and combustion at a waste-to-energy plant. For this comparative evaluation, CDM calculated the anthropogenic and biogenic GHG emissions separately, consistent with voluntary and regulatory GHG reporting protocols.CDM then also calculated the total GHG emissions from each disposal alternative. The presentation of the GHG emissions in both manners allows the Study Communities to evaluate the comparison between landfilling and waste-to-energy both as it is currently being reported and tracked in voluntary and regulatory reporting schemes, and as the total quantity of GHG that would be emitted from a ton of MSW sent to either a landfill or a waste-to-energy plant.

The following are the key assumptions made in calculating the GHG emission rates from either landfills or waste-to-energy plants:

- For landfills, CDM assumed that the landfill gas collection system would not collect and destroy methane for the first two years after waste was placed. Based on our understanding of landfill operations, this is a conservative assumption. CDM also assumed that the LFG collection system collects 75% of the LFG generated (25% escapes to the atmosphere). LFG generation rates were modeled based on the first-order-decay model provided in the LGOP. In order to calculate the total "lifetime" GHG emissions from a ton of waste, CDM modeled the LFG generation, collection and destruction of methane for a century. CDM assumed that electricity would be generated for 30 years after an LFG collection system starts collecting gas, begins and after that point there would not be enough LFG to power an engine. Since landfill gas collection is driven by regulatory requirements, the incremental cost of adding electric generation is minimal and the payback is certainly less than 30

years. Therefore, even though the Bourne and Southbridge Landfills are not currently generating electricity, it is CDM's opinion that assuming electricity generation will be installed by 2015 is reasonable.

Emissions from mobile equipment at each facility are ignored. CDM assumes that the front-end loaders, compaction equipment and other equipment used at each would be similar total GHG emissions.

- The SEMASS facility collects approximately 8,500 tons per year of ferrous and non-ferrous metals from the incoming waste stream. CDM did not provide any credit for GHG emissions reductions as avoided emissions from either the generation of new metals or from metals recycling. The inclusion of this factor will likely decrease the total emissions from the waste-to-energy plant. Similarly, however, CDM did not include any GHG emissions reduction credit for any recycling that may occur now or in the future at the landfills.

- In order to calculate the emission reduction credit for electricity generation, CDM used the average emission factor, rather than the marginal emission factor, from EPA's eGRID data base. The eGRID database contains the blended GHG emission factors per megawatt-hour generated by the electric power plants in the regional grid annually, based on the actual fuel mix for any given year. Average emission rates take into account the emissions from all of the regional power plants. The marginal emission rates are those from the plants that are used only during periods of peak demand, which tend to be the older and less efficient plants. Since the SEMASS facility sells the electricity that it generates to the grid all the time, it is CDM's opinion that using the average annual emission rate, rather than just the emission rates for peaking plants is appropriate.

The specific factors used to estimate the total GHG generation quantities are provided in the tables in Appendix F.

4.3.1.5 Conclusions

Table 4-3 shows that the GHG emission from the transportation of the MSW to disposal facilities is minor compared to the other emissions from MSW disposal. When considering anthropogenic GHG emissions only, and taking into account transportation and credit for electricity generation, the results show that the SEMASS waste-to-energy facility has lower GHG emissions per ton of MSW than do landfills. When considering total anthropogenic and biogenic GHG emitted, and taking into account transportation and credit for electricity generation, the results show that the SEMASS waste-to-energy facility has higher GHG emissions per ton of MSW than do landfills.

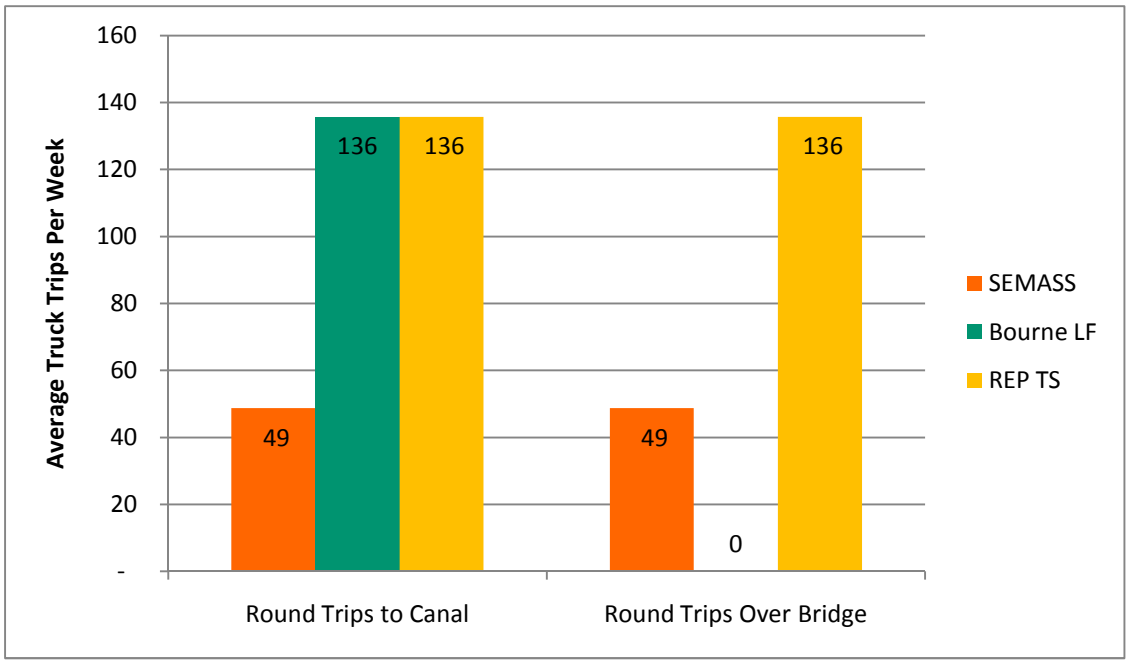
4.3.2 Comparative Truck Trips

As discussed previously, a significant percentage of the MSW generated by the Study Communities is hauled by rail to the SEMASS facility from the two regional transfer stations (Yarmouth-Barnstable and the Upper Cape Transfer Station). If the

alternative for the use of the Bourne landfill or the REP transfer station were implemented, the waste that is currently hauled by rail would be transported in trucks. For this analysis, CDM reviewed the increase in truck traffic created at the Sagamore and Bourne Bridges by reviewing the relative number of trucks that would travel in the roads around the Bridges (i.e. to drive from Route 6 to the Bourne landfill) and the estimated number of truck trips that would cross either bridge if hauling by rail was not available. CDM notes that the Bourne Landfill would create a similar number of truck trips as discussed below to attract their permitted waste stream.

Note that the current tonnage hauled by rail (approximately 113,000 tons per year) would increase the number of truck round trips hauling MSW at the bridges from an average of 49 to 136 per week. Because of the seasonal fluctuation in waste generation on the Cape, the average number of truck trips would be higher in the summer months. The average number of truck trips for the Cape Communities both around and over the canal bridges are presented in Figure 4-4.

Figure 4-4
Total Round Weekly Truck Trips at Roads Near Cape Cod Canal and Crossing the Sagamore and Bourne Bridges for Alternative Disposal Facilities



4.3.3 Metals Recycling

Waste-to-energy plants, including the SEMASS facility, can install have equipment to separate ferrous and non-ferrous waste from the incoming waste stream prior to it being fed into their boilers. This metal is diverted from the waste stream and recycled. Based on information provided by Covanta, the SEMASS facility recovered about four

percent of their incoming MSW stream as ferrous metals and another 0.3% of the incoming waste stream as non-ferrous metals. This was equivalent to diverting approximately 7,900 tons of ferrous and 600 tons of non-ferrous metals from the Study Communities waste stream.

4.3.4 Electricity Generation

MSW is a significant potential source of electricity generation both in waste-to-energy plants and from landfill gas. In a waste-to-energy plant all the carbon-based materials including plastics and paper products is converted to heat and, after on-site losses, to energy that replaces the amount that has to be generated from other power sources.

Landfills generate methane gas from a biological process that breaks down a portion of the landfilled waste. However, a significant portion of the organic portion of the waste does not break down and, therefore, the potential for electricity generation is not as high as waste-to-energy facilities that can produce electricity from all the incoming organic waste. CDM notes that two of the landfills under consideration in this analysis (Bourne and Southbridge) do not currently have systems that generate electricity from their landfills. However, based on discussions with the operators of each landfill indicated that the permitting process is underway to install a landfill gas-to-energy plant at both sites.

The comparative estimate of the amount of electricity generated from waste-to-energy or landfill gas to energy is presented in Table 4-4 below.

Table 4-4
Summary of Relative Electricity Generation Rates per Ton of MSW

Alternative Disposal Method	*Electricity Generated Per Ton of MSW*
Waste-to-Energy Facility	550 kwh/ton
Landfill with active gas collection and electricity generation	256 kwh/ton

Appendix A
Background Information

Generic SEMASS MOU

- MOU for Town of Sharon
- MOU for Town of Fairhaven

MEMORANDUM OF UNDERSTANDING

This MEMORANDUM OF UNDERSTANDING (this "MOU") by and between the [Town of _____],(the "Community"), having an official address at [town address] and SEMASS Partnership ("SEMASS"), a Massachusetts limited partnership, hereinafter referred to individually as a "Party", and, collectively, as "Parties").

WHEREAS, the Parties entered into a [Waste Acquisition Agreement] dated as of [January 1, 1985] , allowing for solid waste from the Community to be accepted for disposal by SEMASS.

WHEREAS, [Address relevant amendments to the 1985 agreement](the 1985 agreement name as amended to date, the "Waste Acquisition Agreement")

WHEREAS, the Parties desire to commence negotiating a definitive written agreement and/or modify certain terms and conditions contained in the Waste Acquisition Agreement that exists between the Parties, either of which in form and substance acceptable to the Parties (an "Extension Agreement"); provided however the execution of such an Extension Agreement remains subject to the completion of negotiation, financial analysis, approval of the Parties' respective Boards of Directors and satisfaction of certain conditions precedent including those set forth on this MOU.

NOW THEREFORE, the Parties hereby summarize the principal terms of a Extension Agreement presently being considered as follows:

1. The term of the Waste Acquisition Agreement shall be extended by fifteen (15) years.
2. The per ton Acceptance Fee for solid waste delivered by the Community and accepted at SEMASS, shall be increased according to the following schedule:
    a. Effective five years prior to the expiration of the Waste Acquisition Agreement, the per-ton fee in effect as of the last day of the prior contract year, inclusive of any Change in Law costs and MTPC credits, shall be increased by $2.50.
    b. Effective four years prior to the expiration of the Waste Acquisition Agreement, the per-ton fee in effect as of the last day of the prior contract year, inclusive of any Change in Law costs and MTPC credits, shall be increased by $7.50.
    c. Effective three years prior to the expiration of the Waste Acquisition Agreement, the per-ton fee in effect as the last day of the prior contract year, inclusive of any Change in Law costs and MTPC credits, shall be increased by $10.00.
    d. Effective two years prior to the expiration of the Waste Acquisition Agreement, the per-ton fee in effect as of the last day of the prior contract

year, inclusive of any Change in Law costs and MTPC credits, shall be increased by $10.00.

e. Effective one year prior to the expiration of the Waste Acquisition Agreement, the per-ton fee in effect as of the last day of the prior contract year, inclusive of any [Change in Law costs and MTPC credits, shall be increased by $10.00.

f. Effective on the first day of the new term of the proposed Waste Acquisition Agreement, the per ton Acceptance Fee, not including any Change in Law costs, shall be adjusted annually on the first day of each successive year of the contract, by multiplication by the Inflation factor (per the Boston CPI-U) for the period ending December 31 of the preceding year. In no event, shall the Inflation factor for any contract year be less than 2% or exceed 4% of the prior year's per ton Acceptance Fee; provided however that if the Inflation factor exceeds 4% (but is limited to 4%) in any year and in any succeeding year the Inflation factor is less than 4%, then such succeeding year's Inflation factor may be increased by an amount equal to the amount by which any prior year's Inflation factor exceeded 4%; again provided that the Inflation factor may not exceed 4% in any year.

3. Effective January 1, 2015 and every five years through the duration of the proposed Waste Acquisition Agreement, the per ton Acceptance Fee paid by the Community shall be ten percent (10%) below the average Acceptance Fee of all non-Tier 1, non-host communities with similar Long-Term Municipal Contracts with SEMASS. Host communities are those communities that host a landfill or energy from waste facility in their town. Long-Term Municipal Contracts shall be defined as any contract entered into by SEMASS and any non-Tier 1 community/municipality on or after January 1, 2010, with an initial term of not less than five years.

4. In order for the provisions outlined in paragraph 3 above to become effective, an Extension Agreement must be reached with at least the number of communities such that the Annual tonnage deliveries to SEMASS in the aggregate, represent fifty percent (50%) of the Annual tonnage deliveries for all of the Tier 1 Communities.

5. If recycling programs approved by the Commonwealth of Massachusetts Department of Environmental Protection (or any agency or department thereof) and conducted by the Community actually reduce the amount of Acceptable Waste generated within the Community during a calendar year below the Annual Tonnage, the Community shall be entitled to a credit against the minimum of Acceptable Waste it is required to deliver.

6. If SEMASS defaults in the performance of its obligations under the proposed Waste Acquisition Agreement, then the Town shall have the right to recover liquidated damages approximating the unamortized portion of its above-current-contract Acceptance Fee (as described in paragraph 2 above) in accordance with a schedule determined at or before the execution of the proposed amendment to the

Waste Acquisition Agreement. SEMASS' obligations under the proposed amendment to the Waste Acquisition Agreement shall be guaranteed by Covanta Holding Corporation.

7. This MOU shall be effective as of April___, 2009 and will terminate upon execution of an Extension Agreement; provided that this MOU shall have no force or effect if it is not signed by both parties before June 30, 2009. If a Extension Agreement is not reached between the Parties by these dates, then the terms and conditions of the existing Waste Acquisition Agreement shall remain in effect through the remainder of that agreement

8. This MOU represents the good faith obligation of the Parties to negotiate a Extension Agreement during the effective period, however, it is understood and agreed that this MOU, when executed by all of the Parties hereto, merely constitutes a statement of mutual intentions with respect to the proposed transactions, does not contain all matters upon which agreement must be reach in order for the proposed transactions to be consummated and, therefore, does not constitute a binding commitment with respect to any of the proposed terms other than the agreement to negotiate in good faith. Furthermore, the Community will not be bound to any contract until a Waste Acquisition Agreement is duly signed by the Selectmen of that Community. In addition, notwithstanding anything in this MOU, the Community remains free to negotiate for any term, including, without limitation, price, and that such negotiation shall not be deemed evidence of a lack of good faith. A binding commitment with respect to the proposed transactions will result only from the execution of the Extension Agreement, subject to the terms and conditions expressed therein. The parties intend to negotiate and execute the Extension Agreement on or before September 30, 2009.

9. Defined terms used in this MOU which are not defined herein shall have the meanings given such terms in the Waste Acquisition Agreement.

IN WITNESS WHEREOF, the Parties have executed this MOU as of April ___, 2009.

Town of [xxx]

By: _____

Name: _____

Title: _____

SEMASS PARTNERSHIP.

By: _____

Name: _____

Title: _____

MEMORANDUM OF UNDERSTANDING

This MEMORANDUM OF UNDERSTANDING (this "MOU") by and between the Town of Sharon, Massachusetts,(the "Community"), having an official address at 90 South Main Street, Sharon, Massachusetts 02067 and SEMASS Partnership ("SEMASS"), a Massachusetts limited partnership, hereinafter referred to individually as a "Party", and, collectively, as "Parties").

WHEREAS, the Parties entered into a Waste Acquisition Agreement dated as of January 1, 1985, allowing for solid waste from the Community to be accepted for disposal by SEMASS.

WHEREAS, the First Amendment to the Waste Acquisition Agreement dated July 1, 2000, the Second Amendment to the Waste Acquisition Agreement dated April 1, 2001, 2001, the Third Amendment to the Waste Acquisition Agreement dated February 1, 2002, the Fourth Amendment to the Waste Acquisition Agreement dated May 5, 2003, the Fifth Amendment to the Waste Acquisition Agreement dated July 1, 2004 are relevant amendments to the 1985 Agreement (the 1985 agreement name as amended to date, the "Waste Acquisition Agreement")

WHEREAS, the Parties desire to commence negotiating a definitive written agreement and/or modify certain terms and conditions contained in the Waste Acquisition Agreement that exists between the Parties, either of which in form and substance acceptable to the Parties (an "Extension Agreement"); provided however the execution of such an Extension Agreement remains subject to the completion of negotiation, financial analysis, approval of the Parties' respective Boards of Directors and satisfaction of certain conditions precedent including those set forth on this MOU.

NOW THEREFORE, the Parties hereby summarize the principal terms of an Extension Agreement presently being considered as follows:

1. The term of the Waste Acquisition Agreement shall be extended by fifteen (15) years.
2. The per ton Acceptance Fee for solid waste delivered by the Community and accepted at SEMASS, shall be increased according to the following schedule:
    a. Effective five years prior to the expiration of the Waste Acquisition Agreement, the per-ton fee in effect as of the last day of the prior contract year, inclusive of any Change in Law costs and MTPC grant, shall be increased by $2.50.
    b. Effective four years prior to the expiration of the Waste Acquisition Agreement, the per-ton fee in effect as of the last day of the prior contract

year, inclusive of any Change in Law costs and MTPC grant, shall be increased by $7.50.

c. Effective three years prior to the expiration of the Waste Acquisition Agreement, the per-ton fee in effect as the last day of the prior contract year, inclusive of any Change in Law costs and MTPC grant, shall be increased by $10.00.

d. Effective two years prior to the expiration of the Waste Acquisition Agreement, the per-ton fee in effect as of the last day of the prior contract year, inclusive of any Change in Law costs and MTPC grant, shall be increased by $10.00.

e. Effective one year prior to the expiration of the Waste Acquisition Agreement, the per-ton fee in effect as of the last day of the prior contract year, inclusive of any Change in Law costs and MTPC grant, shall be increased by $10.00.

f. Effective on the first day of the new term of the proposed Waste Acquisition Agreement, the per ton Acceptance Fee, not including any Change in Law costs, shall be adjusted annually on the first day of each successive year of the contract, by multiplication by the Inflation factor (per the Boston CPI-U) for the period ending December 31 of the preceding year. In no event, shall the Inflation factor for any contract year be less than 0% or exceed 4% of the prior year's per ton Acceptance Fee; provided however that if the Inflation factor exceeds 4% (but is limited to 4%) in any year and in any succeeding year the Inflation factor is less than 4%, then such succeeding year's Inflation factor may be increased by an amount equal to the amount by which any prior year's Inflation factor exceeded 4%; again provided that the Inflation factor may not exceed 4% in any year.

3. Effective January 1, 2015 and every five years through the duration of the proposed Waste Acquisition Agreement, the per ton Acceptance Fee paid by the Community shall be ten percent (10%) below the average Acceptance Fee of all non-Tier 1, non-host communities with similar Long-Term Municipal Contracts with SEMASS. Host communities are those communities that host a landfill or energy from waste facility in their town. Long-Term Municipal Contracts shall be defined as any contract entered into by SEMASS and any non-Tier 1 community/municipality on or after January 1, 2010, with an initial term of not less than five years.

4. If recycling programs approved by the Commonwealth of Massachusetts Department of Environmental Protection (or any agency or department thereof) and conducted by the Community actually reduce the amount of Acceptable Waste generated within the Community during a calendar year below the Annual Tonnage, the Community shall be entitled to a credit against the minimum of Acceptable Waste it is required to deliver.

5. If SEMASS defaults in the performance of its obligations under the proposed Waste Acquisition Agreement, then the Town shall have the right to recover liquidated damages approximating the unamortized portion of its above-current-contract Acceptance Fee (as described in paragraph 2 above) in accordance with a schedule determined at or before the execution of the proposed amendment to the Waste Acquisition Agreement. SEMASS' obligations under the proposed amendment to the Waste Acquisition Agreement shall be guaranteed by Covanta Holding Corporation.

7. This MOU shall be effective as of December___, 2008 and will terminate upon execution of an Extension Agreement; provided that this MOU shall have no force or effect if it is not signed by both parties before June 30, 2009. If an Extension Agreement is not reached between the Parties by these dates, then the terms and conditions of the existing Waste Acquisition Agreement shall remain in effect through the remainder of that agreement

8. This MOU represents the good faith obligation of the Parties to negotiate a Extension Agreement during the effective period, however, it is understood and agreed that this MOU, when executed by all of the Parties hereto, merely constitutes a statement of mutual intentions with respect to the proposed transactions, does not contain all matters upon which agreement must be reached in order for the proposed transactions to be consummated and, therefore, does not constitute a binding commitment with respect to any of the proposed terms other than the agreement to negotiate in good faith. Furthermore, the Community will not be bound to any contract until a Waste Acquisition Agreement is duly signed by the Selectmen of that Community. In addition, notwithstanding anything in this MOU, the Community remains free to negotiate for any term, including, without limitation, price, and that such negotiation shall not be deemed evidence of a lack of good faith. A binding commitment with respect to the proposed transactions will result only from the execution of the Extension Agreement, subject to the terms and conditions expressed therein. The parties intend to negotiate and execute the Extension Agreement on or before September 30, 2009.

9. Defined terms used in this MOU which are not defined herein shall have the meanings given such terms in the Waste Acquisition Agreement.

IN WITNESS WHEREOF, the Parties have executed this MOU as of ~~May~~ June 16, 2009.

Town of Sharon, Massachusetts

By: _____

Name: William A. Heitin

Title: Chairman Board of Selectmen

SEMASS PARTNERSHIP.

By: _____

Name: _____

Title: _____

MEMORANDUM OF UNDERSTANDING

This MEMORANDUM OF UNDERSTANDING (this "MOU") by and between the Town of Fairhaven, Massachusetts,(the "Community"), having an official address at Town Hall, 40 Center Street, Fairhaven, Massachusetts 02719 and SEMASS Partnership ("SEMASS"), a Massachusetts limited partnership, hereinafter referred to individually as a "Party", and, collectively, as "Parties").

WHEREAS, the Parties entered into a Waste Acquisition Agreement dated as of October 15, 1984, allowing for solid waste from the Community to be accepted for disposal by SEMASS.

WHEREAS, Amended by Settlement Agreement dated February 14, 10994, the First Amendment to the Waste Acquisition Agreement dated April 1, 2001, the Second Amendment to the Waste Acquisition Agreement dated July 1, 2001, the Third Amendment to the Waste Acquisition Agreement dated February 1, 2002, the Fourth Amendment to the Waste Acquisition Agreement dated May 5, 2003, the Fifth Amendment to the Waste Acquisition Agreement dated July 1, 2004 and the Sixth Amendment to the Waste Acquisition Agreement dated July 1, 2008 are relevant amendments to the 1985 Agreement (the 1985 agreement name as amended to date, the "Waste Acquisition Agreement")

WHEREAS, the Parties desire to commence negotiating a definitive written agreement and/or modify certain terms and conditions contained in the Waste Acquisition Agreement that exists between the Parties, either of which in form and substance acceptable to the Parties (an "Extension Agreement"); provided however the execution of such an Extension Agreement remains subject to the completion of negotiation, financial analysis, approval of the Parties' respective Boards of Directors and satisfaction of certain conditions precedent including those set forth on this MOU.

NOW THEREFORE, the Parties hereby summarize the principal terms of an Extension Agreement presently being considered as follows:

1. The term of the Waste Acquisition Agreement shall be extended by fifteen (15) years.
2. The per ton Acceptance Fee for solid waste delivered by the Community and accepted at SEMASS, shall be increased according to the following schedule:
    a. Effective five years prior to the expiration of the Waste Acquisition Agreement, the per-ton fee in effect as of the last day of the prior contract year, inclusive of any Change in Law costs and MTPC grants, shall be increased by $5.00.
    b. Effective four years prior to the expiration of the Waste Acquisition Agreement, the per-ton fee in effect as of the last day of the prior contract

year, inclusive of any Change in Law costs and MTPC grants, shall be increased by $10.00.

c. Effective three years prior to the expiration of the Waste Acquisition Agreement, the per-ton fee in effect as the last day of the prior contract year, inclusive of any Change in Law costs and MTPC grants, shall be increased by $10.00.

d. Effective two years prior to the expiration of the Waste Acquisition Agreement, the per-ton fee in effect as of the last day of the prior contract year, inclusive of any Change in Law costs and MTPC grants, shall be increased by $10.00.

e. Effective one year prior to the expiration of the Waste Acquisition Agreement, the per-ton fee in effect as of the last day of the prior contract year, inclusive of any Change in Law costs and MTPC grants, shall be increased by $10.00.

f. Effective on the first day of the new term of the proposed Waste Acquisition Agreement, the per ton Acceptance Fee, not including any Change in Law costs, shall be adjusted annually on the first day of each successive year of the contract, by multiplication by the Inflation factor (per the Boston CPI-U) for the period ending December 31 of the preceding year. In no event, shall the Inflation factor for any contract year be less than 0% or exceed 4% of the prior year's per ton Acceptance Fee; provided however that if the Inflation factor exceeds 4% (but is limited to 4%) in any year and in any succeeding year the Inflation factor is less than 4%, then such succeeding year's Inflation factor may be increased by an amount equal to the amount by which any prior year's Inflation factor exceeded 4%; again provided that the Inflation factor may not exceed 4% in any year.

3. Effective January 1, 2015 and every five years through the duration of the proposed Waste Acquisition Agreement, the per ton Acceptance Fee paid by the Community shall be ten percent (10%) below the average Acceptance Fee of all non-Tier 1, non-host communities with similar Long-Term Municipal Contracts with SEMASS. Host communities are those communities that host a landfill or energy from waste facility in their town. Long-Term Municipal Contracts shall be defined as any contract entered into by SEMASS and any non-Tier 1 community/municipality on or after January 1, 2010, with an initial term of not less than five years.

4. If recycling programs approved by the Commonwealth of Massachusetts Department of Environmental Protection (or any agency or department thereof) and conducted by the Community actually reduce the amount of Acceptable Waste generated within the Community during a calendar year below the Annual Tonnage, the Community shall be entitled to a credit against the minimum of Acceptable Waste it is required to deliver.

5. If SEMASS defaults in the performance of its obligations under the proposed Waste Acquisition Agreement, then the Town shall have the right to recover liquidated damages approximating the unamortized portion of its above-current-contract Acceptance Fee (as described in paragraph 2 above) in accordance with a schedule determined at or before the execution of the proposed amendment to the Waste Acquisition Agreement. SEMASS' obligations under the proposed amendment to the Waste Acquisition Agreement shall be guaranteed by Covanta Holding Corporation.

6. This MOU shall be effective as of December___, 2008 and will terminate upon execution of an Extension Agreement; provided that this MOU shall have no force or effect if it is not signed by both parties before June 30, 2009. If an Extension Agreement is not reached between the Parties by these dates, then the terms and conditions of the existing Waste Acquisition Agreement shall remain in effect through the remainder of that agreement

7. This MOU represents the good faith obligation of the Parties to negotiate a Extension Agreement during the effective period, however, it is understood and agreed that this MOU, when executed by all of the Parties hereto, merely constitutes a statement of mutual intentions with respect to the proposed transactions, does not contain all matters upon which agreement must be reached in order for the proposed transactions to be consummated and, therefore, does not constitute a binding commitment with respect to any of the proposed terms other than the agreement to negotiate in good faith. Furthermore, the Community will not be bound to any contract until a Waste Acquisition Agreement is duly signed by the Selectmen of that Community. In addition, notwithstanding anything in this MOU, the Community remains free to negotiate for any term, including, without limitation, price, and that such negotiation shall not be deemed evidence of a lack of good faith. A binding commitment with respect to the proposed transactions will result only from the execution of the Extension Agreement, subject to the terms and conditions expressed therein. The parties intend to negotiate and execute the Extension Agreement on or before September 30, 2009.

8. Defined terms used in this MOU which are not defined herein shall have the meanings given such terms in the Waste Acquisition Agreement.

IN WITNESS WHEREOF, the Parties have executed this MOU as of ~~May~~ June 8, 2009.

Town of Fairhaven, Massachusetts

By: _____

Name: Brian K. Bowcock

Title: Chairman

SEMASS PARTNERSHIP.

By: _____

Name: Stephen Diaz

Title: VP-NE Regional Business Mgr.

Term Sheets for Mass Coastal Railroad for Yarmouth-Barnstable Transfer Station

Appendix A to Contract No.: MC-C-811 for Town of Yarmouth

	Per Ton Rail Rates: MSW from Yarmouth to SEMASS (subject to Notes A-E)							
Minimum Annual Rail Tonnage Commitment	2008	2009	2010	2011	2012	2013	2014	2015
90,000	$11.66	$11.95	$12.25	$12.56	$12.87	$13.19	$13.52	$13.86
102,000	$11.25	$11.53	$11.82	$12.12	$12.42	$12.73	$13.05	$13.37
109,000	$10.91	$11.19	$11.47	$11.75	$12.05	$12.35	$12.66	$12.97
116,000	$10.59	$10.85	$11.12	$11.40	$11.69	$11.98	$12.28	$12.58
123,000	$10.32	$10.58	$10.84	$11.12	$11.39	$11.68	$11.97	$12.27
130,000	$10.06	$10.32	$10.57	$10.84	$11.11	$11.39	$11.67	$11.96
137,000	$9.86	$10.11	$10.36	$10.62	$10.89	$11.16	$11.44	$11.72

NOTE A: By January 1 of each year, Yarmouth will select in writing its annual tonnage commitment for that year. One of the above levels must be selected. So as to provide maximum flexibility to grow total volume, Yarmouth may increase this commitment at any time, to be effective on the first day of the next month that follows at least fifteen days' written notice. The corresponding lower rate will then be applied, from that point forward, to all remaining tonnage shipped that year. Yarmouth may not adjust its tonnage commitment to a lower level, except on each January 1.

NOTE B: Rates are take-or-pay at the corresponding committed tonnage level. By January 31 of each year, Yarmouth will furnish Mass Coastal a summary of the total tons shipped by rail to SEMASS during the previous calendar year. Yarmouth agrees to pay for any shortfall of the commitment of which it is the cause, in such a manner that does not reduce the gross revenue that MC would have received had Yarmouth not made the higher tonnage commitment.

NOTE C: As shown, rates will be escalated each January 1 (beginning in 2009) by a fixed 2.5%.

NOTE D: Rates are based on Yarmouth loading each car to full visual capacity. In addition, Yarmouth agrees to safely tamp as much solid waste as possible in each car.

NOTE E: Rates are based on shipping a minimum of four (4) cars on any given day (shipping in "four car blocks"). If three (3) or fewer cars are released for shipment on any particular day, then Mass Coastal may elect to pick up these cars the following day, along with the cars released that following day. However, regardless of the number loaded, cars will not be allowed to sit for more than one (1) day between pick-ups at the Transfer Station, except that if three (3) or fewer cars are loaded on Saturday, they may be picked up on Monday at the latest.

Agreement between Yarmouth and Barnstable and SEMASS

AGREEMENT

THIS AGREEMENT is entered into effective the 1st day of July, 2001 (the "Effective Date") by and between the Town of Barnstable and the Town of Yarmouth, both bodies corporate and politic (collectively, "Barnstable/Yarmouth") and SEMASS Partnership ("SEMASS"), a Massachusetts limited partnership, with offices at 141 Cranberry Highway, Route 28, West Wareham, Massachusetts 02576.

Recitals

A. Barnstable/Yarmouth operate the municipal solid waste transfer station known as the Yarmouth-Barnstable Transfer Station located at 50 Workshop Road, So. Yarmouth, MA 02664 (the "Transfer Station").

B. The Town of Yarmouth has entered into that certain Transportation Agreement dated June 30, 1989, as amended, with the Bay Colony Railroad Corporation (the "Bay Colony Agreement").

C. The Town of Yarmouth has issued general obligations bonds in the original principal sum of $3,234,637.20 in connection with the Transfer Station, which bonds require the payments of principal and interest set forth in Exhibit A attached hereto (the "Debt Service Payments").

D. Barnstable/Yarmouth are burdened by the obligation to invoice and bear the risk of collection for municipal solid waste ("MSW") that is received at the Transfer Station from commercial haulers (the "Commercial MSW").

E. SEMASS has made a proposal to Barnstable/Yarmouth in regards to the Transfer Station, the Bay Colony Agreement, the Debt Service Payments, and the Commercial MSW.

F. Barnstable/Yarmouth have determined that acceptance of the proposal from SEMASS would be in the best interest of both the Town of Barnstable and Town of Yarmouth and

would lead to more efficiency and assist both Barnstable and Yarmouth to improve their percentage of recycling.

NOW, THEREFORE, in consideration of the mutual benefits to be gained by the parties hereto, Barnstable/Yarmouth and SEMASS hereby agree as follows:

1. Bay Colony Agreement. During the term of this Agreement, SEMASS shall pay directly to Bay Colony Railroad Corporation all railroad transportation charges due and payable by the Town of Yarmouth under the Bay Colony Agreement for MSW that is transported by rail under the Bay Colony Agreement to the resource recovery facility located in Rochester, Massachusetts that is owned and operated by SEMASS (the "SEMASS Facility"). The Town of Yarmouth agrees to provide to SEMASS in a timely fashion sufficient information on amounts covered by this paragraph 1 that are due and payable by it to the Bay Colony Railroad Corporation so that SEMASS can make such payments by their due dates.

2. Unavailability of Rail Due to Certain Conditions. In the event that MSW cannot be transferred from the Transfer Station to the SEMASS Facility by rail solely because:

(i) rail cars are unable to reach the SEMASS Facility due to track and right-of-way maintenance or destruction; or

(ii) the rail car unloading equipment at the SEMASS Facility is temporarily out of service for routine maintenance; or

(iii) Bay Colony is unable to provide a sufficient number of rail cars,

then SEMASS shall bear all trucking costs incurred for transporting to the SEMASS Facility all MSW received at the Transfer Station that would otherwise be transported to the SEMASS Facility by rail.

3. Debt Service Payments. SEMASS shall reimburse the Town of Yarmouth for the actual Debt Service Payments that are made by the Town of Yarmouth on or after July 1, 2001. The Town of Yarmouth shall invoice SEMASS for the payments that SEMASS is obligated to

make under this paragraph 3, which invoice shall include sufficient documentation to support that the payments for which the Town of Yarmouth is requesting reimbursement have actually been made to the party entitled to receive such payment.

4. Payments to Barnstable/Yarmouth. Beginning with the Effective Date, and continuing monthly throughout the term of this Agreement, SEMASS shall pay into the Barnstable/Yarmouth Transfer Station Enterprise Fund the following:

a. $7.00 per ton for the first 59,000 tons of MSW that are received by the Transfer Station during a calendar month other than "Yarmouth-Barnstable MSW" hereinafter defined; and

b. $5.00 per ton for all tons in excess of 59,000 tons of MSW that are received by the Transfer Station during a calendar month other than "Yarmouth-Barnstable MSW" hereinafter defined.

Barnstable/Yarmouth shall invoice SEMASS monthly for the amounts that are due and payable by SEMASS under this paragraph 4, which invoice shall include sufficient documentation to support the payment requested. As used herein, the phrase "Yarmouth-Barnstable MSW" means MSW originating within the Towns of Yarmouth or Barnstable that is:

(i) delivered to either of the following locations:

(A) the MSW residential drop-off point for residents of the Town of Yarmouth located at 606 Forest Road, So. Yarmouth, MA 02664; or

(B) the MSW residential drop-off point for residents of the Town of Barnstable located at 48 Flint Street, Marstons Mills, MA 02648, or

(ii) MSW collected from municipal facilities and lands of either the Town of Yarmouth or the Town of Barnstable that is delivered directly to the Transfer Station.

5. Change in Law Adjustments. As used herein, "Change in Law" means (A) the adoption, promulgation, issuance, modification, or official change in interpretation, after the Ef-

fective Date, of any federal, state, or local law, by-law, ordinance, code, regulation, rule, or ruling; (B) the imposition, after the Effective Date, of any condition on the issuance, reissuance, or continued effectiveness of any permit, license, or approval relating to the Transfer Station, which establishes requirements more burdensome than those imposed as of the Effective Date; or (C) the order or judgment or other action of any federal, state or local court, administrative agency, or governmental body relating to the Transfer Station issued after the Effective Date, that relate in any manner whatsoever to the suspension, termination, interruption, or non-renewal of any permit, license, consent, authorization, or approval affecting the acquisition, design, construction, equipping, start-up, operation, maintenance, ownership, use, or possession of the Transfer Station. In the event that a Change in Law after the Effective Date increases the operating and capital costs of the Transfer Station incurred by Barnstable/Yarmouth (the "CIL Costs"), the per ton payments provided in paragraph 4 above shall be adjusted to allow Barnstable/Yarmouth to recover the actual CIL Costs incurred, which recovery shall be on a basis that is consistent with generally accepted accounting principals. Barnstable/Yarmouth shall provide SEMASS with written notice of any proposed Change in Law that may affect the Transfer Station and SEMASS shall have the right to participate in the public proceedings for any proposed Change in Law.

6. Commercial MSW Invoicing and Collection. Beginning July 1, 2001, and continuing monthly throughout the term of this Agreement, SEMASS shall be responsible for invoicing and collection for MSW that is received at the Transfer Station from commercial haulers, excluding, however, any Yarmouth-Barnstable MSW in the event that a commercial hauler is used to transport Yarmouth-Barnstable MSW to the Transfer Station. Barnstable/Yarmouth represent and warrant to SEMASS that they will take all reasonable actions that are necessary to enable SEMASS to timely invoice and collect for MSW that is received at the Transfer Station from commercial haulers. SEMASS shall have the right to direct commercial waste haulers that have contracts with SEMASS to drop off at the Transfer Station MSW that is under contract with

SEMASS. SEMASS shall prepare and file on behalf of Barnstable/Yarmouth the monthly reports required by the Massachusetts Department of Environmental Protection to identify the tonnage of MSW received at the Transfer Station from commercial haulers. SEMASS shall provide to Barnstable/Yarmouth notice prior to implementation of each price change that SEMASS applies to commercial haulers for MSW delivered to the Transfer Station.

7. Term and Right to Terminate. This Agreement shall be for a three (3) year term beginning on the Effective Date. This Agreement shall be automatically extended for successive three (3) year terms. The Town of Barnstable, the Town of Yarmouth, and SEMASS shall each have the option to terminate this Agreement at the end of the then current term by delivering to the other parties not less than sixty (60) days' prior written notice of the intent to terminate. In no event shall the term of this Agreement extend beyond the date that the first of the following agreements terminate:

(i) That certain Waste Acquisition Agreement dated as of July 1, 1985, as amended, by and between Barnstable and SEMASS (the "Barnstable WAA"); or

(ii) That certain Waste Acquisition Agreement dated as of July 1, 1985, as amended, by and between Yarmouth and SEMASS (the "Yarmouth WAA").

8. Default. If either party fails to perform any obligation imposed on it by this Agreement and performance of such obligation is not recommenced within sixty (60) days following delivery of written notice by the other party, specifying the nature of the failure and requesting that it be remedied, the non-defaulting party, in addition to every other remedy now or hereafter existing at law or in equity, by statute or otherwise, may terminate this Agreement by written notice delivered to the defaulting party.

9. Force Majeure. Except with respect to the performance of any obligations hereunder to make payments, a delay or failure of performance hereunder by either party shall not constitute an event of default under this Agreement if such delay or failure of performance is

caused by an Event of Force Majeure. Furthermore, except as otherwise provided herein, neither party shall be liable to the other for monetary or any other damages on account of a delay or failure of performance hereunder caused by an Event of Force Majeure. As used herein, the phrase "Event of Force Majeure" means any event or condition having a material and adverse effect on the ability of a party to perform pursuant to this Agreement, if such event or condition is beyond the reasonable control of such party, including, but not limited to, acts of God, landslides, lightning, earthquakes, hurricanes, tornadoes, blizzards, fires, explosions, floods, acts of a public enemy, wars, blockades, insurrections, riots, or civil disturbances.

10. No Waiver Implied. No failure or delay on the part of a party to exercise any right or remedy under this Agreement shall operate as a waiver thereof, nor shall any single or partial exercise by a party of any right or remedy preclude any other or future exercise thereof or the exercise of any other right.

11. Expenses and Attorney's Fees. Where an event of default has occurred, the defaulting party agrees to pay all out-of-pocket ordinary expenses (including reasonable attorneys fees) of the non-defaulting party in connection with the enforcement of this Agreement, including the collection of amounts due hereunder.

12. Governing Law. The interpretation and performance of this Agreement shall be in accordance with and controlled by the laws of The Commonwealth of Massachusetts. Except as provided in paragraph 13, the sole and exclusive forum for the initial determination of any question of law or fact relating to this Agreement shall be any court of competent jurisdiction in The Commonwealth of Massachusetts, including the United States District Court for the District of Massachusetts.

13. Arbitration. In the event that a dispute arises under this Agreement and the issues in dispute (A) are factual issues and not issues requiring the construction or interpretation of law or the terms of this Agreement and (B) affect only the rights and duties of the parties to this

Agreement, said disputes, claims, or other matters arising out of or related to this Agreement, or the breach thereof, will be decided by the American Arbitration Association. All other disputes, claims, or other matters arising out of or related to this Agreement, or the breach thereof, will be decided by a court of competent jurisdiction in The Commonwealth of Massachusetts, including the United States District Court for the District of Massachusetts.

14. Effect of Litigation or Arbitration on Agreement. The pendency of litigation or arbitration shall not affect the obligations of the parties to make any payment or render any service required by this Agreement nor the rights of the parties under this Agreement.

15. Miscellaneous Provisions.

A. Entire Agreement. This Agreement constitutes the entire agreement between the parties hereto relating to the subject matter hereof and all previous agreements, discussions, communications, and correspondence with respect to the subject matter hereof are superseded by the execution of this Agreement. This Agreement is separate and distinct from, relates to a different subject matter than, and in no way changes the terms and conditions of either the Barnstable WAA or the Yarmouth WAA.

B. Modification. This Agreement may not be modified or amended except by a writing signed by or on behalf of both parties by their duly authorized officers.

C. Successors and Assigns. This Agreement shall inure to the benefit of and bind the respective successors and permitted assigns of the parties hereto.

D. Notices. The parties hereby designate the following addresses for all notices hereunder until changed in accordance with this subparagraph 15.D:

If to SEMASS:

SEMASS Partnership
Attn: General Business Manager
141 Cranberry Highway, Route 28
West Wareham, MA 02576

With a copy to:

American Ref-Fuel Company of SEMASS, L.P.
Attn: Vice President Legal
15990 North Barker's Landing, Suite 200
Houston, Texas 77079

If to Barnstable/Yarmouth:

Yarmouth/Barnstable Transfer Station
50 Workshop Road
So. Yarmouth, MA 02664

With copies to:

Town Manager
Town of Barnstable
367 Main Street
Hyannis, Massachusetts 02601

Town of Yarmouth
Town Hall
1146 Route 28
Yarmouth, Massachusetts 02664

All notices, reports and other documents required or permitted under this Agreement shall be in writing (except as otherwise expressly provided herein) and shall be deemed to have been given or delivered when:

(a) delivered personally (or, in the case of permitted oral notices, by telephone), or

(b) deposited in the mails, postage prepaid, or certified mail, return receipt requested, or delivered to a private carrier providing evidence of receipt as part of its services, in either case addressed to the party to whom notice is being given at its address set forth above,

to the attention, in the case of a Town, of its clerk. Either party may change its address by notice similarly given.

E. Further Actions. Each party agrees that it will, at its own expense, execute any and all certificates, documents, and other instruments and take such other further actions as may be reasonably necessary to give effect to the terms of this Agreement.

F. Counterparts. This Agreement may be executed in several counterparts, any one of which shall be considered an original hereof for all purposes.

G. Severability. In the event that any of the provisions, portions or applications of this Agreement are held to be unenforceable or invalid by any court of competent jurisdiction, SEMASS and Barnstable/Yarmouth shall negotiate an equitable adjustment in the provisions of this Agreement with a view toward effecting the purpose of this Agreement, and the validity and enforceability of the remaining provisions, portions or applications thereof shall not be affected thereby.

H. Headings for Convenience. The headings in this Agreement are for convenience of reference only and in no way define or limit the scope or content of this Agreement or in any way affect its provisions.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the day and year first above written.

SEMASS PARTNERSHIP

BY: AMERICAN REF-FUEL COMPANY OF SEMASS, L.P.
its Managing General Partner

BY: _____
LYNN JOHNSTON
Northern Regional Vice President

[Signatures continue on next page.]

THE TOWN OF YARMOUTH

BY: _____
Name: _____

BY: _____
Name: _____

BY: _____
Name: _____

BY: _____
Name: _____

BY: _____
Name: _____

Approved as to form:

BY: _____
Name: _____

THE TOWN OF BARNSTABLE

BY: _____
Name: JOHN C. KLIMM
Title: Town Manager

Approved as to form:

BY: _____
Name: _____
Title: _____

Proposed Agreement between Bourne Landfill and Municipality for MSW Disposal

INTERMUNICIPAL AGREEMENT
Between
The Town of Bourne
And
The Town of xxxxxxx

THIS INTERMUNICIPAL AGREEMENT is entered into this ___ day of _____, 2009, by and between the Town of Bourne, acting herein by and through its Town Administrator, with offices located at 24 Perry Avenue, Buzzards Bay, Massachusetts 02532 (the "Town of Bourne") and the Town of xxxxxxx, acting herein by and through its_____ _____, with offices located at _____ xxxxxxx, Massachusetts xxxxx (the "Town of xxxxxxx").

RECITALS

WHEREAS, the Town of xxxxxxx desires to enter into an agreement for certain solid waste management services and is willing to deliver or cause to be delivered to the Bourne Landfill no less than all of the municipal solid waste (MSW) and Bulky Non-MSW (Solid Wastes) produced from the Town of xxxxxx's own residential population and town buildings that is in its direct control and not from commercial sources; and

WHEREAS, the Town of Bourne operates the Integrated Solid Waste Management (ISWM) Facility including the Bourne Landfill and is willing to accept Solid Wastes according to the terms and conditions stated herein; and

WHEREAS, this agreement sets forth the terms and conditions pursuant to which the Town of Bourne will provide services to the Town of xxxxxxx for disposal of Solid Wastes; and

WHEREAS, the Town of Bourne and the Town of xxxxxxx have duly authorized the undersigned officials to execute this Agreement on behalf of and as the act and deed of their respective municipalities;

AGREEMENT
NOW, THEREFORE, in consideration of the mutual benefits to be obtained hereby, the Town of Bourne and the Town of xxxxxxx agree as follows:

TERM
This Agreement shall take effect upon authorization by the Town Administrator of Town of Bourne and shall remain in effect for fiscal years (from July 1, 20XX until June 30, 20XX), provided that the Town of Bourne Landfill maintains duly permitted landfill airspace with all applicable approvals from local, regional, state and federal regulatory agencies.

DELIVERY SPECIFICATIONS
The Town of Bourne Landfill will accept MSW and bulky non-MSW wastes transported via discharge-type vehicles from the Town of xxxxxxx during regular business hours. These business hours might be changed or modified at the sole discretion of the Town of Bourne, which shall provide written notification to the Town of xxxxxxx at least ten days prior to implementing said changed or modified business hours.

Drivers transporting the Town of xxxxxxx's wastes shall be solely responsible for the off-loading of vehicles transporting the Town of xxxxxxx's wastes, as well as for any and all mechanical failures, damage to vehicles transporting the Town of xxxxxxx's wastes and personal injury, which may occur while on Town of Bourne property. Drivers shall not queue beyond the capacity of the left turn lane at any U-turn on Route 28 MacArthur Boulevard southbound or northbound. In the event that the driver arrives at a U-turn where the left turn lane queue is full, the driver shall proceed to the next U-turn or rotary for reversing direction. Drivers shall utilize the most direct route to and from the Facility and not travel unnecessarily on secondary roads. Drivers shall be responsible for exercising caution at all times and be observant of potential hazards to self and equipment, which might exist from time to time. Drivers shall not smoke or cause any open flames while at Town of Bourne property. While at the Bourne Landfill, drivers shall not utilize cellular telephones. Drivers shall use extreme caution and wear hardhats, safety glasses, puncture-resistant boots and brightly colored safety clothing while outside of the delivery vehicle to facilitate unloading. At all other times, Drivers shall remain inside vehicle cabs and shall not loiter outside the vehicle at any time. Drivers shall follow any and all rules, regulations and directions given by Town of Bourne staff while at Town of Bourne property, report any and all accidents to the Town of Bourne immediately and promptly prepare written documentation thereof as may be requested by the Town of Bourne.

WASTE BAN MATERIALS

Solid Wastes delivered to the ISWM Facility for disposal shall be delivered in full compliance with local, state and federal rules, regulations and policies. The Department of Environmental Protection (DEP) at 310 CMR 19.017 Waste Control specifically bans the transfer and/or the delivery of the following for disposal: lead batteries, leaves, tires, white goods, yard waste, aluminum containers, metal or glass containers, single polymer plastics, recyclable paper, cathode ray tubes, asphalt pavement, brick, concrete, metal and wood (all according to DEP definitions). The Town of xxxxxxx agrees to fully comply with current DEP and Town of Bourne waste bans, rules and policies for implementation of waste bans and any future changes and additions that may be promulgated. Waste banned materials discovered in loads delivered for disposal shall be subject to applicable surcharges set by the Town of Bourne or outright rejection of individual materials or of the entire load solely at the discretion of the Town of Bourne.

ACCEPTABLE MATERIALS

Residential MSW and non-MSW bulky wastes produced within the Town of xxxxxxx will be accepted at the ISWM Facility subject to rules, applicable fees and surcharges promulgated by the Town of Bourne.

UNACCEPTABLE MATERIALS

The Town of xxxxxxx must call the Bourne Landfill in advance to determine the suitability of any items not listed as an "Acceptable Materials" above. Materials listed below ("Unacceptable Materials") that are delivered to the ISWM Facility will be subject to handling surcharges and may be reloaded onto the Town of xxxxxxx's delivery vehicle. Unacceptable Materials identified after the Town of xxxxxxx has exited Town of Bourne property will be segregated for removal by the Town of xxxxxxx or otherwise handled by the Town of Bourne. The Town of Bourne will notify the Town of xxxxxxx directly at the Bourne Landfill or by telephone or facsimile of unacceptable materials

delivered within two (2) hours of discovery. The Town of xxxxxxx agrees that it will responsibly manage any Unacceptable Materials in accordance with any and all applicable laws, rules, regulations and policies promulgated by local, regional, state or federal agencies. The Town of xxxxxxx agrees to bear any and all expenses incurred by the Town of Bourne plus fifteen percent (15%) caused from Unacceptable Materials delivered to the ISWM Facility by the Town of xxxxxxx including, but not limited to: expenses related to emergency response; materials handling; personnel; environmental assessment; environmental remediation; and fines. In addition, delivery of certain materials to the Facility is a violation of applicable law. Such incidents may result in reporting to regulatory authorities, legal action, fines and a loss of future access to the Bourne Landfill.

Unacceptable Materials.

- Commercial or industrial wastes.
- Subtitle C hazardous materials (including, but not limited to batteries, paint, fuel, oil, gasoline, pesticides).
- Explosive materials.
- Corrosive materials.
- Pathological or biological waste.
- Radioactive waste.
- Motor vehicles.
- Gas cylinders.
- Tanks and drums of any kind.
- Rolls of any material.
- Liquid waste.
- Gases of any type.
- PCB light ballasts.
- Mercury bearing products.
- Asbestos.
- White Goods.
- Air Conditioners.
- Cathode Ray Tubes.
- Tires.
- Asphalt pavement
- Brick
- Concrete
- Metal
- Wood
- Animal carcasses
- Any other waste material as may be determined unacceptable by the Massachusetts Department of Environmental Protection (MADEP), Bourne Board of Health and/or the United States Environmental Protection Agency.

Facility staff reserves the right to reject any material deemed unacceptable in their professional opinion.

MSW AND BULKY NON-MSW DISPOSAL RATES

MSW and Bulky Non-MSW Disposal Rates (the Disposal Rates) are assessed on a per

pound basis and quoted on a per ton basis as measured at the Bourne Landfill scales. The Disposal Rates for the management of municipally generated Acceptable Materials, as defined above, are summarized below. These Disposal Rates expressly exclude commercial waste accepted by the Town of xxxxxxx and transferred to the ISWM Facility.

FY 20XX	**$ xx.xx/ton**
FY 20XX	**$ xx.xx/ton**
FY 20XX	**$ xx.xx/ton**

The above Disposal Rates are subject to Change in Law adjustments pursuant to the "Change in Law" provisions below.

CHANGE IN LAW

If any governmental or regulatory authority implements a change or changes in law or regulation that impacts the cost of operating the Bourne Landfill, the above listed rates will be subject to modification. In such an event, the Town of Bourne will provide the Town of xxxxxxx thirty (30) days written notice of the change in rate and the reasons for the required change. If the Town of xxxxxxx deems such proposed rate changes unacceptable, the Town of xxxxxxx shall inform the Bourne ISWM Facility in writing within 10 days of receiving notice. If agreement is not achieved between the parties to this Agreement within 30 days of the Town of xxxxxxx having received notice, the Town of Bourne or the Town of xxxxxxx may terminate this agreement.

From time to time, rules and regulations governing the operation of the ISWM Facility may be amended to satisfy local, regional, state or federal regulations and policies. The Town of Bourne will attempt to provide the Town of xxxxxxx with reasonable notice of any such changes. The Town of xxxxxxx agrees to abide by these amendments. If rules, regulations and/or policies are amended for operational or other, non-regulatory or non-legal reasons, notice will be provided to the Town of xxxxxxx at least 30 days before implementation. If the Town of xxxxxxx deems such proposed amendments unacceptable, the Town of xxxxxxx shall inform the Bourne ISWM Facility in writing within 10 days of the Town of xxxxxxx receiving notice. If agreement is not achieved within 30 days of the Town of xxxxxxx having received notice, the ISWM Facility or the Town of xxxxxxx may terminate this Agreement.

TOWN OF XXXXXXX'S RESPONSIBILITY TO DELIVER APPROPRIATE MATERIAL

The Town of xxxxxxx agrees to deliver to the Facility, not less than all acceptable material, as defined above, that is directly under the Town of xxxxxxx's control and generated by the Town of xxxxxxx. This Agreement expressly excludes commercial wastes accepted by the municipality and transferred to the ISWM Facility. The Town of Bourne shall reserve xx,xxxtons of MSW and bulky non-MSW waste disposal capacity annually for the Town of xxxxxxx's benefit and the Town of xxxxxxx shall deliver or cause to be delivered a minimum of xx,xxxtons annually to the Bourne Landfill and hereby commits to pay the Town of Bourne the minimum number of tons multiplied by the then current rate as delineated herein. In the event that the Town of xxxxxxx achieves recycling capabilities, through implementation of a MADEP approved recycling program, resulting in a reduction in the annual generation rate of acceptable materials below the current xx,xxxtons per year minimum the Town of Bourne will consider a

reduction in the annual minimum. In such an event, the Town of xxxxxxx will provide the Town of Bourne thirty (30) days written notice of its desire to change the annual minimum rate and a detailed explanation of circumstances effectuating the change. If the Town of Bourne deems such proposed rate change unacceptable, the Town of Bourne shall inform the Town of xxxxxxx in writing within 10 days of receiving notice. If agreement is not achieved between the parties to this Agreement within 30 days of the Town of Bourne having received notice, the Town of Bourne or the Town of xxxxxxx may terminate this agreement.

FORCE MAJEURE

Except with respect to the performance of any obligations hereunder to make payments, a delay or failure of performance hereunder by either party shall not constitute an event of default under this Agreement if such delay or failure of performance is caused by any event or condition having a material and adverse effect on the Town of xxxxxxx's or the Town of Bourne's ability to perform pursuant to this Agreement, if such event or condition is beyond the reasonable control of the Town of xxxxxxx or the Town of Bourne, including but not limited to acts of God, landslides, lightning, earthquakes, hurricanes, tornadoes, blizzards, fires, explosions, floods, acts of a public enemy, terrorism, wars, blockades, insurrections, riots, civil disturbances, labor disputes, strikes, work slowdowns, work stoppages, loss of access to the Bourne Landfill, a partial or entire delay or failure in the provision of necessary utilities or services to any part of the Bourne Integrated Solid Waste Management Facility including the Bourne Landfill, loss of permits or Change in Law.

TERMS

NET 30 DAYS

AGREEMENT TERMINATION

The Town of Bourne may suspend or terminate this Agreement at any time following ten (10) days written notice to the Town of xxxxxxx, or ban the Town of xxxxxxx from engaging in the activities as allowed in this Agreement, for reasons outlined as follows:

- Failure of the Town of xxxxxxx, for any reason, to fulfill in a timely and proper manner its obligations as described herein.
- Repeat violations of any of the provisions of this Agreement or rules of the ISWM Facility by the Town of xxxxxxx.

The Town of Bourne or the Town of xxxxxxx may give notice of unilateral termination of this contract after June 30, 2010, should it be deemed in the best interest of either party, provided that the terminating party shall give no less than 180 days written notice to the other.

INDEMNIFICATION BY TOWN OF XXXXXXX

The Town of xxxxxxx hereby agrees to indemnify, defend (with counsel acceptable to the Town of Bourne), and hold harmless the Town of Bourne and its elected officials, management, employees, agents, contractors, successors and assigns (collectively, the "Bourne Indemnified Parties") against any and all liabilities, liens, penalties, fines,

forfeitures, judgements, restoration costs, demands, deficiencies, damages, claims, causes of action and suits of any kind or character, and all reasonable costs and expenses incidental thereto that any or all of the Bourne Indemnified Parties may hereafter suffer, incur, be responsible for or pay out as a result of or in connection with the adverse impacts on the public health, safety or the environment that arises in any way from the transport of materials by the Town of xxxxxxx or the Town of xxxxxxx's agent to Town of Bourne property.

INDEMNIFICATION BY TOWN OF XXXXXX

The Town of xxxxxx hereby agrees to indemnify, defend (with counsel acceptable to the Town of xxxxxxx), and hold harmless the Town of xxxxxxx and its elected officials, management, employees, agents, contractors, successors and assigns (collectively, the "Town of xxxxxxx's Indemnified Parties") against any and all liabilities, liens, penalties, fines, forfeitures, judgements, restoration costs, demands, deficiencies, damages, claims, causes of action and suits of any kind or character, and all reasonable costs and expenses incidental thereto that any or all of the Town of xxxxxxx's Indemnified Parties may hereafter suffer, incur, be responsible for or pay out as a result of or in connection with the adverse impacts on the public health, safety or the environment that arises from the sole negligence of the Town of Bourne related to the management or operation of the Bourne Integrated Solid Waste Management Facility.

ASSIGNMENT

Neither the Town of xxxxxxx nor the Town of Bourne may assign or in any way transfer its interest in and to this Agreement without obtaining the prior written consent of the other party.

HOURS OF OPERATION

The Bourne Integrated Waste Management Facility is open from 7:00 a.m. to 4:00 p.m., Monday through Friday. Other hours of operation will be made available upon mutual agreement between the parties. The facility may reject loads due to capacity limitations after 11:00 a.m. unless prior notification of load delivery is made by Town of xxxxxxx to the Scalehouse Operator at (508) 759-0639 or a daily delivery schedule has been agreed upon between the parties. The facility is located on Route 28 east, approximately one-half mile from the Bourne Bridge. Take the second exit off the Bourne Rotary, heading west on Route 28, and take the first left lane turnabout. The Facility can be reached at (508) 759-0651.

ACCEPTANCE

Each of the parties to this Intermunicipal Agreement certifies that it has received authorization from its respective Town/City Meeting to enter into this Agreement pursuant to M.G.L. Chapter 40, Sec. 4A.

ISWM FACILITY:
TOWN OF BOURNE
MASSACHUSETTS

BY:

_____
Thomas M. Guerino
Town Administrator

TOWN OF XXXXXXX:
TOWN OF XXXXXXX
MASSACHUSETTS

BY:

_____

_____

_____

_____

_____

DATE: _____

DATE: _____

Approved as to Form

_____
Robert S. Troy, Bourne Town Counsel

Approved as to Appropriation

_____
Linda Marzelli, Bourne Finance Director

Approved as to Form

_____
, xxxxxxx Town Counsel

Approved as to Appropriation

_____
, xxxxxxx Town Accountant

Proposed Draft Discussion Extension to Waste Acquisition Agreement with SEMASS

SEVENTH AMENDMENT TO WASTE ACQUISITION AGREEMENT

This Seventh Amendment to Waste Acquisition Agreement (the "Seventh Amendment") is effective as of July 1, 2010, and is entered into by and between SEMASS Partnership ("SEMASS"), a Massachusetts limited partnership, with offices at 141 Cranberry Highway, Route 28, West Wareham, Massachusetts 02576, and the Town of Brewster, a body corporate and politic (the "Community"), with offices at 2198 Main Street, Brewster, Massachusetts 02631.

W I T N E S S E T H:

WHEREAS, SEMASS and the Community have entered into that certain Waste Acquisition Agreement dated as of January 1, 1985 (the "1985 Agreement"); Amendment to Waste Acquisition Agreement dated as of July 1, 2000; Second Amendment to Waste Acquisition Agreement dated as of April 1, 2001; Third Amendment to Waste Acquisition Agreement dated as of February 1, 2002; Fourth Amendment to Waste Acquisition Agreement dated as of May 5, 2003; Fifth Amendment to Waste Acquisition Agreement dated as of July 1, 2004; Letter Agreement dated December 15, 2004; and Sixth Amendment to Waste Acquisition Agreement dated as of July 1, 2008 (the 1985 Agreement as amended to date, the "Waste Acquisition Agreement").

WHEREAS, the Parties desire to modify certain terms and conditions contained in the Waste Acquisition Agreement as set forth in this Agreement.

NOW, THEREFORE, in consideration of the mutual benefits obtained hereby, SEMASS and the Community hereby agree as follows:

1. Amendments.

A. The definition of "Original Term" shall be deleted in its entirety and inserted in place thereof is the following:

> *"Original Term" means the period from the Effective Date to June 30, 2030.*

B. The definition of "Annual Minimum Tonnage" in Article 14.0, Standard Definitions, shall be amended by inserting at the end of the definition, prior to the period, the following:

> *;provided, however, if recycling programs approved by the Commonwealth of Massachusetts Department of Environmental Protection (or any agency or department thereof) and conducted by the Community actually reduce the amount of Acceptable Solid Waste generated within the Community during a calendar year below the Annual Minimum Tonnage, the Community shall be entitled to a credit for that calendar year against the Annual Minimum Tonnage equal to the amount of reduction due to such recycling program. The Community shall request such credit within thirty (30) days of the end of the calendar year to which the credit applies, shall submit with such request a copy of its recycling and composting records for said year and shall certify that said records accurately describe the amount of recyclable and compostable material diverted from the waste stream and recycled and composted during said year.*

C. Section 4.2.2 is hereby deleted in its entirety and inserted in place there of the following:

4.2.2 The Acceptance Fee shall be:

(a) increased, beginning July 1, 2015 and each year thereafter during the Term of the Agreement, by Acceptance Fee Inflation Factor (where the period is the twelve months ended June30) to the extent the Acceptance Fee Inflation Factor is a positive number; and

(b) subject to adjustment from time to time as provided below for projected Plant Change in Law Costs during an identified period. For each Change in Law, adjustments may be made by written notice delivered by SEMASS to the Community at any time within six (6) months after Plant Change in Law Costs from the Change in Law in question are first incurred and thereafter only on or before April 15 in each calendar year. Such notice shall describe the amount of adjustment, the term of the adjustment, and the Plant Change in Law

Costs for which the adjustment is being made (including identification of each applicable Change in Law and the dates thereof), and shall include a copy of a document prepared by SEMASS's Qualified Accountants setting forth the assumptions, formulas and calculations used in computing the amount of the adjustment. The amount of the adjustment shall be the total projected annualized Plant Change in Law Costs, divided by the total annual minimum tonnage of solid waste under Long-term Contracts (excluding, however, all solid waste under Long Term Contracts expected to be collected from the Town of Rochester, Massachusetts and the Towns within the Carver, Marion, Wareham Regional Disposal District as presently constituted). Adjustments shall be effective on the first day of the first month after the month in which the notice is delivered to the Community unless that day is less than fourteen (14) days after the delivery of such notice, in which case the adjustment shall become effective on the first day of the following month. Any adjustment in the Acceptance Fee for Plant Change in Law Costs which has been in effect for more than three (3) months on or before any April 15 shall expire on the following May 1 unless a notice as described above continuing the adjustment (in the same or a different amount) is delivered to the Community on or before such April 15. Determinations by SEMASS of adjustments to the Acceptance Fee because of Plant Change in Law Costs (except as provided in Article 4.2.6) shall be incontestable unless the determination contains a manifest error or was made in bad faith at an amount known or which reasonably should have been known by SEMASS to be in excess of the amount it was entitled to receive. SEMASS shall not adjust the Community's Acceptance Fee because of a Change in Law unless it at the same time adjusts the Acceptance Fee of all other suppliers of solid waste who are subject to the same or comparable Change in Law provisions.

D. The definition of "Acceptance Fee" in Section 14.0, Standard Definitions, is hereby deleted in its entirety and inserted in place thereof the following:

"Acceptance Fee" means:
(a) until July 1, 2010, the Base Acceptance Fee as adjusted from time to time in response to Changes in Law, all as provided in Article 4.2.2.;
(b) thereafter, according to the following table:

Date	*Acceptance Fee*
July 1, 2010 – June 30, 2011	*$ 40.01*
July 1, 2011 – June 30, 2012	*$ 47.51*
July 1, 2012 – June 30, 2013	*$ 57.51*
July 1, 2013 – June 30, 2014	*$ 67.51*
July 1, 2014 – June 30, 2015	*$ 77.51*
July 1, 2015 and each July 1 thereafter	*The lesser of (a) the Acceptance Fee in effect on June 30 of such year escalated by the change in the Consumer Price Index from July 1of the prior year in accordance with Article 4.2.2 and (b) an amount determined on any*

	of July 1, 2015, July 1, 2020 or July 1, 2025 equal to ten percent (10%) below the then average Acceptance Fee of all Non-Tier 1, Non-Host communities with Long-Term Municipal Contracts with SEMASS escalated annually thereafter. Non-Tier 1 communities shall mean communities other than the Town of Plymouth, Massachusetts; Town of Wellfleet, Massachusetts; Town of West Bridgewater, Massachusetts; Town of Truro, Massachusetts; Town of Stoughton, Massachusetts; Town of Middleborough, Massachusetts; Town of Mattapoisett, Massachusetts; Town of Freetown, Massachusetts; Town of Fairhaven, Massachusetts; Town of Acushnet, Massachusetts; Town of Sharon, Massachusetts; Town of Sandwich, Massachusetts; Town of Provincetown, Massachusetts; Massachusetts Air National Guard - Otis Air National Guard Base, Massachusetts; Town of Orleans, Massachusetts; Town of Norwell, Massachusetts; Town of Mashpee, Massachusetts; Town of Kingston, Massachusetts; Town of Harwich, Massachusetts; Town of Yarmouth, Massachusetts; Town of Hanson, Massachusetts; Town of Falmouth, Massachusetts; Town of Eastham, Massachusetts; Town of Dennis, Massachusetts; Town of Chatham, Massachusetts; Town of Canton, Massachusetts; Town of Braintree, Massachusetts; Town of Brewster, Massachusetts; and Town of Barnstable, Massachusetts. Non-Host communities are those communities other than those that host a Covanta owned or operated landfill, transfer station or energy from waste facility in their borders. Long-Term Municipal Contracts shall mean any contract entered into by SEMASS and any Non-Tier 1 community on or after July 1, 2010, with an initial term of not less than five years. Covanta shall mean any entity that is directly or indirectly majority owned or controlled by Covanta Energy Corporation.

E. The definition of Expected Minimum Tonnage in Section 16.0, Non Standard Definitions, is hereby deleted in its entirety and inserted in place thereof the following:

"Expected Minimum Tonnage" means 5,153 tons per year of solid waste.

F. Section 10.3 of the Agreement is amended by inserting a new Section 10.3.8 as follows:

10.3.8 Notwithstanding the forgoing, in addition to any remedies the Community may have under the Agreement, , beginning July 1, 2011, SEMASS shall pay the Community damages, if any, for breach of Article 10.1.1 for each 12 month period ending June 30 in accordance with the following equation:

(X tons shortfall below the Total tons of Acceptable Waste delivered for such period) divided by (Total tons of Acceptable Tons delivered during such period) times (the Extension Liquidated Damages); where Total tons of Acceptable Waste delivered shall not exceed the Annual Maximum Tonnage and the Extension Liquidated Damages are as follows:

For period ended June 30:

2011	*$12,883.00*
2012	*$64,413.00*
2013	*$167,473.00*
2014	*$322,063.00*
2015	*$528,183.00*
2016	*$422,546.00*
2017	*$316,910.00*
2018	*$211,273.00*
2019	*$105,637.00*

G. The definition of "Acceptance Fee Inflation Factor Percentage" in Article 16.0, Non-Standard Definitions, shall be deleted in its entirety.

2. Effect of Modification. Except as expressly modified by the terms and conditions of this Seventh Amendment, each and every one of the terms and conditions of the Waste Acquisition Agreement is hereby ratified and confirmed, and remains in full force and effect. In the event of a conflict between the terms and conditions of this Seventh Amendment and the terms and conditions of the Waste Acquisition Agreement, the terms and conditions of this Seventh Amendment shall govern. This Seventh Amendment, together with the Waste Acquisition

Agreement, represents the complete understanding among the parties and supersedes all prior negotiations, statements or agreements, whether written or oral, among the parties to the Waste Acquisition Agreement as amended by the Seventh Amendment as to the matters set forth in this Seventh Amendment and the Waste Acquisition Agreement. This Seventh Amendment and the Waste Acquisition Agreement may be amended by, and only by, an instrument in writing executed and delivered by the duly authorized representatives of each of the parties.

3. Severability; Modifications. Should one or more of the provisions of this Seventh Amendment be determined by a court of law to be illegal or unenforceable, the other provisions shall nevertheless remain effective and shall be enforceable.

4. Execution in Counterparts. This Seventh Amendment may be executed in any number of counterparts, each of which when so executed and delivered shall be deemed an original and such counterparts together shall constitute one instrument.

[signature page follows]

IN WITNESS WHEREOF, the hereto have caused this Seventh Amendment to be executed effective as of the date first written above.

SEMASS PARTNERSHIP

BY: Covanta SEMASS LLC, the General Partner of Covanta Company of SEMASS, L.P., the Managing General Partner of SEMASS Partnership.

By: _____
Name: _____
Title: _____

THE TOWN OF BREWSTER

By: _____
Name: _____
Title: _____

By: _____
Name: _____
Title: _____

By: _____
Name: _____
Title: _____

Solely as guarantor of SEMASS's payment obligations set forth in Section 1.F. of this Seventh Amendment (Section 10.3.8 of the Agreement)
COVANTA HOLDING CORPORATION

By: _____
Name: _____
Title: _____

ACKNOWLEDGEMENTS

STATE OF _____ §
§ _____, 2009
COUNTY OF _____ §

Then personally appeared the above named _____, _____ of Covanta SEMASS LLC, the General Partner of Covanta Company of SEMASS, L.P., the Managing General Partner of SEMASS Partnership, a Massachusetts limited partnership, and acknowledged the foregoing instrument to be the free act and deed of said SEMASS Partnership, before me,

_____
Notary Public

My commission expires: _____

COMMONWEALTH OF MASSACHUSETTS

_____ COUNTY, ss. _____, 2009

Then personally appeared the above-named members of the Board of Selectmen, and acknowledged the foregoing instrument to be the free act and deed of the Town, before me,

_____
Notary Public

My commission expires: _____

STATE OF _____ §
§ _____, 2009
COUNTY OF _____ §

Then personally appeared the above named _____, _____ of Covanta Holding Corporation, a Delaware corporation, and acknowledged the foregoing instrument to be the free act and deed of said corporation, before me,

_____
Notary Public

My commission expires: _____

Appendix B

Information on Disposal Facilities

Recent Permit for Bourne Landfill

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
SOUTHEAST REGIONAL OFFICE
20 RIVERSIDE DRIVE, LAKEVILLE, MA 02347 508-946-2700

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

IAN A. BOWLES
Secretary

LAURIE BURT
Commissioner

September 2, 2009

Mr. Daniel Barrett
Bourne Department of Integrated Solid Waste Management
24 Perry Avenue
Buzzards Bay, Massachusetts 02532

RE: PERMIT APPROVAL
Application for: BWP SW 10
AUTHORIZATION TO OPERATE
PHASE 2A/3A STAGE 2 LINED LANDFILL EXPANSION

AT: Bourne Integrated Solid Waste Management Facility
MacArthur Boulevard
Bourne, MA

Transmittal Number: X226234

Dear Mr. Barrett:

The Massachusetts Department of Environmental Protection, Solid Waste Management Section ("Department"), has completed its review of the permit application ("Application") listed above in regard to operation of Phase 2A/3A, Stage 2 of the Bourne Sanitary Landfill ("Landfill") and determined the Application is technically complete. Accordingly, the Application to Operate Phase 2A/3A, Stage 2 of the Landfill is approved with the conditions herein.

Application Summary

The Application was prepared and submitted by Sitec Environmental, Inc. ("Sitec"), Marshfield, Massachusetts on behalf of the Town of Bourne ("Town"). The Application consisted of a Transmittal Form assigned No. X226234, an application form BWP SW 10, and one bound volume entitled:

This information is available in alternate format. Call Donald M. Gomes, ADA Coordinator at 617-556-1057. TDD# 866-539-7622 or 617-574-6868.

DEP on the World Wide Web: http://www.mass.gov/dep
Printed on Recycled Paper

Application for Authorization to Operate a Landfill
Phase 2A/3A Stage 2 Landfill Expansion
BWP SW 10 – Transmittal X226234
Department of Integrated Solid Waste Management
Town of Bourne
201 MacArthur Boulevard
Bourne, Massachusetts

July 27, 2009

On September 2, 2009, a surveyed As-Built plan, prepared by Alpha Surveying and Engineering, Inc., titled "As-Built Plan of Clay cap in Bourne Massachusetts" dated "12-1-08" and most recently revised on "8-25-09", was submitted to MassDEP. The plan depicts the top of subgrade, top of clay and top of drainage sand elevations and the leachate pipe location and elevation.

PROJECT BACKGROUND

The Town of Bourne Integrated Solid Waste Management Facility ("Facility") is located off MacArthur Boulevard (Route 28) in Bourne, Massachusetts on a 74.05 acre parcel of land. The Facility is owned and operated by the Town and consists of the inactive unlined landfill areas designated Phase 1A, 1B, 1C, and 1D (approximately 26 acres), the active lined landfill area designated Phase 2 (approximately 7.3 areas), and the active lined landfill areas designated Phase 3, Stage 1, Stage 2 and Stage 3 (approximately 12 acres) and a Large Handling Facility. Ongoing operations at the Facility include composting, recycling, and waste disposal in Phase 2A/3A of the lined Landfill and construction and demolition materials transfer at the Large Handling Facility area of the Facility. The following operations are historical, currently existing, or proposed by the Town as part of the Bourne Integrated Solid Waste Management Facility (ISWMF).

- Phase 1 unlined landfill. Phase 1 is the inactive unlined waste disposal area where the Town ceased accepting waste on August 1, 1999. On January 12, 2000, MassDEP issued a Corrective Action Design (BWP SW 25, transmittal No. W005919) permit approval for final closure of the Phase 1A, 1B and 1C areas to be completed in 2000. The Town installed a temporary pavement cover system over the Phase 1D area to prevent stormwater infiltration and control landfill gas in the Phase 1D area in accordance with the compliance plan and schedule in the Administrative Consent Order with Administrative Penalty (ACOP-SE-00-4001) signed between the Town and MassDEP on March 23, 2000. On December 31, 1999, the Town submitted a Corrective Action Design (BWP SW 25, transmittal No. W009595) permit application for reclamation of the Phase 1D unlined landfill. MassDEP approved the reclamation application on July 26, 2002. Reclamation work began in December 2002. Reclamation temporarily ceased and is anticipated to recommence in the fall of 2009.

- Phase 2 lined landfill. Phase 2 is an existing single composite lined landfill disposal area designed and operated in sections designated Stage 1 (5.3-acres) and Stage 2 (2-acres). On September 9, 1998, MassDEP issued a Major Permit Modification Approval, Authorization to Construct, Phase 2, Stage 1 and 2 (BWP SW 11, transmittal No. P24465). On July 27, 1999, MassDEP issued an Authorization to Operate ("ATO") permit for the Phase 2, Stage 1

disposal operations (BWP SW 10, transmittal No. W004193). On March 23, 2000, MassDEP issued an ATO permit for the Phase 2, Stage 2 disposal operations (BWP SW 10, transmittal No. W009379).

The Town developed a Corrective Action Design ("CAD") for the phased final cover system construction of the Phase 2 and Phase 3 landfill areas. The CAD presented the Landfill specific design and details for the construction of three (3) segments, or phases, of cap and the landfill gas management system construction that would result in the complete and final closure of the Phase 2 and Phase 3 landfill areas. MassDEP issued an approval for the construction of the landfill gas management system for the Phase 2 landfill area on September 21, 2001 and issued an approval for the Phase 2 final cover system on April 5, 2002 to facilitate final cover construction during the 2002 construction season. The Phase 2 final cover system was completed in the fall of 2002.

- Phase 3 lined landfill. Phase 3 is a three-stage landfill disposal area constructed with a double composite liner with leak detection. Stage 1 is a 6.4-acre lined disposal cell. Stage 2 is a 1.3-acre lined disposal area on the eastern side-slope. Stage 1 and 2 were constructed in 2000 and began operations in 2001.

  Phase 3 Stage 3 is a 4.25 acre lined disposal cell constructed in 2003 that began operations in 2004. On June 30, 2004, (BWP SW 25, transmittal No. W019833) and on June 30, 2006, (BWP SW 25, transmittal No. W085034) MassDEP approved construction of a final cover system over filled areas of Phase 3. The final cover system was constructed on the eastern sideslopes of Phase 3 Stage 1 and 2 in 2004 an over the eastern sideslope of Phase 3 in 2006. The western sideslopes of Phase 3 have been overlain with waste material as part of the Phase 2A/3A operations or by intermediate cover material.

- Residential drop-off facility. An existing, temporary, residential transfer station is currently operated at the site including waste, recycling and composting drop-off operations. The Town is near completion of constructing a new residential waste transfer area on an adjacent 25 acre parcel of land.

- Difficult to Manage Waste: Within the Facility Transition Plan approval issued by MassDEP on February 8, 2005 (BWP SW 22, transmittal No. W050698), MassDEP approved grinding of difficult to manage waste materials, such as furniture, within the active area of the landfill to reduce the volume and increase the density of these materials. The net result will be a reduction in landfill volume used for disposal and a reduction in post disposal landfill settlement.

- Recycling operations. Recycling activities are currently conducted at the Facility including but not limited to asphalt, brick, and concrete (ABC) crushing, the sorting of scrap metal, and the storage and baling of other recyclables.

- Compost operations. Compost activities are currently conducted at the Facility including, but not limited to, the grinding of stumps, material stockpiles, and compost windrow operations under an existing registration. The compost operation has been relocated to an adjacent 25 acre parcel owned by the Town situated to the south of the Landfill to accommodate the Phase 1D reclamation.

- Large Handling Facility. The Town has discontinued C&D waste processing at the Facility. In order to maintain uninterrupted service to the region, MassDEP approved a Transition Plan on February 8, 2005 (BWP SW 22, transmittal No. W050698), allowing the Town to temporarily transfer unprocessed C&D debris within the active lined Landfill cell. These materials were then shipped to a permitted processing facility. An Authorization to Construct permit was issued for a permanent C&D transfer station("Large handling Facility") on October 31, 2006 (BWP SW 05, transmittal No. W066083). An Authorization to Operate permit was issued on March 31, 2009 (BWP SW 06, transmittal No. X006266). The transfer station is currently operating and waste transfer at the active face has been discontinued.
- Future Operations. Phases 4 through 6 are conceptual lined landfill cells that may be constructed on the remaining areas of the site assigned parcel. Several of these phases would only be available if reclamation of the Phase 1D is successful and reclamation of other unlined areas of Phase 1 is permitted. At this time, each phase of these conceptual disposal areas will need an Authorization to Construct permit and an Authorization to Operate permit prior to being developed.

PHASE 2A/3A DESIGN DESCRIPTION

The Authorization to Construct permit application detailed the design and construction of Phase 2A/3A of the Landfill expansion. The design utilized the existing liner system and final cover system in areas of Phase 2A/3A where they existed and included constructing a new primary composite liner and leachate collection system with a secondary composite liner with leak detection system to monitor the performance of the primary liner where these were required to supplement the existing groundwater protection systems.

Phase 2A/3A is a 19.9 acre lined disposal cell overlying portions of Phase 1, Phase 2, and Phase 3 and a narrow strip of land between Phases 1 and Phases 2 and 3 where no prior waste disposal has occurred and no liner system existed. Phase 2A/3A added approximately 1,800,000 cubic yards of air space. The facility is being approved to continue to dispose up to an average 600 tons per day, and up to a maximum of 700 tons per day. At this filling rate, the life expectancy of Phase 2A/3A was approximately six (6) years based on a compacted MSW density of 1400 pounds per cubic yard.

The Authorization to Construct permit for Phase 2A/3A was issued on June 16, 2004 (BWP SW 08, transmittal No. W045546). Phase 2A/3A was constructed in two stages, designated Stage 1 and Stage 2. Stage 1 was constructed in 2004 and an Authorization to Operate permit was issued for Stage 1 on March 18, 2005 (BWP SW 10, W057879). Stage 2 consists of 4.55 acres constructed on the eastern sideslope of Phase 1 ABC landfill. The Authorization to Operate permit for Stage 2 is the subject of this permit approval.

Double Composite Liner System with Leak Detection

Phase 2A/3A, Stage 2 was constructed with a double composite liner system with leak detection above the eastern sideslope of Phase 1. Phase 1 of the Landfill is unlined, but was previously

capped with a standard geomembrane-based capping system. The liner constructed over Phase 1 of the Landfill included, from bottom to top:

- Stripping the vegetative support material from the existing cap,
- Inspection of and supplementing, where necessary, the existing 9" sand drainage layer above the existing geomembrane cap;
- A minimum 12-inch thick low-permeability soil barrier layer ($k \leq 1 \times 10^{-7}$ cm/sec); overlain by
- A geocomposite barrier layer consisting of a needle-punched geocomposite clay liner (GCL), overlain by;
- A geomembrane barrier layer consisting of a minimum 60-mil textured HDPE flexible membrane liner (FML), overlain by;
- A leak detection layer consisting of a geocomposite (geonet/geotextile) drainage layer, overlain by;
- A geomembrane barrier layer consisting of a minimum 60-mil textured HDPE FML, overlain by;
- A leachate collection layer with a minimum 18-inch sand layer ($k \geq 1 \times 10^{-2}$ cm/sec).

Primary Leachate Collection System

The Phase 2A/3A leachate collection system was designed to drain the primary liner system so that no more than one-foot (1') of hydraulic head will develop on the liner. The leachate collection system components included the minimum 18-inch leachate collection sand layer and leachate collection pipes constructed with 6-inch diameter HDPE pipe.

The perforated primary leachate collection pipe from Phase 2A/3A, Stage 1 North gravity drains to a solid pipe extending through Stage 2 South into Phase 3, Stage 3 and connects to the Phase 3 Stage 3 primary leachate collection system. A separate perforated pipe was constructed within the Stage 1 South drainage sand and discharge collected liquid to the Phase 3, Stage 3 leachate collection system. An internal sump area exists at the low point of the Phase 3 Stage 3 liner where leachate is conveyed out of the sump via a submersible pump installed within a side-slope riser pipe to 207,000 gallon glass fused steel above ground storage tank. .

Leachate from the Phase 2A/3A, Stage 2 primary leachate collection system drains to perforated collection pipes that discharge into the Phase 2A/3A, Stage 1 leachate collection system.

Leak Detection System

The Phase 2A/3A leak detection system was designed to detect and collect any potential leakage through the primary liner into the leak detection system. The Phase 2A/3A leak detection system consists of geocomposite drainage materials (geonet with geotextile) and perforated HDPE pipes installed in a trough constructed between the primary and secondary liners. Any leakage through the primary liner will gravity drain via the geonet into the secondary leachate collection pipes.

The Phase 2A/3A Stage 2 leak detection, secondary collection geocomposite is directly connected to the Stage 1 leak detection, secondary collection geocomposite. Leachate within this pipe will be conveyed to the southeastern end of the Phase 2A/3A to the existing Phase 3 Stage 3 secondary leachate collection system sump. The sump is equipped with an independent pumping system that conveys the secondary leachate to the above ground storage system.

Leachate Management

The Town has a contract with an agreement with Wastewater Services Inc. to load and transport leachate from the storage tank for disposal at American Re-Fuel's SEMASS incinerator and/or the New Bedford Wastewater Treatment Plant, or other permitted facility via tanker trucks on an as-needed basis. The quantity of leachate generated will be recorded and the leachate quality will be monitored in accordance with the approved plan.

Stormwater Management System

The Phase 2A/3A stormwater management system is designed to control run-off and run-on from the 25-year, 24-hour rainfall event during operations and after final closure. The stormwater management plan included the resizing of two existing stormwater retention basins along with the construction of diversion berms, letdown channels, and perimeter drainage channels. Retention Basin No. 1 is located on the western side of Phase 3, Stage 3 of the Landfill. A portion of this basin was used in the construction of the Phase 2A/3A liner. To compensate for this loss of storage volume and to add additional volume, the western side of the existing basin was further excavated. Additional excavation will be performed as Phase ID is reclaimed. Modified Basin No. 1 has a surface area of approximately one acre, and a storage capacity of approximately 460,000 cubic feet of storage, which exceeds the 25-year, 24-hour storm event run-off volume of approximately 115,000 cubic feet and the 100-year, 24-hour storm event run-off volume of approximately 192,000 cubic feet.

Retention Basin No. 2 is located in the southwest corner of the site and will continue to be utilized. Basin No. 2 provides approximately 534,000 cubic feet of storage capacity, which exceeds the 25-year, 24-hour storm event run-off volume of approximately 122,000 cubic feet and the 100-year, 24-hour storm event run-off volume of approximately 193,000 cubic feet.

Retention Basin No. 3 is located in the northwest corner of the site and will continue to be utilized. Basin No. 3 provides approximately 164,000 cubic feet of storage capacity, which exceeds the 25-year, 24-hour storm event run-off volume of approximately 86,000 cubic feet and the 100-year, 24-hour storm event run-off volume of approximately 147,000 cubic feet.

APPROVAL AND CONDITIONS

MassDEP has determined the ATO application is satisfactory and in accordance with the authority granted pursuant to Massachusetts General Laws, Chapter 111, Section 150A, hereby approves the Phase 2A/3A, Stage 2 Construction Certification and authorizes solid waste disposal operations in Phase 2A/3A, Stage 2 of the landfill subject to the following conditions:

1. Life of Permit: This Authorization to Operate permit for Phase 2A/3A, Stage 2 shall be valid until Phase 2A/3A, Stage 2 reaches capacity or for a period of five (5) years which ever comes first. This Authorization to Operate also supersedes Condition 1 of the March 18, 2005, Authorization to Operate Phase 2A/3A, Stage 1 in that Stage 1 may continue to operate in conjunction with Stage 2.

2. Regulatory Compliance: The Town shall operate and maintain the Facility, including Phase 2A/3A, Stages 1 and 2, in accordance with MassDEP regulations, requirements, the Manual, or as specified by this permit. This includes, but is not limited to, 310 CMR 19.043(5) *Standard Conditions*, 310 CMR 19.051 *Financial Assurance Requirements*, and 310 CMR 19.130 *Operation and Maintenance Requirements*. There shall be **no** deviation from the approved plan without prior written approval from MassDEP.

3. Waste Types and Tonnage Limits: The Town may accept an average of 600 tons per day of waste with a maximum of 700 tons per day not to exceed 4,900 tons per week. The Town shall not accept more than 219,000 tons of waste for disposal per year. Waste approved to be disposed at the Landfill includes municipal solid waste (MSW), residual C&D material and other non-MSW material. The definition of non-MSW for the purpose of this permit includes construction and demolition waste residuals from a C&D processing facility, bulky waste, difficult to manage waste, and other special wastes that have received prior written approval from MassDEP and only in accordance with Department policy.

   The overall Facility tonnage, including recycling, composting, and disposal remains at a maximum materials acceptance rate of 825 tons per day as established during the EIR process.

4. Hours of Operation: The Town may operate the Facility seven days per week, fifty-two (52) weeks per year, Monday through Saturday 7:00 AM to 4:00 PM and Sunday from 7:00 AM to 12:00 PM.

5. Buffer Waste Layer: The Town shall place an initial 5-foot thick lift of solid waste that functions as a buffer layer that must be free of bulky waste or other waste that because of its length, shape, or other characteristics, has the potential to puncture the liner. The Town shall ensure that the buffer waste layer adheres to the following conditions:

   a. The select waste shall be processed to a maximum particle size of 3-inches.

   b. Buffer layer materials shall be pre-approved by a Professional Engineer (PE) or other qualified personnel. The supervising PE shall inspect the liner prior to buffer materials placement, inspect representative samples of the buffer layer materials, and observe placement of the materials to the extent necessary to determine that the initial solid waste buffer layer will not compromise the liner integrity. A certification report prepared by the supervising PE shall be submitted to MassDEP with thirty (30) days of completing first lift placement.

6. Nuisance Conditions: The Town shall ensure that Facility operations do not create nuisance problems with vectors, odors, dust, noise, litter or other nuisance conditions. Measures shall be undertaken immediately to mitigate any potential impacts from nuisance conditions including temporarily ceasing operation on any given day. Operations shall be modified to prevent these conditions from reoccurring.

7. Landfill Gas Monitoring Consultant Services: The Town shall continue to engage the services of a third party consultant, experienced in the optimization of the performance of landfill gas collections systems, to review the landfill gas collection system performance and advise the Town regarding necessary adjustments to the system vacuum and /or design based on temperature, methane, oxygen and nitrogen levels. Performance data shall be collected at each landfill gas extraction well at least every 48 hours, or more frequently as necessary. Adjustments to the landfill gas extraction rate shall be made as appropriate to maintain maximum efficiency. The results of each test and records of each adjustment to the landfill gas collection system shall be recorded and maintained on-site for MassDEP review upon request.

8. Waste Inspections: The Town shall conduct waste inspections for banned waste and other unacceptable materials in accordance with MassDEP's recycling rules, the approved Waste Ban Plan, or as required by this permit. Routine operations shall include supervised unloading and inspection of all waste for unacceptable materials including asbestos, hazardous materials, and waste ban materials. All unacceptable materials shall be managed in accordance with procedures contained in the operation and maintenance plan and as modified by this permit.

9. Asbestos Inspection Protocol: The Town shall adhere to the following protocol for testing and inspecting incoming waste material to prevent the acceptance and processing of Asbestos Containing Materials (ACM).

   a. A sign shall be posted at the entrance to the Facility identifying acceptable and unacceptable materials received at the Facility. The sign must clearly state that ACM is not accepted at the Facility.

   b. An on-site asbestos inspector certified/licensed by the Massachusetts Department of Labor and Workforce Development (the "DLWD") shall visually inspect all incoming loads of waste in order to determine the presence and/or likelihood of ACM. In addition to classroom certification, inspectors must have a minimum of forty (40) hours of on-the-job training and/or experience in identifying potential ACM and sampling protocols. A minimum of two employees shall maintain an asbestos inspector license. All other operations staff shall attend asbestos awareness class.

   c. For each load where ACM is suspected the Town shall notify the MassDEP Southeast Regional Office, Solid Waste Management Section, by telephone (508-946-2828) within two (2) hours after identifying the load as containing suspect ACM. The Town shall also submit a written report that identifies the source (name of hauler and vehicle license number, and, if known, the generator name and address, the type, quantity, handling

procedures and disposition of the suspect ACM, to the MassDEP Southeast Regional Office, Solid Waste Management Section via facsimile (508-946-2865) within two (2) hours of observing the suspect ACM. If facsimile is not available, the Town shall notify the MassDEP Southeast Regional Office, Solid Waste Management Section via telephone within two (2) hours (508) 946-2828), and submit a written report via mail within twenty-four (24) hours, of observing the suspect ACM.

Note 1: Pursuant to MassDEP **Policy # BWP-96-012: Concerning Non-Friable Asbestos-Containing Material,** (www.mass.gov/dep/air/laws/96-012.htm) if the Town determines that the only suspect ACM within a waste load is **intact** and **unbroken** vinyl asbestos tile and asphalt based asbestos-containing siding products and asphalt based asbestos-containing roofing materials, then the entire load may be disposed, provided that best management practices are used to prevent emissions. The load does not require notification to MassDEP. The load should not be culled, compacted or otherwise handled in a manner that causes breakage of the suspect ACM material. Recyclable materials that are banned from disposal pursuant to 310 CMR 19.017, should be culled from the load prior to disposal, whenever this can be performed without causing a threat to worker safety and/or result in a discharge of asbestos to the environment. Recyclable materials that are likely to be contaminated by exposure to asbestos containing materials do not need to be culled and may be transferred for disposal.

10. Leachate Management: The Town shall operate and maintain the leachate collection and handling equipment at the Landfill in accordance with 310 CMR 19.130(30), the approved plan or as required by this permit. At a minimum, the Town shall conduct quarterly analysis of the leachate for the parameters listed at 310 CMR 19.132(1)(h) or as required to comply with the monitoring requirements and standards of all leachate disposal permits. The quantity of leachate generated shall be reported in the Facility Inspection reports required pursuant to Condition 16.

11. Leachate Monitoring: Upon commencement of operation of Phase 2A/3A, Phase 2, periodic Secondary Leachate Collection System (SLCS) flow rates for the combined Phase 2A/3A, Stage 1 and 2 and Phase 3, Stage 3 area shall be determined and submitted to MassDEP bi-monthly, by the 15th calendar day of the subsequent month. SCLS flow rates shall be measured each week on Monday, Wednesday and Friday.

    Notification Flow Rates shall be one-hundred (100) gallons per acre per day (gpad) for the Monday, Wednesday and Friday measurements and an average of fifty (50) gpad, calculated on a 30-day running average basis.

    Action Flow Rates shall be 200 gpad for the Monday, Wednesday and Friday measurements and an average one-hundred (100) gpad, calculated on a 30-day running average basis.

    Unless otherwise approved by MassDEP, the Town shall, for each SLCS flow rate exceedance of either NFR, notify MassDEP by the next business day (Monday through

Friday), evaluate the operations and maintenance at the Landfill, conduct an assessment to evaluate the appropriateness of the Notification Flow Rate, and take other actions as deemed appropriate by MassDEP.

If the SLCS exceeds either ALR, the Town shall notify MassDEP by the next business day (Monday through Friday), schedule a meeting with MassDEP, and submit an engineering evaluation report within thirty (30) days of the exceedance, unless an alternate schedule is approved by MassDEP.

MassDEP reserves the right to modify the NFR and the ALR and the frequency and/or method of SLCS measurements, and/or the required responses at any time.

12. Cover Requirements: The Town shall apply daily, intermediate, and final cover materials at the Landfill in accordance with 310 CMR 19.130 (15), the approved plan, or as required by this permit.

13. Stormwater runoff: The Town shall control and collect all stormwater in contact with solid waste and/or daily cover within the Phase 2A/3A, Stages 1 and 2 leachate collection systems such that the contact water is not allowed to flow into unlined areas of the site.

14. Material Stockpile/Storage: As required pursuant to Condition 5 of the March 31, 2009 Authorization to Operate the Large Handling Facility co-located at the Facility there shall be no excessive storage or speculative accumulation of materials at the Facility. Pursuant to the materials storage limits stated in the Financial Assurance Estimate, a maximum of 825 tons of materials shall be stored at the Facility at any time.

15. Environmental Monitoring: At a minimum, the Town shall conduct quarterly environmental monitoring of all existing groundwater, surface water, and soil gas monitoring points at the Landfill in accordance with MassDEP regulations, the approved plan, and as modified by MassDEP through review of monitoring data and the CSA. All sampling results including leachate sampling shall be submitted to MassDEP within 60-days after the scheduled sampling period or as required to notify MassDEP of any exceedances.

16. Facility Inspections: The Town shall provide for the Facility to be inspected by a Massachusetts Registered Professional Engineer, or other qualified professional approved by MassDEP on a bi-monthly basis. An inspection report shall be submitted to MassDEP no later than 14 days following the inspection. The report shall address all aspects of the Facility including the compost and recycling operations, the C&D transfer operations, the Phase 2A/3A, Stage 1 and 2 disposal operations, leachate volumes, leachate management, stormwater controls, and all other site features. The report shall indicate whether all items are in compliance and propose remedies and establish a schedule for correcting any problems.

17. Records: The Town shall maintain daily logs at the Facility at all times to record the operational information required pursuant to 310 CMR 19.130 (34) with copies

periodically forwarded to the Board of Health. The Town shall retain copies of all personnel training records regarding operation and maintenance procedures, health and safety training, asbestos training, first aid, emergency procedures and any other training. All logs and records shall be available for Department review upon request.

18. Financial Assurance Mechanism: The Town shall continually maintain the approved financial assurance mechanism, revise the cost estimates, and submit the revised estimates in accordance with 310 CMR 19.051.

19. Annual Report: The Town shall submit an Annual Report to MassDEP by February 15th of each year which summarizes the facility operations for the previous calendar year on a form as provided by MassDEP.

20. Facility Modification(s): The Town shall submit a permit modification application to MassDEP for review and approval for any activities proposed to be conducted on the site assigned property including any construction or substantial changes or additions to site operations.

21. Local, State, Federal Requirements: The Town shall fully comply with all applicable local, state, and federal laws, regulations, and policies, by-laws, ordinances and agreements. Applicable federal regulations include, but are not limited to, 29 CFR Part 1910, OSHA standards governing employee health and safety in the workplace.

22. Permit Limitations: The issuance of this conditional approval is limited to the construction certification and operation of the Phase 2A/3A, Stage 2 lined disposal area and does not relieve the Town from the responsibility to comply with all other regulatory or permitting requirements. MassDEP reserves the right to require additional assessment or action, as deemed necessary to protect and maintain the environment free from objectionable nuisance conditions, dangers or threats to public health or the environment.

APPEAL

RIGHT OF APPEAL

Right to Appeal – This approval has been issued pursuant to M.G.L. Chapter 111, Section 150A, and 310 CMR 19.037: Procedure for Existing Facility Permits, Permit Modifications, Permit Renewals and other Approvals, of the "Solid Waste Management Regulations". Pursuant to 310 CMR 19.037(5), any person aggrieved by the issuance of this determination may file an appeal for judicial review of said decision in accordance with the provisions of M.G.L. Chapter 111, Section 150A and M.G.L. Chapter 30A not later than thirty days following receipt.

Notice of Appeal - Any aggrieved person intending to appeal the decision to the superior court shall provide notice to MassDEP of the intention to commence such action. Said notice of intention shall include the MassDEP File Number X226234 and shall identify with particularity the issues and reason (s) why it is believed the approval decision was not proper. Such notice

shall be provided to the Office of General Counsel of MassDEP and the Regional Director for the regional office that made the decision. The appropriate addresses to send such notices are:

Office of General Counsel
Department of Environmental Protection
One Winter Street
Boston, MA 02108

David Johnston
Acting Regional Director
Department of Environmental Protection
20 Riverside Drive
Lakeville, MA 02347

No allegation shall be made in any judicial appeal of this decision unless the matter complained of was raised at the appropriate point in the administrative review procedures established in those regulations, provided that matter may be raised upon showing that it is material and that it was not reasonably possible with due diligence to have been raised during such procedures, or that matter sought to be raised is of critical importance to the public health or environmental impact of the permitted activity.

If you have any questions or comments regarding this approval letter, feel free to contact me at (508) 946-2833 or Dan Connick at (508) 946-2884 or at the letterhead address.

Very truly yours,

This final document copy is being provided to you electronically by the Department of Environmental Protection. A signed copy of this document is on file at the DEP office listed on the letterhead.

David B. Ellis, Chief
Solid Waste Management Section

E/DC/
\\dep-fp-lak-001\Home$\DConnick\A-B\Bourne\Phase2A-3A ATC\Phase 2A 3A Stage 2 ATO.doc

ec: Bourne Board of Health
24 Perry Avenue
Buzzards Bay, MA 02532
ccoffin@townofbourne.com

Bourne Integrated Solid Waste Management
24 Perry Avenue
Buzzards Bay, MA 02532
pgoddard@townofbourne.com

Cape Cod Commission
3225 Main Street
P.O. Box 226
Barnstable, MA 02630
aadams@capecodcommission.org

ec: Sitec Environmental, Inc.
769 Plain Street, Unit C
Marshfield, MA 02350
ATTN: A. R. Quinn.
rquinn@sitec-engineering.com

DEP-BOSTON
ATTN: J. Doucett

fc: Board of Selectmen
24 Perry Avenue
Buzzards Bay, Massachusetts 02532
(508) 759-8026

Bourne Department of Public Works
24 Perry Avenue
Buzzards Bay, MA 02532
(508) 759-8026

Legislation Forming the Greater New Bedford Refuse District

AGREEMENT

Between

CITY OF NEW BEDFORD

TOWN OF ACUSHNET

TOWN OF DARTMOUTH

TOWN OF FAIRHAVEN

REGIONAL REFUSE DISTRICT

Agreement signed: Dec. 3, 1979

AGREEMENT FORMING THE GREATER NEW BEDFORD REGIONAL REFUSE MANAGEMENT DISTRICT [INCLUDING AMENDMENTS THROUGH MAY, 1993]

SECTION I - THE REGIONAL REFUSE MANAGEMENT DISTRICT COMMITTEE

A. COMPOSITION

The powers and duties of the Regional Refuse District shall be vested in and exercised by a Regional Refuse Disposal District Committee, hereinafter sometimes referred to as the Committee. All appointments to the Committee shall be made by the Mayor of the City of New Bedford, subject to confirmation by the City Council, and the Board of Selectmen of each town. All members of the Committee shall serve until their successors are appointed and qualified.

B. INITIAL COMMITTEE

Within twenty-one days after the establishment of the Regional Refuse District, the City of New Bedford shall appoint three members, the Town of Dartmouth shall appoint two members, the Town of Fairhaven shall appoint one member, and the Town of Acushnet shall appoint one member, all to serve on the Committee. The members so appointed shall serve on the Committee until their respective successors are appointed and qualified, as provided in sub-section I.C. [This section is now obsolete; see section I.C and notes 1 and 2.]

C. PERMANENT COMMITTEE

The Regional Refuse Disposal District Committee shall have six members, three of whom shall be appointed by the City of New Bedford, and three of whom shall be appointed by the Town of Dartmouth. Members shall serve a term of three years. In every year in which a term of a member expires, the Town or City involved

shall appoint a member to serve on the Committee for a term of three years from July 1 of the year in which appointment is required to be made.

D. **VACANCIES**

If a vacancy occurs amount the members appointed under sub-section I.B. the City or Town involved shall, within thirty days after such vacancy occurs, appoint a member to serve until his successor is appointed and qualified, as provided in sub-section I.C.

If a vacancy occurs among the members appointed under sub-section I.C. the City or Town involved shall, within thirty days after such vacancy occurs, appoint a member to serve for the balance of the unexpired term.

Any member wishing to resign from the Committee shall file with the Committee a written notification or resignation with a copy thereof to the Clerk of the parties which he represents. No vacancy shall exist by resignation without compliance with the above provisions.

E. **ORGANIZATION**

Promptly upon the appointment and qualification of the members of the initial committee and annually thereafter at the first regular meeting of the Committee, the Committee shall organize and choose by ballot a chairman from among its own membership.

F. **POWERS AND DUTIES**

The Committee shall have all the powers and duties conferred and imposed upon regional refuse disposal district committees by law and conferred and imposed upon it by this agreement, and other additional powers and duties as are specified

in Sections 44A to 44K, inclusive, of Chapter 40 of the General laws and any amendments thereof or additions thereto, now or thereafter enacted or as may be specified in any other applicable general law or specified law.

G. QUORUM

The quorum for the transaction of business shall be a majority of the Committee, but a number less than a majority may adjourn.

SECTION II - LOCATION OF REGIONAL REFUSE DISPOSAL FACILITY

The regional refuse disposal facilities shall be a landfill located in the northeast section of the Town of Dartmouth in the area known, as Crapo Hill, and such ancillary waste management facilities as the District Committee shall approve. Each party shall transfer its municipal waste to the landfill site. Each party shall also provide its own facility for the use of residents of the municipality for disposal of household waste and other waste not suitable for direct disposal at the landfill as determined by the Committee; each party shall also be responsible for the transfer of such waste to the landfill. All District facilities shall be operated by the Committee subject to the rules and regulations of appropriate municipal and state agencies.

SECTION III - APPORTIONMENT AND PAYMENT OF COSTS

A. Apportionment of Costs

Until the first full fiscal year after the District Committee has certified to the member communities that the Regional Refuse Disposal Facility is available to receive refuse from the member communities, the costs incurred by the District shall be apportioned among the parties annually on the basis of the most recent available population census taken either by the Commonwealth

pursuant to the provisions of General Laws chapter 9, section 7, as amended, or by the United States Bureau of the Census pursuant to Title 13 of the United States Code. Each party shall pay its share of all costs of the District in the proportion that its population bears to the aggregate of the total population of all parties.

Beginning with the first full fiscal year following the certification of availability by the District Committee under the preceding paragraph, the net costs of operation of the District shall be allocated to each party in each year in proportion to the estimated weight of the refuse to be delivered to the facility by such party. For this purpose "net costs" shall mean all of the expenses paid or funded by the District, including allowances for the creation and maintenance of reasonable reserves, less revenues received by the District from sources other than assessments to the parties, including interest on reserves, and fees charged to private haulers. Notwithstanding the foregoing, if for any reason the Regional Refuse Disposal Facility is continuously unable to receive refuse from the parties for a period of greater than six months, then the net costs of the District for such period shall be allocated among the parties in accordance with the formula set forth in the first paragraph of this section.

Within five months of the end of each fiscal year, a determination shall be made as to the actual net costs incurred in operation of the District for such year and the actual weight of refuse delivered by each party to the facility during such year. Such determination shall be used when preparing the budget for the succeeding fiscal year to provide adjustments to each party's share of such budget. Such adjustments shall be made by charging or crediting each party with the difference between the amount of such

costs apportioned to it for the preceding fiscal year upon the basis of the estimated budget and the estimated weight of refuse for such year and the amount of such costs which would have been apportioned to it if the actual costs and the actual weight of refuse for such year had been used when the budget had been prepared for such year.

In order to make the above adjustments, the facility shall contain a motor truck scale for weighing all vehicles delivering refuse to the facility. Accurate records shall be kept showing the weight of refuse delivered by each member.

B. <u>Times of Payment of Apportioned Costs</u>

Each party shall pay to the District in each fiscal year its proportionate share of costs certified by the District Treasurer in accordance with subsection IV C. Except as otherwise provided in subsection IV A., or in subsection IX, the annual share of each party shall be paid in such amounts and at such times that at least the following percentages of such annual share shall be paid on or before the following respectively indicated dates:

July 10	25%
October 10	50%
January 10	75%
April 10	100%

In the event that any party fails to make a payment of its apportioned share after proper certification by the District Treasurer in accordance with the schedule set forth above, and such failure continues for more than thirty (30) days, then such payment shall bear interest from the original due date, at the "prime rate" published from time to time by the Wall Street Journal, or if such index is no longer published, any similar rate selected by the District Committee. The District Treasurer shall certify the amount of any such interest charges owed hereunder to the

treasurers of the parties hereto, and such amounts shall be paid to the District in accordance with the provisions of General Laws Chapter 40, Section 44H.

C. APPORTIONMENT OF COSTS

Notwithstanding anything in this Agreement to the contrary, in the event that the District enters into a contract with a third party to dispose of the waste of its member municipalities, the District shall cause such contract to charge separately for the waste of each such municipality. All costs incurred under any such contract shall be directly assessed to the municipality to which such costs are attributable. In preparing its budget, the District shall include an estimate of the amount of any such contractual payments required to be made on behalf of each municipality, and include such estimates in its assessments, subject to adjustment in the manner provided in subsection III.A. hereof.

SECTION IV - BUDGET

A. INITIAL BUDGET

After the original committee is organized, it shall prepare a reasonably detailed operating and maintenance budget covering expense, if any, for the balance of the then fiscal year. Copies of such proposed budget shall be submitted to the Mayor, to the chairman of the finance or advisory committee of each party, and to the Board of Selectmen of each town for its consideration. A budget shall be adopted not earlier than fourteen days but within thirty days after the proposed budget has been so submitted. The amount of the said budget shall be apportioned among the parties according to the provisions of Section III herein. The regional district treasurer shall certify to the treasurer of each party its respective shares of said budget. The sums thus certified shall be

payable by each party to the Regional Refuse Disposal District Committee but only from funds which may be, or may have been, appropriated by each party for such purposes.

B. TENTATIVE OPERATING AND MAINTENANCE BUDGET

Thereafter, the Committee shall annually prepare a tentative budget for the ensuing fiscal year, attaching thereto provisions for any installment of principal or interest to become due in such fiscal year on any bonds or other evidence of indebtedness of the District and any other capital costs to be apportioned to the parties. The said Committee shall mail a copy of thereof to the Board of Selectmen, Mayor and the Finance Committee or Advisory Committee, if any, of each party on or before November 15, in such detail as the Committee may deem advisable.

C. FINAL OPERATING AND MAINTENANCE BUDGET

The Committee shall adopt an annual operating and maintenance budget, including debt and interest charges and any other current capital costs as separate items, on or before December 21, for the ensuing fiscal year and the said Committee shall apportion the amounts necessary to be raised in order to meet the said budget in accordance with the provisions of Section III. The amount so apportioned to each party shall, prior to December 31, of each year preceding the fiscal year to which said budget relates, be certified by the district treasurer to the treasurer of such parties and such parties shall, at the next annual meeting, appropriate the amounts so certified.

SECTION V - TRANSPORTATION

Each party shall be responsible for the transportation of its refuse to the landfill site, subject to routing by the Committee and rules and regulations of municipal agencies having jurisdiction

with respect thereto.

SECTION VI - AMENDMENTS

This agreement may be amended from time to time in the manner hereinafter provided, but no such amendment shall be made which shall substantially impair the rights of the holders of any bonds or other notes or other evidence of indebtedness of the District then outstanding, or the rights of the District to procure the means for payment thereof, provided that nothing in this section shall prevent the admission of a town to the District, subject however, to provisions as found in Section VI of this agreement and the reapportionment accordingly of capital costs of the District represented by bonds or notes of the District then outstanding and of interest thereon.

B. PROCEDURE

Any proposal of amendment, except a proposal for amendment providing for the withdrawal of a party (which shall be acted upon as provided in Section VIII), may be initiated by a vote of a majority of all members of the Committee. The secretary of the Committee shall mail or deliver a notice in writing to the Board of Selectmen of the Town of Dartmouth and to the Mayor of the City of New Bedford, that a proposal to amend this agreement has been made and shall enclose a copy of such proposal. The Selectmen of the Town of Dartmouth shall include in the warrant for the next annual or special town meeting called for the purpose, an article stating the proposal or the substance thereof. Such amendment shall take effect upon its acceptance by all the Town of Dartmouth to be by majority vote at a town meeting as aforesaid and in the City of New Bedford, the majority vote of the City Council, provided, however, that any such amendment that admits a new town or city to the

District in accordance with section VII hereof, or changes the number of members appointed by any member community in accordance with section IC hereof, or changes the manner of amending this agreement in accordance with this section VI B, shall require a two-thirds vote by the town meeting of each town and a two-thirds vote of the city council of each city.

SECTION VII - ADMISSION - ADDITIONAL TOWNS

By an amendment of this agreement adopted under and in accordance with Section VI above, any other town or towns may be admitted to the Regional Refuse District upon adoption as therein provided of such amendment and upon acceptance by the town or towns seeking admission of the agreement as so amended, and also upon compliance with such provisions of law as may be applicable and such terms as may be set forth in such amendment, provided that any lease or agreement with the District may be a party to would not be violated or voided.

SECTION VIII - WITHDRAWAL

A. <u>LIMITATIONS</u>

The withdrawal of a party from the District may be effected by an amendment to this agreement in the manner hereinafter provided by this section. Any party seeking to withdraw shall, by vote at an annual or special town meeting, request the Committee to draw up an amendment to this agreement setting forth the terms by which such party may withdraw from the District, provided that the said party shall remain liable to the District for its share of indebtedness of the District outstanding at the time of such withdrawal, and for interest thereon, to the same extent and in the same manner as though the party had not withdrawn from the District. No party shall engage in independent solid waste

disposal without the prior approval of the Committee.

B. **PROCEDURE**

The clerk of the party seeking to withdraw shall notify the Committee in writing that such party has voted to request the Committee to draw up an amendment to the agreement (enclosing a certified copy of such vote). Thereupon, the Committee shall draw up an amendment to the agreement setting forth such terms of withdrawal as it deems advisable, subject to the limitation contained in sub-section VI. A. The terms of withdrawal shall insure that the withdrawing party will pay its share of any temporary borrowing in anticipation of revenue which may be outstanding at the time of withdrawal. The secretary of the Committee shall mail or deliver a notice in writing to the Board of Selectmen of the withdrawing party or to the Mayor of the withdrawing city that the Committee has drawn up an amendment to the agreement providing for the party's withdrawal (enclosing a copy of such amendment). The selectmen or mayor of the withdrawing party shall include in the warrant for the next annual or a special town meeting or of a meeting of the city council, an article stating the amendment or the substance thereof. Such amendment shall take effect upon its acceptance by the withdrawing party, acceptance to be by a majority vote at a town meeting as aforesaid or by a majority vote of the city council.

C. **CESSATION OF TERMS OF OFFICE OF WITHDRAWING PARTIES**

Upon the effective date of withdrawal, the terms of office of the members serving on the Regional Refuse Disposal District Committee from the withdrawing party shall terminate and the total membership of the Committee shall be decreased accordingly.

D. APPORTIONMENT OF CAPITAL COSTS AFTER WITHDRAWAL

The withdrawing party's annual share of any future installment of principal and interest on obligations outstanding on the effective date of its withdrawal shall be computed in the same manner as in Section III D [now III.A] until the impending obligations are satisfied. Due dates of payments shall be in the same manner as specified in Section III F [now III.B].

SECTION IX - FISCAL YEAR

Except as may otherwise be provided by law, the fiscal year of the District shall be the same as the fiscal period of the parties and the work "year" or "fiscal year" as it relates in this agreement to a fiscal or budget period shall mean the fiscal year of the District. If the fiscal year of the District shall be other than the calendar year, the dates on or before which the respective percentages of the annual share of each party shall be paid as provided in sub-section III F [now III.B], shall be adjusted so that not less than 25% thereof shall be paid not later than the tenth day of the first month of such fiscal year; 50% shall be paid not later than the tenth day of the fourth month of such fiscal year; 75% shall be paid not later than the tenth day of the seventh month of such fiscal year; and 100% shall be paid not later than the tenth day of the tenth month of such fiscal year.

SECTION X - INCURRING OF DEBT

Within seven days after the date on which the Committee authorizes the incurring of debt, other than temporary debts in anticipation of revenue to be received from parties, the said Committee shall cause written notice of the date of said authorization, the sum authorized and the general purpose or purposes for authorizing such debt, to be given to the Board of

Selectmen of each party town and to the Mayor. The notice for which provision is herein made shall be deemed to have been duly given to a Board of Selectmen of a party town if delivered to the Chairman of said Board or if mailed by registered or certified mail within the time specified, postage prepaid, and addressed to the Chairman of the said Board at the Selectmen's Office or at his last known permanent address. The notice for which provision is herein made shall be deemed to have been duly given to the Mayor if delivered to said Mayor or if mailed by registered or certified mail with the time specified, postage prepaid, and addressed to the Mayor at the Mayor's Office. Within thirty days after the date on which the Committee authorized the incurring of said debt, each party shall hold a meeting, both for the purpose of expressing approval or disapproval of the amount of said debt; and if at such meeting a majority of the voters or councillors fails to approve of the amount authorized by the Committee, the said debt shall not be incurred and the Committee shall thereupon prepare another proposal which may be the same as any prior proposal and an authorization to incur debt therefor.

IN WITNESS WHEREOF, we hereunto set our hands and seals this 3rd day of December in the year one thousand nine hundred seventy-nine.

IN WITNESS WHEREOF, we hereunto set our hands and seals this 3rd day of December in the year one thousand nine hundred seventy-nine.

Approved as to form and legality:

City Solicitor

CITY OF NEW BEDFORD
By:

John A. Markey, Mayor

DEPARTMENT OF PUBLIC WORKS
By:

George H. Brightman, Commissioner

Approved as to form and legality

Town Counsel

TOWN OF ACUSHNET

Selectman

Selectman

Selectman

Approved as to form and legality

Town Counsel

TOWN OF DARTMOUTH

Selectman

Selectman

Selectman

Approved as to form and legality

Town Counsel

TOWN OF FAIRHAVEN

Selectman

Selectman

Selectman

Notes:

1. Fairhaven and Acushnet were originally parties signatories. By amendment approved by the parties in 1981, Acushnet was permitted to withdraw from the District. By amendment approved by the parties in 1982, Fairhaven was permitted to withdraw from the District.

2. Amendment No. 1 (1984) amended section IC., which formerly provided for three members from New Bedford, two from Dartmouth, and one each from Acushnet and Fairhaven, and also amended section VI.B. to specify the requirements of a two thirds majority in the circumstances now stated.

3. Amendment No. 2 (1986) amended section III.F. (now section III.B.) to add language requiring the parties to pay interest on assessments paid late.

4. Amendment No. 3 (1993) amended section II and section V, which formerly required the parties to deliver waste at a transfer station to be constructed at Shawmut Avenue in New Bedford, and also amended section III, which formerly specified that "capital costs" would be allocated among the parties based on population, and that "operating costs" would be allocated among the parties based on the volume of waste delivered to the refuse disposal facility.

10/12/94

AMENDMENT TO DISTRICT AGREEMENT

Moved: That the Committee amend the Agreement forming the Greater New Bedford Regional Refuse Management District, in accordance with authority conferred by Chapter 652 of the Acts of 1987, by revising sections IV, subsections B and C thereof to provide as follows:

SECTION IV -- BUDGET

B. TENTATIVE OPERATING AND MAINTENANCE BUDGET

Thereafter, the Committee shall annually prepare a tentative budget for the ensuing fiscal year, attaching thereto provisions for any installment of principal or interest to become due in such fiscal year on any bonds or other evidence of indebtedness of the District and any other capital costs to be apportioned to the parties. The said Committee shall mail a copy thereof to the Board of Selectmen, Mayor and the Finance Committee or Advisory Committee, if any, of each party on or before January 1, in such detail as the Committee may deem advisable.

C. FINAL OPERATING AND MAINTENANCE BUDGET

The Committee shall adopt an annual operating and maintenance budget, including debt and interest charges and any other current capital costs as separate items, on or before January 21, for the ensuing fiscal year and the said Committee shall apportion the amounts necessary to be raised in order to meet the said budget in accordance with the provisions of Section III. The amount so apportioned to each party shall, on or before February 1 of each year preceding the fiscal year to which said budget relates, be certified by the district treasurer to the treasurer of such parties and such parties shall, at the next annual meeting, appropriate the amounts so certified.

Information Provided by Casella Waste for Rochester Environmental Park Transfer Station

Southbridge Recycling & Disposal Park, Inc.

Proposal To:

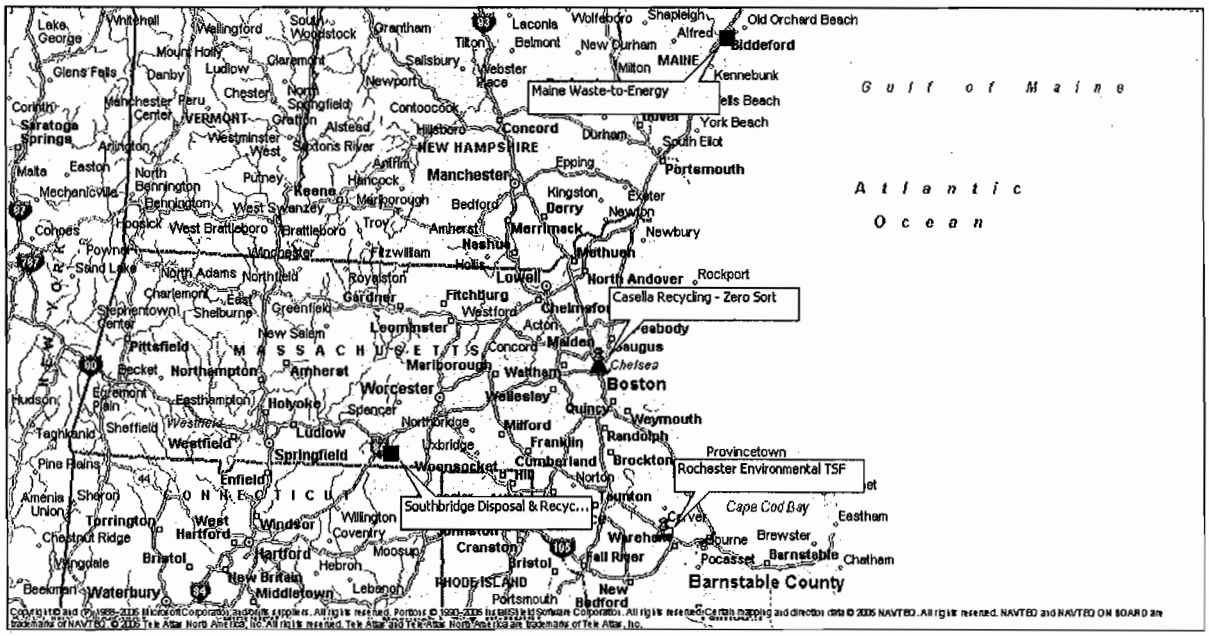
Camp Dresser & Mckee Inc. (CDM.)

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139

For:

Municipal solid waste (MSW) disposal options for the Barnstable County participant communities

Solid Waste & Recycling Qualifications



Qualifications of Bidder

Southbridge Recycling and Disposal Park, Inc. (SBLF), is a wholly owned subsidiary of Casella Waste Systems, Inc. (CWS), submits this backround and qualifications information to CDM for the purpose of determining alternative options for the municipal solid waste coming out of fourteen (14) member communities of Barnstable County. Our goal is to demonstrate to the member communities the cost effective options available for the MSW coming out of the Barnstable County market and to work together for find additional diversion and/or recycling opportunities to help further reduce the financial/environmental impact to the member communities.

Specifically, CWS will show:

- Who is Casella?
- Detail the Key personnel directly responsible for the scope of work
- Disposal capacity options for the member communities
- What makes Casella a great Long-term partner

Company Overview

CWS has over 28 years of experience in the solid waste management business. Currently, CWS operates primarily in the eastern United States (New York, Vermont, Pennsylvania, New Hampshire, Maine and Massachusetts). We service our customers from 37 waste hauling operations throughout the region. In addition, we operate 34 transfer stations, 9 state-of-the-art landfills and 1 landfill airspace/closure agreements, 39 material recovery facilities and one waste-to-energy facility. An important part of our experience is the extensive knowledge of State Environmental Regulations and the State personnel associated with implementing those regulations. CWS has an excellent reputation with the environmental regulatory agencies in each of the states in which it operates.

CWS manages the solid waste and recycling operations on a geographic basis through four regions, which are designated as the Central, Eastern, Western and FCR regions.

Central Region: The Central region consists of wastesheds located in Vermont, northwestern New Hampshire and eastern upstate New York. The portion of upstate New York served by the Central Region includes Clinton, Franklin, Essex, Warren Washington, Saratoga, Rennselaer and Albany Counties.

Eastern Region: The eastern region consists of wastesheds located in Maine, Southeastern New Hampshire and Massachusetts. The company entered the State of Maine in 1996 and Massachusetts in 2000 with the acquisition of assets that were divested by Allied Waste Industries, Inc.

Western Region: The Western region consists of wastesheds located in upstate New York and Northern Pennsylvania. The company entered the market in 1997 with the acquisition of Superior Disposal Services, Inc. The Western region provides local service in the following New York

Counties: St. Lawrence, Jefferson, Lewis, Onondaga, Cayuga, Wayne, Ontario, Monroe, Livingston, Cortland, Otsego, Schoharie, Chemung, Stueben, Yates, Schuyler, Allegany, Cattaraugus, Erie, Niagara, Orleans, and Chautauqua. In addition, the Western Region provides local service in the following Pennsylvania Counties: Tioga, Bradford, Potter, Warren and McKean.

FCR Recycling: FCR Recycling is one of the largest processors and marketers of recycled material in the eastern United States, comprising of 23 material recycling facilities that process and then market recyclable materials. FCR processed and marketed approximately 1,300,000 tons of recyclable materials in FY 2008. FCR facilities are located in markets including: Connecticut, North Carolina, New Jersey, Florida, Tennessee, Georgia, Michigan, New York, South Carolina, Massachusetts, Wisconsin, and Maine.

Qualifications and Experience of Key Personnel for the Corporation

John W. Casella. Mr. Casella has served as chief executive officer of the company since 1993. Mr. Casella also served as president of the company from 1993 to July 2001. In July 2001, Mr. Casella was reelected chairman of the board of directors of the company, a position he also held from 1993 to December 1999. In addition, Mr. Casella has been chairman of the board of directors of Casella Waste Management, Inc. since 1977. Mr. Casella is also an executive officer and director of Casella Construction, Inc., a company owned by Mr. Casella and Douglas R. Casella, which specializes in general contracting, soil excavation and related heavy equipment work. Mr. Casella has been a member of numerous industry-related and community service-related state and local boards and commissions, including the board of directors of the Associated Industries of Vermont, The Association of Vermont Recyclers, Vermont State Chamber of Commerce and the Rutland Industrial Development Corporation. Mr. Casella has also served on various state task forces, serving in an advisory capacity to the Governors of Vermont and New Hampshire on solid waste issues. Mr. Casella holds an Associate of Science in Business Management from Bryant & Stratton University and a Bachelor of Science in Business Education from Castleton State College. Mr. Casella is the brother of Douglas R. Casella.

Brian Oliver. Mr. Oliver has served as our Regional Vice President of the Northeast and now East Regions since July 2004. From June 1996 to April 1998, Mr. Oliver served as Division Controller of two Vermont operations. Mr. Oliver holds a Bachelor of Science in Business Administration from Bryant College and also holds a Masters Degree from St. Michael's College.

Raymond E. Duerr. Mr. Duerr has served as Director of Landfill Sales & Volume since July 2007 and as Western Region Sales Manager since 2005. Mr. Duerr has over 20 years experience working in the waste industry in all facets of the business from operations, sales, recycling and landfills. Mr. Duerr holds a Bachelor of Science in Business Logistics from the Penn State University.

John Farese. Mr. Farese has served as Landfill Manager for the past seven years. Mr. Farese has over 20 years of experience working with the waste industry throughout the northeast. Mr. Farese holds a Civil Engineering degree from Wentworth Institute.

John Schwalbe, PE. Has served as Director of Landfill Operations and Development since May 2002. From January 1996 to April 2002 he served as Director of Engineering for Waste Management Inc.'s Eastern area. From 1993 to December 1995 he served as Director of Engineering for USA Waste, Inc. From 1991 to 1993 Mr.Schwalbe was General Manager for the Monroeville Landfill in Pittsburgh, PA. Prior to that from 1986 to 1991 John worked for a Regional Engineer, Donohue and Associates as a project engineer and with the Wisconsin Department of Natural Resources as an environmental specialist. Mr. Schwalbe has a Masters and Bachelors degree in Civil and Environmental Engineering from the University of Wisconsin in Madison and a Bachelors degree in Biology/Math from St. John's University in Collegeville, MN.

These Key Personnel can be contacted at the following locations and phone numbers:

John Casella, John Schwalbe
Casella Waste Systems
P.O. Box 866
25 Greens Hill Lane
Rutland, VT 05701
Phone: (802) 775-0325
Fax: (802) 775-6198
John.Casella@CASELLA.COM
John.Schwalbe@CASELLA.COM

Brian Oliver
Casella Waste Management
110 Main St., Suite 1308
Saco, ME 04072
Phone: (800) 584-1115
Brian.Oliver@CASELLA.COM

Raymond Duerr
Casella Waste Systems
798 Cascadilla St. Suite 100
Ithaca, NY 14850
Phone: (607) 277-4820
Fax: (607)277-0599
Raymond.Duerr@CASELLA.COM

John Farese
Southbridge Recycling and Disposal Park, Inc.
165 Barefoot Rd.
Southbridge, MA 01550
Phone: (508) 248-0010
Fax: (508) 248-2025
John.Farese@CASELLA.COM

Disposal Capacity Options for the member communities

Our extensive experience with operating, permitting, expanding and opening new development areas at our transfer stations and landfills has provided a tremendous opportunity to develop excellent working relationships with counties, municipalities, communities and customers throughout the Northeast.

The following table provides certain information regarding the landfills, transfer stations and material recovery facilities that CWS operates that could be used to solve the disposal and recycling needs for the member communities of Barnstable County. Each landfill in the table is a Subtitle D landfill.

Landfill	Location	Permitted Annual Tonnage
SOUTHBRIDGE DISPOSAL & RECYCLING PARK	SOUTHBRIDGE MA	180,000**
MAINE-ENERGY INCINERATOR (MERC)	BIDDEFORD, MAINE	312,000
ROCHESTER ENVIRONMENTAL TSF	WAREHAM, MA	890 TONS/DAY
CASELLA RECYCLING – ZERO SORT FACILITY	CHARLESTOWN, MA	189,000

** SBLF current permit is 180,000 tons/year. With the implementation of our new permit in 2010, the capacity for the landfill will go up to 300,000 tons/year in the second year and 405,000 tons/year in the following years.

Southbridge Recycling & Disposal Park, Inc. (SBLF)

On November 25, 2003, we acquired Southbridge Recycling and Disposal Park, Inc. SBLF has a contract with the Town of Southbridge, Massachusetts to maintain and operate the 13 acre C&D recycling facility and a 52 acre landfill currently permitted to accept residuals from the recycling facility and a limited amount of municipal solid waste. The contract has a remaining life of eight years and is renewable by us for four additional five-year terms or until the landfill has reached full capacity, whichever is greater. In May 2007, we finalized an amendment to our contract with the Town of Southbridge which would allow us to seek approvals to convert the landfill from C&D to municipal solid waste. In June 2008, we received a positive vote from the Southbridge, Massachusetts Board of Health to amend the landfill site assignment allowing the site to receive municipal solid waste from communities other than Southbridge, and to expand the annual permit to 405,600 tons per year from 180,960 tons per year.

Maine Energy Waste-to-Energy Facility

We own a waste-to-energy facility, Maine Energy, which generates electricity by processing non-hazardous solid waste. This waste-to-energy facility provides us with important additional disposal capacity and generates power for sale. The facility receives solid waste from municipalities under long-term waste handling agreements and also receives raw materials from commercial and private waste haulers and municipalities with short-term contracts, as well as, from our own collection operations. Maine Energy is contractually required to sell all of the electricity generated at its facility to Florida Power and Light, and electric utility, and guarantees 100% of its net electric generating capacity to FPL, Energy Power Marketing, Inc.

Casella Recycling – Zero Sort Facility

This facility is located in the heart of the City of Boston with exceptionally easy access to all major transportation corridors. We have operated this facility since 1999. The plant has annual capacity of 189,000 tons per year. When you couple that with long standing relationships (and contracts) with the City of Boston and several other large municipalities, the core volume of this huge operation is well protected and secure long term. We own the site and recently invested more than $6 million dollars upgrading the facility to Single Stream.

What make Casella a Great Long Term partner

Casella Waste Systems, Inc. (CWS), through its wholly owned subsidiary, Southbridge Recycling and Disposal Park, Inc, (SBLF) believes it is uniquely qualified to perform the work required by the member communities of Barnstable County.

North East Experience

CWS operates an extensive collection of solid waste assets throughout the North East including hauling, collection, transfer, landfill and recycling services. Over the past twenty-eight years, we have built a comprehensive solid waste infrastructure to serve the solid waste customers in the North East United States. This significant operating footprint has provided us with comprehensive regulatory, customer and public sector experience that uniquely qualifies us to provide the member communities with a comprehensive plan to manage the solid waste, diversion and recycling needs to include backup facilities should the need arise.

Landfill and Recycling Capabilities

CWS owns and operates significant landfill capacity and recycling assets located in the Massachusetts waste shed that will have over 700,000 tons per year of capacity to handle the long-term disposal needs of the member communities of Barnstable County. Additionally, CWS, through its wholly-owned subsidiary FCR, Inc., operates one of the largest East Coast recycling facilities handling nearly 200,000 tons per year of recycled fibers and containers collected through our network of large-scale residential, commercial and municipal customers throughout Massachusetts.

Our goal would be to work with the member communities not only to develop a long-term plan to manage the solid waste disposal capacity needs, but also, to develop a strategy to increase the diversion and recycling rates within the County to help further reduce the cost of disposal, increase the awareness of the benefits and recycling and reduce the impact on the environment.

Casella's Commitment to Green Initiatives

For the past several years, CWS has been committed to developing projects to further reduce the impact to our environment. In FY 2008, we produced roughly 100,000 MWh of electricity from out gas-to-energy facilities, or enough to power about 11,000 homes. When all of our new capacity comes on line, we expect to produce enough electricity to power over 26,000 homes. Based upon our success and commitment to being "Green," Casella was awarded the 2008 Industry Partner of the Year Award by the US EPA's Landfill and Methane Outreach Program. We continue to be the only firm in our industry to be involved with the Climate Leaders program through which we market our landfill gas emission credits throughout Massachusetts.
In addition, continues to pursue the opportunity to create clean bio-fuels from the traditional waste stream by entering into an agreement with Fulcrum Bio Energy, Inc. to use our collected waste for the development of waste-to-liquid biofuels.

Appendix C

Representative Waste-to-Energy Contracts

North Reading, Massachusetts Agreement with Covanta-Haverhill Waste-to-Energy Facility

SERVICE AGREEMENT

THIS AGREEMENT is made and entered into as of July 1, 2010, by and among COVANTA HAVERHILL ASSOCIATES, a Massachusetts general partnership ("CHA") and the TOWN OF NORTH READING, MASSACHUSETTS (the "Town").

WITNESSETH:

WHEREAS, CHA is the owner and operator of a resource recovery facility located in Haverhill, Massachusetts (the "Facility") where CHA accepts Acceptable Waste (defined hereinafter) for disposal by the process of combustion, generating electricity thereby, and disposing of residue therefrom; and,

WHEREAS, the Town is a body politic and corporate and a public instrumentality in the Commonwealth of Massachusetts; and

WHEREAS, CHA and the Town now wish to enter into an agreement pursuant to which the Town will deliver to the Facility and CHA will accept at the Facility, certain quantities of Acceptable Waste;

NOW, THEREFORE, in consideration of the foregoing premises, and the mutual conditions and covenants contained herein, the parties hereto, intending to be legally bound, do hereby agree as follows:

1) Definitions. For purposes of this Agreement, the following capitalized words and phrases shall be given the following respective meanings:

   a) "Acceptable Waste" means all municipal solid waste collected and disposed of by or on behalf of the Town, but excluding (i) explosives, ammunition and ordnance materials; pathological and biological wastes, (ii) asbestos and asbestos products, asphalt, radioactive materials, oil sludge and highly flammable substances, (iii) cesspool or other human wastes, liquid wastes, human and animal remains and leaves and yard waste (other than amounts legally acceptable in municipal solid waste), (iv) motor vehicles or large parts thereof, lead acid batteries, motorcycles, auto springs, auto transmissions, trailers, farm or other large machinery or large parts thereof and marine vehicles or large parts thereof, (v) large concentrations of plastics and tires, asphalt shingles, wallboard, sheetrock and wire and cable, (vi) non-burnable construction materials and demolition debris, (vii) cleaning fluids, crankcase oils, cutting oils, petroleum products (including without limitation, drained oil), oil based paints, acids, caustics, pesticides, insecticides, poisons, drugs, chemicals and fine powdery earth used to filter cleaning fluid, (viii) tree logs, tree stumps and any item of waste (other than mattresses, sofas or furniture) exceeding six feet in anyone of its dimensions or being in whole or in part a solid mass, the solid mass portion of which has dimensions such that a sphere with a diameter of twelve inches could be contained within such solid mass portion, (ix) all large household appliances, commonly referred to as "white goods", including, without limitation, refrigerators, stoves, dishwashing machines, washing machines, drying machines, water heaters, and the like, (x) any Hazardous Substance or other item of waste the disposal or processing of which by CHA would be in violation of any Environmental Laws (except for *de minimus* amounts legally acceptable in municipal solid waste), and (xi) any item of waste which CHA, after consultation with the Town, reasonably believes the processing of which will damage the Facility. The parties recognize that some

substances which are not, as of the date of this Agreement, considered Hazardous Substances or which CHA is not prohibited from processing at the Facility under any Environmental Laws may be determined subsequent to the date hereof to be Hazardous Substances or which CHA may be prohibited from processing at the Facility under Environmental Laws and, at the time of such determination and upon written notice thereof by CHA to the Town, such substances shall cease to be Acceptable Waste.

b) "Commencement Date" means that date more particularly described in Section 6 hereof.

c) "Commonwealth" means the Commonwealth of Massachusetts.

d) "Contract Year" means a one-year period beginning on July 1 of each year during the term hereof other than the first Contract Year which shall commence on the Commencement Date and end on June 30, 2015, unless extended as provided herein.

e) "Environmental Laws" means (i) all statutes, regulations, rules, ordinances, codes, licenses, permits, orders, decrees, approvals, plans, authorizations, and similar items (whether previously existing, now existing or hereafter enacted, amended, promulgated or issued, and whether or not contemplated by the parties as of the date of this Agreement) of the United States, the Commonwealth or any political subdivision thereof or of any agency, department, commission, board, bureau or other instrumentality of any of them, (ii) all binding and final judicial and administrative decrees, judgments and orders (whether previously existing, now existing or hereafter enacted, amended, promulgated, or issued, and whether or not contemplated by the parties as of the date of this Agreement), and (iii) any common law theories of liability applicable to claims, demands, requirements, damages, costs or expenses, in each case relating to or addressing the pollution, contamination, protection, or remediation of the environment or the protection or restoration of natural resources, including, but not limited to:

i) the Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. Sections 9601 et seq.) including the Superfund Amendments and Reauthorization Act of 1986, Resource Conservation and Recovery Act (42 U.S.C. Sections 6901 et seq.), Clean Air Act (42 U.S.C. Sections 7401 et seq.), Hazardous Materials Transportation Act (49 U.S.C. Sections 1801 et seq.), Clean Water Act (33 D.S.C. Sections 1251 et seq.) including the Water Pollution Control Act, Insecticide, Fungicide, and Rodenticide Act (7 D.S.C. Sections 136 et seq.), Toxic Substances Control Act (15 D.S.C. Sections 2601 et seq.), Safe Drinking Water Act (42 U.S.C. Sections 300(f) et seq.), the Endangered Species Act (16 U.S.C. Sections 1531 et seq.), the Medical Waste Tracking Act (42 D.SC. Sections 6992 et seq.), and the Emergency Planning and Community Right-to-Know Act (42 D.S.C. Sections 11001 et seq.), and any analogous state or local laws or ordinances, including, but not limited to, the Massachusetts Hazardous Waste Management Act (Mass. Gen. Laws c. 21C), and Massachusetts Oil and Hazardous Material Release Prevention and Response Act (Mass. Gen. Laws c. 21E), and any regulations promulgated pursuant to any such federal, state or local laws or ordinances; and

ii) all requirements pertaining to reporting, licensing, permitting, investigation, remediation, mitigation, and/or removal of any releases or threatened releases of chemical substances, pollutants, contaminants or hazardous or toxic substances, materials or wastes (whether solid, liquid or gaseous), into the air, surface water, groundwater or land, or otherwise

relating to the processing, distribution; use, treatment, recycling, storage, disposal, transport or handling of chemical substances, pollutants, contaminants or hazardous or toxic substances, materials or wastes (whether solid, liquid or gaseous).

f) "Event of Force Majeure" means any of the following acts or events affecting CHA which may have a material adverse effect on its rights or obligations under this Agreement, if such act or event is beyond the control of CHA.

(1) an act of God, epidemic, landslide, lightning, earthquake, fire or explosion (which is not also the result of the willful or negligent action of CHA or a lack of due diligence by CHA), storm, flood, an act of war or of the civil or military authorities, civil disturbance, strike, lockout, work slowdown, or similar industrial or labor action or any other similar occurrence;

(2) the order and/or judgment of any federal, state or local court, administrative agency or governmental officer or body, if it is not also the result of the willful or negligent action of CHA or a lack of due diligence by CHA; provided that the contesting in good faith of any such order and/or judgment shall not, of itself, constitute or be construed as a willful or negligent action or lack of due diligence by CHA;

(3) the failure to obtain, or suspension, termination, interruption or failure of renewal of any permit, license, consent, authorization or approval essential to the operation, ownership or possession of the Facility or the operation of the Landfill, if it is not also the result of the willful or negligent action of CHA or a lack of due diligence by CHA; provided that the contesting in good faith of any such failure to obtain, suspension, termination, interruption or failure of renewal shall not, of itself, be construed as a willful or negligent action or a lack of due diligence by CHA;

(4) the adoption, promulgation, issuance, material modification or change in interpretation after the date of this Agreement of any federal, state or local law, regulation, rule, requirement, or ordinance, unless such law, regulation, rule, requirement or ordinance was on or prior to such date duly adopted, promulgated, issued or otherwise officially modified or changed in interpretation, in each case in final form, to become effective without any further action by any federal, state or local governmental body, administrative agency or governmental official having jurisdiction; or

(5) the failure of the communities in which the Facility or the Landfill is situated or the appropriate federal or state agencies or public or private utilities having operational jurisdiction over the Facility or the Landfill to provide and maintain all utilities, services, sewerage and water lines essential to the operation of the Facility or the Landfill, if it is not also the result of the willful or negligent action of CHA or a lack of due diligence by CHA.

g) "Hazardous Substance" means any substance, waste or material listed or characterized as hazardous, extremely hazardous or toxic by the United States Environmental Protection Agency or any similar state environmental agency pursuant to any Environmental Laws.

h) "Landfill" means the site utilized for the disposal of residue generated at the Facility.

i) "Recycle" means to recover or reclaim from the waste stream, at the source prior to collection, materials or by-products that are to be (i) reused, (ii) employed as an ingredient or a feedstock in an industrial or manufacturing process to make a product, or (iii) employed in a particular function or application as an effective substitute for a commercial product or a commodity provided, however, that to Recycle does not mean to deliver such materials or byproducts to a landfill or to any Third Party for disposal or to recover energy from the combustion of such materials or by-products.

j) "Third Party" means any natural person, corporation, association or partnership, and any governmental agency, department, commission, board, bureau or other instrumentality, other than CHA or the Town.

k) "Tipping Fee" means the fee more particularly described in Section 5(a).

l) "Ton" means a "short ton" of 2,000 pounds.

2) Guaranteed Delivery of Acceptable Waste.

a) Except as set forth in Section 2(b), the Town shall deliver or cause to be delivered to the Facility within a reasonable period of time following collection and except as hereinafter provided, CHA shall accept at the Facility, all Acceptable Waste (including bulky waste collected separately from other waste at no additional fee) that is not Recycled and that is collected by or on behalf of the Town in each Contract Year. The Town shall not deliver or cause to be delivered to the Facility any Acceptable Waste that is generated in any location other than within the jurisdiction of the Town. The Town shall perform its obligations under this Agreement in material conformance with all applicable laws, including, without limitation, Environmental Laws.

b) If the Town ceases to collect and/or manage the household waste produced by households in its jurisdiction at any time between July 1, 2010 and June 30, 2015, the Town shall have the right upon six months written notice to CHA, to terminate this Agreement.

c) The Town shall promptly remove at its sole cost any waste rejected by CHA at the Facility in accordance with Section 3(a) hereof and shall be liable to CHA for all costs incurred by CHA in removing and disposing of such rejected waste if the Town fails to do so. The Town shall not be obligated to pay a Tipping Fee for waste so rejected.

d) CHA shall operate the Facility and perform its obligations under this Agreement in material conformance with all applicable laws, including, without limitation, Environmental Laws, and shall provide for the disposal of ash and any other by-products of the operation of the Facility at landfills or other sites which are lawfully permitted and operated.

e) For purposes of this Agreement any reference to the Town shall also include any hauler delivering waste to the Facility on behalf of the Town. The Town shall cause all its haulers to comply with the obligations of the Town hereunder, including without limitation, including such obligations in all of its current contracts with its haulers, to the extent such contracts may be amended by the Town, and in all of its future contracts with its haulers.

3) Right of Refusal

a) CHA shall have the right without any liability to the Town to refuse deliveries of:

i) waste other than Acceptable Waste; and

ii) any waste delivered at other than the then established receiving hours as set forth herein or any waste delivered by or on behalf of the Town not in conformity with the terms of this Agreement.

b) CHA may also refuse delivery of all or any portion of the Acceptable Waste collected by or on behalf of the Town if as a result of an Event of Force Majeure the Facility or any substantial portion thereof is shut down (other than in the normal course of operation and maintenance) and, as a result thereof, CHA is unable to accept and process such Acceptable, Waste at the Facility. In such, event, CHA shall designate an alternate disposal site that is lawfully permitted and operated and shall pay the cost of disposal of such Acceptable Waste at such alternative site. To the extent reasonably practicable, CHA shall give the Town not less than 24 hours' notice of any such shut down and designation of an alternate disposal site. The Town shall pay CHA the per Ton Tipping Fee for such Acceptable Waste less the reasonable incremental costs, if any, that are payable by the Town to cause such Acceptable Waste to be delivered to such alternate disposal site.

Notwithstanding the foregoing:

(i) During any period during which CHA is unable to accept and process Acceptable Waste at the Facility due to an Event of Force Majeure, CHA at its expense will promptly, diligently and in good faith take all action reasonably necessary for it to be able to accept and process such Acceptable Waste including, without limitation, all actions reasonably necessary to obtain any temporary restraining orders, preliminary or permanent injunctions, approvals, licenses or permits needed to resume acceptance and processing of such Acceptable Waste and any repairs or other improvements to the Facility and any modifications to the operation thereof required for such purpose. CHA shall, during any such period, keep the Town duly notified (not less often than monthly) of all such actions, and the expected duration of any such period.

(ii) If as a result of an Event of Force Majeure the capacity of the Facility to accept and process Acceptable Waste is reduced but not completely suspended, CHA shall allocate a portion of such reduced capacity of the Facility to the Town pro rata based on the Town's share of the total tonnage as stated in Exhibit 2 to this Agreement, provided that, unless otherwise agreed to by the Town, if such capacity is insufficient to process all of the Town's Acceptable Waste, all of such Acceptable Waste shall be delivered to an alternate disposal site as provided in this paragraph 3(b) subject to the provisions of clause (iii) hereof. CHA shall not enter into any new contracts for the disposal of Acceptable Waste at the Facility subsequent to the occurrence of such Event of Force Majeure until the capacity of the Facility is sufficient to accept and process all Acceptable Waste delivered by the Town in accordance with this Agreement. Any Acceptable Waste not processed at the Facility in accordance with this clause (ii) shall be delivered to an alternate disposal site as provided in this paragraph 3(b) subject to the provisions of clause (iii) hereof.

(iii) If the period during which the Facility or any substantial portion thereof is shut down due to an Event of Force Majeure equals or exceeds ninety (90) days in duration, CHA may, at any time on or after such ninetieth day, (x) upon not less than fourteen (14) days notice to the Town assign this Agreement to the operator of an alternate disposal site that is lawfully permitted and operated, or (y) upon not less than one hundred twenty (120) days notice to the Town terminate this Agreement.

(iv) In the event CHA elects to assign this Agreement to the operator of an alternate disposal site pursuant to clause (iii) of this paragraph (b), the Town shall thereafter and during the remaining term of this Agreement deliver all such Acceptable Waste to such alternate disposal site and, at CHA's option, shall pay either CHA or such operator the applicable per Ton Tipping Fee provided for herein, less the reasonable incremental costs, if any, that are payable by the Town to cause such Acceptable Waste to be delivered to such alternate disposal site..

(v) In the event CHA elects to terminate this Agreement pursuant to clause (iii) of this paragraph (b), from and after the effective date of such termination neither CHA nor the Town shall have any further obligation to the other party hereunder, provided that if at any time thereafter CHA is able to accept and process Acceptable Waste at the Facility it shall so notify the Town, and the Town, solely at its option, may elect to resume deliveries of Acceptable Waste to the Facility upon the terms and conditions, and at the then applicable per Ton Tipping Fee, provided for herein for the balance of the original term of this Agreement.

c) CHA may also refuse delivery of Acceptable Waste it is unable to process for any reason not otherwise described in paragraphs (a) or (b) of this Section 3. In such event, CHA shall designate an alternate disposal site that is lawfully permitted and operated and shall pay the cost of disposal of such Acceptable Waste at such alternative site. To the extent reasonably practicable, CHA shall give the Town not less than twenty-four (24) hours' notice of any such refusal and designation of an alternate disposal site, provided that if such refusal is due to the substitution of other Acceptable Waste for the Town's Acceptable Waste, CHA shall give the Town not less than seven (7) days' notice of any such refusal and designation of an alternate disposal site. The Town shall pay CHA the per Ton Tipping Fee for such Acceptable Waste less the reasonable incremental costs, if any, that are payable by the Town to cause such Acceptable Waste to be delivered to such alternate disposal site over and above the cost of delivery of such Acceptable Waste to the Facility. The provisions of paragraph (b) of this Section 3 regarding the assignment or termination of this Agreement shall not apply to any refusal by CHA to accept and process Acceptable Waste contemplated by this paragraph (c).

d) To the extent required by Environmental Laws, CHA shall inspect all waste delivered to the Facility and shall take such other steps as shall be necessary or appropriate to monitor discharges from the Facility for the presence of Hazardous Substances and shall promptly notify the Town if CHA becomes aware the Town or its haulers has delivered any Hazardous Substances to the Facility.

e) If CHA designates an alternate disposal site and any of the Acceptable Waste specified in paragraph 1.a) is not considered Acceptable Waste for the alternate disposal site, CHA shall be responsible for the removal and disposal of the unacceptable waste and shall be responsible for all costs associated with its removal and transport to a disposal site.

4) Manner of Delivery and Weighing

a) The Town shall deliver or cause to be delivered Acceptable Waste in a clean, orderly and safe manner, including, without limitation, in such a manner that it will not be spilled, other than on the tipping floor, or blown on the site, of the Facility. If Acceptable Waste is so spilled or blown, the Town shall promptly, at its sole cost, collect and remove such spilled or blown Acceptable Waste and if the Town fails to do so, the Town shall be liable to CHA for all costs of such clean-up by CHA. The Town shall adhere to all safety rules and regulations of CHA in delivering Acceptable Waste to the Facility.

b) The parties recognize that the City of Haverhill is authorized to designate certain highway routes within the vicinity of the Facility to be used by the Town to deliver Acceptable Waste to the Facility. Unless otherwise authorized by the City of Haverhill, the Town shall use only the routes to the Facility designated by the City of Haverhill, provided that any failure of the Town to use such routes shall not constitute a default under this Agreement.

c) Unless the City of Haverhill shall otherwise require by regulation or written order, scheduled delivery days and hours shall be 2:00 a.m. to 6:00 p.m., Monday through Friday, and 6:00 a.m. to noon on Saturday, exclusive of any customary holiday recognized in the Commonwealth. On any Saturday of a week during which is celebrated a customary holiday recognized in the Commonwealth, the scheduled delivery hours shall be 6:00 a.m. to 3:00 p.m.

d) CHA shall utilize and maintain motor truck scales to weigh all vehicles delivering Acceptable Waste to the Facility in accordance with applicable state law. Each vehicle delivering Acceptable Waste to the Facility shall be weighed, indicating gross weight, tare weight, time and truck identification on a weight record. Such records shall be used by CHA as a basis for calculating monthly and yearly deliveries made by the Town. CHA reserves the right to modify the above arrangement with any other system designed to perform the same functions. CHA shall maintain records of the tonnage delivered by the Town and accepted by CHA each day and each month and will retain such record for a period of no less than three (3) years.

e) The Town shall cause all vehicles used for delivery of Acceptable Waste to the Facility to be in safe and clean condition and in good repair and to be properly covered or enclosed so as to prevent any refuse, dirt, dust or other materials from falling or blowing out from the vehicles. The Town shall use or cause to be used only vehicles with the capability of dumping directly into the waste pit at the Facility and which have a capacity of three (3) tons or more. Such vehicles shall bear such names or means of identification as may be reasonably acceptable to CHA.

f) If the average time between "time in" and "time out" on all scale tickets for all haulers delivering to the Facility on any day exceeds two (2) hours, CHA shall credit the Town against Tipping Fees due $1.50 for every full three (3) minutes that the Town's scale tickets exceed two (2) hours; provided however, such provision shall not apply if the delay is due in whole or in part to the Town.

5) Tipping Fee and Payment

a) The Town shall pay CHA a tipping fee (the "Tipping Fee") per Ton of Acceptable Waste

accepted at the Facility during each Contract Year, or delivered to an alternate disposal site as provided in Section 3 hereof, as follows:

Contract Year	Tipping Fee
July 1, 2010 through June 30, 2011	$67.00
July 1, 2011 through June 30, 2012	$69.00
July 1, 2012 through June 30, 2013	$71.00
July 1, 2013 through June 30, 2014	$73.00
July 1, 2014 through June 30, 2015	$75.00

Optional Contract Years	Tipping Fee
July 1, 2015 through June 30, 2016	$77.00
July 1, 2016 through June 30, 2017	$79.00
July 1, 2017 through June 30, 2018	$81.00
July 1, 2018 through June 30, 2019	$83.00
July 1, 2019 through June 30, 2020	$85.00

b) CHA shall invoice the Town within ten (10) days after the end of each month for all deliveries of Acceptable Waste at the Facility during such month.

c) Tipping Fees hereunder shall be due and payable within thirty (30) days of the date of mailing of the invoice therefor by CHA. Any payment for Tipping Fees not received within forty-five (45) days of such date shall bear interest after such forty-fifth day until paid at the lesser of one percent (1%) per month or the maximum legal rate per month.

d) The obligation of the Town to pay Tipping Fees and any other amount to be paid by it from time to time hereunder shall not be subject to diminution by reason of any shutdown of the Facility, set-off, abatement, counterclaim, existence of a dispute or any other reason, known or unknown, foreseeable or unforeseeable, which might otherwise constitute a legal or equitable defense or discharge of the liabilities of either party hereunder or limit recourse against either party. The foregoing provisions of this Section 5(d) shall not affect the obligations of the Town and CHA under Section 3 hereof or the right of either party to pursue independently any claim it might have against the other party based upon nonperformance by such party of its obligations hereunder.

e) The Town shall plan and budget for all anticipated Tipping Fees payable hereunder in each Contract Year. Notwithstanding any provision of this Agreement to the contrary, the parties hereto recognize and agree that the obligation of the Town to make any payment hereunder is not a general obligation of the Town but is subject to appropriation by the Town for such purpose. Subject to the foregoing, so long as CHA shall not be in default hereunder, the Town shall not appropriate any amount for the disposal of Acceptable Waste in any Contract Year other than in accordance with this Agreement and shall promptly notify CHA if at any time the Town shall fail to appropriate any amount required to satisfy its obligations under this Agreement.

f) CHA shall not during the initial term of this Agreement enter into an agreement with the municipalities listed below for the acceptance and disposal of Acceptable Waste on similar terms to those in this Agreement for Tipping Fees lower than those offered in this Agreement unless CHA offers the Town an agreement on the same terms.

Municipalities

Andover	Arlington	Bedford	Belmont	Billerica	Boxborough	Burlington
Carlisle	Chelmsford	Dracut	Hamilton	Lexington	Lincoln	Lowell
Manchester	N Reading	Peabody	Tewksbury	Tyngsboro	Watertown	Wenham
West Newbury		Westford	Wilmington	Winchester		

6) Term

This Agreement shall commence on July 1, 2010 (the "Commencement Date") and end on June 30, 2015, unless extended as provided herein. The Town may extend this Agreement for a single five-year term by providing written notice to CHA prior to January 1, 2014. If CHA and the Town enter into the five-year extension, this agreement is automatically amended to provide that the Tipping Fee shall be as set forth above plus such amounts caused by a Change in Law. A "Change in Law" means either (a) the enactment, adoption, promulgation, modification, written interpretation or reinterpretation, written guideline or repeal, subsequent to the Commencement Date, of any law, ordinance, code, rule, regulation or similar legislation by any Federal, State, County or other governmental body, or (b) the modification of or the imposition of any conditions on the issuance, modification or renewal of any official permit, license or approval subsequent to the Commencement Date, which in the case of either (a) or (b), establishes requirements affecting the operation of the Facility which are more burdensome than and adversely inconsistent with the most stringent requirements which are applicable to the Facility or CHA, as the case may be, and which are contained in any applicable laws with respect to the Facility in effect as of the Commencement Date.

7) Default

a) The following shall constitute events of default by the Town:

i) the failure of the Town to make any payment required to be made to CHA under this Agreement within thirty (30) days after receipt of written notice from CHA that such amount is past due;

ii) the failure of the Town to perform any of its other material obligations under this Agreement which failure is not cured within sixty (60) days, or a cure commenced and diligently pursued within sixty (60) days and cured within ninety (90) days, after the date of written notice from CHA of such failure; or

iii) in the event the Town shall make an assignment for the benefit of creditors, file a voluntary petition in bankruptcy, be adjudicated as bankrupt or insolvent, file any petition or answer seeking for itself any reorganization, arrangement, composition, readjustment, liquidation, dissolution or similar relief under any present or future statute, law or regulation file any

answer admitting or not contesting the material allegations of a petition filed against it in any such proceeding or seek consent to or acquiesce in the appointment of any trustee, liquidator or receiver of it or of all or any substantial part of the properties of it.

b) The following shall constitute events of default by CHA:

i) the failure of CHA to perform any of its material obligations under this Agreement which failure is not cured within sixty (60) days, or a cure commenced and diligently pursued within sixty (60) days and cured within ninety (90) days, after the date of written notice from the Town of such failure; or

ii) in the event CHA shall make an assignment for the benefit of creditors, file a voluntary petition in bankruptcy, be adjudicated a bankrupt or insolvent, file any petition or answer seeking for itself any reorganization, arrangement, composition, readjustment, liquidation, dissolution or similar relief under any present or future statute, law or regulation, file any answer admitting or not contesting the material allegations of a petition filed against it in any such proceeding or seek or consent to or acquiesce in the appointment of any trustee, liquidator or receiver of it or of all or any substantial part of the properties of it.

c) Upon the occurrence of an event of default, in addition to any other remedies available in law or equity, the party not in default may terminate this Agreement by written notice to the defaulting party.

d) Any obligation to pay any fixed sum of money that may have accrued and be due and payable hereunder, and the obligations contained in Section 8 hereof, shall survive the termination or expiration of this Agreement.

8) Indemnification

a) CHA shall indemnify, defend, reimburse and hold harmless the Town and its officers, employees and representatives from any and all threatened or actual claims, demands, suits and causes of action (collectively "Claims"), and all damages, penalties, costs and expenses (including, without limitation, attorney's fees) arising therefrom (collectively "Damages"), incurred as a result of (i) any act or omission by CHA in connection with the performance of its obligations under this Agreement that gives rise to liability under any Environmental Laws, except to the extent that such Claims or Damages arise out of or result from the delivery to CHA by the Town of any waste that does not constitute Acceptable Waste (provided that CHA shall have given the Town notice of such delivery within two years of the date of such delivery), (ii) injury to or death of any person (including, without limitation, persons employed by the Town) or damage or destruction of property (including, without limitation, to the property of the Town and Third Parties), to the extent arising out of, resulting from or in any way connected with the negligence or willful misconduct of CHA or its officers, employees and representatives, (iii) breach of any obligation, covenant or undertaking of CHA contained herein, and (iv) any misrepresentation or breach of warranty by CHA contained herein.

b) To the extent permissible by Massachusetts law, Town shall indemnify, defend, reimburse and

hold harmless CHA and its partners, officers, directors, employees and representatives from any and all Claims and Damages incurred as a result of (i) the delivery to CHA by the Town of any waste that does not constitute Acceptable Waste that gives rise to liability under any Environmental Laws (provided that CHA shall have given the Town notice of such delivery within two years of the date of such delivery), (ii) injury to or death of any person (including, without limitation, persons employed by CHA) or damage or destruction of property (including, without limitation, to the property of CHA and Third Parties), to the extent arising out of, resulting from or in any way connected with the negligence or willful misconduct of the Town or its officers, employees and representatives, (iii) breach of any obligation, covenant or undertaking of the Town contained herein, and (iv) any misrepresentation or breach of warranty by the Town contained herein.

c) The obligations of a party to this Agreement (each an "Indemnitor") to indemnify, defend, reimburse and hold harmless the other party hereto and its officers, employees and representatives (each an "Indemnitee") as set forth in Paragraph (a) or (b) above shall not apply:

i) To any Claims or Damages arising out of any acts or omissions or circumstances that occurred prior to the Commencement Date;
ii) To any defense costs or expenses, including the costs of attorneys, consultants and/or investigators, unless authorized in advance and in writing by the Indemnitor;
iii) To any Claims or Damages to the extent caused by the acts or omissions of the Indemnitee.

d) If the Indemnitee is presented with a claim by a Third Party, or an Indemnitee suffers a loss or damage that may be subject to indemnification or defense from the Indemnitor under this Agreement, the Indemnitee shall promptly give reasonable notice thereof to the Indemnitor, together with a complete copy of the Third Party claim (if any); provided, however, that the failure to promptly give such notice shall not relieve the Indemnitor from any liability for indemnification hereunder unless the Indemnitor is materially prejudiced in its ability to defend, settle or otherwise assert rights to reduce exposure to, such liability, claim, demand, cost or exposure.

e) After notification to the Indemnitor of any Third Party claim, if such claim is properly the subject of indemnification under this Agreement, the Indemnitor shall undertake the defense of such claim, at its expense, and using counsel selected by the Indemnitor, but reasonably satisfactory to the Indemnitee, even if the Indemnitor believes such claim is groundless. The Indemnitee may retain separate co-counsel at its sole cost and expense (unless responsibility for the cost thereof is authorized in writing by the Indemnitor pursuant to Section 8(c)(ii) above) and participate in the defense of the Third Party claim. The Indemnitee shall cooperate in such defense at the Indemnitor's request and reasonable expense, including providing access to any of its employees, property and records for purpose of conducting an investigation of such claim and for the purpose of obtaining statements, photographs, and chemical analyses and taking such other steps as may be necessary to preserve evidence of the occurrence on which the claim is based.

f) The defense and indemnity provisions set forth above should not be interpreted or deemed to limit, in any way, any right of action which may be asserted by any party against publicly or privately created funds established for the purpose of satisfying, wholly or in part, claims asserted or perfected by such parties.

g) As long as the Indemnitor is conducting the defense of any Third Party claim, the Indemnitee will not consent to the entry of any judgment or enter into any settlement with respect to a Third Party claim without the prior written consent of the Indemnitor, which consent shall not be unreasonably withheld.

9. Limitation of Liability.

Except for the specific obligations of the parties provided in Section 8 hereof, in no event whether based upon contract, tort or warranty shall either party hereto be liable to the other party hereto for, or obligated in any manner to pay, special, consequential or indirect damages.

10. Insurance.

a. The Town shall at all times during the term of this Agreement maintain, or cause any hauler delivering Acceptable Waste to the Facility on behalf of the Town to maintain, in full force and effect the insurance coverages set forth in Exhibit 1 which is attached and made a part hereof, and all other insurances as may be required by applicable law. Such insurance coverages shall name CHA as an additional insured to the extent of the Town's indemnity obligation under Section 8 of this Agreement. Certificates of insurance must be furnished to CHA on or prior to the Commencement Date, and annually thereafter in the month of July, evidencing that such insurance has been procured and remains in force.

b. CHA shall at all times during the term of this Agreement maintain in full force and effect the insurance coverages set forth in Exhibit 1 which is attached and made a part hereof, and all other insurances as may be required by applicable law. Such insurance coverages shall name the Town as an additional insured to the extent of CHA's indemnity obligation under Section 8 of this Agreement. Certificates of insurance must be furnished to the Town on or prior to the Commencement Date, and annually thereafter in the month of July, evidencing that such insurance has been procured and remains in force.

11. Representations, Warranties and Additional Covenants of the Town.

The Town hereby represents and warranties to, and covenants with, CHA as follows:

a. The Town is a political subdivision of the Commonwealth of Massachusetts and a body politic and corporate duly organized and validly existing under the constitution and laws of the Commonwealth, with full legal right, power and authority to enter into and perform its obligations under this Agreement.

b. The Town has duly authorized the execution and delivery of this Agreement and the performance by the Town of its obligations hereunder and this Agreement has been duly and validly executed and delivered by the Town and constitutes a legal, valid and binding obligation of the Town, enforceable against the Town in accordance with its terms, subject to bankruptcy; insolvency, reorganization, moratorium and other similar laws affecting creditors' rights heretofore or hereafter enacted to the extent constitutionally applicable and to the exercise of judicial discretion in appropriate cases.

c. Neither the execution or delivery by the Town of this Agreement, nor the performance

by the Town of its obligations hereunder (i) conflicts with, violates or results in a breach of any law, regulation, requirement or order of any federal, state or local agency or governmental body applicable from time to time to the performance of any obligations under this Agreement, (ii) violates or results in a breach of any term or condition of any judgment or decree, or any agreement or instrument, to which the Town is a party or by which the Town or any of its properties or assets are bound, or constitutes a default thereunder, or (iii) results in the creation or imposition of any lien, charge or encumbrance of any nature whatsoever upon any of the properties or assets of the Town.

d. No approval, authorization, order or consent of, or declaration, registration or filing with, any governmental authority is required for the valid execution, delivery and performance of this Agreement by the Town, except such as have been duly obtained or made.

e. There is no action, suit or proceeding, at law or in equity, before or by any court or governmental authority, pending or, to the best of the Town's knowledge, threatened, against the Town, wherein an unfavorable decision, ruling or finding would materially adversely affect the performance by the Town of its obligations hereunder or which, in any way, would adversely affect the validity or enforceability of this Agreement.

f. The Town has, and will renew or maintain in full force and effect, all permits, licenses or permissions or registrations with, or consents of, governmental authorities necessary in the performance of its obligations under this Agreement.

12. Representations, Warranties and Additional Covenants of CHA.

CHA hereby represents and warranties to, and covenants with, the Town as follows:

a. CHA is duly created, validly existing and in good standing under the laws of the Commonwealth of Massachusetts, with full legal right, power and authority to enter into and perform its obligations under this Agreement.

b. CHA has duly authorized the execution and delivery of this Agreement and the performance by CHA of its obligations hereunder and this Agreement has been duly and validly executed and delivered by CHA and constitutes a legal, valid and binding obligation of CHA, enforceable against CHA in accordance with its terms, subject to bankruptcy, insolvency, reorganization, moratorium and other similar laws affecting creditors' rights heretofore or hereafter enacted to the extent constitutionally applicable and to the exercise of judicial discretion in appropriate cases.

c. Neither the execution or delivery by CHA of this Agreement, nor the performance by CHA of its obligations hereunder (i) conflicts with, violates or results in a breach or any law, regulation, requirement or order of any federal, state or local agency or governmental body applicable from time to time to the performance of any obligations under this Agreement, (ii) violates or results in a breach of any term or condition of any judgment or decree, or any agreement or instrument, to which CHA is a party or by which CHA or any of its properties or assets are bound, or constitutes a default thereunder, or (iii) results in the creation or imposition of any lien, charge or

encumbrance of any nature whatsoever upon any of the properties or assets of CHA.

d. No approval, authorization, order or consent of, or declaration, registration or filing with, any governmental authority is required for the valid execution, delivery and performance of this Agreement by CHA, except such as have been duly obtained or made.

e. There is no action, suit or proceeding, at law or in equity, before or by any court or governmental authority, pending or, to the best of CHA's knowledge, threatened, against CHA, wherein an unfavorable decision, ruling or finding would materially adversely affect the performance by CHA of its obligations hereunder or which, in any way, would adversely affect the validity or enforceability of this Agreement.

f. CHA has, and will renew or maintain in full force and effect, all permits, licenses or permissions or registrations with or consents of governmental authorities necessary in the performance of its obligations under this Agreement.

13. Negotiation, Mediation And Dispute Resolution

a. While this Agreement is in effect, CHA and the Town shall attempt in good faith to resolve disputes arising out of or relating to this Agreement. In the event of a dispute, CHA and the Town shall exchange relevant information and shall attempt to resolve the dispute prior to any party instituting any formal legal proceedings. If the matter cannot be resolved, the parties shall mediate the dispute pursuant to paragraph (b) of this Section 13.

b. Any mediation hereunder shall be handled by an independent neutral party mutually agreed upon by CHA and the Town. The mediation shall be completed within thirty (30) days after mediation has been requested. Responsibility for expenses directly associated with the mediation shall be equitably apportioned among the parties, as reasonably determined by the mediator. In the event the parties cannot resolve the dispute through mediation, or by any further dispute resolution procedure mutually acceptable to the parties, then either party is permitted to institute legal proceedings as such party deems appropriate. In no event may a party commence litigation or any other proceeding unless and until completion of mediation pursuant to this section. Any litigation or other legal proceedings shall, unless otherwise agreed to in writing by the parties, be brought only in a state or federal court with jurisdiction within the Commonwealth.

14. Miscellaneous.

a. Except as otherwise provided in Section 3(b)(iii), this Agreement may not be assigned by the Town or CHA without the prior written consent of the other party and any such assignment or attempted assignment without such written consent shall be void. Notwithstanding the foregoing, CHA may assign its interests and obligations hereunder without the prior written consent of the Town to a person, firm or corporation acquiring all or substantially all of the business and assets of CHA, by merger, consolidation, transfer of assets or otherwise, or to an entity controlling or controlled by, or under common control with, CHA, provided that CHA shall give the Town written notice of

any such assignment not less than fourteen (14) days prior to the effective date of such assignment.

b. CHA shall receive title to all Acceptable Waste upon its delivery to the Facility and not refused pursuant to paragraph 3..

c. The laws of the Commonwealth shall govern the validity, interpretation, construction and performance of this Agreement.

d. All notices pertaining to this Agreement shall be in writing, shall be deemed delivered (i) if personally delivered or (ii) within two (2) days after having been transmitted by prepaid registered or certified mail, return receipt requested, addressed as follows:

If to the Town:	Town of North Reading Town Hall 235 North Street North Reading, MA 01864 Attn: Town Administrator
If to CHA:	Covanta Haverhill 100 Recovery Way Haverhill, MA 01838 Attn: Business Manager
With a copy to:	Covanta Energy Group, Inc. 40 Lane Road, CN 2615 Fairfield, NJ 07007-2615 Attention: General Counsel

Changes in the respective addresses to which such notices shall be sent may be made from time to time by either party by notice to the other party.

e. All prior agreements, understandings and negotiations pertaining to the subject matter hereof for the term hereof are merged herein and superseded hereby, there being no other agreement or understanding than those written or specified herein.

f. If any provision of this Agreement is held invalid by any court or body of competent jurisdiction, the remainder of this Agreement shall remain in full force and effect to the greatest extent permitted by law.

g. No custom, act, forbearance, or words or silence at any time, gratuitous or otherwise, shall impose any additional obligation or liability upon either party or waive or release either party from any default or the performance or fulfillment of any obligation or liability or operate against either party as a supplement, alteration or amendment or change of any term or provision unless set forth in a written instrument duly executed by such party expressly stating that it is intended to impose such an additional obligation or liability or to constitute such a waiver or release, or that it is intended to operate as such a supplement, alteration, amendment or change.

h. All rights and remedies of each party shall be cumulative and not alternative, in addition to and not exclusive of any other right or remedy to which such party may be lawfully entitled

EXHIBIT 1
INSURANCE

A. During the term of this Agreement, the Town of Tewksbury hauler delivering Acceptable Waste to the Facility on behalf of the Town shall keep in force the following insurance coverages:

Coverages	Limits of Liability	
Worker's Compensation		Statutory
Environmental Liability Insurance per Claim		$1,000,000
		$3,000,000 Aggregate
Comprehensive Motor Vehicle Liability Insurance	Per Accident and Aggregate	$1,000,000
Comprehensive General Liability Insurance including Completed Operations and Contractual Liability	Per Accident and Aggregate	$1,000,000
Comprehensive Excess Liability (Umbrella)	Per Accident and Aggregate	$2,000,000

CHA's insurance shall be primary with respect to any insurance maintained by the Town and shall not call on the Town's insurance for contributions with respect to CHA's contractual liability.

Before commencement of disposal hereunder and annually thereafter, CHA shall furnish to the Town certificates of insurance to the effect that such insurance has been procured and is in force. The certificates shall contain the following express obligation:

> "This is to certify that the policies of insurance described herein have been issued to the insured for whom this certificate is executed and are in force at this time. In the event of cancellation or material change in policy affecting the certificate holder, thirty (30) days prior written notice will be given the certificate holder."

B. During the term of this Agreement, CHA shall keep in force the following insurance coverages:

Coverages	Limits of Liability	
Worker's Compensation		Statutory
Environmental Liability Insurance per Claim		$1,000,000
		$3,000,000 Aggregate
Comprehensive Motor Vehicle Liability Insurance	Per Accident and Aggregate	$1,000,000
Comprehensive General Liability Insurance including Completed Operations and Contractual Liability	Per Accident and Aggregate	$6,000,000
Comprehensive Excess Liability (Umbrella)	Per Accident and Aggregate	$2,000,000

CHA's insurance shall be primary with respect to any insurance maintained by the Town and shall not call on the Town's insurance for contributions with respect to CHA's contractual liability.

Before commencement of disposal hereunder and annually thereafter, CHA shall furnish to the Town certificates of insurance to the effect that such insurance has been procured and is in force. The certificates shall contain the following express obligation:

> "This is to certify that the policies of insurance described herein have been issued to the insured for whom this certificate is executed and are in force at this time. In the event of cancellation or material change in policy affecting the certificate holder, thirty (30) days prior written notice will be given the certificate holder."

Exhibit 2

[List each town and their estimated tonnage for 2010]

Belmont, Massachusetts Agreement with Wheelebrator-North Andover Waste-to-Energy Facility

2010-19

SERVICE AGREEMENT

THIS AGREEMENT is made and entered into as of June 15, 2009 by and among WHEELABRATOR NORTH ANDOVER INC., a Delaware corporation ("WNA") and the TOWN OF BELMONT, MASSACHUSETTS (the "Town").

WITNESSETH:

WHEREAS, WNA is the owner and operator of a resource recovery facility located in North Andover, Massachusetts (the "Facility") where WNA accepts Acceptable Waste (defined hereinafter) for disposal by the process of combustion, generating electricity thereby, and disposing of residue therefrom; and,

WHEREAS, the Town is a body politic and corporate and a public instrumentality in the Commonwealth of Massachusetts; and

WHEREAS, WNA and the Town now wish to enter into an agreement pursuant to which the Town will deliver to the Facility, and WNA will accept at the Facility, certain quantities of Acceptable Waste;

NOW, THEREFORE, in consideration of the foregoing premises, and the mutual conditions and covenants contained herein, the parties hereto, intending to be legally bound, do hereby agree as follows:

1. Definitions. For purposes of this Agreement, the following capitalized words and phrases shall be given the following respective meanings:

(a) "Acceptable Waste" means all municipal solid waste collected and disposed of by or on behalf of the Town, but excluding (i) explosives, ammunition and ordnance materials, pathological and biological wastes, (ii) asbestos and asbestos products, asphalt, radioactive materials, oil sludge and highly flammable substances, (iii) cesspool or other human wastes, liquid wastes, human and animal remains and leaves and yard waste (other than amounts legally acceptable in municipal solid waste), (iv) motor vehicles or large parts thereof, lead acid batteries, motorcycles, auto springs, auto transmissions, trailers, farm or other large machinery or large parts thereof and marine vehicles or large parts thereof, (v) large concentrations of plastics and tires, asphalt shingles, wallboard, sheetrock and wire and cable, (vi) unburnable construction materials and demolition debris, (vii) cleaning fluids, crankcase oils, cutting oils, petroleum products (including without limitation, drained oil), oil based paints, acids, caustics, pesticides, insecticides, poisons, drugs, chemicals and fine powdery earth used to filter cleaning fluid, (viii) tree logs, tree stumps and any item of waste (other than mattresses, sofas or furniture) exceeding six feet in any one of its dimensions or being in whole or in part a solid mass, the solid mass portion of which has dimensions such that a sphere with a diameter of twelve inches could be contained within such solid mass portion, (ix) all large household appliances, commonly referred to as "white goods", including, without limitation, refrigerators, stoves, dishwashing machines, washing machines, drying

machines, water heaters, and the like, (x) any Hazardous Substance or other item of waste the disposal or processing of which by WNA would be in violation of any Environmental Laws (except for de minimus amounts legally acceptable in municipal solid waste), and (xi) any item of waste which WNA, after consultation with the Town, reasonably believes the processing of which will damage the Facility. The parties recognize that some substances which are not, as of the date of this Agreement, considered Hazardous Substances or which WNA is not prohibited from processing at the Facility under any Environmental Laws may be determined subsequent to the date hereof to be Hazardous Substances or which WNA may be prohibited from processing at the Facility under Environmental Laws and, at the time of such determination and upon written notice thereof by WNA to the Town, such substances shall cease to be Acceptable Waste.

(b) "Commencement Date" means that date more particularly described in Section 6 hereof.

(c) "Commonwealth" means the Commonwealth of Massachusetts.

(d) "Contract Year" means a one-year period beginning on July 1 of each year during the term hereof other than the first Contract Year which shall commence on the Commencement Date and end on June 30, 2010.

(e) "Environmental Laws" means (i) all statutes, regulations, rules, ordinances, codes, licenses, permits, orders, decrees, approvals, plans, authorizations, and similar items (whether previously existing, now existing or hereafter enacted, amended, promulgated or issued, and whether or not contemplated by the parties as of the date of this Agreement) of the United States, the Commonwealth or any political subdivision thereof or of any agency, department, commission, board, bureau or other instrumentality of any of them, (ii) all binding and final judicial and administrative decrees, judgments and orders (whether previously existing, now existing or hereafter enacted, amended, promulgated, or issued, and whether or not contemplated by the parties as of the date of this Agreement), and (iii) any common law theories of liability applicable to claims, demands, requirements, damages, costs or expenses, in each case relating to or addressing the pollution, contamination, protection, or remediation of the environment or the protection or restoration of natural resources, including, but not limited to:

(i) the Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. Sections 9601 et seq.) including the Superfund Amendments and Reauthorization Act of 1986, Resource Conservation and Recovery Act (42 U.S.C. Sections 6901 et seq.), Clean Air Act (42 U.S.C. Sections 7401 et seq.), Hazardous Materials Transportation Act (49 U.S.C. Sections 1801 et seq.), Clean Water Act (33 U.S.C. Sections 1251 et seq.) including the Water Pollution Control Act, Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sections 136 et seq.), Toxic Substances Control Act (15 U.S.C. Sections 2601 et seq.), Safe Drinking Water Act (42 U.S.C. Sections 300(f) et seq.), the Endangered Species Act (16 U.S.C. Sections 1531 et seq.), the Medical Waste Tracking Act (42 U.SC. Sections 6992 et seq.), and the Emergency Planning and Community Right-to-Know Act (42 U.S.C. Sections 11001 et seq.), and any analogous state or local laws or ordinances, including, but not limited to,

the Massachusetts Hazardous Waste Management Act (Mass. Gen. Laws c. 21C), and Massachusetts Oil and Hazardous Material Release Prevention and Response Act (Mass. Gen. Laws c. 21E), and any regulations promulgated pursuant to any such federal, state or local laws or ordinances; and

(ii) all requirements pertaining to reporting, licensing, permitting, investigation, remediation, mitigation, and/or removal of any releases or threatened releases of chemical substances, pollutants, contaminants or hazardous or toxic substances, materials or wastes (whether solid, liquid or gaseous), into the air, surface water, groundwater or land, or otherwise relating to the processing, distribution, use, treatment, recycling, storage, disposal, transport or handling of chemical substances, pollutants, contaminants or hazardous or toxic substances, materials or wastes (whether solid, liquid or gaseous).

(f) "Event of Force Majeure" means any of the following acts or events affecting WNA which may have a material adverse effect on its rights or obligations under this Agreement, if such act or event is beyond the control of WNA:

(i) an act of God, epidemic, landslide, lightning, earthquake, fire or explosion (which is not also the result of the willful or negligent action of WNA or a lack of due diligence by WNA), storm, flood, an act of war or of the civil or military authorities, civil disturbance, strike, lockout, work slowdown, or similar industrial or labor action or any other similar occurrence;

(ii) the order and/or judgment of any federal, state or local court, administrative agency or governmental officer or body, if it is not also the result of the willful or negligent action of WNA or a lack of due diligence by WNA; provided that the contesting in good faith of any such order and/or judgment shall not, of itself, constitute or be construed as a willful or negligent action or lack of due diligence by WNA;

(iii) the failure to obtain, or suspension, termination, interruption or failure of renewal of any permit, license, consent, authorization or approval essential to the operation, ownership or possession of the Facility or the operation of the Landfill, if it is not also the result of the willful or negligent action of WNA or a lack of due diligence by WNA; provided that the contesting in good faith of any such failure to obtain, suspension, termination, interruption or failure of renewal shall not, of itself, be construed as a willful or negligent action or a lack of due diligence by WNA;

(iv) the adoption, promulgation, issuance, material modification or change in interpretation after the date of this Agreement of any federal, state or local law, regulation, rule, requirement, or ordinance, unless such law, regulation, rule, requirement or ordinance was on or prior to such date duly adopted, promulgated, issued or otherwise officially modified or changed in interpretation, in each case in final form, to become effective without any further action by any federal, state or local governmental body, administrative agency or governmental official having jurisdiction; or

(v) the failure of the communities in which the Facility or the Landfill is situated or the appropriate federal or state agencies or public or private utilities having operational jurisdiction over the Facility or the Landfill to provide and maintain all utilities, services, sewerage and water lines essential to the operation of the Facility or the Landfill, if it is not also the result of the willful or negligent action of WNA or a lack if due diligence by WNA.

(g) "Hazardous Substance" means any substance, waste or material listed or characterized as hazardous, extremely hazardous or toxic by the United States Environmental Protection Agency or any similar state environmental agency pursuant to any Environmental Laws.

(h) "Landfill" means the site utilized for the disposal of residue generated at the Facility.

(i) "Recycle" means to recover or reclaim from the waste stream, at the source prior to collection, materials or by-products that are to be (i) reused, (ii) employed as an ingredient or a feedstock in an industrial or manufacturing process to make a product, or (iii) employed in a particular function or application as an effective substitute for a commercial product or commodity; provided, however, that to Recycle does not mean to deliver such materials or byproducts to a landfill or to any Third Party for disposal or to recover energy from the combustion of such materials or by-products.

(j) "Third Party" means any natural person, corporation, association or partnership, and any governmental agency, department, commission, board, bureau or other instrumentality, other than WNA or the Town.

(k) "Tipping Fee" means the fee more particularly described in Section 5(a).

(l) "Ton" means a "short ton" of 2,000 pounds.

2. Guaranteed Delivery of Acceptable Waste.

(a) The Town shall deliver or cause to be delivered to the Facility within a reasonable period of time following collection and, except as hereinafter provided, WNA shall accept at the Facility, all Acceptable Waste that is not Recycled and that is collected by or on behalf of the Town in each Contract Year. The Town shall not deliver or cause to be delivered to the Facility any Acceptable Waste that is generated in any location other than within the jurisdiction of the Town. On or prior to March 31, 2009, and thereafter on or prior to March 31 in each Contract Year, the Town shall provide WNA with a written estimate of the number of Tons of Acceptable Waste it anticipates delivering to the Facility in each month in the initial Contract Year or the following Contract Year, as applicable. Such estimate shall not be binding on the Town. The Town shall perform its obligations under this Agreement in material conformance with all applicable laws, including, without limitation, Environmental Laws.

(b) The Town shall promptly remove at its sole cost any waste rejected by

WNA at the Facility in accordance with Section 3(a) hereof and shall be liable to WNA for all costs incurred by WNA in removing and disposing of such rejected waste if the Town fails to do so. The Town shall not be obligated to pay a Tipping Fee for waste so rejected.

(c) WNA shall operate the Facility and perform its obligations under this Agreement in material conformance with all applicable laws, including, without limitation, Environmental Laws, and shall provide for the disposal of ash and any other by-products of the operation of the Facility at landfills or other sites which are lawfully permitted and operated.

(d) For purposes of this Agreement any reference to the Town shall also include any hauler delivering waste to the Facility on behalf of the Town. The Town shall cause all its haulers to comply with the obligations of the Town hereunder, including, without limitation, including such obligations in all of its current contracts with its haulers, to the extent such contracts may be amended by the Town, and in all of its future contracts with its haulers.

3. Right of Refusal.

(a) WNA shall have the right without any liability to the Town to refuse deliveries of:

(i) waste other than Acceptable Waste; and

(ii) any waste delivered at other than the then established receiving hours as set forth herein or any waste delivered by or on behalf of the Town not in conformity with the tennis of this Agreement.

(b) WNA may also refuse delivery of all or any portion of the Acceptable Waste collected by or on behalf of the Town if as a result of an Event of Force Majeure the Facility or any substantial portion thereof is shut down (other than in the normal course of operation and maintenance) and, as a result thereof, WNA is unable to accept and process such Acceptable Waste at the Facility. In such event, WNA shall designate an alternate disposal site that is lawfully permitted and operated and shall pay the cost of disposal of such Acceptable Waste at such alternative site. To the extent reasonably practicable, WNA shall give the Town not less than 24 hours' notice of any such shut down and designation of an alternate disposal site. The Town shall pay WNA the per Ton Tipping Fee for such Acceptable Waste less the reasonable incremental costs, if any, that are payable by the Town to cause such Acceptable Waste to be delivered to such alternate disposal site over and above (x) the cost of delivery of such Acceptable Waste to the Facility plus (y) the reasonable incremental costs, if any, that are attributable to the first five (5) additional miles of travel to such alternate disposal site.

Notwithstanding the foregoing:

(i) During any period during which WNA is unable to accept and process

Acceptable Waste at the Facility due to an Event of Force Majeure, WNA at its expense will promptly, diligently and in good faith take all action reasonably necessary for it to be able to accept and process such Acceptable Waste including, without limitation, all actions reasonably necessary to obtain any temporary restraining orders, preliminary or permanent injunctions, approvals, licenses or permits needed to resume acceptance and processing of such Acceptable Waste and any repairs or other improvements to the Facility and any modifications to the operation thereof required for such purpose. WNA shall, during any such period, keep the Town duly notified (not less often than monthly) of all such actions, and the expected duration of any such period, and shall permit the Town to participate and intervene where permissible in all such actions if the Town so desires; provided, however, that WNA shall have the sole right to direct the prosecution of any such action and the Town shall reasonably cooperate with WNA in connection therewith and not do anything in the course thereof contrary to the interests of WNA.

(ii) If as a result of an Event of Force Majeure the capacity of the Facility to accept and process Acceptable Waste is reduced but not completely suspended, WNA shall allocate a portion of such reduced capacity of the Facility to the Town pro rata based on the Town's share of the total tonnage then under contract for disposal at the Facility from Massachusetts cities and towns which were prior to the Commencement Date members of the North East Solid Waste Committee, provided that, unless otherwise agreed to by the Town, if such capacity is insufficient to process all of the Town's Acceptable Waste, all of such Acceptable Waste shall be delivered to an alternate disposal site as provided in this paragraph 3(b) subject to the provisions of clause (iii) hereof WNA shall not enter into any new contracts for the disposal of Acceptable Waste at the Facility subsequent to the occurrence of such Event of Force Majeure until the capacity of the Facility is sufficient to accept and process all Acceptable Waste delivered by the Town in accordance with this Agreement. Any Acceptable Waste not processed at the Facility in accordance with this clause (ii) shall be delivered to an alternate disposal site as provided in this paragraph 3(b) subject to the provisions of clause (iii) hereof.

(iii) If the period during which the Facility or any substantial portion thereof is shut down due to an Event of Force Majeure equals or exceeds ninety (90) days in duration, WNA may, at any time on or after such ninetieth day, (x) upon not less than fourteen (14) days notice to the Town assign this Agreement to the operator of an alternate disposal site that is lawfully permitted and operated, or (y) upon not less than one hundred twenty (120) days notice to the Town terminate this Agreement.

(iv) In the event WNA elects to assign this Agreement to the operator of an alternate disposal site pursuant to clause (iii) of this paragraph (b), the Town shall thereafter and during the remaining term of this Agreement deliver all such Acceptable Waste to such alternate disposal site and, at WNA's option, shall pay either WNA or such operator the applicable per Ton Tipping Fee

provided for herein, less the reasonable incremental costs, if any, that are payable by the Town to cause such Acceptable Waste to be delivered to such alternate disposal site.

(v) In the event WNA elects to terminate this Agreement pursuant to clause (iii) of this paragraph (b), from and after the effective date of such termination neither WNA nor the Town shall have any further obligation to the other party hereunder, provided that if at any time thereafter WNA is able to accept and process Acceptable Waste at the Facility it shall so notify the Town, and the Town, solely at its option, may elect to resume deliveries of Acceptable Waste to the Facility upon the terms and conditions, and at the then applicable per Ton Tipping Fee, provided for herein for the balance of the original term of this Agreement.

(c) WNA may also refuse delivery of Acceptable Waste it is unable to process for any reason not otherwise described in paragraphs (a) or (b) of this Section 3. In such event, WNA shall designate an alternate disposal site that is lawfully permitted and operated and shall pay the cost of disposal of such Acceptable Waste at such alternative site. To the extent reasonably practicable, WNA shall give the Town not less than twenty-four (24) hours' notice of any such refusal and designation of an alternate disposal site, provided that if such refusal is due to the substitution of other Acceptable Waste for the Town's Acceptable Waste, WNA shall give the Town not less than seven (7) days' notice of any such refusal and designation of an alternate disposal site. The Town shall pay WNA the per Ton Tipping Fee for such Acceptable Waste less the reasonable incremental costs, if any, that are payable by the Town to cause such Acceptable Waste to be delivered to such alternate disposal site over and above the cost of delivery of such Acceptable Waste to the Facility. The provisions of paragraph (b) of this Section 3 regarding the assignment or termination of this Agreement shall not apply to any refusal by WNA to accept and process Acceptable Waste contemplated by this paragraph (c).

(d) To the extent required by Environmental Laws, WNA shall inspect all waste delivered to the Facility and shall take such other steps as shall be necessary or appropriate to monitor discharges from the Facility for the presence of Hazardous Substances and shall promptly notify the Town if WNA becomes aware the Town or its haulers has delivered any Hazardous Substances to the Facility.

4. Manner of Delivery and Weighing.

(a) The Town shall deliver or cause to be delivered Acceptable Waste in a clean, orderly and safe manner, including, without limitation, in such a manner that it will not be spilled, other than on the tipping floor, or blown on the site, of the Facility. If Acceptable Waste is so spilled or blown, the Town shall promptly, at its sole cost, collect and remove such spilled or blown Acceptable Waste and if the Town fails to do so, the Town shall be liable to WNA for all costs of such clean-up by WNA. The Town shall adhere to all safety rules and regulations of WNA in delivering Acceptable Waste to the Facility.

(b) The parties recognize that the Town of North Andover is authorized to designate certain highway routes within the vicinity of the Facility to be used by the Town to deliver Acceptable Waste to the Facility. Unless otherwise authorized by the Town of North Andover, the Town shall use only the routes to the Facility designated by the Town of North Andover, provided that any failure of the Town to use such routes shall not constitute a default under this Agreement.

(c) Unless the Town of North Andover shall otherwise require by regulation or written order, scheduled delivery days and hours shall be 6:00 a.m. to 5:00 p.m., Monday through Friday, and 7:00 a.m. to noon on Saturday, exclusive of any customary holiday recognized in the Commonwealth. On any Saturday of a week during which is celebrated a customary holiday recognized in the Commonwealth, the scheduled delivery hours shall be 6:00 a.m. to 5:00 p.m.

(d) WNA shall utilize and maintain motor truck scales to weigh all vehicles delivering Acceptable Waste to the Facility in accordance with applicable state law. Each vehicle delivering Acceptable Waste to the Facility shall be weighed, indicating gross weight, tare weight, time and truck identification on a weight record. Such records shall be used by WNA as a basis for calculating monthly and yearly deliveries made by the Town. WNA reserves the right to modify the above arrangement with any other system designed to perform the same functions. WNA shall maintain records of the tonnage delivered by the Town and accepted by WNA each day and each month and will retain such record for a period of no less than three (3) years.

(e) The Town shall cause all vehicles used for delivery of Acceptable Waste to the Facility to be in safe and clean condition and in good repair and to be properly covered or enclosed so as to prevent any refuse, dirt, dust or other materials from falling or blowing out from the vehicles. The Town shall use or cause to be used only vehicles with the capability of dumping directly into the waste pit at the Facility and which have a capacity of three (3) tons or more. Such vehicles shall bear such names or means of identification as may be reasonably acceptable to WNA.

5. Tipping Fee and Payment.

(a) The Town shall pay WNA a tipping fee (the "Tipping Fee") per Ton of Acceptable Waste accepted at the Facility during each Contract Year, or delivered to an alternate disposal site as provided in Section 3 hereof, as follows:

Contract Year	Tipping Fee
July 1, 2010 through June 30, 2011	$66.00
July 1, 2011 through June 30, 2012	$68.00
July 1, 2012 through June 30, 2013	$70.00
July 1, 2013 through June 30, 2014	$72.00
July 1, 2014 through June 30, 2015	$74.00

(b) WNA shall invoice the Town within ten (10) days after the end of each month for all deliveries of Acceptable Waste at the Facility during such month.

(c) Tipping Fees hereunder shall be due and payable within thirty (30) days of the date of mailing of the invoice therefor by WNA. Any payment for Tipping Fees not received within forty-five (45) days of such date shall bear interest after such forty-fifth day until paid at the lesser of one percent (1%) per month or the maximum legal rate per month.

(d) The obligation of the Town to pay Tipping Fees and any other amount to be paid by it from time to time hereunder shall not be subject to diminution by reason of any shutdown of the Facility, set-off, abatement, counterclaim, existence of a dispute or any other reason, known or unknown, foreseeable or unforeseeable, which might otherwise constitute a legal or equitable defense or discharge of the liabilities of either party hereunder or limit recourse against either party. The foregoing provisions of this Section 5(d) shall not affect the obligations of the Town and WNA under Section 3 hereof or the right of either party to pursue independently any claim it might have against the other party based upon nonperformance by such party of its obligations hereunder.

(e) The Town shall plan and budget for all anticipated Tipping Fees payable hereunder in each Contract Year. Notwithstanding any provision of this Agreement to the contrary, the parties hereto recognize and agree that the obligation of the Town to make any payment hereunder is not a general obligation of the Town but is subject to appropriation by the Town for such purpose. Subject to the foregoing, so long as WNA shall not be in default hereunder, the Town shall not appropriate any amount for the disposal of Acceptable Waste in any Contract Year other than in accordance with this Agreement and shall promptly notify WNA if at any time the Town shall fail to appropriate any amount required to satisfy its obligations under this Agreement. If the Town ceases to collect and/or manage the household waste produced by households in its jurisdiction at any time during the term of this Agreement, the Town shall have the right, upon six months written notice to WNA, to terminate this Agreement.

6. Term. This Agreement shall be effective upon execution by the parties hereto, provided that performance hereunder shall commence on July 1, 2010 (the "Commencement Date") and end on June 30, 2015.

7. Default.

(a) The following shall constitute events of default by the Town:

(i) the failure of the Town to make any payment required to be made to WNA under this Agreement within thirty (30) days after receipt of written notice from WNA that such amount is past due;

(ii) the failure of the Town to perform any of its other material obligations under this Agreement which failure is not cured within sixty (60) days, or a cure commenced and diligently pursued within sixty (60) days and

cured within ninety (90) days, after the date of written notice from WNA of such failure; or

(iii) in the event the Town shall make an assignment for the benefit of creditors, file a voluntary petition in bankruptcy, be adjudicated as bankrupt or insolvent, file any petition or answer seeking for itself any reorganization, arrangement, composition, readjustment, liquidation, dissolution or similar relief under any present or future statute, law or regulation, file any answer admitting or not contesting the material allegations of a petition filed against it in any such proceeding or seek or consent to or acquiesce in the appointment of any trustee, liquidator or receiver of it or of all or any substantial part of the properties of it.

(b) The following shall constitute events of default by WNA:

(i) the failure of WNA to perform any of its material obligations under this Agreement which failure is not cured within sixty (60) days, or a cure commenced and diligently pursued within sixty (60) days and cured within ninety (90) days, after the date of written notice from the Town of such failure; or

(ii) in the event WNA shall make an assignment for the benefit of creditors, file a voluntary petition in bankruptcy, be adjudicated a bankrupt or insolvent, file any petition or answer seeking for itself any reorganization, arrangement, composition, readjustment, liquidation, dissolution or similar relief under any present or future statute, law or regulation, file any answer admitting or not contesting the material allegations of a petition filed against it in any such proceeding or seek or consent to or acquiesce in the appointment of any trustee, liquidator or receiver of it or of all or any substantial part of the properties of it.

(c) Upon the occurrence of an event of default, in addition to any other remedies available in law or equity the party not in default may terminate this Agreement by written notice to the defaulting party.

(d) Any obligation to pay any fixed sum of money that may have accrued and be due and payable hereunder, and the obligations contained in Section 8 hereof, shall survive the termination or expiration of this Agreement.

8. Indemnification

(a) WNA shall indemnify, defend, reimburse and hold harmless the Town and its officers, employees and representatives from any and all threatened or actual claims, demands, suits and causes of action (collectively "Claims"), and all damages, penalties, costs and expenses (including, without limitation, attorney's fees) arising therefrom (collectively "Damages"), incurred as a result of (i) any act or omission by WNA in connection with the performance of its obligations under this Agreement that gives rise to

liability under any Environmental Laws, except to the extent that such Claims or Damages arise out of or result from the delivery to WNA by the Town of any waste that does not constitute Acceptable Waste (provided that WNA shall have given the Town notice of such delivery within two years of the date of such delivery), (ii) injury to or death of any person (including, without limitation, persons employed by the Town) or damage or destruction of property (including, without limitation, to the property of the Town and Third Parties), to the extent arising out of, resulting from or in any way connected with the negligence or willful misconduct of WNA or its officers, employees and representatives, (iii) breach of any obligation, covenant or undertaking of WNA contained herein, and (iv) any misrepresentation or breach of warranty by WNA contained herein.

(b) To the extent permitted by law, the Town shall indemnify, defend, reimburse and hold harmless WNA and its officers, employees and representatives from any and all Claims and Damages incurred as a result of (i) the delivery to WNA by the Town of any waste that does not constitute Acceptable Waste that gives rise to liability under any Environmental Laws (provided that WNA shall have given the Town notice of such delivery within two years of the date of such delivery), (ii) injury to or death of any person (including, without limitation, persons employed by WNA) or damage or destruction of property (including, without limitation, to the property of WNA and Third Parties), to the extent arising out of, resulting from or in any way connected with the negligence or willful misconduct of the Town or its officers, employees and representatives, (iii) breach of any obligation, covenant or undertaking of the Town contained herein, and (iv) any misrepresentation or breach of warranty by the Town contained herein.

(c) The obligations of a party to this Agreement (each an "Indemnitor") to indemnify, defend, reimburse and hold harmless the other party hereto and its officers, employees and representatives (each an"Indemnitee") as set forth in Paragraph (a) or (b) above shall not apply:

(i) To any Claims or Damages arising out of any acts or omissions or circumstances that occurred prior to the Commencement Date;

(ii) To any defense costs or expenses, including the costs of attorneys, consultants and/or investigators, unless authorized in advance and in writing by the Indemnitor; or

(iii) To any Claims or Damages to the extent caused by the acts or omissions of the Indemnitee.

(d) If the Indemnitee is presented with a claim by a Third Party, or an Indemnitee suffers a loss or damage that may be subject to indemnification or defense from the Indemnitor under this Agreement, the Indemnitee shall promptly give reasonable notice thereof to the Indemnitor, together with a complete copy of the Third Party claim (if any); provided, however, that the failure to promptly give such notice shall not relieve the Indemnitor from any liability for indemnification hereunder unless the Indemnitor is

materially prejudiced in its ability to defend, settle or otherwise assert rights to reduce exposure to, such liability, claim, demand, cost or exposure.

(e) After notification to the Indemnitor of any Third Party claim, if such claim is properly the subject of indemnification under this Agreement, the Indemnitor shall undertake the defense of such claim, at its expense, and using counsel selected by the Indemnitor, but reasonably satisfactory to the Indemnitee, even if the Indemnitor believes such claim is groundless. The Indemnitee may retain separate co-counsel at its sole cost and expense (unless responsibility for the cost thereof is authorized in writing by the Indemnitor pursuant to Section 8 (c)(ii) above) and participate in the defense of the Third Party claim. The Indemnitee shall cooperate in such defense at the Indemnitor's request and reasonable expense, including providing access to any of its employees, property and records for purpose of conducting an investigation of such claim and for the purpose of obtaining statements, photographs, and chemical analyses and taking such other steps as may be necessary to preserve evidence of the occurrence on which the claim is based.

(f) The defense and indemnity provisions set forth above should not be interpreted or deemed to limit, in any way, any right of action which may be asserted by any party against publicly or privately created funds established for the purpose of satisfying, wholly or in part, claims asserted or perfected by such parties.

(g) As long as the Indemnitor is conducting the defense of any Third Party claim, the Indemnitee will not consent to the entry of any judgment or enter into any settlement with respect to a Third Party claim without the prior written consent of the Indemnitor, which consent shall not be unreasonably withheld.

9. Limitation of Liability. Except for the specific obligations of the parties provided in Section 8 hereof, in no event whether based upon contract, tort or warranty shall either party hereto be liable to the other party hereto for, or obligated in any manner to pay, special, consequential or indirect damages.

10. Insurance.

(a) The Town shall at all times during the term of this Agreement maintain, or cause any hauler delivering Acceptable Waste to the Facility on behalf of the Town to maintain, in full force and effect the insurance coverages set forth in Exhibit I which is attached and made a part hereof, and all other insurances as may be required by applicable law. Such insurance coverages shall name WNA as an additional insured to the extent of the Town's indemnity obligation under Section 8 of this Agreement. Certificates of insurance must be furnished to WNA on or prior to the Commencement Date, and annually thereafter in the month of July, evidencing that such insurance has been procured and remains in force.

(b) WNA shall at all times during the term of this Agreement maintain in full force and effect the insurance coverages set forth in Exhibit I which is attached and made a part hereof, and all other insurances as may be required by applicable law. Such insurance coverages shall name the Town as an additional insured to the extent of WNA's

indemnity obligation under Section 8 of this Agreement. Certificates of insurance must be furnished to the Town on or prior to the Commencement Date, and annually thereafter in the month of July, evidencing that such insurance has been procured and remains in force.

11. Representations, Warranties and Additional Covenants of the Town. The Town hereby represents and warranties to, and covenants with, WNA as follows:

(a) The Town is a political subdivision of the Commonwealth of Massachusetts and a body politic and corporate duly organized and validly existing under the constitution and laws of the Commonwealth, with full legal right, power and authority to enter into and perform its obligations under this Agreement.

(b) The Town has duly authorized the execution and delivery of this Agreement and the performance by the Town of its obligations hereunder and this Agreement has been duly and validly executed and delivered by the Town and constitutes a legal, valid and binding obligation of the Town, enforceable against the Town in accordance with its terms, subject to bankruptcy, insolvency, reorganization, moratorium and other similar laws affecting creditors' rights heretofore or hereafter enacted to the extent constitutionally applicable and to the exercise of judicial discretion in appropriate cases.

(c) Neither the execution or delivery by the Town of this Agreement, nor the performance by the Town of its obligations hereunder (i) conflicts with, violates or results in a breach of any law, regulation, requirement or order of any federal, state or local agency or governmental body applicable from time to time to the performance of any obligations under this Agreement, (ii) violates or results in a breach of any term or condition of any judgment or decree, or any agreement or instrument, to which the Town is a party or by which the Town or any of its properties or assets are bound, or constitutes a default thereunder, or (iii) results in the creation or imposition of any lien, charge or encumbrance of any nature whatsoever upon any of the properties or assets of the Town.

(d) No approval, authorization, order or consent of, or declaration, registration or filing with, any governmental authority is required for the valid execution, delivery and performance of this Agreement by the Town, except such as have been duly obtained or made.

(e) There is no action, suit or proceeding, at law or in equity, before or by any court or governmental authority, pending or, to the best of the Town's knowledge, threatened, against the Town, wherein an unfavorable decision, ruling or finding would materially adversely affect the performance by the Town of its obligations hereunder or which, in any way, would adversely affect the validity or enforceability of this Agreement.

(f) The Town has, and will renew or maintain in full force and effect, all permits, licenses or permissions or registrations with, or consents of, governmental authorities necessary in the performance of its obligations under this Agreement.

12. Representations, Warranties and Additional Covenants of WNA. WNA hereby represents and warranties to, and covenants with, the Town as follows:

(a) WNA is duly created, validly existing and in good standing under the laws of the State of Delaware, and is duly qualified as a foreign corporation to do business in the Commonwealth, with full legal right, power and authority to enter into and perform its obligations under this Agreement.

(b) WNA has duly authorized the execution and delivery of this Agreement and the performance by WNA of its obligations hereunder and this Agreement has been duly and validly executed and delivered by WNA and constitutes a legal, valid and binding obligation of WNA, enforceable against WNA in accordance with its terms, subject to bankruptcy, insolvency, reorganization, moratorium and other similar laws affecting creditors' rights heretofore or hereafter enacted to the extent constitutionally applicable and to the exercise of judicial discretion in appropriate cases.

(c) Neither the execution or delivery by WNA of this Agreement, nor the performance by WNA of its obligations hereunder (i) conflicts with, violates or results in a breach of any law, regulation, requirement or order of any federal, state or local agency or governmental body applicable from time to time to the performance of any obligations under this Agreement, (ii) violates or results in a breach of any term or condition of any judgment or decree, or any agreement or instrument, to which WNA is a party or by which WNA or any of its properties or assets are bound, or constitutes a default thereunder, or (iii) results in the creation or imposition of any lien, charge or encumbrance of any nature whatsoever upon any of the properties or assets of WNA.

(d) No approval, authorization, order or consent of, or declaration, registration or filing with, any governmental authority is required for the valid execution, delivery and performance of this Agreement by WNA, except such as have been duly obtained or made.

(e) There is no action, suit or proceeding, at law or in equity, before or by any court or governmental authority, pending or, to the best of WNA's knowledge, threatened, against WNA, wherein an unfavorable decision, ruling or finding would materially adversely affect the performance by WNA of its obligations hereunder or which, in any way, would adversely affect the validity or enforceability of this Agreement.

(f) WNA has, and will renew or maintain in full force and effect, all permits, licenses or permissions or registrations with, or consents of, governmental authorities necessary in the performance of its obligations under this Agreement.

13. Negotiation, Mediation And Dispute Resolution.

(a) While this Agreement is in effect, WNA and the Town shall attempt in good faith to resolve disputes arising out of or relating to this Agreement. In the event of a dispute, WNA and the Town shall exchange relevant information and shall attempt to resolve the dispute prior to any party instituting any formal legal proceedings. If the

matter cannot be resolved, the parties shall mediate the dispute pursuant to paragraph (b) of this Section 13.

(b) Any mediation hereunder shall be handled by an independent neutral party mutually agreed upon by WNA and the Town. The mediation shall be completed within thirty (30) days after mediation has been requested. Responsibility for expenses directly associated with the mediation shall be equitably apportioned among the parties, as reasonably determined by the mediator. In the event the parties cannot resolve the dispute through mediation, or by any further dispute resolution procedure mutually acceptable to the parties, then either party is permitted to institute legal proceedings as such party deems appropriate. In no event may a party commence litigation or any other proceeding unless and until completion of mediation pursuant to this section. Any litigation or other legal proceedings shall, unless otherwise agreed to in writing by the parties, be brought only in a state or federal court with jurisdiction within the Commonwealth.

14. Miscellaneous.

(a) Except as otherwise provided in Section 3(b)(iii), this Agreement may not be assigned by the Town or WNA without the prior written consent of the other party and any such assignment or attempted assignment without such written consent shall be void. Notwithstanding the foregoing, WNA may assign its interests and obligations hereunder without the prior written consent of the Town to a person, film or corporation acquiring all or substantially all of the business and assets of WNA, by merger, consolidation, transfer of assets or otherwise, or to an entity controlling or controlled by, or under common control with, WNA, provided that WNA shall give the Town written notice of any such assignment not less than fourteen (14) days prior to the effective date of such assignment.

(b) WNA will receive title to all Acceptable Waste upon its delivery to the Facility.

(c) The laws of the Commonwealth shall govern the validity, interpretation, construction and performance of this Agreement.

(d) All notices pertaining to this Agreement shall be in writing, shall be deemed delivered (i) if personally delivered or (ii) within two (2) days after having been transmitted by prepaid registered or certified mail, return receipt requested, addressed as follows:

If to the Town:

Town Administrator
455 Concord Avenue
Belmont, Ma 02478

If to WNA:

Wheelabrator North Andover Inc.
285 Holt Road
North Andover, MA 01845
Attn: Plant Manager

Changes in the respective addresses to which such notices shall be sent may be made from time to time by either party by notice to the other party.

(e) All prior agreements, understandings and negotiations pertaining to the subject matter hereof for the term hereof are merged herein and superseded hereby, there being no other agreement or understanding than those written or specified herein. The parties acknowledge and agree that on and after the execution and delivery of this Agreement by the parties hereto neither party shall have any obligation pursuant to the Article XI.2 of the Service Agreement dated as of April 8, 1981, between WNA and the Town and that such provision shall be null and void as of the date of execution and delivery hereof by such parties.

(f) If any provision of this Agreement is held invalid by any court or body of competent jurisdiction, the remainder of this Agreement shall remain in full force and effect to the greatest extent permitted by law.

(g) No custom, act, forbearance, or words or silence at any time, gratuitous or otherwise, shall impose any additional obligation or liability upon either party or waive or release either party from any default or the performance or fulfillment of any obligation or liability or operate against either party as a supplement, alteration or amendment or change of any term or provision unless set forth in a written instrument duly executed by such party expressly stating that it is intended to impose such an additional obligation or liability or to constitute such a waiver or release, or that it is intended to operate as such a supplement, alteration, amendment or change.

(h) All rights and remedies of each party shall be cumulative and not alternative, in addition to and not exclusive of any other right or remedy to which such party may be lawfully entitled in case of any breach or threatened breach of any term or provision herein except as otherwise expressly provided herein. The rights and remedies of each party shall be continuing and not exhausted by any one or more uses thereof, and may be exercised at any time or from time to time and as often as may be expedient. Any option or election to enforce any such right or remedy of each party may be exercised or changed at any time or from time to time.

15. Prohibited Contracts. WNA agrees that it will not enter into a Prohibited Contract (as defined below) that contains a lower tipping fee than the then current Tipping Fee unless WNA offers the Town the opportunity to amend this Agreement to reduce the Town's then current Tipping Fee to such lower tipping fee.

For the purposes of this Section 15, a "Prohibited Contract" shall mean a new contract or an extension or amendment of an existing contract (i) with a municipality located within a 40 mile driving distance of the Facility, (ii) with an effective date prior to June 1, 2010, (iii) where, if a new contract, the term is not less than two (2) and not more than five (5) years, and if an amendment or extension, the extension period or term added by the amendment is not less than two (2) and not more than five (5) years, and (iv) on terms

which are substantially similar to the terms set forth in this Agreement, provided however that an amendment or extension of an existing contract not requiring the consent of both parties shall not be considered a Prohibited Contract.

WITNESS the execution hereof as an instrument under seal, as of the day and year first above written.

TOWN OF BELMONT, MASSACHUSETTS

By: _____

_____

_____

Its: Board of Selectmen

WHEELABRATOR NORTH ANDOVER INC.

By: _____

Its: Vice President

Approved as to form:

By: Kopelman and Paige / RTM

Its: Town Counsel

Under the Provisions of MGL, Ch 44, Sec 31C, I hereby certify that an appropriation in the amount of this contract or order is available therefore and that an officer or agent of the Town of Belmont has been authorized to execute this contract and approve all requisitions and change orders, up to $3,500,000.

_____

Barbara Hagg, Town Accountant

Contract NO. 2010 - 19
Account No. 14332-529500

EXHIBIT I
INSURANCE

A. During the term of this Agreement, the Town or any hauler delivering Acceptable Waste to the Facility on behalf of the Town shall keep in force the following insurance coverages:

Coverages	Limits of Liability	
Workers' Compensation Insurance	Statutory	
Employers' Liability Insurance	Per Occurrence	$1,000,000
Comprehensive General Liability Insurance, including contractual and products/completed operations	Per Occurrence	$1,000,000
	General Aggregate	$2,000,000
Comprehensive Automobile Liability Insurance, including non-owned and hired vehicle coverage	For bodily injury and property damage Per Occurrence	$1,000,000
Comprehensive Excess Umbrella	Per Occurrence	$4,000,000

The Town's insurance shall be primary with respect to any insurance maintained by WNA and shall not call on WNA's insurance for contributions with respect to the Town's contractual liability.

Before commencement of disposal hereunder and annually thereafter, the Town shall furnish to WNA certificates of insurance to the effect that such insurance has been procured and is in force. The certificates shall contain the following express obligation:

"This is to certify that the policies of insurance described herein have been issued to the insured for whom this certificate is executed and are in force at this time. In the event of cancellation or material change in policy effecting the certificate holder, thirty (30) days prior written notice will be given the certificate holder."

B. During the term of this Agreement, WNA shall keep in force the following insurance coverages:

Coverages	Limits of Liability	
Workers' Compensation Insurance	Statutory	
Employers' Liability Insurance	Per Occurrence	$1,000,000
Comprehensive General Liability Insurance, including contractual and products/completed operations	Per Occurrence	$1,000,000
	General Aggregate	$2,000,000
Comprehensive Automobile Liability Insurance, including non-owned and hired vehicle coverage	For bodily injury and property damage Per Occurrence	$1,000,000
Comprehensive Excess Umbrella	Per Occurrence	$4,000,000

WNA's insurance shall be primary with respect to any insurance maintained by the Town and shall not call on the Town's insurance for contributions with respect to WNA's contractual liability.

Before commencement of disposal hereunder and annually thereafter, WNA shall furnish to the Town certificates of insurance to the effect that such insurance has been procured and is in force. The certificates shall contain the following express obligation:

"This is to certify that the policies of insurance described herein have been issued to the insured for whom this certificate is executed and are in force at this time. In the event of cancellation or material change in policy effecting the certificate holder, thirty (30) days prior written notice will be given the certificate holder."

Wheelabrator North Tipping Fees
FY11 -FY15

Outside Disposal: 14332-529500

Dates	Tipping Fee / Ton	Estimated Tonnage	Dollar Value
July 1, 2010 - Juune 30, 2011	$66.00	10,000	$660,000.00
July 1, 2011 - Juune 30, 2012	$68.00	10,000	$680,000.00
July 1, 2012 - Juune 30, 2013	$70.00	10,000	$700,000.00
July 1, 2013 - Juune 30, 2014	$72.00	10,000	$720,000.00
July 1, 2014 - Juune 30, 2015	$74.00	10,000	$740,000.00
Total Value of Contract:		3,500,000	

Revere, Massachusetts Agreement with Wheelebrator-Saugus Waste-to-Energy Facility

The City of REVERE, MASSACHUSETTS
Office of the Mayor
281 Broadway, Revere, MA 02151
(781) 286-8110 Fax (781) 286-8199

THOMAS G. AMBROSINO
Mayor

June 25, 2009

Mr. John O'Rourke, Plant Manager
Wheelabrator Saugus, Inc.
100 Salem Turnpike
Saugus, Massachusetts 01906-1899

Re: *First Amendment to Service Agreement*

Dear Mr. O'Rourke:

Enclosed you will find four (4) signed originals of the First Amendment to Service Agreement which we discussed yesterday. I understand that, based upon this Agreement, the City's Base Tipping Fee shall be reduced to $71.00 per ton effective July 1, 2009.

Please have an appropriate Wheelabrator representative sign the agreements and return two originals to me.

Yours truly,

Thomas G. Ambrosino
Mayor

Enclosures
Cc: City Clerk John Henry
DPW Superintendent Donald E. Goodwin, Jr.
Ms. Paula Martin

FIRST AMENDMENT TO SERVICE AGREEMENT

THIS FIRST AMENDMENT TO SERVICE AGREEMENT is made and entered into as of June 25, 2009 by and among WHEELABRATOR SAUGUS INC. (the "Company"), a Delaware corporation and successor-in-interest to Refuse Energy Systems Company, J.V., and the CITY OF REVERE, MASSACHUSETTS, a body politic and corporate organized under the laws of the Commonwealth of Massachusetts (the "Municipality").

WITNESSETH:

WHEREAS, the Company and the Municipality are parties to that certain Agreement for Services, dated as of July 10, 1995 (the "Original Agreement"), pursuant to which the Company accepts Acceptable Waste delivered by or on behalf of the Municipality for disposal at its resource recovery facility located in Saugus, Massachusetts. Capitalized terms not otherwise defined herein shall have the meaning assigned to them in the Original Agreement; and

WHEREAS, as an incentive for the Municipality to agree to extend the Initial Term of the Original Agreement for an additional five (5) year period, the Company has offered to reduce the Base Tipping Fee for the remainder of the Term of the Original Agreement (i.e., July 1, 2009 through December 31, 2009) as provided herein; and

WHEREAS, the parties now wish to amend the Original Agreement as provided herein.

NOW, THEREFORE, in consideration of the foregoing premises, and the mutual conditions and covenants contained herein, the parties hereto, intending to be legally bound, do hereby agree as follows:

1. Amendment to Section 5.2:

Section 5.2 of the Original Agreement is hereby amended by the addition of the following new Section 5.2.e.

"e. Effective July 1, 2009, for the period between July 1, 2009 and December 31, 2009, the current Base Tipping Fee shall be reduced from $78.06 to $71.00, and, notwithstanding anything herein to the contrary, for such period this Base Tipping shall not be increased except in connection with a Change in Law pursuant to Section 5.6.

The Base Tipping Fee for the remainder of the Initial Term shall be as follows:

January 1, 2010 through December 31, 2010: $71.00 per ton
January 1, 2011 through December 31, 2011: $71.00 per ton
January 1, 2012 through December 31, 2012: $73.00 per ton

January 1, 2013 through December 31, 2013: $75.00 per ton
January 1, 2014 through December 31, 2014: $77.50 per ton

Notwithstanding anything herein to the contrary, these Base Tipping Fees shall not escalate or increase except in connection with a Change in Law pursuant to Section 5.6, and shall otherwise remain fixed for the time periods specified above. In addition, notwithstanding anything to the contrary in Section 5.2.b, the Company shall not be obligated to provide any Comparative Statements during the periods specified above."

2. Amendment to Section. 6.1

Section 6.1 of the Original Agreement is hereby deleted in its entirety and the following shall be inserted in lieu thereof:

"6.1 This Agreement shall begin on the date of the execution hereof and shall have an Initial Term of twenty (20) years from the Start-up Date."

3. Effectiveness of Original Agreement

Except as specifically amended herein, all of the terms and conditions of the Original Agreement shall remain in full force and effect.

WITNESS the execution hereof as an instrument under seal, as of the day and year first above written.

CITY OF REVERE, MASSACHUSETTS

By:_____

Its: Mayor

WHEELABRATOR SAUGUS INC.

By:_____

Its: Vice President

Worcester, Massachusetts Agreement with Wheelebrator-Millbury Waste-to-Energy Facility

WHEELABRATOR MILLBURY INC.
WASTE DISPOSAL AGREEMENT

THIS AGREEMENT (this "Agreement"), made and entered into this 28th day of June, 2006, by and between Wheelabrator Millbury Inc., a Delaware corporation, with a business address at 331 Southwest Cutoff Road, Millbury, MA 01527 ("WMI"), and the City of Worcester, a body politic and corporate existing as a political subdivision of the Commonwealth of Massachusetts, acting by and through its City Council and City Manager (the "City").

W I T N E S S E T H:

WHEREAS, WMI operates a resource recovery facility located in Millbury, Massachusetts (the "Facility") for the purposes of receiving and disposing of Acceptable Waste (as defined herein) by the process of combustion, generating electricity thereby, and disposing of residue therefrom;

WHEREAS, the City is desirous of securing a long-term disposal option for all of the Acceptable Waste generated within the City;

WHEREAS, the City and WMI are desirous, for mutual considerations, of entering into a long-term contractual relationship pursuant to which the City will deliver or cause to be delivered to the Facility, and WMI will accept at the Facility, Residential Acceptable Waste (as defined herein);

NOW THEREFORE, in consideration of the foregoing premises, and the mutual conditions, covenants and promises contained herein, the parties hereto, intending to be legally bound, do hereby agree as follows:

SECTION I

DEFINITIONS

1. "Acceptable Waste" means all household or municipal garbage, trash, rubbish, refuse, normally or which may be hereinafter collected and disposed of by or on behalf of the City, but excluding, without limitation, (a) Hazardous Waste, explosives and ordnance materials, pathological wastes, radioactive materials, lead acid batteries, sludges, highly inflammable

substances, cesspool or other human wastes, human and animal remains, motor vehicles, farm or other large machinery, non-burnable construction materials and demolition debris and hazardous refuse of any type or kind including those addressed by regulations adopted by the United States Environmental Protection Agency ("EPA") pursuant to the Resource Conservation and Recovery Act of 1976, as amended, or other federal or state statutes, such as, but not limited to, cleaning fluids, hazardous paints, acids, caustics, poisons, radioactive materials, fine powdery earth used to filter cleaning fluid, and refuse of similar nature; (b) unless consented to by the Facility's plant manager, any item of waste exceeding six (6) feet in any one of its dimensions or being in whole or in part a solid mass, the solid mass portion of which has dimensions such that a sphere with a diameter of eight (8) inches could be contained within such solid mass portion; (c) all large household appliances, commonly referred to as "white goods" including, without limitation, refrigerators, stoves, washing machines, drying machines, water heaters, and the like; (d) any controlled substances regulated under the Controlled Substances Act, 21 USC 801 et seq., or any equivalent state law; (e) any material that a waste-to-energy facility cannot accept pursuant to any waste bans designated by the Commonwealth of Massachusetts pursuant to 310 CMR 19.017 et seq. (the "Waste Bans"); (f) small appliances containing chlorofluorocarbons (CFCs) including, without limitation, air conditioners, water coolers, and dehumidifiers; (g) tires and cathode ray tubes (in each case in excess of a de minimis amount); and (h) upon notice to the City by WMI, all other items of waste which WMI reasonably believes would be likely to pose a threat to health or safety or the acceptance and disposal of which may cause damage to the Facility or be in violation of any judicial decision, order, action, permit, authorization, license, approval or registration of any federal, state or local government or any agency thereof, or any other regulatory authority or applicable law or regulations. Any substances which are determined by the EPA or any other federal, state, or local agency subsequent to the date hereof to be hazardous, toxic, dangerous, harmful, or otherwise designated as a "waste ban," shall, at the time of such determination, cease to be Acceptable Waste.

2. "Affiliate" means, with respect to any person, corporation, firm or entity, any person, corporation, firm or entity which, directly or indirectly, controls or is controlled by or is under common control with such person, corporation, firm, or entity.

3. "Anniversary Date" for the purposes of Tipping Fee escalation is as defined in Section V.2.

4. "Base Date" for the purposes of Tipping Fee escalation is as defined in Section V.2.(a).

5. "BTF" (Base Tipping Fee) for the purposes of Tipping Fee escalation is as defined in Section V.2.

6. "Central Massachusetts Resource Recovery Committee Communities" means the Massachusetts municipalities set forth on Appendix I attached hereto.

7. "Change in Law" means any event or condition listed in subsection (a) hereof demonstrated to have, or which may upon showing of reasonable basis be expected to have, an adverse effect on a party, or on a party's ability to perform pursuant to this Agreement, or on the Facility or the Facility site, or the Facility's Residue Landfill, or the operation of any or all of them, if such event or condition is beyond the control of the party and not the result of any willful or negligent act of the party as justification for not performing any obligation or complying with any condition required of such party under this Agreement.

(a) Change in Law shall include:

(i) the adoption, promulgation, issuance, modification, or official change in interpretation after the date of this Agreement of any federal, state or local law, regulation, rule, requirement, ruling or ordinance that was not on or prior to such date duly adopted, promulgated, issued or otherwise officially modified or changed in interpretation, in each case in final form, to become effective without any further action by any federal, state, or local governmental body, administrative agency or governmental official having jurisdiction;

(ii) the order, judgment, policy decision, or guidance of any federal, state or local court, administrative or regulatory agency, or governmental officer or body entered subsequent to the date of this Agreement; or

(iii) the suspension, termination, interruption or failure of renewal of any permit, license, consent, authorization, or approval essential to the operation, ownership or possession of the Facility, the Facility site or the Facility's Residue Landfill as provided for herein or required with respect hereto.

(b) Notwithstanding the foregoing, a "Change in Law" shall not include the following:

(i) Occupational Safety and Health Administration (OSHA) standards or regulations applicable to a broad range of businesses or industrial facilities in the United States and not limited to solid waste industry businesses or facilities;

(ii) the Solid Waste Management Facility Regulations, 310 CMR 19.00, as of October 7, 2005, attached hereto as Appendix II;

(iii) any state law outside of the Commonwealth of Massachusetts except as applicable to the Facility's Residue Landfill; and

(iv) a Change in Law pertaining to WMI's income taxes or other taxes applicable to a broad range of businesses or industrial facilities in the United States and not limited to solid waste industry businesses or facilities.

8. "Change in Law Invoice" means the annual invoice provided to the City for Change in Law costs as set forth in Section XII.2.

9. "Contract Year" means a one-year period beginning each year on July 1 and ending on June 30 of the following year; provided, however, that the first Contract Year (the "Initial Contract Year") shall begin on January 1, 2008 and end on June 30, 2008.

10. "CPI" (Consumer Price Index) for the purposes of Tipping Fee escalation is as defined in Section V.2.

11. "CPI_B" (Base Date Consumer Price Index) for the purpose of Tipping Fee escalation is as defined in Section V.2.

12. "CPI_X" (Anniversary Date Consumer Price Index) for the purpose of Tipping Fee escalation is as defined in Section V.2.

13. "Environmental Laws" means (i) all statutes, regulations, rules, ordinances, codes, licenses, permits, orders, decrees, approvals, plans, authorizations, policies, and similar items (whether previously existing, now existing or hereafter enacted, amended, promulgated or issued, and whether or not contemplated by the parties as of the date of this Agreement) of the United States, the Commonwealth of Massachusetts or any political subdivision thereof or of any agency, department, commission, board, bureau or other instrumentality of any of them, (ii) all binding and final judicial and administrative decrees, judgments and orders (whether previously existing, now existing or hereafter enacted, amended, promulgated, or issued, and whether or not contemplated by the parties as of the date of this Agreement), and (iii) any common law theories

of liability applicable to claims, demands, requirements, damages, costs or expenses, in each case relating to or addressing the pollution, contamination, protection, or remediation of the environment or the protection or restoration of natural resources.

14. "Facility's Residue Landfill" means the ash landfills located in Shrewsbury, Massachusetts and Putnam, Connecticut, or any other landfill owned by Waste Management, Inc. or its subsidiaries in New England that is capable of accepting ash residue from the Facility and that has accepted for disposal at least 60% of the total ash generated by the Facility in the prior fifteen (15) months immediately preceding a Change in Law event.

15. "Force Majeure Event" means any act, event, or condition that is beyond the reasonable control of, and is not also the result of the willful or negligent act, error or omission, failure to exercise reasonable care or diligence, or breach of this Agreement on the part of the party relying thereon as justification for not performing an obligation or complying with any condition required of such party under this Agreement, and that materially interferes with or materially increases the cost of performing its obligations hereunder or reduces its revenues hereunder. Such acts or events may include, but not be limited to, the following:

(i) an act of God, epidemic, landslide, lightning, earthquake, fire or explosion, storm, flood, an act of war or of the civil or military authorities, civil disturbance, strike, lockout, work slowdown, or similar industrial or labor action or any other similar occurrence;

(ii) the failure of the communities in which the Facility or the Facility's Residue Landfill is situated or the appropriate federal or state agencies or public or private utilities having operational jurisdiction over the Facility or the Facility's Residue Landfill to provide and maintain all utilities, services, sewerage and water lines essential to the operation of the Facility or the Facility's Residue Landfill ; or

(iii) Change in Law.

Notwithstanding the foregoing, none of the following acts, events, or circumstances shall constitute a Force Majeure Event:

(a) any act, event or circumstance that would not have occurred if the affected party had complied with its material obligations under this Agreement and such failure to comply was not caused by a Force Majeure Event;

(b) changes in interest rates, inflation rates, labor costs, energy prices, commodity prices, currency values, exchange rates, or other general economic conditions;

(c) changes in the financial condition of the City, WMI, the Guarantor, or their affiliates affecting the ability to perform their respective obligations; or

(d) union or labor work rules or requirements that have the effect of increasing the number of employees employed at the Facility or otherwise increasing the cost to WMI of performance hereunder (but excluding strikes, lockouts, work slowdowns, or similar industrial or labor actions or any other similar occurrence which may be considered a Force Majeure Event).

16. "Guaranteed Annual Tonnage" means that tonnage more particularly described in Section II.

17. "Guarantor" means Waste Management, Inc. or a successor guarantor pursuant to Section XIV.

18. "Guaranty" means the guarantee required to be provided by WMI pursuant to Section XIV.

19. "Hazardous Waste" means (a) any waste defined as a hazardous waste in 40 CFR Part 261 or in any applicable state or local hazardous waste regulatory program; (b) any waste that is mixed with a listed hazardous waste as regulated in 40 CFR Part 261.3(a)(v)(2)(iv) or any applicable state or local hazardous waste regulatory program; (c) any waste containing polychlorinated biphenyls in concentrations that are subject to regulation under the federal Toxic Substances Control Act; (d) any waste containing radioactivity at levels that are subject to regulation under federal, state, or local law; or (e) any other waste that is regulated as a hazardous waste by any applicable federal, state, or local statutory or common laws, regulations, rules, or ordinances.

20. "Recycle" means to recover or reclaim from the waste stream, at the source prior to collection, materials or by-products that are to be (i) reused, (ii) employed as an ingredient or a feedstock in an industrial or manufacturing process to make a product, or (iii) employed in a particular function or application as an effective substitute for a commercial product or commodity; provided, however, that to Recycle does not mean to deliver such materials or by-products to a landfill or to any Third Party for disposal or to recover energy from the combustion of such materials or by-products.

21. "Residential Acceptable Waste" means that Acceptable Waste generated within the City collected by or on behalf of the City the source of which is residential households located in

the City, municipal buildings located in the City, and small businesses that are municipally collected and located in the City.

22. "Service Fees" means the monthly fees payable by the City to WMI as set forth in Section V.

23. "Shortfall Fees" means the fees payable by the City to WMI as a result of a Tons Shortfall in a Contract Year as more particularly described in Section V.3.

24. "Third Party" means any natural person, corporation, association, or partnership, and any governmental agency, department, commission, board, bureau, or other instrumentality, other than WMI, any Affiliate of WMI, or the City.

25. "Tipping Fee" means the cost per ton for disposing of quantities of Acceptable Waste at the Facility as set forth in Section V.

26. "TF_x" (Tipping Fee as adjusted) for the purposes of Tipping Fee escalation is as defined in Section V.2(b).

27. "Ton" means a "short ton" of 2,000 pounds.

28. "Tonnage" means Tons of Residential Acceptable Waste.

29. "Tons Shortfall" means that tonnage quantity by which the Guaranteed Annual Tonnage exceeds the actual tonnage delivered in a Contract Year as more particularly described in Section V.

SECTION II

GUARANTEED DELIVERY AND ACCEPTANCE OF ACCEPTABLE WASTE

1. Commencing January 1, 2008, the City shall deliver or cause to be delivered, and WMI agrees to accept, subject to the terms and conditions set forth herein, all Residential Acceptable Waste that is not Recycled in each Contract Year.

2. In the event that the City does not directly provide for and control the collection and disposal of all its Residential Acceptable Waste, the City shall deliver a number of Tons of Residential Acceptable Waste per Contract Year, designated by the City by July 31 of each Contract Year (January 1, 2008 in the Initial Contract Year), in an amount not less than 90% and not more than 110% of the average number of Tons of Residential Acceptable Waste delivered by the City to the Facility and accepted by WMI in the three (3) calendar years immediately preceding the date hereof (in the Initial Contract Year, such amount shall be multiplied by .5) or

the date on which the City no longer provides for such collection and disposal if the City is doing so on the date hereof but ceases doing it hereafter (the "Guaranteed Annual Tonnage"); provided, however, if the City fails to provide WMI with the Guaranteed Annual Tonnage amount for any Contract Year by July 31 of such Contract Year, the Guaranteed Annual Tonnage amount shall be equal to the average number of Tons of Residential Acceptable Waste delivered by the City to the Facility and accepted by WMI in the three (3) calendar years immediately preceding the date hereof or the date on which the City no longer provides for such collection and disposal if the City is doing so on the date hereof but ceases doing it hereafter. Notwithstanding the foregoing, the City may only reduce its Guaranteed Annual Tonnage by an amount not to exceed twenty-five percent (25%) of the City's initial Guaranteed Annual Tonnage throughout the term of this Agreement.

3. To the extent the City does not have a Guaranteed Annual Tonnage obligation under Section II.1, WMI shall have the right to audit the City's waste supply information and procedures to ensure that the City is delivering all its Residential Acceptable Waste that is not Recycled to the Facility.

4. Should any Waste Bans imposed by a Change in Law, or the City's participation in a Commonwealth of Massachusetts approved program of residential source separation of recyclable materials, substantially reduce the City's waste stream, the City and WMI agree to meet and negotiate in good faith a reasonable and appropriate reduction to the City's Guaranteed Annual Tonnage.

SECTION III

REFUSAL TO ACCEPT DELIVERIES

1. WMI shall have the right to refuse deliveries of the following types or categories of waste (but may, if possible or practical, reject partial loads), and the City shall remove and dispose of, at its sole cost, any such waste delivered by or on behalf of the City which is so rejected by WMI:

(a) waste other than Residential Acceptable Waste;

(b) any waste delivered at other than the established receiving hours as set forth herein;

(c) any waste delivered by the City in a manner or by means not in conformity with the requirements of this Agreement; or

(d) any or all waste which WMI is unable to accept as the result of a Force Majeure Event.

2. (a) WMI may also refuse delivery of any and all Residential Acceptable Waste delivered by the City for reasons other than those identified in Section III.1 including Residential Acceptable Waste it is unable to process due to WMI's fault or negligence. In such event, WMI shall be liable to the City, as WMI's sole liability, as specified in Section III.2(b) below.

(b) For any or all Residential Acceptable Waste delivered by the City in accordance with this Agreement and rejected by WMI, or diverted by WMI, in either case pursuant to Section III. 2(a), the City agrees to pay to WMI the per Ton Tipping Fee set forth in Section V.2, and to deliver such Tonnage to an alternative disposal site designated by WMI, and WMI agrees to pay the tipping fee cost of disposal at such designated alternative disposal site, and reimburse the City for the direct reasonable and necessary incremental cost of transportation of such Residential Acceptable Waste to the alternative disposal site in excess of the cost of transportation of an equal amount of such Residential Acceptable Waste to the Facility.

3. WMI agrees that, during the period of any inability or refusal to accept Residential Acceptable Waste pursuant to Section III.1(d) and Section III.2, the City shall be considered to have delivered to the Facility, for purpose of determining whether the City has satisfied its Guaranteed Annual Tonnage commitment (to the extent applicable under Section II.1), the number of Tons diverted to the alternate disposal site based on the alternate disposal site's weight records or, if such records are not available, a pro rata portion of the City's Guaranteed Annual Tonnage commitment as allocable to the period of WMI's inability or refusal less any Tonnage accepted by WMI during such period (but in no case less than zero); provided, however, the City shall use all reasonable efforts to supply excess quantities of Residential Acceptable Waste to WMI upon WMI's reasonable request, and at the times requested, once a Force Majeure Event which prevented WMI from accepting Residential Acceptable Waste pursuant to Section III.1(d) has been remedied or when WMI removes or remedies the cause of its refusal to accept such Acceptable Waste pursuant to Section III.2(a).

4. Notwithstanding the foregoing:

(a) During any period which WMI is unable to accept and process Residential Acceptable Waste at the Facility due to a Force Majeure Event, WMI will, at its expense, promptly, diligently, and in good faith use reasonable efforts to take all action reasonably necessary for it to be able to accept and process such Residential Acceptable Waste including, without limitation, all actions reasonably necessary to obtain any temporary restraining orders, preliminary or permanent injunctions, approvals, licenses or permits needed to resume acceptance and processing of such Residential Acceptable Waste and any reasonable repairs or other improvements to the Facility and any reasonable modifications to the operation thereof required for such purpose. WMI shall, during any such period, keep the City duly notified (not less often than monthly) of all such actions, and the expected duration of any such period, and shall permit the City to participate and intervene where permissible, at the City's expense, in all such actions if the City so desires; provided, however, that WMI shall have the sole right to direct the prosecution of any such action and the City shall reasonably cooperate with WMI in connection therewith and not do anything in the course thereof contrary to the interests of WMI.

(b) If as a result of a Force Majeure Event the capacity of the Facility to accept and process Residential Acceptable Waste is reduced but not completely suspended, WMI shall allocate a portion of such reduced capacity of the Facility to the City pro rata based on the City's Guaranteed Annual Tonnage (if applicable under Section II.2) or the average number of Tons of Residential Acceptable Waste delivered by the City to the Facility and accepted by WMI in the three (3) years immediately preceding the date of the Force Majeure Event. WMI shall not accept any waste under any new contracts for the disposal of Acceptable Waste at the Facility subsequent to the occurrence of such Force Majeure Event until the capacity of the Facility is sufficient to accept and process all Residential Acceptable Waste delivered by the City in accordance with this Agreement.

SECTION IV

MANNER OF DELIVERY AND WEIGHING

1. The City shall deliver or cause to be delivered only Residential Acceptable Waste to the Facility, and shall deliver or cause the Residential Acceptable Waste to be delivered, in a clean, orderly, and safe manner, including, without limitation, in such a manner that it will not be spilled, other than on the tipping floor, or blown on the Facility site. If the City fails to cause such

deliveries of Acceptable Waste to be undertaken in such a manner, the City shall promptly, at its sole cost, remedy such failure including collecting and removing any spilled or blown Acceptable Waste. If the City fails to do so, the City shall be liable to WMI for all costs of such cleanup by WMI.

2. The City shall adhere to, and shall require haulers delivering on behalf of the City to adhere to, all reasonable and applicable safety rules and regulations as made known to the City by WMI at all times while the City or the City's hauler's vehicles or personnel are on the Facility premises, including the Hauler Safety Rules attached hereto as Appendix III and WMI's Tipping Floor Policy attached hereto as Appendix III-2. In addition, the City shall execute, and shall, if applicable, cause its haulers to execute, the Hauler's Safety Declaration attached hereto as Appendix III-1. The City shall pay WMI all costs, damages, or expenses arising out of the City's or its employees', contractors', haulers', or agents' negligent or willful failure to comply with such safety rules or regulations, or its or their failure to supply only Residential Acceptable Waste to the Facility.

3. The City shall deliver Residential Acceptable Waste only during WMI's scheduled delivery days and hours. Unless modified in writing by WMI, WMI scheduled delivery days and hours shall be 6:00 a.m. to 5:00 p.m., Monday through Friday, and 7:00 a.m. to 3:00 p.m. on Saturday, exclusive of Christmas, New Year's Day (January 1), Memorial Day, Independence Day (July 4), Labor Day, and Thanksgiving. There shall be no deliveries accepted at other hours unless agreed upon in advance by the parties hereto; provided, however, WMI shall use reasonable efforts to accept deliveries at other hours in the event that extreme weather conditions have prevented the City from making routine deliveries as contemplated herein subject to local approval.

4. The City shall cause all vehicles used for deliveries of Residential Acceptable Waste to the Facility to be in safe and clean condition, in good repair, and in compliance with all applicable law. The City shall only use vehicles with the capability of mechanically dumping directly into the Facility waste pit, and which have a capacity of one-half (1/2) ton or more. Such vehicles shall contain adequate identification so that WMI can determine the source of the Residential Acceptable Waste being delivered to the Facility. WMI shall use reasonable efforts, to the extent practicable, to operate the Facility in a manner that limits wait times at the Facility.

5. WMI shall utilize and maintain motor truck scales, certified as required by law, to weigh all vehicles delivering Residential Acceptable Waste to the Facility. Each vehicle shall be weighed, and a weight record will be generated reflecting the vehicle's gross weight, tare weight, time, and truck identification. Such records shall be used by WMI as a basis for calculating monthly and yearly deliveries made by the City. WMI reserves the right to modify the above arrangement with any other systems which perform essentially the same functions and which are not unreasonably burdensome to the City. In addition, WMI shall have the right to require the City and the City's haulers to attach any equipment or device to their vehicles as is reasonably necessary to enable WMI to comply with this Section IV.5 at WMI's expense.

6. WMI shall maintain, for a period no less than six (6) years, records of the tonnage delivered on the City's behalf and accepted by WMI each day. The City shall have the reasonable right to review such weight records at the Facility during normal Facility business hours upon no less than 24 hours' notice to WMI of the City's desire to conduct such a review, and in such a manner as to not interfere with the Facility's orderly operation. In addition, a record of each load shall be included in WMI's monthly invoice to the City.

7. WMI agrees to calibrate its truck scales at least two (2) times per calendar year. WMI commits to adjust the accuracy of the truck scales in accordance with applicable law within fifteen (15) days of the date upon which its truck scales are determined to be inaccurate. Any truck scale found to be inaccurate shall be placed out of service until it is calibrated.

SECTION V
SERVICE FEES

1. In consideration of WMI's services or the availability of WMI's services hereunder, WMI shall be entitled to receive Service Fees from the City. The City shall plan and budget for the anticipated costs of such Service Fees, plus a reasonable estimated contingency for additional costs, in any fiscal year budget throughout the term of this Agreement.

For every month the Service Fees shall be equal to (a) the Tipping Fee for that month (as defined in Section V.2 below) multiplied by the number of Tons of Residential Acceptable Waste actually delivered by or on behalf of the City and accepted by WMI at the Facility or otherwise disposed of by or at the direction of WMI for the City for that month; plus

(b) any other costs arising under this Agreement, including, without limitation, any interest charges due for late payment, and any amounts pursuant to Section XII.

2. (a) For all Residential Acceptable Waste delivered to and accepted at the Facility in accordance with this Agreement, or otherwise disposed of by or at the direction or cost of WMI, and regardless of whether such Residential Acceptable Waste was not actually delivered to and disposed of at the Facility so long as the City owes WMI a payment obligation thereof pursuant to this Agreement, the City shall pay WMI a Tipping Fee of Sixty Three Dollars ($63.00) per Ton as of the Base Date as adjusted for escalation on the Anniversary Date in accordance with Section V.2(b) hereunder. The Base Date shall be January 1, 2005, and the Anniversary Date shall be July 1 of each calendar year during the term of this Agreement, commencing July 1, 2008; provided, however, January 1, 2006, January 1, 2007, and January 1, 2008 shall also each be an Anniversary Date hereunder although the Tipping Fee as of January 1, 2008 shall not exceed Seventy Dollars and Fifty Cents ($70.50).

(b) The Tipping Fee set forth in Section V.2(a) shall be escalated on each Anniversary Date subsequent to the Base Date in accordance with the following formula:

$$TF_X = BTF\,[1 + (.75(\Delta\,CPI))]$$

Where:

TF_X = Tipping Fee as of the Anniversary Date in the computation year.

BTF = The Base Tipping Fee as of the Base Date.

$$\Delta\,CPI = \frac{CPI_X - CPI_B}{CPI_B}$$

Where:

CPI = CPI Urban Wage Earners and Clerical workers - Northeast Urban

CPI_B = The CPI published for September 2004 (197.7).

CPI_X = The CPI published for March in the computation year (September for the escalation on January 1, 2006, January 1, 2007, and January 1, 2008).

3. If applicable pursuant to Section II.1 hereunder, if the City fails to deliver the required Guaranteed Annual Tonnage in any Contract Year for reasons other than that WMI cannot accept delivery under Section III.1(d) and Section III.2, WMI may, in its sole discretion, assess Shortfall Fees against the City. The Shortfall Fees shall be equal to the difference between the Guaranteed

Annual Tonnage for such Contract Year and the number of Tons of Acceptable Waste delivered to the Facility in such Contract Year multiplied by the Tipping Fee in effect for such Contract Year. The Shortfall Fees shall be paid by the City to WMI within twenty-five (25) days of receipt of the annual settlement statement provided pursuant to Section VI.2 hereunder.

4. If applicable pursuant to Section II.1 hereunder, the City agrees that if the City delivers or causes to be delivered quantities of Acceptable Waste in excess of the Guaranteed Annual Tonnage in any Contract Year, and WMI agrees to accept such excess Tons, the City shall pay WMI 120% of the Tipping Fee in effect for such Contract Year for such excess Tonnage.

SECTION VI
PAYMENTS

1. WMI will invoice the City within ten (10) days after the end of each calendar month for the preceding month's deliveries. The City shall make payment to WMI of all invoiced amounts within twenty-five (25) days of the City's receipt of such invoice. All overdue payments from the City to WMI not received by WMI within thirty (30) days shall bear interest at the greater of 1% over the *Wall Street Journal*'s Prime Rate or the maximum interest rate permitted by applicable law.

2. Within sixty (60) days after the end of each Contract Year during the term of this Agreement, WMI shall deliver to the City an annual settlement statement, which shall show the computation of the Service Fees, Change in Law costs, and Shortfall Fees for the year and a reconciliation in reasonable detail of the Service Fees and Change in Law costs so computed with the amounts paid during the Contract Year (the "Annual Settlement Statement"). If the reconciliation is such that (i) the City has overpaid WMI, then WMI shall at the time of delivery of the Annual Settlement Statement refund the overpayment to the City, or (ii) the City has underpaid WMI, then the City shall, within twenty-five (25) days of receipt of the Annual Settlement Statement, pay to WMI the additional amount due. WMI waives the right to collect Shortfall Fees from the City if the Shortfall Fees are not included in the Annual Settlement Statement; provided, however, WMI shall have the right to correct any errors in Shortfall Fees listed in the Annual Settlement Statement without penalty to WMI.

3. The obligation of WMI and the City to pay the amounts to be paid by each party from time to time hereunder shall not be subject to diminution by reason of any shutdown of the

Facility, set-off, abatement, counterclaim, existence of a dispute, or any other reason, known or unknown, foreseeable or unforeseeable, which might otherwise constitute a legal or equitable defense or discharge of the liabilities of either party hereunder or limit recourse against either party. The foregoing provisions of this Section VI.3 shall not offset any right of either party to pursue independently any claim it might have against the other party based upon nonperformance by either party of its obligations hereunder.

SECTION VII

TERM

This Agreement shall become effective on the date hereof, and shall continue in full force and effect until December 31, 2027, unless this Agreement is otherwise terminated as provided herein; provided, however, that performance hereunder shall not commence until January 1, 2008. Notwithstanding anything to the contrary set forth herein, the City and WMI shall each have the right to terminate this Agreement effective December 31, 2017. Notice of such termination shall be provided in writing to the other party no later than December 31, 2015. It shall be a condition precedent to the effectiveness of the termination of this Agreement by WMI under this Section VII that WMI shall have also exercised its termination right under the waste disposal agreements with those Central Massachusetts Resource Recovery Committee Communities which contain the same termination provision as set forth in this Section VII and which are dated no later than June 1, 2006.

SECTION VIII

EVENT OF DEFAULT: TERMINATION

1. (a) Upon the occurrence of an Event of Default by WMI, the City shall have the right to terminate this Agreement or pursue a cause of action for actual damages, or both. The following shall constitute Events of Default by WMI:

(i) the unexcused failure of WMI or the Guarantor to perform or observe any of its material covenants, services, obligations or duties created by this Agreement;

(ii) the unexcused failure of WMI to make any payment due and payable under this Agreement;

(iii) the material falseness or inaccuracy of any representation or warranty made by WMI, if the legality of this Agreement or the ability of WMI to carry out its duties and obligations under this Agreement is thereby adversely affected;

(iv) the failure to provide and maintain current the insurance required to be provided by WMI hereunder or the Guaranty; or

(v) the commencement of any bankruptcy, insolvency, liquidation or similar proceeding by or against WMI or the Guarantor; the consent by WMI or the Guarantor to the appointment of or taking possession by a receiver, liquidator, trustee in bankruptcy or custodian of WMI or the Guarantor or any substantial part of their respective assets; or any assignment of all or substantially all of the assets of WMI or the Guarantor for the benefit of creditors; provided that in the case of commencement of an involuntary petition or proceeding or entry of a judgment or judicial order that includes or seeks to cause any of the above events, such petition, proceeding, judgment or order shall remain undischarged or undismissed for 120 days.

(b) Upon the happening of any event described in Section VIII.1(a)(i)-(v), the City may declare an Event of Default by providing written notice of such declaration and the event causing it to WMI setting forth in detail the alleged failure or deficiency of WMI. WMI shall have thirty (30) days after receipt of such written notice from the City to cure such failure or deficiency. If the failure or deficiency cannot reasonably be completed within thirty days, the preceding sentence shall be satisfied if within thirty (30) days, WMI shall have commenced to cure and shall continue to pursue such cure until the failure or deficiency is remedied, but in no case shall such period extend beyond 120 days from the date of receipt of such written notice. In the event that WMI does not cure such failure or deficiency within said thirty (30) day period (or extension as provided above), the City may terminate this Agreement for cause by providing written notice thereof to WMI.

2. (a) Upon the occurrence of an Event of Default by City, WMI shall have the right to terminate this Agreement or pursue a cause of action for actual damages, or both. The following shall constitute Events of Default by the City:

(i) the unexcused failure of the City to perform or observe any of its material covenants, agreements, obligations or duties created by this Agreement;

(ii) the unexcused failure of the City to make any payment due and payable under this Agreement;

(iii) the failure to provide and maintain current the insurance required to provided by the City hereunder;

(iv) the material falseness or inaccuracy of any representation or warranty made by the City, if the legality of this Agreement or the ability of WMI to carry out its duties and obligations under this Agreement is thereby adversely affected; or

(v) in the event the City shall make an assignment for the benefit of creditors, file a voluntary petition in bankruptcy, be adjudicated as bankrupt or insolvent, file any petition or answer seeking for itself any reorganization, arrangement, composition, readjustment, liquidation, dissolution or similar relief under any present or future statute, law or regulation, file any answer admitting or not contesting the material allegations of a petition filed against it in any such proceeding or seek or consent to or acquiesce in the appointment of any trustee, liquidator or receiver of it or of all or any substantial part of the properties of it.

(b) Upon the happening of any event described in Section VIII.2(a)(i)-(v), WMI may declare an Event of Default by providing written notice to the City setting forth in detail the alleged failure or deficiency of the City. The City shall have thirty (30) days after receipt of such written notice from WMI to cure such failure or deficiency. If the failure or deficiency is one that cannot reasonably be completed within thirty (30) days, the preceding sentence shall be satisfied if within thirty (30) days the City shall have commenced to cure and shall continue to pursue such cure until the failure or deficiency is remedied, but in no case shall such period extend beyond 120 days from date of receipt of such written notice. In the event that the City does not cure such failure or deficiency within said thirty (30) day period (or extension as provided above), WMI may terminate this Agreement by providing written notice thereof to the City.

3. Any obligation to pay any fixed sum of money that may have accrued and be due and payable hereunder, and the obligations contained in Sections IX, XI, and XV hereof, shall survive the termination or expiration of this Agreement.

SECTION IX

INDEMNIFICATION

1. To the extent permitted by law, WMI shall indemnify, defend, reimburse and hold harmless the City and its officers, employees and representatives from any and all threatened or actual claims, demands, suits and causes of action (collectively "Claims"), and all damages, penalties, costs and expenses (including, without limitation, attorney's fees) arising therefrom (collectively "Damages"), incurred as a result of (i) any act or omission by WMI in connection with the performance of its obligations under this Agreement, except to the extent that such Claims or Damages arise out of, or result from, the delivery to WMI by the City of any waste that does not constitute Acceptable Waste; (ii) injury to or death of any person (including, without limitation, persons employed by the City) or damage or destruction of property (including, without limitation, to the property of the City and Third Parties), to the extent arising out of, resulting from or in any way connected with the negligence or willful misconduct of WMI or its officers, employees and representatives; (iii) any act or omission of WMI or its officers, employees, and representatives under this Agreement that may result in any liability for the City under any Environmental Laws; (iv) breach of any obligation, covenant or undertaking of WMI contained herein; and (v) any misrepresentation or breach of warranty by WMI contained herein.

2. To the extent permitted by law, the City shall indemnify, defend, reimburse and hold harmless WMI and its officers, employees and representatives from any and all Claims and Damages incurred as a result of (i) the delivery to WMI by the City of any waste that does not constitute Acceptable Waste; (ii) injury to or death of any person (including, without limitation, persons employed by WMI) or damage or destruction of property (including, without limitation, to the property of WMI and Third Parties), to the extent arising out of, resulting from or in any way connected with the negligence or willful misconduct of the City or its officers, employees, representatives, contractors, and haulers; (iii) any act or omission of the City or its officers, employees, representatives, contractors, and haulers under this Agreement that may result in any liability for WMI under any Environmental Laws; (iv) breach of any obligation, covenant or undertaking of the City contained herein; and (v) any misrepresentation or breach of warranty by the City contained herein.

3. The obligations of a party to this Agreement (each an "Indemnitor") to indemnify, defend, reimburse and hold harmless the other party hereto and its officers, employees and

representatives (each an "Indemnitee") as set forth in Section IX.1 or IX.2 above shall not apply to:

(a) any Claims or Damages to the extent caused by the acts or omissions of the Indemnitee; or

(b) in the case where the Indemnitor has assumed the defense of a claim, any defense costs or expenses, including the costs of attorneys, consultants, and/or investigators, incurred by an Indemnitee, unless authorized in advance in writing by the Indemnitor

4. If the Indemnitee is presented with a claim by a Third Party, or an Indemnitee suffers a loss or damage that may be subject to indemnification or defense from the Indemnitor under this Agreement, the Indemnitee shall promptly give reasonable notice thereof to the Indemnitor, together with a complete copy of the Third Party claim (if any); provided, however, that the failure to promptly give such notice shall not relieve the Indemnitor from any liability for indemnification hereunder unless the Indemnitor is materially prejudiced in its ability to defend, settle or otherwise assert rights to reduce exposure to, such liability, claim, demand, cost or exposure.

5. After notification to the Indemnitor of any Third Party claim, if such claim is properly the subject of indemnification under this Agreement, the Indemnitor shall undertake the defense of such claim, at its expense, and using counsel selected by the Indemnitor, but reasonably satisfactory to the Indemnitee, even if the Indemnitor believes such claim is groundless. The Indemnitee may retain separate co-counsel at its sole cost and expense and participate in the defense of the Third Party claim. The Indemnitee shall cooperate in such defense at the Indemnitor's request and reasonable expense, including providing access to any of its employees, property and records for purpose of conducting an investigation of such claim and for the purpose of obtaining statements, photographs, and chemical analyses and taking such other steps as may be necessary to preserve evidence of the occurrence on which the claim is based.

6. The defense and indemnity provisions set forth above should not be interpreted or deemed to limit, in any way, any right of action which may be asserted by any party against publicly or privately created funds established for the purpose of satisfying, wholly or in part, claims asserted or perfected by such parties.

7. As long as the Indemnitor is conducting the defense of any Third Party claim, the Indemnitee will not consent to the entry of any judgment or enter into any settlement with respect

to a Third Party claim without the prior written consent of the Indemnitor, which consent shall not be unreasonably withheld.

SECTION X
INSURANCE

1. The City shall at all times during the term of this Agreement maintain, and shall cause any hauler delivering Acceptable Waste to the Facility on behalf of the City to maintain, in full force and effect the insurance coverages set forth in Appendix IV-1 which is attached and made a part hereof, and all other insurances as may be required by applicable law. In addition, the City shall comply, and shall cause any hauler delivering Acceptable Waste to the Facility on behalf of the City to comply, with the terms of Appendix IV-1. To the extent the City is self-insured, the City hereby represents and warrants that it is in compliance with all legal requirements with respect to its self-insured status. The City further represents and warrants that, should it no longer be self-insured or otherwise not be in compliance with all legal requirements with respect to its self-insured status, the City shall immediately notify WMI and immediately provide the coverages and comply with the requirements set forth in Appendix IV-1.

2. WMI shall, at all times during the term of this Agreement, maintain in full force and effect the insurance coverages set forth in Appendix IV-2 which is attached and made a part hereof, and all other insurances as may be required by applicable law.

SECTION XI
LIMITATION OF LIABILITY

Except for payment obligations contained in this Agreement, in no event, whether arising out of or in connection with either the performance or non-performance by either party of its obligations under this Agreement, shall either party be liable for or obligated to the other party in any manner to pay special, consequential, incidental, punitive, or indirect damages.

SECTION XII

FORCE MAJEURE EVENTS; CHANGE IN LAW

1. The performance of either party hereunder shall be excused if such party is reasonably precluded from performance by the occurrence of a Force Majeure Event. Such excuse of performance shall be only to the minimum extent reasonably forced on such party by such event and such party shall continue to perform all other responsibilities hereunder. In addition, WMI shall be excused, without cost or liability to the City, for failure or delay in performance of any obligation set forth in this Agreement including its obligation to accept Residential Acceptable Waste at the Facility by reason of a Force Majeure Event. This provision shall not, however, relieve a party from using reasonable efforts to overcome or remove a Force Majeure Event. Such failure or delay shall be excused at any time during which performance is prevented by such Force Majeure Event, and during such period thereafter as may be reasonably necessary for the party to correct the adverse effect of such Force Majeure Event, provided that the party shall use reasonable efforts to obtain a stay or appeal any Force Majeure Event constituting a Change of Law if, in the party's good faith judgment after consultation with counsel, such action is warranted. The party relying on a Force Majeure Event shall provide prompt notice of a Force Majeure Event to the other party and shall attempt to remedy with all reasonable dispatch the cause or causes constituting a Force Majeure Event; provided, however, the settlement of strikes, lock-outs, work slowdowns, and other similar industrial or labor actions, or legal actions or administrative proceedings, shall be entirely in the discretion of the party relying on a Force Majeure Event and such party shall not be required to make settlement of strikes, lockouts, work slow-downs and other similar industrial or labor actions or legal actions or administrative proceedings when such settlement is unfavorable, in the judgment of such party.

2. (a) (i) In the event that a Change in Law in any way increases WMI's capital cost, or its cost of operating, maintaining or owning the Facility or the Facility's Residue Landfill, or decreases the revenue generated by the Facility, the City shall pay WMI each year (y) an amount equal to the portion of the additional debt issued or equity contributed (including a reasonable return on such equity) if any, to finance the capital cost of such Change in Law amortized on a straight-line basis over the lesser of (A) the useful life of the capital equipment as determined by WMI using good and prudent engineering and industry standards or (B) fifteen (15) years , and/or (z) the increases in WMI's operating, maintenance or ownership costs, or decrease

in WMI's revenues for such year, each, as applicable, multiplied by a fraction the numerator of which is the City's Guaranteed Annual Tonnage (to the extent the City has a Guaranteed Annual Tonnage requirement under Section II.1) or the number of Tons of Acceptable Waste delivered by the City in the prior Contract Year, and the denominator of which is 465,000 (except during the Initial Contract Year in which case the denominator will be 232,000) (the "City's Percentage").

(ii) In the event that a capital modification required by a Change in Law results in a savings in operation and maintenance costs for WMI, WMI shall issue a credit to the City in the Annual Settlement Statement in an amount equal to the City's Percentage of such savings.

(iii) In no event shall (y) the City be required to pay WMI or be entitled to a credit from WMI for any costs or savings incurred by WMI after the expiration of this Agreement; or (z) the City be responsible for any Change in Law costs for the Facility's Residue Landfill in excess of the City's pro rata share of WMI's use of such landfill.

(b) Notwithstanding the provisions of Section XII.(2)(a) hereunder:

(i) Any amounts the City owes for any Change(s) in Law (other than Change(s) in Law related to taxes, fees or charges imposed by any governmental entity described in Section XII.2(e)) that occur during the period January 1, 2005 through June 30, 2015 (the "Change in Law Deferral Period") will be deferred until July 1, 2015. Commencing July 1, 2015, the City shall pay its portion of:

(A) any costs (capital and operation and maintenance) that arise after the Change in Law Deferral Period resulting from any Change(s) in Law during the Change in Law Deferral Period; and

(B) any costs (capital and operation and maintenance) resulting from any Change(s) in Law during the Change in Law Deferral Period that were deferred.

(ii) Any savings in operation and maintenance costs by WMI as a result of a Change in Law that occurs during the Change in Law Deferral Period shall also be deferred and credited to the City after the end of the Change in Law Deferral Period.

(iii) Any deferred costs for which the City is responsible, or deferred savings to which the City is entitled, arising during the Change in Law Deferral Period, shall be amortized over the term of this Agreement remaining after June 30, 2015, assuming the term of this Agreement is in force for its full 20 year term.

(iv) If the City or WMI terminates this Agreement effective December 31, 2017 pursuant to Section VII herein, the City shall not be liable for any such costs or entitled to any such savings otherwise payable after termination of this Agreement.

(v) The City shall not be responsible to pay WMI for the City's Percentage of any costs related to (y) a Change in Law resulting in WMI incurring an increase in operational and maintenances costs of less than $10,000 in any Contract Year; and (z) a Change in Law resulting in WMI incurring costs for a capital modification(s) of less than $75,000 in any Contract Year (the "Change in Law Threshold"). The Change in Law Threshold for any Contract Year shall no longer apply if, in such Contract Year, WMI has incurred, in the aggregate, $30,000 for operational and maintenance costs or $150,000 in capital modifications that were subject to the Change in Law Threshold. WMI and the City acknowledge that the Change in Law Threshold is not intended to act as a "deductible" and, accordingly, the Change in Law Threshold shall not apply in cases where a Change in Law results in WMI incurring an increase in operational and maintenance costs in excess of $10,000 per Contract Year or costs for a capital modification(s) in excess of $75,000 per Contract Year. In no event shall the Change in Law Threshold apply to any taxes or fees described in Section XII.2(e).

(c) WMI shall promptly notify the City of any capital modifications required to be made or increased operational and maintenance costs as the result of a Change in Law. WMI shall, as soon as practicable after request by the City, provide the City with (i) a description of the Change in Law; (ii) an explanation, supported by engineering analysis (if applicable), as to the need for a capital modification as a result of such Change in Law; and (iii) a reasonably detailed scope of work for the design of the capital modification. In addition, WMI shall, at the City's expense, make WMI's engineering consultants available to the City or the City's engineering consultants in the event that the City requests to review any materials prepared by WMI's engineering consultant. If the City disagrees that the capital modification is necessary or that the costs are reasonable, the City may invoke non-binding mediation in accordance with Section XVI.8, and thereafter binding dispute resolution in accordance with Section XVI.8, if necessary. Notwithstanding the foregoing, the City shall make all payments due to WMI as set forth in this Agreement pending any resolution of any dispute resolution proceeding.

(d) WMI shall use reasonable efforts to deliver to the City by June 1st and December 1st of each year an invoice reflecting such amounts (the "Change in Law Invoice") and

the City shall pay the Change in Law Invoice within twenty-five (25) days of the City's receipt of such invoice. To the extent that any estimates are used by WMI in the Change in Law Invoice, any necessary adjustments will be reflected in the Annual Settlement Statement.

(e) WMI shall also be entitled to a payment from the City equal to the City's Percentage of any increase in cost resulting from a Change in Law relating to taxes, fees, assessments or other charges, direct or indirect, levied or imposed by:

(i) The City and the municipal subdivisions in which the Facility is situated, and in which the Facility's Residue Landfill is located (but excluding any fees which WMI agrees to pay under a negotiated agreement with any such municipal subdivision); and

(ii) The United States, the Commonwealth of Massachusetts, or any governmental entity or authority.

(f) The City shall promptly notify WMI of any Change in Law that the City reasonably determines will result in a reduction in WMI's operational and maintenance costs. The City shall, together with such notice, provide WMI with (i) a description of the Change in Law; and (ii) an explanation, supported by engineering analysis, as to the manner in which WMI's operational and maintenance costs have been reduced by the Change in Law. In addition, the City shall, at WMI's expense, make the City's engineering consultants available to WMI or WMI's engineering consultants in the event that WMI requests to review any materials prepared by the City's engineering consultant. Thereafter, the City and WMI shall meet and negotiate in good faith a credit due to the City due to the Change in Law. If the parties cannot agree, the City may invoke non-binding mediation in accordance with Section XVI.8, and thereafter binding dispute resolution in accordance with Section XVI.8, if necessary.

3. If the City disputes WMI's statements or summaries as to the effect of a Force Majeure Event, the City shall have the right, at its sole cost, to insist upon an independent determination of such effect to be made by an independent Third Party mutually agreeable to the City and WMI. Such independent determination shall be final and binding upon the City and WMI.

4. If the Facility or any substantial portion thereof is shut down due to a Force Majeure Event for a period which equals or exceeds ninety (90) days, WMI may, at any time on or after such ninetieth (90th) day, (a) upon not less than fourteen (14) days notice to the City assign this Agreement to the operator of an alternate disposal site that is lawfully permitted and operated,

or (b) upon not less than one hundred twenty (120) days notice to the City, terminate this Agreement.

5. (a) If a Change in Law or Changes in Law in any Contract Year result in the City making payments to WMI in an amount equal to or greater than thirty percent (30%) of all Tipping Fees paid or to be paid to WMI by the City for such Contract Year, the City may terminate this Agreement upon not less than ninety (90) days' notice to WMI.

(b) If a Change in Law or Changes in Law in any Contract Year result in WMI issuing a credit to the City in an amount equal to or greater than thirty percent (30%) of all Tipping Fees paid or to be paid to WMI by the City for such Contract Year, WMI may terminate this Agreement upon not less than ninety (90) days' notice to the City. In addition, if a Change in Law or Changes in Law result in WMI incurring or potentially incurring at least Twenty Million Dollars ($20,000,000) in capital modification or operational and maintenance costs on or after January 1, 2023, WMI may terminate this Agreement upon not less than twelve (12) months' notice to the City.

SECTION XIII
ASSIGNMENT

This Agreement shall not be assigned by either party without the prior written consent of the other party and any such assignment or attempted assignment without such written consent shall be void; provided, however, that without the City's consent, WMI may assign its interest and obligation hereunder to a financially viable person, firm, or corporation acquiring all or substantially all of the business or assets of WMI by merger, consolidation, transfer of assets, or otherwise, or to an Affiliate of WMI, and, further provided, that WMI may make such an assignment without such consent to a Third Party in connection with the financing or refinancing of the Facility or a modification thereto, or as security for any debt associated with the operation of the Facility. Subject to the provisions of this Section XIII, this Agreement shall be binding upon, and inure to the benefit of, any successors or assigns of the parties hereto.

SECTION XIV

CORPORATE GUARANTEE

Simultaneously with the execution of this Agreement, WMI shall provide a guaranty from the Guarantor in the form set forth in Appendix V hereto. If at any time the Guarantor's credit standing is reduced to below investment grade by Standard and Poor's Corporation or any successor ("S&P") and Moody's Investors Services Inc. or any successor ("Moody's"), WMI shall promptly provide a substitute guarantee from an entity with either a net worth of at least $50 million or an investment grade credit rating or better by S&P or Moody's or shall provide other security reasonably acceptable to the City to guarantee WMI's performance of its obligations under this Agreement. The obligations of the Guarantor shall be binding on the Guarantor's successors and assigns and may not be assigned or transferred to any other party without the prior written approval of the City, such approval not to be reasonably withheld; notwithstanding the foregoing, the Guarantor may assign its obligations to an entity with an investment grade rating or better from either S&P or Moody's or a net worth of at least $50 million without the consent of the City.

SECTION XV

RIGHT OF FIRST REFUSAL

1. (a) Subject to the limits of applicable law, in the event that WMI shall propose or elect to continue to operate the Facility beyond the term of this Agreement, the City agrees that before entering into arrangements with any Third Party for the disposal of all or any part of the City's Guaranteed Annual Tonnage (to the extent the City has a Guaranteed Annual Tonnage obligation under Section II.1) or the City's Residential Acceptable Waste, the City shall first offer to dispose of such Tonnage at the Facility upon terms and conditions substantially similar to such Third-Party arrangements.

(b) In turn, subject to the limits of applicable law, if WMI shall propose or elect to continue to operate the Facility beyond the term of this Agreement, WMI shall so advise the City, and, upon request of the City, WMI shall make available to the City disposal capacity at the Facility for all or part of the City's Guaranteed Annual Tonnage (to the extent the City has a Guaranteed Annual Tonnage obligation under Section II.1) or the City's Residential Acceptable Waste upon terms and conditions substantially similar to other terms and conditions for disposal

offered by WMI to other municipal entities with which WMI is contracting on a long-term basis for the supply of waste during such extended term of operation.

2. (a) At least six months prior to the end of the term of this Agreement, WMI and the City shall meet for the purpose of discussing the continued operation of the Facility and the terms and conditions which might apply to Residential Acceptable Waste disposal by the City during any such continued operations.

(b) The rights of first refusal contained in Section XV.1 shall be applicable only during the first year after the end of the term of this Agreement and shall be forever discharged if, having been offered rights pursuant to this Section XV, a party shall elect not to accept the terms and conditions and the other party shall have thereafter entered into an arrangement for waste disposal on such terms and conditions with a Third Party.

SECTION XVI

MISCELLANEOUS

1. Applicable Law. The laws of the Commonwealth of Massachusetts shall govern the validity, interpretation, construction and performance of this Agreement.

2. Compliance with Laws. In the performance of this Agreement, each party shall comply with all Federal, state, and local laws, rules, ordinances, regulations, and all administrative and judicial positions known to it, except for such period as it may in good faith be contesting the validity or application thereof.

3. Severability. If any court or body of competent jurisdiction holds any provision of this Agreement invalid, the remainder of this Agreement shall remain in full force and effect.

4. Headings. The Section headings in this Agreement are for convenience and reference only and in no way define or limit the scope or content of this Agreement or in any way affect its provisions.

5. Notices. All notices given pursuant to this Agreement shall be transmitted by prepaid certified mail, return receipt requested, with notice deemed to be given upon receipt, addressed as follows:

If to the City:	City of Worcester 20 East Worcester Street Worcester, MA 01604 Attn: Dept. of Public Works & Parks
If to WMI:	Wheelabrator Millbury Inc. 331 Southwest Cutoff Road Millbury, MA 01527 Attn: Plant Manager
With a copy to:	Wheelabrator Millbury Inc. c/o Wheelabrator Environmental Systems Inc. 4 Liberty Lane West Hampton, NH 03842 Attn: General Counsel

Changes in the respective addresses to which such notices shall be sent may be made from time to time by either party by notice to the other party.

6. Entire Agreement. This Agreement contains the entire understanding of the parties with respect to the subject matter hereof, and supersedes all prior agreements, representations and understandings of the parties. This Agreement may be amended or modified only by written instrument duly executed by the parties hereto.

7. Enforcement; Waiver. The failure on the part of any party to enforce any provision of this Agreement shall not be construed as a waiver of its right to enforce such provision in the future. A waiver of any term of this Agreement on the part of any party in one case shall not be construed as a waiver in any other and shall not affect any other term of this Agreement.

8. Non-Binding Mediation. Either party to this Agreement may request non-binding mediation of any dispute arising under this Agreement provided that a party shall not be required to participate in non-binding mediation with respect to any particular matter that has been previously the subject of such mediation or that has been determined by a court of appropriate jurisdiction. If a party shall request non-binding mediation by a notice in writing to the other, such notice shall specify the particular provisions of this Agreement and the particular facts with respect to which a dispute exists and shall set forth, in brief, the position of the requesting party with respect thereto. The following procedure shall apply:

(a) The president or other senior officer of WMI and the chief executive officer of the City (together, the "Designated Officers") shall meet with all reasonable dispatch at a time

and place reasonably selected by them. Without limiting the discretion of the aforesaid officers, it shall, for purposes of this paragraph, be reasonable if the time shall be within ten (10) business days and if the place shall be within the City or at the Facility.

(b) The meeting between the Designated Officers may be attended by such staff or consultants as each such officer shall deem appropriate. Each party shall be given an opportunity to state its position, the requesting party to have the first opportunity to do so. The Designated Officers shall discuss whether they believe that there is a basis for resolution of the matter, with or without the assistance of an independent mediator. Either party may at any time thereafter state its intention to request the assistance of an independent mediator. Thereupon that party shall, within ten (10) business days, deliver to the other a proposed list of at least three candidates for mediator, each of whom shall be a professional engineer or an attorney and none of whom shall have any current or on-going relationship to the proposing party. Unless the other party shall reject every candidate for reasonable cause, such other party shall select one of the candidates and that candidate shall be mediator for the matter. If such other party shall reject every candidate for reasonable cause, such other party shall propose three different candidates and the process shall be repeated until a mediator is selected.

(c) The mediator selected shall have full discretion as to the conduct of the mediation and each party shall in good faith participate in the mediator's program to resolve the dispute until and unless either the parties reach agreement with respect to the disputed matter or one party determines in good faith that there is no reasonable likelihood that a resolution will result.

(d) Mediation is intended to assist the parties in dispute resolution. No mediator shall be empowered to render a binding decision and neither party shall be required to agree to a settlement that it in good faith believes is contrary to a correct interpretation of this Agreement and contrary to its interests. Each party shall bear its own expenses arising out of any mediation under this Agreement.

(e) Following the conclusion of any mediation process initiated pursuant to Section XVI.8 herein, either party may bring any action with respect to enforcement of this Agreement either in the appropriate Superior Court for the Commonwealth or the United States District Court for the District of Massachusetts. Judicial proceedings held in Massachusetts state

or federal courts will be the sole forum for binding dispute resolution. Each party waives the right to a trial by jury.

9. Most Favored Nations. (a) Provided the City has executed this Agreement by June 30, 2006, WMI agrees that, for a period commencing June 30, 2006 and ending January 1, 2015, it will not enter into a substantially similar waste disposal agreement with any municipality that contains a lower tipping fee than the then current Tipping Fee unless the City is provided an opportunity to amend this Agreement to reduce the City's then current Tipping Fee; provided, however, that the foregoing clause shall not apply to any agreement under which WMI and/or an affiliate of WMI provide both waste hauling and disposal services, or any agreement between WMI and the Town of Millbury. For the avoidance of doubt, a waste disposal agreement with a different term than that set forth herein, or which contains a materially different tonnage commitment than that agreed to by the City herein, shall not be considered "substantially similar."

(b) The foregoing clause supersedes, as of the date hereof, any other "right of first refusal" clause or agreement between WMI and the City including, without limitation, Section XV of that certain Waste Supply Agreement dated October 24, 1984 between the City and WMI (the "Waste Supply Agreement"), and supersedes, as of January 1, 2008, any "most favored nations" agreement between WMI and the City including, without limitation, Section XIII of the Waste Supply Agreement; provided, however, in no event shall the execution of this Agreement by WMI or the City provide the City with any rights under Section XIII of the Waste Supply Agreement.

10. Transfer Agent. If, during the term of this Agreement, the City becomes a member of a regional solid waste entity (the "Solid Waste District") either through general or special legislation or through an intermunicipal agreement, the City may request that WMI act as a transfer agent for funds paid by the City to the Solid Waste District (the "Transfer Agent") by notifying WMI in writing that the City has become a member of the Solid Waste District and that it would like WMI to act as the Transfer Agent. If the City makes such request, WMI agrees to remit to the Solid Waste District any amounts which the City designates in its payments to WMI to be remitted to the Solid Waste District, provided such amounts are in excess of any outstanding amounts then owed to WMI by the City. In no event, however, shall WMI have any responsibility or liability in its role as the Transfer Agent except as set forth in this Section XVI.10.

SECTION XVII
REPRESENTATIONS, WARRANTIES AND COVENANTS

1. City Representations, Warranties and Covenants. The City hereby represents, warrants and covenants to WMI as follows:

(a) The City is a municipal corporation duly created and existing pursuant to the laws of the Commonwealth of Massachusetts. The City has the full legal right, power and authority to enter into this Agreement and to perform its duties and obligations hereunder. This Agreement has been duly authorized, executed and delivered by the City and constitutes a legal, valid and binding obligation of the City, enforceable against it in accordance with its terms, and the authorization, execution, delivery and performance of this Agreement by the City does not violate any law, judgment, order, ruling or regulation applicable to the City and does not constitute a breach of or default under any agreement or instrument by which the City is bound.

(b) The City is subject to suit on account of this Agreement and may, in an appropriate action brought before a court with proper jurisdiction, be liable in damages for breach of contract, including interest.

(c) No material action, suit, proceeding or official investigation has been threatened, publicly announced or commenced against the City by any federal, state or local governmental authority or agency, or in any federal, state or local court that seeks to enjoin, assess civil or criminal penalties against, assess civil damage against or obtain any judgment, order or consent decree binding the City on account of this Agreement or any actions contemplated to be taken by the City under this Agreement.

(d) The City is not subject to any federal, state or local law or regulation or written interpretation thereof by any applicable regulatory authority, that would make the execution or delivery by the City of this Agreement, the compliance by the City with the terms and conditions hereof, or the consummation by the City of the transactions contemplated hereby, a violation of such law or regulation.

2. WMI Representations, Warranties and Covenants. WMI represents, warrants and covenants to the City as follows:

(a) WMI is a corporation duly organized and validly existing in good standing in the State of Delaware and is qualified and authorized to do business in the Commonwealth of Massachusetts.

(b) WMI has full power and authority to enter into this Agreement and to perform its duties and obligations hereunder. This Agreement has been duly authorized, executed and delivered by WMI and the authorization, execution, delivery and performance of this Agreement by WMI shall not violate any law, judgment, order, ruling or regulation applicable to WMI and constitutes a legal, valid and binding obligation of WMI, enforceable against it in accordance with its terms except as the enforcement thereof may be subject to bankruptcy and insolvency laws or similar laws affecting creditors' rights or equitable principles, and does not constitute a breach of or default under any agreement or instrument by which WMI is bound.

(c) No material action, suit, proceeding or official investigation has been threatened, publicly announced or commenced against WMI or the Guarantor by any federal, state or local governmental authority or agency, or in any federal, state or local court, that seeks to enjoin, assess civil or criminal penalties against, assess civil damage against or obtain any judgment, order or consent decree binding WMI on account of this Agreement or the Guarantor on account of the actions contemplated to be taken by WMI hereunder or by the Guarantor.

(d) To the best of WMI's knowledge and belief there is no federal, state or local law or regulation thereunder or written interpretation thereof by any applicable regulatory authority, that would make the execution or delivery of the Guaranty or the consummation by the Guarantor of the transactions contemplated thereby, a violation of such law or regulation.

(e) Pursuant to M.G.L. Chapter 62, Section 49A, WMI has complied with all laws of the Commonwealth of Massachusetts relating to the payment of taxes.

IN WITNESS WHEREOF, the parties hereto, intending to be legally bound, have caused this Agreement to be executed as a sealed instrument by their duly authorized representatives as of the day and year first above written.

Recommended:

By: Robert L. Moylan Jr.

Name: Robert L. Moylan, Jr.

Title: Commissioner of the City of Worcester
Department of Public Works and Parks

CITY OF WORCESTER

By: [illegible]

Name: Michael V. O'Brien

Title: City Manager

Approved as to form:

By: Michael E. Traynor

Name: Michael E. Traynor

Title: Deputy City Solicitor

WHEELABRATOR MILLBURY INC.

By: [illegible]

Name: MARK A. WEDDMAN

Title: PRESIDENT

APPENDIX I

CENTRAL MASSACHUSETTS

RESOURCE RECOVERY COMMITTEE COMMUNITIES

1. Town of Auburn
2. Town of Dover
3. Town of East Brookfield
4. Town of Franklin
5. Town of Grafton
6. Town of Holden
7. Town of Holliston
8. Town of Hopedale
9. Town of Hopkinton
10. Town of Maynard
11. Town of Medfield
12. Town of Medway
13. Town of Mendon
14. Town of Milford
15. Town of Millbury
16. Town of Millis
17. Town of Milville
18. Town of Natick
19. Town of Needham
20. City of Newton
21. Town of Northborough
22. Town of Northbridge
23. Town of Oxford
24. Town of Paxton
25. Town of Princeton
26. Town of Rutland
27. Town of Sherborn
28. Town of Shrewsbury
29. Town of Southborough
30. Town of Spencer
31. Town of Upton
32. Town of Walpole
33. Town of Westborough
34. Town of Weston
35. Town of Westwood
36. City of Worcester

APPENDIX II

Solid Waste Management Facility Regulations

APPENDIX III

WHEELABRATOR TECHNOLOGIES INC.
A WASTE MANAGEMENT COMPANY

CUSTOMER/HAULER SAFETY and ENVIRONMENTAL REQUIREMENTS

Zero Tolerance for Unsafe Acts, Behaviors, and Conditions

< Wheelabrator is committed to safety! Wheelabrator has established a goal of zero tolerance for unsafe acts and conditions. Customers/Haulers (Hauling companies) working at Wheelabrator facilities must understand that safety is paramount to the success of all work and that poor safety work practices will not be tolerated. Safety performance may be used as a factor when selecting Customers/Haulers for future work. Wheelabrator requires its Customers/Haulers to fully comply with applicable OSHA regulations at all times. Violators may be removed from a facility. If you have questions, please ask.

Arriving at the Facility - Security

< Wheelabrator reserves the right to require each Customer's/Hauler's employee to wear an identification badge provided by the facility.

< All Customers/Haulers must be covered by a valid contract including:
- Customer/Hauler declaration;
- Safety and Environmental Requirements for Special Waste Haulers; and
- Current certificate of insurance
- Customers/Haulers must have valid licenses and certificates applicable for the work being performed.

Communications

< Obey the Loader Operator or other designated Wheelabrator employee's instructions at all times.

< In the event of an emergency medical or otherwise, the Customer/Hauler is to contact the Control Room using the plant phone or paging system. In general, Customers/Haulers should not call 911 using a personal cellular phone.

Customer/Hauler Safety and Environmental Evaluations

< Wheelabrator strongly believes that performing work safely begins at the top with commitment from management. Customers/Haulers will take action when work performance feedback is provided by Wheelabrator.

< If Wheelabrator observes safety hazards or environmental incidents caused by a Customer/Hauler, which pose an imminent danger, Wheelabrator will stop the work and require the Customer's/Hauler's supervisor to take immediate corrective action to eliminate the hazard(s).

< Customer's/Hauler's employees who demonstrate an attitude of indifference towards safety or the environment may result in Wheelabrator staff removing them from the site or terminating the contract.

< Customer's/Hauler's employees who fail to perform work in compliance with the contract requirements may be permanently removed from the site.

Customer/Hauler Vehicles

< Reverse alarms shall be operable on all equipment.
< All equipment shall be operated at a safe speed.
< No persons are permitted to ride on the outside of vehicles.
< Seatbelts must be used at all times while operating equipment.

Drug and Alcohol Program

< All Customers/Haulers working at Wheelabrator facilities must have a fully implemented drug and alcohol program. Elements of the program shall include, but not limited to the following:
  - a Customer's/Hauler's employee shall not show up for work at the facility while under the influence of drugs or alcohol;
  - a provision for drug and alcohol testing when there is reasonable suspicion; and
  - a method for communicating when the Customer's/Hauler's employee is taking prescription medications that could influence work performance.
< Wheelabrator is not responsible for the administration of the program.

Emergency Evacuation

< The general fire alarm will be sounded for all emergencies requiring evacuation. When this alarm sounds, leave the facility immediately.
< If an emergency alarm sounds, know your escape route. Do not use the elevator. Use stairwells and follow the exit signs.
< The primary assembly point for any evacuation is at the administrative building parking lot, unless otherwise instructed. Each facility has a secondary evacuation assembly point. When the primary assembly point cannot be used, the facility will instruct the Customer/Hauler where to meet.

Fall Protection

< For hand unloading within 15 feet of the pit, the following fall protection requirements must be used:
  - a guardrail system or floor and wall opening covers as applicable;
  - a personal fall arrest system consisting of a full body harness and a lanyard with locking snap-hooks attached to a secure anchor point; or
  - a safety net system.
  - Chains/Safety gates on all work platforms must be closed when the platform is occupied.

First-Aid and Medical Attention

< Each Customer/Hauler must have a First-Aid kit available. Bloodborne pathogen training and related equipment is the responsibility of the Customer/Hauler.
< **All accidents, injuries, and near misses must be reported immediately to the Control Room.**

< **Where emergency services are required, the call will be made through the Control Room. Contact the Control Room for all emergencies.** In general, Customer's/Hauler's should not dial 911 from a cellular phone.

< Know where the closest emergency eyewash and shower stations are located and how to operate them.

Hazard Communications

< Prior to bringing any hazardous chemical on site, Customers/Haulers will submit the MSDS to be used for the project. Once the hazardous chemical has been approved by Wheelabrator, the Customer/Hauler will follow the facility chemical storage and disposal requirements. Customers/Haulers will disclose any hazardous materials brought on site and the MSDSs must be kept readily available.

< Customers/Haulers must coordinate with the facility before storing any hazardous materials. Information such as: the quantity, location to drains, and material compatibility will be addressed.

< Customers/Haulers are responsible for the removal and disposal of any hazardous materials brought on site in accordance with applicable law.

< Containers, lines, and tanks are labeled at the facility. If you have a question, ask the Control Room.

< MSDSs for all hazardous materials used on the site by Wheelabrator are available at multiple locations (e.g., in the Control Room). If you have a question about a hazardous material used at the site, ask the Control Room.

Incident Investigation and Reporting

< Customers/Haulers are required to report all workplace incidents to the Control Room immediately. An incident is defined as any OSHA Recordable, Near Miss, Lost Work or Restricted Duty event.

< Customers/Haulers must, <u>within 24 hours of occurrence</u>, complete an Incident Investigation Report. The investigation shall contain at a minimum the information required on OSHA's Form 301 and the following: causal factor(s), root cause(s), corrective actions and alternative solutions for preventing a re-occurrence of the event. The completed report shall be provided to the Control Room.

Ladders

< Portable metal ladders and other portable conductive ladders may not be used near exposed energized lines or equipment.

< Portable extension ladders must be extended 3 feet above the point of support and shall be tied off or held securely by another person.

< Do not separate extension ladders for individual use.

< Portable "A" frame ladders must be fully opened before use.

< Do not climb step ladders that are leaned against walls, tanks, or other vertical surfaces.

< No damaged or modified ladders are permitted on site.

< Do not use "job-built" ladders or make-shift ladders (like pallets).

< Face the ladder at all times and maintain three points of contact.

Leaks and Spills

< Leaks or spills to the ground are not permitted. If you observe a leak or spill of any quantity, immediately notify the Control Room.

< All temporary fuel and chemical storage tanks shall have a means of secondary containment.

< Never release chemicals, oils, fuels, solvents, etc., into plant drains, sinks, or sewers.

< No hazardous waste is to be generated unless permitted by the Customer's/Hauler's contract with Wheelabrator.

< Do not dispose of waste generated on site onto the tipping floor.

< Install temporary covers when performing any work within 20 feet of drains. Such activities include work with liquid chemicals and oil.

< Clean tools and equipment of ash inside the plant structure before leaving property.

Materials Handling

< Do not store materials in a manner that restricts access, blocks emergency/fire equipment or obstructs views of roadways or walkways.

< Do not stack materials too high. Acceptable height is based on the stability of the materials being stacked.

< Materials must be able to be self supported or by using vertical, horizontal, and diagonal braces.

< All materials stored in elevated areas must be securely fastened to prevent falling.

Mobile Equipment

< Customers/Haulers are not permitted to use Wheelabrator equipment and tools unless authorized. Authorized is defined as performed with Wheelabrator supervisory approval by trained persons.

Personal Protective Equipment

< Customers/Haulers must provide PPE to their employees.

< All PPE shall be worn in accordance with manufacturer instructions (e.g., hard hats facing forward).

< Unless otherwise designated by Wheelabrator, hard hats are required in all areas of the facility. Wheelabrator reserves the right to require Customers/Haulers to wear hard hats and reflective safety vests of a specified color.

< Safety glasses with permanently affixed side shields are required at all times on site, except in designated areas. Mirrored safety glass lenses or shades of any color greater than 10% are not permitted while working indoors.

< Work boots with hardened (steel, fiberglass) toes are required. Sneakers are not permitted.

< Work gloves shall be worn when required.

< Goggles are recommended in areas where dust and particulate are present.

< Hearing Protection is required in all areas inside of the facility. Double hearing protection is required in areas where signs are posted.

< Face shields are required for all grinding and chemical transfer operations.

< Customers/Haulers are required to follow the instructions on all posted signs.

Personal Hygiene

< Customer's/Hauler's employees are required to thoroughly wash their hands and face before eating or drinking if involved with the unloading process.

< Customers/Haulers may not enter lunchrooms or administrative areas with dirty or dusty protective work clothing or equipment.

Parking

< Park only in areas designated by Wheelabrator.

< Never block building exits, emergency routes, fire lanes, or emergency or fire equipment.

Respiratory Protection

< Wheelabrator employees are required to wear respirator protection while performing specific tasks or while working in specific environmental conditions. Respiratory protection selection is based on air sampling data collected during these tasks and in various conditions.

< Customers/Haulers shall wear respiratory protection in all posted areas.

< Customers/Haulers must select the appropriate respiratory protection for their employee's exposures. Customers/Haulers are free to review Wheelabrator industrial hygiene air sampling data to assist in selecting the appropriate respiratory protection. However, Wheelabrator's air sampling data may not be relevant to the tasks the Customer/Hauler will be performing. Customers/Haulers are required under OSHA Standards to assess their employees' exposure(s) to air contaminants.

< Customers/Haulers using respiratory protection are required by OSHA to have a respiratory protection program.

< In accordance with OSHA's Standard, Customers/Haulers wearing tight fitting respirators must be clean shaven, with no facial hair impeding the face to respirator seal or exhalation valve operation.

Speed Limit

< All vehicles operated on Wheelabrator property shall obey posted speed limits.

< Adjust speed in response to reduced visibility or slippery conditions.

Tipping Floor, Fuel Yards and, Ash and Metal Recovery Loading/Unloading Areas

< Each Wheelabrator facility has a tipping floor or fuel/waste unloading area policy. The policy is attached – see Appendix III-2 for the specific site rules.

< Tipping Floor, Fuel Yards and, Ash and Metal Recovery Loading/Unloading Areas are restricted to authorized persons.

< Customers/Haulers are not permitted in the fuel yard (e.g., wood, tires, culm) and ash and metal recovery loading/unloading areas unless authorized by a Wheelabrator employee.

Tools and Equipment

< Customers/Haulers are not allowed to use Wheelabrator tools or equipment unless authorized.

Unsafe Acts, Horseplay, Intoxicants, Firearms

< **No unsafe acts, horseplay, intoxicants, or firearms are allowed on site.**

< **Follow instructions in all posted areas - observe all warning signs!**

Walking/Working Surfaces

< Keep all walking/working surfaces free of debris, trip hazards (cords, hoses, and lines), slippery, or spilled materials.

< Keep emergency/fire equipment, eyewash stations/safety showers clear at all times.

< Keep exits, stairways, and corridors clear of obstructions at all times.

Miscellaneous

< Smoking or chewing tobacco is only permitted in designated areas.

< Eating or drinking is not permitted at any time within the facility except in designated areas.

< Customers/Haulers are not permitted in warehouse areas unless accompanied by a Wheelabrator employee.

< Housekeeping is a continuous effort; Customers/Haulers are required to keep work areas clean and orderly.

< Barrier Tape:

- Yellow Tape in the plant – Customers/Haulers can enter the area with caution.
- Red Tape in the plant – Do Not Enter.

APPENDIX III -1

CUSTOMER'S/HAULER'S DECLARATION

As the duly authorized and designated representative of the CITY OF WORCESTER ("Customer/Hauler"), I hereby certify on behalf of the City that:

1. Customer/Hauler has been advised and instructed by Company concerning working conditions including potential hazards, if any, involved in the job and/or location in which Customer/Hauler will be working or present.

2. Customer/Hauler has been instructed and will instruct all of its agents, subcontractor and employees, prior to their reporting to Company's premises, with respect to such conditions and/or hazards and the proper safety precautions to be observed in regard thereto.

3. Customer/Hauler has issued or will issue to all such agents and employees, all necessary, adequate, and operative protective clothing and equipment, together with full instructions and training for their use, prior to the start of said work.

4. Customer/Hauler will properly supervise all such agents, subcontractor and employees to ensure compliance in the use of protective clothing and equipment and in the strict observance of the facility site's Safety and Environmental Requirements For Special Waste Haulers and all other federal, state, and local regulations.

5. Customer/Hauler acknowledges that a copy of the Wheelabrator Safety and Environmental Requirements For Special Waste Haulers has been provided to and will be followed by all employees, agents, and subcontractor of the Customer/Hauler.

6. Customer/Hauler acknowledges the following items were specifically discussed:

   - Company site specific Safety and Environmental Requirements For Special Waste Haulers, and consequences for non-compliance with the contract;
   - Plant Specific Tipping Floor Policy;
   - Site-specific physical and chemical hazards, including OSHA Hazard Communication;
   - Site-specific emergency procedures;
   - Eye, Foot, Hand, Head, Hearing, and Fall protective requirements;
   - OSHA inorganic arsenic, cadmium, lead, and respiratory protection standard requirements, including site-specific industrial hygiene monitoring data available for Customer/Hauler examination, and the associated use of respiratory protection, protective clothing, personal hygiene, and work practices.*

* Be advised that OSHA's policy is to prohibit the use of negative pressure and/or tight-fitting respirators where employee facial hair interferes with the face-to-facepiece seal. The Company endorses and complies with this policy.

7. Customer/Hauler has implemented its employer obligations under the Federal OSHA and Department of Transportation (DOT) or equivalent State plan regulations listed below and has policies, procedures, programs, and systems in place to fulfill these obligations. This list of regulatory requirements may be modified by Wheelabrator based on the actual tasks and unloading situation.

- First Aid and Medical Attention (29CFR1910.151 & 29CFR192.23)
- Personal Protective Equipment (29CFR1910 Subpart 1 & 29CFR1926.28 & 95) including:
  - Occupational Foot Protection (29CFR1910.136 & 29CFR1926.96)
  - Head Protection (29CFR1910.135 & 29CFR1926.100)
  - Hearing Protection (29CFR1910.95 & 29 CFR1926.101)
  - Eye and Face Protection (29CFR1910.133 & 29CFR1926.102)
- Fall Protection (29CFR1926.104 & 500-503)
- Hazard Communication (29CFR1910.1200 & 29CFR1926.59)
- Respiratory Protection (29CFR 1910.134 & 29CFR1926.103)
- Lead (29CFR1910.1025 & 29CFR1926.62)
- Cadmium (29CFR1910.1027 & 29CFR1926.1127)
- Inorganic Arsenic (29CFR1910.1018 & 29CFR1926.1118)
- Hand and Power Tools (29CFR1910 Subpart P 29CFR1926, Subpart I)
- Materials Handling, Storage, Use, and Disposal (29CFR1910 Subpart N & 29CFR1926 Subpart H)
- Cranes, Derricks, Hoists, Elevators, and Conveyors (29CFR1910 Subparts F & N, 29CFR1926 Subpart N)
- Bloodborne pathogens (29CFR 1910.1030).

8. Customer/Hauler is required to report all workplace incidents to the Loader Operator or other designated Wheelabrator employee immediately. An incident is defined as any OSHA Recordable, Near Miss, Lost Work or Restricted Duty event. Customers/Haulers must, within 24 hours of occurrence, complete the incident investigation report form supplied by the Loader Operator or other designated Wheelabrator employee. The incident investigation will at a minimum include: casual factor(s), root cause(s), corrective actions and alternative solutions for preventing re-occurrence. The completed report shall be provided to the Administrative Building.

Printed Name: Michael V. O'Brien Signature: _____

Company Name: City of Worcester Date: _____

APPENDIX III-2

Wheelabrator Millbury Inc.

Tipping Floor Rules and Procedures

1. Not more than one person per waste delivery vehicle may exit a vehicle on the tipping floor. All other vehicle occupants must remain in the vehicle. If more than one person is required to unload a vehicle, it will be considered a "Special Waste" load and shall be handled according to the requirements below for Assured Destruction/Special Wastes (see No. 15).

2. The designated individual who exits the delivery vehicle must stay within 6 feet of their vehicle when in the tipping building. When closing swinging doors, the driver is to stay with the moving door until it is closed. Vehicles are not to be left unattended.

3. Delivery vehicle occupants shall stay at least 15 feet away from the pit opening.

4. After tipping their load, delivery vehicles shall pull away from the pit to a clear, safe area within the tipping building to close and/or secure the vehicle doors.

5. There shall be no riding on the outside of delivery vehicles.

6. Any violation of these rules by a waste delivery vehicle driver or occupant shall be reported to the hauling company's district office and to the Wheelabrator VP of Environmental Management & Public Policy. The loader operator shall document the hauling company name, license plate or other truck identifier, the date and time of the violation.

7. The front-end loader operators are the only Wheelabrator (WTI) employees or WTI contractors routinely allowed to work in the tipping building. Other WTI employees or WTI contractors are permitted to work within the tipping building to conduct repair and maintenance activities, to conduct waste inspections, to escort visitors, and in case of an emergency. During these events, the WTI employees or WTI contractors shall, at a minimum, notify the loader operator of the type and location of the work to be done before starting the work and shall mark the area where the work will be done with safety tape, barrels, or other equivalent high visibility markers.

8. Any traffic direction will be done by the front-end loader operator while within the loader cab or when standing at the entrance to the tipping building (see No. 9). All loaders and other heavy equipment used in the tipping building shall be equipped with a loud speaker or public address system to clearly communicate with people on the floor or in the other vehicles in the tipping building.

9. If additional traffic directors (WTI employee or WTI contractor) are absolutely necessary, they shall only be located at the tipping building entrance doorway, and shall not enter into the

building any further than 10 feet, and a line shall be painted on the floor 10 feet within the building.

10. The front-end loader operator is to maintain a minimum 15-foot exclusion zone around each delivery vehicle.

11. Loaders shall be equipped with working back-up alarms capable of being heard during high ambient noise periods. The loader operator is to ensure that the alarm is working properly before starting his/her shift.

12. When escorting visitors onto the tipping floor, the WTI escort is to notify the loader operator who will then park and shut down the machine. No waste delivery vehicles are to enter the building during the visit and all delivery vehicles in the building are to have exited before the visitors enter the building. Facilities that have clearly delineated pathways along the wall of the building do not have to cease tipping floor operations during the passage of people along the pathway. In the situation where the loader needs to be operating, e.g., waste inspections, the loader operator needs to pay attention to the task and be fully aware of the location of those on the tipping floor.

13. Non-WTI employees, e.g., WTI Contractors, inspectors, other governmental personnel, etc. that may need to enter the tipping building shall first be given a safety briefing by a WTI employee and then asked to sign a safety declaration that this policy was reviewed with them. If a representative of a governmental agency or office refuses to sign the declaration, the WTI employee shall read the declaration to the governmental representative and then the WTI employee shall sign the declaration noting that the declaration was read to the official. Other casual visitors, e.g., tour groups, should receive the Visitor Safety Briefing, but are not required to sign a safety declaration.

14. To minimize the pedestrian traffic on the tipping floor, restroom facilities, e.g., portable toilets, will not be located within the tipping building.

15. When receiving Assured Destruction or Special Wastes that need special handling such as requiring more than one person to be out of the delivery vehicle, facilities should comply with the following at a minimum. Facilities should attempt to schedule delivery of Assured Destruction/Special Waste (AD/SW) materials during low waste delivery traffic hours. After the AD/SW delivery vehicle has parked on the tipping floor, the loader operator shall park the loader until the AD/SW vehicle has unloaded and all "pedestrians" are off the tipping floor, e.g., in the delivery vehicle or exited the tipping building.

16. Any WTI employees or WTI contractors moving closer than 6 feet from the pit opening shall wear a harness and lifeline secured to a suitable anchor, and shall notify the loader operator in advance of this activity.

17. Signs shall be posted at the scale house and entrance to the tipping building summarizing these rules.

18. All WTI employees, WTI contractors, Refuse Drivers or others conducting business on the tipping floor, e.g., agency inspectors, shall wear hard hats, sturdy shoes, eye protection and high visibility vests when in the tipping building.

19. WTI employees or WTI contractors that do not observe these rules are subject to disciplinary action, up to and including termination.

20. Delivery vehicle occupants that do not obey these rules are subject to being banned from the facility along with their company being banned.

21. Variances from these rules will be granted in writing on a case-by-case basis by the WTI VP of Environmental Compliance and Public Policy.

APPENDIX IV-1

INSURANCE

During the term of this Agreement, the City and its haulers shall keep in force the following minimum insurance coverages on an occurrence basis with insurance companies rated "B+" or better by A.M. Best rating service:

Coverages	Limits of Liability	
Workers' Compensation Insurance	Statutory	
Employers' Liability Insurance	Per Occurrence	$1,000,000
Comprehensive General Liability Insurance, including contractual and products/completed operations	Per Occurrence	$1,000,000
	General Aggregate	$2,000,000
Comprehensive Automobile Liability Insurance, including non-owned and hired vehicle coverage	For bodily injury and property damage Per Occurrence	$1,000,000
Comprehensive Excess Umbrella	Per Occurrence	$4,000,000

The comprehensive general liability insurance shall be specifically endorsed to provide coverage for the contractual liability accepted by the City in this Agreement.

Prior to disposing of any Acceptable Waste at the Facility, the City and its haulers shall furnish WMI certificates of insurance or other evidence satisfactory to WMI to the effect that such insurance has been procured and is in force. At least thirty (30) days prior to the expiration of any of the insurance policies required herein, the City and its haulers shall furnish WMI certificates of insurance, in accordance with the terms hereof, evidencing the renewal of such insurance for a period equal to at least the earlier of (a) the expiration of the term of this Agreement and (b) one year from the date of expiration of the then current insurance policies.

The insurance policies required herein shall be endorsed with, and the certificates of insurance shall contain, the following language:

"Wheelabrator Millbury Inc. and its affiliates are named as an additional insured with respect to the comprehensive general, excess umbrella, and automobile liability policies set forth herein. A waiver of the underwriter's rights of subrogation applies in favor of Wheelabrator Millbury Inc. and its affiliates as their interest may appear with respect to all policies described herein."

The certificates shall also contain the following express obligation:

> "In the event of cancellation or material change in a policy affecting the certificate holder, thirty (30) days' prior written notice will be given the certificate holder."

APPENDIX IV-2

INSURANCE

During the term of this Agreement, WMI shall keep in force the following minimum insurance coverages on an occurrence basis with insurance companies rated "B+" or better by A.M. Best rating service:

Coverages	Limits of Liability	
Workers' Compensation Insurance	Statutory	
Employers' Liability Insurance	Per Occurrence	$1,000,000
Comprehensive General Liability Insurance, including contractual and products/completed operations	Per Occurrence	$1,000,000
	General Aggregate	$2,000,000
Comprehensive Automobile Liability Insurance, including non-owned and hired vehicle coverage	For bodily injury and property damage Per Occurrence	$1,000,000
Comprehensive Excess Umbrella	Per Occurrence	$4,000,000

CORPORATE GUARANTEE

This Guarantee Agreement (this "Guarantee"), dated as of June 28, 2006, is made and entered into by Waste Management, Inc., a Delaware corporation ("Guarantor").

WITNESSETH:

WHEREAS, Wheelabrator Millbury Inc. (the "Company") is entering into a Waste Disposal Agreement (the "Agreement") effective as of the date of this Guarantee with the City of Worcester (the "City") pursuant to which the City will deliver municipal solid waste to the Company's waste-to-energy facility for disposal; and

WHEREAS, Guarantor will directly or indirectly benefit from the Agreement.

NOW, THEREFORE, in consideration of the City entering into the Agreement, Guarantor hereby covenants and agrees as follows:

1. Guarantor and its successors and assigns hereby guarantee to the City that it will cause the Company to perform all of its obligations and responsibilities in accordance with the terms and conditions of the Agreement. Guarantor shall be entitled to all the defenses and benefits of the terms and conditions of the Agreement.

2. This Guarantee shall become effective only upon the effective date of the Agreement.

EXECUTED as of the day and year first above written.

WASTE MANAGEMENT, INC.

By: Cherie C. Rice

Name: Cherie C. Rice

Title: Vice President & Treasurer

WASTE MANAGEMENT, INC.

By: Jay Clement

Name: Jay Clement

Title: Assistant Treasurer

Appendix D

Detailed Cost Tables for Evaluation of MOU

Table D-1

Summary of Future Tipping Fees - Current Tipping Fee at $37 per ton and 2015 Market at $80 per ton

	Starting in July 1 of Year																				
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Annual Per Ton Tip Fee	$ 37.00	$ 39.50	$ 47.00	$ 57.00	$ 67.00	$ 77.00	$ 79.31	$ 81.69	$ 84.14	$ 86.66	$ 89.26	$ 91.94	$ 94.70	$ 97.54	$ 100.47	$ 103.48	$ 106.59	$ 109.78	$ 113.08	$ 116.47	$ 119.96
Increase		$ 2.50	$ 7.50	$ 10.00	$ 10.00	$ 10.00								CPI							
Reset Based on $80 Market Rate	$ 37.00	$ 39.50	$ 47.00	$ 57.00	$ 67.00	$ 77.00	$ 72.00	$ 74.16	$ 76.38	$ 78.68	$ 81.04	$ 83.47	$ 85.97	$ 88.55	$ 91.21	$ 93.94	$ 96.76	$ 99.66	$ 102.65	$ 105.73	$ 108.91
Present Value of Increase - Market Reset		$2.50	$9.60	$18.42	$26.52	$33.93	($6.51)	($6.44)	($6.36)	($6.29)	($6.22)	($6.15)	($6.08)	($6.01)	($5.94)	($5.87)	($5.80)	($5.73)	($5.67)	($5.60)	($5.54)
Year from Start		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Normalizing Rate	4.2%
Assumed CPI	3%

CDM Projected Market Rate		$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 80.00	$ 82.40	$ 84.87	$ 87.42	$ 90.04	$ 92.74	$ 95.52	$ 98.39	$ 101.34	$ 104.38	$ 107.51	$ 110.74	$ 114.06	$ 117.48	$ 121.01
SEMASS Projected Market Rate		$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 100.00	$ 103.00	$ 106.09	$ 109.27	$ 112.55	$ 115.93	$ 119.41	$ 122.99	$ 126.68	$ 130.48	$ 134.39	$ 138.42	$ 142.58	$ 146.85	$ 151.26
		$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 120.00	$ 123.60	$ 127.31	$ 131.13	$ 135.06	$ 139.11	$ 143.29	$ 147.58	$ 152.01	$ 156.57	$ 161.27	$ 166.11	$ 171.09	$ 176.22	$ 181.51

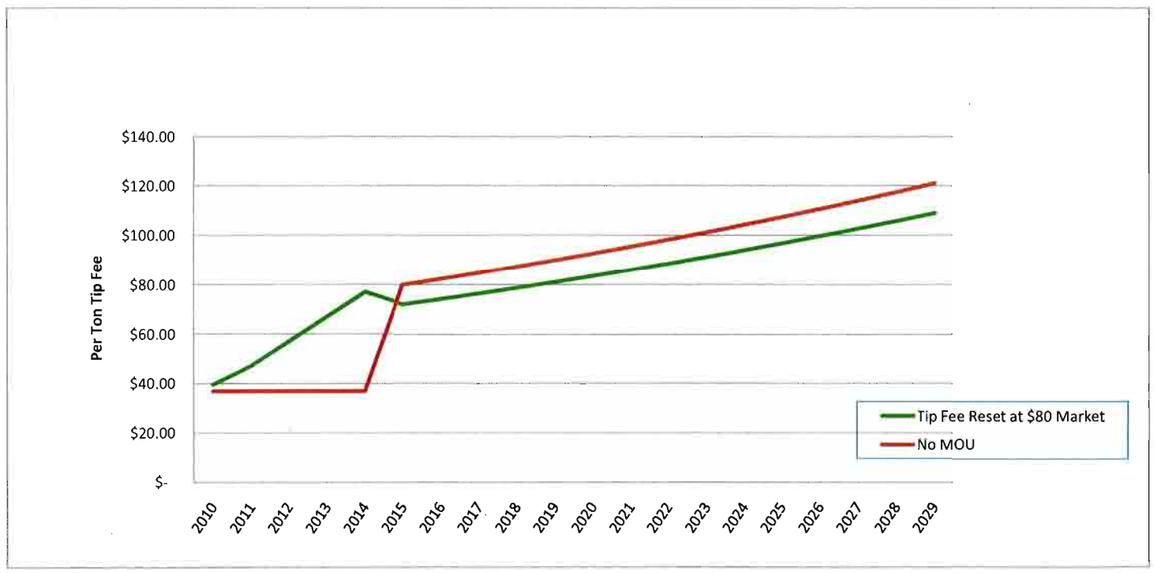


Table D-2

Summary of Future Tipping Fees - Current Tipping Fee at $37 per ton and 2015 Market at $90 per ton

	Starting in July 1 of Year																				
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Annual Per Ton Tip Fee	$ 37.00	$ 39.50	$ 47.00	$ 57.00	$ 67.00	$ 77.00	$ 79.31	$ 81.69	$ 84.14	$ 86.66	$ 89.26	$ 91.94	$ 94.70	$ 97.54	$ 100.47	$ 103.48	$ 106.59	$ 109.78	$ 113.08	$ 116.47	$ 119.96
Increase		$ 2.50	$ 7.50	$ 10.00	$ 10.00	$ 10.00								CPI							
Based on SEMASS Contract	$ 37.00	$ 39.50	$ 47.00	$ 57.00	$ 67.00	$ 77.00	$ 79.31	$ 81.69	$ 84.14	$ 86.66	$ 89.26	$ 91.94	$ 94.70	$ 97.54	$ 100.47	$ 103.48	$ 106.59	$ 109.78	$ 113.08	$ 116.47	$ 119.96
Present Value of Increase		$2.50	$9.60	$18.42	$26.52	$33.93	($8.70)	($8.60)	($8.50)	($8.41)	($8.31)	($8.21)	($8.12)	($8.02)	($7.93)	($7.84)	($7.75)	($7.66)	($7.57)	($7.49)	($7.40)
Year from Start		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Totals - Present Values																($82.65)	$ (90.40)				$ (120.52)

Normalizing Rate	4.2%
Assumed CPI	3%

CDM Projected Market Rate		$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 90.00	$ 92.70	$ 95.48	$ 98.35	$ 101.30	$ 104.33	$ 107.46	$ 110.69	$ 114.01	$ 117.43	$ 120.95	$ 124.58	$ 128.32	$ 132.17	$ 136.13
With Signed MOU	$ 37.00	$ 39.50	$ 47.00	$ 57.00	$ 67.00	$ 77.00	$ 90.00	$ 92.70	$ 95.48	$ 98.35	$ 101.30	$ 104.33	$ 107.46	$ 110.69	$ 114.01	$ 117.43	$ 120.95	$ 124.58	$ 128.32	$ 132.17	$ 136.13

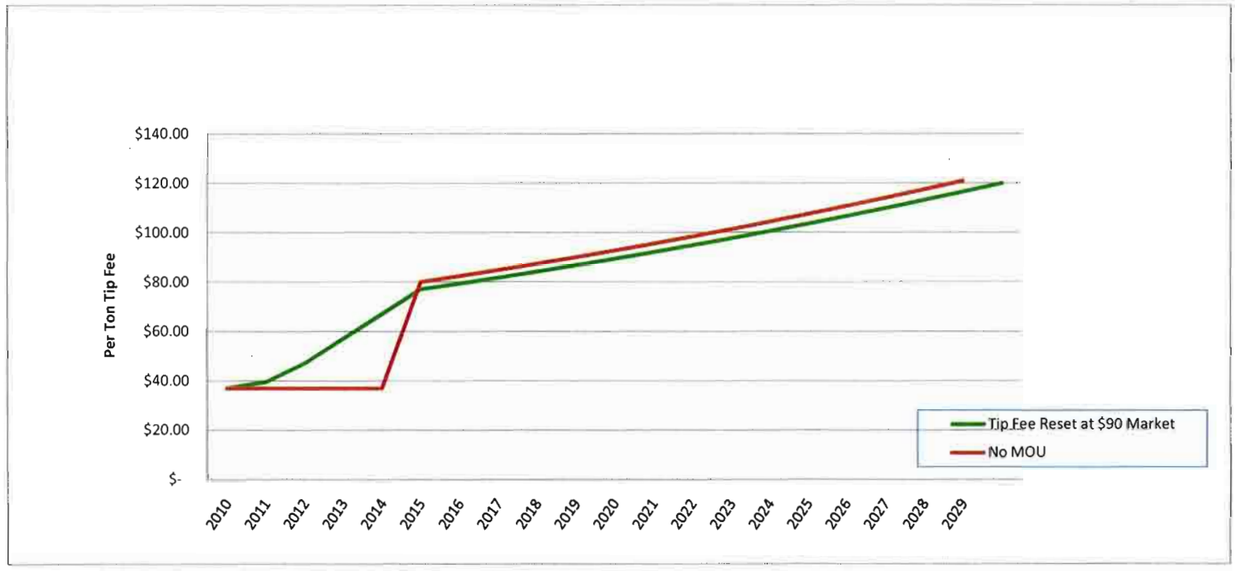


Table D-3

Summary of Future Tipping Fees - Current Tipping Fee at $37 per ton and 2015 Market at $100 per ton

	Starting in July 1 of Year																				
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Annual Per Ton Tip Fee	$ 37.00	$ 39.50	$ 47.00	$ 57.00	$ 67.00	$ 77.00	$ 79.31	$ 81.69	$ 84.14	$ 86.66	$ 89.26	$ 91.94	$ 94.70	$ 97.54	$ 100.47	$ 103.48	$ 106.59	$ 109.78	$ 113.08	$ 116.47	$ 119.96
Increase		$ 2.50	$ 7.50	$ 10.00	$ 10.00	$ 10.00									CPI						
Reset Based on $80 Market Rate						$ 77.00	$ 72.00	$ 74.16	$ 76.38	$ 78.68	$ 81.04	$ 83.47	$ 85.97	$ 88.55	$ 91.21	$ 93.94	$ 96.76	$ 99.66	$ 102.65	$ 105.73	$ 108.91
Present Value of Increase - Market Reset		$2.50	$9.60	$18.42	$26.52	$33.93	($22.79)	($22.53)	($22.27)	($22.02)	($21.76)	($21.51)	($21.26)	($21.02)	($20.78)	($20.54)	($20.30)	($20.07)	($19.84)	($19.61)	($19.38)
Year from Start		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Normalizing Rate	4.2%
Assumed CPI	3%

CDM Projected Market Rate	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 100.00	$ 103.00	$ 106.09	$ 109.27	$ 112.55	$ 115.93	$ 119.41	$ 122.99	$ 126.68	$ 130.48	$ 134.39	$ 138.42	$ 142.58	$ 146.85	$ 151.26
SEMASS Projected Market Rate	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 100.00	$ 103.00	$ 106.09	$ 109.27	$ 112.55	$ 115.93	$ 119.41	$ 122.99	$ 126.68	$ 130.48	$ 134.39	$ 138.42	$ 142.58	$ 146.85	$ 151.26
	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 120.00	$ 123.60	$ 127.31	$ 131.13	$ 135.06	$ 139.11	$ 143.29	$ 147.58	$ 152.01	$ 156.57	$ 161.27	$ 166.11	$ 171.09	$ 176.22	$ 181.51

Table D-4

Summary of Future Tipping Fees - Current Tipping Fee at $20 per ton and 2015 Market at $80 per ton

	Starting in July 1 of Year																				
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Annual Per Ton Tip Fee	$ 20.00	$ 22.50	$ 30.00	$ 40.00	$ 50.00	$ 60.00	$ 61.80	$ 63.65	$ 65.56	$ 67.53	$ 69.56	$ 71.64	$ 73.79	$ 76.01	$ 78.29	$ 80.63	$ 83.05	$ 85.55	$ 88.11	$ 90.76	$ 93.48
Increase		$ 2.50	$ 7.50	$ 10.00	$ 10.00	$ 10.00								CPI							
Present Value of Increase - Market Reset - $80 per ton		$2.50	$9.60	$18.42	$26.52	$33.93	($14.82)	($14.65)	($14.48)	($14.31)	($14.15)	($13.98)	($13.82)	($13.66)	($13.50)	($13.35)	($13.20)	($13.04)	($12.89)	($12.74)	($12.60)
Year from Start		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Normalizing Rate	4.2%
Assumed CPI	3%

CDM Projected Market Rate - $80 per ton		$ 20.00	$ 20.00	$ 20.00	$ 20.00	$ 20.00	$ 80.00	$ 82.40	$ 84.87	$ 87.42	$ 90.04	$ 92.74	$ 95.52	$ 98.39	$ 101.34	$ 104.38	$ 107.51	$ 110.74	$ 114.06	$ 117.48	$ 121.01

Table D-5

Summary of Future Tipping Fees - Current Tipping Fee at $20 per ton and 2015 Market at $90 per ton

	Starting in July 1 of Year																				
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Annual Per Ton Tip Fee	$ 20.00	$ 22.50	$ 30.00	$ 40.00	$ 50.00	$ 60.00	$ 61.80	$ 63.65	$ 65.56	$ 67.53	$ 69.56	$ 71.64	$ 73.79	$ 76.01	$ 78.29	$ 80.63	$ 83.05	$ 85.55	$ 88.11	$ 90.76	$ 93.48
Increase		$ 2.50	$ 7.50	$ 10.00	$ 10.00	$ 10.00		CPI													
Present Value of Increase - Market Reset - $80 per ton		$2.50	$9.60	$18.42	$26.52	$33.93	($22.96)	($22.69)	($22.43)	($22.17)	($21.92)	($21.66)	($21.42)	($21.17)	($20.93)	($20.68)	($20.45)	($20.21)	($19.98)	($19.75)	($19.52)
Year from Start		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Normalizing Rate	4.2%
Assumed CPI	3%

CDM Projected Market Rate - $90 per ton		$ 20.00	$ 20.00	$ 20.00	$ 20.00	$ 20.00	$ 90.00	$ 92.70	$ 95.48	$ 98.35	$ 101.30	$ 104.33	$ 107.46	$ 110.69	$ 114.01	$ 117.43	$ 120.95	$ 124.58	$ 128.32	$ 132.17	$ 136.13

Table D-6

Summary of Future Tipping Fees - Current Tipping Fee at $20 per ton and 2015 Market at $100 per ton

	Starting in July 1 of Year																				
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Annual Per Ton Tip Fee	$ 20.00	$ 22.50	$ 30.00	$ 40.00	$ 50.00	$ 60.00	$ 61.80	$ 63.65	$ 65.56	$ 67.53	$ 69.56	$ 71.64	$ 73.79	$ 76.01	$ 78.29	$ 80.63	$ 83.05	$ 85.55	$ 88.11	$ 90.76	$ 93.48
Increase		$ 2.50	$ 7.50	$ 10.00	$ 10.00	$ 10.00								CPI							
Present Value of Increase - Market Reset - $80 per ton		$2.50	$9.60	$18.42	$26.52	$33.93	($31.10)	($30.74)	($30.39)	($30.04)	($29.69)	($29.35)	($29.01)	($28.68)	($28.35)	($28.02)	($27.70)	($27.38)	($27.06)	($26.75)	($26.44)
Year from Start		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Normalizing Rate	4.2%
Assumed CPI	3%

CDM Projected Market Rate - $100 per ton		$ 20.00	$ 20.00	$ 20.00	$ 20.00	$ 20.00	$ 100.00	$ 103.00	$ 106.09	$ 109.27	$ 112.55	$ 115.93	$ 119.41	$ 122.99	$ 126.68	$ 130.48	$ 134.39	$ 138.42	$ 142.58	$ 146.85	$ 151.26

Appendix E

Detailed Haul Cost Estimates to Alternative Disposal Facilities

Table E-1
Comparative Haul Costs - SEMASS

		Rail Haul Costs		Truck Haul Costs from Transfer Station						
Town	Proposed Tonnage	Tons by Rail	Cost for Rail	Tonnage Handled at Transfer Station	Round Trip Miles Hauled by Truck	Tonnage Handled Per Trip	Trips Per Year	Miles Hauled Per Year	Truck Hauling Costs	Total Costs (Per Ton Costs)
Yarmouth-Barnstable Regional Transfer Station										
Barnstable	49,000	49,000	$ 679,000	17,752	28	10	1,775	49,706	$ 223,337	$ 1,283,487
Yarmouth	27,500	27,500	$ 381,150	27,500	0	0				
Subtotals	**76,500**	**76,500**	**$ 1,060,150**	**45,252**			**1,775**	**49,706**	**$ 223,337**	**$ 16.78**
Upper Cape Regional Transfer Station										
Falmouth	18,500	18,500	$ 204,795	12,288	12	10	1,229	14,746	$ 66,255	
Mashpee	7,500	7,500	$ 83,025	6,166	12	10	617	7,399	$ 33,246	$ 561,346
Sandwich	10,519	10,519	$ 116,445	12,815	20	20	641	12,815	$ 57,580	
Subtotals	**36,519**	**36,519**	**$ 404,265**	**31,269**			**2,486**	**34,960**	**$ 157,081**	**$ 15.37**
Cape Towns That Haul Directly										
Brewster	6,600			6,600	100	20	330	33,000	$ 148,275	
Chatham	6,000			6,000	104	20	300	31,200	$ 140,187	
Dennis	12,322			12,322	84	20	616	51,752	$ 232,533	
Eastham	4,000			4,000	116	20	200	23,200	$ 104,242	
Harwich	7,500			7,500	94	20	375	35,250	$ 158,385	$ 1,221,413
Orleans	5,497			5,497	106	20	275	29,134	$ 130,905	
Provincetown	4,000			4,000	162	20	200	32,400	$ 145,579	
Truro	2,200			2,200	168	20	110	18,480	$ 83,034	
Wellfleet	2,600			2,600	134	20	130	17,420	$ 78,271	
Subtotals	**50,719**			**50,719**			**2,536**	**271,837**	**1,221,413**	**$ 24.08**
Off-Cape Towns That Haul Directly from Transfer Station										
Hanson	2,600			2,600	50	10	260	13,000	$ 58,411	
Kingston	5,000			5,000	32	10	500	16,000	$ 71,891	
Plymouth	14,000	Cedarville TS		1,690	42	10	169	7,098	$ 31,893	$ 419,730
		Manomet TS		8,908	36	10	891	32,069	$ 144,091	
		South Street TS		8,416	30	10	842	25,248	$ 113,444	
Subtotals	**21,600**			**26,614**			**2,661**	**93,415**	**$ 419,730**	**$ 15.77**
Off-Cape Towns That Haul Directly in Curbside Collection Trucks										
Norwell	4,000	No Transfer Station		4,000	60	15	267	16,000	$ 71,891	$ 71,891
										$ 17.97
Totals	**189,338**	**113,019**	**$ 1,464,415**	**157,854**			**9,725**	**465,917**	**$ 2,093,452**	**$ 3,557,867**
										$ 18.79

Assumptions

Cost Per Ton for Rail from Yarmouth-Barnstable (2015)	$ 13.86
Cost Per Ton for Rail from Upper Cape Transfer Station (2015)	$ 11.07
Cost Per Truck Mile Hauled (2015)	$ 4.49

Cells shown for Barnstable, Falmouth, Mashpee, Sandwich and Plymouth are tonnages from 2008 MassDEP database and are included as separate operations from town transfer stations. Other tonnages are based on proposed GATT

Table E-2
Haul Costs to Bourne Landfill

Town	Proposed Tonnage	Haul Route	Truck Haul Costs from Transfer Station									
			Tonnage	Round Trip Miles Hauled to SEMASS	Round Trip Miles to	Tonnage Handled Per Trip	Trips Per Year	Miles Hauled to Reg TS	Miles Hauled to Bourne	Total Miles Hauled	Truck Hauling Costs	Cost Per Ton
Yarmouth - Barnstable Regional Transfer Station												
Barnstable	49,000	Local TS to Yarmouth	17,752	28	N/A	10	1,775	49,706	-	49,706	$ 223,337	
		Yarmouth to Bourne	49,000	80	56	20	2,450		137,200	137,200	$ 616,465	
Yarmouth	27,500	Direct	27,500	80	56	20	1,375		77,000	77,000	$ 345,976	
Subtotal	**76,500**		**76,500**							**263,906**	**$ 1,185,778**	**$ 15.50**
Upper Cape Regional Transfer Station												
Falmouth	18,500	Local TS to UCRTS	12,288	12	N/A	10	1,229	14,746		14,746	$ 66,255	
		UCRTS to Bourne	18,500		15	20	925		13,875	13,875	$ 62,343	
Mashpee	7,500	Local TS to UCRTS	6,166	12	N/A	10	617	7,399		7,399	$ 33,246	
		UCRTS to Bourne	7,500		15	20	375		5,625	5,625	$ 25,274	
Sandwich	10,519	Local TS to UCRTS	12,815	20	N/A	20	641	12,815		12,815	$ 57,580	
		UCRTS to Bourne	12,815		15	20	641		9,611	9,611	$ 43,185	
Subtotal	**36,519**		**36,519**							**64,071**	**$ 287,883**	**$ 7.88**
Cape Towns that Haul Directly												
Brewster	6,600	Direct	6,600	100	76	20	330		25,080	25,080	$ 112,689	
Chatham	6,000	Direct	6,000	104	80	20	300		24,000	24,000	$ 107,837	
Dennis	12,322	Direct	12,322	84	60	20	616		36,966	36,966	$ 166,095	
Eastham	4,000	Direct	4,000	116	92	20	200		18,400	18,400	$ 82,675	
Harwich	7,500	Direct	7,500	94	70	20	375		26,250	26,250	$ 117,946	
Orleans	5,497	Direct	5,497	106	82	20	275		22,538	22,538	$ 101,266	
Provincetown	4,000	Direct	4,000	162	138	20	200		27,600	27,600	$ 124,012	
Truro	2,200	Direct	2,200	148	124	20	110		13,640	13,640	$ 61,287	
Wellfleet	2,600	Direct	2,600	134	110	20	130		14,300	14,300	$ 64,253	
Subtotal	**50,719**		**50,719**						**208,774**	**208,774**	**$ 938,060**	**$ 18.50**
Off-Cape Towns that Haul Directly from Transfer Station												
Hanson	2,600	Direct	3,297	50	70	10	330		23,079	23,079	$ 103,698	
Kingston	5,000	Direct	6,255	32	45	10	626		28,148	28,148	$ 126,472	
Plymouth	14,000	Cedarville TS - Direct	1,690	42	16	10	169		2,704	2,704	$ 12,150	
		Manomet TS - Direct	8,908	18	30	10	891		26,724	26,724	$ 120,076	
		South Street TS - Direct	8,416	30	36	10	842		30,298	30,298	$ 136,133	
Subtotal	**21,600**		**28,566**				**2,857**		**110,952**	**110,952**	**$ 498,529**	**$ 17.45**
Off-Cape Town that Haul Directly in Curbside Collection Trucks												
Norwell	4,000	No Transfer Station	4,000		80	15	267		21,333	21,333	$ 95,855	
												$ 23.96
Totals	**189,338**		**196,304**				**3,123**		**341,059**		**$ 3,006,104**	**$ 15.88**

Assumptions

Round Trip Miles Closer to Bourne than SEMASS		24
Cost Per Truck Mile Hauled	$	4.49

Table E-3
Haul Costs to Rochester Environmental Park

Town	Proposed Tonnage	Haul Route	Truck Haul Costs from Transfer Station									
			Tonnage	Round Trip Miles Hauled to SEMASS	Trip Miles to REP	Tonnage Handled Per Trip	Trips Per Year	Miles Hauled to Reg TS	Miles Hauled to Bourne	Total Miles Hauled	Truck Hauling Costs	Cost Per Ton
Yarmouth - Barnstable Regional Transfer Station												
Barnstable	49,000	Local TS to Yarmouth	17,752	28	N/A	10	1,775	49,706	-	49,706	$ 223,337	
		Yarmouth to Bourne	49,000	80	78	20	2,450		191,100	191,100	$ 858,648	
Yarmouth	27,500	Direct	27,500	80	78	20	1,375		107,250	107,250	$ 481,894	
Subtotal	**76,500**		**76,500**							**348,056**	**$ 1,563,879**	**$ 20.44**
Upper Cape Regional Transfer Station												
Falmouth	18,500	Local TS to UCRTS	12,288	12	N/A	10	1,229	14,746		14,746	$ 66,255	
		UCRTS to Bourne	18,500		44	20	925		40,700	40,700	$ 182,873	
Mashpee	7,500	Local TS to UCRTS	6,166	12	N/A	10	617	7,399		7,399	$ 33,246	
		UCRTS to Bourne	7,500		44	20	375		16,500	16,500	$ 74,138	
Sandwich	10,519	Local TS to UCRTS	12,815	20	N/A	20	641	12,815		12,815	$ 57,580	
		UCRTS to Bourne	12,815		44	20	641		28,193	28,193	$ 126,676	
Subtotal	**36,519**		**36,519**							**120,353**	**$ 540,768**	**$ 14.81**
Cape Towns that Haul Directly												
Brewster	6,600	Direct	6,600	100	98	20	330		32,340	32,340	$ 145,310	
Chatham	6,000	Direct	6,000	104	102	20	300		30,600	30,600	$ 137,492	
Dennis	12,322	Direct	12,322	84	82	20	616		50,520	50,520	$ 226,997	
Eastham	4,000	Direct	4,000	116	114	20	200		22,800	22,800	$ 102,445	
Harwich	7,500	Direct	7,500	94	92	20	375		34,500	34,500	$ 155,015	
Orleans	5,497	Direct	5,497	106	104	20	275		28,584	28,584	$ 128,435	
Provincetown	4,000	Direct	4,000	162	160	20	200		32,000	32,000	$ 143,782	
Truro	2,200	Direct	2,200	148	146	20	110		16,060	16,060	$ 72,161	
Wellfleet	2,600	Direct	2,600	134	132	20	130		17,160	17,160	$ 77,103	
Subtotal	**50,719**		**50,719**						**264,565**	**264,565**	**$ 1,188,739**	**$ 23.44**
Off-Cape Towns that Haul Directly from Transfer Station												
Hanson	2,600	Direct	2,600		50	10	260		13,000	13,000	$ 58,411	
Kingston	5,000	Direct	5,000		32	10	500		16,000	16,000	$ 71,891	
Plymouth	14,000	Cedarville TS - Direct	1,690		42	10	169		7,098	7,098	$ 31,893	
		Manomet TS - Direct	8,908		36	10	891		32,069	32,069	$ 144,091	
		South Street TS - Direct	8,416		30	10	842		25,248	25,248	$ 113,444	
Subtotal	**21,600**		**26,614**				**2,661**		**93,415**	**93,415**	**$ 419,730**	**$ 15.77**
Off-Cape Town that Haul Directly in Curbside Collection Trucks												
Norwell	4,000	No Transfer Station	4,000		60	15	267		16,000	16,000	$ 71,891	
												$ 17.97
Totals	**189,338**		**194,352**				**2,928**		**373,979**		**$ 3,785,007**	**$ 19.99**

Assumptions

Round Trip Miles Closer to Bourne than SEMASS	2
Cost Per Truck Mile Hauled	$ 4.49

Appendix F

Greenhouse Gas Calculations Back-up

Transportation related GHG Emissions calculations from Municipal Solid Waste Disposal

Summary of Transportation results (metric tons of CO_2e)

Town	Disposal Option 1: Semass WTE	Disposal Option 2: Bourne Landfill	Disposal Option 3: REF Transfer Station to Southbridge, MA	Disposal Option 4: Yarmouth Transfer Station to 700 miles out of state
Bourne	580.46	1,416.16	1,164.09	1,197.80
Brewster	46.24	57.34	124.85	168.38
Chatham	43.72	53.81	115.18	155.60
Dennis	72.52	93.24	219.28	302.28
Eastham	32.51	39.24	80.15	106.53
Falmouth	194.48	139.34	414.83	681.47
Harwich	49.39	62.01	138.73	189.24
Mashpee	182.92	15.76	272.25	359.18
Orleans	40.82	50.07	106.30	143.32
Provincetown	45.40	52.13	93.04	118.87
Sandwich	193.46	86.60	318.75	340.90
Truro	22.81	26.51	49.02	62.60
Wellfleet	24.41	28.78	55.38	72.53
Yarmouth	280.06	200.38	607.61	655.36

Disposal Option 1: Semass WTE

Town	Annual waste (tons)	Transfer station?	Distance one way from transfer station (miles)				Annual Number of trips [1]		Annual Mileage		Fuel economy (miles/gallon)[2, 3]		Diesel use (gallons)		CO_2 emission factor (kg/gallon)[4]	CO_2 emissions (metric tons)	CH_4 emission factor[4]		CH_4 emissions (metric tons)	N_2O emission factor[4]		N_2O emissions (metric tons)	CO_2E emissions (metric tons)[4]
			Rail	Truck (8-ton)	Truck (20-ton)	Truck (25-ton)	Rail	Trucks	Rail	Trucks	Rail	Truck	Rail	Trucks			Rail (g/gallon)	Truck (g/mile)		Rail (g/gallon)	Truck (g/mile)		
Barnstable	49000	Through Yarmouth Transfer Stati	40	14			368	12250	14720	171500	0.54	5.8	27330.13	29568.97	10.15	577.53	0.8	0.0051	0.02274	0.26	0.0048	0.00793	580.46
Brewster	6600	Hauled Directly to SEMASS				50		528		26400	0.54	5.8		4551.72	10.15	46.20		0.0051	0.00013		0.0048	0.00013	46.24
Chatham	6000	Private hauler from Transfer Station				52		480		24960	0.54	5.8		4303.45	10.15	43.68		0.0051	0.00013		0.0048	0.00012	43.72
Dennis	12322	Truck to SEMASS				42		986		41402	0.54	5.8		7138.26	10.15	72.45		0.0051	0.00021		0.0048	0.00020	72.52
Eastham	4000	Participates in Regional Barnstable City Bid				58		320		18560	0.54	5.8		3200.00	10.15	32.48		0.0051	0.00009		0.0048	0.00009	32.51
Falmouth	18500	Through Otis Regional TS (RAIL)	25		6		368	1850	9200	11100	0.54	5.8	17081.33	1913.79	10.15	192.80	0.8	0.0051	0.01372	0.26	0.0048	0.00449	194.48
Harwich	7500	Hauled Directly to SEMASS				47		600		28200	0.54	5.8		4862.07	10.15	49.35		0.0051	0.00014		0.0048	0.00014	49.39
Mashpee	7500	Through Otis Regional TS (RAIL)	25		6		368	750	9200	4500	0.54	5.8	17081.33	775.86	10.15	181.25	0.8	0.0051	0.01369	0.26	0.0048	0.00446	182.92
Orleans	5497	Hauled Directly to SEMASS				53		440		23307	0.54	5.8		4018.50	10.15	40.79		0.0051	0.00012		0.0048	0.00011	40.82
Provincetown	4000	Hauled Directly to SEMASS				81		320		25920	0.54	5.8		4468.97	10.15	45.36		0.0051	0.00013		0.0048	0.00012	45.40
Sandwich	10519	Through Otis Regional TS (RAIL)	25		10		368	1052	9200	10519	0.54	5.8	17081.33	1813.62	10.15	191.78	0.8	0.0051	0.01372	0.26	0.0048	0.00449	198.46
Truro	2200	Truck to SEMASS				74		176		13024	0.54	5.8		2245.52	10.15	22.79		0.0051	0.00007		0.0048	0.00006	22.81
Wellfleet	2600	Truck to SEMASS				67		208		13936	0.54	5.8		2402.76	10.15	24.39		0.0051	0.00007		0.0048	0.00007	24.41
Yarmouth	27500	Through Yarmouth Transfer Stati	40				368		14720		0.54	5.8	27330.13	0.00	10.15	277.40	0.8		0.02186	0.26		0.00711	280.06
											14811.49	159500											

Notes:

[1]Three rail trips per week, 38 weeks/year. Five rail trips per week 14 weeks/year. Email, Dan Wahle,Mass Coastal to Bruce Haskell, CDM (11/27/09); Assume roundtrips - one way full, one way empty

[2]Trucks are assumed to be Advanced diesel Heavy-Duty Vehicles as defined in TCR; TCR fuel economy for heavy trucks is 5.8 mpg.

[3] All rail is via a one locomotive train with a 1,850 hp diesel engine. Email, Dan Wahle,Mass Coastal to Bruce Haskell, CDM (11/27/09)

Fuel economy of rail based on Federal Railroad Administration "Comparative Evaluation of Rail and Truck Fuel Efficiency on Competitive Corridors" Appendix D, Bottom-up method.

0.538599641 mpg = 111.4 gallons consumed per 60 mi traveled (30 mi loaded, 30 mi empty)

[4]The Climate Registry General Reporting Protocol, Tables: 13-1, 13-3, 13-6, B-1

Disposal Option 2: Bourne Landfill

Town	Annual waste (tons)	Distance from one way from town transfer station to Bourne landfill, MA (miles)[1]	Truck Capacity (tons)[1]	Annual Number of trips[2]	Annual Mileage	Fuel economy (miles/gallon)[3]	Diesel use (gallons)	CO_2 emission factor (kg/gallon)[4]	CO_2 emissions (metric tons)	CH_4 emission factor (g/mile)[4]	CH_4 emissions (metric tons)	N_2O emission factor (g/mile)[4]	N_2O emissions (metric tons)	CO_2E emissions (metric tons)[4]
Barnstable	49000	66	8	12250	808500	5.8	139396.55	10.15	1414.88	0.0051	0.00412	0.0048	0.00388	1,416.16
Brewster	6600	62	25	528	32736	5.8	5644.14	10.15	57.29	0.0051	0.00017	0.0048	0.00016	57.34
Chatham	6000	64	25	480	30720	5.8	5296.55	10.15	53.76	0.0051	0.00016	0.0048	0.00015	53.81
Dennis	12322	54	25	986	53231	5.8	9177.77	10.15	93.15	0.0051	0.00027	0.0048	0.00026	93.24
Eastham	4000	70	25	320	22400	5.8	3862.07	10.15	39.20	0.0051	0.00011	0.0048	0.00011	39.24
Falmouth	18500	43	20	1850	79550	5.8	13715.52	10.15	139.21	0.0051	0.00041	0.0048	0.00038	139.34
Harwich	7500	59	25	600	35400	5.8	6103.45	10.15	61.95	0.0051	0.00018	0.0048	0.00017	62.01
Mashpee	7500	12	20	750	9000	5.8	1551.72	10.15	15.75	0.0051	0.00005	0.0048	0.00004	15.76
Orleans	5497	65	25	440	28584	5.8	4928.34	10.15	50.02	0.0051	0.00015	0.0048	0.00014	50.07
Provincetown	4000	93	25	320	29760	5.8	5131.03	10.15	52.08	0.0051	0.00015	0.0048	0.00014	52.13
Sandwich	10519	47	20	1052	49439	5.8	8524.02	10.15	86.52	0.0051	0.00025	0.0048	0.00024	86.60
Truro	2200	86	25	176	15136	5.8	2609.66	10.15	26.49	0.0051	0.00008	0.0048	0.00007	26.51
Wellfleet	2600	79	25	208	16432	5.8	2833.10	10.15	28.76	0.0051	0.00008	0.0048	0.00008	28.78
Yarmouth	27500	52	25	2200	114400	5.8	19724.14	10.15	200.20	0.0051	0.00058	0.0048	0.00055	200.38

Notes:

[1]Trucks capacity from Bruce Haskell, CDM. Distance is from Semass to Bourne is 12 miles.

[2]Assume roundtrips - one way full, one way empty

[3]Trucks are assumed to be Advanced diesel Heavy-Duty Vehicles as defined in TCR; TCR fuel economy for heavy trucks is 5.8 mpg.

[4]The Climate Registry General Reporting Protocol, Tables: 13-1, 13-3, B-1

Disposal Option 3: REP Transfer Station to Southbridge, MA

Town	Annual waste (tons)	Distance from one way from REP transfer station to Southbridge, MA (miles)	Annual Number of trips [1]	Annual Mileage	Fuel economy (miles/gallon)[2]	Diesel use (gallons)	CO_2 emission factor (kg/gallon)[3]	CO_2 emissions (metric tons)	CH_4 emission factor (g/mile)[3]	CH_4 emissions (metric tons)	N_2O emission factor (g/mile)[3]	N_2O emissions (metric tons)	CO_2E emissions (metric tons)[3]	CO_2E emissions from Cape Cod transport (metric	Total CO_2E emissions (metric tons)
Barnstable	49000	85	3920	333200	5.8	57448.28	10.15	583.10	0.0051	0.00170	0.0048	0.00160	583.63	580.46	1164.09
Brewster	6600	85	528	44880	5.8	7737.93	10.15	78.54	0.0051	0.00023	0.0048	0.00022	78.61	46.24	124.85
Chatham	6000	85	480	40800	5.8	7034.48	10.15	71.40	0.0051	0.00021	0.0048	0.00020	71.47	43.72	115.18
Dennis	12322	85	986	83790	5.8	14446.48	10.15	146.63	0.0051	0.00043	0.0048	0.00040	146.77	72.52	219.28
Eastham	4000	85	320	27200	5.8	4689.66	10.15	47.60	0.0051	0.00014	0.0048	0.00013	47.64	32.51	80.15
Falmouth	18500	85	1480	125800	5.8	21689.66	10.15	220.15	0.0051	0.00064	0.0048	0.00060	220.35	194.48	414.83
Harwich	7500	85	600	51000	5.8	8793.10	10.15	89.25	0.0051	0.00026	0.0048	0.00024	89.33	49.39	138.73
Mashpee	7500	85	600	51000	5.8	8793.10	10.15	89.25	0.0051	0.00026	0.0048	0.00024	89.33	182.92	272.25
Orleans	5497	85	440	37380	5.8	6444.76	10.15	65.41	0.0051	0.00019	0.0048	0.00018	65.47	40.82	106.30
Provincetown	4000	85	320	27200	5.8	4689.66	10.15	47.60	0.0051	0.00014	0.0048	0.00013	47.64	45.40	93.04
Sandwich	10519	85	842	71529	5.8	12332.62	10.15	125.18	0.0051	0.00036	0.0048	0.00034	125.29	193.46	318.75
Truro	2200	85	176	14960	5.8	2579.31	10.15	26.18	0.0051	0.00008	0.0048	0.00007	26.20	22.81	49.02
Wellfleet	2600	85	208	17680	5.8	3048.28	10.15	30.94	0.0051	0.00009	0.0048	0.00008	30.97	24.41	55.38
Yarmouth	27500	85	2200	187000	5.8	32241.38	10.15	327.25	0.0051	0.00095	0.0048	0.00090	327.55	280.06	607.61

Notes:

[1]Trucks are assumed to have a capacity of 25 tons. Only accounts for one way trips, trucks likely to be carrying something on the way back unrelated to town's waste disposal.

[2]Trucks are assumed to be Advanced diesel Heavy-Duty Vehicles as defined in TCR; TCR fuel economy for heavy trucks is 5.8 mpg.

[3]The Climate Registry General Reporting Protocol, Tables: 13-1, 13-3, B-1

Disposal Option 4: Yarmouth Transfer Station to 700 miles out of state

Town	Annual waste (tons)	Distance from one way from town to Yarmouth transfer station (miles)		Annual Number of on-Cape trip ends[1]		Annual Mileage [1,2]			Fuel economy (miles/gallon)[3,4]		Fuel economy (ton-miles/gallon)[5]	Diesel use (gallons)[4]			CO_2 emission factor (kg/gallon)[6]	CO_2 emissions (metric tons)	CH_4 emission factor[6]		CH_4 emissions (metric tons)	N_2O emission factor[6]		N_2O emissions (metric tons)	CO_2E emissions (metric tons)[6]
		Rail	Truck (25-ton)	Rail (Cape)	Trucks	Rail (Cape)	Trucks	Rail (out of state)	Rail (Cape)	Truck	Rail (out of state)	Rail (Cape)	Truck	Rail (out of state)			Rail (g/gallon)	Truck (g/mile)		Rail (g/gallon)	Truck (g/mile)		
Barnstable	49000	5		368		1840		700	0.63	5.8	301.00	2934.80	0.00	113953.49	10.15	1186.42	0.8	0.0051	0.09351	0.26	0.0048	0.03039	1,197.80
Brewster	6600		12		528		6336	700	0.63	5.8	301.00	0.00	1092.41	15348.84	10.15	166.88	0.8	0.0051	0.01231	0.26	0.0048	0.00402	168.38
Chatham	6000		15		480		7200	700	0.63	5.8	301.00	0.00	1241.38	13953.49	10.15	154.23	0.8	0.0051	0.01120	0.26	0.0048	0.00366	155.60
Dennis	12322		5		986		4929	700	0.63	5.8	301.00	0.00	849.79	28655.81	10.15	299.48	0.8	0.0051	0.02295	0.26	0.0048	0.00747	302.28
Eastham	4000		20		320		6400	700	0.63	5.8	301.00	0.00	1103.45	9302.33	10.15	105.62	0.8	0.0051	0.00747	0.26	0.0048	0.00245	106.53
Falmouth	18500	40		368		14720		700	0.63	5.8	301.00	23478.40	0.00	43023.26	10.15	674.99	0.8	0.0051	0.05320	0.26	0.0048	0.01729	681.47
Harwich	7500		10		600		6000	700	0.63	5.8	301.00	0.00	1034.48	17441.86	10.15	187.53	0.8	0.0051	0.01398	0.26	0.0048	0.00456	189.24
Mashpee	7500	30		368		11040		700	0.63	5.8	301.00	17608.80	0.00	17441.86	10.15	355.76	0.8	0.0051	0.02804	0.26	0.0048	0.00911	359.18
Orleans	5497		16		440		7036	700	0.63	5.8	301.00	0.00	1213.13	12783.72	10.15	142.07	0.8	0.0051	0.01026	0.26	0.0048	0.00336	143.32
Provincetown	4000		42		320		13440	700	0.63	5.8	301.00	0.00	2317.24	9302.33	10.15	117.94	0.8	0.0051	0.00751	0.26	0.0048	0.00248	118.87
Sandwich	10519	15		368		5520		700	0.63	5.8	301.00	8804.40	0.00	24462.79	10.15	337.66	0.8	0.0051	0.02661	0.26	0.0048	0.00865	340.90
Truro	2200		33		176		5808	700	0.63	5.8	301.00	0.00	1001.38	5116.28	10.15	62.09	0.8	0.0051	0.00412	0.26	0.0048	0.00136	62.60
Wellfleet	2600		29		208		6032	700	0.63	5.8	301.00	0.00	1040.00	6046.51	10.15	71.93	0.8	0.0051	0.00487	0.26	0.0048	0.00160	72.53
Yarmouth	27500	0		368		0		700	0.63	5.8	301.00	0.00	0.00	63953.49	10.15	649.13	0.8	0.0051	0.05116	0.26	0.0048	0.01663	655.36

Notes:

[1]Three rail trips per week, 38 weeks/year. Five rail trips per week 14 weeks/year. Email, Dan Wahle,Mass Coastal to Bruce Haskell, CDM (11/27/09); Assume roundtrips - one way full, one way empty.

[2]Trucks are assumed to have a capacity of 25 tons

[3]Trucks are assumed to be Advanced diesel Heavy-Duty Vehicles as defined in TCR; TCR fuel economy for heavy trucks is 5.8 mpg.

[4]Email, Dan Wahle,Mass Coastal to Bruce Haskell, CDM (11/27/09)

Fuel economy of Cape rail based on Federal Railroad Administration "Comparative Evaluation of Rail and Truck Fuel Efficiency on Competitive Corridors" Appendix D, Bottom-up method.

0.626959248 mpg = 95.7 gallons consumed per 60 mi traveled (30 mi loaded, 30 mi empty)

[5]Out of state rail is via a two locomotive train with two 4,000 ho diesel engines. Fuel economy of Out of State rail based on Federal Railroad Administration "Comparative Evaluation of Rail and Truck Fuel Efficiency on Competitive Corridors" Appendix A, Exhibit A-1. List of Rail Movements; 301 ton-miles per gallon.

[6]The Climate Registry General Reporting Protocol, Tables: 13-1, 13-3, 13-6 B-1

Annual Electricity Generation GHG Emissions Reduction calculations from Municipal Solid Waste

Town	Barnstable	Brewster	Chatham	Dennis	Eastham	Falmouth	Harwich	Mashpee	Orleans	Provincetown	Sandwich	Truro	Wellfleet	Yarmouth
Proposed Annual Tonnage	49,000	6,600	6,000	12,322	4,000	18,500	7,500	7,500	5,497	4,000	10,519	2,200	2,600	27,500
Waste to Energy Electricity Production														
kwh produced[1]	26,950,000	3,630,000	3,300,000	6,777,100	2,200,000	10,175,000	4,125,000	4,125,000	3,023,350	2,200,000	5,785,450	1,210,000	1,430,000	15,125,000
Displaced $MTCO_2$ from grid[2]	(11,108.78)	(1,496.28)	(1,360.26)	(2,793.52)	(906.84)	(4,194.13)	(1,700.32)	(1,700.32)	(1,246.22)	(906.84)	(2,384.76)	(498.76)	(589.45)	(6,234.52)
LFG to Energy Electricity Production [5]														
Landfill gas capture rate (scf/min)[2]	329.09	44.33	40.30	82.76	26.86	124.25	50.37	50.37	36.92	26.86	70.65	14.78	17.46	184.70
Landfill gas captured (scf)[2]	172,971,381.50	23,298,186.08	21,180,169.16	43,497,007.41	14,120,112.78	65,305,521.59	26,475,211.45	26,475,211.45	19,404,564.98	14,120,112.78	37,132,366.57	7,766,062.03	9,178,073.30	97,075,775.33
MMBtu value[3]	86,918.12	11,707.34	10,643.04	21,857.25	7,095.36	32,816.02	13,303.79	13,303.79	9,750.79	7,095.36	18,659.01	3,902.45	4,611.98	48,780.58
MMBtu produced[3]	34,767.25	4,682.94	4,257.21	8,742.90	2,838.14	13,126.41	5,321.52	5,321.52	3,900.32	2,838.14	7,463.61	1,560.98	1,844.79	19,512.23
kwh produced[3]	10,183,728.08	1,371,685.82	1,246,987.11	2,560,895.87	831,324.74	3,844,876.93	1,558,733.89	1,558,733.89	1,142,448.03	831,324.74	2,186,176.24	457,228.61	540,361.08	5,715,357.60
Displaced $MTCO_2$ from grid[3]	(4,197.73)	(565.41)	(514.01)	(1,055.60)	(342.67)	(1,584.86)	(642.51)	(642.51)	(470.92)	(342.67)	(901.14)	(188.47)	(222.74)	(2,355.87)

WTE electricity	**0.001659236**	**$MTCO_2$ / kwh**	(0.23)
LFG electricity	**0.002657291**	**$MTCO_2$ / kwh**	(0.09)
New England grid electricity[4]	**0.000412200**	**$MTCO_2$ / kwh**	

Notes:

[1]The SEMASS WTE facility net energy production from Tony LoRe, CDM; email 11/30/09

550 kwh/ton of MSW

[2]LFG capture rates from the IPCC FOD model (as referenced in LGOP) - see model spreadsheet for each town; Capture rates assume 75%.

525,600 min/year

[3]Local Government Operations Protocol emission factors from Table G-2

0.0005025 MMBtu / scf of LFG

40% Efficiency of combustion unit

0.003414 MMBtu/kwh

1000 kg / metric ton

[4]EPA egrid factors from LGOP emission factors from Table G-7; NEWE region

908.9 lbs CO_2/MWh

1000 kwh/MWh

2205 lbs/metric ton

[5]Assumes electricity production from year 3 through year 33 only.

Annual Municipal Solid Waste GHG Emissions calculations

Town	Barnstable	Brewster	Chatham	Dennis	Eastham	Falmouth	Harwich	Mashpee	Orleans	Provincetown	Sandwich	Truro	Wellfleet	Yarmouth
Proposed Annual Tonnage	49,000	6,600	6,000	12,322	4,000	18,500	7,500	7,500	5,497	4,000	10,519	2,200	2,600	27,500
Waste to Energy GHG emissions ($MTCO_2$)[1]	44,716.42	6,023.03	5,475.48	11,244.81	3,650.32	16,882.73	6,844.35	6,844.35	5,016.45	3,650.32	9,599.43	2,007.68	2,372.71	25,095.95
Landfill gas capture rate (scf/min)[2]	418.64	56.39	51.26	105.27	34.17	158.06	64.08	64.08	46.96	34.17	89.87	18.80	22.21	234.95
Landfill gas captured (MMscf)[2]	220.04	29.64	26.94	55.33	17.96	83.07	33.68	33.68	24.68	17.96	47.24	9.88	11.68	123.49
Landfill CH_4 emissions ($MTCO_2E$)[2]	13,697.63	1,844.99	1,677.26	3,444.54	1,118.17	5,171.56	2,096.58	2,096.58	1,536.65	1,118.17	2,940.52	615.00	726.81	7,687.45
LFG Combustion emissions ($MTCO_2$)[3]	5764.93	776.50	705.91	1449.70	470.61	2176.56	882.39	882.39	646.73	470.61	1237.58	258.83	305.89	3235.42
Landfill CO_2 emissions ($MTCO_2$)[4]	7598.57	1023.48	930.44	1910.81	620.29	2868.85	1163.05	1163.05	852.43	620.29	1631.21	341.16	403.19	4264.50
TOTAL Landfill emissions ($MTCO_2E$)	27,061.13	3,644.97	3,313.61	6,805.05	2,209.07	10,216.96	4,142.01	4,142.01	3,035.82	2,209.07	5,809.31	1,214.99	1,435.90	15,187.37
Difference in GHG emissions (WTE - landfill)	17,655.29	4,178.04	3,798.22	7,800.28	2,532.15	11,711.17	4,747.77	4,747.77	3,479.80	2,532.15	6,658.91	1,392.68	1,645.89	17,408.50

WTE GHG emissions rate	**0.91**	**$MTCO_2$ / ton MSW**
Landfill GHG emissions rate	**0.55**	**$MTCO_2E$ / ton MSW**

Notes:

[1]Local Government Operations Protocol emission factors from Table G-2

912.58 kg CO_2/short ton of MSW (assumes 65% of MSW is biogenic, 35% of MSW is from fossil fuel origin)

1000 kg / metric ton

[2]LFG capture rates from the IPCC FOD model (as referenced in LGOP) - see model spreadsheet for each town; Capture rates assume 75%.

Equation 9.1: CH_4 emitted ($MTCO_2E$) = LFG collected x % CH4 x {(1-DE) + [((1-CE) / CE) x (1-OX)]} x unit conversion x GWP

525,600 min/year

0.50 Fraction of CH_4 in LFG

0.75 Collection Efficiency (CE)

0.10 Oxidation Factor (OX)

0.99 CH_4 Destruction Efficiency (DE)

1 mmscf LFG = 19.125 metric tons of CH_4

21 GWP of CH_4

[3]Local Government Operations Protocol emission factors from Table G-2

90.72 kg CO_2/MMBtu of MSW (assumes 65% of MSW is biogenic, 35% of MSW is from fossil fuel origin)

52.07 kg CO_2/MMBtu of LFG (assumes 50% CH_4, 50% CO_2)

0.0262 kg CO_2/scf of LFG (assumes 50% CH_4, 50% CO_2)

1000 kg / metric ton

[4] Cynthia Hibbard, CDM

CO_2 emitted ($MTCO_2$) = (LFG collected/CE) x % CO2 x unit conversion x GWP

0.50 Fraction of CH_4 in LFG

0.75 Collection Efficiency (CE)

1 mmscf LFG = 51.800 metric tons of CO_2

1 GWP of CO_2

Does not account for any carbon sink potential at the landfill.

Appendix G

Comments on Draft Report and Response Summary

Responses to Comments Received on Draft Report
Evaluation of Future Disposal Alternatives for Municipal Solid Waste
April 2010

	Comment Letter	Comment	Response
1.	Sierra Club (James McCaffrey) March 5, 2010	Zero Waste being ignored in study	Further measures to divert and recycle portions of the MSW will be evaluated separately. Zero Waste is outside of scope of CDM study.
		Concern about waste-to-energy plants as environmentally sound	Currently, waste-to-energy provides an appropriate method for disposal of the MSW from the Study Communities. Concerns about calculations of Greenhouse Gas (GHG) Emissions are addressed in Section 4.2.1.
		Development of a responsiveness summary on comments	This table is the responsiveness summary
2.	Covanta Energy (Tim Cippola) March 5, 2010	"CDM has presented misleading GHG emissions information that is inconsistent with international, USEPA and Massachusetts reporting methodologies and precedents."	In section 4.2.1, CDM has provided the documentation for the presented GHG analysis including conformance with the standards referenced by Covanta. CDM believes that the presentation of GHG analysis conforms to applicable standards.
		"We believe that several of the technical underpinnings of their analysis are either flawed or oversimplified in underreporting of landfill GHG emissions."	CDM has revised the original estimate of landfill gas emissions in response to Covanta comments including extending the lifetime of emissions to 100-years and not counting collection for the first two years after waste placement. Other assumptions made by CDM are in accordance with published information and our experience as documented in Section 4.2.1.
		"CDM's draft calculations of GHG emission has not followed internationally and domestically accepted protocols...."	The narrative of this comment focuses on the accounting for the biogenic and anthropogenic portion of the waste streams. CDM's approach is outlined in detail in Section 4.2.1.
		"The calculation of GHG emissions attributes avoided grid electricity to two landfills where no landfill gas to energy systems are currently in-place."	The Bourne and Southbridge landfills have both applied for permits for landfill gas to energy facilities that CDM expects will be operational when the Study Communities would start to utilize them in 2015.
		"CDM appears to oversimplify landfill gas collection, applying one collection efficiency of the entire life of waste in the landfill...."	CDM utilized landfill gas collection efficiencies based on our experience with these facilities and accepted design protocols.
		"CDM has used an average grid GHG emission intensity for its calculation. Calculations of avoided grid electricity should better reflect the mix of electricity to likely to be displaced by LFGTE or EfW."	Average emission rates take into account the emissions from all fo the regional power plants. The marginal emission rates are from those plants that are used only during periods of peak demand, which tend to be the older and less efficient plants. Since the SEMASS plant sells the electricity that it generates to the grid all the time, it is CDM's opinion that using the average annual emission rate, rather than just the emission rates for peaking plants is appropriate.
		"The CDM calculation did not account for ferrous and non-ferrous recovery at the SEMASS EfW facility."	Noted in Section 4.2.1.

	Comment Letter	Comment	Response
3.	Mass Coastal Railroad (Dan Wahle) March 2, 2010	Number of truck trips that would traverse Cape Cod roads and bridges should be noted for each option.	Truck trips around and over the Canal bridges for various alternatives are presented in section 4.2.2 and figure 4-4.
		Removal of truck trips from roadways with existing and expanded use of rail versus trucks	CDM generally agrees with the calculations of truck trips presented in the comments.
4.	Water Energy & Ecology Information Services (Chris Powicki) February 22, 2010	All MSW management options should be subjected to a rigorous and transparent "true cost" evaluation	The Commission is proposing to conduct a second study to evaluate recycling on Cape Cod. This study could evaluate the potential for a "true cost" analysis of various waste disposal options. This was outside of the scope of work for this study.
		Landfilling, incineration and other waste-to-energy methodologies represent resource management failures to varying degrees. This should be acknowledged in report.	At this time, landfilling and waste-to-energy are the two most significant methods for disposal of MSW after recycling and waste reduction in Massachusetts. The report acknowledges that the communities should track future recycling efforts as well as future technologies that may develop by 2015.
		Cradle to grave analysis of GHG emissions related to reduction, reuse, recycling, landfilling and energy recover should be performed.	Average emission rates take into account the emissions from all fo the regional power plants. The marginal emission rates are from those plants that are used only during periods of peak demand, which tend to be the older and less efficient plants. Since the SEMASS plant sells the electricity that it generates to the grid all the time, it is CDM's opinion that using the average annual emission rate, rather than just the emission rates for peaking plants is appropriate. It is outside of CDM's scope of work to evaluate waste reduction, reuse and recycling. This will be the focus of a future solid waste study that the Commission is attempting to fund.
		Source reduction, beneficial reuse and materials recovery should be adopted as foundational elements in the region's resource management strategy.	The development of the region's resource management strategy is a policy decision and outside of the scope of work for this study.
		Favors development of a Zero Waste approach.	The evaluation of a Zero Waste alternative and recycling will be part of a future study to be performed by the Commission when funding becomes available.
		The report's recommendations need to be evaluated from a wider perspective as a component of a strategy for the transition to sustainability	Outside of the scope of work for the report.
		Evaluate impact of centralized wastewater treatment plants and handling of sludges	Outside of the scope of work for the report.
		Report should list economic benefits such as jobs, taxes, user fees, etc. from each alternative.	Outside of the scope of work for the report.
		GHG analysis leaves a lot to be desired. Does not include recycling as an alternative.	The evaluation of recycling will be conducted under a separate report that the Commission is attempting to fund. This analysis could evaluate GHG benefits from recycling and reductions in the extraction of raw materials as requested.

	Comment Letter	Comment	Response
5.	Cape and Islands Sierra Club (David Dow) February 17, 2010	Part of report missing the emission of toxic air pollutants and disposal of residual ash from waste-to-energy plants.	CDM was provided information by SEMASS on their emissions. The results of their ongoing monitoring program is that the total emissions are generally well below their permit requirements.
		Since Commission regional plan calls for 60% recycling by 2012, it is not appropriate to construct a waste-to-energy plant at the Bourne landfill.	There is no plan currently to construct a waste-to-energy plant at the Bourne Landfill. CDM did discuss that Bourne was permitting a plant to turn extracted landfill gas into energy at their landfill.
6.	Town of Plymouth (Kerin McCall) February 18, 2010	Table 2-1 – tonnages shown as handled at transfer stations are totals not just MSW	Added note and revised column heading on table 2-1 to clarify.
		Last paragraph in section 3.3 states that none of the town's signed the MOU but Plymouth signed it in August 2009.	Section is revised.
		Table 3-1 incorrectly showed Plymouth's contract as expiring in 2016.	Table 3-1 has been revised.

COMMENT 1 – Sierra Club

From: "James McCaffrey" <director@SierraClubMass.org>
To: "pdaley@capecodcommission.org" <pdaley@capecodcommission.org>
Cc: "msarkisyan@capecodcommission.org" <msarkisyan@capecodcommission.org>, "edith.demello@state.ma.us" <edith.demello@state.ma.us>, "chrisp@weeinfo.com" <chrisp@weeinfo.com>, "pniedzwiecki@capecodcommission.org" <pniedzwiecki@capecodcommission.org>
Subject: SC Comments to CCC SWAC

Dear Ms. Daley:

Please confirm receipt of these comments, thank you.

Comments are attached as PDF and also included below as text in the event there are issues with receiving or opening attachments.

Very Best Regards,

James McCaffrey

James McCaffrey
Director
Massachusetts Sierra Club
10 Milk Street, Suite 632
Boston MA 02108

617.423.5775 voice
617.890.0338 fax
www.sierraclubmass.org
director@sierraclubmass.org

The Sierra Club is a non-profit environmental organization with 21,000 members in Massachusetts and 700,000 members nationwide dedicated to the preservation, protection, and exploration of the earth's natural environment. Join us! www.sierraclubmass.org

March 5, 2010

Patty Daley

Cape Cod Commission

3225 Main St.
PO BOX 226

Barnstable, MA 02630-0226
Fax: 508-362-3136

Via email: pdaley@capecodcommission.org

Sierra Club comments on CDM Waste Alternatives to the CMAS Contract & Recommendations to CCC Solid Waste Advisory Committee

Dear Ms. Daley,

On behalf of the Sierra Club we submit our comments on the proposed CDM Waste Alternatives to the CMAS Contract and the Evaluation of Future Disposal Alternatives for Municipal Solid Waste. We have been following the process underway to evaluate options for discard management on Cape Cod, and are concerned that Zero Waste has been ignored. Zero Waste is a planning approach to eliminate waste rather than manage it.

1. Numerous reports conclude that 90% of discarded material can be diverted from disposal, eventually eliminating the need for incineration, and landfilling as we know it. For example, in San Jose, where a landfill was projected to have only five more years of capacity, Zero Waste strategies extended the anticipated capacity an additional 35 years.

In light of the recently announced MassDEP policy shift for the Solid Waste Master Plan, 2010-20, it is striking that the focus on the Cape is still on waste disposal rather than waste reduction. MassDEP studied waste management options and impacts for a full two years before concluding, [3]Focusing on incineration and landfills is the wrong end of the waste equation...there is a lot more we can do to increase recycling and reduce disposal of useful materials.[2] [1] <#_ftn1>

Moreover, this decision was informed by a report from the Tellus Institute, commissioned by the DEP and paid for with public money. The data presented showed that from a lifecycle perspective, a waste reduction approach utilizing proven strategies such as Pay-As-You-Throw trash programs, composting of organics, and Extended Producer Responsibility for products and packaging, is the clear winner over landfilling and incineration, in terms of greenhouse gas emissions, energy and resource savings, and toxic emissions.[2] <#_ftn2>

Extended Producer Responsibility (EPR) is a Zero Waste strategy that will

reduce the volume and toxicity of waste by requiring producers to pay for the cost of discard management. Thus EPR gives brand owners incentive to redesign products to be more durable, repairable and recyclable. Most people associate EPR with toxic products such as electronics, but potentially it can cover the full range of products and packaging, which accounts for 75% of the waste stream. DEP plans to work with other states in the Northeast on harmonious bill language for EPR for multiple product categories.

Instead of destroying finite resources by burning and burying, Cape Cod has the option of implementing programs that will extend the lives of products and materials, while generating new businesses and jobs in reuse, remanufacture, repair, disassembly, recycling, and composting. To our knowledge, no consultants have been hired to evaluate the Zero Waste option for Cape Cod.

2. Given the December 11, 2009 announcement from the Office of Energy and Environmental Affairs noting that new waste to energy regulations are needed to ³lower emissions of greenhouse gases and other pollutants,² CDM¹s characterization of incineration as ³clean² and the SEMASS operation as ³environmentally sound,² must be questioned.

Incinerators produce more carbon dioxide per kilowatt-hour of electricity than power plants fired by coal, oil, or natural gas. The incinerator industry, however, claims that the CO2 emissions from the biomass portion of the waste, being biogenic, are therefore ³carbon neutral, ³ and need not be counted. Biogenic sources of carbon in the atmosphere are those that are part of the natural carbon cycle. In the case of trees, for example, which grow, die, decay, grow again, etc., there is no net carbon gain in the atmosphere over time because the carbon is simply cycling in a natural system. Breaking this cycle, by harvesting, processing, transporting, and removing organic materials from functioning eco-systems, whether it be to burn directly for fuel, or to manufacture into products and then incinerate them for waste-to-energy, disrupts the capacity of these natural systems to recycle carbon. The result is a net increase in CO2.

The incinerator industry would have us believe that because roughly 50% of the waste they are burning is biogenic in origin (as opposed to fossil), their operations are part of this natural cycle, and therefore ³carbon neutral.² Moreover, to defend their claim, they quote selectively from the Intergovernmental Panel on Climate Change¹s protocol for national emissions inventories, which is set up to avoid counting emissions twice, and can be misleading if quoted out of context. But the IPCC does say explicitly, ³However, if incineration of waste is used for energy purposes, both fossil and biogenic CO2 emissions should be estimated...²[3] <#_ftn3>

Forests and soil systems can take decades to reabsorb the CO2 released to

the atmosphere when biomass is used for energy systems. While the volume of paper products, cardboard, and wood that burns round the clock in incinerators comes from a biogenic source, it may take 50 or 80 years for new trees to mature and replace those that have been cut. But preventing or delaying release of CO2 from the atmosphere is critical now, when climatologists are telling us that only a concerted effort to curb GHG emissions, beginning now with reductions of 2 to 3 % per year , over the next 10 to 20 years can forestall an irreversible tipping point for climate change. The proposed alternatives would, in contrast, result in an increase of CO2 output at this time.

A prestigious report from Princeton published in Science in October 2009 has alerted the world to the ³fatal error² in the Kyoto climate treaty that allows these burning systems to be called beneficial. One of the authors, Tim Searchinger explains, ³Even if you were to cut down the world¹s forests...and take the wood and put it in a boiler‹which obviously releases enormous amounts of carbon from the trees‹that is treated as a pure way of reducing greenhouse gas emissions. And that¹s obviously an error.²[4] <#_ftn4> The conclusion of the report is that nations must count all carbon dioxide coming out of smoke stacks and tailpipes, regardless of the source. Incinerating biomass materials (rather than leaving them in place, conserving, reusing, recycling or composting them) causes a net transfer of carbon from soils and forest to the atmosphere, where it contributes to global warming.

3. We understand from our members on Cape Cod that a number of written comments to CCC on the CDM report have not been distributed to the SWAC advisory Committee. Sierra Club requests that the Commission develop a responsiveness summary for all written comments.

We request that this summary go beyond noting the concerns expressed, and explain what the Cape Cod Commission plans to do to address these issues, which include failure to consider Zero Waste benefits to the region; inadequate discussion of hazardous waste emissions from waste-to-energy plants; incomplete analysis of the greenhouse gas emissions; and anticipated new state and Federal standards for disposal sites.

We appreciate your attention to these matters.

Very Truly Yours,

James McCaffrey Director Massachusetts Sierra Club Lynn Pledger Chair,

Zero Waste Committee Massachusetts Sierra Club

[1] <#_ftnref1> Secretary Ian Bowles in a release from the Office of Energy and Environmental Affairs, December 11, 2009

[2] <#_ftnref2> http://www.mass.gov/dep/recycle/priorities/dswmpu01.htm

[3] <#_ftnref3> Sabin Guendehou., et al., ³2006 IPCC Guidelines for National Greenhouse Gas Inventories; Chapter 5:
Incineration and Open Burning of Waste,² Intergovernmental Panel on Climate Change National Greenhouse Gas Inventories Programme, p. 5.5, 2006.

<#_ftnref4>

[4] http://www.npr.org/templates/story/story.php?storyId=114055974

COVANTA
ENERGY
for a cleaner world

Thomas Cipolla
Business Manager

Covanta SEMASS
141 Cranberry Highway
West Wareham, MA 02576

March 5, 2010

Ms. Patty Daley
Chief of Staff
Cape Cod Commission
3225 Main Street
Barnstable, MA 02630

Dear Ms. Daley:

In August 2009, CDM was hired by the Cape Cod Commission to investigate waste disposal alternatives and conduct a study that would examine the cost, the long-term viability and the risks associated with various waste disposal services available to local communities. Since that time, we have hosted CDM representatives at our Energy-from-Waste (EfW) facility to see first hand how we convert post-recycled municipal solid waste from Cape Cod into clean renewable energy. We have also made ourselves available to CDM consultants and discussed with them the technical aspects of the EfW process and greenhouse gas emissions.

Shortly, CDM plans to issue its findings in a final report to the Commission. Based on our review of the draft Report and of the slide presentation made to the Commission on February 18, 2010, we believe that CDM has presented misleading greenhouse gas (GHG) emissions information that is inconsistent with international, U.S. EPA, and Massachusetts reporting methodologies and precedent. Furthermore, we believe that several of the technical underpinnings of their analysis are either flawed or oversimplified and result in underreporting of landfill GHG emissions.

As a result, CDM, in its February 18th presentation, has concluded that EfW facilities release more GHG emissions than landfilling, contrary to widespread international consensus. CDM has reached a conclusion that contradicts findings by the U.S. EPA, the European Union, the Intergovernmental Panel on Climate Change (IPCC), the World Economic Forum, the United Nations Framework Convention on Climate Change and numerous peer reviewed and published studies that find that energy-from-waste significantly lowers GHG emissions relative to landfilling.

Both the European Union (EU) and the U.S. EPA have developed waste hierarchies which give preference to recycling and energy recovery over waste disposal in landfills.[1,2] A recent paper co-authored by U.S. EPA and North Carolina State researchers demonstrated the value of EfW over landfilling from both a GHG and energy perspective.[3] We have attached a copy of this paper for your review. In addition, a paper providing a review of ten different waste management scenarios found EfW to be the most attractive option in terms of net carbon emissions.[4]

In addition, the Nobel Prize winning IPCC has identified EfW as a key GHG emission mitigation technology due to its avoidance of landfill methane.[5] The European Union, in the 1999 Landfill Directive, took aggressive steps to reduce landfill methane emissions by restricting the amount of biodegradable waste sent to landfills.[6] Early implementation of this directive has already resulted in reductions of GHG emissions from waste management; energy recovery through incineration is an important part of this trend.[7] The European Environment Agency expects GHG emissions from MSW management to drop considerably by 2020 with increasing use of incineration with energy recovery and recycling.[8] Finally, the World Economic Forum, has concluded that EfW is one of ten technologies that will "contribute substantially to the clean energy infrastructure of the future."[9]

As described above, the CDM Presentation states that GHG emissions from EfW exceed those from landfilling, in contrast to overwhelming evidence and public policy. We believe that this erroneous conclusion is due to a series of technical flaws and deviations from generally accepted GHG accounting practices as described below.

CDM's draft calculation of greenhouse gas emissions has not followed internationally and domestically accepted protocols for calculating and reporting GHG emissions.

The results in CDM's presentation sum biogenic CO_2 and anthropogenic GHG emissions to determine total GHG emissions, in direct contrast with existing precedents. Comparisons of greenhouse gas emissions from waste disposal practices should be based on anthropogenic emissions only. The *2006 IPCC Guidelines for National Greenhouse*

---

[1] U.S. Environmental Protection Agency Office of Solid Waste and Emergency Response. *Opportunities to Reduce Greenhouse Gas Emissions through Materials and Land Management Practices.* Washington, DC. September 2009.
[2] European Union, EU (2008) Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives. *Official Journal of the European Union.* L312, **51**, 3-30
[3] Kaplan, P.O, J. DeCarolis, and S. Thorneloe, 2009, Is it better to burn or bury waste for clean electricity generation? *Environ. Sci. Technology* 43 (6) pp1711-1717
[4] Thorneloe, S. A., K. Weitz, J. Jambeck, 2007, Application of the U.S. Decision Support Tool for Materials and Waste Management, *Waste Management* 27 (8) pp1006-1020.
[5] IPCC, 2007. Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC, Geneva, Switzerland.
[6] European Union, EU (1999) Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste. *Official Journal of the European Communities,* L182, 42, 1-19.
[7] European Environment Agency. Annual European Community greenhouse gas inventory 1990-2005 and inventory report 2007, May 27, 2007. {p.402}
[8] European Environment Agency. EEEA Briefing, Better management of municipal waste will reduce greenhouse gas emissions. 2008.
[9] World Economic Forum, 2010, *Green Investing 2010: Policy Mechanisms to Bridge the Financing Gap*

Gas Inventories and the *Greenhouse Gas Protocol* are widely recognized as the primary standards for greenhouse gas accounting. These documents, designed to ensure consistent and accurate reporting, form the basis of the U.S. EPA and the Massachusetts GHG inventories. Both documents clearly state that biomass emissions are to be reported separately from anthropogenic emissions and for informational purposes only, and should not be summed together with anthropogenic emissions. Anthropogenic emissions include carbon dioxide (CO_2) from the combustion of fossil based components in waste (e.g. plastics) and methane (CH_4) emissions from landfills.

This separate reporting is done to clearly recognize the significant difference between biogenic and anthropogenic emissions. Biogenic emissions are part of the normal carbon cycle. Anthropogenic emissions on the other hand, represent releases of permanently sequestered fossil carbon, or releases that are due solely to the actions of mankind, as is the case with landfill methane emissions. Instead, CDM has reported the total GHG emissions as a sum of anthropogenic and biogenic emissions, disregarding their differences, and inconsistent with established methods. In fact, the GHG emissions in the Presentation would *not* be consistent with those reported under either the federal or Massachusetts mandatory GHG reporting programs.

The global precedent for the separate treatment of biogenic and anthropogenic GHG emissions is further outlined in the examples below:

- The Massachusetts GHG reporting rule specifies that GHG emissions shall be reported in accordance with The Climate Registry General Reporting Protocol. The General Reporting Protocol states that "CO_2 emissions from biomass combustion are reported separately because the carbon in biomass is of a biogenic origin – meaning that it was recently contained in living organic matter – while the carbon in fossil fuels has been trapped in geologic formations for millennia."[10]
- The U.S. EPA released a comprehensive life cycle assessment of GHG emissions in 2006 titled *Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks*. In performing their analysis, "Nonbiogenic CO_2 emitted during combustion (i.e., CO_2 from plastics) is counted toward the GHG emissions associated with combustion, but biogenic CO_2 is not."[11]
- The U.S. EPA Municipal Solid Waste Decision Support Tool, a comprehensive tool specifically designed to assist planners in evaluating waste management options, does not count biogenic emissions of CO_2 as a GHG emission. A 2006 EPA report using the MSW-DST clearly outlined this distinction: "[Metric tons carbon equivalents] is based on carbon dioxide fossil and methane emissions. Carbon dioxide biomass is not included because it is considered to be part of the natural short-term carbon cycle."[12]

---

[10] The Climate Registry, 2008, *General Reporting Protocol, Version 1.1: Accurate, transparent, and consistent measurement of greenhouse gases across North America.*
[11] U.S. EPA, 2006, *Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks.*
[12] U.S. EPA, 2006, *Application of Life-Cycle Management to Evaluate Integrated Municipal Solid Waste Management Strategies.*

- Recognizing the important distinction between biogenic CO_2 and anthropogenic GHG emissions, biomass CO_2 emissions from combustion have not been capped under cap and trade programs in place including California's proposed carbon cap, the Kyoto Protocol[13], the European Union Emission Trading Scheme (EU-ETS)[14], or the Regional Greenhouse Gas Initiative (RGGI).[15] It is important to note that Massachusetts is a RGGI member state.

By summing biogenic CO_2 and anthropogenic emissions in their analysis, CDM has placed fossil carbon and biogenic carbon on equal footing, despite near universal consensus that they are distinctly different. To properly evaluate waste disposal options, comparisons must be based on anthropogenic GHG emissions.

The calculation of greenhouse gas emissions attributes avoided grid electricity benefits to two landfills where no landfill gas to energy systems are currently in place.

The CDM analysis accounts for displaced grid electricity for the Bourne and Rochester Environmental Park landfills, even though there are no landfill gas to energy (LFGTE) systems installed at either landfill. Landfills are not required to install landfill gas to energy systems and future installations should not be assumed, unless required by permit or other regulatory mechanism and clearly identified by CDM in its assumptions. Expectations of future systems could be represented as a emissions range in evaluating the options.

Based on the results in the Presentation, CDM appears to oversimplify landfill gas collection, applying one collection efficiency over the entire life of waste in the landfill. To calculate emissions for comparison purposes, a lifetime efficiency, that accounts for periods of no methane collection, must be used.

The largest component driving the performance of EfW relative to landfilling is landfill methane avoidance. Not all landfill methane can be collected during the year, nor over the life span of waste in a landfill. When looking over the lifetime of waste in a landfill, the EPA default value of 75% is high, given that landfill gas is not collected for the entire life of a landfill (Figure 1). In full compliance with state and federal regulations, landfills have anywhere from two to five years after waste is placed in a cell before the installation of landfill gas collection equipment is required. Furthermore, landfills are not required to collect landfill gas for destruction forever. Once the regulatory minimum of fifteen years has passed, landfills can cease collection and destruction of landfill gas once

---

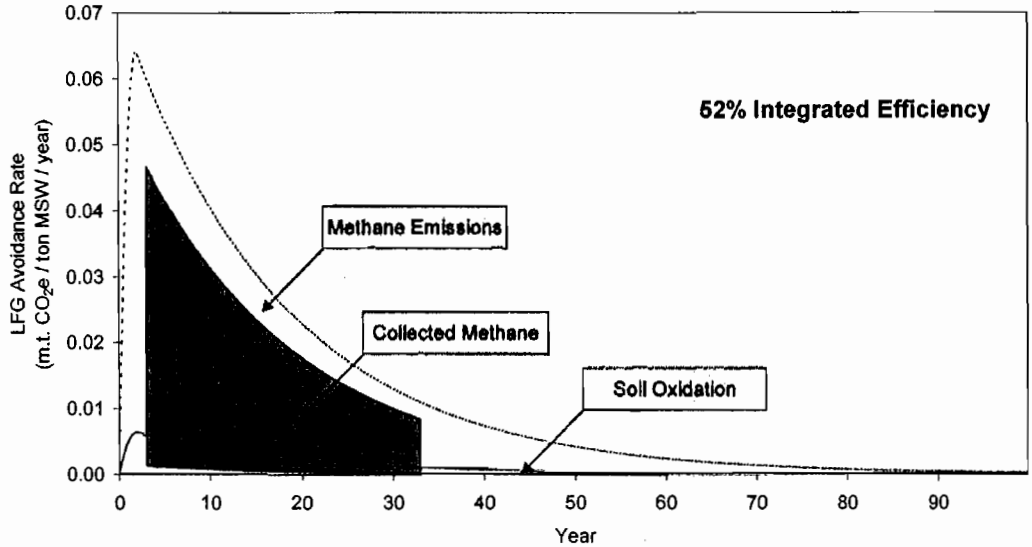
[13] United Nations. Kyoto Protocol to the United Nations Framework Convention on Climate Change. 1998.

[14] European Union. Directive 2003/87/EC Establishing a Scheme for Greenhouse Gas Emissions Allowance Trading within the Community and Amending Council Directive 96/61/EC. {Annex IV – "The emission factor for biomass shall be zero}

[15] Regional Greenhouse Gas Initiative Model Rule. January 1, 2007.

concentrations of non-methane organic compounds (NMOCs) drop below a certain threshold regardless of the methane emissions.[16]

Figure 1. Methane Collection & Destruction Over Time



If a landfill were to install collection three years after waste was placed in the landfill, and to continuously operate the collection system for 30 years at the EPA's default efficiency of 75%, the landfill would only collect 52% of the total methane generated over the life of the waste in the landfill. Even this figure is likely conservative. Initial collection systems installed in areas with temporary or interim caps, typical with the early conditions in a landfill cell, have lower collection efficiencies than fully capped landfills. In contrast, CDM has assumed that the landfill is able to collect 75% of the methane every year from the date that it is first placed in the landfill to 100 years later, significantly overestimating the collection likely achieved under current regulation. In fact, the Massachusetts Department of Environmental Protection has commented to the U.S. EPA that a collection efficiency of 40% is more realistic.[17]

In fact, in order to achieve a 75% lifetime collection efficiency, as assumed by CDM, the landfill would have to achieve collection efficiencies approaching 90% indefinitely after installation of a collection system in year three of the life of the waste in the landfill.

CDM has used average grid GHG emissions intensity for its calculation. Calculations of avoided grid electricity should better reflect the mix of electricity likely to be displaced by LFGTE or EfW.

CDM has assumed that electricity generated by landfill gas to energy and EfW displaces electrical generation at the average grid intensity for the New England region. This

[16] 60 CFR Subpart WWW – Standards of Performance for Municipal Solid Waste Landfills

[17] Laurie Burt, Commissioner Massachusetts DEP, June 10, 2009 Letter to U.S. EPA, Re: Docket ID No. EPA-HQ-OAR-2008-0508 ("Mandatory Reporting of Greenhouse Gases," Vol. 74, No. 68 *Federal Register* 16448, April 10, 2009) Document ID: EPA-HQ-OAR-2008-0508-0453.1

average grid intensity reflects all generation, including wind, biomass, nuclear, solar, and other sources without greenhouse gas emissions. Given that Massachusetts is a member of RGGI and that generators of fossil based electricity must pay for their CO_2 emissions, it is extremely unlikely that utilities would elect to reduce their carbon neutral forms of power generation in response to electricity generated by LFGTE or EfW.

In contrast, fossil fuel generation would likely be curtailed in response to additional renewable generation. Such factors for fossil fuel generated electricity are available; however, the U.S. EPA has specifically designed its non-baseload emission factors as an improvement. These factors exclude baseload generation, which is generally unaffected by relatively small changes in electrical generation.[18] We suggest that these EPA non-baseload factors be used in comparative analyses.

The CDM calculation did not account for ferrous and non-ferrous recovery at the SEMASS EfW facility.

The SEMASS facility recovers both ferrous and nonferrous metals, readily recyclable materials that would have wound up in landfills had the waste not been processed at SEMASS. Both the U.S. EPA WARM tool and MSW-DST account for ferrous recovery at EfW facilities. Suitable factors for the recycling of ferrous and non-ferrous (aluminum) metals are available in the EPA's 2006 report *Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks.*

Table 1. GHG Emissions from Waste Management Options (m.t. CO_2e / ton MSW)

Alternative	Facility Emissions	Hauling	Avoided Electric	Fe & Non-Fe Recovery	Net Total
SEMASS	0.32	0.01	-0.32	-0.10	-0.10
Bourne Landfill	0.63	0.01	0.00	0	0.64
Crapo Hill Landfill	0.64	0.01	-0.09	0	0.56
Rochester Environmental Park	0.63	0.02	0.00	0	0.65
LD rail to out of state landfills	0.63	0.03	-0.05	0	0.62

To evaluate the GHG emissions from waste management options, it is imperative to follow Massachusetts, U.S. EPA, and international precedents. When the issues identified above are resolved and accepted precedents are used, EfW clearly emerges as a net GHG benefit when compared to the practice of landfilling (Table 1). Not only do these precedents establish the framework for evaluating and comparing GHG emissions, these precedents are firmly based in science: CO_2 emissions from the combustion of biomass are part of the normal carbon cycle and do not add permanently sequestered fossil CO_2 to the atmosphere. Consequently, biomass emissions should not be included in comparisons of the GHG impacts from waste management practices. By relying on

[18] U.S. EPA, 2008, *The Emissions & Generation Resource Integrated Database for 2007 (eGRID 2007) Technical Support Document.*

information that deviates from accepted practices, the Commission will be making a policy decision based on misleading data. Given that we will likely be living in a carbon constrained world in the future, making decisions on the best available data is critical.

Please feel free to call me at (508) 291-4450 if you have any questions. We would welcome the opportunity to meet with you, and your client communities, to discuss our comments further.

Sincerely,

Thomas Cipolla
Business Manager

Attachment
cc: B. Haskell (CDM)
M. Van Brunt (Covanta)

Environ. Sci. Technol. **2009**, *43*, 1711–1717

Is It Better To Burn or Bury Waste for Clean Electricity Generation?

P. OZGE KAPLAN,*,†
JOSEPH DECAROLIS,‡ AND
SUSAN THORNELOE§

National Risk Management Research Laboratory, United States Environmental Protection Agency (U.S. EPA), Research Triangle Park, North Carolina 27711, and Department of Civil Engineering, North Carolina State University, Raleigh, North Carolina 27695

Received August 26, 2008. Revised manuscript received December 13, 2008. Accepted December 30, 2008.

Downloaded by 65.51.91.227 on October 26, 2009 | http://pubs.acs.org
Publication Date (Web): February 10, 2009 | doi: 10.1021/es802395e

The use of municipal solid waste (MSW) to generate electricity through landfill-gas-to-energy (LFGTE) and waste-to-energy (WTE) projects represents roughly 14% of U.S. nonhydro renewable electricity generation. Although various aspects of LFGTE and WTE have been analyzed in the literature, this paper is the first to present a comprehensive set of life-cycle emission factors per unit of electricity generated for these energy recovery options. In addition, sensitivity analysis is conducted on key inputs (e.g., efficiency of the WTE plant, landfill gas management schedules, oxidation rate, and waste composition) to quantify the variability in the resultant life-cycle emissions estimates. While methane from landfills results from the anaerobic breakdown of biogenic materials, the energy derived from WTE results from the combustion of both biogenic and fossil materials. The greenhouse gas emissions for WTE ranges from 0.4 to 1.5 $MTCO_2e$/MWh, whereas the most agressive LFGTE scenerio results in 2.3 $MTCO_2e$/MWh. WTE also produces lower NO_x emissions than LFGTE, whereas SO_x emissions depend on the specific configurations of WTE and LFGTE.

Introduction

In response to increasing public concern over air pollution and climate change, the use of renewable energy for electricity generation has grown steadily over the past few decades. Between 2002 and 2006, U.S. renewable electricity generation—as a percent of total generation—grew an average of 5% annually (*1*), while total electricity supply grew by only 1% on average (*2*). Support mechanisms contributing to the growth of renewables in the United States include corporate partnership programs, investment tax credits, renewable portfolio standards, and green power markets. These mechanisms provide electric utilities, investment firms, corporations, governments, and private citizens with a variety of ways to support renewable energy development. With several competing renewable alternatives, investment and purchasing decisions should be informed, at least in part, by rigorous life-cycle assessment (LCA).

In 2005, a total of 245 million tons of MSW was generated in the United States, with 166 million tons discarded to landfills (*3*). Despite the increase in recycling and composting rates, the quantity of waste disposed to landfills is still significant and expected to increase. How to best manage the discarded portion of the waste remains an important consideration, particularly given the electricity generation options. Although less prominent than solar and wind, the use of municipal solid waste (MSW) to generate electricity represents roughly 14% of U.S. nonhydro renewable electricity generation (*1*). In this paper we compare two options for generating electricity from MSW. One method, referred to as landfill-gas-to-energy (LFGTE), involves the collection of landfill gas (LFG) (50% CH_4 and 50% CO_2), which is generated through the anaerobic decomposition of MSW in landfills. The collected LFG is then combusted in an engine or a turbine to generate electricity. A second method, referred to as waste-to-energy (WTE) involves the direct combustion of MSW, where the resultant steam is used to run a turbine and electric generator.

Clean Air Act (CAA) regulations require capture and control of LFG from large landfills by installing a gas collection system within 5 years of waste placement (*4*). The gas collection system is expanded to newer areas of the landfill as more waste is buried. Not all LFG is collected due to delays in gas collection from initial waste placement and leaks in the header pipes, extraction wells, and cover material. Collected gas can be either flared or utilized for energy recovery. As of 2005, there were 427 landfills out of 1654 municipal landfills in the United States with LFGTE projects for a total capacity of 1260 MW. It is difficult to quantify emissions with a high degree of certainty since emissions result from biological processes that can be difficult to predict, occur over multiple decades, and are distributed over a relatively large area covered by the landfill.

CAA regulations require that all WTE facilities have the latest in air pollution control equipment (*5*). Performance data including annual stack tests and continuous emission monitoring are available for all 87 WTE plants operating in 25 states. Since the early development of this technology, there have been major improvements in stack gas emissions controls for both criteria and metal emissions. The performance data indicate that actual emissions are less than regulatory requirements. Mass burn is the most common and established technology in use, though various MSW combustion technologies are described in ref *6*. All WTE facilities in the United States recover heat from the combustion process to run a steam turbine and electricity generator.

Policy-makers appear hesitant to support new WTE through new incentives and regulation. Of the 30 states that have state-wide renewable portfolio standards, all include landfill gas as an eligible resource, but only 19 include waste-to-energy (*7*). While subjective judgments almost certainly play a role in the preference for LFGTE over WTE, there is a legitimate concern about the renewability of waste-to-energy. While the production of methane in landfills is the result of the anaerobic breakdown of biogenic materials, a significant fraction of the energy derived from WTE results from combusting fossil-fuel-derived materials, such as plastics. Countering this effect, however, is significant methane leakage—ranging from 60% to 85%—from landfills (*8*). Since methane has a global warming potential of 21 times that of CO_2, the CO_2e emissions from LFGTE may be larger than those from WTE despite the difference in biogenic composition.

Although WTE and LFGTE are widely deployed and analyzed in the literature (*9–13*), side-by-side comparison of the life-cycle inventory (LCI) emission estimates on a mass

* Corresponding author phone: (919) 541-5069; fax: (919) 541-7885; e-mail: kaplan.ozge@epa.gov.
† On Oak Ridge Institute for Research and Education postdoctoral fellowship with U.S. EPA.
‡ North Carolina State University.
§ U.S. EPA.

10.1021/es802395e CCC: $40.75 © 2009 American Chemical Society
Published on Web 02/10/2009

per unit energy basis is unavailable. LCI-based methods have been used to evaluate and compare solid waste management (SWM) unit operations and systems holistically to quantify either the environmental impacts or energy use associated with SWM options in the broad context of MSW management (*14–16*).

The purpose of this paper is to present a comprehensive set of life-cycle emission factors—per unit of electricity generated—for LFGTE and WTE. In addition, these emission factors are referenced to baseline scenarios without energy recovery to enable comparison of the emissions of LFGTE and WTE to those of other energy sources. While the methodology presented here is applicable to any country, this analysis is based on U.S. waste composition, handling, and disposal, with which the authors are most familiar. In addition, parametric sensitivity analysis is applied to key input parameters to draw robust conclusions regarding the emissions from LFGTE and WTE. The resultant emission factors provide critical data that can inform the development of renewable energy policies as well as purchasing and investment decisions for renewable energy projects in the prevailing marketplace.

Modeling Framework

The LFGTE and WTE emission factors are based on the composition and quantity of MSW discarded in the United States in 2005 (Table S1 of Supporting Information (SI)). We excluded the estimated quantity and composition of recycled and composted waste.

The emission factors are generated using the life-cycle-based process models for WTE (*17*) and LF/LFGTE (*18*) embedded in the municipal solid waste decision support tool (MSW-DST). The MSW-DST was developed through a competed cooperative agreement between EPA's Office of Research and Development and RTI International (*19–22*). The research team included North Carolina State University, which had a major role in the development of the LCI database, process, and cost models as well as the prototype MSW-DST. While a summary is provided here, Table S2 (SI) provides a comprehensive set of references for those interested in particular model details. The MSW-DST includes a number of process models that represent the operation of each SWM unit and all associated processes for collection, sorting, processing, transport, and disposal of waste. In addition, there are process models to account for the emissions associated with the production and consumption of gasoline and electricity. The objective of each process model is to relate the quantity and composition of waste entering a process to the cost and LCI of emissions for that process. The LCI emissions are calculated on the basis of a combination of default LCI data and user-input data to enable the user to model a site-specific system. For example, in the landfill process model, one key exogenous input is the efficiency of the LFG collection system. The functional unit in each process model is 1 ton of MSW set out for collection. The MSW includes the nonhazardous solid waste generated in residential, commercial, institutional, and industrial sectors (*3*).

Each process model can track 32 life-cycle parameters, including energy consumption, CO_2, CO, NO_x, SO_x, total greenhouse gases (CO_2e), particulate matter (PM), CH_4, water pollutants, and solid wastes. CO_2 emissions are represented in two forms: fossil and biogenic. CO_2 released from anthropogenic activities such as burning fossil fuels or fossil-fuel-derived products (e.g., plastics) for electricity generation and transportation are categorized as CO_2-fossil. Likewise, CO_2 released during natural processes such as the decay of paper in landfills is categorized as CO_2-biogenic.

The management of MSW will always result in additional emissions due to collection, transportation, and separation of waste. However, for this analysis, the configuration of the SWM system up through the delivery of the waste to either a landfill or WTE facility is assumed to be same.

TABLE 1. Inputs to the Landfill Process Model

	LFG collection system efficiency [a] (%)	oxidation rate (%)
during venting	0	15
during first year of gas collection	50	15
during second year of gas collection	70	15
during third year and on of gas collection	80	15

[a] We assumed efficiency of the collection system based on the year of the operation and the ranges stated in U.S. EPA's AP-42 (*8*).

Electricity Grids. While LFGTE and WTE provide emissions reductions relative to landfill scenarios without energy recovery, the generation of electricity from these sources also displaces conventional generating units on the electricity grid. The process models in MSW-DST can calculate total electricity generated and apply an offset analysis on the grid mix of fuels specific to each of the North American Electric Reliability Council (NERC) regions, an average national grid mix, or a user-defined grid mix. Because our focus is on the emissions differences between WTE and LFGTE technologies, the emissions factors reported here exclude the displaced grid emissions.

For reference purposes, emission factors for conventional electricity-generating technologies are reported along with the emission factors for WTE and LFGTE (*23*). These emission factors on a per megawatt hour basis include both the operating emissions from power plants with postcombustion air pollution control equipment and precombustion emissions due to extraction, processing, and transportation of fuel. The background LCI data are collected on a unit mass of fuel (*23*); when converted on a per unit of electricity generated basis, the magnitude of resultant emissions depends on the efficiency of the power plant. A sensitivity analysis was conducted on plant efficiencies to provide ranges for emission factors.

Estimating Emission Factors for Landfill Gas-to-Energy. The total LCI emissions from landfills are the summation of the emissions resulting from (1) the site preparation, operation, and postclosure operation of a landfill, (2) the decay of the waste under anaerobic conditions, (3) the equipment utilized during landfill operations and landfill gas management operations, (4) the production of diesel required to operate the vehicles at the site, and (5) the treatment of leachate (*18*). The production of LFG was calculated using a first-order decay equation for a given time horizon of 100 years and the empirical methane yield from each individual waste component (*18, 24*). Other model inputs include the quantity and the composition of waste disposed (Table S1, SI), LFG collection efficiency (Table 1), annual LFG management schedule (Figure 1), oxidation rate (Table 1), emission factors for combustion byproduct from LFG control devices (Table S3, SI), and emission factors for equipment used on site during the site preparation and operation of a landfill. While there are hundreds of inputs to the process models, we have modified and conducted sensitivity analysis on the input parameters that will affect the emission factors most significantly.

The emission factors are calculated under the following scenario assumptions: (1) A regional landfill subject to CAA is considered. (2) A single cell in the regional landfill is modeled. (3) Waste is initially placed in the new cell in year 0. (4) The landfill already has an LFG collection network in place. (5) An internal combustion engine (ICE) is utilized to generate electricity. (6) The offline time that is required for

Downloaded by 65.51.91.227 on October 26, 2009 | http://pubs.acs.org
Publication Date (Web): February 10, 2009 | doi: 10.1021/es802395e

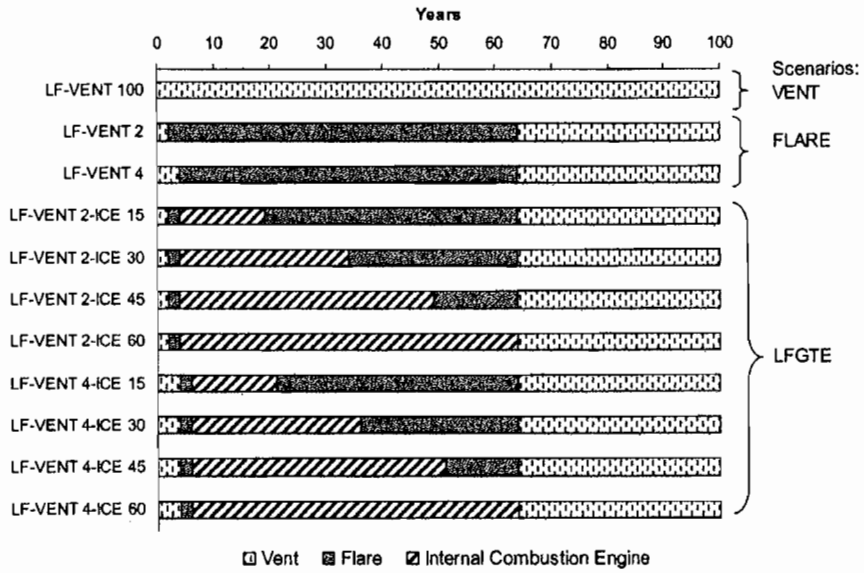


FIGURE 1. Annual landfill gas management schedule assumed for alternative scenarios.

Downloaded by 65.51.91.227 on October 26, 2009 | http://pubs.acs.org
Publication Date (Web): February 10, 2009 | doi: 10.1021/es802395e

the routine maintenance of the ICE is not considered. (7) The LFG control devices are assumed to have a lifetime of 15 years. (8) The LFG will be collected and controlled until year 65. This assumption is based on a typical landfill with an average operating lifetime of 20 years in which LFG production decreases significantly after about 60 years from initial waste placement. This is based on the use of a first-order decay equation utilizing empirical data from about 50 U.S. LFG collection systems.

The timing of LFG-related operations has significant variation and uncertainty that will influence the total emissions from landfills as well as the emission factors per unit of electricity generated. To capture these uncertainties and variation, several different management schemes were tested. Figure 1 presents the different cases considered for LFGTE projects. Each case differs according to the management timeline of the LFG. For instance, LF-VENT 2-ICE 15 corresponds to no controls on LFG for the first two years, after which the LFG is collected and flared in the third and fourth years. From year 5 until year 19, for a period of 15 years, the LFG is processed through an ICE to generate electricity, after which the collected gas is flared until year 65. Finally from year 65 on, the LFG is released to the atmosphere without controls.

To quantify the emissions benefit from LFGTE and WTE, landfill emissions occurring in the absence of an energy recovery unit can serve as a useful comparison. Thus, three baseline scenarios without electricity generation were defined for comparison to the energy recovery scenarios: LF-VENT 100 (LFG is uncontrolled for the entire lifetime of the LF), LF-VENT 2 (LFG is uncontrolled for the first two years, and then the LFG is collected and flared until year 65), LF-VENT 4 (LFG is uncontrolled for the first four years, and then the LFG is collected and flared until year 65). Since emissions are normalized by the amount of electricity generated (MW h) to obtain the emission rates, an estimate of hypothetical electricity generation for the baseline scenarios must be defined. The average electricity generation from a subset of the energy recovery scenarios is used to calculate the baseline emission rates. For example, emission factors [g/(MW h)] for LF-VENT 2 are based on the average of electricity generated in LF-VENT 2-ICE 15, LF-VENT 2-ICE 30, LF-VENT 2-ICE 45, and LF-VENT 2-ICE 60. Additional sensitivity analysis was conducted on oxidation rates where scenarios were tested for a range of 10−35%.

Estimating Emission Factors for Waste-to-Energy. The total LCI emissions are the summation of the emissions associated with (1) the combustion of waste (i.e., the stack gas (accounting for controls)), (2) the production and use of limestone in the control technologies (i.e., scrubbers), and (3) the disposal of ash in a landfill (*17*).

Emissions associated with the manufacture of equipment such as turbines and boilers for the WTE facility are found to be insignificant (<5% of the overall LCI burdens) and, as a result, were excluded from this analysis (*25*). In addition, WTE facilities have the capability to recover ferrous material from the incoming waste stream and also from bottom ash with up to a 90% recovery rate. The recovered metal displaces the virgin ferrous material used in the manufacturing of steel. The emission offsets from this activity could be significant depending on the amount of ferrous material recovered. Total LCI emissions for WTE were presented without the ferrous offsets; however, sensitivity analysis was conducted to investigate the significance.

In the United States, federal regulations set limits on the maximum allowable concentration of criteria pollutants and some metals from MSW combustors (*5*). The LCI model calculates the controlled stack emissions using either the average concentration values at current WTE facilities based on field data or mass emission limits based on regulatory requirements as upper bound constraints. Two sets of concentration values (Table S4, SI) are used in calculations to report two sets of emission factors for WTE (i.e., WTE-Reg and WTE-Avg). The emission factors for WTE-Reg were based on the regulatory concentration limits (*5*), whereas the emission factors for WTE-Avg were based on the average concentrations at current WTE facilities.

The CO_2 emissions were calculated using basic carbon stoichiometry given the quantity, moisture, and ultimate analysis of individual waste items in the waste stream. The LCI model outputs the total megawatt hour of electricity production and emissions that are generated per unit mass of each waste item. The amount of electricity output is a function of the quantity, energy, and moisture content of the individual waste items in the stream (Table S1, Supporting Information), and the system efficiency. A lifetime of 20 years and a system efficiency of 19% [18000 Btu/(kW h)] were assumed for the WTE scenarios. For each pollutant, the following equation was computed:

$$LCI_WTE_i = \sum_j \{(LCI_Stack_{ij} + LCI_Limestone_{ij} + LCI_Ash_{ij}) \times Mass_j\}/Elec \quad \text{for all } i \quad (1)$$

where LCI_WTE_i is the LCI emission factor for pollutant i [g/(MW h)], LCI_Stack_{ij} is the controlled stack gas emissions for pollutant i (g/ton of waste item j), $LCI_Limestone_{ij}$ is the allocated emissions of pollutant i from the production and use of limestone in the scrubbers (g/ton of waste item j), LCI_Ash_{ij} is the allocated emissions of pollutant i from the disposal of ash (g/ton of waste item j), $Mass_j$ is the amount of each waste item j processed in the facility (ton), and Elec is the total electricity generated from MSW processed in the facility (MW h). In addition, the sensitivity of emission factors to the system efficiency, the fossil and biogenic fractions of MSW, and the remanufacturing offsets from steel recovery was quantified.

Results and Discussion

The LCI emissions resulting from the generation of 1 MW h of electricity through LFGTE and WTE as well as coal, natural gas, oil, and nuclear power (for comparative purposes) were calculated. The sensitivity of emission factors to various inputs was analyzed and is reported. Figures 2–4 summarize the emission factors for total CO_2e, SO_x, and NO_x, respectively.

Landfills are a major source of CH_4 emissions, whereas WTE, coal, natural gas, and oil are major sources of CO_2-fossil emissions (Table S5, SI). The magnitude of CH_4 emissions strongly depends on when the LFG collection system is installed and how long the ICE is used. For example, LF-VENT 2-ICE 60 has the least methane emissions among LFGTE alternatives because the ICE is operated the longest (Table S5, SI). CO_2e emissions from landfills were significantly higher than the emissions for other alternatives because of the relatively high methane emissions (Figure 2, Table S5).

The use of LFG control during operation, closure, and postclosure of the landfill as well as the treatment of leachate contributes to the SO_x emissions from landfills. SO_x emissions from WTE facilities occur during the combustion process and are controlled via wet or dry scrubbers. Overall, the SO_x emissions resulting from the LFGTE and WTE alternatives are approximately 10 times lower than the SO_x emissions resulting from coal- and oil-fired power plants with flue gas controls (Figure 3). The SO_x emissions for WTE ranged from 140 to 730 g/(MW h), and for LFGTE they ranged from 430 to 900 g/(MW h) (Table 2, Table S5). In a coal-fired power plant, average SO_x emissions were 6900 g/(MW h) (Table S6 and S7, SI). Another important observation is that the majority of the SO_x emissions from natural gas are attributed to processing of natural gas rather than the combustion of the natural gas for electricity-generating purposes.

The NO_x emissions for WTE alternatives ranged from 810 to 1800 g/(MW h), and for LFGTE they ranged from 2100 to 3000 g/(MW h) (Figure 4, Table 2, Table S5). In a coal-fired power plant, average NO_x emissions are 3700 g/(MW h) (Tables S6 and S7, Supporting Information). The emission factors for other criteria pollutants were also calculated. Besides CO and HCl emissions, the emission factors for all LFGTE and WTE cases are lower than those for the coal-fired generators (Tables S5–S8, SI).

While we have provided a detailed, side-by-side comparison of life-cycle emissions from LFGTE and WTE, there is an important remaining question about scale: How big an impact can energy recovery from MSW make if all of the discarded MSW (166 million tons/year) is utilized? Hypothetically, if 166 million tons of MSW is discarded in regional landfills, energy recovery on average of ~10 TW h or ~65 (kW h)/ton of MSW of electricity can be generated, whereas a WTE facility can generate on average ~100 TW h or ~600 (kW h)/ton of MSW of electricity with the same amount of MSW (Table 3). WTE can generate an order of magnitude more electricity than LFGTE given the same amount of waste. LFGTE projects would result in significantly lower electricity generation because only the biodegradable portion of the MSW contributes to LFG generation, and there are significant inefficiencies in the gas collection system that affect the quantity and quality of the LFG.

Moreover, if all MSW (excluding the recycled and composted portion) is utilized for electricity generation, the WTE alternative could have a generation capacity of 14000 MW, which could potentially replace ~4.5% of the 313000 MW of current coal-fired generation capacity (*26*).

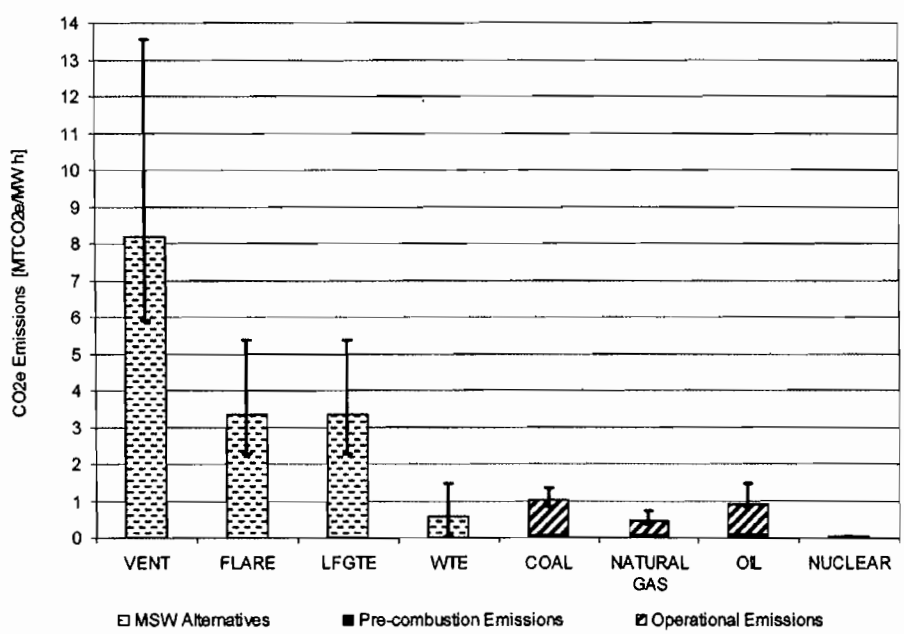


FIGURE 2. Comparison of carbon dioxide equivalents for LFGTE, WTE, and conventional electricity-generating technologies (Tables S5–S8, Supporting Information, include the full data set).

Downloaded by 65.51.91.227 on October 26, 2009 | http://pubs.acs.org
Publication Date (Web): February 10, 2009 | doi: 10.1021/es802395e

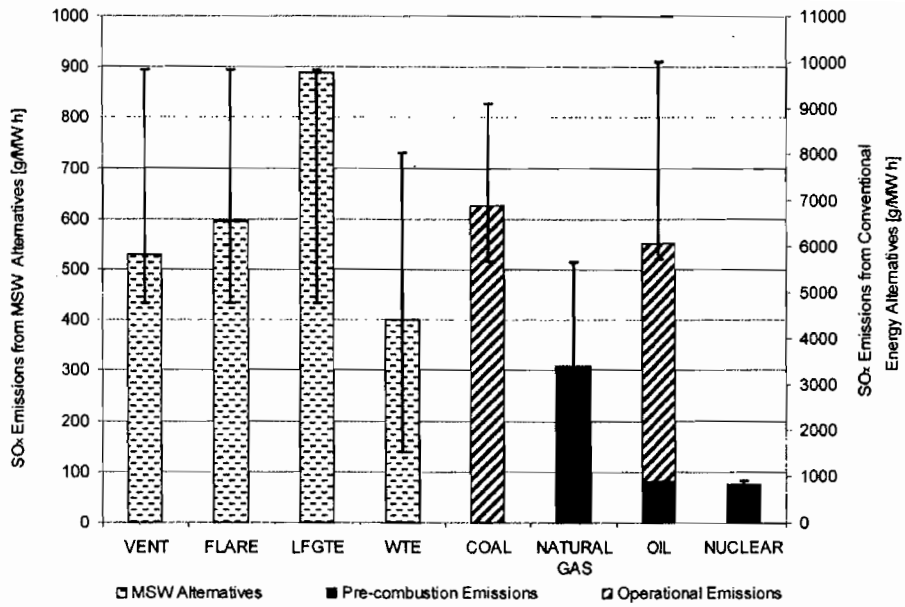


FIGURE 3. Comparison of sulfur oxide emissions for LFGTE, WTE, and conventional electricity-generating technologies (Tables S5–S8, Supporting Information, include the full data set).

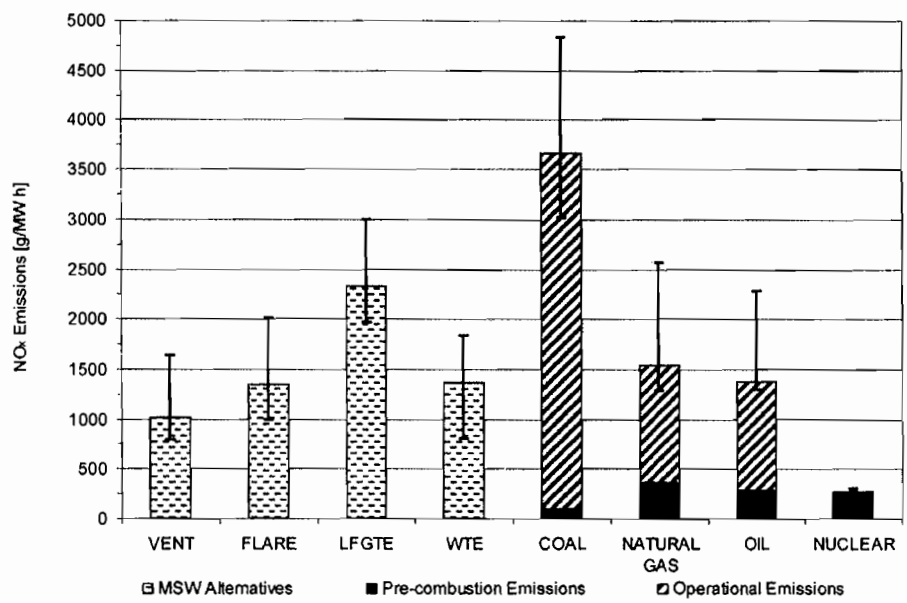


FIGURE 4. Comparison of nitrogen oxide emissions for LFGTE, WTE, and conventional electricity-generating technologies (Tables S5–S8, Supporting Information, include the full data set).

A significant portion of this capacity could be achieved through centralized facilities where waste is transported from greater distances. The transportation of waste could result in additional environmental burdens, and there are clearly limitations in accessing all discarded MSW in the nation. Wanichpongpan studied the LFGTE option for Thailand and found that large centralized landfills with energy recovery performed much better in terms of cost and GHG emissions than small, localized landfills despite the increased burdens associated with transportation (*13*). To quantify these burdens for the United States, emission factors were also calculated for long hauling of the waste via freight or rail. Table S9 (SI) summarizes the emission factors for transporting 1 ton of MSW to a facility by heavy-duty trucks and rail.

Sensitivity analysis was also conducted on key inputs. With incremental improvements, WTE facilities could achieve efficiencies that are closer to those of conventional power plants. Thus, the system efficiency was varied from 15% to 30%, and Table 2 summarizes the resulting LCI emissions. The variation in efficiencies results in a range of 470–930 kW h of electricity/ton of MSW, while with the default heat rate; only 600 (kW h)/ton of MSW can be generated. The efficiency also affects the emission factors; for example, CO_2-fossil emissions vary from 0.36 to 0.71 Mg/(MW h).

The emission savings associated with ferrous recovery decreased the CO_2e emissions of the WTE-Reg case from 0.56 to 0.49 $MTCO_2e$/(MW h). Significant reductions were observed for CO and PM emissions (Table 2).

Downloaded by 65.51.91.227 on October 26, 2009 | http://pubs.acs.org
Publication Date (Web): February 10, 2009 | doi: 10.1021/es802395e

TABLE 2. Sensitivity of Emission Factors for WTE to Plant Efficiency, Waste Composition, and Remanufacturing Benefits of Steel Recovery

	baseline factors		Sensitivity on: system efficiency	Sensitivity on: waste composition		Sensitivity on: steel recovery	
Input Parameters Varied[a]							
heat rate [Btu/(kW h)]	18000	18000	*[11000, 23000]*	18000	18000	18000	18000
efficiency (%)	19	19	*[15, 30]*	19	19	19	19
composition	default	default	default	*all biogenic*	*all fossil*	default	default
stack gas limits	reg	avg	*reg/avg*	reg	reg	*reg*	*avg*
steel recovery	excludes	excludes	excludes	excludes	excludes	*includes*	*includes*
Results: Criteria Pollutants							
CO [g/(MW h)]	790	790	[500,1000]	740	880	−110	−110
NO_x [g/(MW h)]	1300	1500	[810, 1800]	1200	1400	1200	1400
SO_x [g/(MW h)]	578	221	[140, 730]	550	620	450	90
PM [g/(MW h)]	181	60	[38, 230]	180	190	−190	−310
Results: Greenhouse Gases							
CO_2-biogenic [Mg/(MW h)]	0.91	0.91	[0.58, 1.2]	1.5	0.03	0.91	0.91
CO_2-fossil [Mg/(MW h)]	0.56	0.56	[0.36, 0.71]	0.02	1.5	0.49	0.49
CH_4 [Mg/(MW h)]	1.3E−05	1.3E−05	[8.1E−06, 1.6E−05]	1.6E−05	7.9E−06	−5.0E−05	−5.0E−05
CO_2e [$MTCO_2e$/(MW h)]	0.56	0.56	[0.36, 0.71]	0.02	1.45	0.49	0.49
Results: Electricity Generation							
TW h [b]	98	98	[78, 160]	61	37	98	98
(kW h)/ton	590	590	[470, 930]	470	970	590	590
GW [c]	12	12	[9.7, 20]	7.6	4.7	12	12

[a] For each sensitivity analysis scenario, the input parameters in italics were modified and resultant emission factors were calculated and are reported. [b] The values represent the TWh of electricity that could be generated from all MSW disposed into landfills. [c] 1 TWh/8000 h = TW; a capacity factor of approximately 0.91 was utilized.

TABLE 3. Comparison of Total Power Generated

	total electricity generated from 166 million tons of MSW, TW h	total power [a], GW	electricity generated from 1 ton of MSW, (kW h)/ton
waste-to-energy	78−160	9.7−19	470−930
landfill-gas-to-energy	7−14	0.85−1.8	41−84

[a] 1 TW h/8000 h = TW; a capacity factor of approximately 0.91 was utilized.

Downloaded by 65.51.91.227 on October 26, 2009 | http://pubs.acs.org
Publication Date (Web): February 10, 2009 | doi: 10.1021/es802395e

The composition of MSW also has an effect on the emission factors. One of the controversial aspects of WTE is the fossil-based content of MSW, which contributes to the combustion emissions. The average composition of MSW as discarded by weight was calculated to be 77% biogenic- and 23% fossil-based (Table S1, SI). The sensitivity of emission factors to the biogenic- vs fossil-based waste fraction was also determined. Two compositions (one with 100% biogenic-based waste and another with 100% fossil-based waste) were used to generate the emission factors (Table 2). The CO_2e emissions from WTE increased from 0.56 $MTCO_2e$/(MW h) (WTE-Reg) to 1.5 $MTCO_2e$/(MW h) when the 100% fossil-based composition was used (Table 2, Figure 2). However, the CO_2e emissions from WTE based on 100% fossil-based waste were still lower than the most aggressive LFGTE scenario (i.e., LF-VENT 2-ICE 60) whose CO_2e emissions were 2.3 $MTCO_2e$/(MW h).

The landfill emission factors include the decay of MSW over 100 years, whereas emissions from WTE and conventional electricity-generating technologies are instantaneous. The operation and decomposition of waste in landfills continue even beyond the monitoring phases for an indefinite period of time. Reliably quantifying the landfill gas collection efficiency is difficult due to the ever-changing nature of landfills, number of decades that emissions are generated, and changes over time in landfill design and operation including waste quantity and composition. Landfills are an area source, which makes emissions more difficult to monitor. In a recent release of updated emission factors for landfill gas emissions, data were available for less than 5% of active municipal landfills (*27*). Across the United States, there are major differences in how landfills are designed and operated, which further complicates the development of reliable emission factors. This is why a range of alternative scenarios are evaluated with plausible yet optimistic assumptions for LFG control. For WTE facilities, there is less variability in the design and operation. In addition, the U.S. EPA has data for all the operating WTE facilities as a result of CAA requirements for annual stack testing of pollutants of concern, including dioxin/furan, Cd, Pb, Hg, PM, and HCl. In addition, data are available for SO_2, NO_x, and CO from continuous emissions monitoring. As a result, the quality and availability of data for WTE versus LFGTE results in a greater degree of certainty for estimating emission factors for WTE facilities.

The methane potential of biogenic waste components such as paper, food, and yard waste is measured under optimum anaerobic decay conditions in a laboratory study (*24*), whose other observations reveal that some portion of

the carbon in the waste does not biodegrade and thus this quantity gets sequestered in landfills (*28*). However, there is still a debate on how to account for any biogenic "sequestered" carbon. Issues include the choice of appropriate time frame for sequestration and who should be entitled to potential sequestration credits. While important, this analysis does not assign any credits for carbon sequestered in landfills.

Despite increased recycling efforts, U.S. population growth will ensure that the portion of MSW discarded in landfills will remain significant and growing. Discarded MSW is a viable energy source for electricity generation in a carbon-constrained world. One notable difference between LFGTE and WTE is that the latter is capable of producing an order of magnitude more electricity from the same mass of waste. In addition, as demonstrated in this paper, there are significant differences in emissions on a mass per unit energy basis from LFGTE and WTE. On the basis of the assumptions in this paper, WTE appears to be a better option than LFGTE. If the goal is greenhouse gas reduction, then WTE should be considered as an option under U.S. renewable energy policies. In addition, all LFTGE scenarios tested had on the average higher NO_x, SO_x, and PM emissions than WTE. However, HCl emissions from WTE are significantly higher than the LFGTE scenarios.

Supporting Information Available

MSW composition, physical and chemical characteristics of waste items, detailed LCI tables and sensitivity results, and emission factors for long haul of MSW. This material is available free of charge via the Internet at http://pubs.acs.org.

Literature Cited

(1) Energy Information Administration. Renewable Energy Consumption and Electricity Preliminary 2006 Statistics. www.eia.doe.gov/cneaf/solar.renewables/page/prelim_trends/rea_prereport.html (accessed Aug 26, 2008).

(2) Energy Information Administration. Annual Energy Review 2006. www.eia.doe.gov/emeu/aer/elect.html (accessed Aug 26, 2008).

(3) U.S. Environmental Protection Agency. *Municipal Solid Waste in the United States: 2005 Facts and Figures*; EPA/530/R06/011; U.S. EPA: Washington, DC, 2006.

(4) Federal plan requirements for municipal solid waste landfills that commenced construction prior to May 30, 1991 and have not been modified or reconstructed since May 30, 1991; final rule. *Fed. Regist.* **1999**, *64* (215).

(5) Standards of performance for new stationary sources and emission guidelines for existing sources: Large municipal waste combustors; final rule. *Fed. Regist.* **2006**, *71* (90).

(6) Ruth, L. A. Energy from municipal solid waste: A comparison with coal combustion technology. *Prog. Energy Combust. Sci.* **1998**, *24*, 545–564.

(7) Database of State Incentives for Renewable Energy. Rules, Regulations, & Policies for Renewable Energy. http://www.dsireusa.org/summarytables/reg1.cfm?&CurrentPageID=7&EE=0&RE=1 (accessed Aug 26, 2008).

(8) U.S. Environmental Protection Agency. AP-42 Fifth Edition. Compilation of Air Pollutant Emission Factors. http://www.epa.gov/ttn/chief/ap42/ch02/index.html (accessed Aug 26, 2008).

(9) Cheng, H. F.; Zhang, Y. G.; Meng, A. H.; Li, Q. H. Municipal solid waste fueled power generation in China: A case study of waste-to-energy in Changchun City. *Environ. Sci. Technol.* **2007**, *41*, 7509–7515.

(10) Eriksson, O.; Finnveden, G.; Ekvall, T.; Bjorklund, A. Life cycle assessment of fuels for district heating: A comparison of waste incineration, biomass- and natural gas combustion. *Energy Policy* **2007**, *35*, 1346–1362.

(11) Jaramillo, P.; Matthews, H. S. Landfill-gas-to-energy projects: Analysis of net private and social benefits. *Environ. Sci. Technol.* **2005**, *39*, 7365–7373.

(12) Themelis, N. J.; Ulloa, P. A. Methane generation in landfills. *Renewable Energy* **2007**, *32*, 1243–1257.

(13) Wanichpongpan, W.; Gheewala, S. H. Life cycle assessment as a decision support tool for landfill gas-to energy projects. *J. Cleaner Prod.* **2007**, *15*, 1819–1826.

(14) Eriksson, O.; Carlsson Reich, M.; Frostell, B.; Bjorklund, A.; Assefa, G.; Sundqvist, J. O.; Granath, J.; Baky, A.; Thyselius, L. Municipal solid waste management from a systems perspective. *J. Cleaner Prod.* **2005**, *13*, 241–252.

(15) Kaplan, P. O.; Ranjithan, S. R.; Barlaz, M. A. Use of life-cycle analysis to support solid waste management planning for Delaware. *Environ. Sci. Technol.*, in press.

(16) Thorneloe, S. A.; Weitz, K.; Jambeck, J. Application of the U.S. decision support tool for materials and waste management. *Waste Manage.* **2007**, *27*, 1006–1020.

(17) Harrison, K. W.; Dumas, R. D.; Barlaz, M. A.; Nishtala, S. R. A life-cycle inventory model of municipal solid waste combustion. *J. Air Waste Manage. Assoc.* **2000**, *50*, 993–1003.

(18) Camobreco, V.; Ham, R.; Barlaz, M.; Repa, E.; Felker, M.; Rousseau, C.; Rathle, J. Life-cycle inventory of a modern municipal solid waste landfill. *Waste Manage. Res.* **1999**, 394–408.

(19) Harrison, K. W.; Dumas, R. D.; Solano, E.; Barlaz, M. A.; Brill, E. D.; Ranjithan, S. R. A decision support system for development of alternative solid waste management strategies with life-cycle considerations. *ASCE J. Comput. Civ. Eng.* **2001**, *15*, 44–58.

(20) Kaplan, P. O.; Barlaz, M. A.; Ranjithan, S. R. Life-cycle-based solid waste management under uncertainty. *J. Ind. Ecol.* **2004**, *8*, 155–172.

(21) Solano, E.; Ranjithan, S.; Barlaz, M. A.; Brill, E. D. Life cycle-based solid waste management—1. Model development. *J. Environ. Eng.* **2002**, *128*, 981–992.

(22) RTI International. Municipal Solid Waste Decision Support Tool. https://webdstmsw.rti.org/ (accessed Aug 26, 2008).

(23) National Renewable Energy Laboratory. U.S. Life-Cycle Inventory Database. http://www.nrel.gov/lci/about.html (accessed Aug 26, 2008).

(24) Eleazer, W. E.; Odle, W. S.; Wang, Y. S.; Barlaz, M. A. Biodegradability of municipal solid waste components in laboratory-scale landfills. *Environ. Sci. Technol.* **1997**, *31* (3), 911–917.

(25) Environment Agency. *Life Cycle Inventory Development for Waste Management Operations: Incineration*; R&D Project Record P1/392/6; Environment Agency: Bristol, U.K., 2000.

(26) U.S. Department of Energy. *Electric Power Annual 2005*; DOE/EIA-0348(2005); U.S. DOE: Washington, DC, 2006.

(27) U.S. Environmental Protection Agency. *Background Information Document for Updating AP42 Section 2.4 Municipal Solid Waste Landfills*; EPA/600/R-08-116; U.S. EPA: Washington, DC; http://www.epa.gov/ttn/chief/ap42/ch02/draft/db02s04.pdf.

(28) Barlaz, M. A. Carbon storage during biodegradation of municipal solid waste components in laboratory-scale landfills. *Global Biogeochem. Cycles* **1998**, *12*, 373–380.

ES802395E

Downloaded by 65.51.91.227 on October 26, 2009 | http://pubs.acs.org
Publication Date (Web): February 10, 2009 | doi: 10.1021/es802395e

Mass Coastal Railroad requests that additional environment information please be added to the "Cape Cod Commission Draft Report – Evaluation of Future Disposal Alternatives for Municipal Solid Waste" dated January, 2010.

Specifically, the number of estimated truck trips that would traverse Cape Cod's roads and bridges should be noted for each option, in consideration of the significant environmental and quality of life impacts that truck traffic on Cape Cod's highways can produce.

As examples (using round numbers for simplicity):

- Annual tons currently shipped by rail to SEMASS:

  80,000 Yarmouth
  40,000 Otis
  120,000 total

- Equivalent annual truck trips removed from Cape Cod's highways (at 20 tons per truck):

  6,000 loaded to the bridges
  6,000 empty returning
  12,000 total truck trips removed

Put another way, if the Bourne Landfill was selected for Cape Cod's msw:

- 8,000 truck trips from the mid and lower Cape (Yarmouth 80,000 tons / 20 tons per truck, round trip) would be added to all of these roads:
  - ✓ The base of the Sagamore Bridge (last exit), and
  - ✓ The base of the Bourne Bridge (going around the rotary), and
  - ✓ The road between the Sagamore and Bourne Bridges on the Cape side of the Cape Cod Canal.
- 4,000 truck trips from the upper Cape (Otis 40,000 tons / 20 tons per truck, round trip) would be added to these roads:
  - ✓ 2,000 trips (loaded) up Rt. 28, almost to the Bourne Bridge, and
  - ✓ 2,000 trips (empty) around the Bourne Bridge rotary to return via Rt. 28.

These truck traffic impacts need to be considered in the Commission's Report, since they all affect:

- ➢ Highway congestion
- ➢ Diesel engine emissions
- ➢ Highway wear and tear

Of particular note, SEMASS and Mass Coastal are presently developing a *new* Energy Train, designed to attract the lower Cape towns (currently trucking all the way to SEMASS) to use the Yarmouth Transfer Station. This could remove an estimated additional 4,000 annual truck trips off of Cape Cod's highways (40,000 tons / 20 tons per truck, round trip).

Please contact Mass Coastal for additional information, at (508) 771-8400, ext. 102. Thank you for including this information in the Commission's Final Report.

Dan Wahle
Vice President – Marketing
Massachusetts Coastal Railroad, LLC

March 2, 2010

COMMENT 4 - Water Energy & Ecology Information Services

From: Chris Powicki [mailto:chrisp@weeinfo.com]
Sent: Monday, February 22, 2010 11:21 AM
To: Patty Daley
Cc: 'David Dow'; 'Christina Rawley'
Subject: Comments on Cape-Wide Solid Waste Alternatives Analysis for 2/25 SWAC Meeting

Dear Patty, please ensure that these comments are made available to colleagues within the Commission, as well as members of the SWAC. Thx - Chris

Date: February 22, 2010

To: Cape Cod Commission & Cape Cod Solid Waste Advisory Committee

As a concerned citizen and a consultant on energy and environmental issues, I write to offer recommendations for the ongoing MSW options analysis based on the Cape Cod Commission Act, the activities of the Cape Cod Solid Waste Advisory Committee (SWAC), a draft report and recent presentation by CDM, and the *Cape & Islands Energy Technology Strategy*.

As the agency charged with protecting this region's environment and economy from both pressing and long-term threats, the Cape Cod Commission must ensure that efforts to minimize the MSW management costs faced by local communities do not impose additional burdens on ecological resources and atmospheric chemistry. More detailed comments are provided below.

- **All MSW management options should be subjected to a rigorous and transparent "true cost" evaluation.** The SWAC's focus appears to be on reducing disposal/tipping fees, rather than on the full range of impacts associated with waste generation and disposition. *Consistent with the goals of the Cape Cod Commission Act, the economic, environmental, and social impacts associated with each option should be assessed on a life-cycle basis and communicated to decision-makers and the public in the context of regional, state, national, and global goals relating to resource management, environmental quality, climate change, and sustainable development.* Appropriate starting points would be (1) to look at MSW management practices over the past 2 decades to examine the transition away from landfilling and toward incineration, as well as the SEMASS experience; and (2) to identify resource management pathways leading to a zero-waste economy. Historical data on disposal rates, emissions, recycling, and other key parameters – along with visionary, long-term objectives such as those being adopted by communities, regions, and states – will help put the costs and benefits of available MSW options in perspective.

- **Landfilling, incineration, and other waste-to-energy methodologies represent resource management failures to varying degrees and should be acknowledged as such in the CDM report and in the SWAC's deliberations.** A critical assumption underlying the CDM report is flawed: Incineration of MSW is not environmentally

sound. *The only environmentally sound MSW management option is source reduction, i.e., not generating the waste in the first place.* Beneficial reuse and recycling may be considered less harmful but are not environmentally benign.

- **A cradle-to-grave analysis of greenhouse gas emissions relating to source reduction, reuse, recycling, landfilling, and energy recovery should be performed to inform the SWAC's deliberations.** CDM's estimated emissions associated with various options incorporated in the CDM presentation are questionable. First and foremost, they fail to account for the embodied energy in all of the materials that were transported into the region. More egregiously, electricity generation via incineration at SEMASS is presented as a sink rather than source of emissions. When the SEMASS plant operates, it pushes an equivalent amount of generating capacity off the margin within the New England electricity marketplace. In the ISO-NE control area, firing MSW generally displaces natural gas capacity. According to plant and ISO-NE data, greenhouse gas emissions from SEMASS far exceed those from modern gas plants on the basis of pounds of CO_2 released per megawatt-hour produced. In 2007, combustion of MSW from communities on Cape Cod and Martha's Vineyard resulted in the release of more than 110,000 metric tons of CO_2 by SEMASS. Had this power been produced by a high-efficiency gas plant, emissions of CO_2, conventional air pollutants, and toxic chemicals would have been much lower. *Burning Cape Cod's trash to generate power increases rather than reduces emissions.* Further, landfilling MSW and then capturing and firing the gas associated with uncontrolled anaerobic digestion of biological materials is an extremely inefficient way to generate energy (but it does prevent the release of methane, a potent greenhouse gas). Advanced energy recovery technologies are being developed and should be investigated with long-term objectives in mind.

- **Source reduction, beneficial reuse, and materials recovery should be adopted as foundational elements in the region's resource management strategy so as to reduce the amount of MSW that must be transported, landfilled, or transformed into energy at additional economic, environmental, and social cost.** SEMASS emissions attributable to burning the Cape's MSW are equivalent to almost 3% of the total energy-related CO_2 footprint for the Cape & Islands region in 2007. Much of the waste fired at SEMASS should not be. Roughly 50% is biogenic in nature, containing nutrients and organic materials amenable to composting and beneficial reuse. Recycling rates on the Cape are generally poor due in part to a lack of incentives and infrastructure. *As the SWAC evaluates waste management options, it should focus first on reducing waste disposal, diverting biogenic materials from the waste stream, and improving recycling rates.* This will ensure that both the out-of-pocket costs and the externalized costs associated with disposition of the remaining MSW are minimized.

Thanks for your consideration of these comments. I would be glad to answer any questions you might have.

Sincerely,

Chris Powicki
Principal, Water Energy & Ecology Information Services
774.487.4614
2042 Main Street, Brewster, MA 02631
www.weeinfo.com

COMMENT 5 – Cape and Islands Sierra Club

From: David Dow <ddow420@comcast.net>
Date: February 17, 2010 3:07:00 PM EST
To: pdaley@capecodcommission.org, Paul Niedzwiecki <pniedzwiecki@capecodcommission.org>, Marianna Sarkisyan <msarkisyan@capecodcommission.org>
Cc: David Dow <ddow420@comcast.net>, edith.demello@state.ma.us, paul.sieloff@wellfleet-ma.gov, Lynne Pledger <pledger@hardwickpostandbeam.com>
Subject: Sierra Club Comments on CDM Report to CCC SWAC on Alternatives to SEMASS Contract After 2015
Return-Path: ddow420@comcast.net
Received: from omta13.westchester.pa.mail.comcast.net (LHLO omta13.westchester.pa.mail.comcast.net) (76.96.62.52) by sz0042.wc.mail.comcast.net with LMTP; Wed, 17 Feb 2010 20:07:02 +0000 (UTC)
Received: from c-75-67-151-196.hsd1.ma.comcast.net ([75.67.151.196]) by omta13.westchester.pa.mail.comcast.net with comcast id j8711d00E4EVfrf3Z872ZL; Wed, 17 Feb 2010 20:07:02 +0000
X-Caa-Spam: 00000
X-Authority-Analysis: v=1.1 cv=fBaDMhvevXdwDb3rDaeedICNjDqFfWH4ma9I/01T+bk= c=1 sm=1 a=ku7iEFQ7el0A:10 a=V/evONBxa7HgncsgAlfieg==:17 a=C_IRinGWAAAA:8 a=QTchIA2ChxLzrCwhD6MA:9 a=VRGJ2M8QgODcFEOwd7gA:7 a=RHRCwQLrNwUY4lvY_Dc2bsqoX_gA:4 a=WnwPyobtS3UA:10 a=1IKDa-aZM6YA:10 a=si9q_4b84H0A:10 a=XOwchBvH66nrXEFU:21 a=staXr62SvZlX17cW:21 a=DaraFsL0b4UjugIa4UIA:9 a=OYmctMR8kRSAk8GYcb0A:7 a=lhDbub7212nBtwGTGuqrLosbsIEA:4 a=V/evONBxa7HgncsgAlfieg==:117
Message-Id: <47C32370-40EC-45C0-8682-EAE8FBDE3B3A@comcast.net>
Content-Type: multipart/alternative; boundary=Apple-Mail-8-367211705
Mime-Version: 1.0 (Apple Message framework v936)
X-Mailer: Apple Mail (2.936)

To: Patty Daley, Cape Cod Commission

Subject: Sierra Club Comments on CDM Report on Alternatives to SEMASS Contract After 2015

The Cape Cod & the Islands Group- Sierra Club submits the following comments on the CDM contractor report on addressing municipal solid wastes (MSW) after the SEMASS contract expires in 2015. The Massachusetts Chapter's Zero Waste Committee supports the recent Massachusetts Department of Environmental Protection's (Ma. DEP) decision to place a moratorium on the construction of waste-to-energy incinerators (wte) and to address greenhouse gas emissions associated with landfills/wte facilities. The recent Ma. DEP decisions for developing a new direction for the state's Solid Waste Management Plan will have major implications for the recommendations in the CDM report, but the full implications are not yet understood as we await the state guidelines on how they plan to implement this policy. The Sierra Club does not support construction of a replacement wte facility at the Bourne Landfill as an option when the SEMASS contract expires for most of the towns on Cape Cod in 2015. We favor transition to a Zero Waste (ZW) approach and hope that the Cape Cod Commission (CCC) can obtain a grant in 2010 to discuss increasing our recycling rate for MSW and construction wastes (CW) to begin moving us towards ZW which emphasizes recycling, source reduction, reuse, composting, extended producer responsibility, expanding the bottle bill, etc.

The two major state unfunded mandates facing Cape Cod towns are upgrading our wastewater infrastructure to improve water quality in our coastal embayments and addressing MSW in a cost effective fashion. The Cape Cod & the Island Group views this an opportunity to move from a

focus on addressing these as pollution problems that require treatment/disposal approaches to resources that are out of place that require closing the loop on Cape Cod in order to make the transition to sustainability locally. Cape Cod towns have to address these unfunded mandates in the face of the challenges posed by climate disruption/state mandate for reducing our greenhouse gas emissions from fossil fuel sources.

Every year as Cape citizens pay their property taxes and more households are forced into the FAIR system, we realize that Cape Cod is already being impacted by climate change. In addition, the fish populations offshore are undergoing migrations (either southwest/northeast or inshore/offshore) in response to climate change (natural and man-made). The report submitted by CDM to the CCC Solid Waste Advisory Committee (SWAC) ignores this reality and the report's recommendations need to be evaluated from a wider perspective of how it fits in as a component of a strategy for the transition to sustainability. It is hard for us to tell whether this failing emanates from the narrow scope of work for the contract or the limited vision of the contractor, or some combination of both.

We need to look at this problem from a more holistic perspective, since plans to sewer portions of Cape Cod towns and build centralized sewage treatment plants which produce sludge containing emerging contaminants of concerns (endocrine disruptors, pharmaceuticals and personal care products, household cleaning products, etc.) will present a disposal challenge, whether one uses anaerobic digesters, composting or some other disposal option. Most of the wastewater focus has been on the consequences of discharging treated effluent back into our sole source aquifer for drinking water and conserving our groundwater resources in the face of population growth and climate disruption. Unfortunately this closing of the water resource loop perspective has not been brought to bear in the dialog on MSW/CW financial challenge where the current "wte" approach doesn't capture a lot of the embodied energy or recycle/reuse materials that are potential resources. To make matters worse we haven't created any "green jobs" on Cape Cod that would occur with a ZW approach. Finally the rising tipping fees make the "wte" approach a drain on municipal finances and our limited property tax base which will be stretched to address our wastewater infrastructure upgrade challenges.

Both of these problems are linked and we need to develop an integrated strategy to address these large unfunded mandates in a cost efficient manner. Business as usual treatment and disposal practices of the past are not the solution if we are to make the transition to sustainability in the face of rising population levels, climate change and create "green" jobs to replace those that has been permanently lost in the economic meltdown. We need action and not rhetoric from the CCC and town officials that are responsible for implementing the Regional Policy Plan and their town equivalents. The time to begin a dialog with the public on a transition to sustainability is now, so that we can build community support for the heavy lifting that has to be done. The Sierra Club and other environmental NGOs can support this process, but we don't have the resources and expertise to lead this discussion.

by industry and not those required to protect public health (like many EPA regulations). Since the national Sierra Club policy opposes dilution as the answer to toxic pollution, the Club's Air Committee has taken many toxic air polluters to court and won these cases. Many of the toxic air emissions aren't regulated and for the regulated emissions the monitoring programs are often inadequate. These realities need to be reflected in the CDM reort, especially if Cape Cod towns plan to use the Bourne LF as a replacement to the SEMASS contract after 2015.

* Since the Cape Cod Commission's Regional Policy Plan proposes to expand the recycling rate to 60% by 2012, this goal seems to run contrary to supporting a local wte facility at the Bourne LF where guaranteed tonnage and tipping fee revenues are important to financial viability. Hopefully the CCC SWAC will receive funding for their proposed recycling study to examine this tradeoff in more detail. The 2009 GAIA report points out that 90% of the msw currently placed in landfills or incinerated can either by composted or recycled, so that one would only have to find ways to address the other 10% through extended producer responsibility; source reduction or green production technologies to encourage degradation or product reuse. One should think of trash as resources out of place and develop strategies to close the material recycling loop and move towards carbon neutrality, Increased composting and/or anaerobic digestion of organic wastes could be an initial step in this direction, along with increased recycling through curbside trash pickup and pay-to-throw user fees at town landfills.

* Communities like San Francisco, Ca. and Marthas Vineyard are leading the way towards increased recycling rates and implementation of the ZW conceptual approach for msw and C&D. The CCC SWAC and towns on Cape Cod should move in this direction, rather than pursuing the obsolete wte approach which has less favorable cost/benefit ratios and can cause air pollution/produce challenges for handling hazardous solid waste components.

Thanks for your consideration of these comments.

David Dow
Chair, Cape Cod & the Islands Group- Sierra Club

18 Treetop Lane
East Falmouth, Ma. 02536-4814

phone: 508-540-7142
email: ddow420@comcast.net

References:

Ciplet, David. 2009. An Industry Blowing Smoke; Global Alliance for Incineration Alternatives; 38 pp.; Berkeley, Ca.

COMMENT SIX – Town of Plymouth

From: Kerin McCall [mailto:KMcCall@townhall.plymouth.ma.us]
Sent: Thursday, February 18, 2010 11:45 AM
To: Patty Daley
Subject: RE: CC SWAC

Patty,
I was just able to finally finish reviewing the draft report prepared by CDM, and I found a couple of errors regarding the information about Plymouth. I hope that it's not too late to submit comments.

- In Table 2-1, the tonnage handled at Plymouth's transfer stations appears to be total tonnage accepted, not MSW. The correct numbers for MSW for 2008, as submitted to DEP, are 1,417 tons at Cedarville, 3,779 at Manomet, and 7,152 at South St.
- The last paragraph in section 3.3 states that none of the four off-Cape communities signed the MOU, however, Plymouth signed it in August.
- In Table 3-1, Plymouth is included in the section with Towns whose contracts expire Sept 1, 2016, however, our contract actually expires Jan. 1, 2015.

I don't think this information affects the core of the report, but it would be good to have the correct information for posterity.

Some of the information in the report is quite interesting and not what I had expected. It's great to have information on other contracts and facilities. Thank you for including Plymouth and the other 3 off-Cape communities in this study. I think it has been valuable and is advantageous for all of the communities to look at MSW from a regional perspective, not only from the contracting point of view, but also for the exchange of ideas and information. Thank you for facilitating this study.