



**CAPITOL REGION COUNCIL OF
GOVERNMENTS,
HARTFORD, CONECTICUT**

**REGIONAL SOLID WASTE MANAGEMENT
OPTIONS ANALYSIS**

Final Report

November 21, 2008

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ES 1. OVERVIEW

Over the past two months, MidAtlantic Solid Waste Consultants (MSW Consultants) has performed a systems-based review of solid waste management in the Mid-Conn region, for the purpose of identifying long-term solid waste disposal and management options. To accomplish this review, MSW Consultants:

- ◆ Performed a survey of Mid-Conn Towns;
- ◆ Reviewed available waste generation, disposal, financial, and other publicly available data about the CRRRA Mid-Conn Project;
- ◆ Toured waste processing and disposal facilities in the Mid-Conn region;
- ◆ Attended several legislative committee meetings on the Mid-Conn project;
- ◆ Researched governance options available to the Towns; and
- ◆ Researched other integrated waste management system structures that may provide insight to improvements available to the Mid-Conn Towns.

The 70 communities that are currently disposing of their waste at the CRRRA's Mid-Connecticut Project (Mid-Conn Towns) have a population of close to 1.2 million and generate approximately 2,700 tons per day of municipal solid waste. Strictly from a size perspective, the Mid-Conn region can command market leverage that could enable the Mid-Conn Towns to collectively achieve an efficient, optimized integrated solid waste management system.

ES 1.1. EXISTING COLLECTION SYSTEMS AND FUNDING STRATEGIES

Our review of collection systems identified the following notable observations:

- ◆ **Subscription Service:** The majority of municipalities (36 of the 61 that responded to our survey) require residents to subscribe with a private hauler for curbside collection. However, the larger cities provide public or exclusively contracted collection, so 65 percent of the population is served by an exclusive service provider. The subscription method tends to be an inefficient system with redundancies and misuse of resources due to duplication of services on single road or street.
- ◆ **Automated Refuse Collection:** Almost 80 percent of the Mid-Conn Town population is receiving automated or semi-automated refuse collection service.
- ◆ **Automated Recycling Collection:** Automated recycling collection is frequently used for single stream collection service. Only 6 percent of the Mid-Conn region population has access to fully or semi-automated collection systems for recyclables. This suggests that recycling collection efficiency improvements are possible.
- ◆ **Commercial Collection:** Commercial refuse and recycling collection is almost entirely left to the private marketplace. Other than licensing, the Towns generally have no role in the relationship between haulers and their commercial customers.

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- ◆ **Solid Waste Funding:** Solid waste system funding is predominantly by General Fund transfers, millage and tipping fees paid at the Town transfer station. Few Towns have direct billing for solid waste services.

ES 1.2. CRRA MID-CONN PROJECT

CRRA oversees the operation of numerous facilities on behalf of the Mid-Connecticut region that provides for an integrated municipal waste management system.

- ◆ **Material Processing Facility (MPF)** that accepts loads of municipal solid waste and processes the waste into a Refuse Derived Fuel (RDF) that is incinerated in the adjacent RRF.
- ◆ **Resource Recovery Facility (RRF)** that converts the waste to energy through steam turbines. The RRF for the Mid-Conn region is a 60 year old former coal fired plant.
- ◆ Four **Transfer Stations** are strategically located throughout the Mid-Conn region to reduce transfer distances for collection vehicles by consolidating loads into larger transfer trailers, for delivery to the CRRA processing facilities.
- ◆ **Material Recovery Facility (MRF)** accepts commingled loads of containers and fiber (paper) and process the materials for sale to final and secondary recyclable commodity markets. This plant recently was upgraded to accept single stream loads of recyclables where paper and containers are mixed in a single load.
- ◆ **Hartford Landfill** has been an integral part of the CRRA overall system for the Mid-Conn region since its inception. This facility received all ash generated by the RRF and non-processibles that by-passed the MRF processing. Due to close December 31, 2008, CRRA will have to use an out-of-state landfill for ash and non-processibles. Unfortunately for the Mid-Conn municipalities, this capacity does not include bulky waste and municipalities are now directly responsible for finding disposal outlets on their own.

CRRA is a large and complicated organization with complex financial management. CRRA Mid-Conn financial data is challenging to review with data limited to what was available on the CRRA website and publicly released documentation. Review of annual budgets show the overhead/administrative costs for the Mid-Conn region operations being in excess of \$9 million per operating year.

CRRA administrative and overhead costs seem to be high relative to similarly sized solid waste management organizations. The \$9 million is well above, on a proportionate basis, what was observed for other large integrated waste management systems with RRF capacity that are included as case studies in this report.

CRRA appears to be over-allocating its administrative and overhead expenses to Mid-Conn Project. While the Mid-Conn Project processes 41 percent of the total tons managed by CRRA; generates 67 percent of the kilowatt hours produced by the CRRA, and accounts for 52 percent of the total revenue generated by the CRRA., it appears they pay over 75 percent of the administrative and overhead costs of the CRRA annually.

ES 2. GOVERNANCE OPTIONS

Under Connecticut law, there are a number of options for joint municipal action or management. Note that although MSW Consultants is a professional services firm specializing in solid waste management issues, we do not employ attorneys and are not qualified to comment on the legality or legal appropriateness of these options. Rather, the attempt is to summarize the options from a technical standpoint, focusing on their relative cost, accountability, administrative complexity, and flexibility to meet Town needs.

Table ES-1 summarizes the integrated waste management governance options that appear to be available to the Towns.

Table ES-1 Solid Waste Management Governance Options

| Governance Option | Description |
|--|--|
| Status Quo | Towns will be left with their own decision of whether or not to negotiate for re-upping with the CRRRA at the conclusion of their current disposal agreement. This scenario assumes that there would be no formal agreements or governance bodies established. |
| Joint Procurement, Separate Contracts | This scenario captures the strategy used by the towns in the Southwest region in their negotiations with the CRRRA Bridgeport project. In this instance, the Town of Norwalk unilaterally established a budget and procurement plan to undergo procurement of a transfer station operation, transport, and disposal from the lowest cost qualified private market vendor. Other regional Towns were invited to join the contract, but each town was responsible for contracting separately with the winning proposer. |
| Shared Asset Agreement | A shared asset agreement authorizes two or more municipalities to “jointly perform any function that each municipality may perform separately.” In this scenario, participating Towns would presumably enter into a shared asset agreement for transfer, transportation, and disposal of wastes, once again jointly procuring the services from the private market through a Request for Proposals. |
| Interlocal Agreement | Interlocal agreements can be used for “refuse collection and disposal” as these are among the eligible services covered by such an agreement. Authorization is required by each Towns’ legislative body, a public hearing, the creation of an interlocal advisory board staffed by a member from each participating Town, and the establishment of a range of governance procedures. An example of this organizational structure can be found in the Bristol Resource Recovery Facility where the project exists between the vendor (Covanta) and the Bristol Resource Recovery Facility Operating Committee (BRRFOC). |

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| Governance Option | Description |
|--|---|
| Municipal/Metropolitan District | Municipal and metropolitan districts allow district members to perform any function the municipalities may perform separately. Municipal districts are governed by a board consisting of two members appointed by each participating municipality, plus additional board members for every 5,000 population of participating municipalities. Metropolitan districts require formation of a charter and establishment of an entire set of governance rules, and must be passed by a majority of voters to be enacted. |
| Regional Solid Waste Management Authority | Regional Solid Waste Management Authorities can be formed by participating municipalities creating a district, signing an interlocal agreement, or signing a mutual contract for a definitive period of time. It appears that a key nuance of this option is the allowance for these authorities to provide for processing and disposal of wastes outside the authority boundaries. |
| Regional Resources Recovery Authority | Resource Recovery Authorities are authorized under the Connecticut General Statutes § 7-273aa et seq., require a concurrent ordinance of founding members, which must determine the number of Authority members, the number of votes to be cast by each member, the method of determining member's compensation (if any), the method of their appointment and removal, their terms of office. Subsequent members may join under the terms and conditions set by the Authority. Enables members to finance and own assets. |

There are clearly a wide range of options available for Connecticut municipalities to join forces for the provision of municipal services. However, the majority of these options appear to require relatively onerous processes to establish and administer. For this reason, it appears that two options are of greatest interest to the Mid-Conn Towns:

- ◆ **Joint Procurement, Individual Contracts:** This option would appear to be the simplest means by which some or all of the CRCOG or Mid-Conn Towns could procure services from the private market.
- ◆ **RRA:** If the Mid-Conn Towns are truly interested in optimizing the existing solid waste management infrastructure that is already in place in the Mid-Conn Region, this would require the formation of a special entity to acquire these assets.

ES 3. CASE STUDIES

MSW Consultants identified several case studies that illustrate integrated waste management governance at the state, regional, county, and town level. While descriptions of each case study are contained in the full report and will not be repeated here, these case studies collectively support several important principles that suggest how to best establish successful systems that balance high service with low costs:

- ◆ The combination of state-level regulatory framework and local governance plays a huge role in establishing effective systems. In states where the local government is both (a) relatively populous, such as a county, and (b) has been granted the ability to control sufficient waste flow to justify solid waste infrastructure development, solid waste

management systems function effectively. Connecticut, with its reliance on town-level rather than county-level governance, and with its complex framework for waste management, faces greater challenges than many other states.

- ◆ Where there is direct control of the solid waste organization by the underlying stakeholder (such as for an individual county), accountability is high which leads to good service at reasonable costs.
- ◆ Managing wastes based on intelligent procurement and contracting, assuming a reasonably competitive environment, is equally effective at meeting waste management needs as providing for the infrastructure through public organizations.

ES 4. ALTERNATIVES

There are many considerations that will lead to an optimized integrated solid waste management strategy. MSW Consultants identified the following considerations that will be of great importance.

ES 4.1. JOINT PARTICIPATION BY TOWNS

Any combination of Towns could theoretically join together for the purpose of aggregating waste flow and seeking disposal or processing. All 70 municipalities working collectively would expectantly drive the most competitive pricing from the private market. If not the entire 70 municipalities, then Towns considering a joint agreement should target a minimum of 500 tpd or more to gain interest and the potential for a viable private market solution for long term disposal. Towns that group together should be contiguous, and smaller rural Towns should aggressively seek to join forces with larger suburban and urban towns to minimize their solid waste costs.

ES 4.2. NEGOTIATE WITH CRRA

Towns could opt simply to negotiate collectively with the CRRA to continue providing the same or similar services as the current arrangement. Under this solution, there may be some opportunity to improve contractual terms with CRRA (i.e. get all-in disposal services including CRRA handling loads of bulky waste), but it is assumed that there would be minimal changes from the current service level in the absence of a compelling external catalyst, such as competition. This scenario uses the strength of the Town's united front in capturing a deal with CRRA that meets all the goals and objectives of the Mid-Conn municipalities.

ES 4.3. ACQUIRING CRRA INFRASTRUCTURE

If the Mid-Conn Towns are truly interested in optimizing the existing solid waste management infrastructure that is already in place in the Mid-Conn Region, this would require the formation of a special entity (RRF) to acquire and manage the operation of waste management assets. It is not clear if CRRA would be willing to consider divesting itself of Mid-Conn Project assets to a newly created entity.

ES 4.4. OPEN MARKET PROCUREMENT

Mid-Conn Towns could seek long term disposal solutions by procuring such services (transfer station operations, transport, disposal, processing, etc.) from private sector providers through

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a competitive process. In theory, the CRRA would act as one of many potential vendors that might provide a proposal under a competitive procurement. Under this strategy, the Towns assume the role of contract managers and rely on the open market to provide solutions, but have no direct control over the processing and disposal infrastructure (other than through contract terms).

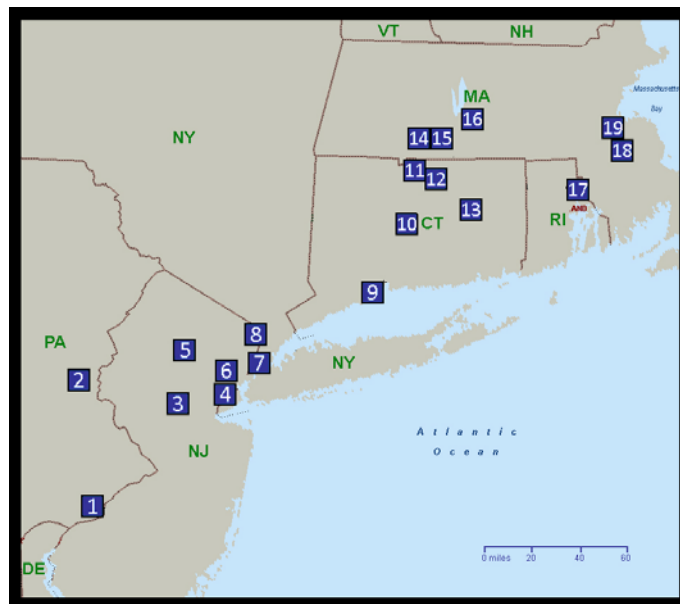
ES 4.5. ROAD HAUL

Currently this is the only long haul method used in Connecticut for municipal solid waste. While it is the goal of the State's legislature to provide for the management of Connecticut municipal waste within the State's jurisdictional boundaries, there is a group of municipalities in Southwestern CT that have contracted for road haul of municipal waste to out-of-state landfills. In this instance, municipal waste is baled by the selected contractor, placed in plastic bags, loaded onto flat bed trucks and transferred to landfills in New York, Pennsylvania and Ohio for disposal. The cost to bale, transfer and dispose was reported to be in the \$60 to \$70 per ton range, which is competitive with tipping fees charged at in-state RRF for municipal waste.

ES 4.6. RAIL HAUL

As shown in Figure ES-1, there are rail-enabled transfer stations in the Mid-Conn region that are currently utilized to process and transfer recyclable materials and construction and demolition waste (C&D). With the difficulty in siting and permitting new landfill capacity in Connecticut, the value of loading waste materials onto rail cars and rail hauling to distant landfills is increasing. More and more landfills in the United States are setting up to accommodate accepting material by rail, as it can be a much more cost efficient process than road haul that is heavily subject to fluctuations in fuel prices. The infrastructure for this technology for municipal waste exists in the region but, would require additional permitting and modifications to existing operations to accommodate handling of municipal waste.

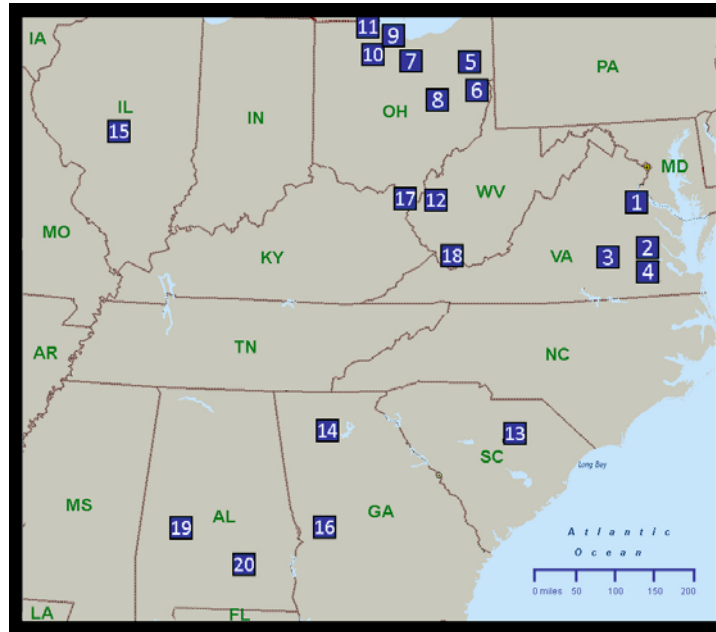
Figure ES-1 Map of Rail-Accessible Transfer Stations



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There are rail enabled landfills that can receive and dispose of wastes for \$18 to \$24/ton, as shown in Figure ES-2 below.

Figure ES-2 Rail-Enabled Landfills



The transportation costs from the Northeast region to these distant landfills allows cost-effective options for long term disposal.

ES 4.7. COLLECTION OPTIMIZATION

There are two main opportunities for improving the efficiency and reducing the cost of collection in the Mid-Conn region.

- ◆ **Converting to Exclusive Collection:** The Towns that do not currently provide for exclusive collection (either with public collection crews or via contract) stand to decrease the cost of collection for their residents by implementing exclusive collection.
- ◆ **Regional Collection:** Routing efficiencies available to regional collection systems would also be expected to reduce collection costs.

ES 4.8. RECYCLING OPTIMIZATION

There are two main opportunities for improving recycling in the Mid-Conn region.

- ◆ **Procurement of Processing Capacity:** Recyclables processing capacity should be procured similar to how disposal should be procured. This is necessary to understand the different material revenues associated with dual stream and single stream recyclables.
- ◆ **Establish Volume-based Pricing:** Volume based pricing has been shown to greatly increase diversion by establishing a financial incentive to recycle. However, enacting volume-based pricing may require substantial changes to Town solid waste funding strategies.

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ES 5. RECOMMENDATIONS

There are clearly a wide range of options available for Mid-Conn Towns to optimize their solid waste management system. Primary recommendations are provided below.

ES 5.1. GOVERNANCE

If the Towns are primarily interested in solving only the long term disposal issue, then it would seem that the Norwalk procurement model would be the easiest to pursue.

Conversely, if the Towns are truly interested in establishing an organization that can implement a disciplined, accountable, integrated system that employs best practices and optimized technology in all phases of waste management, then it would appear that the formation of a Mid-Conn RRA is warranted, followed by pursuit of management control of integrated solid waste system assets.

ES 5.2. LONG TERM DISPOSAL

Once the governance issue is determined, there appear to be a clear set of steps that should be pursued to secure disposal capacity:

- ◆ **Define Service Requirements:** Develop a draft contract with terms and conditions approved by the Towns, for long term solid waste disposal including transfer and transportation. In short, define what kind of system you want.
- ◆ **Engage CRRA:** It seems reasonable to request a comprehensive, long term proposal from CRRA to see if this already established organization can continue to be the Mid-Conn service provider for the foreseeable future at a rate comparable to the \$62/ton offered for next year (with reasonable, transparent annual rate increases).
- ◆ **Procure from the Open Market:** If CRRA cannot or will not provide a workable long term solution in writing, proceed to issue an RFP to interested private vendors for disposal (including transfer station operations, transportation, and final disposal).

ES 5.3. COLLECTION OPTIMIZATION

There are two primary opportunities to improve the collection of wastes and recyclables in the Mid-Conn Region:

- ◆ **Establishing exclusive collection programs** will immediately reduce collection costs and provide greater municipal control of recycling, which will be critical if the State is going to achieve a 58 percent diversion rate.
- ◆ Investigate cooperation among two or more Towns to **implement multi-jurisdiction or regional curbside collection**. Regional collection systems will impart benefits of better economies of scale, as well as more efficient routing.

ES 5.4. RECYCLING OPTIMIZATION

There are several steps that should be taken to fully evaluate the opportunities to improve recycling within the Mid-Conn Region.

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- ◆ The Mid-Conn Towns should jointly investigate a long-term (5-year to 7-year) agreement for processing recyclables. The market for recyclables processing is similar to the market for disposal, and market solutions should be explored for both dual stream and single stream processing.
- ◆ Mid-Conn Towns should obtain full control of recycling collection, through either public or contract collection. Only with municipal control will the Towns have a chance to achieve significantly higher recycling rates.
- ◆ Explore volume-based pricing, which gives a financial incentive to residents to recycle. This will require many Towns to reconfigure their solid waste revenue mechanisms.

ES 6. CONCLUSION

Despite the apparently daunting challenges that lay ahead, in reality the Mid-Conn Region has numerous opportunities to improve waste management for its Towns. Doing so will require commitment to several basic principles:

- ◆ **Control and Accountability Leads to Optimization:** From an organizational standpoint, establishing a Mid-Conn solid waste management entity that is directly accountable to the Mid-Conn Towns and also has the organizational control (charter and mission, management and technical expertise, procurement power, financial flexibility) to optimize the system will win out over all other options towards serving the Towns' financial and service needs within the context of the Connecticut SWMP.
- ◆ **Bigger is Better:** The more Towns willing to bundle their waste flows or customer bases prior to procuring a service, the better the resulting proposals will be.
- ◆ **Use Market Forces:** The Northeast region private market has evolved sufficiently such that there are multiple qualified, financially secure vendors that are capable of providing any of the transfer, transportation, disposal, or processing needs of the entire Mid-Conn Region. This market should be leveraged to provide the Towns with a true picture of the best available pricing for various services.

Despite the current disposal contracts not expiring until 2012, the Mid-Conn Region should initiate the decision making process immediately to provide sufficient lead time to enact the recommendation contained in this report. There will almost certainly be unforeseen obstacles, so longer lead time is appropriate.

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1. INTRODUCTION

1.1 BACKGROUND

The Capitol Region Council of Governments (CRCOG) engaged Mid-Atlantic Solid Waste Consultants (MSW Consultants) to complete a study of long-term disposal options for its 29 municipal members and the 70 total municipalities constituting the Mid-Connecticut (Mid-Conn) Region. The Mid-Conn Region is one of four regions of the State of Connecticut that is serviced by a quasi-public agency called the Connecticut Resources Recovery Authority (CRRA). The CRRA is tasked with implementing solid waste recycling, disposal, and resource recovery systems and facilities. CRRA was established 35 years ago with the purpose of financing the infrastructure for solid waste-related services that can meet waste disposal needs for the entire state of Connecticut, and which municipalities, regions and private entities could voluntarily agree to use.

In or around 1992, the 70 Mid-Conn Towns entered into 20-year agreement with the CRRA for provision of all solid wastes to be disposed in a group of facilities called the Mid-Connecticut Project. As its centerpiece, the Mid-Conn Project encompasses a refuse-derived fuel (RDF) and RDF-to-energy facility complex; the Project also includes transfer stations to feed the RDF complex as well as a material recovery facility (MRF) with an education center and a landfill (owned by the City of Hartford) for ash disposal, bulky, and bypass wastes. The service contracts for the Mid-Conn Towns are due to expire on or before 2012. Prior to this expiration, the Towns are interested in evaluating their long-term disposal options and selecting a long-term disposal strategy that meets the overall needs and budgets of each member.

1.2 SCOPE

The scope for this project was negotiated to cover a broad range of issues within the project budget established by CRCOG for the analysis. The project was divided into three phases and 10 tasks. A brief description of the final negotiated list of phases and tasks undertaken in this project are as follows:

1.2.1 PHASE 1: CURRENT SYSTEM CHARACTERIZATION

- ◆ **Task 1 – Project Initiation:** This task included a range of steps needed to initiate the project, establish communications, align expectations, confirm the project schedule and key milestones, and otherwise lay ground rules for the master planning effort. The task included review of available system data, attendance at a kick-off meeting with CRCOG, and participation in a cursory tour of solid waste facilities located in the region.
- ◆ **Task 2 – Municipal Solid Waste and Recycling Program Inventory:** This task compiled an inventory of the waste and recycling collection and management programs in place in the Mid-Conn Towns, including the size of the customer base, quantities of waste and recyclables generated, collection program characteristics, recycling program characteristics, revenue mechanisms, and current program costs. The task was performed by assembling available data on the Towns, supplemented by a direct survey to the Town

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public works directors to compile certain information that was not readily available elsewhere.

- ◆ **Task 3 – Solid Waste Facility Inventory:** MSW Consultants inventoried the solid waste management facilities that are currently located in the 70 Town Mid-Conn region, including transfer stations, material recovery facilities, compost (or green waste processing) facilities, and landfills. This effort was limited to research of readily available information on the CT DEP website, and encompassed both CRRA-owned and privately owned facilities.
- ◆ **Task 4 – CRRA Documentation Review and WTE Benchmarking:** This task included a limited budget to review the current interlocal agreements that govern the current disposal arrangement with the Mid-Connecticut project of CRRA, as well as the range of financial and operating data available in the public records sections of the CRRA website. As part of this task, MSW Consultants also contacted a limited number of WTE facilities and other integrated waste management systems nationally to gather relevant case studies from which lessons can be drawn for the Mid-Conn region.
- ◆ **Task 5 – Interim Presentation:** MSW Consultants presented preliminary findings to the Board on September 24 at a meeting attended by representatives of many of the Mid-Conn Towns.

1.2.2 PHASE 2: ANALYSIS OF ALTERNATIVES

- ◆ **Task 6 – Identification of Town Program Alternatives:** Based on data collection and feedback received from the Phase 1 tasks, MSW Consultants, based on its experience and on the principles of integrated solid waste management, identified and summarized promising program initiatives that meet state recycling goals and minimize system costs.
- ◆ **Task 7 – Analysis of Disposal Alternatives:** The most critical element of this analysis involved analyzing disposal alternatives for the Mid-Conn Towns, including the transfer, transportation, and disposal cost elements of each alternative.
- ◆ **Task 8 – Analysis of Recycling Alternatives:** MSW Consultants identified policies, management strategies, billing strategies (e.g., Pay-As-You-Throw), new facility development, and market development issues that will lead towards increases in diversion as Connecticut marches towards its 58 percent recycling goal by 2024.

1.2.3 PHASE 3: DEVELOP AND DISSEMINATE SOLID WASTE PLAN

- ◆ **Tasks 9 and 10 – Presentation of Findings:** Results of the research and analysis undertaken in the project are contained in this report. Key findings will also be presented to the Mid-Conn Towns in a final presentation in November 2008.

1.3 INFORMATION INCLUDED IN THE REVIEW

Given the budget for this assignment, MSW Consultants review of CRRA data was limited to the following sources:

- ◆ Annual Report of Connecticut Resource Recovery Operations for the Fiscal Year Ending June 30, 2007 (October 4, 2007). This report contains information on all four CRRA projects including 1) Name, type of contract, and charges for waste management service

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contracts with the private sector; 2) Waste received and processed; 3) Outstanding issues of notes and bonds; 4) Revenues received; and 5) General administrative fees. (annual_operations_report_fy07_100507.pdf)

- ◆ 2007 Annual Report Requirements Sections 1-123 (January 30, 2008). Report contains a list of all bond issues for the proceeding year; a list of all projects receiving financial assistance including the amount of funds provided; a list of all individuals and firms receiving >\$5,000 in loans, grants or payments for services; revenue and expenditures balance sheet; value of issued bonds and outstanding bonds; human resource policies; and planned events for the current fiscal year. In addition the report provides, under CGS Section 22a-268e, a description of efforts to mitigate the Enron transaction. (annual_report_fy_2007_sec_1_123.pdf)
- ◆ CRRRA Comprehensive Annual Financial Report – Fiscal Year Ended June 30, 2007 (December 21, 2007). Contains a detailed breakout of the finances of the Authority and net assets for the General Fund, Mid-Connecticut Project, Bridgeport Project, Wallingford Project and Southeast Project. In addition the report contains information on waste generation and disposal, debt capacity and general demographic information. (cafr_fy_2007.pdf)
- ◆ Connecticut Resources Recovery Authority, FY 2009 Operating and Capital Budget. December 20, 2007. Contains the Authority’s fiscal year 2009 operating and capital budgets and tip fees for the General Fund and the following five projects: Bridgeport (SWAB); Bridgeport (SWEROC); Mid Connecticut; Southeast; and Wallingford. (CRRRA_fy_2009_budget.pdf)
- ◆ Legal Service Agreement Summary. A one page table displaying the contracting party and the contract terms, hourly rate, the contract amount and the method of contract award. (2008 LEGAL SERVICES AGREEMENT SUMMARY 2009.pdf)
- ◆ PowerPoint Presentation from CRRRA Annual Meeting (February 27, 2008). Discusses recycling and regulation issues; tonnage, electricity and disposal costs for the Bridgeport, Wallingford, Mid Connecticut and Southeast projects; and future options for the CRRRA. (CRRRA_Annual_Meeting_2-27-2008_presentation_files/frame.htm)
- ◆ “Meeting the Challenge – Ensuring Capacity for Connecticut’s Municipal Solid Waste and Recyclables in Changing Market Conditions. (A White Paper)” (February 27, 2007). Discusses the shortfalls in disposal capacity, the risk of out of state disposal, the contributions of CRRRA, the shift to private ownership, and future options for the CRRRA. (GBB-CRRRA_White_Paper_2-27-2007.pdf)
- ◆ Reviewed Staff Briefing entitled Resource Recovery Facility Ownership: Options and Implementations, which discussed ownership options for RRFs after retirement of long-term debt service payments.
- ◆ Attended the state legislature’s Program Review and Investigations Committee public hearing held on September 23rd on RRF facilities’ ownership.
- ◆ Letter dated January 23, 2006, from Updike, Kelly & Spellacy, P.C. to CRCOG outlining the procedures available to Connecticut municipalities to share services and assets.
- ◆ “Laws on Regional Entities,” Connecticut Office of Legislative Research (OLR), Sept 26, 2008.

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- ◆ State of Connecticut State Solid Waste Management Plan, Amended December 2006. This plan seeks to guide the management of waste according to the state's preferred waste management hierarchy, for the period 2005 through 2024.

1.4 DEFINITIONS OF TERMS

Throughout this report there are terms used that are common to the solid waste industry or have been created to convey a particular concept for this analysis, yet these terms may not be widely used outside the industry or this report. Note that these definitions do not necessarily reflect Connecticut statutory definitions for Solid Waste Management (Sec.22a-209-1). Rather, they are an attempt to standardize the use of industry terms used in this report. The alphabetical list below attempts to summarize these terms and their definitions.

- ◆ **Bulky Waste** is the waste generated by both the residential sector and the commercial sector that too large for standard containerized collection practices to be utilized (i.e. furniture, mattresses, appliances, etc.). These items also can require special processing or bypass in a solid waste system that utilizes waste-to-energy (WTE).
- ◆ **CRCOG Towns** refer to the 29 CRCOG municipal members that are a subset of the 70 Mid-Conn municipalities.
- ◆ **Commercial Waste** is the waste generated by commercial entities, such as businesses, office buildings, restaurants and institutions (i.e. hospitals, school, etc.).
- ◆ **Connecticut Department of Environmental Protection (DEP)** is the Connecticut state agency involved with the regulating the permitting and operations of facilities associated with the processing, recovery and disposal of municipal waste generated by Connecticut municipalities. DEP was also responsible for preparation of the state's December 2006 Solid Waste Management Plan update.
- ◆ **Construction and Demolition Waste (C&D Waste)** is generated by the construction of new structures or the renovation or demolition of existing structures. It typically contains bulky, inert, and heavy items such as concrete, dimensional lumber, treated/painted wood, scrap metal, corrugated cardboard, drywall, carpet/backing, and related items.
- ◆ **Convenience Center** refers to any Town-managed facility where residents and businesses can drop-off waste and recyclables into roll-off containers for transport to the Mid-Connecticut Project processing and disposal facilities. These facilities are also called "transfer stations" by many Towns.
- ◆ **Long haul transfer** refers to the use of loaded transfer trailers for transportation of wastes over the road to distant disposal facilities.
- ◆ **Mass Burn** is the waste recovery technology that burns and recovers energy and steam from the burning of raw, unprocessed municipal solid waste.
- ◆ **Material Processing Facility (MPF)** the is the official name of the CRRA Mid-Connecticut Project facility that accepts municipal waste from the 70 municipalities and converts the material to a fuel source for generating electric and steam recovery. The end-product is a Refuse Derived Fuel that is burned in the incineration plant to generate energy.

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- ◆ **Material Recovery Facility (MRF)** is a facility for accepting and processing recyclable materials and selling the materials to secondary markets.
- ◆ **Mid-Conn Region/Mid-Conn Towns/Towns** refers to the 70 towns that currently have their waste delivered to the CRRA Mid-Connecticut Project.
- ◆ **Mid-Connecticut Project** refers to the CRRA-managed transfer, processing, and disposal facilities that serve the 70 Mid-Conn Towns.
- ◆ **Municipally Managed Waste** the waste that is collected by public collection crews or under contract. In other words, the local Town government is directly involved in the provision of the collection service.
- ◆ **Municipal Solid Waste** means solid waste from residential, commercial, industrial, and institutional sources, excluding solid waste consisting of significant quantities of hazardous waste as defined in Section 22a-115 of the General Statutes, landclearing debris, biomedical waste, sewage sludge and scrap metal.
- ◆ **Non-processible Waste** refers to waste that is segregated and cannot be burned for energy recovery because of some property of the waste (e.g., oversized items that might damage processing equipment, or inerts); rather, such waste has to be landfilled.
- ◆ **Privately Managed Waste** is collected under subscription between a household or business with no direct Town involvement, other than licensing the hauler.
- ◆ **Processible Waste** is segregated and can be processed at the MPF and burned for energy recovery.
- ◆ **Refuse Derived Fuel (RDF)** is the processible fraction of the waste stream that can be incinerated to generate energy.
- ◆ **Residential Waste** is the waste generated by households, including primarily putrescible wastes as well as oversized MSW, sometimes know as “bulky wastes”.
- ◆ **Towns or Mid-Conn Towns** constitutes all the 70 towns or municipalities that make up the Mid-Conn Region.
- ◆ **Transload Facility** is a location where waste is actually loaded on a train (either intermodal or top load of gondolas) for rail transportation.
- ◆ **Transfer Stations** are facilities designed to consolidate waste delivered by commercial compactor collection trucks into larger containers for truck to the MPF.
- ◆ **Waste-by-rail** refers to the shipment of wastes via railroad rather than by road.
- ◆ **Waste to Energy (WTE)** is the technology to burn waste for the recovery of energy and/or stream.

1.5 REPORT CONTENT

The full report is divided into the following remaining sections:

- ◆ **Section 2 – Overview of Current System:** This section summarizes the demographics, waste generation, collection programs, recycling programs, system funding strategies, and facilities in the Mid-Conn region.

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- ◆ **Section 3 – Related Case Studies:** Nationally, there are thousands of variations on municipal waste management that have met with varying degrees of success. This section examines a limited number of alternative waste management systems based on prior project work and/or awareness of the MSW Consultants project team. Case studies have been selected to highlight span state, regional, county, and local solid waste system management regimes, and also to highlight one or more particular concepts or points of comparison. It was beyond the scope of the study to conduct detailed benchmarking comparisons.
- ◆ **Section 4 – Governance Options:** This section explores the different mechanisms that enable two or more municipalities to jointly provide solid waste management services in Connecticut.
- ◆ **Section 5 – Analysis of Alternatives:** This section examines a range of collection, recycling, and disposal alternatives for the Mid-Conn Towns. Because of budgetary constraints, the focus of the section is on the disposal alternatives, but limited discussion is also provided for collection and recycling optimization.
- ◆ **Section 6 – Recommendations:** In this section, MSW Consultants attempts to summarize the strategies that would appear to offer the best options for Mid-Conn Towns leading up to the expiration of their CRRRA contracts.

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A summary of key measures of the size of the region are shown in Table 2-1 which summarizes the data collected from CRRRA, CT DEP and MSW Consultant's municipal survey performed in September, 2008 and is shown in Appendix A.

Table 2-1 Municipalities

| Demographics and Waste Generation | CRCOG Towns | Mid-Conn Towns |
|---|-------------------------------|-------------------------------|
| Number of Towns | 29 | 70 |
| Population | 658,000 | 1,138,000 |
| Refuse Disposed (tons) | 495,548 annually 1,700 tpd | 823,413 annually 2,900 tpd |
| Recyclables Delivered to CRRRA (tons) | 48,098 annually 185 tpd | 83,197 annually 320 tpd |
| Recyclables Delivered to CRRRA as a Percent of All Materials Delivered to CRRRA | 8.8% | 9.0% |

Values in this table are based on FY 2007 data.

With a population of almost 1.2 million, the Mid-Conn region is comparable in size to the cities of San Diego or Dallas, or Hillsborough County, Florida (Tampa area). The total waste generated amounts to over 2,700 tons per day; for perspective this is roughly one-tenth the waste generation of the five boroughs of New York City. The 29 CRCOG municipalities alone make up a population of over 650 thousand, equivalent to Baltimore, MD or Austin, TX. By any measure, the Mid-Conn Region is large enough to support its own integrated waste management system, and the CRCOG communities alone have sufficient mass to leverage solid waste market power.

It is worth noting that population density varies significantly among the Mid-Conn Towns, from populated cities to surrounding suburban communities to more rural areas outside the population centers. In this sense, the region is more comparable to a large county than to a city which would most likely contain more urban, densely populated areas.

2.2. COLLECTION SYSTEMS

MSW Consultants conducted a direct survey of the 70 Mid-Conn Towns, supplemented with data collected by CT DEP. These sources provided the following information about collection systems in the Mid-Conn Region.

2.2.1.1 Residential Collection

It is well known in the solid waste industry that the strongest control of the waste stream can be achieved by controlling the collection function. Towns that control collection – either because they provide collection with public resources or they contract for collection with a private hauler – can better monitor the set-out behaviors of their customers and track the precise waste generated within their borders. Table 2-2 summarizes the reported residential collection management strategy employed by Towns in the Mid-Conn Region which

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summarizes the data collected from CT DEP and MSW Consultant's municipal survey performed in September, 2008 and is shown in Appendix A.

Table 2-2 Collection Provider Summary

| Service Provider | Refuse Collection | | Recycling Collection | |
|-----------------------|-------------------|--------------|----------------------|--------------|
| | Number | % Population | Number | % Population |
| Municipal | 7 | 30.9% | 7 | 27.0% |
| Contract | 18 | 34.2% | 20 | 41.1% |
| Subscription/Drop-off | 36 | 34.8% | 34 | 31.9% |
| Total | 61 | 100% | 61 | 100% |

Note: Data in table is a summary of responses to a survey of all 70 Mid-Conn Towns conducted in September, 2008, supplemented with some CT DEP data.

As Table 2-2 indicates, the more populous Towns tend to have either municipal or contract collection, while the less populous Towns rely on subscription service, a local convenience center or a combination of the two. All told, the survey suggests that roughly one-third of the population of the Mid-Conn Region must opt to subscribe to a private hauler for collection service, or else use a local convenience center to drop off their wastes and recyclables. This is the case in over half of the Towns.

It should be noted that many communities report offering a drop-off location for residents for municipal waste, recyclables, yard waste and other special wastes like household hazardous waste, bulky waste, appliances, tires, etc. Although sometimes called "transfer stations" by the survey respondents, these facilities in many cases are more accurately termed "convenience centers" where residents deposit wastes and recyclables into roll-off containers for transport to a central transfer station or the processing or disposal facility. Full scale commercial transfer stations are described later in this section.

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Table 2-3 summarizes the reported collection technology in place in the Towns that provide municipal or contract collection (subscription Towns do not track this information), based on MSW Consultant's municipal survey performed in September 2008 and supplemented with CT DEP data (see Appendix A).

Table 2-3 Collection Technology Summary

| Collection Technology | Refuse Collection | | Recycling Collection | |
|--------------------------------|-------------------|--------------|----------------------|--------------|
| | Number | % Population | Number | % Population |
| Manual | 8 | 13.8% | 31 | 86.9% |
| Semi-automated | 1 | 5.9% | 2 | 4.3% |
| Fully Automated | 19 | 53.1% | 2 | 2.9% |
| Fully Automated/Semi-automated | 5 | 26.4% | 0 | 0.0% |
| Semi-automated/Manual | 1 | 0.7% | 1 | 5.9% |
| Total | 34 | 100% | 36 | 100% |

Note: Data in table is a summary of responses to a survey of all 70 Mid-Conn Towns conducted in September, 2008, supplemented with some CT DEP data.

As shown, of the municipalities responding, the most common collection technology was found to be fully automated collection. This method is clearly one of the most effective overall as it reduces the amount of labor required for collecting municipal waste and recyclables. This suggests that municipalities have sought to be cost effective about the elements of their waste management system they control.

Interestingly, over 85 percent of households were reported to have manual recycling collection, with recyclables being collected in two streams (fiber and comingled containers). However, late this summer CRRA conducted performance testing on a new single stream technology integrated into the CRRA MRF. With the availability of this new technology, CRRA is optimistic that single stream will be a popular alternative to the dual stream collection system and expects the amount of recycling in the region to increase significantly. CRRA reported having requests from several municipalities about the single stream program.

Based on a subset of responses, Table 2-4 suggests that refuse and recycling collection frequency are predominantly once-per-week, which is the most common frequency for collection systems in the Northeast. Twice per week collection is generally only seen in the more southern states, while every-other-week frequency is generally limited to recycling or yard waste collection programs. Again, this reflects a lower cost than twice per week collection, so it appears that the Mid-Conn Towns have managed their collection systems to provide low-cost services to their residents. Table 2-4 is based on MSW Consultant's municipal survey performed in September 2008 and supplemented with CT DEP data (see Appendix A).

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Table 2-4 Collection Frequency

| Collection Frequency | Refuse Collection | | Recycling Collection | |
|----------------------|-------------------|--------------|----------------------|--------------|
| | Number | % Population | Number | % Population |
| 2x/Week | 0 | 0.0% | 0 | 0.0% |
| 1x/Week | 20 | 100.0% | 19 | 92.8% |
| Every Other Week | 0 | 0.0% | 2 | 7.2% |
| Total | 20 | 100% | 21 | 100% |

Note: Data in table is a summary of responses to a survey of all 70 Mid-Conn Towns conducted in September, 2008, supplemented with some CT DEP data.

The survey revealed the following other collection services in place in the Mid-Conn Region:

- ◆ **Yard Waste:** Eight Towns reported that yard waste was either collected by the municipality or by contract collections. In all cases, yard waste collection was limited to a seasonal basis, often including both fall, December holiday, and spring seasonal collection.
- ◆ **Bulky Waste:** Fifteen Towns reported information regarding bulky waste collection frequency. Of these, 50 percent said that they had once a week collection, 43 percent reported on-call collection, and 7 percent reported “other” but, did not provide information about other collection.

2.2.2 COMMERCIAL COLLECTION

Respondents to the direct survey indicated that the majority of the Towns leave commercial waste collection to the private sector and elect not to get involved with the commerce between collection haulers and the commercial and institutional establishments that generate commercial waste. In other words, each commercial and institutional establishment must arrange for its own refuse collection. Commercial waste collection service is essentially akin to residential subscription service, where any hauler can be selected provided the hauler is licensed, permitted or registered to provide these services by the Town.

2.2.3 OTHER SERVICES

Some municipalities offer drop-off collection services for special waste streams such as electronic waste, household hazardous waste, bulky waste, appliances, and other wastes that are difficult to manage in the municipal solid waste stream. Also, the CRRA sponsors events throughout the year for the collections of these materials. The information associated with these events is advertised in local publications and posted on the CRRA website.

Table 2-5 shows the total number of municipalities that responded that they had a household hazardous waste collection program. Table 2-5 and 2-6 are based on MSW Consultant’s municipal survey performed in September 2008 and supplemented with CT DEP data (see Appendix A).

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Table 2-5 Household Hazardous Waste Programs

| HHW Program | Total | Total Population Responding | % Population Responding |
|--------------|-----------|-----------------------------|-------------------------|
| Yes | 40 | 723,554 | 95.1% |
| No | 5 | 37,017 | 4.9% |
| Total | 45 | 760,571 | 100% |

Note: Data in table is a summary of responses to a survey of all 70 Mid-Conn Towns conducted in September, 2008, supplemented with some CT DEP data.

Table 2-6 shows the total number of municipalities that provide an electronic waste recycling program.

Table 2-6 Electronic Waste Recycling Programs

| Electronic Waste Program | Total | Total Population Responding | % Population Responding |
|--------------------------|-----------|-----------------------------|-------------------------|
| Yes | 27 | 476,509 | 65.5% |
| No | 14 | 250,708 | 34.5% |
| Total | 41 | 727,217 | 100% |

Note: Data in table is a summary of responses to a survey of all 70 Mid-Conn Towns conducted in September, 2008, supplemented with some CT DEP data.

Removal of these materials from the municipal solid waste stream is particularly important for waste management systems that utilize incineration as the primary processing/disposal options. Regulations and air quality requirements dictate that as much of these materials be removed as possible to reduce regulatory violations.

2.2.4 CONSTRUCTION AND DEMOLITION (C&D) WASTE COLLECTION

It should be noted that C&D waste is managed for disposal purposes entirely by the private sector, though some municipalities accept this material at their convenience centers (Town transfer stations), then have material delivered to a C&D processor or transporter. This is likely driven by the fact that no C&D waste is accepted within the CRRA Mid-Conn Project, as this material is extremely detrimental to the operation of an RRF. Even in mass burn facilities with no front-end processing, C&D material (which is frequently bulky, dense, and full of inert materials like concrete) is not highly combustible and tends to wear the equipment out much faster than the municipal solid waste stream. Details of the C&D management system are provided later in this report.

2.3. TOWN SOLID WASTE FUNDING MECHANISMS

Table 2-7 shows the response of how solid waste and recycling collection is funded by municipalities responding to the municipal survey.

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Table 2-7 Solid Waste Funding

| Funding Response | Total Response | Population Responding | % Population Responding |
|---|----------------|-----------------------|-------------------------|
| General Fund Transfer | 12 | 249,486 | 25.5% |
| General Fund/Residents Responsibility | 2 | 35,172 | 3.6% |
| General Fund/Tip Fee | 2 | 51,747 | 5.3% |
| General Fund/Tip Fee/Residents Responsibility | 3 | 17,095 | 1.7% |
| Millage | 16 | 191,777 | 19.6% |
| Millage/Other | 1 | 1,529 | 0.2% |
| Millage/Residents Responsibility | 1 | 9,654 | 1.0% |
| Millage/Tip Fee | 1 | 107,174 | 10.9% |
| Residents Responsibility | 1 | 6,618 | 0.7% |
| Special Assessment | 1 | 25,084 | 2.6% |
| Special Assessment/Tip Fee | 1 | 4,971 | 0.5% |
| Tip Fee | 6 | 138,580 | 14.1% |
| Tip Fee/Residents Responsibility | 7 | 128,358 | 13.1% |
| User Fee/Other | 1 | 12,192 | 1.2% |
| Total | 55 | 979,437 | 100.0% |

Note: Data in table is a summary of responses to a survey of all 70 Mid-Conn municipalities conducted in September, 2008, supplemented with some CT DEP data.

Each system appears to have as unique a funding mechanism as it does a collection methodology. Few are exactly the same. For instance, there are contracted collection services in municipalities that are paid directly by the homeowner to the contracted collector and some that the all costs associated with collection and disposal are funneled through the municipalities, so that homeowner pays no direct service fee. Because of the myriad of payment systems, it was difficult for those responding to the survey to specifically state what the per household cost for collection, transfer and disposal was. There were a few exceptions, including; Enfield with a municipal collection system that reported a monthly household rate of \$15.00, Colebrook with a municipal collection systems and reporting a monthly cost of \$18.00 per household to Westbrook with a subscription system reporting an average monthly household cost of \$30.00.

2.4. CRRA MID-CONN PROJECT

CRRA oversees the operation of numerous facilities on behalf of the Mid-Connecticut service region. The facilities include, a Material Processing Facility (MPF) that generates a Refuse Derived Fuel (RDF) for incineration in a Resource Recovery Facility (RRF) located adjacent to the MPF, a landfill for by-pass of non-processible waste, bulky waste and ash, a Material

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Recovery Facility (MRF) to accept source separated recyclable materials from residential and commercial sources for recovery and marketing of commodities to end use markets, and finally four transfer facilities that consolidate loads collected in smaller collection vehicles from more remote areas of the Mid-Conn region into larger transfer trailers to reduce transportation cost to the MPF and Recycling Center for processing.

It should be noted that the Mid-Conn Project uses RDF in lieu of mass burn because the incineration facility is formerly a coal burning plant and not designed to handle incineration of raw, unprocessed solid waste. The front-end processing system (RDF) enables the CRRA to provide a fuel that can be burned in coal boiler systems, while also typically generating a higher BTU value compared to straight solid waste.

The RDF generated by the MPF is transported by conveyor to the WTE where it is combusted. Heat in the form of steam is recovered from the combustion and is used to generate electricity. The MPF is operated by the Metropolitan District Corporation (MDC) under contract with CRRA.

The advantage of RDF is that non-combustible materials are removed through mechanical operations and generates a more homogenous fuel source that has a higher BTU value per pound than material burned in a straight mass burn facility. Though the front end cost is eliminated, the fuel value is generally lower and CRRA uses the RDF front-end technology because it worked with the pre-existing coal firing boiler systems. In fact, initially coal was co-fired with the RDF to meet the boiler demands until the amount of RDF was sufficient to eliminate the need for coal as a supplemental fuel source.

There are two disadvantages of the current RDF operations. The first is that there are no provisions to manage bulky waste. Second, with the closure of the local landfill, all bulky waste and ash will have to be transported and disposed to an out-of-state facility after January 1, 2009. Later, case studies will demonstrate that other integrated waste management systems with RRF operations have made provisions to manage all the municipal waste generated within the jurisdiction they are responsible for, whether it is to a landfill that is part of the overall system or by contract to an outside landfill operation or a suitable alternative to landfilling.

In 2006, Grillo Engineering Co. (Grillo) was retained by CRRA to conduct an inspection of the Mid-Connecticut Project Waste Processing Facility (WPF). The inspection focused on the condition of the process mechanical equipment and the ongoing maintenance practices and procedures performed by the operator, the Metropolitan District Commission (MDC). The 2006 report gave a description of the condition of the equipment, the reason for the condition (i.e. maintenance or operating practices), and recommendations for restoration efforts (capital improvements), including approximate repair cost and time. The Grillo Report suggests that facility (MPF) has at least twenty years of useful capacity provided the current maintenance and capital improvement schedule it followed.

The Facility processes waste from 7:30 a.m. until 11:30 p.m., Monday through Saturday. Operators work 10-hour shifts, four days a week. The first operating shift arrives at 6 AM, and assist with cleaning until about 7 a.m., when they begin to start the processing operations. MSW is fed starting at 7:30 a.m. That shift continues until 4:30 p.m. Sundays are available for either operations if there is excess MSW to be processed or maintenance if major maintenance is needed. The second operating shift arrives at 4 p.m. and operates the Facility until 11:30

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p.m. At that time, the operations cease and operating staff assist with cleaning the equipment until 2:30 a.m.

In total, the facility receives an average of 800,000 tons per year (TPY) and has processed as much as 830,000 TPY during peak years. Some of that tonnage is what is sold by CRRA on a “spot market” to out-of-region and out-of state sources to ensure a steady fuel source for the WTE. The plant processes approximately 3,200 tons per day (TPD) on Mondays through Fridays and takes approximately 500 TPD on Saturdays.

Waste flow to the facility is controlled through municipal contracts with CRRA where each municipality commits to a “put-or-pay” arrangement, guaranteeing that the municipality will deliver a specified tonnage or pay the difference of the shortfall. It is reported that no municipalities have paid for a short fall in recent years.

Table 2-8 provides a summary of the FY09 Budgeted Expenditures for the Mid-Conn Project

Table 2-8 Mid-Conn Project Budgeted Expenditures

| Line Item | 2009 Budget | Percent |
|--------------------------------------|----------------------|---------------|
| General Administration | \$9,933,666 | 9.0% |
| Debt Service/Administration | \$3,062,000 | 2.8% |
| Resource Recovery Facility | \$0 | 0.0% |
| Ash Disposal | \$0 | 0.0% |
| Waste Transport | \$24,484,000 | 22.1% |
| Regional Recycling | \$2,972,500 | 2.7% |
| Recycling Education | \$0 | 0.0% |
| Waste Processing Facility | \$26,767,000 | 24.2% |
| Power Block Facility | \$18,358,000 | 16.6% |
| Energy Generating Facility | \$1,837,000 | 1.7% |
| Landfills | \$14,266,300 | 12.9% |
| Transfer Stations | \$2,316,000 | 2.1% |
| 171 Murphy Road | \$83,000 | 0.1% |
| Jets / Energy Generating Facility | \$6,627,000 | 6.0% |
| Contribution to Future Needs Reserve | \$0 | 0.0% |
| Total | \$110,706,466 | 100.0% |

As shown, the Mid-Conn Project is a \$110 million system, with substantial costs associated with the RDF and WTE operation, waste transportation, and landfill operations. One notable observation of these costs is that the line item, “Recycling Education” has a zero dollar value, suggesting there is no recycling education. It is believed that this cost is built into the

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operating costs of the CRRA Trash Museum. Clarification of this was requested from CRRA, but no response was provided in time to be incorporated into this final report.

At the request of CRCOG, MSW Consultants attempted to evaluate the administrative costs allocated to the Mid-Conn Project. To do so, we consulted the Oct 28 Operations Report issued by the CRRA. This report provides a detailed accounting of general administrative expenses. These expenses include a range of line items spanning allocated salaries and overhead for management and administration, legal expenses, advertising and public relations, and a contribution to a “risk fund.” These line item expenses are shown in Table 2-9.

Table 2-9 Mid-Conn Project General Administrative Expenditures (Adopted FY09)

| Line Item | 2009 Budget | Percent |
|----------------------------------|--------------------|---------------|
| Postage and Delivery Fees | 5,166 | 0.1% |
| Duplication and Printing | 5,000 | 0.1% |
| Advertising | 35,000 | 0.4% |
| Marketing and Public Relations | 40,000 | 0.4% |
| Office Supplies | 5,000 | 0.1% |
| Miscellaneous Services | 2,000 | 0.0% |
| Business Meetings and Travel | 2,000 | 0.0% |
| Mileage Reimbursement | 4,000 | 0.0% |
| Building Operations | 104,000 | 1.0% |
| Ground Maintenance | 46,000 | 0.5% |
| Fees/License/Permits | 1,000 | 0.0% |
| Claims/Loss | 25,000 | 0.3% |
| Bad Debt Expense | 10,000 | 0.1% |
| Contribution to Risk Fund | 1,000,000 | 10.1% |
| IT Consultant | 10,000 | 0.1% |
| Legal | 2,740,000 | 27.6% |
| Financial | 50,000 | 0.5% |
| Auditor | 20,000 | 0.2% |
| Insurance, Consulting, Brokerage | 88,000 | 0.9% |
| Other Consulting Services | 220,000 | 2.2% |
| Gas | 10,500 | 0.1% |
| Computer Hardware | 2,000 | 0.0% |
| Computer Software | 5,000 | 0.1% |
| Allocation – Salaries | 3,060,000 | 30.8% |
| Allocation – Overhead | 2,444,000 | 24.6% |
| Total | \$9,933,666 | 100.0% |

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There are a number of questions raised by the general administrative expenses shown here. The largest contributors to the administrative charges are the allocated salaries, overhead, and legal expense. Table 2-10 lists the names and titles of upper management, though the \$3 million allocated for salaries may include middle management. A request to CRRA to clarify the staff and titles included in this figure was submitted, but no response was received in time to be integrated into this final report

Table 2-10 List of CRRA Upper Management for Mid-Conn Project

| Employee's Name | Employee's Title |
|-------------------|---|
| Thomas D. Kirk | President |
| James P. Bolduc | Chief Financial Officer |
| Michael Tracey | Director of Operations |
| Peter W. Egan | Director of Environmental Affairs & Development |
| Laurie Hunt | Director of Legal Affairs |
| Paul Nonnenmacher | Director of Public Affairs |
| Thomas P. Gaffey | Director of Recycling and Enforcement |
| Michael R. Bzdyra | Government Relations Liaison |

MSW Consultants attempted to discern the allocation basis that was used to assign general and administrative expenses to the Mid-Conn Project. This exercise is shown in Table 2-11.

Table 2-11 Contribution of Tons, kWh and Revenues by CRRA Project

| CRRA Project | Tons | | KwH | | Revenues | |
|--------------|------------------|---------------|----------------|---------------|------------------|---------------|
| | Tons | Pct | KwH (mil) | Pct | Revs (mil) | Pct |
| Mid-Conn | 800,414 | 40.6% | 403,000 | 67.4% | \$98,047 | 52.1% |
| Southeast | 263,014 | 13.4% | 131,500 | 22.0% | \$11,091 | 5.9% |
| Bridgeport | 753,486 | 38.3% | 0 | 0.0% | \$57,022 | 30.3% |
| Wallingford | 152,665 | 7.8% | 63,360 | 10.6% | \$22,101 | 11.7% |
| Total | 1,969,579 | 100.0% | 597,860 | 100.0% | \$188,261 | 100.0% |

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This table suggests that the Mid-Conn Project processes 41 percent of the total tons managed by CRRA; generated 67 percent of the kilowatt hours produced by the CRRA, and accounts for 52 percent of the total revenue generated by the CRRA.

Table 2-12 compares selected general and administrative expenses allocated to each project.

Table 2-12 Allocated G&A Expense by CRRA Project

| CRRA Project | Salaries | | Overhead | | Legal | |
|--------------|--------------------|---------------|--------------------|---------------|--------------------|---------------|
| | Amount | Pct | Amount | Pct | Amount | Pct |
| Mid-Conn | \$3,060,000 | 78.2% | \$2,444,000 | 76.4% | \$2,740,000 | 78.4% |
| Southeast | \$67,000 | 1.7% | \$62,000 | 1.9% | \$30,000 | 0.9% |
| Bridgeport | \$415,000 | 10.6% | \$342,000 | 10.7% | \$400,000 | 11.4% |
| Wallingford | \$370,000 | 9.5% | \$352,000 | 11.0% | \$325,000 | 9.3% |
| Total | \$3,912,000 | 100.0% | \$3,200,000 | 100.0% | \$3,495,000 | 100.0% |

As shown in this table, 76 to 78 percent of the salaries, overhead, and legal costs have been allocated to the Mid-Conn Project. It is not clear what allocation basis was used to attribute these G&A expenses to the Mid-Conn Project, except to say that the amounts appear excessive considering several common allocation measures shown in Table 2-8. As a result of the apparent over-allocation, the Mid-Conn Project is carrying the highest percentage of G&A expense of any of the CRRA projects. This is shown in Table 2-13.

Table 2-13 Allocated G&A as a Percent of Revenues

| CRRA Project | Revenues (mil) | Allocated Expense (mil) | Percent | Towns Served | Populations Served |
|--------------|------------------|-------------------------|-------------|--------------|--------------------|
| Mid-Conn | \$98,047 | \$9.9 | 10.1% | 70 | 1,200,000 |
| Southeast | \$11,091 | \$0.9 | 8.3% | 12 | 300,000 |
| Bridgeport | \$57,022 | \$3.1 | 5.4% | 19 | 780,000 |
| Wallingford | \$22,101 | \$1.2 | 5.2% | 5 | 210,000 |
| Total | \$188,261 | \$15.1 | 8.0% | 106 | 2,490,000 |

As shown, the Mid-Conn Project appears to be shouldering the vast majority of CRRA G&A expenses, to the tune of 10 percent of the total revenue. As will be discussed later, this appears to be on the high end compared to other integrated solid waste management systems that include a range of WTE, landfill, transfer station, and recycling facilities.

2.5. TOWN CONTRACTS WITH CRRA

An evaluation of contracts from several municipalities revealed that all long-term contracts with CRRA were the same with the exception of the “put-or-pay” tonnage figure and the cost

2. EXISTING SYSTEM

of disposal. This conclusion correlates with the conclusion of a local municipal staff person who reviewed numerous contracts to determine if some gave preferential treatment to one municipality over another. This individual reported that all contracts were the same with the exception of the “put-or-pay” and in some instance the price paid for facility-specific operations.

2.6. FACILITIES

MSW Consultants compiled a list and subsequently visited the operating solid waste management facilities in the region, both those owned by CRRRA as well as private companies. These facilities are briefly described below.

2.6.1 WASTE TO ENERGY FACILITY (WTE)

The boiler plant that relies on the RDF as a fuel source is fed by conveyor from the MPF facility. The RDF generated by the process is rated at approximately 5,700 Btu per pound. There are three boilers and two steam turbines in the WTE facility which is contractually operated by Covanta a private contractor that operates other WTE mass burn facilities for CRRRA in CT.

The plant is approximately 60 years old with upgrades when converted to WTE. The facility is the former Hartford Electric and Light Co. using General Electric turbines. Each is rated for 45 megawatts. The facility that houses the turbines is large enough for six, and if the facility is expanded MDC has already looked at mass burn with steam generated through the existing turbines or by adding additional turbines depending on the energy load.

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Figure 2-2 Mid-Conn Project WTE Facility



2.6.2 MATERIAL RECOVERY FACILITY (MRF)

The CRRA-managed Recycling Facility is located on Murphy Street and is currently converting from a dual stream (fiber and containers) to a single stream system, where fiber and containers will be collected simultaneously in a single stream collection vehicle. Single stream has proven to be a cost effective way to collect curbside separated recyclable materials, especially given the current fuel costs. However, single stream processing is typically more costly and residue rates are higher.

Currently the plant is running one shift per day for processing, but expects to go to a two shift system, as the interest in single stream collection has been high among Mid-Conn Towns. It was suggested that the plant can handle 25 tons per hour (TPH) for single stream, while it processes only 15 tons per hour for dual stream.

Operation of the facility is contracted to Casella, while the single stream equipment and technology is CP Manufacturers. CP designed and implemented the single stream system.

Some materials are rail hauled to end markets. As the pictures below depict, there is a rail line running directly on the back side of the facility and is used when there is a market price advantage is ship by rail.

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Figure 2-3 Mid-Conn Project MRF



2.6.3 TRANSFER FACILITY OPERATIONS (TS)

CRRA operates four (4) commercial transfer stations that accept materials from haulers servicing the residential and commercial sectors. At these facilities, trucks servicing residential and commercial collection routes consolidate their loads into larger transfer trailers (typically 100 cubic yard) for transport to the MPF.

The CRRA operates four commercial transfer facilities. Three are operated under a service contract with CWPM while the fourth is in Torrington and is operated by Copes. MSW Consultants toured the Essex Transfer Station, which services five towns and approximately ten haulers. This facility transfers MSW and three separate streams of recyclables. There is a 100 cubic yard trailer for single stream (new), one for containers (metal, aluminum can, glass and plastic jugs and bottles) and one for fiber. The facility is sited on a property adjacent to the Essex Township Building that has a rail line running on its eastern boundary. This picture depicts the recycling transfer portion of the Essex Transfer facility.

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Figure 2-4 Mid-Conn Project Essex Transfer Station



2.6.4 C&D TRANSLOADING FACILITY, AIRPORT ROAD, PORTLAND

There is a privately owned facility on Airport Road in Portland, in the southwestern region of the Mid-Conn service area. This facility uses rail haul for C&D debris materials. The picture below shows the rail access point.

Figure 2-5 Airport Road Transload Facility



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2.6.5 BABYLON RECYCLING FACILITY

Centrally located near the Bradley International Airport and more easily accessible from all parts of the Mid-Conn Region, this facility has the potential for expansion for MSW rail haul in the event this proves to be an economically viable alternative to the current system.

Figure 2-6 Babylon Recycling and Transload Facility



2.6.6 ALL WASTE INC.

This rail enabled transfer facility is at 123 Murphy Road in an industrial area landlocked by businesses on all sides. There are two buildings housing a C&D transfer station and a recycling processing center at this facility. Both buildings are served by rail.

The recycling center consist of a 200 x 100 foot building with 5 tipping bays, 2 dock doors and a rail access. The C&D transfer station is 150 x 60 foot building with 8 tipping bays and outbound rail siding on the north side of the building where rail cars are top-loaded. There were 22 rail cars spotted on site the day of the visit but 15 were moved from yard during the duration of the visit.

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Figure 2-7 All-Waste Transload Facility



2.6.7 MURPHY ROAD RECYCLING

This facility is located in an industrial area and adjacent to the 123 Murphy Road operation; however, it appeared that the facilities on either side did not have a significant amount of activity. This facility is primarily a recycling facility processing commingled recyclables. The outbound material is moved by rail car.

The estimated size of the building is 80 x 60 feet with 20 unloading loading bays. There are four docks doors for loading tractor trailers. Track goes along the north side of the building from spur off rail line for loading box rail cars. It was estimated that 3 acres were used for container and truck storage.

2.6.8 SUMMARY

Based on our review of the solid waste facilities in the region, there is ample infrastructure to manage wastes and recyclables generated by the Mid-Conn Towns.

3. SOLID WASTE SYSTEM CASE STUDIES

3.1. INTRODUCTION

One of the challenges facing the solid waste industry is that no two solid waste systems are alike. At the surface, they all provide some combination of collection, recyclables processing, composting, and disposal (or incineration). Yet, there are myriad unique details in each system – geographic, demographic, regulatory, political, climatic – for which it is impossible to find a perfect match with another solid waste system.

However, across the industry there have clearly emerged solid waste management paradigms, policies, management practices and operating practices that lead to high performance of the system. In practice, solid waste management has been successfully (and less successfully) managed at all levels of government: at the state level, with regional authorities, at the county level, by individual cities and towns, and through multi-jurisdiction actions. While “high performance” may be defined differently in different jurisdictions, for the purpose of this report we define a high performing system as one that

- ◆ Protects the environment;
- ◆ Encourages source reduction and recycling as central to the system objectives;
- ◆ Provides all services with an eye toward cost minimization; and
- ◆ Is responsive and equitable in its treatment of customers.

In short, there are lessons to be learned from other waste management paradigms. This section attempts to briefly identify and summarize five case studies from which one or more important lessons can be drawn. Note that it was not the intent to compare these systems directly or comprehensively with the Mid-Conn Region. Rather, it is to highlight elements and characteristics from these other systems that are especially relevant to the Mid-Conn situation.

For each case study, we provide (a) a description of the waste management system, (b) a brief justification for our including it in the case study write-ups, and (c) notable lessons that are contributed by the case study. Note that it was beyond the scope of this study to perform detailed benchmarking comparisons with the Mid-Conn Region. Rather, MSW Consultants has drawn examples based on its prior project experience as well as professional experience in the industry.

There are five case studies presented:

- ◆ State-Agency – Delaware Solid Waste Authority
- ◆ Regional Authority – Southeastern Public Service Authority
- ◆ County – Lancaster County, Pennsylvania
- ◆ County – Pinellas County, Florida
- ◆ Multi-Town Joint Procurement – Norwalk/CRRRA Bridgeport Project

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3.2. STATE AGENCY

The Delaware Solid Waste Authority (www.dswa.com) is the state agency tasked with managing Delaware's solid waste. DSWA's stated mission is to perform its duties in a cost-effective manner that protect the public health and the environment.

DSWA is responsible for all phases of solid waste management in Delaware. The Authority is responsible for the operation of a network of three landfills and three transfer stations; yard waste processing and composting; and a state-wide network of drop-off recycling sites. At the formation of the DSWA, the state made a critical decision to issue no new permits to private solid waste facility operators, which a short in time lead to the Authority becoming the only market for solid waste management in the State.

The DSWA has been a self-sustaining enterprise organization since its inception, and has managed all of Delaware's solid waste within its own borders. Because it has enjoyed a monopoly position for waste disposal, and due to the lack of landfills that are within reasonable driving distance for direct haul, the DSWA has been able to set tip fees at its network of facilities that support not only its transfer and disposal operations, but also other related services including recycling.

3.2.1 REASON FOR SELECTING DSWA

The primary reason for selecting the DSWA for inclusion as a case study is to highlight its functional success based entirely on the policy decision made at inception to create a true publicly owned and operated monopoly at the state level to serve the interests of the entire state. By opting to perpetually own its facilities, and by prohibiting the permitting of private sector facilities, DSWA controls its own destiny. This model has enabled the DSWA to invest heavily in landfill technology, and to expand its system at a rate commensurate with the growth in waste generation (two of its landfills are currently undergoing expansions).

3.2.2 RELEVANT OBSERVATIONS

The DSWA has been extremely successful at providing environmentally sound disposal of wastes for its entire in-state waste generation. It has done so with reasonably level tip fees over the past 10 years. In hindsight, the decision at DSWA's formation to establish a state-owned and operated waste management monopoly has insulated Delaware from the shocks and vagaries of the private waste market over its lifetime.

In addition to this major success, it is worth noting that the DSWA has long been attacked for its lack of commitment to recycling. Historically, the DSWA has committed only to a statewide network of drop-off facilities. Although cost-effective to operate, drop-off recycling sites are inferior to curbside recycling for achieving meaningful diversion. It is of interest that the DSWA has recently begun to offer curbside single stream recycling to Delaware residents. However, in practice this service is offered at a cost of \$6 per household per month, which effectively limits its effectiveness. Here, too, there is a lesson to be drawn involving the optimal way to provide curbside recycling.

3.3. REGIONAL AUTHORITY

There are three regional authorities in Virginia that have had vastly different experiences with waste management. The Southeastern Public Service Authority (SPSA) of Virginia provides municipal solid waste disposal to eight member jurisdictions in the Hampton Roads planning district. Its members include Chesapeake, Franklin, Isle of Wight, Norfolk, Portsmouth, Southampton, Suffolk and Virginia Beach. SPSA evolved from a regional water supply system at its inception in 1973 to a solid waste management organization in 1976. Between 1978 and 1988, SPSA constructed and opened the main infrastructure components, including transfer stations, a regional landfill, and a refuse derived fuel (RDF) plant similar to the Mid-Conn Project facility.

SPSA signed thirty-year contracts with its eight member jurisdictions in 1988, at the completion of the waste to energy facility. The contracts obligate the member jurisdictions to deliver to SPSA at least 95 percent of all of the disposable solid waste generated within, collected by, or otherwise under the control of the contracting community. SPSA agreed to provide at least one delivery point within each community where the locality could drop-off its solid waste. The municipalities, with the exception of Suffolk and Virginia Beach, agreed to pay the tipping rate established by SPSA. Suffolk and Virginia Beach established different special arrangements with SPSA.

The entire system overlooked one important fact. At inception, there were limited other disposal options in the area, and no mechanism was in place for the jurisdictions to control commercial waste. As the solid waste industry evolved, private hauling companies gained market share of the commercial waste stream, and in an effort to offer businesses the most competitive rate, delivered this waste to the low-cost landfills that have arisen in Southeastern Virginia. This in turn has reduced the volume of wastes being delivered to the SPSA facilities. To compensate for the waste volume shortfall, SPSA has continually had to raise its tip fees – which has caused much consternation among its member jurisdictions who have committed to deliver wastes and pay the prevailing tip fee. At the current time, SPSA finds itself charging its member communities a \$104/ton tip fee, while having to offer commercial haulers and out-of-state generators a lower tip fee of \$60/ton to attract additional waste flow.

The Virginia Peninsula Public Service Authority (VPPSA) and the Central Virginia Waste Management Authority (CVWMA) are two other public solid waste authorities operate in Virginia under a similar charter to SPSA. VPPSA serves a group of communities adjacent to but further inland from SPSA, and CVWMA serves jurisdictions surrounding the Richmond area in the middle of the state.

However, VPPSA and CVWMA are structured and operate in a different manner than SPSA. These two authorities primarily coordinate solid waste disposal in their regions by contracting or coordinating services with vendors from the private solid waste management industry. Since both entities contract with private vendors, they do not own any landfills and do not process a significant amount of waste. Instead, they served as waste flow aggregators that negotiated contracts with private landfills so their member communities could dispose of their solid waste at a set tipping fee. For example, in the VPPSA region, the localities are responsible for the transportation of waste to the landfill, while VPPSA pays the landfill's tipping fee and seeks reimbursement from the localities.

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The table below shows some basic operating and financial data for the three Virginia authorities.

Table 3-1 Financial Data for Virginia Authorities

| | VPPSA | CVWMA | SPSA |
|---------------------|---------------|----------------|-----------------|
| No. of Employees | 65 | 12 | 486 |
| Population Served | 500,000 | 1,045,000 | 1,125,783 |
| Disposal Tip Fee | \$25/ton | \$32/ton | \$104/ton |
| Current Assets | \$4.1 million | \$4.4 million | \$11.2 million |
| Current Liabilities | \$1.8 million | \$1.5 million | \$36.7 million |
| Total Debt | \$3.3 million | \$0.0 | \$241.0 million |
| Annual Debt Service | \$0.7 million | \$0.0 | \$31.6 million |
| Operating Revenue | \$6.9 million | \$12.5 million | \$81.5 million |
| Operating Expense | \$6.8 million | \$12.5 million | \$70.8 million |
| | | | |

Source: 2007 Financial Statements and respective authority internal documents.

As shown, the two authorities that serve primarily as waste flow aggregators and contract managers have secured highly competitive disposal fees for their members, while incurring relatively little or no debt. This stands in stark contrast to the SPSA situation.

It should be noted that SPSA recently announced its intent to invoke regulatory flow control on its member communities in an attempt to bring the migrating commercial waste flow back into the system. Citing the April 2007 Supreme Court ruling in *United Haulers v. Oneida-Herkimer County*, which provided that flow control is lawful so long as the beneficiary is a publicly owned facility, SPSA has undertaken a major campaign to accomplish flow control. This process is ongoing.

3.3.1 REASON FOR SELECTING SPSA

SPSA and its sister authorities in Virginia were selected to illustrate the challenges of operating a regional, multi-jurisdictional authority that finances, owns, and operates its own disposal and incineration infrastructure. History has shown that the private market has been far more efficient in its development of low-cost sustainable solid waste disposal capacity in this region of the country compared to the one public agency that attempted to do so. Unlike the DSWA situation, there was no mechanism at the time to provide SPSA with a true monopoly over the entire waste stream, which would have alleviated its problems.

3.3.2 RELEVANT OBSERVATIONS

While past developments do not necessarily predict future performance, it seems a fair lesson that the private market has been more efficient at providing flexible, cost effective disposal to

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public entities. Of equal importance, this is occurring in a region where landfills can still be developed cheaply, and where sufficient competitive disposal capacity exists

Like the CRRA Mid-Conn Project, SPSA is also obviously subjecting its members to costs that are excessive compared to other local alternatives. While the CRRA Mid-Conn Project has enjoyed effective flow control and has not faced the loss of waste like SPSA, it too has appeared to face challenges associated with transparency and with managing a complex integrated waste management system serving multiple jurisdictions across the state.

Although not mentioned above, it should also be noted that all three of the Virginia authorities are full service waste disposal providers for all waste streams. Residential and commercial wastes are all accepted, including bulky wastes. With its recent dictum absolving itself of responsibility for bulky waste disposal, CRRA Mid-Conn is unique in its sudden decision to cease providing a critical element of waste disposal.

3.4. COUNTY (LANCASTER COUNTY, PENNSYLVANIA)

Every year, Lancaster County generates in excess of 530,000 tons of waste. This waste is managed through an integrated waste disposal system owned and operated by the Lancaster County Solid Waste Management Authority (LCSWMA), which serves Lancaster County and its incorporated jurisdictions (like Connecticut, every square foot of Pennsylvania is an incorporated city, town, or borough). The system consists of a transfer station, resource recovery facility (RRF), landfill (Frey Farm Landfill) and a Household Hazardous Waste (HHW) collection facility serving a county-wide population of approximately 450,000.

Only 20 percent of that volume of waste generated enters the Frey Farm Landfill. The integrated system is mainly comprised of the RRF (which generates electricity by burning waste), a county-wide comprehensive recycling program and the Frey Farm Landfill. A household hazardous waste facility provides additional management for wastes that are not preferable in either the Resource Recovery Facility or the Frey Farm Landfill. Because of the Authority's integrated waste disposal system, the life of the Frey Farm Landfill has been extended by almost twenty years and is expected to last well up to 2020.

Of particular interest, the RRF has one of the most important roles in Lancaster County's integrated solid waste management system. In operation since 1991, the RRF has the capacity to process up to 1,200 tons of solid waste per day. The RRF accepts municipal waste loads in transfer trailers and direct haul collection vehicles. The facility processed 342,600 tons of waste and produced 81,500 tons of ash, used for daily cover at the Frey Farm Landfill. The facility generated 198 million kilowatts of electricity and \$10.8 million of electric revenue. It recovered 6,700 tons of metal, generating \$850,000 of recycled metal revenue.

3. CASE STUDIES

Table 3-2 summarizes the County's tip fee schedule effective in 2008.

Table 3-2 Lancaster SWA Tip Fee Schedule

| Material Type | VPPSA |
|-------------------------------|--------------|
| Refuse | \$68/ton |
| Non-processible | \$68/ton |
| Non-processible and oversized | \$110/ton |
| C&D Debris | \$53/ton |

As a final note, the Lancaster County SWMA performs its duties with a staff of 20 management and administrative employees. There are six senior level management staff members, each overseeing a particular component of the overall system. There is one communications manager, two staff involved with the county's recycling programs, ten in the financial department and human resources and finally one for technical support. The annual cost for support operations is approximately \$1.62 million, which is approximately 3.3 percent of the total annual system cost of \$48 million.

3.4.1 REASON FOR SELECTING LCSWMA

LCSWMA is used as a case study because it managed an integrated solid waste management system that contains all of the components of the Mid-Conn Project (recycling, transfer, RRF and landfill). Further, it was possible to readily obtain staffing and overhead costs for the system compared to the fraction of total costs. While not included in the northeast region of the country, the eastern part of Pennsylvania has a disposal pricing structure consistent with the Northeast region. While not quite the size of the Mid-Conn system, Lancaster was evaluated to examine administrative costs on a proportionate basis with Mid-Conn's administrative overhead costs.

3.4.2 RELEVANT OBSERVATIONS

There are a number of notable observations to be made about the Lancaster system relative to the CRRRA Mid-Conn Project. Although the Lancaster RRF is less than half the size of the CRRRA Mid-Conn Project facility, it is notable that the tip fee is at or below recent prevailing tip fee for the Mid-Conn Project (at least prior to the recent announcement of a significant tip fee reduction effective in 2009).

Further, the management and administrative staffing levels of the LCSWMA and associated overhead costs are of interest. As shown, the 3.3 percent G&A costs of the Lancaster system are significantly below the 10 percent level of the CRRRA Mid-Conn Project.

Finally, it should be noted that, although this is technically an authority, as an entity the LCSWMA exists for the direct benefit of its entire county and the incorporated jurisdictions, and is therefore directly accountable to these stakeholders. It appears that this accountability has pushed the Authority to meet the solid waste disposal needs of the county in a cost-effective manner given the choice of disposal strategy.

3.5. COUNTY (PINELLAS COUNTY, FLORIDA)

The Pinellas County Utilities Department of Solid Waste Operations manages more than two million tons of municipal solid waste is generated in Pinellas County. The County owns and operates a comprehensive integrated waste management system that includes a waste-to-energy facility, a Class I landfill for ash and non-processible wastes, a yard waste processing facility, and an HHW facility.

The Waste-to-Energy (WTE) facility has the capacity to burn 3,150 tons of garbage every day, and currently processes about one million tons of garbage every year. The process can produce up to 75 megawatts (MW) per hour of electricity. It sells about 60 MW to Progress Energy for distribution within the community, and the remainder powers the plant itself. This electricity powers approximately 45,000 homes and businesses. The WTE facility uses state-of-the-art air pollution control technology, which continuously monitors WTE emissions, ensuring the plant's emissions fall within the United States Environmental Protection Agency's (EPA) standards.

Ash generated from the combustion of solid waste is transferred to the adjacent Residue Storage and Processing Building. Here, the ash is size-separated using screens, and both ferrous (steel) and non-ferrous (aluminum) metals are recovered from the ash using mechanical equipment such as magnets and eddy currents. The recovered metals are sold to steel mills and smelters for recycling, and the remaining ash is used for landfill cover and interior site berms and roadways.

Like all Florida public solid waste organizations, the Pinellas County solid waste organization is an enterprise fund, meaning that it is responsible for funding itself through user fees. Of particular interest, the tipping fee charged by the County for municipal waste is \$37.50 per ton and includes tires and yard waste. It was reported to MSW Consultants that at the current time, the Pinellas County WTE is debt free and has built up a capital improvement fund for its infrastructure of close to \$100 million.

3.5.1 REASON FOR SELECTING PINELLAS COUNTY

Pinellas County was selected because its administrative costs were reported at about 10 percent of the total operating budget or approximately five million dollars per year. Also, it is a system that has recently paid off all long-term debt service. As shown above, the tipping fee is approximately half the CRRA rate, while the overall system processes a greater amount of waste annually.

3.5.2 RELEVANT OBSERVATIONS

The Pinellas County system manages roughly the same waste flow as the CRRA Mid-Conn Project. The County's WTE is older than the Mid-Conn plants, and has extinguished its debt. At the current time, the tip fee at this facility is less than \$40/ton. Florida has long been a leader in assigning counties both the responsibility and the authority to establish county-wide waste disposal infrastructure. Pinellas County reflects the outcome of this management strategy – no debt, built up reserves, and a very cost competitive tip fee. Given that there will be no long-term debt service with the CRRA Mid-Conn Project by 2012 this case study suggests that a tip fee decrease would be reasonable to expect. It is not clear, however, if this will be the case in practice.

3. CASE STUDIES

3.6. JOINT PROCUREMENT (NORWALK, CT)

This case study is highly relevant to the Mid-Conn Region, insofar as it represents the recent experience of towns using the CRRA Bridgeport Project. The Bridgeport Project disposal contracts were set to expire at the end of 2008. In 2006, the Town of Norwalk undertook a process similar to that being undertaken now by the Mid-Conn Towns. MSW Consultants conducted an in-depth interview with the Norwalk Public Works Director, Mr. Hal Alvord, and has attempted to summarize key elements of the case study based on this interview.

Unlike the Mid-Conn Project RDF, the Bridgeport Project RRF is scheduled to convert to private ownership (by Wheelabrator Technologies) at the extinguishment of debt service and expiration of the current disposal agreements. Norwalk's inquiries about future tip fees suggested that rates expected to escalate from the current \$74 haul and disposal cost per ton to \$99/ton – presumably *after* extinguishment of all debt on the facility. The \$99/ton rate consisted off a disposal fee of \$76/ton at a CRRA facility, a \$5.00 per ton commitment fee plus transportation costs. In light of the dramatic increase in the tip fee and the loss of a public asset, Norwalk unilaterally opted to test the open market for transfer station operations, transfer, and disposal. This decision was made because of a lack of responsiveness from CRRA in providing guidance and transparent information relative to future disposal tip fees, as well as poor enforcement and low service levels, which were also cited by Norwalk. (Norwalk indicated that CRRA representatives began referring to the town as “ship-jumpers” at about this time.)

Because of a high level of distrust between the Town and the CRRA, the Town opted to hire a law firm which in turn retained a professional consultant to develop the technical specifications and perform the procurement. This arrangement enabled the Town to maintain confidentiality throughout its process. The Town subsequently contacted surrounding towns, seven of which entered into confidentiality agreements with Norwalk and joined in the procurement in exchange for covering a share of the cost of the procurement. Despite the legal arrangement, it was reported by Norwalk that throughout the process, CRRA hired an attorney who bombarded the Town with Freedom of Information (FOI) requests to monitor developments. Confidentiality was maintained nonetheless.

Three project teams submitted proposals in response to the RFP. Of interest, one of the proposers was a team lead by Wheelabrator, which proposed a solution centered on its Bridgeport RRF but was exclusive of any relationship with the CRRA. The other two teams consisted of IESI/We Care Transportation, and City Carting of Stamford. CRRA itself elected not to participate in this procurement process.

City Carting, which has been providing recycling service to Norwalk for the past four years, provided what was considered by far the best proposal and was unanimously selected to provide transfer station operations, transportation, and disposal. City Carting proposed transport and disposal fees of \$74.88 per ton, all inclusive (both regular and bulky wastes). This rate had annual CPI-indexed cost escalation plus reasonable fuel surcharges. For the towns that operate transfer stations, the City Carting proposal also included transfer station operating fees ranging from \$8 to \$10 per ton.

To minimize the legal challenges associated with interlocal agreements, district or authority formation, the participating towns structured the RFP to enable actual contracting to be

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performed separately between each town and City Carting. To date, five of the seven towns have opted to contract individually with City Carting for disposal for a five-year period.

3.6.1 REASON FOR SELECTING NORWALK

This case study was found to be highly relevant to the Mid-Conn Towns in almost every facet.

3.6.2 RELEVANT OBSERVATIONS

This case study would appear to mirror the current Mid-Conn Region situation in many ways. It is most informative for several reasons. First, it demonstrates how the private waste market can provide viable, cost-effective waste disposal solutions. Second, the case study suggests that other CRRA projects have struggled to provide good service at a defensible rate to other towns, and in fact CRRA opted not to respond to the RFP. Even more tellingly, CRRA offered an unsolicited price reduction to the towns after the fact once the outcome had been made public.

Finally, the joint procurement strategy that was used enabled a group of towns to seek long term disposal jointly, but contract individually. In doing so they avoided a great deal of legal and administrative cost and resources that would have been involved with setting up a more formal joint action arrangement.

3.7. SUMMARY

In conclusion, these case studies support several important principles that suggest how to best establish successful systems that balance high service with low costs:

- ◆ The combination of state-level regulatory framework and local governance plays a huge role in establishing effective systems. In states where the local government is both (a) relatively populous, such as a county, and (b) has been granted the ability to control sufficient waste flow to justify solid waste infrastructure development, solid waste management systems function effectively. Connecticut, with its reliance on town-level rather than county-level governance, and with its complex framework for waste management, faces greater challenges than many other states.
- ◆ Where there is direct control of the solid waste organization by the underlying stakeholder (such as for an individual county), accountability is high which leads to good service at reasonable costs. This is demonstrated in the Pinellas and Lancaster County examples.
- ◆ Managing wastes based on intelligent procurement and contracting, assuming reasonably competitive environment, is equally effective at meeting waste management needs as providing for the infrastructure through public organizations.

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4. GOVERNANCE OPTIONS

4.1 INTRODUCTION

4.1.1 GOVERNANCE OPTION OVERVIEW

Given the scale, complexity, and cost of the integrated waste management system that would be required to serve some or all of the Mid-Conn Towns, a critical consideration that must be addressed at the outset of deliberations will involve establishing the way in which the solid waste system will be managed and governed. At the most basic level, the question is to what degree are the 70 Towns, which currently make waste management decisions independently of one another, willing to formally or informally align themselves into a unified entity for the purpose of achieving mutually beneficial improvements, leverage, or economies of scale in waste management. This section summarizes the primary options associated with the governance and management of a long-term waste recycling and disposal system under the control of the 70 Mid-Conn Towns.

Under Connecticut law, there are a number of options for joint municipal action or management. MSW Consultants has relied on two sources of information to compile a summary of these options.¹ Note that although MSW Consultants is a professional services firm specializing in solid waste management issues, we do not employ attorneys and are not qualified to comment on the legality or legal appropriateness of these options. Rather, we have attempted to summarize the options from a technical standpoint, focusing on their relative cost, accountability, administrative complexity, and flexibility to meet Town needs.

For each of these options, MSW Consultants provides a description and qualitative discussion, as well as a ranking of the key characteristics of each option such as administrative cost/ease of administration; negotiating leverage; economies of scale; regulatory/legal considerations; accountability; cost management; risks; and lead time to implement.

4.1.2 WASTE MANAGEMENT STRATEGY OVERVIEW

In general, there are three primary strategies for long-term disposal that could be pursued in the Mid-Conn region. Of course, there are many possible nuances to these options, but for the sake of evaluating governance strategies we refer to the following simplified list:

- ◆ **Negotiate with CRRA:** This refers to working with the CRRA to continue providing the same or similar services as the current arrangement, through some degree of negotiation. Under this solution, there may be some opportunity to improve contractual terms with CRRA, but it is assumed that there would be minimal changes from the current service level in the absence of a compelling external catalyst (which would theoretically be created by the last two strategies).
- ◆ **Procure Services from the Private Sector:** Mid-Conn Towns could alternatively seek long term disposal solutions by procuring such services (transfer station operations,

¹ These sources are: (1) Letter dated January 23, 2006, from Updike, Kelly & Spellacy, P.C. to CRCOG outlining the procedures available to Connecticut municipalities to share services and assets; and (2) “Laws on Regional Entities,” Connecticut Office of Legislative Research (OLR), Sept 26, 2008.

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transport, disposal, processing, etc.) from private sector providers through a competitive process. In theory, the CRRA would act as one of many potential vendors that might provide a proposal under a competitive procurement. Under this strategy, the Towns assume the role of contract managers and rely on the open market to provide solutions, but have no direct control over the processing and disposal infrastructure (other than through contract terms).

- ◆ **Acquire and Manage Assets:** At the most aggressive end of the spectrum it is conceptually possible to form an entity whose mission is to acquire and manage processing and disposal assets directly for the benefit of participating municipalities. Under this solution, the Towns would act, in effect, like the many large counties and other municipalities across the U.S. that have opted to establish publicly owned integrated waste management systems, and would be involved in both facility management and procurement of facility operations and various services needed to operate the system.

4.2 STATUS QUO

Under the status quo, each Town will be left with their own decision of whether or not to negotiate for re-upping with the CRRA at the conclusion of their current disposal agreement. For Towns that re-up, it is likely that the CRRA will dictate the terms of any subsequent disposal agreement with limited influence from the Towns. (Alternatively, individual Towns could opt to seek waste management solutions from the private market external to the CRRA. These options are discussed below, although Towns could individually pursue private market solutions). While Mid-Conn Towns may undertake some joint negotiations and/or discussions with CRRA under this scenario, it is assumed that there would be no formal agreements or governance bodies established. The status quo is defined as retaining individual contracts between each Town and the CRRA. Table 4-1 summarizes the characteristics of the status quo.

Table 4-1 Solid Waste Management Under the Status Quo

| Characteristic | Comment |
|-------------------------------------|--|
| Strategies for Waste Mgmt | <i>Negotiate with CRRA</i> |
| Cost to Implement | <i>Low</i> – consists primarily of contract negotiation costs and fees for legal review of revised contract |
| System Cost | <i>Unknown</i> – Towns would be relying on a single service provider who has historically been allowed to set its own fees with little pressure from a private market or value conscious governing board. It is unlikely costs would decrease from current levels, and may increase. |
| Administrative and Legal Complexity | <i>Low</i> – each Town would rely on in-house counsel or existing legal assistance to establish contract |
| Lead Time to Implement | <i>0-6 Months</i> – Towns could expect to follow CRRA lead. This option presumably represents the final fall-back if no other options pan out. |
| Economies of Scale | <i>None</i> – Duplicative contracting and contract management for all Towns |

4. GOVERNANCE OPTIONS

| Characteristic | Comment |
|---|--|
| Accountability of CRRA to Individual Towns | Low – Barring significant changes to the current governance of the CRRA, increased transparency and value-conscious decision making would improve |
| Market Leverage | Low – Individual Towns left to their own device whether negotiating with CRRA or seeking private market solution |
| Long Term Risks | Numerous – Individual Towns with small waste volumes may be left to the whim of either CRRA or the private market in both the near and long term, with little leverage to obtain favorable terms. |

4.3 JOINT PROCUREMENT, SEPARATE CONTRACTS

This scenario captures the strategy used by the towns in the Southwest region in their negotiations with the CRRA Bridgeport project. In that scenario, Norwalk unilaterally established a budget and procurement plan to undergo a procurement for transfer station operation, transport, and disposal from the lowest cost qualified private market vendor. Norwalk subsequently invited other towns to join the procurement in return for covering a share of the cost of the procurement. Other towns interested in participating needed only a commitment from the town mayor (and associated approval from town selectmen if required because of the cost). Subsequent to the procurement, each town was responsible for contracting separately with the winning proposer, so there were no significant legal governance hurdles during the process. As described in Section 3, this process resulted in at least six towns exiting the CRRA system to enter into 5-year agreements with a private vendor. Table 4-2 summarizes the characteristics of this option.

Table 4-2 Solid Waste Management Using Piggyback of Single Town Procurement

| Characteristic | Comment |
|--|--|
| Strategies for Waste Mgmt | <i>Procure Services from Private Sector</i> |
| Cost to Implement | Low – Consists primarily of shared procurement cost and fees for legal review of revised contract. Spreads procurement cost over multiple Towns. |
| System Cost | <i>Market-based and Predictable</i> – Towns would secure a rate based on prevailing market conditions and have a defined mechanism for annual rate increases and/or fuel surcharges. |
| Administrative and Legal Complexity | Low – Although conceptually simple, this option requires one or more Towns (presumably larger Towns) to unilaterally opt to procure services, and assumes that other Towns would agree to join the process. |
| Lead Time to Implement | 2 Years – In addition to the participating Towns agreeing on the method of the piggyback arrangement, the successful private vendor will require significant lead time to prepare to handle wastes. |
| Economies of Scale | Low – Allows sharing of costs during joint procurement, but requires individual contracting and contract management for the Towns opting to participate. |

4. GOVERNANCE OPTIONS

| Characteristic | Comment |
|--|--|
| Accountability of CRRA to Individual Towns | <i>N/A</i> – Successful vendor (which could theoretically include the CRRA) will be obligated to perform under the terms of the contract. |
| Market Leverage | Medium – If the private market perceives this strategy as a viable source of large and sustainable waste flows, then leverage could be high. |
| Long Term Risks | Contract Renewal – The resulting contract will likely govern some period between 5 and 10 years; however, disposal market dynamics may have changed significantly when the current contract expires, resulting in rate shock for the participating Towns. |

4.4 SHARED ASSET AGREEMENT

A shared asset agreement authorizes two or more municipalities to “jointly perform any function that each municipality may perform separately,” and are covered under the Connecticut General Statutes §7-148cc. Shared asset agreements must be approved in each municipality in similar fashion to approval of an ordinance, and the agreement must be reviewed at least once every five years to evaluate effectiveness.

In this scenario, participating Towns would presumably enter into a shared asset agreement for transfer, transportation, and disposal of wastes, once again jointly procuring the services from the private market through a Request for Proposals. (In this and all other governance options that consider a procurement of services, CRRA is treated as one of multiple vendors that could possibly provide the best solution.) Table 4-3 summarizes the characteristics of this option.

Table 4-3 Solid Waste Management Using Shared Asset Agreements

| Characteristic | Comment |
|-------------------------------------|--|
| Strategies for Waste Mgmt | Procure Services from Private Sector |
| Cost to Implement | Low – Requires drafting of appropriate agreements, followed by customary procurement costs. |
| System Cost | Market-based and Predictable – Towns would secure a rate based on prevailing market conditions and have a defined mechanism for annual rate increases and/or fuel surcharges. |
| Administrative and Legal Complexity | Low to Medium – Mechanism for shared asset agreement seems relatively straightforward, but raises question of which Town performs contract administration. |
| Lead Time to Implement | 2 Years – In addition to the participating Towns forming the shared asset agreement, the successful private vendor will require significant lead time to prepare to handle wastes. |
| Economies of Scale | Low – Allows sharing of costs during joint procurement as well as joint contracting at least conceptually. However, each Town would likely need to devote resources to monitoring the shared asset agreement. |

4. GOVERNANCE OPTIONS

| Characteristic | Comment |
|--|--|
| Accountability of CRRRA to Individual Towns | <i>N/A</i> – Successful vendor (which could theoretically include the CRRRA) will be obligated to perform under the terms of the contract. |
| Market Leverage | Medium – If the private market perceives this strategy as a viable source of large and sustainable waste flows, then leverage could be high. |
| Long Term Risks | <p>Contract Renewal – The resulting contract will likely govern some period between 5 and 10 years; however, disposal market dynamics may have changed significantly when the current contract expires, resulting in rate shock for the participating Towns.</p> <p>Inter-municipal Management – Shared asset agreements do not provide structure for optimizing long term solid waste management, only for capitalizing on current market conditions for transfer and disposal.</p> |

4.5 INTERLOCAL AGREEMENT

Interlocal agreements are authorized under the Connecticut General Statutes §7-339b, and specifically cite “refuse collection and disposal” as being among the eligible services covered by such an agreement. Enacting an interlocal agreement requires adherence to a specific process defined in the General Statutes, which includes authorization by each Towns’ legislative body, a public hearing, the creation of an interlocal advisory board staffed by a member from each participating Town, and the establishment of a range of governance procedures. Table 4-4 summarizes the characteristics of this option.

Table 4-4 Solid Waste Management Using Interlocal Agreements

| Characteristic | Comment |
|--|--|
| Strategies for Waste Mgmt | Procure Services from Private Sector |
| Cost to Implement | Low – Requires drafting of agreements, followed by customary procurement costs. |
| System Cost | Market-based and Predictable – Towns would secure a rate based on prevailing market conditions and have a defined mechanism for annual rate increases and/or fuel surcharges. |
| Administrative and Legal Complexity | Low to Medium – Mechanism for interlocal agreement seems relatively straightforward, but requires issues of governance to be addressed and raises question of which Town performs contract administration. |
| Lead Time to Implement | 2 Years – In addition to the participating Towns forming the interlocal agreement, the successful private vendor will require significant lead time to prepare to handle wastes. |
| Economies of Scale | Low – Allows sharing of costs during joint procurement as well as joint contracting at least conceptually. However, each Town would likely need to devote resources to monitoring the interlocal agreement. |

4. GOVERNANCE OPTIONS

| Characteristic | Comment |
|--|--|
| Accountability of CRRA to Individual Towns | <i>N/A</i> – Successful vendor (which could theoretically include the CRRA) will be obligated to perform under the terms of the contract. |
| Market Leverage | High – If the interlocal agreement binds all Towns to supply waste flow, the private market should be responsive for guarantee of sustainable waste flow. |
| Long Term Risks | <p>Contract Renewal – The resulting contract will likely govern some period between 5 and 10 years; however, disposal market dynamics may have changed significantly when the current contract expires, resulting in rate shock for the participating Towns.</p> <p>Inter-municipal Management – Interlocal agreements do not provide structure for optimizing long term solid waste management, only for capitalizing on current market conditions for transfer and disposal.</p> |

An example of this organizational structure can be found in the Bristol Resource Recovery Facility where the project exists between the vendor (Covanta) and the Bristol Resource Recovery Facility Operating Committee (BRRFOC). Fourteen municipalities are under contract with the BRRFOC for their municipal solid waste to be handled by the Bristol RRF (operated by Covanta).

4.6 MUNICIPAL/METROPOLITAN DISTRICT

Municipal and metropolitan districts are authorized under the Connecticut General Statutes §7-330, and allow district members to perform any function the municipalities may perform separately. Municipal districts are governed by a board consisting of two members appointed by each participating municipality, plus additional board members for every 5,000 population of participating municipalities (in other words, more populous municipalities get more board members). Metropolitan district formation requires one municipality with greater than 25,000 population to obtain 2/3rd vote of the legislature plus submission of a petition of at least 10 percent of voters to enact. Metropolitan districts require formation of a charter and establishment of an entire set of governance rules, and must be passed by a majority of voters to be enacted. Table 4-5 summarizes the characteristics of this option.

Table 4-5 Solid Waste Management Using Districts

| Characteristic | Comment |
|---------------------------|---|
| Strategies for Waste Mgmt | Procure Services from Private Sector |
| Cost to Implement | Low to Medium – Requires establishment of the district, followed by customary procurement costs. |
| System Cost | Market-based and Predictable – Assuming district could be formed, Towns would secure a rate based on prevailing market conditions and have a defined mechanism for annual rate increases and/or fuel surcharges. |

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| Characteristic | Comment |
|---|--|
| Administrative and Legal Complexity | Medium – Appears to require potentially significant effort to establish the districts. |
| Lead Time to Implement | 2 Years – In addition to the participating Towns forming the district, the successful private vendor will require significant lead time to prepare to handle wastes. |
| Economies of Scale | Low – Creation of the district appears to create a new organization that would likely duplicate some of the functions performed by individual Towns. Each Town would likely need to devote resources to monitoring the district functions. |
| Accountability of CRRA to Individual Towns | N/A – Successful vendor (which could theoretically include the CRRA) will be obligated to perform under the terms of the contract. |
| Market Leverage | High – Guaranteed sustainable waste flow from a single contracting entity should yield a responsive private market. |
| Long Term Risks | <p>Contract Renewal – The resulting contract will likely govern some period between 5 and 10 years; however, disposal market dynamics may have changed significantly when the current contract expires, resulting in rate shock for the participating Towns.</p> <p>Inter-municipal Governance – Interlocal agreements do not provide structure for optimizing long term solid waste management, only for capitalizing on current market conditions for transfer and disposal.</p> |

4.7 REGIONAL SOLID WASTE MANAGEMENT AUTHORITY

Regional Solid Waste Management Authorities are authorized under the Connecticut General Statutes § 22a-207 *et seq.* A Regional Solid Waste Management Authority (SWMA) can be formed to provide for processing, storage, or disposal *outside* of the authority's boundaries for solid wastes generated within its boundaries. Regional SWMAs can be formed by the participating municipalities creating a district, signing an interlocal agreement, or signing a mutual contract for a definitive period of time, so in this regard they require the chartering/formation steps described with these solutions.

It appears that a key nuance of this option is the allowance for these authorities to provide for processing and disposal of wastes outside the authority boundaries. This would seem to preclude a SWMA from owning, operating, or procuring processing and disposal at facilities within the authority boundary, which suggests that the CRRA Mid-Connecticut Project facilities might not be eligible for use within an SWMA. This has major implications and limits the applicability of a SWMA for the Mid-Conn Towns, insofar as it would appear that there would be little reason to form a SWMA once a district had been formed or an interlocal agreement or mutual contract executed. Table 4-6 summarizes the characteristics of this option.

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Table 4-6 Solid Waste Management Using SWMA

| Characteristic | Comment |
|--|---|
| Strategies for Waste Mgmt | Procure Services from Private Sector for use of facilities outside the Mid-Conn region. |
| Cost to Implement | High – Requires establishment of an interlocal agreement or district, followed by authority formation. |
| System Cost | Market-based – Assuming district could be formed, Towns would secure a rate based on prevailing market conditions and have a defined mechanism for annual rate increases and/or fuel surcharges. |
| Administrative and Legal Complexity | High – Requires appropriate enabling action (ordinance, district) as well as formation of the actual authority. |
| Lead Time to Implement | 2-3 Years – In addition to the participating Towns taking the steps to form the authority, the successful private vendor will require significant lead time to prepare to handle wastes. |
| Economies of Scale | Low – Creation of the authority appears to create a new organization that would likely duplicate some of the functions performed by individual Towns. |
| Accountability of CRRA to Individual Towns | N/A – Successful vendor (which could theoretically include the CRRA) will be obligated to perform under the terms of resulting contracts. |
| Market Leverage | High – Guaranteed sustainable waste flow from a single contracting entity should yield a responsive private market. |
| Long Term Risks | <p>Loss of Flexibility – It is not clear if formation of a SWMA would limit the future options for waste processing and disposal because of the provisions for out-of-region processing and disposal (i.e., could a SWMA develop in-region facilities?)</p> <p>Bureaucracy – Current solid waste authorities in Connecticut have given some indication of becoming entrenched and losing focus on serving their customers</p> |

4.8 REGIONAL RESOURCES RECOVERY AUTHORITY

Resource Recovery Authorities are authorized under the Connecticut General Statutes § 7-273aa *et seq.*, requiring a concurrent ordinance of founding members to determine the number of Authority members, the number of votes to be cast by each member, the method of determining member's compensation (if any), the method of their appointment and removal, their terms of office. A Resources Recovery Authority (RRA), of which the CRRA is one, can be formed to conduct a comprehensive program for solid waste disposal and resources recovery and for solid waste management services. An RRA can

- ◆ Acquire property by purchase, transfer, or by condemnation;
- ◆ Develop, own, operate and maintain resource recovery projects; and
- ◆ Issue bonds which are secured as to both principal and interest by (1) the full faith and credit of the municipalities, (2) revenues derived from the operation of a facility, or (3) a

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pledge of revenues to be derived from the operation of a facility and the municipalities' full faith and credit.

RRAs are formed by passage of concurrent ordinances of founding members, which must determine the number of the authority's members, the number of votes to be cast by each member, the method of determining members' compensation (if any), the method of their appointment and removal, and their terms of office. Subsequent members may join under terms and conditions set by the authority.

Subject to favorable resolution of the Mid-Conn facility ownership issue currently under debate, a Mid-Conn RRA could be formed with the idea of taking over ownership and direct control of the current CRRA Mid-Conn transportation and disposal infrastructure. An extension of this would be to look at the potential benefits of converting from the current Refuse Derived Fuel (RDF) system to a Mass Burn and eliminating the costs associated with the front-end processing to generate a RDF.

There are two Authorities in Connecticut that have pursued this strategy. One is the Eastern Connecticut Resource Recovery Authority (ECRRA) whose sole member is Middletown. The other is a collection of eleven towns in western Connecticut that form the Housatonic Resource Recovery Authority (HRRRA) and has a contract with a Wheelabrator subsidiary that provides that HRRRA municipal solid waste will be disposed of either at the Lisbon or Bridgeport RRFs (Wheelabrator operates these two facilities) or out-of-state as a fallback. Wheelabrator also owns and operates a landfill in the eastern region of the state, which is soon to be the last active municipal waste landfill in Connecticut.

Table 4-7 summarizes the characteristics of this option.

Table 4-7 Solid Waste Management Using RRA

| Characteristic | Comment |
|--|--|
| Strategies for Waste Mgmt | <i>Procure Services from Private Sector and Acquire and Manage Assets</i> |
| Cost to Implement | <i>High</i> – Requires establishment of concurrent ordinances to form the authority and establish all rules of governance |
| System Cost | <i>Optimally, cost-based</i> – This option stands alone among the governance options because, if an RRA were successful at acquiring the Mid-Connecticut Project facility assets, it would be possible to optimize all aspects of the current system and pass on the cost-based rates to the member municipalities. |
| Administrative and Legal Complexity | <i>High</i> – Not only requires appropriate enabling action (ordinance, authority formation), but also requires negotiation with CRRA to acquire current Mid-Connecticut Project assets. It is beyond the scope of this study to predict the likely level of effort or resulting costs of such an acquisition. |
| Lead Time to Implement | <i>Unknown</i> – While the Authority formation could be accomplished in one or two years (theoretically), it is not possible to predict the duration associated with acquiring Mid-Connecticut Project assets from CRRA. |

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| Characteristic | Comment |
|---|--|
| Economies of Scale | Low – Creation of the authority appears to create a new organization that would likely duplicate some of the functions performed by individual Towns. |
| Accountability of CRRA to Individual Towns | N/A – CRRA would be displaced or else treated as just another vendor. |
| Market Leverage | High – Guaranteed sustainable waste flow from a single contracting entity should yield a responsive private market. |
| Long Term Risks | Bureaucracy – Current solid waste authorities in Connecticut have given some indication of becoming entrenched and losing focus on serving their customers. However, it is presumed that a RRA formed specifically for the Mid-Conn Towns would remain attentive. |

4.9 A WORD ABOUT FLOW CONTROL

The term “flow control” refers to the situation where a municipality requires by law that waste generated within its boundaries be delivered only to facilities designated by the municipality. (Flow control can also generally used to describe a situation where an exclusive franchise for waste pickup is granted to a single waste hauler by a municipality.)

The Supreme Court first recognized that the interstate hauling of waste was commerce for the purposes of Commerce Clause analysis in *City of Philadelphia v. New Jersey*, 437 U.S. 617 (1978). The United States Constitution gives Congress the power to regulate commerce amongst the States. Courts have interpreted this delegation of authority to Congress to mean that States do not have the power to interfere with interstate commerce by engaging in economic protectionism. The Commerce Clause is applicable not only to regulation by States, but also to regulation by local governmental units like counties and municipalities.

Later the Court distinguished its earlier ruling in *C & A Carbone, Inc. v. Clarkstown*, 511 U.S. 383 (1994) on the basis of a public/private distinction. The Court in *United Haulers v. Oneida-Herkimer* concluded that a flow control ordinance which directs all county-generated waste to a single, public, facility (in this case a waste processing facility owned and operated by a joint solid waste authority) does not discriminate against interstate commerce.² Balancing the

² In the *Oneida-Herkimer* case, two New York counties had established a joint Solid Waste Authority under state law to manage all solid waste generated within the counties. The Authority developed and operated a facility for processing solid waste and recyclables. Under the system, private haulers pick up citizens’ trash from the curb, and county flow control ordinances require all solid waste generated within the counties to be delivered to the Authority’s facility for processing and ultimate disposal. The Authority charges tipping fees higher than the open market, but uses the revenue to cover the costs of a comprehensive waste management system. In addition to landfill transportation and disposal, the fees enable the Authority to provide robust recycling service, composting, household hazardous waste disposal, and other services. The Authority accepts recyclables and many forms of hazardous waste for free, thus encouraging separation of these items from the waste stream and increasing the counties’ ability to enforce recycling laws. A group of trash haulers challenged the flow control ordinances alleging that the ordinances discriminated against interstate commerce and consequently violated the Constitution’s Commerce Clause. The court noted: “Disposing of trash has been a traditional government activity for years, and laws that favor government in such areas—but treat every private business, whether in-state or out-of-state, exactly the same—do not discriminate against interstate commerce for purposes of the

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benefits of the flow control ordinance against the incidental burden on interstate commerce, the Court decided that the public benefits of the flow control system far outweighed any burden that may have been imposed on interstate commerce, and the Court upheld the county's flow control system.

Historically, the 70 participating municipalities in the Mid-Conn Region have directed the flow of municipal waste to the CRRRA facilities by licensing waste haulers to provide collection and disposal services in each municipality and directing them to deliver municipal waste to CRRRA facility. Failure of a hauler to deliver the wastes to the CRRRA would result in revoking that hauler's license. This system appears to be working. This statement is based on each municipality having an obligation to deliver a minimum amount of tonnage per year as part of their contract with the CRRRA. The agreements all have a "put-or-pay" that stipulates the amount of municipal waste from that municipality that must be delivered annual to the CRRRA facilities. The data obtained as part of the research for this project show that virtually all of the participating Towns have met their put-or-pay requirements, which suggests that private haulers are delivering their wastes.

MSW Consultants does not employ any attorneys and is not qualified to offer a legal opinion on the viability of flow control. However, based on our understanding of the above outcomes, we believe if an Authority was formed by all or part of the 70 Mid-Conn municipalities and they either assumed ownership of the existing CRRRA infrastructure or financed and built a new infrastructure, they could legally flow control the waste to the associated publicly owned facilities. CRCOG and its member Towns are advised to seek qualified legal expertise for additional analysis of this issue.

4.10 SUMMARY

There are clearly a wide range of options available for Connecticut municipalities to join forces for the provision of municipal services. However, the majority of these options appear to require relatively onerous processes to establish and administer. For this reason, it appears that two options are of greatest interest to the Mid-Conn Town:

- ◆ **Joint Procurement, Individual Contracts:** This option would appear to be the simplest means by which some or all of the CRCOG or Mid-Conn Towns could procure services from the private market. Ultimately, it will require one or more Towns to take the lead in developing and conducting the procurement, but it should be possible to share these costs. The downside to this method is that the winning proposer will still be expected to contract separately with the participating Towns, which will increase the administrative costs associated with the project and may cause the proposers to discount the veracity of the commitment of waste flow (e.g., of Towns are not obligated to enter into a contract).

Commerce Clause." The Court found compelling reasons for treating the county ordinances differently from laws favoring particular private businesses over their competitors. The Court recognized that State and local governments that provide public goods and services on their own, unlike private businesses, are vested with the responsibility of protecting the health, safety, and welfare of their citizens, and laws favoring such States and their subdivisions may be directed toward any number of legitimate goals unrelated to economic protectionism. Applying a balancing test, the Court upheld the county ordinances.

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- ◆ **RRA:** If the Mid-Conn Towns are truly interested in optimizing the existing solid waste management infrastructure that is already in place in the Mid-Conn Region, this would require the formation of a special entity to acquire these assets.

5. ANALYSIS OF ALTERNATIVES

5.1 TOWN NEEDS

When considering alternatives, the Mid-Conn Towns will be forced to balance many competing priorities, both individually as well as for the entire region. Before analyzing and selecting any alternatives for long term solid waste disposal, it will be important for Town decision makers to prioritize what characteristics of the integrated waste management system are most important.

Accountability: As presented in Section 3, the CRRA has delegated a disproportional amount of administrative and overhead costs to the Mid-Conn Region. While only delivering approximately 40 percent of the total waste to the CRRA operations, over 70 percent of administrative salaries and overhead are levied on the Mid-Conn municipalities. Further, the CRRA has recently alerted Mid-Conn Towns that bulky waste disposal will no longer be provided. Such actions suggest that improvements in accountability are possible in an optimized solution.

Full Service Provider: The Mid-Conn Towns want a full service disposal contractor. The fact that they will soon be individually responsible for bulky waste disposal not only places a burden on the Towns, but also creates disjointedness in what should be a single solution. In researching other authorities nationally that are tasked with providing recycling, and municipal waste processing and disposal services, no other authority neglected to handle a component of the waste stream and placed the disposal burden on the municipalities.

Flexibility: A solid waste management system should be flexible to adapt to changes in regulations, economic parameters and the needs of individual Towns. No two communities function alike in their municipal waste collection systems and methods of paying for the system. This must be taken into account.

Reliability: The Towns will need a long term solution for municipal waste management which utilizes best management practices for the entire waste stream. While cost is a critical parameter, equally important is ensuring the best practices in handle all waste generated by communities are utilized. Not every part of the waste stream is handled in the same manner, and the communities recognize the special handling measures for some components of the waste stream. They need a system that provides for all components of the municipal waste stream, not a part of the waste stream.

Stability: The Mid-Conn municipalities are looking for a system that will provide for the disposal of all waste generated for a predictable, reasonable cost. Such stability and predictability will further enhance the long term planning efforts that will be necessary to achieve the State SWMP recycling goals and to optimize WTE technology.

5.2 CONSIDERING THE ALTERNATIVES

The remainder of this section describe the range of alternatives faced by the Mid-Conn Towns, and attempts to frame the optimized outcome under each alternative.

5. ANALYSIS OF ALTERNATIVES

5.2.1 PARTICIPATION BY TOWNS

One of the most basic questions to be answered involves to what degree some or all of the Mid-Conn Towns can successfully join together in the pursuit of an optimized, cost-effective integrated waste management system. Theoretically, almost any combination of Towns could opt to move forward with a joint procurement, interlocal agreement, or other form of organization.

The waste generation from the entire Mid-Conn Region, at roughly 3,000 tons per day (tpd) is large enough to support one or several groupings of Towns to jointly pursue a solution. When seeking long-term disposal capacity, a good rule of thumb is to target a minimum of 500 tpd (700 or 1,000 tpd are preferred) for the purpose of getting competitive proposals from the private market. This is equivalent to 140,000 tons of waste annually. At the current time, none of the Mid-Conn Towns dispose of this much waste individually (Hartford is closest at almost 400 tpd). The 500 tpd threshold should enable proposers to justify the initial fixed costs to establish the facilities and a transportation network that can operate at a reasonable capacity to be efficient.

Given this threshold, there are multiple combinations of Towns that could pursue a solution. We make the following comments about Towns banding together for the purpose of long term disposal:

- ◆ The bigger the committed waste flow, the lower the likely disposal cost will be. If all 70 Mid-Conn Region Towns would commit their waste flow, this would be expected to drive the most competitive pricing from the private market. Three thousand tons per day is sufficient to enable a single regional landfill to meet its financial performance targets, or to supplement the waste flow at multiple regional landfills with excess capacity. For this reason, the most optimal solution would entail all 70 Towns participating in a transportation and disposal procurement.
- ◆ To the extent it is not politically possible for all 70 Towns to join, it is most likely preferable for groups of Towns to be contiguous. This will minimize transportation costs, and therefore pricing differences, of getting wastes from each Town to a central facility for transfer.
- ◆ To the extent it is not possible for all Towns to join, the small rural Towns should aggressively attempt to join with one or more larger, more suburban or urban Towns, if at all possible. Should the centrally located Towns (e.g., the CRCOG Towns) opt to band together and exclude the rural Towns in the remainder of the Mid-Conn Region, it will likely result in higher disposal costs for these smaller rural Towns because of their lower waste flow and potentially longer distance to centrally located transfer facilities and road/rail transportation lines.

5.2.2 NEGOTIATIONS WITH CRRA

A primary alternative for the Mid-Conn Towns is simply to negotiate new long-term disposal contracts with the CRRA. This is intuitively logical insofar as the CRRA's Mid-Conn Project assets will soon be paid in full, and represent the majority of the solid waste disposal infrastructure needed by the Towns. Although it was beyond the scope of this project to perform the financial and technical analysis that would be required to determine the

5. ANALYSIS OF ALTERNATIVES

optimized, cost-based rate that should be charged by CRRA, we believe that the recent unilateral tip fee reduction from \$72 to \$62/ton is indicative of the level of tip fees that might be expected. Further, given recent market prices obtained in the Connecticut market, this level of tip fee appears to be competitive against long haul or rail haul of wastes.

However, for the reasons stated in this report, it appears that the CRRA should be considered more similar to a private sector proposer (i.e., one that is committed to its self-interest rather than to the good of its member Towns). It is not possible to analyze the probable outcome of a negotiation with CRRA; however, establishing clear and disciplined procedures for negotiating with the CRRA will give the Mid-Conn Towns the best chance of securing cost effective disposal from the existing Mid-Conn Project resources. Specifically, it is recommended that the following steps be performed in the negotiations with CRRA:

- ◆ **Define what you want:** Develop a draft contract with terms and conditions approved by the Towns, for long term solid waste disposal, recyclables processing, transfer, transportation. In our experience, it is an extremely helpful exercise to consider the range of terms and conditions that will govern the agreement. In addition to the price, the draft contract should address performance expectations, period of performance and renewals, insurance, waste ownership, performance bonding, liquidated and consequential damages, reliability, and many other details.
- ◆ **Give CRRA first right of refusal:** Provide the draft contract to the CRRA and request a proposal for 10-year (or longer) disposal capacity from CRRA, and establish a firm deadline for receiving this proposal. The proposal should clearly specify the materials CRRA agrees to accept, the locations where they will be accepted, the projected tip fees and other fees to be in effect during the first year of the agreement, and the cost escalation formulas to be applied to adjust the contract price in subsequent years. The proposal should also include any exceptions taken by CRRA to the draft contract language.
- ◆ **Decide whether to open it up to a procurement to the private market:** Assuming CRRA provides such a proposal, evaluate the responsiveness. In light of the somewhat limited research performed for this project, we are inclined to recommend that the Mid-Conn Towns evaluate any CRRA proposal rigidly and decisively, making few or no allowances for unsatisfactory elements of the response. If the CRRA proposal is responsive, the tip fees appear to be consistent with the current (recently reduced) level, and proposed escalation terms are reasonable, then it may not be necessary to undertake the open procurement.

It is important to note that these bullets assume that CRRA is interested in proposing and negotiating in good faith to supply long term disposal capacity to the Mid-Conn Towns. If the Towns ultimately do not believe such good faith negotiations are likely, then it is recommended that the Towns proceed directly to an open market procurement, with the CRRA invited to propose along with other market participants.

It is also important to initiate any negotiations with CRRA within the next six months, which means the Towns should immediately begin drafting appropriate service agreements for the range of services they intend to seek from CRRA (transfer station operation, transportation, disposal, bulky waste, recyclables processing).

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5.2.3 ACQUISITION OF CRRA INFRASTRUCTURE

A conceptually compelling alternative is for the Towns to form the appropriate legal entity or organization to enable acquisition of the Mid-Conn Project assets, and to manage these assets strictly for the benefit of the Towns.

Our technical reading¹ of the summary documentation reviewed during this project suggests that it would first be necessary for the Mid-Conn Towns to form their own Resources Recovery Authority (the “Mid-Conn RRA” or MCRRA). Assuming this step could be accomplished, the resulting Authority would be legally authorized to acquire, manage, and finance the solid waste facility assets for the Mid-Conn facilities. This opportunity is intriguing because it should theoretically accomplish the following:

- ◆ Establish direct accountability of the management of the integrated solid waste system to the participating Towns;
- ◆ Enable an organizational overhaul to assure that management, administrative and operational staffing and resources are appropriate to achieve the mission;
- ◆ Increasing the certainty with which the system could be managed over the long term by eliminating the threat of having to test the private market every 5, 10, or 20 years; and
- ◆ Enable a value engineering analysis of the resource recovery technology to determine the most appropriate strategies for long-term RDF/WTE facility upgrade (and/or expansion);

The counter argument against this alternative is that there can be no assurances that the CRRA would willingly agree to sell or transfer Mid-Conn Project assets to a newly formed Mid-Conn RRA. In a worst case scenario, the Mid-Conn Towns take the appropriate steps to form the MCRRA, only to reach an impasse with the CRRA over the acquisition of Mid-Connecticut Project assets. It was beyond the scope of our analysis to evaluate the political and legal obstacles that could arise in the event this alternative is pursued. Needless to say, such obstacles could be significant, and should be carefully considered prior to proceeding down this path.

5.2.4 WTE Technology Evaluation

During the course of this study, it was noted that the current standard technology for waste to energy facilities is a mass burn configuration. Mass burn facilities are more cost efficient given there is no front-end processing cost, which is common with RDR facilities. An RDF facility requires mechanical and manual process of the waste to generate a fuel to generate a fuel that can be incinerated in the pre-existing coal burning facility.

The Mid-Conn Project utilizes a refuse-derived fuel (RDF) processing technology, which at the time was necessary to feed an incinerator converted from coal. The Mid-Conn Materials Processing Facility (MPF) requires over 90 employees to operate on a daily basis. This is a front end cost, plus facility maintenance that could be avoided by going to a mass-burn system where municipal waste is fed directly into the incineration units.

¹ Note that MSW Consultants does not employ any attorneys and is not qualified to offer legal interpretations. The Mid-Conn Towns are encouraged to seek qualified legal counsel in their pursuit of the options described herein.

5. ANALYSIS OF ALTERNATIVES

The cost to convert to a mass-burn or Waste to Energy (WTE) system would be expected to fall in the range of several hundred million dollars to site, permit, design and construct a new facility in the Mid-Conn Region. This capital cost amortized with an annual operating cost would likely be at or above the current tip fee levels, so this strategy would require further analysis to confirm the costs.

5.2.5 OPEN MARKET PROCUREMENT

It is almost certain that the Mid-Conn Towns should pursue an open market procurement of some or all portion of their integrated waste management needs. On the surface, this strategy might appear risky because of the lack of alternative local disposal options in Connecticut. However, in practice the private market place has developed an increasingly flexible and competitive use of transportation logistics to supply cost-competitive disposal. If the Mid-Conn Towns opt to conduct a procurement for disposal, the winning solution will entail the transfer, consolidation, and transportation of wastes to one or more remote landfills located outside of Connecticut. Road haul and rail haul options are described below.

5.2.5.1 Road Haul

Historically, the vast majority of solid waste that requires transportation from a transfer station to a disposal facility has been shipped in trailers pulled by a truck. Today's long haul truck transport uses several different types of trucks and trailers. The most common is 100 cubic yard aluminum open-top transfer trailers, although compaction trailers are also common. The open top aluminum trailers can accommodate 23 to 24 tons of waste, while the compaction type trailers can only transport 18 to 20 tons legally. In Connecticut, some transfer operations are using a baler to compact, dewater, strap, and wrap MSW within a film plastic cocoon for shipments using flat-bed trailers. Flat-bed trailers offer two distinct advantages over conventional open top or compacting trailers. First, because they are lighter, the flat-bed trailers can haul more than 25 tons of baled material. Second, and of equal or greater importance, flat-bed trailers offer many more opportunities for back-hauling freight on the return trip. These advantages increase the number of landfills that make the transfer operation cost effective regardless of the distance.

Regardless of the tonnage that a trailer can transport, the basic long-haul operational costs are similar. The fuel, labor, and maintenance cost are similar. An operator can normally drive 550 to 600 miles per day. For the operator to make one load per day, the disposal site must be within a 300 mile radius. Many transfer operators require daily revenues of about \$600 per day or at least \$1 per round trip mile. Table 5-1 summarizes the general costs of long haul waste transport by truck. Note that these estimates do not include assumption about return on invested capital and profit, so actual costs obtained in a procurement might be 20 percent or more higher.

Table 5-1 Long Haul Trucking Cost Parameters

| Annual Cost Type | Amount |
|-----------------------|----------|
| Capital Cost | \$22,029 |
| Labor & Benefits Cost | \$85,176 |
| Maintenance Cost | \$24,800 |

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| Annual Cost Type | Amount |
|---------------------------------|------------------|
| Fuel Cost (Based on \$3.50/gal) | \$75,075 |
| Administration & Overhead | \$10,311 |
| Total Estimated Cost | \$217,391 |
| Est. Annual Miles | 171,600 |
| Est. Cost per Mile | \$1.27 |

The City of Hartford is an ideal location within the Mid-Conn region to develop a transfer station using long-haul truck transport. Hartford is within easy reach of three major interstate highways heading south or west toward cheaper landfill disposal options in Virginia, Pennsylvania, Ohio, and New York. The southern route, traveling on I-95, can be congested with heavy traffic through the southern Connecticut and New York City area. This New York congestion can increase transfer cost, reduce reliability, and impede a normal transfer operations. However, there are also numerous options for landfill disposal in western New York, Pennsylvania, and Ohio that would not require travel on the congested I-95 corridor. An example of remote landfills that have significant remaining capacity and are within truck haul distance of central Connecticut are shown in Table 5-2.

Table 5-2 Remote Landfills Accessible by Truck Haul

| Landfill | Location | Remaining Capacity | Transportation Cost/Ton |
|---|-----------------|--------------------|-------------------------|
| Seneca Meadows Landfill | Waterloo, NY | 82,564,254 Tons | \$31 |
| Commonwealth Environmental Systems Landfill | Hegins, PA | 3,761,674 Tons | \$29 |
| Keystone Sanitary Landfill | Dunmore, PA | 7,158,624 Tons | \$20 |
| Mountain View Reclamation Landfill | Upton, PA | 1,100,895 Tons | \$37 |
| Central Waste Inc Landfill | Alliance, OH | 29,000,000 tons | \$58 |
| Carbon Limestone Sanitary Landfill | Lowellville, OH | 26,766,285 Tons | \$53 |
| Countywide Recycling & Disposal Landfill | East Sparta, OH | 26,088,481 Tons | \$60 |

Source: Waste Business Journal Directory and Atlas of Non-Hazardous Waste Sites 2007.

These disposal options would require long-haul trucks to travel either I-90 or the I-84 west corridors which are less traveled and have relatively minor areas of congestion. This stability in the transportation system can lead to reduced transfer cost and increased reliability.

Further, recent projects performed by MSW Consultants suggest that it is possible to obtain disposal fees at remote landfills that are extremely low. These fees can start as low as \$20 per ton, although the precise fee will be a product of the several factors, including the size of the

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committed waste flow. All told, the total transportation and disposal cost from the Central Connecticut area could be as low as \$40 to the closest of these facilities.

5.2.5.2 Rail Haul

The concept of rail transport of refuse, which includes an integrated system of local and remote infrastructure, is called waste-by-rail. Waste-by-rail programs provide long-term disposal capacity to replace local landfills as they reach capacity and close. Landfills of all types are becoming increasingly difficult to site and permit close to urban centers, a situation which will only become more problematic as urban areas spread out, the NIMBY (Not In My Backyard) attitude grows, streets and highways become ever more congested, and highway dollars are increasingly diverted from construction toward maintenance. It has become more environmentally and economically advantageous to site new “regional” landfills away from urban communities. Therefore, as today’s urban landfills reach capacity; they are being replaced by more rural or remote sites that must be fed by long-haul transportation.

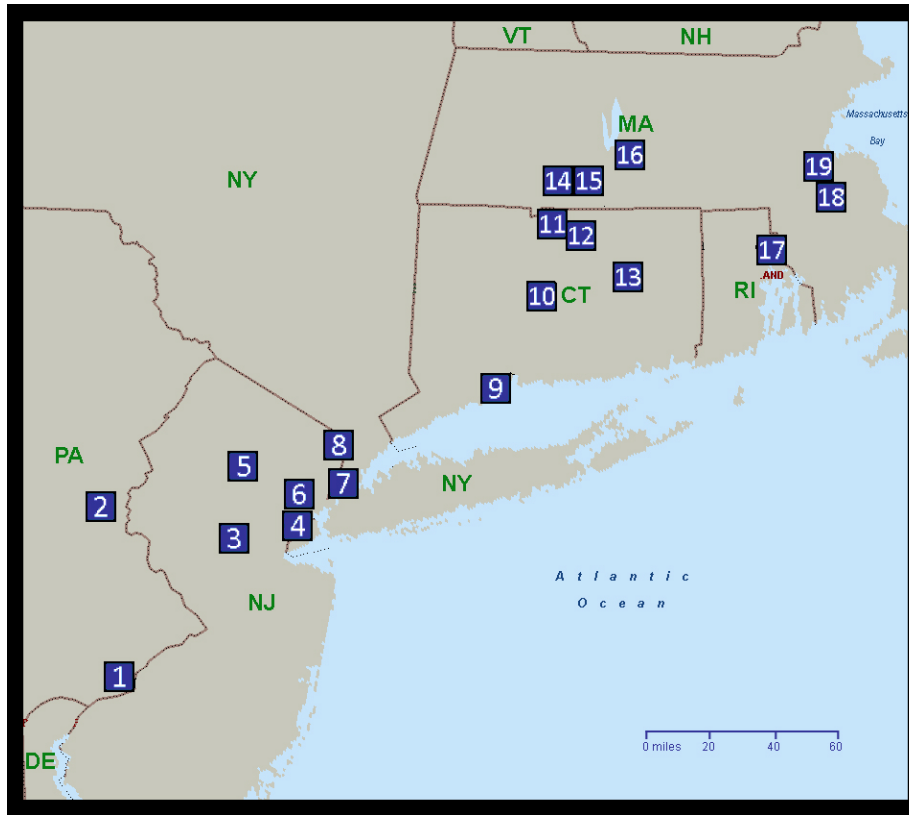
For the solid waste industry, transitioning to remote disposal of refuse that involves rail transport requires that new infrastructure be developed at both origin and destination. There are several models of rail transportation, two of which are utilized in waste-by-rail:

- ◆ **Intermodal:** Intermodal transportation involves loading wastes into a closed container that can be transported by truck, but can also be removed from the truck and loaded onto a flatbed car (single or double stacked) using specialized facilities and equipment (the container can be transported by both truck and rail car, hence “intermodal”). Specialized intermodal yards are required to both load and unload intermodal containers.
- ◆ **Direct Loading:** Alternatively, open top gondola cars accept waste loaded directly (either loose or baled) into the car as it sits on the track. Waste movement by gondola can be handled by railroads at a significantly cheaper cost compared to intermodal transport.

There are already a number of successful waste-by-rail operations serving the Northeast (both intermodal and direct load). Allied Waste and Waste Management ship thousands of tons per day from New York City to landfills in South Carolina and Virginia, respectively. Several private companies are shipping waste by rail from points across the Northeast region to landfills in Pennsylvania and Ohio, as well as points further south. At least several companies are shipping C&D debris by rail from Connecticut. Figure 5-1 shows the locations of rail-enabled transfer stations in the Northeast region, including several in the Mid-Conn Region.

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Figure 5-1 Map of Rail-Accessible Transfer Stations



For the Mid-Conn Region, the use of railroads for waste shipments are of interest because of the substantially greater transportation efficiencies that are possible via rail. Table 5-3 shows a range of transportation costs for rail shipments of varying lengths, based on 2007 Q4 pricing.

Table 5-3 Sample Rail Transportation Costs

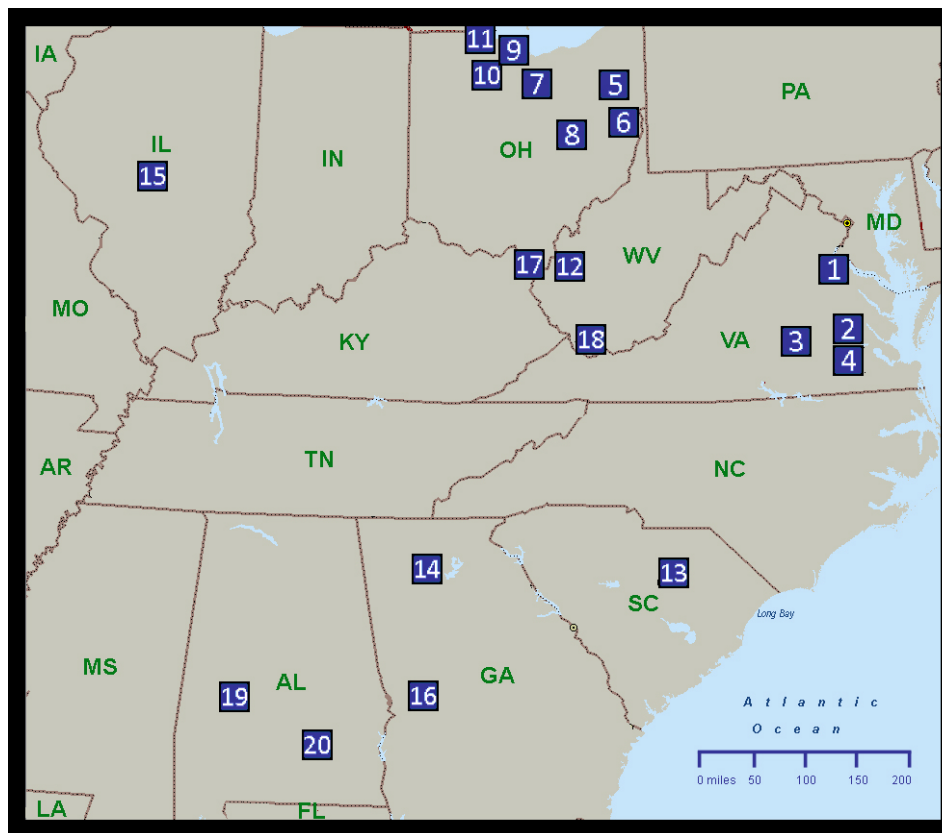
| Estimated Track Mileage | Transportation Cost (\$/ton-mile) ^[1] | Transportation Cost per Ton |
|-------------------------|--|-----------------------------|
| 673 | \$0.015 | \$20.00 |
| 736 | \$0.014* | \$20.00 |
| 948 | \$0.013 | \$24.50 |
| 1,040 | \$0.013 | \$27.00 |
| 1,119 | \$0.013 | \$27.00 |
| 1,355 | \$0.011* | \$30.00 |
| 1,411 | \$0.011* | \$31.50 |
| 1,451 | \$0.012 | \$35.00 |

^[1] Actual cost per ton-mile is indicated by *. Remaining values represent estimates.

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As shown in this table, it is possible to haul wastes by rail over a substantially longer distance at a lower cost per ton compared to truck transfer. The benefit of this efficiency is that it potentially accesses a larger number of low cost landfills that have rail offload capability and excess capacity. In fact, a recent market study performed by MSW Consultants identified at least 20 landfills that have on-site or nearby rail offloading capabilities, with thousands of tons per day of excess capacity. These are shown in Figure 5-2. As but one example, there are two landfills in Alabama with tip fees in the range of \$20/ton that could accept 100 percent of Mid-Conn Region waste on an immediate basis.

Figure 5-2 Rail-Enabled Landfills



The above tables and figures are intended to convey that the private market place has developed a range of solutions to achieve lower disposal costs through road and rail based transportation logistics. In the performance of this project, MSW Consultants contacted three private entities engaged in developing waste-by-rail from the Northeast region, and all three expressed keen interest in the opportunity to develop a proposal to serve the Mid-Conn Region's needs.

Ultimately, the pricing for a waste-by-rail solution will be set by market forces, and not necessarily based on the underlying cost to provide the service. Table 5-4 summarizes the cost components of a waste-by-rail solution.

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Table 5-4 Waste-by-Rail Cost Components

| Component | Cost (\$/ton) |
|---------------------|--------------------|
| Transloading | \$8 - \$12 |
| Rail Transportation | \$20 - \$35 |
| Offloading | \$2 |
| Disposal | \$20 - \$30 |
| Total | \$50 - \$79 |

As shown in the table, waste-by-rail has the potential to significantly undercut current pricing based on cost alone. However, a more likely competitive procurement scenario is for pricing to be set at a point that is slightly below the locally prevailing disposal options. So, if CRRA is offering \$75/ton, expect pricing to be somewhat, but not significantly, below this point.

5.2.6 COLLECTION OPTIMIZATION

Although the focus of this study is on solid waste disposal, it must be noted that there is significant opportunity in the Mid-Conn region to reduce collection costs for residential and commercial customers alike through more aggressive municipal control of collection services, possibly in combination with regional collection programs.

5.2.6.1 Municipal Control of Collection

As noted previously, fully 30 percent of the Mid-Conn Region population must subscribe with a private company to receive curbside waste collection. This means that there are multiple haulers driving residential streets in these neighborhoods, expending excess fuel and time to provide overlapping service. At a minimum, the collection costs incurred by residents in these areas could be reduced significantly (20% or more) for Towns that opt to contract exclusively for collection.

While the cost and environmental benefits of exclusive collection are clear, it must be acknowledged that the political barriers to this solution may be daunting. Local haulers with long-time roots in a particular Town will fear being displaced by larger companies, and past experience suggests that there will be vocal opposition to any attempt to grant exclusive service.

5.2.6.2 Regional Collection

Another rule of thumb to reduce collection costs is to spread fixed costs (fleet yard, management and administration) over as many customers as possible. With the prevalence of relatively small Towns in the Mid-Conn region, there is almost certainly the potential to reduce unit collection costs to the extent two or more contiguous Towns were to combine their collection systems by standardizing collection service levels and optimizing collection routing absent a consideration for interior Town boundaries.

While there are many factors that would impact the level of cost savings that might be achievable, Table 5-5 shows the unit contract costs per household for a range of communities in Brevard County, FL. These communities receive substantially the same level of service.

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This table is intended to reflect the impact on unit cost of increasing the size of the service area.

Table 5-5 Example of Impact on Unit Collection Costs of Size of Service Area

| Community | Population | Refuse Service | Recycling Service | Yard Waste | Bulk Waste | Monthly Collection Cost (\$/Household) |
|----------------------------|------------|----------------|-----------------------|----------------|------------|--|
| Brevard Co. Unincorporated | 476,230 | 2x/wk manual | 1x/week curbsort | 1x/week manual | Included | \$9.12 |
| Palm Bay | 79,413 | 2x/wk manual | 1x/week single stream | 1x/week manual | Included | \$11.01 |
| Melbourne | 71,382 | 2x/wk manual | 1x/week single stream | 1x/week manual | Extra | \$8.10 |
| Rockledge | 20,170 | 2x/wk manual | 1x/week curbsort | 1x/week manual | Extra | \$12.00 |
| Cocoa Beach | 12,482 | 2x/wk manual | 1x/week curbsort | 1x/week manual | Extra | \$10.93 |
| West Melbourne | 9,824 | 2x/wk manual | 1x/week single stream | 1x/week manual | Extra | \$13.05 |
| Palm Shores | 794 | 2x/wk manual | 1x/week curbsort | 1x/week manual | Included | \$13.03 |

Although the data above do not show a perfect correlation between the population of the municipality and the unit price, it supports the general pattern of higher pricing (costs) for smaller geographic areas. All told, the larger municipalities receive similar collection for about a 30 percent lower cost per unit compared to the smaller municipalities. It is likely a similar dynamic would play out in the Mid-Conn Region.

5.2.7 RECYCLING OPTIMIZATION

The Connecticut Solid Waste Management Plan contains a series of incrementally higher recycling rates to be achieved in Connecticut in the coming years. DEP reports the current state-wide recycling rates to be 30 percent. The state-wide rate is targeted to increase to 40 percent by 2015 and ultimately to 58 percent 2024. Yet, based on this same DEP data, the recycling rate for the 70 Mid-Conn communities is approximately 24 percent.

Clearly, there are opportunities for improvement. There are several ways in which recycling could be optimized in the Mid-Conn region, both from a financial standpoint as well as in terms of diversion rate. These are discussed below.

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5.2.7.1 Recyclables Processing Procurement

It is important to be aware that the economics of recyclables processing are a lot like the dynamics of disposal. The larger the flow of recyclables to a processor, the more attractive the economic terms to be achieved. This is especially important because in recent years, recyclables commodity prices have been strong (although recent disruptions to the world economy have significantly reduced recovered material prices lately). Although by no means comprehensive, Table 5-6 summarizes several recent recyclables processing bids received from across the nation in relatively populous jurisdictions.

Table 5-6 Recent Recyclables Processing Terms

| Community | Processing | Payment per Ton | Revenue Share |
|---------------------|---------------|-----------------|---------------|
| City of Denver, CO | Single Stream | \$30 | Yes |
| Anne Arundel Co, MD | Single Stream | \$24 | Yes |
| Sarasota County, FL | Dual Stream | \$80 | No |

As shown in the table, competitively procured recyclables processing can provide both a steady income from payments for daily delivery of single stream or dual stream recyclables, as well as the potential for windfall revenues if certain thresholds are exceeded. At the current time, the Mid-Conn Towns are receiving \$10 per ton of recyclables delivered, which seems to be well below prevailing rates.

Although the immediate priorities for the Mid-Conn Towns are to secure long term disposal, it is recommended that a similar course of action be considered for recyclables processing. In other words, the Towns should:

- ◆ Join together in some way to commit as much recyclables tonnage as possible to one processor;
- ◆ Develop a draft contract for the processing of recyclables that outlines the manner in which recyclables are collected and delivered, and requests the per ton payment (or tip fee) as well as any material revenue share that may be desired;
- ◆ If negotiating with CRRA in good faith, request a formal proposal from CRRA for a 3, 5 or 7 year term for processing recyclables;
- ◆ If the outcome of the CRRA negotiations are unsatisfactory, proceed with an open market procurement for recyclables processing.

In other words, management of the recyclables processing function should mirror solid waste disposal.

5.2.7.2 Recyclables Collection

There are several trends afoot in recycling collection that will almost certainly expand in the Mid-Conn Region. The first, single stream collection, is already underway. The second, volume-based pricing (sometimes called pay-as-you-throw or PAYT), will almost certainly be necessary if the state is going to achieve its long term recycling goals as stated in the Master SWMP.

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Single stream collection refers to the process whereby residents no longer are required to separate their recyclables into two streams (fiber and mixed containers), but rather can set out all their recyclables mixed together for collection in a single-compartment truck. Generally, an optimized single stream program will feature:

- ◆ Standardized 60 or 90 gallon carts provided to residents for use in storing mixed recyclables. See Figure 5-3 for a comparison of the set-outs.
- ◆ Highly efficient collection (either weekly or every other week) by an automated collection truck with a single operator; and
- ◆ Availability of a processing facility that has been configured to sort single stream recyclables.

Figure 5-3 Dual Stream (left) vs. Single Stream (right) Recycling Set-out



The use of carts greatly expand the volume of recyclables that can be stored, and reduces the loss of recyclables from households that dispose of recycling overflow of their 18 gallon bins. Further, cart-based set-outs can be collected by the same collection trucks that provide automated refuse collection, so the collection fleet can be standardized and collection is extremely efficient.

It should be noted that many of the benefits of single stream recycling accrue to the collector. Single stream recyclables are more costly to process because additional sorting must take place. Processing efficiencies are gained only by increasing the types of materials to be recovered, which typically include all recyclable fibers. Further, single stream processing results in a higher residue rate, which means a greater fraction of the recyclables delivered to the facility are lost during the sorting process.

Single stream recycling would especially benefit the Mid-Conn Region to the extent the Towns pursue a strategy of greater municipal control over the collection system (i.e., exclusive contracting).

The second area where recycling could be enhanced in the Mid-Conn Region involves the establishment of true volume-based pricing systems. In a volume-based pricing system would encourage recycling due to the waste cost system being based on the quantity disposed. In this instance the homeowner or business is assessed a fee for collection and disposal services

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based on the amount the entity places out for collection/disposal.² This serves as an incentive to recover and recycle waste and reduce the amount for processing or disposal.

² In addition to volume-based pricing, weight-based pricing is conceptually possible. In this instance, the municipal waste collected is weighed by the collection vehicle and the homeowner would be charged on per pound basis for collection and disposal services. This type of system requires an automated collection vehicle with the arm used to grab, tip and dump the municipal waste into the collection vehicle fitted with a load cell that weighs the material being collected on a household by household basis. However, this technology is subject to errors on the weight readings and therefore has had difficulty in being certified for billing purposes. As load cell accuracy and automatic calibration technology evolves, it may become feasible to perform true weight-based direct billing in the future. However, the unreliability of the on board load cells at the current time has prevented the implementation of weight-based pricing.

6. RECOMMENDATIONS

6.1 INTRODUCTION

On many levels, the integrated solid waste management challenges facing the Mid-Conn Towns are highly complex. Not only are the Towns faced with establishing a long-term strategy for the first time in 20 years, they are doing so in a time of solid waste industry consolidation, a shift from local to regional disposal market dynamics, and in the face of a marginally responsive quasi-public agency that has served the Towns for the past 20 years.

Perhaps the most significant decision to be made in the entire process will entail the strategy by which the Towns choose to join forces for the purposes of pursuing an integrated waste management system. Clearly, larger entities with greater volumes of waste flow will command the best deals on the open market or in any negotiations. Yet, the statutes that exist in Connecticut to enable municipalities to join together to provide services or assets are onerous.

MSW Consultants has attempted to parse through the wide range of complex, interrelated issues for the purpose of offering a clear set of recommendations that can be used by the Mid-Conn Towns to guide their decisions. While we cannot make a single, definitive recommendation, it appears that there are a relatively small number of critical decisions that must be made to optimize the outcome of the process. The sections below attempt to concisely summarize the course of action that should be followed to achieve a best-cost, high service outcome for the Mid-Conn Towns.

6.2 GOVERNANCE

Given the state of the solid waste market and the actions of the CRRA, it is critical that the Towns take steps to capitalize on their combined size as a generator of wastes and recyclables. Recognizing that there may be potential for price subsidization between more urbanized, centrally located Towns (where services can be provided the most cost effectively) against their more rural, distantly located counterparts (which could be more costly to service), it is nonetheless advised that the Mid-Conn Region “stick together” in all actions related to solid waste management. In fact, it may also be appropriate to explore interest among the surrounding towns that are not currently committed to a CRRA project or other private contract arrangement to further bolster the size of the organization.

Given that there are many ways to form joint action organizations, the decision on governance appears to be a critical one that comes down to whether the Towns favor ease of implementation over the prospect of truly establishing a directly accountable organization that can realistically expect to optimize solid waste management in the Region.

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*If the Towns are primarily interested in solving only the long term **disposal** issue, then it would seem that the Norwalk procurement model would be the easiest to pursue.*

Under this model, one (or perhaps several) of the Mid-Conn Towns would be required to take the lead in development of a procurement process, and interested Towns could negotiate an arrangement whereby they share the cost of the procurement and can independently contract with the winning proposer. It is recommended that this procurement generally contain the following terms:

- ◆ Ten (10) years of disposal capacity. While a longer term than will be found in many disposal agreements, a longer term in this situation is expected to provide the most competitive pricing from private sector companies capable of meeting the disposal need outside the CRRA.
- ◆ Uniform pricing at the transfer/transload facility gate that covers transfer, transportation and disposal.
- ◆ Separate pricing for transfer station operations and transportation, given the range of convenience centers within member Towns.
- ◆ Transparent annual cost escalators and/or fuel surcharge formulas.
- ◆ To the extent any of the Towns have industrially zoned property, especially located on or near a rail line or spur, that can be permitted for development into a transfer station, the availability of these parcels should be publicized. It should be noted that the host Town should reasonably expect to earn a host fee for siting a waste management facility within its borders.
- ◆ Appropriate terms governing insurance, guarantee of performance, consequential and liquidated damages, performance bonuses, and other terms geared towards managing the performance of the contract.

Conversely, *if the Towns are truly interested in establishing an organization that can implement a disciplined, accountable, integrated system that employs best practices and optimized technology in all phases of waste management, then it would appear that the formation of a Mid-Conn RRA is warranted.* In the very best case scenario, such an authority could acquire the Mid-Conn assets from the CRRA and begin to optimize their management. (In practice, it does not appear that the CRRA would be likely to willingly divest itself of Mid-Connecticut Project assets.) However, even if it is not possible to acquire existing assets, a Mid-Conn RRA would have the flexibility, self-interest, organizational structure, and financial flexibility to enable a full range of solutions not only for waste disposal, but also for collection system improvements (e.g., regional collection procurement) and recyclables processing.

6.3 LONG-TERM DISPOSAL

Once the governance issue is determined, there appear to be a clear set of steps that should be pursued to secure disposal capacity. These are summarized below:

- ◆ **Define Service Requirements:** Develop a draft contract with terms and conditions approved by the Towns, for long term solid waste disposal including transfer and transportation. This exercise will force the Towns to consider the range of disposal services that are required – putrescible wastes, bulky wastes, HHW, electronics, etc. – and

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to clearly define and quantify the volume and locations where the wastes are generated. The draft contract should address performance expectations, period of performance and renewals, insurance, waste ownership, performance bonding, liquidated and consequential damages, reliability, and many other details.

- ◆ **Engage CRRA:** We note that the CRRA very recently alerted Mid-Conn Towns that the tip fee for wastes will be reduced to \$62/ton effective January 2009. Setting aside concerns about the CRRA's apparently excessive overhead, this is a reasonable rate for the central Connecticut area given the current state disposal market. The Mid-Conn Towns should seek a definitive proposal for a 10-year solution from the CRRA that conforms to their requirements. The proposal should clearly specify the materials CRRA agrees to accept, the locations where they will be accepted, the projected tip fees and other fees to be in effect during the first year of the agreement, and the cost escalation formulas to be applied to adjust the contract price in subsequent years. The proposal should also include any exceptions taken by CRRA to the draft contract language. If an insufficient or no proposal is provided at this stage, then open market procurement should commence.
- ◆ **Procure from the Open Market:** Unless the CRRA provides a transparent, comprehensive, cost-competitive proposal, proceed to issue an RFP to interested private vendors for disposal (including transfer station operations, transportation, and final disposal). MSW Consultants is aware of at least three waste-by-rail companies with active interest in providing alternative disposal capacity to the region, and it is likely that other combinations of teams would propose for a large enough waste flow. Ultimately, it is the vibrancy of the open market that gives the Mid-Conn its best chance to secure cost-effective long-term disposal whether provided by the CRRA or otherwise.

Once again, it is important to reiterate that the Towns will obtain the best outcome by committing to provide the largest flow of waste. A potential risk to the Norwalk model would occur if the private market perceives the RFP to be less than a commitment of wastes from the full number of participating Towns. We note that in the Norwalk case, only some of the towns that participated in the procurement ultimately executed a contract with the winning proposer. Fear of a similar outcome in the Mid-Conn Region could reduce the competitiveness of proposals.

6.4 COLLECTION OPTIMIZATION

There are two primary opportunities to improve the collection of wastes and recyclables in the Mid-Conn Region.

The first opportunity can be pursued independently by those municipalities that currently do not provide exclusive collection services (whether by a public or private service provider). For the 35 Towns where this is the case, ***establishment of exclusive collection programs would be expected to immediately reduce the cost of curbside collection*** to its residents by 20 to 30 percent, if not more. Even if these Towns built in an "opt-out" clause to satisfy residents who insist on self-hauling to the local town convenience center, an exclusively served area would enable far greater collection efficiency, fewer trucks on the road, and lower pricing.

The second opportunity would ***require cooperation among two or more Towns to implement multi-jurisdiction, or even regional, curbside collection***. Once again, of the

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Towns opt to form a Mid-Conn RRA, this authority could serve as the implementing agent for such a solution. However, even in the absence of a Mid-Conn RRA, each Town stands to reduce its collection cost by standardizing its services and joining one or more additional Towns in a regional collection program

6.5 RECYCLING SYSTEMS

There are several steps that should be taken to fully evaluate the opportunities to improve recycling within the Mid-Conn Region.

The first step is directly comparable to the recommended course of action for obtaining long term disposal capacity. Specifically, ***the Mid-Conn Towns should jointly investigate a long-term (5-year to 7-year) agreement for processing recyclables.*** Note that it is critical to perform this procurement by allowing proposers to bid on both dual stream and single stream recyclables. Dual stream recyclables are less costly to process, and have lower residue rates. Prices paid would be expected to be higher for dual stream materials. Single stream recyclables are more costly to process, so prices paid to the generator of the recyclables would be expected to be lower on a per-ton basis. Ultimately, the full cost of recycling covers the entire cost from collection through processing, so knowing the outcome of the processing procurement is necessary to make subsequent decisions on converting to single stream collection. Single stream collection in and of itself may not be the best solution; rather, it must be considered in the context of the overall recycling system.

The second step towards optimizing recycling relates to the collection optimization considerations above. Specifically, ***municipal control of the collection system will greatly influence the provision of recycling collection.*** In subscription systems, residents typically are asked to pay an additional fee for a separate recycling collection service. However, in an optimized collection system, recycling is bundled with other collection programs for a single monthly charge. In this way, there is no disincentive to participate in recycling.

The final step towards optimizing recycling involves ***establishment of collection billing and rate mechanisms that provide a financial incentive to recycle.*** So-called PAYT programs charge residents more for setting out larger volumes of refuse, but allow recyclables to be set out for free. For example, the City of Gainesville, Florida offers the following four levels of refuse service shown in Table 6-1.

Table 6-1 Volume-Based Pricing in the City of Gainesville, Florida

| Refuse Service Level | Approximate volume (13-gallon bags) | Monthly Fee per Household |
|-----------------------------|--|----------------------------------|
| 20-gallon | 1 bag | \$13.21 |
| 35-gallon | 2 bags | \$17.18 |
| 64-gallon | 5 bags | \$21.14 |
| 96-gallon | 7 bags | \$26.42 |

In properly configured PAYT systems such as Gainesville's, residents will change their recycling behavior to take advantage of the lower rates offered to recyclers. Such programs

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implemented in Mid-Conn Towns would be expected to do the same. We note, however, that many Mid-Conn Towns would need to make fundamental changes in the way they fund solid waste to establish this direct link between the residents who generate the waste and the funds for the service. Well over half of the households in the Mid-Conn Region do not get charged a direct fee for curbside collection (at least, not a fee charged by the Town). Rather, these communities receive service funded by taxes or general fund transfer. Establishment of self-sustaining solid waste enterprises in these Towns would be a prerequisite to establishing PAYT programs.

6.6 CONCLUSION

Despite the apparently daunting challenges that lay ahead, in reality *the Mid-Conn Region has numerous opportunities to improve waste management for its Towns*. Doing so will require commitment to several basic principles:

- ◆ **Control and Accountability Leads to Optimization:** From an organizational standpoint, establishing a Mid-Conn solid waste management entity that is directly accountable to the Mid-Conn Towns and also has the organizational control (charter and mission, management and technical expertise, procurement power, financial flexibility) to optimize the system will win out over all other options towards serving the Towns' financial and service needs within the context of the Connecticut SWMP.
- ◆ **Bigger is Better:** The more Towns willing to bundle their waste flows or customer bases prior to procuring a service, the better the resulting proposals will be.
- ◆ **Use Market Forces:** The Northeast region private market has evolved sufficiently such that there are multiple qualified, financially secure vendors that are capable of providing any of the transfer, transportation, disposal, or processing needs of the entire Mid-Conn Region. This market should be leveraged to provide the Towns with a true picture of the best available pricing for various services.

Despite the current disposal contracts not expiring until 2012, the Mid-Conn Region should initiate the decision making process immediately to provide sufficient lead time to enact the recommendation contained in this report. There will almost certainly be unforeseen obstacles, so longer lead time is appropriate.

6. RECOMMENDATIONS

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APPENDIX A

Mid-Conn Town Data

Exhibit 1 CRCOG and Mid-Connecticut Demographics

| Town/City | Demographics | | | | CRCOG | Mid-CT Project |
|------------------|-----------------|-----------------|----------------|--------------------|-------|----------------|
| | 2000 Population | 2007 Population | 2000 Total HHs | 2000 Single Family | | |
| 1 Andover | 3036 | 3,036 | 1,198 | | CRCOG | |
| 2 Avon | 15,832 | 17,333 | 6,480 | 4,722 | CRCOG | Mid-CT |
| 3 Barkhamsted | 3,494 | 3,665 | 1,436 | 1,043 | | Mid-CT |
| 4 Beacon Falls | 5,246 | 5,770 | 2,104 | 1,269 | | Mid-CT |
| 5 Bethlehem | 3,422 | 3,549 | 1,388 | 906 | | Mid-CT |
| 6 Bloomfield | 19,587 | 20,693 | 8,195 | 5,271 | CRCOG | Mid-CT |
| 7 Bolton | 5,017 | 5,116 | 1,969 | 1,546 | CRCOG | Mid-CT |
| 8 Canaan | 1,081 | 1,094 | 610 | 295 | | Mid-CT |
| 9 Canton | 8,840 | 10,086 | 3,616 | 2,412 | CRCOG | Mid-CT |
| 10 Chester | 3,743 | 3,834 | 1,613 | 983 | | Mid-CT |
| 11 Clinton | 13,094 | 13,578 | 5,757 | 3,602 | | Mid-CT |
| 12 Colebrook | 1,471 | 1,529 | 656 | 370 | | Mid-CT |
| 13 Cornwall | 1,434 | 1,480 | 873 | 322 | | Mid-CT |
| 14 Coventry | 11,504 | 12,192 | 4,486 | 3,324 | | Mid-CT |
| 15 Cromwell | 12,871 | 13,552 | 5,365 | 3,296 | | Mid-CT |
| 16 Deep River | 4,610 | 4,673 | 1,910 | 1,188 | | Mid-CT |
| 17 Durham | 6,627 | 7,397 | 2,349 | 1,835 | | Mid-CT |
| 18 East Granby | 4,745 | 5,122 | 1,903 | 1,354 | CRCOG | Mid-CT |
| 19 East Hampton | 13,352 | 12,548 | 4,412 | 2,836 | | Mid-CT |
| 20 East Hartford | 49,575 | 48,697 | 21,273 | 10,056 | CRCOG | Mid-CT |
| 21 East Windsor | 9,818 | 10,617 | 4,356 | 2,067 | CRCOG | Mid-CT |
| 22 Ellington | 12,921 | 14,426 | 5,417 | 3,129 | CRCOG | Mid-CT |
| 23 Enfield | 45,212 | 45,011 | 17,043 | 11,376 | CRCOG | Mid-CT |
| 24 Essex | 6,505 | 6,753 | 2,977 | 1,878 | | Mid-CT |
| 25 Farmington | 23,641 | 25,084 | 9,854 | 6,215 | CRCOG | Mid-CT |
| 26 Glastonbury | 31,876 | 33,169 | 12,614 | 9,027 | CRCOG | Mid-CT |
| 27 Goshen | 2,697 | 3,168 | 1,482 | 771 | | Mid-CT |
| 28 Granby | 4,745 | 5,122 | 1,903 | 1,354 | CRCOG | Mid-CT |
| 29 Guilford | 21,398 | 22,373 | 8,724 | 6,306 | | Mid-CT |
| 30 Haddam | 7,157 | 7,800 | 2,822 | 2,070 | | Mid-CT |
| 31 Hartford | 49,575 | 48,697 | 21,273 | 10,056 | CRCOG | Mid-CT |
| 32 Harwinton | 5,283 | 5,564 | 2,022 | 1,598 | | Mid-CT |
| 33 Hebron | 8,610 | 9,232 | 3,110 | 2,420 | CRCOG | Mid-CT |
| 34 Killingworth | 6,018 | 6,443 | 2,283 | 1,617 | | Mid-CT |
| 35 Litchfield | 8,316 | 8,671 | 3,629 | 2,062 | | Mid-CT |
| 36 Lyme | 18,118 | 18,690 | 7,459 | 4,467 | | Mid-CT |
| 37 Madison | 17,858 | 18,793 | 7,386 | 5,330 | | Mid-CT |
| 38 Manchester | 54,740 | 55,857 | 24,256 | 11,293 | CRCOG | Mid-CT |
| 39 Marlborough | 5,709 | 6,351 | 2,057 | 1,620 | CRCOG | Mid-CT |
| 40 Middlebury | 6,451 | 7,252 | 2,494 | 1,977 | | Mid-CT |
| 41 Middlefield | 4,203 | 4,248 | 1,740 | 1,292 | | Mid-CT |

Exhibit 1 CRCOG and Mid-Connecticut Demographics

Demographics

| Town/City | 2000 Population | 2007 Population | 2000 Total HHs | 2000 Single Family | CRCOG | Mid-CT Project |
|-------------------|--------------------|--------------------|-------------------|--------------------------|-----------|-------------------|
| 42 Naugatuck | 30,989 | 31,931 | 12,341 | 6,436 | | Mid-CT |
| 43 New Hartford | 6,088 | 6,736 | 2,368 | 1,637 | | Mid-CT |
| 44 Newington | 29,306 | 29,619 | 12,264 | 8,609 | CRCOG | Mid-CT |
| 45 Norfolk | 1,660 | 1,652 | 871 | 344 | | Mid-CT |
| 46 North Branford | 13,906 | 14,406 | 5,246 | 3,845 | | Mid-CT |
| 47 North Canaan | 3,350 | 3,352 | 1,444 | 725 | | Mid-CT |
| 48 Old Lyme | 7,406 | 7,384 | 4,570 | 2,299 | | Mid-CT |
| 49 Old Saybrook | 10,367 | 10,539 | 5,357 | 3,272 | | Mid-CT |
| 50 Oxford | 9,821 | 12,527 | 3,420 | 2,807 | | Mid-CT |
| 51 Portland | 8,732 | 9,537 | 3,528 | 2,416 | | Mid-CT |
| 52 Rocky Hill | 17,966 | 18,808 | 7,962 | 4,110 | CRCOG | Mid-CT |
| 53 Roxbury | 2,136 | 2,319 | 1,018 | 559 | | Mid-CT |
| 54 Salisbury | 3,977 | 3,987 | 2,410 | 966 | | Mid-CT |
| 55 Sharon | 2,968 | 3,022 | 1,617 | 660 | | Mid-CT |
| 56 Simsbury | 23,234 | 23,659 | 8,739 | 6,722 | CRCOG | Mid-CT |
| 57 Somers | | 10,417 | 3,012 | | CRCOG | |
| 58 South Windsor | 24,412 | 25,940 | 9,071 | 7,042 | CRCOG | Mid-CT |
| 59 Southbury | 18,567 | 19,678 | 7,799 | 5,129 | | Mid-CT |
| 60 Suffield | 13,552 | 15,104 | 4,853 | 3,332 | CRCOG | Mid-CT |
| 61 Thomaston | 7,503 | 7,818 | 3,014 | 1,840 | | Mid-CT |
| 62 Tolland | 13,146 | 14,631 | 4,665 | 3,931 | CRCOG | Mid-CT |
| 63 Torrington | 35,202 | 35,451 | 16,147 | 7,603 | | Mid-CT |
| 64 Vernon | 28,063 | 29,620 | 12,867 | 5,789 | CRCOG | Mid-CT |
| 65 Waterbury | 107,271 | 107,174 | 46,827 | 15,412 | | Mid-CT |
| 66 Watertown | 21,661 | 22,128 | 8,298 | 5,624 | | Mid-CT |
| 67 West Hartford | 63,589 | 60,486 | 25,332 | 15,979 | CRCOG | Mid-CT |
| 68 Westbrook | 6,292 | 6,618 | 3,460 | 1,563 | | Mid-CT |
| 69 Wethersfield | 26,271 | 25,781 | 11,454 | 8,052 | CRCOG | Mid-CT |
| 70 Winchester | 10,664 | 10,748 | 4,922 | 2,125 | | Mid-CT |
| 71 Windsor Locks | 12,043 | 12,491 | 5,101 | 3,379 | CRCOG | Mid-CT |
| 72 Woodbury | 9,198 | 9,654 | 3,869 | 2,334 | | Mid-CT |
| 73 Columbia | | 4,971 | 1,988 | | | |
| 74 Windsor | | 28,237 | 10,900 | | CRCOG | |
| Total | 1,108,772 | 1,184,690 | 479,228 | 269,096 | 29 | 70 |

[1] Data collected from Municipal Surveys

| | CRCOG | Mid-CT |
|------------|---------|-----------|
| Population | 658,442 | 1,138,029 |

Exhibit 2 Waste Quantities Delivered to CRRA [1]

| Town/City | CRCOG | Mid-CT Project | Refuse Tonnage | | | | Recycling Tonnage | | | |
|-------------------|-------|----------------|--------------------|--------|-------------|-------------|-------------------|-------------|-------------|-------------|
| | | | Minimum Commitment | Cap | FY06 Actual | FY07 Actual | FY08 Actual | FY06 Actual | FY07 Actual | FY08 Actual |
| 1 Andover | CRCOG | | | | | | | | | |
| 2 Avon | CRCOG | Mid-CT | 9,000 | 11,000 | 11,153 | 11,370 | 12,041 | 1,949 | 1,860 | 1,762 |
| 3 Barkhamsted | | Mid-CT | 11,180 | | 15,087 | 14,290 | 13,819 | 1,452 | 1,713 | 1,883 |
| 4 Beacon Falls | | Mid-CT | 2,550 | | 2,866 | 2,141 | 2,627 | 286 | 294 | 306 |
| 5 Bethlehem | | Mid-CT | 1,248 | | 2,047 | 1,946 | 1,863 | 310 | 261 | 353 |
| 6 Bloomfield | CRCOG | Mid-CT | 4,200 | 5,250 | 14,398 | 13,629 | 9,526 | 1,474 | 1,526 | 1,503 |
| 7 Bolton | CRCOG | Mid-CT | 1,500 | 1,830 | 2,704 | 2,274 | 2,101 | 569 | 649 | 534 |
| 8 Canaan | | Mid-CT | 300 | 375 | 662 | 664 | 808 | 0 | 0 | 0 |
| 9 Canton | CRCOG | Mid-CT | 5,400 | | 5,865 | 5,720 | 5,770 | 1,145 | 1,066 | 1,033 |
| 10 Chester | | Mid-CT | 2,000 | | 1,723 | 1,598 | 1,725 | 299 | 357 | 337 |
| 11 Clinton | | Mid-CT | 7,500 | | 9,890 | 9,826 | 9,691 | 1,079 | 748 | 734 |
| 12 Colebrook | | Mid-CT | 769 | | 864 | 800 | 766 | 135 | 144 | 164 |
| 13 Cornwall | | Mid-CT | 640 | 820 | 631 | 548 | 635 | 218 | 208 | 175 |
| 14 Coventry | | Mid-CT | 1,750 | 2,135 | 4,061 | 4,035 | 3,942 | 1,390 | 1,395 | 1,373 |
| 15 Cromwell | | Mid-CT | 6,750 | 9,000 | 12,275 | 13,531 | 10,805 | 1,026 | 855 | 697 |
| 16 Deep River | | Mid-CT | 2,400 | | 3,339 | 3,284 | 3,008 | 417 | 324 | 327 |
| 17 Durham | | Mid-CT | 4,000 | 7,200 | 6,721 | 5,721 | 6,208 | 0 | 3 | 0 |
| 18 East Granby | CRCOG | Mid-CT | 2,800 | | 3,204 | 4,170 | 4,127 | 429 | 378 | 528 |
| 19 East Hampton | | Mid-CT | 4,800 | | 6,470 | 5,285 | 5,676 | 666 | 724 | 831 |
| 20 East Hartford | CRCOG | Mid-CT | 35,000 | | 38,359 | 33,041 | 31,739 | 2,344 | 2,151 | 2,150 |
| 21 East Windsor | CRCOG | Mid-CT | 1,900 | 2,600 | 5,489 | 6,531 | 5,113 | 795 | 773 | 775 |
| 22 Ellington | CRCOG | Mid-CT | 5,834 | | 7,973 | 7,490 | 6,552 | 1,199 | 1,115 | 1,210 |
| 23 Enfield | CRCOG | Mid-CT | 26,500 | | 32,356 | 32,444 | 26,899 | 2,974 | 2,783 | 2,801 |
| 24 Essex | | Mid-CT | 3,100 | | 4,829 | 4,450 | 3,888 | 532 | 602 | 635 |
| 25 Farmington | CRCOG | Mid-CT | 9,000 | | 19,179 | 19,445 | 18,406 | 2,041 | 1,957 | 2,025 |
| 26 Glastonbury | CRCOG | Mid-CT | 9,000 | | 20,990 | 21,408 | 21,062 | 3,629 | 3,387 | 3,300 |
| 27 Goshen | | Mid-CT | 900 | | 1,688 | 1,570 | 1,418 | 295 | 287 | 296 |
| 28 Granby | CRCOG | Mid-CT | 4,000 | | 5,906 | 5,757 | 5,455 | 1,020 | 991 | 1,153 |
| 29 Guilford | | Mid-CT | | | 13,690 | 11,942 | 12,305 | 1,041 | 875 | 1,304 |
| 30 Haddam | | Mid-CT | 3,000 | 4,000 | 3,462 | 3,359 | 3,611 | 474 | 490 | 497 |
| 31 Hartford | CRCOG | Mid-CT | 55,000 | | 113,042 | 111,067 | 104,636 | 2,257 | 2,357 | 2,481 |
| 32 Harwinton | | Mid-CT | 2,500 | | 2,695 | 2,521 | 2,355 | 407 | 418 | 460 |
| 33 Hebron | CRCOG | Mid-CT | 2,500 | 0 | 3,727 | 4,123 | 3,898 | 633 | 729 | 928 |
| 34 Killingworth | | Mid-CT | 2,000 | | 2,799 | 2,710 | 2,767 | 534 | 607 | 671 |
| 35 Litchfield | | Mid-CT | 3,744 | | 5,953 | 5,647 | 5,569 | 610 | 651 | 670 |
| 36 Lyme | | Mid-CT | 950 | | 954 | 997 | 940 | 0 | 0 | 0 |
| 37 Madison | | Mid-CT | | | 10,717 | 11,080 | 10,463 | 1,701 | 1,666 | 1,706 |
| 38 Manchester | CRCOG | Mid-CT | 15,500 | 35,000 | 39,323 | 40,792 | 37,101 | 3,668 | 3,802 | 3,757 |
| 39 Marlborough | CRCOG | Mid-CT | 800 | 2,600 | 4,361 | 4,146 | 3,355 | 452 | 454 | 473 |
| 40 Middlebury | | Mid-CT | 3,500 | | 3,809 | 3,609 | 3,411 | 744 | 818 | 859 |
| 41 Middlefield | | Mid-CT | 4,000 | 7,200 | 6,721 | 5,721 | 6,208 | 0 | 3 | 0 |
| 42 Naugatuck | | Mid-CT | 10,000 | | 19,177 | 19,780 | 18,021 | 1,504 | 1,493 | 1,549 |
| 43 New Hartford | | Mid-CT | 11,180 | | 15,087 | 14,290 | 13,819 | 1,452 | 1,713 | 1,883 |
| 44 Newington | CRCOG | Mid-CT | 20,000 | | 28,814 | 26,633 | 24,895 | 2,332 | 2,330 | 2,119 |
| 45 Norfolk | | Mid-CT | 850 | 1,098 | 995 | 965 | 985 | 184 | 192 | 178 |
| 46 North Branford | | Mid-CT | 7,000 | | 8,214 | 8,010 | 7,373 | 932 | 971 | 879 |
| 47 North Canaan | | Mid-CT | 1,400 | 4,000 | 3,126 | 3,064 | 3,095 | 282 | 249 | 231 |
| 48 Old Lyme | | Mid-CT | 3,700 | | 5,031 | 4,801 | 4,462 | 0 | 0 | 0 |
| 49 Old Saybrook | | Mid-CT | 8,000 | | 18,110 | 17,292 | 14,601 | 1,083 | 1,169 | 1,329 |
| 50 Oxford | | Mid-CT | 4,100 | | 4,981 | 4,792 | 4,365 | 591 | 625 | 658 |
| 51 Portland | | Mid-CT | 0 | 0 | 3,974 | 4,715 | 4,412 | 0 | 114 | 353 |

Exhibit 2 Waste Quantities Delivered to CRRA [1]

| Town/City | CROG | Mid-CT Project | Refuse Tonnage | | | | Recycling Tonnage | | | |
|------------------------|-----------|----------------|--------------------|----------------|----------------|----------------|-------------------|---------------|---------------|---------------|
| | | | Minimum Commitment | Cap | FY06 Actual | FY07 Actual | FY08 Actual | FY06 Actual | FY07 Actual | FY08 Actual |
| 52 Rocky Hill | CROG | Mid-CT | 10,000 | | 14,144 | 14,088 | 13,194 | 1,332 | 1,442 | 1,485 |
| 53 Roxbury | | Mid-CT | 540 | 900 | 1,038 | 988 | 918 | 229 | 217 | 232 |
| 54 Salisbury/Sharon | | Mid-CT | 3,280 | 4,100 | 4,520 | 4,285 | 3,970 | 400 | 1,167 | 1,120 |
| 55 Sharon | | Mid-CT | | | | | | | | |
| 56 Simsbury | CROG | Mid-CT | 11,250 | | 17,175 | 16,547 | 16,433 | 2,689 | 2,834 | 2,929 |
| 57 Somers | CROG | | | | | | | | | |
| 58 South Windsor | CROG | Mid-CT | 10,950 | | 21,788 | 19,232 | 16,646 | 2,846 | 2,632 | 2,502 |
| 59 Southbury | | Mid-CT | 8,000 | | 10,727 | 10,145 | 9,512 | 1,594 | 1,749 | 1,787 |
| 60 Suffield | CROG | Mid-CT | 2,400 | 2,929 | 6,829 | 6,677 | 6,020 | 1,279 | 1,149 | 1,228 |
| 61 Thomaston | | Mid-CT | 3,120 | | 5,140 | 5,024 | 4,961 | 440 | 430 | 432 |
| 62 Tolland | CROG | Mid-CT | 3,600 | 4,392 | 7,485 | 6,943 | 6,710 | 0 | 0 | 0 |
| 63 Torrington | | Mid-CT | 23,000 | | 32,181 | 30,256 | 29,735 | 2,018 | 1,937 | 2,019 |
| 64 Vernon | CROG | Mid-CT | 14,500 | | 19,912 | 18,472 | 15,796 | 2,247 | 2,156 | 2,042 |
| 65 Waterbury | | Mid-CT | 24,000 | 42,000 | 81,958 | 79,479 | 79,157 | 3,452 | 3,245 | 3,214 |
| 66 Watertown | | Mid-CT | 15,000 | | 15,614 | 14,746 | 15,262 | 1,304 | 1,366 | 1,414 |
| 67 West Hartford | CROG | Mid-CT | 33,000 | | 48,188 | 42,885 | 40,033 | 6,126 | 6,207 | 6,607 |
| 68 Westbrook | | Mid-CT | 3,100 | | 4,934 | 5,584 | 5,096 | 394 | 277 | 292 |
| 69 Wethersfield | CROG | Mid-CT | 20,000 | | 17,309 | 16,797 | 17,349 | 2,459 | 2,279 | 2,315 |
| 70 Winchester | | Mid-CT | 11,180 | | 15,087 | 14,290 | 13,819 | 1,452 | 1,713 | 1,883 |
| 71 Windsor Locks | CROG | Mid-CT | 5,500 | 5,500 | 7,213 | 7,454 | 7,021 | 1,017 | 949 | 1,006 |
| 72 Woodbury | | Mid-CT | 4,400 | | 6,205 | 6,068 | 5,803 | 664 | 654 | 820 |
| 73 Columbia | | | | | | | | | | |
| 74 Windsor | CROG | | | | | | | | | |
| Total Collected | 29 | 70 | 530,565 | 153,929 | 896,938 | 864,984 | 815,752 | 80,496 | 80,680 | 83,197 |

[1] Data from the 2008 Participating Municipality Reports on the CRRA Website

Exhibit 3 Type of Municipal Residential Collection Program Based on Surveys

| Town/City | Residential Collection Type | | | |
|------------------|-----------------------------|----------------------|-----------------------|------------------------|
| | Refuse Collection | Recycling Collection | Yard Waste Collection | Bulky Waste Collection |
| 1 Andover | | | | |
| 2 Avon | Subscription | Subscription | Drop-off | Drop-off |
| 3 Barkhamsted | Subscription | Contract | | |
| 4 Beacon Falls | Contract | Contract | | Drop-off |
| 5 Bethlehem | Drop-off | Drop-off | | Drop-off |
| 6 Bloomfield | | | | |
| 7 Bolton | Contract | Contract | Drop-off | Contract/Drop-off |
| 8 Canaan | Subscription | Subscription | Subscription | Subscription |
| 9 Canton | Subscription | Subscription | Subscription | Subscription |
| 10 Chester | Subscription | Subscription | | |
| 11 Clinton | Subscription | Subscription | Drop-off | Drop-off |
| 12 Colebrook | Contract | Contract | | Contract |
| 13 Cornwall | Drop-off | Drop-off | | Drop-off |
| 14 Coventry | Contract | Contract | | Contract |
| 15 Cromwell | | | | |
| 16 Deep River | | | | |
| 17 Durham | Subscription | Subscription | Drop-off | Drop-off |
| 18 East Granby | Drop-off | Drop-off | Drop-off | Drop-off |
| 19 East Hampton | Subscription | Subscription | | |
| 20 East Hartford | Municipal | Contract | | Municipal |
| 21 East Windsor | Contract | Contract | Contract | Contract |
| 22 Ellington | Municipal | Municipal | | |
| 23 Enfield | Municipal | Municipal | Municipal | Municipal |
| 24 Essex | | | | |
| 25 Farmington | Contract | Contract | | Contract |
| 26 Glastonbury | Subscription | Subscription | Drop-off | Subscription |
| 27 Goshen | | | | |
| 28 Granby | Contract | Contract | Drop-off | Subscription |
| 29 Guilford | Subscription | Subscription | | |
| 30 Haddam | | | | |
| 31 Hartford | Municipal | Municipal | Municipal | Municipal |
| 32 Harwinton | Subscription | Subscription | | |
| 33 Hebron | Subscription | Subscription | Subscription | Subscription |
| 34 Killingworth | Subscription | Subscription | | |
| 35 Litchfield | Subscription | Subscription | Drop-off | Drop-off |
| 36 Lyme | | | | |
| 37 Madison | Subscription | Subscription | Drop-off | Drop-off |
| 38 Manchester | Contract | Contract | Contract | Contract |
| 39 Marlborough | Drop-off | Drop-off | | Drop-off |
| 40 Middlebury | Drop-off | Drop-off | Drop-off | Drop-off |
| 41 Middlefield | Subscription | Subscription | Drop-off | Drop-off |

Exhibit 3 Type of Municipal Residential Collection Program Based on Surveys

| Town/City | Residential Collection Type | | | |
|-------------------|-----------------------------|----------------------|-----------------------|------------------------|
| | Refuse Collection | Recycling Collection | Yard Waste Collection | Bulky Waste Collection |
| 42 Naugatuck | Municipal | Municipal | Drop-off | Drop-off |
| 43 New Hartford | Subscription | Subscription | | Drop-off |
| 44 Newington | Contract | Contract | | |
| 45 Norfolk | Subscription | Subscription | | |
| 46 North Branford | | | | |
| 47 North Canaan | | | | |
| 48 Old Lyme | Contract | Municipal | | |
| 49 Old Saybrook | | | | |
| 50 Oxford | Subscription | Subscription | | |
| 51 Portland | Subscription | Subscription | Subscription | Subscription |
| 52 Rocky Hill | Contract | Contract | | |
| 53 Roxbury | Subscription | Drop-off | | |
| 54 Salisbury | Subscription | Subscription | Drop-off | Drop-off |
| 55 Sharon | Subscription | Subscription | Drop-off | Drop-off |
| 56 Simsbury | Subscription | Subscription | Drop-off | Drop-off |
| 57 Somers | Subscription | Subscription | Drop-off | Drop-off |
| 58 South Windsor | Contract | Contract | Municipal | Contract |
| 59 Southbury | Subscription | Subscription | Drop-off | Drop-off |
| 60 Suffield | | | | |
| 61 Thomaston | Contract | Contract | | |
| 62 Tolland | Contract | Contract | | Contract |
| 63 Torrington | Contract | Contract | | |
| 64 Vernon | Municipal | Municipal | Drop-off | Municipal |
| 65 Waterbury | Municipal | Municipal | | |
| 66 Watertown | Subscription | Subscription | Subscription | Subscription |
| 67 West Hartford | Contract | Contract | Municipal | Contract |
| 68 Westbrook | Subscription | Subscription | Drop-off | Drop-off |
| 69 Wethersfield | Contract | Contract | Drop-off | Subscription |
| 70 Winchester | | | | |
| 71 Windsor Locks | Contract | Contract | Contract | Contract |
| 72 Woodbury | Subscription | Subscription | Drop-off | Drop-off |
| 73 Columbia | Drop-off | Drop-off | Drop-off | Drop-off |
| 74 Windsor | Subscription | Contract | Contract | Subscription |

[1] Data collected from Municipal Surveys

Exhibit 4 Type of Municipal Residential Collection Technology [1]

| Town/City | Residential Collection Technology | | | |
|------------------|-----------------------------------|-----------------------|-----------------------|------------------------|
| | Refuse Collection | Recycling Collection | Yard Waste Collection | Bulky Waste Collection |
| 1 Andover | | | | |
| 2 Avon | | | | |
| 3 Barkhamsted | Automated | Manual | | |
| 4 Beacon Falls | Manual | Manual | | |
| 5 Bethlehem | | | | |
| 6 Bloomfield | | | | |
| 7 Bolton | Manual | Manual | | |
| 8 Canaan | | | | |
| 9 Canton | Automated | Semi-auto | | |
| 10 Chester | Automated/Semi-automated | Manual | | |
| 11 Clinton | Automated | Automated | | Manual |
| 12 Colebrook | Automated | | | |
| 13 Cornwall | | | | |
| 14 Coventry | Manual | Manual | | Manual |
| 15 Cromwell | | | | |
| 16 Deep River | | | | |
| 17 Durham | | | | |
| 18 East Granby | | | | |
| 19 East Hampton | Automated | Manual | | |
| 20 East Hartford | Automated | Manual | | Bulk |
| 21 East Windsor | Manual | Manual | Manual | Manual |
| 22 Ellington | | Manual | | |
| 23 Enfield | Semi-automated | Manual | Semi-auto | Bulk |
| 24 Essex | | | | |
| 25 Farmington | Automated | Manual | | Manual |
| 26 Glastonbury | Automated | Manual | | |
| 27 Goshen | | | | |
| 28 Granby | Automated | Manual | | Manual |
| 29 Guilford | | | | |
| 30 Haddam | | | | |
| 31 Hartford | Automated/Semi-automated | Manual/Semi-automated | Manual | Bulk |
| 32 Harwinton | Manual/Semi-automated | Manual | | |
| 33 Hebron | Automated | Manual | | |
| 34 Killingworth | | | | |
| 35 Litchfield | | | | |
| 36 Lyme | | | | |
| 37 Madison | | | | |
| 38 Manchester | Automated | Manual | Manual | Manual |

Exhibit 4 Type of Municipal Residential Collection Technology [1]

| Town/City | Residential Collection Technology | | | |
|-------------------|-----------------------------------|----------------------|-----------------------|------------------------|
| | Refuse Collection | Recycling Collection | Yard Waste Collection | Bulky Waste Collection |
| 39 Marlborough | | | | |
| 40 Middlebury | | | | |
| 41 Middlefield | | | | |
| 42 Naugatuck | Manual | Manual | | |
| 43 New Hartford | | | | |
| 44 Newington | Automated | Manual | | |
| 45 Norfolk | | | | |
| 46 North Branford | | | | |
| 47 North Canaan | | | | |
| 48 Old Lyme | Automated | Manual | | |
| 49 Old Saybrook | | | | |
| 50 Oxford | | | | |
| 51 Portland | | | | |
| 52 Rocky Hill | | Manual | | |
| 53 Roxbury | Manual | | | |
| 54 Salisbury | | | | |
| 55 Sharon | | | | |
| 56 Simsbury | | | | |
| 57 Somers | Automated | Automated | | |
| 58 South Windsor | Automated | Manual | Manual | Manual |
| 59 Southbury | | | | |
| 60 Suffield | | | | |
| 61 Thomaston | Manual | Manual | | |
| 62 Tolland | Automated | Manual | | Manual |
| 63 Torrington | Automated/Semi-automated | Manual | | |
| 64 Vernon | Manual | Manual | | Manual |
| 65 Waterbury | Automated/Semi-automated | Manual | | |
| 66 Watertown | | | | |
| 67 West Hartford | Automated | Manual | Manual | Manual |
| 68 Westbrook | Automated/Semi-automated | Manual | Manual | Manual |
| 69 Wethersfield | Automated | Semi-auto | | Bulk |
| 70 Winchester | | | | |
| 71 Windsor Locks | Automated | Manual | Manual | Manual |
| 72 Woodbury | | Manual | | |
| 73 Columbia | | | | |
| 74 Windsor | | Manual | Manual | |

[1] Data collected from Municipal Surveys

Exhibit 5 Type of Municipal Residential Collection Frequency [1]

| Town/City | Residential Collection Service Frequency | | | |
|------------------|--|----------------------|-----------------------|------------------------|
| | Refuse Collection | Recycling Collection | Yard Waste Collection | Bulky Waste Collection |
| 1 Andover | | | | |
| 2 Avon | | | | |
| 3 Barkhamsted | | | | |
| 4 Beacon Falls | 1x/wk | 1x/wk | | Other |
| 5 Bethlehem | | | | |
| 6 Bloomfield | | | | |
| 7 Bolton | 1x/wk | 1x/wk | | |
| 8 Canaan | | | | |
| 9 Canton | | | | |
| 10 Chester | | | | |
| 11 Clinton | | | | |
| 12 Colebrook | 1x/wk | 1x/wk | | 1x/wk |
| 13 Cornwall | | | | |
| 14 Coventry | 1x/wk | 1x/wk | | |
| 15 Cromwell | | | | |
| 16 Deep River | | | | |
| 17 Durham | | | | |
| 18 East Granby | | | | |
| 19 East Hampton | | | | |
| 20 East Hartford | 1x/wk | 1x/wk | | On-call |
| 21 East Windsor | 1x/wk | 1x/wk | Other | 1x/wk |
| 22 Ellington | | | | |
| 23 Enfield | 1x/wk | 1x/wk | 1x/wk | On-call |
| 24 Essex | | | | |
| 25 Farmington | 1x/wk | 1x/wk | | |
| 26 Glastonbury | 1x/wk | 1x/wk | | On-call |
| 27 Goshen | | | | |
| 28 Granby | 1x/wk | 1x/wk | | On-call |
| 29 Guilford | | | | |
| 30 Haddam | | | | |
| 31 Hartford | 1x/wk | 1x/wk | 1x/wk | 1x/wk |
| 32 Harwinton | | | | |
| 33 Hebron | | | | |
| 34 Killingworth | | | | |
| 35 Litchfield | | | | |
| 36 Lyme | | | | |
| 37 Madison | | | | |
| 38 Manchester | 1x/wk | 1x/wk | 1x/wk | 1x/wk |
| 39 Marlborough | | | | |
| 40 Middlebury | | | | |
| 41 Middlefield | | | | |
| 42 Naugatuck | 1x/wk | EOW | | |

Exhibit 5 Type of Municipal Residential Collection Frequency [1]

| Town/City | Residential Collection Service Frequency 2x/wk - 1x/wk - EOW - Other - On-call | | | |
|-------------------|---|----------------------|-----------------------|------------------------|
| | Refuse Collection | Recycling Collection | Yard Waste Collection | Bulky Waste Collection |
| 43 New Hartford | | | | |
| 44 Newington | | | | |
| 45 Norfolk | | | | |
| 46 North Branford | | | | |
| 47 North Canaan | | | | |
| 48 Old Lyme | | | | |
| 49 Old Saybrook | | | | |
| 50 Oxford | | | | |
| 51 Portland | | | | |
| 52 Rocky Hill | | | | |
| 53 Roxbury | | | | |
| 54 Salisbury | | | | |
| 55 Sharon | | | | |
| 56 Simsbury | | | | |
| 57 Somers | | | | |
| 58 South Windsor | 1x/wk | 1x/wk | Other | 1x/wk |
| 59 Southbury | | | | |
| 60 Suffield | | | | |
| 61 Thomaston | | | | |
| 62 Tolland | 1x/wk | 1x/wk | | Oncall |
| 63 Torrington | | | | |
| 64 Vernon | 1x/wk | 1x/wk | | On-call |
| 65 Waterbury | | | | |
| 66 Watertown | | | | |
| 67 West Hartford | 1x/wk | 1x/wk | Other | 1x/wk |
| 68 Westbrook | 1x/wk | EOW | | |
| 69 Wethersfield | 1x/wk | 1x/wk | | On-call |
| 70 Winchester | | | | |
| 71 Windsor Locks | 1x/wk | 1x/wk | 1x/wk | 1x/wk |
| 72 Woodbury | | | | |
| 73 Columbia | | | | |
| 74 Windsor | | 1x/wk | Other | |

[1] Data collected from Municipal Surveys

Exhibit 6 Type of Municipal Residential Special Waste Collection Programs [1]

| Town/City | House Hold Hazardous Waste | | Electronic Waste | |
|------------------|----------------------------|---|------------------|--|
| | Yes/No | Explanation | Yes/No | Explanation |
| 1 Andover | | | | |
| 2 Avon | Yes | Participates with MDC, Hartford, CT | No | |
| 3 Barkhamsted | | | | |
| 4 Beacon Falls | No | Part of CNVCOG's Hazardous collection plan | No | Part of CNVCOG's Plan |
| 5 Bethlehem | Yes | As a member of CNVCPG | Y | As a member of CNVCOG |
| 6 Bloomfield | | | | |
| 7 Bolton | Yes | Mid NEROC Member | Yes | Done 1 time per year |
| 8 Canaan | Yes | | Yes | At transfer station |
| 9 Canton | Yes | MDC Program 19 days available | Yes | MDC Program |
| 10 Chester | | | | |
| 11 Clinton | Yes | Once per year | No | |
| 12 Colebrook | Yes | Twice per year | Yes | Tiwce per year |
| 13 Cornwall | Yes | LHCEO regional rprogram | Yes | LHECO regional program & at transfer station |
| 14 Coventry | Yes | Drop off at regional facility twice a month April-Nov | Y | Drop off at Twon Facility samll fee - available weekly most of the year. |
| 15 Cromwell | | | | |
| 16 Deep River | | | | |
| 17 Durham | No | | No | |
| 18 East Granby | Yes | Once annually in conjunction with Windsor Locks and | | |
| 19 East Hampton | | | | |
| 20 East Hartford | Yes | Once yearly with MDC | No | Modificaton with State to approve at Transfer station |
| 21 East Windsor | Yes | Contracted through MDC | No | |
| 22 Ellington | | | | |
| 23 Enfield | Yes | Pratnered with MDC | Yes | Partnered with CRRA |
| 24 Essex | | | | |
| 25 Farmington | Yes | In conjunction with MDC | Yes | Through CRRA |
| 26 Glastonbury | Yes | 10x/Year | Yes | Drop-off at Town transfer station for fee. |
| 27 Goshen | | | | |
| 28 Granby | Yes | CRRA Collection day | Yes | Reident Drop-off at transfer station |
| 29 Guilford | | | | |
| 30 Haddam | | | | |
| 31 Hartford | Yes | Twice a year drop-off site | Yes | Twice a year drop-off site |
| 32 Harwinton | | | | |
| 33 Hebron | Yes | Quarterly | Yes | Semi-annually |

Exhibit 6 Type of Municipal Residential Special Waste Collection Programs [1]

| Town/City | House Hold Hazardous Waste | | Electronic Waste | |
|-------------------|----------------------------|---|------------------|---|
| | Yes/No | Explanation | Yes/No | Explanation |
| 34 Killingworth | | | | |
| 35 Litchfield | Yes | Regional veent twice per year | Yes | Regional event twice per year |
| 36 Lyme | | | | |
| 37 Madison | Yes | Regional Drop-off center open summer only | Yes | Occosonally run drop-off by CRRA |
| 38 Manchester | Yes | Drop-off at Regional Facility 10 times per year | No | |
| 39 Marlborough | Yes | CREOC Regional participation | No | |
| 40 Middlebury | Yes | Administered through COGCNV | Yes | Collection point at transfer station |
| 41 Middlefield | No | | No | |
| 42 Naugatuck | Yes | Regional 10 town one day collections three times a year. | Yes | Only 2 events with HHW towns one day drop-off events. Rest of the time we promote CRRA's. |
| 43 New Hartford | Yes | Twice annually at trasfer station | Yes | Available at trasfer staation |
| 44 Newington | | | | |
| 45 Norfolk | | | | |
| 46 North Branford | | | | |
| 47 North Canaan | | | | |
| 48 Old Lyme | | | | |
| 49 Old Saybrook | | | | |
| 50 Oxford | | | | |
| 51 Portland | Yes | Regional through MDC | No | |
| 52 Rocky Hill | | | | |
| 53 Roxbury | | | | |
| 54 Salisbury | Yes | Tiwcce a year as prrt of Litchfield Hill/NWOCOG (Srping-Falls Viliage, Fall -Torrington | Yes | Year round drop off at the transfer station |
| 55 Sharon | Yes | Tiwcce a year as prrt of Litchfield Hill/NWOCOG (Srping-Falls Viliage, Fall -Torrington | Yes | Year round drop off at the transfer station |
| 56 Simsbury | Yes | 1x/Yr in twon and other sites by MDC | Yes | In area towns by CRRA |
| 57 Somers | Yes | Participate with regional collection | Yes | At transfer station |
| 58 South Windsor | Yes | MDC Regional Program | No | |

Exhibit 6 Type of Municipal Residential Special Waste Collection Programs [1]

| Town/City | House Hold Hazardous Waste | | Electronic Waste | |
|------------------|----------------------------|--|------------------|--|
| | Yes/No | Explanation | Yes/No | Explanation |
| 59 Southbury | Yes | Regional 3 to 4 times a year at rotating sites | Yes | Just did first drop-off collection in co-operation with CRRA |
| 60 Suffield | | | | |
| 61 Thomaston | | | | |
| 62 Tolland | No | | No | |
| 63 Torrington | | | | |
| 64 Vernon | Yes | Vernon is a member of CRRA and CROG. Drop-off in Manchester CT. | Yes | Drop-off at Vernon Transfer Station |
| 65 Waterbury | | | | |
| 66 Watertown | Yes | Three times a year through CRCOG | Yes | Residents drop-off at recycling center for a fee or participate in one of the CRRA collections |
| 67 West Hartford | Yes | Annual MDC sponsored | Yes | 3 one day drop-off collections |
| 68 Westbrook | Yes | CREPA Sybrook | Yes | CREPA Saybrook |
| 69 Wethersfield | Yes | Town participates with MDC | No | |
| 70 Winchester | | | | |
| 71 Windsor Locks | Yes | MDC oversees program. Town hosts one event per year - residents can use other MDC collections. | | |
| 72 Woodbury | Yes | Three times annually through COS | Yes | Annually through CRRA |
| 73 Columbia | No | | No | |
| 74 Windsor | Yes | Through regional water-sewer district | Yes | Drop-off center at twon's landfill |

[1] Data collected from Municipal Surveys