Proposed City of Northampton Scope of Work

HDR Engineering, Inc. (HDR) shall perform the following activities in support of the preparation of a solid waste management alternatives study entitled "Examining Solid Waste Management Alternatives in the City of Northampton."[1] This report will be referred to as the Study Report.

HDR will be responsible for incorporating portions of the work prepared by Stantec Consulting Services, Inc (Stantec) and the City of Northampton (City). The preliminary outline of the Study Report and who is primarily responsible for preparing each section is provide below.

Examining Solid Waste Management Alternatives in the City of Northampton

No.	Section	Primary Responsibility
I	Summary	HDR
II	Description of the Enterprise Fund and the Current Solid Waste Management System	City
III	Description of the Wasteshed – Use of the Landfill	Stantec/HDR
IV	Waste Quantity and Characterization	HDR
V	Waste Collection	HDR
VI	Recycling and Zero Waste	HDR
VII	Innovative and Emerging Technologies	HDR
VIII	Disposal Alternatives/Landfill Operations Capacity Sensitivity	Stantec
IX	Project Financing Issues	HDR
X	Economic Assessment of Options	HDR/Stantec

[1] This is a working title.

The following tasks relate to HDR's scope of work for this effort.

Task 1: Description of the Wasteshed and Waste Quantity and Characterization

HDR shall provide an assessment of the quantity and characterization of the target waste stream and a description of the wasteshed that is served by the Glendale Road landfill.

This task is intended to provide the City with a better understanding of the quantity and composition of the waste stream to permit the City to appropriately examine potential collection and processing options. HDR will assist Stantec and the City estimate the tonnage generated in neighboring communities and the amount delivered to the Glendale landfill. Tonnage generation will be based on reports submitted by each community to and reported by the Massachusetts Department of Environmental Protection (DEP). HDR will attempt to determine the portion of the "commercial waste" delivered to the Glendale landfill from the neighboring communities through a telephone survey of the waste haulers.

The waste composition evaluation will be conducted in two phases as follows:

The Phase 1 activity will involve examining available waste characterization data from studies done elsewhere by EPA, HDR, DEP, the California Integrated Solid Waste Management Board and other communities such as Palo Alto that have done extensive waste characterization studies. The intent will be to identify any available data from comparable locations that can be used to assist the City in confirming the specific nature of the City's waste being managed. Part of this effort will include an assessment of the applicability of this data to the City's waste stream. When reviewing other waste composition studies, HDR will consider the affects on the composition of the post consumer waste stream that may, for example, result from bottle bills, the length of the growing season and types of yard waste generated, and demographics of the community.

Although a review of the waste composition studies conducted in other locations will provide general information on what is "typically" in the post consumer waste stream, it will not necessarily be representative of the waste stream in Northampton. The objective of Phase 2 is to get a better understanding of the post consumer waste generated in Northampton. The level of specificity needed will depend on the types of programs being considered by the City. For example, more detail on the quantity of organics in the waste stream will be required for an organics composting program than will be needed if the waste is landfilled or combusted.

Phase 2 will attempt to substantiate the results of the Phase 1 effort through field sampling of waste and recyclables generated in Northampton. If, as a result of the Phase 1 effort, it is determined that additional City specific waste composition data is needed, then HDR will, working with the City staff develop and implement a field validation study targeting the following:

Optional Field Validation Studies

A. Drop-off center field investigation

B. Curbside field investigation

C. Landfill field investigation, including source of waste delivered to the landfill.

Objective: Characterize the recyclables and organics, including yard waste and food waste, being disposed of in Northampton's waste stream by sampling portions of the residential and commercial waste being collected in Northampton. In addition, the field tests will help to verify the estimated quantity of waste and recyclables being generated by Northampton households.

Each of these field surveys is important. The easiest sort will be at the Locust Street and Glendale Road drop-off sites. Individuals that use these sites, however, may not be representative of the entire City. For example, individuals that use drop-off centers may tend to recycle more than the general population. The curbside investigation, along with the web survey described later, will likely provide a better representative sample of all household in the City. The field test at the landfill will provide information of the types of "commercial" waste being delivered to the landfill. It includes waste collected from business in Northampton and residential and business waste collected in neighboring communities.

Approach: For the curbside and landfill portions of the study, the City will need to obtain the cooperation of select haulers. HDR will work with the City to identify the suitable site for the waste characterization study to be performed. Samples will be targeted and data tracked based on specific routes within the City. HDR's statistician and other staff will work with the City to develop an analysis that sets a clear baseline for future evaluation of the waste stream.

Activities: Task activities will include:

1. Meeting with City staff and haulers to review waste collection route data.
2. Developing a list of material categories for analysis - focusing on recyclables and organics (both food and yard waste).
3. Confirming with the City the appropriate sampling and sorting area, and discuss logistics with the facility managers regarding locations, availability of equipment, ability to store sort equipment, sample disposition, and safety.
4. Developing specific sampling and sorting procedure.
5. Developing sampling and sorting documents - including training materials and reporting forms.
6. Obtain equipment and supplies required for the sort:
    - Safety equipment - first aid kit, portable emergency eyewash and protective gear for staff
    - Table rentals. Although the waste and recyclables will be collected in different locations, HDR anticipates that the physical sorting will done in a portion of the shed located at the Glendale landfill. The shed, in lieu of renting tents, provides a covered location that will protect the sorting process from wind and inclement weather that may affect the sorting area and the validity of the results. The proximity of the shed to the landfill

will facilitate the ultimate disposal of the sorted waste. If the shed is note available or a suitable option, then tent rentals, including delivery, set-up and fire department permit by rental company for enclosed space.

- Sorting baskets, rakes, shovels

7. Selecting sort days - ideally these will be consecutive days during a non-holiday week with warm, dry and low-wind weather. It is possible that sort days are non-consecutive, depending on weather.
8. Training sorters and overseeing sorting of targeted samples - it is expected that the sort will last up to four days (pre-sort preparation and post-sort analysis will require additional time).
9. Analyzing sort data to estimate the weight of each material category
10. Summarizing the waste composition data to support any recommendations for increased diversion.

Task 2: Waste Collection

HDR has already completed a preliminary analysis for: (a) the current system of private subscription service collection and the City drop-off sites at Locust Street and the Glendale Road landfill, and (b) a city wide curbside collection. A possible shortcoming of the analysis is the lack of data on the use of these two options by Northampton residents.

To improve analysis of collection options, HDR will prepare and conduct a web based survey for Northampton resident. (If preferred by the City, the survey could be conducted through a mailing to City residents rather than being web based. HDR will be willing to discuss the advantages and disadvantages of each approach. The budget, however, assumes that a web based survey is conducted.) If feasible we will use the City's web site to distribute and receive the survey. The purpose of the survey is to supplement the information used in the preliminary study and obtain additional information on the use of the drop-off sites, landfill and subscription services. Based on the survey responses HDR will calculate the number of households the use the drop-off sites, subscription services, and/or the landfill. HDR will also seek data on the type and costs of the subscription services. In addition, data will be sought to determine the incremental miles traveled by residents that use the drop-off sites and landfill. This information is required to estimate the costs incurred to drop-off MSW and recyclables. These costs are currently not included in the preliminary analysis. The results of Tasks 1 and 2 will be combined to obtain a more supportable analysis.

Task 2 most likely will not affect the decision on the expansion of the Glendale Landfill, but it could affect the decision on implementing citywide collection or the closing of either or both of the drop-off sites.

Based on the geographic and demographic makeup of the respondents, the survey will also attempt to answer the other questions such as:

- Are the users of the drop-off sites located evenly throughout the City or do they tend live closer to the sites?

- Do smaller households (e.g., two or fewer residents per household) tend to use the drop-off sites more often?
- What is the age distribution of those that use the drop-off centers?
- Do households that have subscription services also use the drop-off site? If so, why?
- How many households purchase multiple vehicle stickers?
- Are there any financial incentives for recycling included in the subscription services being used?

The information will be used to check or revise the prior analysis. HDR shall prepare a draft memo documenting these findings for review by City staff. Based on comments from City staff, we will revise the prior analysis of collection options.

[Note: A beta test of the survey is recommended, but may not meet the project schedule and budget constraints. HDR would also like to ask respondents to indicate if they would be willing to also participate in a telephone "survey" or provide us with copies of subscription service bills. A review of actual bills will be far more accurate than relying upon respondents to self-report the data. A beta test has not been included in the estimated budget.]

[Note: The web based survey can be expanded to seek additional information to support the preparation of the Study Report, such as how many households use backyard composting or have garbage disposals in their homes. A separate survey of businesses in Northampton could be developed to determine recycling and waste disposal practices and costs. A targeted survey of restaurants, grocery stores, and other businesses that generate food waste could be developed to confirm the interest in reinitiating a food waste program potentially as part of a broader organics initiative that can be included as part of a zero waste strategy. Including of businesses in the survey has not been included in the estimated budget.]

Task 3: Recycling and Zero Waste

The City already has a comprehensive and robust recycling, composting, e-waste, and other special waste programs. These programs may provide a foundation for a formal "zero waste" initiative in the City. Working closely with City staff, HDR will review and discuss the opportunities for increased diversion from each waste generator sector. HDR will discuss program improvement opportunities and options for increasing diversion and reducing the toxicity of waste in the City.

Based on our knowledge of the City's existing system and experience working with other jurisdictions striving for zero waste, HDR will compile a list of policy, program and facility initiatives that could be implemented by the City as part of a zero waste initiative. This list will be initially reviewed by City staff and then [reviewed by the stakeholders at a public forum or workshop.] Based on input from the stakeholders and City, HDR will revise and refine this list to be reflective of the specific needs and desires of the City.

Based on the waste generation and waste characterization analysis conducted in Task 1 and the City demographic data, HDR will identify the opportunities for decreasing the volume and toxicity of waste generated by: single-family, multi-family, commercial, industrial, self-haul, and City government. These will include potential modifications to the City's current "pay-as-you-throw" (PAYT) program. The PAYT alternatives discussion will be tied to the collection options analyzed in Task 1. Some of the survey results will help HDR address the extent and effectiveness of PAYT programs in Northampton at the drop off sites as well as those included in any subscription services such as per-can pricing. HDR will discuss the economic drivers used elsewhere to increase waste diversion.

Coupled with the programs already in place, HDR will prepare a draft section of the Study Report documenting "zero waste" initiatives that the City may wish to implement or promote at the state level. These may include programs for residences and businesses in Northampton. Special attention will be paid to expanding or supplementing the backyard composting and yard waste composting operations already in place in Northampton. Some of the results of the web survey will address the extent and effectiveness of these programs.

One option that will be discussed is the development of "resource recovery parks." HDR will assess the activities at the Glendale Road landfill, which could currently be classified as a resource recovery park, and make suggestions on how to enhance and expand activities in both the near and longer term to further develop the site as a resource recovery park.

Resource recovery parks can include emerging technologies to deal with portions of the waste stream. Based on the responses from the public hearing held to discuss these emerging technologies and the likely economics associated with such facilities, which tend to favor facilities larger than that supported by the City's waste alone, most of these emerging technologies at first blush do not appear feasible for application here. The only exception might be the development of an in-vessel composting system. HDR will summarize the experience with in-vessel composting in Massachusetts and elsewhere in more detail. Particular emphasis will be placed on the experience in Massachusetts. HDR will address the history of organics composting in the region and address the possibility of a phased approach to expand the City's current programs. HDR will also address the potential of using the digesters at the City's wastewater treatment plant to process and divert food waste or other organics from the landfill.

HDR will, to the extent possible, identify the planning level costs associated with each of the proposed policy, program and facility initiatives. HDR will also identify alternative funding sources used in other communities, such as producer-based fees, hauler-based fees, customer-based fees, facility-based fees and capital cost financing.

The results of this effort will summarize in a zero waste section of the Study Report. This will include a definition and objectives of zero waste programs with examples from other communities.

Task 4: Emerging and Waste Processing Technology Options

HDR will prepare brief descriptions (about 1 to 3 paragraphs each) of the various types of emerging technologies. HDR will discuss actual experience with these types of technologies based on the results of recent trips throughout the world by HDR engineers' to inspect various reference facilities. The technologies' that will be discussed are anaerobic and aerobic digestion, thermal processing (gasification, plasma arc and pyrolysis), hydrolysis and mechanical processing. The purpose of these discussions will be to provide the reader with an understanding of the current state of development of these technologies. HDR will update the state of development of each technology based on its experience in other communities and additional visits, it any, taken to study various emerging technologies. This hopefully will include the results from the innovative technology procurement in Los Angeles, CA and the demonstration project in Salinas Valley, CA. Since it is unlikely that any of the emerging technologies would be suitable for Northampton, this section of the Study Report will let the readers know that these technologies were considered.

Task 5: Project Financing Issues

HDR will include in the assessment of implementation issues: 1) waste acquisition; 2) alternative delivery systems, and 3) financing options. The only waste the City currently "controls" is the amount brought to the drop-off center. Since use of the drop off site is voluntary, the quantity of waste controlled by the City is uncertain. The City has no control over waste collected through subscription service or any of the regional waste brought to the landfill. Discounts are provided to encourage the larger private haulers to bring waste to the landfill. This means the tipping fees will need to be competitive in order to implement any emerging or processing technology.

The alternative delivery systems that will be considered will include Design/Bid/Build, Design/Build, and Design/Build/Operate along with various public and private financing options.

Task 6: Conduct Economic Assessment of Options

To assist the City in its decision concerning the landfill expansion, HDR will, at a minimum, assess budget/cost impacts of the following five waste disposal options.

- Option 1: Expand the landfill and make no changes to the collection system.
- Option 2: Close the landfill and drop-off center located adjacent to the landfill and make no other changes to the collection system.
- Option 3: Expand the landfill, add City-arranged curbside collection services for single-family homes and make no other changes to the collection system.
- Option 4: Close the landfill and the drop-off center located adjacent to the landfill, add City-arranged curbside collection services for single-family homes and make no other changes to the collection system.

- Option 5: Close the landfill and discontinue all other City solid waste services.

HDR will use the data provided in Tasks 1 through 5 to update and expand the work previously done. Based upon consultations with the City and the results of the prior tasks, HDR may expand the list of alternatives that could include options such as developing the Glendale Road drop off site into a modern resource recovery park, modifying and expanding the City's PAYT program, and expanding the organic waste composting program (including the use of the digesters at the City wastewater treatment plant).

Task 7: Participation in Meetings, Public Forums, and Workshops

HDR will assist the City prepare for and participate in meetings, public forums and workshops as requested by the City. HDR will assist in preparing PowerPoint presentation and other materials required for these meetings.

Task 8: Draft Study Report

HDR will incorporate the results of the above tasks into a Draft Study Report for review and comment by the City. HDR will incorporate the City's consolidated comments into the final Study Report. A preliminary outline of the Study Report is provided on page 1 of this scope of work.

Optional Task A. Assess Carbon Footprint of Solid Waste Management Options

If the City desires, HDR will include an assessment of the carbon footprint implications of the various alternatives being considered.

Objective: Compare the local carbon footprint for each of the solid waste management options under evaluation, based on EPA data on emission material and energy factors and other nationally recognized data sources.

Approach: Using the EPA WARM Model, and local input data on the existing solid waste system and planned program modifications; HDR will develop a comparison for the Metric tons of carbon equivalent (MTCe) for each of the solid waste management options identified by the City.

Consultant Responsibilities

Prepare a list of model input information necessary to define the energy requirements for buildings and equipment needed to define each management option, material flow assumptions resulting from implementation of each option and local energy emission factors to be used to evaluate carbon emissions based on existing infrastructure data.

Work with the project team to develop the planned management options in sufficient detail to define the equipment and building requirements that would change to accommodate the program changes including reasonable assumptions for program diversion impacts.

Provide a draft tabular summary of the comparative results for each of the management options evaluated and discussion of the findings.

Provide a PowerPoint presentation summarizing the highlights of the findings and option comparison that can be included in the presentation under this optional Task A.