

**Innovative Recycling and Waste Reduction Grant  
IG07-05**

**FINAL REPORT  
January 31, 2010**

***Participation Barriers to Commercial and Residential Recycling in an  
Urban Environment***



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**Innovative Recycling and Waste Reduction Grant 07-05**  
**Final Report**  
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**TABLE OF CONTENTS**

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<u><b>Section</b></u>	<u><b>Page</b></u>
<b>1.0 Introduction.....</b>	<b>1</b>
<b>1.1 Project Background.....</b>	<b>1</b>
<b>1.2 Project Goals &amp; Objectives.....</b>	<b>2</b>
<b>1.3 Innovative Features.....</b>	<b>2</b>
<b>1.4 Proposed Audience and Information Dissemination.....</b>	<b>3</b>
<b>2.0 Project Implementation.....</b>	<b>5</b>
<b>2.1 Initial Project Activities &amp; Timeline.....</b>	<b>5</b>
<b>2.2 Equipment and Services Procured.....</b>	<b>7</b>
<b>2.3 Problems Encountered.....</b>	<b>8</b>
<b>3.0 Project Results.....</b>	<b>9</b>
<b>3.1 Achievement of Goals and Objectives.....</b>	<b>9</b>
<b>3.2 Advanced Technology or Process Demonstration.....</b>	<b>22</b>
<b>3.3 Material Recovery.....</b>	<b>23</b>
<b>3.4 Transferability.....</b>	<b>25</b>
<b>3.5 Cost-Effectiveness and Efficiency.....</b>	<b>26</b>
<b>3.5.1 Project Expenditures.....</b>	<b>26</b>
<b>3.5.2 Avoided Disposal Fees.....</b>	<b>29</b>
<b>3.5.3 Cost/Benefit.....</b>	<b>30</b>
<b>3.5.4 Nontraditional Materials.....</b>	<b>32</b>
 <b><u>Tables</u></b>	
<b>1 - Grant Schedule/Timeline.....</b>	<b>5</b>
<b>2 - Grant Scope of Services.....</b>	<b>6</b>
<b>3 - Residential Pilot Recycling Totals.....</b>	<b>23</b>
<b>4 - Residential Pilot Results vs. Baseline Data.....</b>	<b>24</b>
<b>5 - Commercial Pilot Recycling Totals.....</b>	<b>25</b>
<b>6 - Innovative Grant Expenditures.....</b>	<b>27</b>
<b>7 - In-Kind Contributions.....</b>	<b>28</b>
<b>8 - Avoided Disposal Fees.....</b>	<b>29</b>
<b>9 - Landfill Space Conservation.....</b>	<b>30</b>
<b>10 - Residential Pilot Net Benefit and Cost Savings per Capita.....</b>	<b>31</b>
<b>11 - Commercial Pilot Net Benefit.....</b>	<b>32</b>
 <b><u>Figures</u></b>	
<b>1 - Impact of Carts on Participation.....</b>	<b>24</b>

**Appendices**

Appendix A – Baseline Data

Appendix B – Qualitative Research / Focus Groups

Appendix C – Quantitative Research / Surveys

Appendix D – Community-Based Pilot Marketing Plan

Appendix E – Procure Containers, Equipment, and Supplies

Appendix F – Pilot Program Implementation and Results

Appendix G – Pilot Program Incentives

Section 1.0  
Introduction

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**1.1 Project Background**

The profusion of cultures, languages and small businesses has helped to make the City of Tampa (City) a varied, thriving and energetic community. However, a diverse urban population also poses challenges when developing marketing strategies to effectively overcome participation barriers to commercial/institutional (C/I) and residential recycling. The languages, cultures, beliefs, and attitudes, as well as socioeconomic factors of an ethnically rich commercial and residential urban area all influence the likelihood of recycling participation. Even within these areas, there is a high level of diversity and barriers to recycling participation will differ.

The City of Tampa provides solid waste collection, disposal and recycling services for over 80,000 commercial and residential customers. The City offers businesses, which generate more than 60 percent of the overall waste stream, recycling of cardboard, office paper, aluminum, glass and plastic container recycling. The City of Tampa's residents do their part as well. The weekly curbside recycling program collects 400 tons of newspaper and 225 tons of aluminum cans, glass bottles and jars, and plastic bottles monthly. All City of Tampa residents in single family residences have curbside recycling service available to them and the average participation rate is 38 percent citywide.

Observations by recycling collection route drivers on participation, and records of tonnages, revealed that three areas of the City have consistently had significantly lower than average results. Despite the availability of the same recycling program throughout the City and the same marketing methods having been employed, more businesses and residents within three urban areas of the City have elected not to participate. In order to increase recycling, it is crucial to understand the barriers to participation and how to effectively encourage businesses and residents in these areas to adopt recycling behaviors. Please note that two of the three areas were later combined due to route sizes resulting in two target areas for the duration of the project.

In order to answer these challenges, the City of Tampa was awarded an Innovative Recycling and Waste Reduction Grant by the Florida Department of Environmental Protection (DEP) to undertake a study of participation barriers to commercial and residential recycling in an urban environment.

## 1.2 Project Goals & Objectives

Principles of marketing show that an environmental analysis and diagnosis can help us assess the barriers and benefits to recycling as perceived by residents and business that do not participate. A marketing plan must consider key factors in the external environment that are important; these include social, cultural, economic, technological, political-legal, ecological, and competitive markets. This project's goals and objectives include:

- **Track Baseline Data:** Obtain baseline data from three urban neighborhood collection routes that have consistently exhibited lower than average participation rates and yielded low recycling tonnages. Track collection tonnages for newspapers, aluminum cans, glass bottles and jars, and plastic bottles from residents and examine specific businesses for cardboard, paper and container diversion. Document actual participation rates for households. Interview collection route drivers regarding their observations.
- **Conduct Qualitative Research:** Conduct focus groups to elicit qualitative feedback regarding the perceived barriers and benefits to recycling participation and explore related solid waste and toxicity issues with area businesses and residents.
- **Perform Quantitative Research:** Incorporate focus groups results into phone survey questions for non-participating businesses and residents, including reuse, resource conservation, toxicity, Construction and Demolition (C&D) debris, and community-based incentives.
- **Prepare Community-Based Pilot Marketing Plan:** Use qualitative and quantitative research findings to develop a pilot community based marketing plan to overcome barriers to participation in three select neighborhoods.
- **Implement Marketing Plan Pilot:** Implement pilot plan with a goal of increasing participation by 25 percent.

## 1.3 Innovative Features

Although research is available on high participation suburban neighborhoods, not much is known about the factors that most influence diverse, non-participating urban communities. This project identified key participation barriers to recycling in two culturally and socioeconomically diverse urban areas. Understanding what factors most likely motivate or detract from a business's or individual's decision to participate can be incorporated into recycling marketing plans and even help shape program design. Given the changing population trends throughout Florida, it is important that recycling staff better understand the factors that both pose barriers and also motivate people in our urban

centers to recycle. For instance, Tampa's foreign born population increased by 66 percent from 1990 to 2000; the majority is from Latin America.<sup>1</sup>

Whereas most recycling programs launch promotional campaigns that rely upon education and advertising to attain recycling participation in suburban areas, these methods have been less effective in urban areas. Results of this study were used to develop a community specific marketing plan which emphasizes removal of perceived barriers to recycling while enhancing its benefits. The innovative component of this project also lies in the use of community based incentives to encourage socioeconomically challenged communities to participate in source reduction, waste reduction, recycling and composting programs. The most effective incentives for these communities were identified through the focus groups and survey responses.

#### 1.4 Proposed Audience and Information Dissemination

In Florida, the C/I sector comprises more than 51 percent of the overall waste stream.<sup>2</sup> The importance of this sector cannot be ignored if the City is to achieve greater diversion. This project identified the barriers to participation by small businesses within one targeted area of the City that demonstrated lower than average participation in the recycling program through focus groups and survey methods.

The City offers the C/I sector the opportunity to recycle the following materials:

- 1) Corrugated cardboard
- 2) Office paper
- 3) Aluminum cans
- 4) Glass containers
- 5) Plastic containers (#1 and #2)

The quantities and types of these materials may vary significantly for suburban versus non-suburban areas. Education and economic factors can play an important role in determining how to target recovery of these materials. These factors were researched and the findings will guide the development of a marketing plan.

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<sup>1</sup> City of Tampa, *Tampa Profile – Population Characteristics*, www. TampaGov.net, page 6.

<sup>2</sup> “*Solid Waste Management in Florida 2000*,” Florida Department of Environmental Protection, Bureau of Solid and Hazardous Waste, Division of Waste Management, page 7.

In addition to the C/I sector, the residents in these socioeconomically and culturally diverse urban neighborhoods have also exhibited much lower than average participation rates in recycling, unlike more suburban and high socioeconomic areas. The intent of this project was to identify the barriers and factors that would most motivate urban areas to participate in the weekly curbside recycling program.

Results of this project have applicability around the state and should provide valuable insights into how best to develop a marketing plan that truly addresses the concerns socioeconomically challenged businesses and residents hold about participating in recycling programs and the factors that they identify as motivating them to do so. A PowerPoint presentation, summarizing this project, will be offered at an annual Recycle Florida Today (RFT) Issues Forum and also at Solid Waste Association of North America's (SWANA) Florida Sunshine Chapter Conference. Electronic versions of the focus group and phone surveys will be made available to statewide recycling coordinators and public works directors. Articles summarizing the results of the research will also be published in trade and industry periodicals and journals.

Section 2.0  
Project Implementation

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**2.1 Initial Project Activities & Timeline**

***Project Schedule***

The information listed below details the scope of services listed in the City’s contract with the DEP, including the project tasks, project schedule, a task description, and the deliverables for the project. The relative deliverables for each task are included in either the Appendices of this report or on a CD disk. Section 3.0 details the actual deliverable results prepared and produced.

*Table 1 - Grant Schedule/Timeline (red X represents City issued stop work order)*

Task	1Q	2Q	3Q	4Q	5Q	6Q	7Q	8Q	9Q	10Q	11Q	12Q	Final Report
Task 1: Track Baseline Data	X	X	X										
Task 2: Conduct Qualitative Research	X	X	X	X	X	X							
Task 3: Perform Quantitative Research	X	X	X	X	X	X							
Task 4: Prepare Community-Based Pilot Marketing Plan				X	X	X	X	X					
Task 5: Procure Necessary Containers, Equipment, and Supplies									X	X	X	X	
Task 6: Implement Pilot Marketing Plan									X	X	X	X	
Task 7: Identify and Procure Incentives for Pilot Participation Program									X	X	X	X	
Task 8: Project Management & Administration	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 9: Quarterly Reports	X	X	X	X	X	X	X	X	X	X	X	X	
Task 10: Final Report											X	X	2/15/10

**Table 2 - Grant Scope of Services**

<b>Task</b>	<b>Activities</b>	<b>Deliverables</b>
Task 1: Track Baseline Data	From 2 urban neighborhood collection routes consistently exhibiting lower than average participation rates and yielding low recycling tonnages.	Baseline Data Tracking Form (including actual participation rates). Driver Interview Questionnaire
Task 2: Conduct Qualitative Research	Conduct focus groups to elicit feedback regarding the perceived barriers & benefits to recycling participation.	Focus Group Questionnaire
Task 3: Perform Quantitative Research	Incorporate focus groups results into phone survey questions for non-participating businesses and residents, including reuse, resource conservation, toxicity, C&D, and community-based incentives.	Phone Survey Questionnaire
Task 4: Prepare Community-Based Pilot Marketing Plan	Use qualitative and quantitative research findings to develop a pilot community based marketing plan to overcome barriers to participation in two select urban neighborhoods.	Pilot Marketing Plan in hard copy and electronic format
Task 5: Procure Necessary Containers, Equipment, and Supplies	Conduct research on what type and how many containers will be required as well as any other needed equipment & supplies.	List of containers, equipment and supplies to be procured
Task 6: Implement Pilot Marketing Plan	Implement pilot plan with the goal of increasing participation by 25%.	Pilot tracking form Pilot Program Evaluation Report
Task 7: Identify and Procure Incentives for Pilot Participation Program	Identification of incentives based on research and data analysis.	List of incentives to be procured
Task 8: Project Management & Administration	Coordinate and oversee all project tasks and ensure compliance with DEP agreement.	Oversee Ten Tasks
Task 9: Quarterly Reports	Prepare and deliver quarterly reports in hard copy and electronic format.	Quarterly Reports
Task 10: Final Report	Prepare and deliver final report in hard copy and electronic format.	Final Report

## 2.2 Equipment and Services Procured

Listed below are the equipment, supplies, technical services and promotionals procured for the project.

The following technical and professional services were procured for overall project:

- Kessler Consulting, Inc (KCI) provided ongoing project management and technical assistance for all project tasks for the duration of the project.
- DKF Connects (MWBE) conducted qualitative research and compiled results from two residential Focus Groups in the targeted pilot areas.
- Mason-Dixon Polling and Research, Inc. (MWBE) conducted quantitative research and compiled results from the residential telephone survey.
- Alliance Communication conducted quantitative research and compiled results for the commercial telephone survey.

The following supplies and materials were procured for the residential recycling pilot program:

- Pilot announcement postcards (printing and mailing)
  - Card stock
- Educational brochures (printing and mailing)
- Recycling decals for use on 65 gallon residential recycling carts
- Community event promotional items and educational giveaways (100 each)
  - Activity books
  - Bag clips
  - Crayons (soy)
  - Woven tote bags
  - Wristbands
  - Rulers
  - Stickers and tattoos
  - Litter bags

The following supplies, equipment, and materials were procured for the commercial recycling pilot program:

- Commercial recycling poster
- Pilot announcement letter (printing and mailing)
- Brochures (printing and mailing)
- 95 gallon recycling carts (10 each)
- Slim Jim containers (36 each)

- Slim Jim lids with holes (36 each)
- Slim Jim trolleys (30 each)
- Saddle bags (60 each)
- Tilt cart (1 each)
- Deskside recycling bin (8 each)
- Round recycling bin and lid with holes (4 each)
- Recycling decals
  - Large recycling symbol (100 each)
  - Small recycling symbol (50 each)
  - Paper only (50 each)
  - Bottles and cans only (50 each)

The following tickets were procured for the financial or eco-incentives to residents:

- Gasparilla Extravaganza Parade (40)
- Tampa Bay Lightning/St. Pete Times Forum (12)
- Lowry Park Zoo (24)
- Busch Gardens (4)
- Museum of Science and Industry (4)

### **2.3 Problems Encountered**

Grant Manager Nina Stokes took a temporary leave of absence and Regina Byrd managed all activities of this grant project during Ms. Stokes' absence. Necessary project transition meetings were conducted with the project team.

The pilot was delayed due to City staffing impacts and delays with collection data to finalize draft plans.

The City requested and received a grant extension to allow for additional time to conduct the pilot. A project extension was granted until January 31, 2010. Additionally, scope and budget modifications were approved by the DEP. Corresponding grant budget documents and project timelines were edited to reflect the grant modification.

Section 3.0  
Project Results

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### **3.1 Achievement of Goals and Objectives**

#### ***Task 1 – Analyze Baseline Data***

During the project kick-off meeting held on May 3, 2007, the project team identified the boundaries of three urban neighborhoods that exhibited lower than average participation rates and recycling tonnages. These neighborhoods were:

- North Sulphur Springs – Route RCF09, Truck #1215
- Ybor City – Southern portion of Route RCTh03, Truck #1204
- Belmont Heights – Northern portion of Route RCTh03, Truck #1204

Based on the City’s input, route geography, and population size, two of the three chosen areas were consolidated into a single route, focusing the project on just two target areas:

- North Sulphur Springs – Route RCF-09, Truck #1215
- Belmont Heights/Ybor City – RCTh-03, Truck #1204

KCI requested from City staff the baseline data and additional information from these neighborhoods. KCI compiled the information provided by the City and calculated the recycling collection tonnage and diversion for newspapers, aluminum cans, and glass and plastic bottles from residents and examined specific businesses for cardboard, paper and container recycling tonnage and capacity. KCI documented, using City-provided data and information, the participation rates for households along the selected collection routes. KCI staff also interviewed collection route drivers regarding their observations. The residential participation rate for the Belmont Heights/Ybor City area was 12.8 percent; the North Sulphur Springs area participation rate was 14.5 percent. Belmont Heights/Ybor City residents generated 40.5 pounds of recyclables per household per year, while North Sulphur Springs residents generated 52.3 pounds per household per year.

U.S. Census Tract data research revealed that residents of both areas are predominantly African American (60 and 72 percent respectively) and Caucasian (30 and 21 percent respectively). The first target area, the North Sulphur Springs neighborhood, contains 3,991 households. The second target area, the Belmont Heights/Ybor City neighborhood, contains 3,686 households. Both of these target areas were significantly below the City’s 38 percent recycling rate.

A report was prepared that documents the City-provided tracking information, draws conclusions, and provides recommendations. A copy of this letter report is included as Appendix A.

### ***Task 2 – Conduct Qualitative Research***

This project utilized both qualitative and quantitative approaches to help gather data and develop pilot program recommendations.

The qualitative approach focused on developing and executing two focus groups to provide information from non-recycling households in the target areas. Each focus group represented a cross-section of the residents living in the two pilot areas. Discussion was designed to elicit qualitative feedback regarding the perceived barriers and benefits to recycling participation and to explore related solid waste and toxicity issues with residential customers in the two selected areas. A local firm, DKF Connects (DKF), provided the framework and executed both focus groups, with technical support from KCI. The two focus groups were executed on February 18 and 21, 2008.

Each focus group provided a unique and keen insight into the challenges that were faced in developing a marketing program for increasing recycling participation in the selected areas, as well as sound and plausible ideas for incentive programs that would help motivate them personally, as well as their neighbors, to recycle. The information gathered in the focus groups emphasizes the recycling challenges inherent in urban environments.

The two focus groups that DKF conducted in each target area provided practical insights into how residents thought or felt about recycling. The demographics and socioeconomic factors between the two target areas are very similar, and for the most part, the reactions they had were the same. The top two reasons (in ranking order) for not recycling are included below.

- Apathy/laziness
- Lack of recycling information/education (specifically not having a blue bin nor knowing where or how to get one)

Both target areas noted the benefits of recycling include keeping the community clean and safe, especially for children.

The overall top three incentives to participate in a recycling program for both target areas were found to be:

- Monetary incentive
- Citywide recognition
- Community parties/celebrations

With this in mind, it seems that residents would like to see direct benefits on a local level, and understand how recycling directly impacts them.

Also notable was that the focus groups felt that television commercials (including public access), radio, and public relations/community outreach (mail, door-to-door, community groups, and churches) are the most effective communication methods to promote recycling.

All that being said, Belmont Heights/Ybor City and Sulphur Springs were found also to have individual challenges with very different needs. The residents of Belmont Heights/Ybor City tend to be long term, whereas the population of North Sulphur Springs tends to be more transient in nature. Recycling was not a subject of interest for the North Sulphur Springs residents, nor did it appear to have the opportunity to become important to them in the near future. It was found that they responded more positively to an economic incentive, such as discounts on utility bills or neighborhood challenges.

Another of the key findings that came out of the focus group in Belmont Heights/Ybor City was that residents wanted to recycle, but they did not have the information or tools needed to make this happen. Specifically, many of the respondents did not have recycling bins or a pickup schedule.

One key piece of information that the Focus Groups provided was that many residents in the Sulphur Springs area were collecting aluminum cans to sell as scrap metal. This was an interesting and unexpected piece of information and supports the idea of an economic incentive to encourage behavior change.

A report was prepared that includes the screening documents, moderator's guide, a video of each focus group, transcripts of the proceedings, and the outcomes. The report provides conclusions and program recommendations based on results of the focus group feedback. A copy of the final focus group results report was previously transmitted to

the DEP in April 2008. The focus group executive summary is included with this final report as Appendix B.

### ***Task 3 – Perform Quantitative Research***

KCI and its sub-consultants used the focus group information and results to develop telephone survey questions for businesses and residents within the select collection route areas. The purpose of the telephone survey was to expand upon the qualitative research gathered by the focus groups and to fill any missing gaps that could be provided by quantitative analysis using a larger sample. It was determined that the initial number of households identified on the two collection routes was not sufficient in size to provide a statistically valid pool, so the target area was expanded to six zip codes and a greatly enlarged audience population.

#### ***Residential Survey***

Mason Dixon Poling and Research, Inc. (MDI) executed the residential survey with technical support provided by KCI between July 28 and August 8, 2008 and polled 400 respondents. The survey included, but was not limited to, questions on disposal and recycling practices, knowledge of toxicity and hazardous wastes, certain types of Municipal Solid Waste (MSW), and proposed incentives. Demographic data collected during the telephone surveys included ethnicity, income, age and sex. Results from the telephone surveys helped identify the barriers and potential incentives to increase recycling rates in the target areas.

The results of telephone survey quantifiable data conducted by MDI helped to support some of the items identified by the focus groups. The quantitative data contributed significantly to the development of the pilot plan because it is measurable, whereas the focus groups results are expressions of emotion and opinion, and thus open to interpretation. The telephone survey results differed from the focus groups results in that a majority of survey respondents stated that recycling was offered in their neighborhood; they had a blue bin; and they named a specific collection day for recycling. But keep in mind that the phone survey was an expanded area, while the focus groups were a specific targeted area.

Additionally, the overwhelming majority of such responses to the survey could have been attributed to a July 2006 city-wide *recycling material-expansion* mailing that was

performed shortly before the telephone surveys were conducted. Over 60 percent of those who recycle remembered receiving recycling information by mail; 50 percent remembered receiving such information within the past several months; and 79 percent said they found the information useful. However, less than 50 percent knew who to call for bins or assistance.

The survey found the majority (77 percent) of recyclers participate in the City's curbside program primarily because it *helps the environment*, which includes reducing litter and cleaner neighborhoods. Most also thought it was *the right thing to do*.

Most of the residents who recycle were familiar with the schedule and the types of materials acceptable for recycling and expressed overall satisfaction with the service and the program. Less than half knew about the recent increase in the types of materials accepted.

The number one reported barrier to participation was recycling is inconvenient and complicated. Many residents reported that they do not recycle simply because they do not have a bin. Also, a majority of respondents (55 percent) indicated that they would recycle if they had a larger container on wheels.

Cash and prizes were rated as the most effective types of incentives that should be considered for the pilot program. Educating the public about the benefits to the community and region, and addressing global environmental concerns outranked neighborhood competitions and recognition programs. Respondents suggested the best means of communication would be direct mail and the local newspaper. Additionally, the respondents indicated that Mayor Pam Iorio and local professional sports players would be the most effective spokespersons.

The residential survey results are included in this final report as Appendix C.

### ***Commercial Survey***

In addition to the residential survey, a commercial business survey designed to gauge interest in recycling, understand why businesses do not recycle, and learn what would encourage businesses to recycle was prepared and executed by Alliance Communication Inc. (AC) between August 28 and September 9, 2008. Eighty-seven businesses in the pilot area were surveyed.

The vast majority (94 percent) of respondents to the commercial survey said they had never received recycling information from the City. Seventy-five percent said they were unaware of the City's commercial recycling program, but 86 percent said they would recycle if they received information.

Almost all respondents reported that they reuse office supplies, packaging products and shipping boxes, and buy in bulk when possible. Some reuse paper for scrap or notes. Most do not scan documents and do not have scanning capability.

Over half said they were familiar with the environmental benefits of recycling, but 42 percent did not know how recycling could save their business money and 83 percent did not know whether it would cost to recycle. Over 70 percent said they would probably recycle if they knew it could save them money by reducing disposal costs. Although most said space is not a barrier to recycling, Ybor City businesses do have space limitations.

Most businesses (72 percent) responded that they would recycle if they were provided free desk-side recycling containers and 64 percent said they would use drop-off centers if there were no cost. Eighty-two percent believed that their janitorial or cleaning service providers would recycle the materials they collect.

Overall, businesses seemed eager for information and willing to recycle if provided the necessary resources. They would recycle to help the environment, save money, and to earn recognition by the City, Chamber of Commerce, or local newspaper. Any commercial recycling program should be easy with no cost or fees.

The commercial survey results are included in this final report as Appendix C.

#### ***Task 4 – Prepare a Community-Based Pilot Marketing Plan***

The design of a community-based social marketing program begins with identifying the barriers to the desired activity in order to overcome them. Based on the results of the qualitative and quantitative studies, KCI identified the most prevalent negative elements and concepts that resonated throughout the residential evaluation of this project. The analysis of this information allowed KCI to identify the barriers, prioritize their

importance to residents, and select behavior change tools and incentives that can overcome those barriers. Outlined below are the key concepts that provided a baseline for the creation of the recommended incentives for the pilot program.

### ***Marketing Plan Recommendations***

Analysis of the residential focus groups and survey data indicated that residents in the target areas want to see the direct results and impacts of recycling in their communities. A sustainable education program and marketing campaign aimed at *local* environmental, health, safety, and economic benefits would diminish an individual's barriers to recycling; help residents see the value of recycling; and encourage participation in the City's curbside program. Specific plans and recommendations incorporating these ideas were developed for each of the pilot areas. To gauge which incentive would prove to be the most effective, one pilot program was to focus on environmental incentives, while the other was to focus on economic incentives. The addition of monetary incentive awards was to be used in only one of the two targeted areas.

The City agreed that total expenditures for the incentive would equal approximately \$16,000. Additionally, \$24,000 would be allocated to purchase promotional event items, education materials, and supplies (i.e. carts and signs).

The commercial pilot focused on data collection and technical support including comprehensive waste assessments.

Both program plans were created in PowerPoint format to allow collection managers to easily convey the pilot purpose and goals to those working on the pilot implementation such as recycling collection drivers and support staff.

Both marketing plans are included in this final report as Attachment D.

### ***Task 5 – Procure Necessary Containers, Equipment, and Supplies***

The residential pilot employed 866 recycling carts (65 gallon) with recycling decals. Of those, 439 were distributed in the North Sulphur Springs area and 427 were provided to residents in the Belmont Heights/Ybor City area. There were 6,478 existing blue bins utilized; 3,260 in North Sulphur Springs and 3,218 in Belmont Heights/Ybor City.

The project team obtained quotes for commercial pilot containers, equipment and supplies that were recommended based on waste assessments conducted at five (5) area businesses on November 18 and 24, 2009. Containers, equipment and supplies purchased included:

- Slim Jims and lids w/ holes for bottles and cans
- Slim Jim trolleys
- Saddle bags
- Tilt carts
- City recycling carts (95 gallon)
- Deskside recycling bins
- Round recycling bins and lids with holes for bottles and cans
- Recycling decals
- Commercial recycling poster
- Educational brochures and postcards
- Recycling promotional items for community events (activity books, bag clips, soy crayons, woven tote bags, wristbands, rulers, litter bags, stickers and tattoos)

The containers, equipment, and supplies were purchased using grant funds totaling \$16,218.92. These items were delivered to each pilot business participant on January 29, 2010. Photographs of these items are included in this final report as Appendix E.

### ***Task 6 – Implement Pilot Marketing Plan***

#### **RESIDENTIAL PILOT**

The residential pilot took place in the time period between November 1 and December 31, 2009. This pilot not only tested the use of incentives, but also tested the use of larger automated carts and recently available single stream recycling processing. An operational training meeting was held with all designated pilot route collection drivers on October 6, 2009. Over 800 95 gallon carts were cleaned, prepared, and delivered to targeted areas (400 carts per area) by the City during the last week of October. The remaining route utilized existing blue bins in each targeted area.

#### ***Educational Materials***

Educational and outreach materials (postcards and brochures) were printed and mailed out to residential participants in mid October in time for the November 1<sup>st</sup> kick off.

Different versions were created for the control and the incentive based neighborhoods, as well as versions to explain both the pilot cart program and the traditional bin recycling program.

Belmont Heights/Ybor City was the control route for the purposes of the pilot program. Those residents who received carts and those who received bins received educational materials only. This campaign was focused on families and their local environmental impact in order to have more “staying” power. Educational concepts also focused on recycling benefits that extend beyond the local community to include regional issues that affect the entire population. Additionally, the program used the national “green” momentum to tie local recycling efforts to the broader issues, such as reducing global warming. These educational messages were gathered from the focus group and telephone survey responses.

Residents on the North Sulphur Springs route were provided with educational materials as well as incentives to recycle. They were invited to participate in a challenge between neighbors within the North Sulphur Springs pilot area with an emphasis on economic benefits and community recognition as an incentive and reward. The education materials provided information not only about the recycling carts, but the incentives to recycle as well. The incentive program utilized messages gathered from the focus group and telephone survey responses.

Educational materials for both target areas are included in this final report as Appendix F.

### ***Recognition and Rewards***

Recognition and communication was one of the keys to ensuring that residents were involved and engaged in the recycling program. Residential collection drivers notated the Top 10 Recyclers on each route, using the route log provided to collect recycling data during the pilot. Top 10 Recyclers were those with proper curb set-out, no contamination, and full bins or carts. A total of 80 households were recognized by recycling collection drivers as excellent recyclers. A route observation was conducted by KCI staff on January 18, 2010 to verify the Top 10 Recyclers list. Additionally, KCI cross checked the list with the City’s customer address list. A total of 18 addresses were found not valid due to vacant lots, typos, wrong address, account not active, etc.

Notifications letters were sent to 62 households. A total of 23 recycling challenge winners responded for their reward. Of that, nine winners were presented with their reward at a City Hall event by Solid Waste Director Tonja Brickhouse on January 21, 2010. And 14 winners picked up their reward at the City of Tampa Department of Solid Waste and Environmental Program Management. A total of 6 percent of the households on the incentive route were reached and rewarded through the eco-partnership and eco-tickets and tours.

The recycling challenge winners were presented with tickets to nearby local attractions such as Museum of Science and Industry (MOSI), Busch Gardens, Gasparilla Extravaganza, and the Florida Aquarium as incentives. Other incentives included eco-tours at the Lowry Park Zoo and the St. Pete Times Forum. All tours were family tours.

The List of Top 10 Recyclers and City Council event photos are included in this final report as Appendix F.

### ***Community Events***

Community recycling events were conducted to educate and encourage recycling in targeted pilot areas. These events were held in conjunction with the City of Tampa Fire Department's Open House events. The first event was held on November 14, 2009 in conjunction with America Recycles Day (ARD) at Fire Station #11 and the second event was held on December 12, 2009 at Fire Station #12. Both events were well received and had over 150 residents participate. Each event provided residents with recycling education information and giveaways such as reusable bags, bookmarks, beads, pencils, and recycling pledge cards. A guess-the-crushed-aluminum-can-cube contest was also conducted at the first event and the winner was awarded with admission tickets to Busch Gardens donated by Anheuser-Busch Recycling. A drawing was also conducted at each event for residents to win an enclosed compost bin donated by Norseman Environmental Products. Winners were presented with their awards by the Solid Waste Director, Tonja Brickhouse at the Department of Solid Waste and Environmental Program Management office.

Photos from the community events are included in this final report as Appendix F.

### **Data Collection and Results**

Data collection from residential routes in the North Sulphur Springs and Belmont Heights/Ybor City areas began the first week of November and continued on a weekly basis through January 2, 2010.

Residential recycling route drivers collected data to measure recycling participation and tonnages in the two target areas, distinguishing between those residents who were provided carts and bins. During the time period between November 5, 2009 and January 2, 2010 the North Sulphur Springs residents using carts achieved an 18.5 percent participation rate and 17.63 pounds of recyclables per set out, while those using bins achieved a 11.4 percent participation and 14.13 pounds per set out. The baseline participation rate for North Sulphur Springs was 14.5 percent.

During the time period November 6 and December 31, 2009 the Belmont Heights/Ybor City residents using carts achieved a 16.7 percent participation rate and 23.89 pounds per set out, while those using bins achieved a 10.4 percent participation and 9.22 pounds per set out. The baseline participation rate for Belmont Heights/Ybor City was 12.8 percent.

The residential route log and driver instructions are included in this final report as Appendix F.

### **COMMERCIAL PILOT**

A pilot announcement letter inviting participation and an educational brochure were developed and mailed in October 2009. A total of five businesses agreed to participate in the pilot, including Kimmins Contracting Corp, Acropolis, Bernini's, Gaspar's Grotto, and Green Iguana. Technical assistance was provided to each of the businesses including conducting comprehensive waste assessments, which were performed on November 18 and 24, 2009. The commercial pilot data collection and technical assistance continued through December 31, 2009 in Ybor City. Waste assessment results and recommendations were finalized and transmitted to each participating business on January 29, 2010.

Other resources provided the participating businesses included:

- Phone consultation with Technical Consultant
- Indoor recycling containers (carts/break time baler/Slim Jims/deskside bins)

- Education materials (brochure and signs/posters)
- Staff training
- Local recycling vendor directory
- Recycling container directory

The commercial pilot tracked commercial recycling data and corresponding collection services in Ybor City from November 1, 2009 through January 2, 2010. A commercial route driver log was created and used to track recycling data and corresponding collection services from participating businesses. Data included:

- Day of the week
- Container size
- Number of containers set out
- Level of container fullness

The commercial route log and driver instructions included are in this final report as Appendix F.

The targeted commercial businesses achieved a 100 percent participation rate, meaning that they always put their containers out on service day with the majority full. Four out of the five businesses recycle only cardboard and were unaware they could recycle paper and commingled containers as well. Only one of the businesses recycles paper, cardboard, and commingled containers. All participating businesses expressed enthusiasm about expanding or improving their recycling program. The City has expanded their program to include commingled containers.

The results and recommendations of the residential and commercial pilot programs are included in this final report as Appendix F.

### ***Task 7 – Identify and Procure Incentives for Pilot Participation Program***

The project team solicited partnership/sponsorships with local eco-partners (area attractions) to offer free admission tickets as prizes to winners of the Neighborhood Recycling Challenge. Local area attractions included the Lowry Park Zoo, Florida Aquarium, Busch Gardens, MOSI, St. Pete Times Forum, and Gasparilla Extravaganza. All winners were asked to sign for their reward/tickets.

The eco-partner budget and signature sheets are included in this final report as Appendix G. Award winners who have not picked up their tickets will be notified via telephone.

### ***Task 8 – Project Management and Administration***

This project was funded through an innovative recycling and waste reduction grant that was awarded to the City of Tampa by FDEP. Effectively managing the project, coordinating activities, and administering the grant was a joint effort between the City and KCI. Provided below is an explanation of how the team maintained open lines of communication, as well as a summary of the City's in-kind service involvement that was critical to the project's success.

*Project Meetings:* KCI held monthly project team meetings with the City, or as necessary, either by telephone conferencing or in person. KCI prepared the meeting agenda based on the approach described herein. Monthly updates were provided and open communication was maintained between KCI staff and the City regarding project activities, deliverables, and relevant updates. These monthly meetings were crucial for the momentum and exchange of clear communication between the City and KCI regarding project work and activities to ensure the City's objectives and requirements were being met.

*City Involvement:* City staff contributed support in the areas outlined below.

- Participated in an initial kick-off meeting, as well as the monthly meetings/calls mentioned above.
- Provided appropriate route maps, collection service, participation, and recovery data so that the proper analysis could occur in a manner that was useful for the tasks of this project. Without the appropriate data in a useable form, the baseline and pilot data could not be tracked and evaluated for the two select collection routes to be targeted by this project.
- Coordinated project components with KCI and, when needed, program participants.
- Provided copies of any existing recycling educational materials for the residential and commercial sectors.
- Delivery of recycling pilot route carts and mailing to targeted residents.

- Approved and edited, when applicable, all KCI draft documents for final approval before final production and distribution to the public or appropriate City representatives.
- Provided support to KCI staff as needed during planning, development, and implementation stages.
- Contacted and solicited meetings with appropriate community partners.
- Worked to procure items listed in City's Scope of Services with DEP.

### **3.2 Advanced Technology or Process Demonstration**

This project was able to demonstrate, through an advanced process, the effectiveness of utilizing social based community marketing techniques to develop sustainable behavior for recycling participation, set-outs, and tonnage with both pilots.

There is little research available about the factors that most influence diverse, non-participating urban communities. This project identified key participation barriers to recycling in two culturally and socioeconomically diverse urban areas by conducting both qualitative and quantitative research through focus groups and survey methods. Focus groups uncovered barriers by learning about attitudes, beliefs, socioeconomic and demographic factors that impact recycling participation. While the surveys built upon the findings from the focus groups to explore quantitative data. Results from this research are described in Task 2 and 3 of the project results.

Another advanced process of this project was the use of community based incentives to encourage socioeconomically challenged communities to participate in source reduction, waste reduction, recycling and composting programs. The focus groups and survey results identified the most effective incentive for these communities, which included a neighborhood recycling challenge with the opportunity to win tickets to local area attractions (eco-partners). This not only rewarded recycling challenge winners, but also promoted local businesses with sustainable eco-programs, rather than promoting consumption. Each eco-partner also offered an eco-tour of their facility to highlight their sustainable practices. Results from the incentive program are described in more detail in Task 6 and 7 of the project results.

This project also demonstrated significant recycling program advancement through commercial waste assessments. As a result of the assessment, Kimmins implemented a recycling saddle bag program that impacted the entire administrative office. Each

employee was provided a saddle bag to use in conjunction with their garbage bin to collect mixed office paper. A central recycling paper container is located in each department. It is believed that more people will recycle if it is convenient and easy to use. Alternatively, Kimmins could switch the program to capture solid waste in the saddle bags and use their bins to collect recyclables, which would likely increase the volume of recycling participation.

Lastly, this project created and demonstrated a link between all Department of Solid Waste and Environmental Program Management staff through education and interrelated interaction from the driver (collection) to the final program plan and results. Social based marketing information is useful to all City departments and is an important foundation for developing and implementing a successful program plan among department divisions.

### 3.3 Material Recovery

#### ***Residential Pilot***

As shown in Table 3, the residential recycling pilot recovered 45.98 tons of recyclables. Currently, the City collects the following materials from their residential curbside program: Aluminum cans, foil, and pie tins; steel cans (including empty aerosol cans); plastic bottles (numbers 1 and 2 only); glass bottles and jars; gable top containers (milk and juice containers); newspapers and inserts; junk mail; phone books; magazines and catalogs; office paper; brown paper bags; paperboard (cereal boxes, paper towel roles); and corrugated cardboard. Based on the current tip fee of \$71.00 per ton at McKay Bay (Waste-to-Energy Landfill), this pilot has saved the City \$3,264.58 in disposal costs in a two month period.

*Table 3 – Residential Pilot Recycling Totals*

<b>Residential Recycling Route</b>	<b>Bins Set Out</b>	<b>Carts Set Out</b>	<b>Total Tons</b>
North Sulphur Springs <b>Carts</b> (incentive)	N/A	651	5.74
North Sulphur Springs <b>Bins</b> (incentive)	2,984	N/A	21.08
Belmont Heights/Ybor City <b>Carts</b> (control)	N/A	571	6.82
Belmont Heights/Ybor City <b>Bins</b> (control)	2,678	N/A	12.34
<b>Total</b>	<b>5,662</b>	<b>1,222</b>	<b>45.98</b>

Furthermore, the residential pilot increased pounds of recyclables per household per year (lbs/HH/year) by **61 percent** for the incentive area (NSS) and **23 percent** for the control

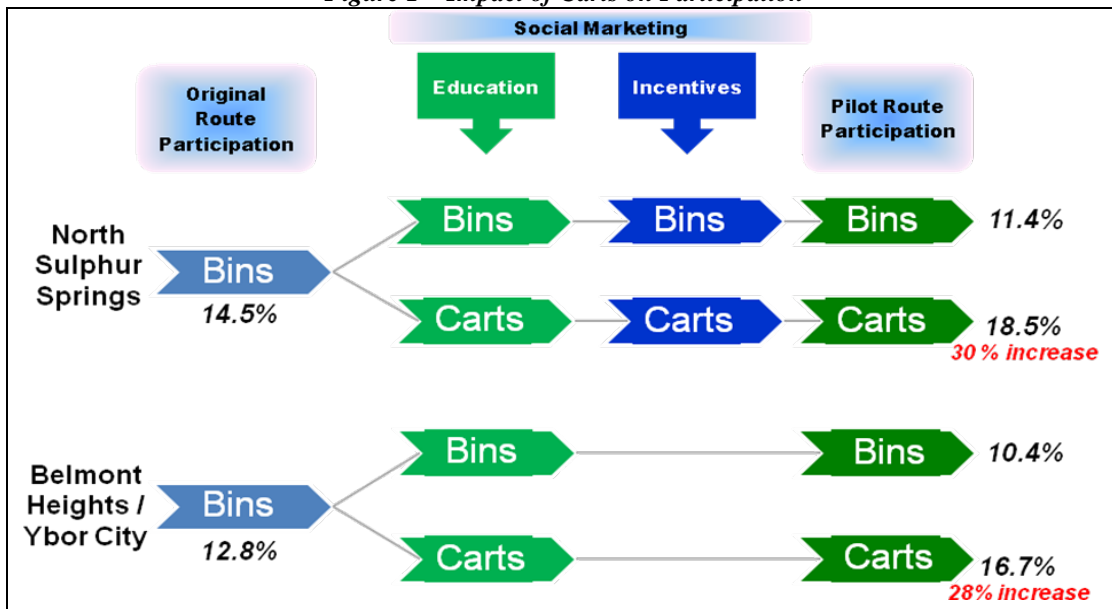
area (BH/Ybor) compared to the baseline data. This is a significant improvement of recyclables collected and processed that will ultimately increase recycling revenue shares for the City.

**Table 4 – Residential Pilot Results vs. Baseline Data**

Residential Recycling Route	lbs/HH/year Baseline Data	lbs/HH/year Pilot Results
North Sulphur Springs (incentive area)	52.3	84.1 (61% increase)
Belmont Heights/Ybor City (control area)	40.5	49.8 (23% increase)

The project also led to greater quantities of recovered materials by implementing the use of single stream automated carts in the residential recycling pilot. Implementation of carts increased recycling participation by 30 percent in the incentive area (NSS) and by 28 percent in the control area (BH/Ybor) compared to the baseline data. Figure 1 below compares baseline participation to pilot participation, and highlights the dramatic impact of carts during the pilot.

**Figure 1 – Impact of Carts on Participation**



**Commercial Pilot**

The commercial recycling pilot recovered a total of 9.35 tons of recyclables from five targeted businesses during the pilot period. Currently, the City collects the following materials from their commercial curbside program: Office paper (white computer or printer paper); white stationary and notepads; index cards; manila file folders; plain envelopes; magazines and catalogs; newspaper and insets; junk mail; phone books; paperboard (cereal boxes, paper towel rolls, etc.); brown paper bags; corrugated cardboard (flattened); aluminum cans, foil, and pie tins; steel cans (including empty aerosol cans); plastic bottles (numbers 1 and 2 only); glass bottles and jars; and gable top containers (milk and juice containers). Based on the current tip fee of \$71.00 per ton at McKay Bay, the commercial pilot saved a total of \$663.85 in disposal costs in a two month period. Additionally, as a result of the waste assessments, each targeted business expanded or increased their recycling program two fold, thus increasing recycling revenue for the City.

*Table 5 – Commercial Pilot Recycling Totals*

Commercial Business Route	# of Containers	# of Pick-Ups / Week	Total Pilot Pick-Ups Reported	Material	Tons Collected <sup>3</sup>
Acropolis Ybor	2 cy dumpster	3	16	Cardboard	.80
Bernini's	1 cart – 95 gal	2	11	Cardboard	.14
Gaspar's Grotto	2 carts – 95 gal	2	22	Cardboard	.55
Green Iguana Ybor	3 carts – 95 gal	2	33	Cardboard	1.24
Kimmins Contracting Corp	3 carts – 95 gal	2	33	Cardboard, paper, and commingled containers	6.62
<b>Total</b>					<b>9.35</b>

**3.4 Transferability**

The results, lessons learned, and all materials developed from this project are transferable through the DEP website to all Florida jurisdictions with low recycling participation in urban communities. The following materials have been developed:

- Baseline data tracking
- Focus group results
- Telephone survey instruments and results
- Marketing and incentive pilot program plan
- Route logs
- Data tracking spreadsheets

<sup>3</sup> Cardboard based on 50 lbs/yd. Mixed recyclables based on 267 lbs/yd.

- Outreach and educational materials (brochure, postcard, poster, decals)
- Eco-partnerships
- KCI waste assessments form and results
- Recycling vendor directory
- Recycling container directory

In addition, the project team plans on presenting the results of this project at the upcoming Recycle Florida Today (RFT) Annual Conference in June 2010. Since the pilot started later than expected, results were not available until 2010 for a formal presentation. The project was featured in the December 2008 and December 2009 issues of the KCI newsletter *Innovative Times*. Articles will also be developed and submitted for future issues of Resource Recycling, RFT's newsletter, and the Florida Sunshine Chapter of the Solid Waste Association of North America (SWANA) newsletter. Furthermore, the City will act as a mentor by being available to respond to questions other communities may have about this project.

### **3.5 Cost-Effectiveness and Efficiency**

The following sections describe how the project resulted in substantial improvements in the recycling program including total project expenditures, avoided disposal fees, and cost/benefit rational.

#### **3.5.1 Project Expenditures**

The table below provides a breakdown of the total expenditures of this innovative grant project by category/expenditure type and vendor payments. The total grant funds expended equaled \$167,468.06.

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**Table 6 – Innovative Grant Expenditures**

<b>Category / Expenditure Type</b>	<b>Vendor</b>	<b>Total Expenditures</b>
<b><i>Professional/Technical Services</i></b>		
Consulting Services	Kessler Consulting, Inc.	\$115,409.15
Commercial Survey Services	Alliance Communication (MWBE)	\$7,175.00
Residential Survey Services	Mason Dixon Polling	\$20,000.00
Focus Group Services	DKF Connects (MWBE)	\$8,664.99
<b>Subtotal</b>		<b>\$151,249.14</b>
<b><i>Containers / Equipment</i></b>		
Slim Jim Lid (36)	WebstaurantStore.com	\$791.64
Slim Jim Containers (36)	WebstaurantStore.com	\$809.64
Slim Jim Trolley (30)	Recy-cal.com	\$2,208.60
Saddle Bags (7 quart w/lid) (60)	Recyclingcontainer.com / Busch Systems	\$327.00
Recycle Tilt Truck (1)	WebstaurantStore.com	\$474.00
Wheeled Carts (green 95 gallon)	City of Tampa Solid Waste	\$394.80
Deskside Recycling Bin (28 quarts) (8)	WebstaurantStore.com	\$33.52
Round Recycling/Bin (32 gallon) (4)	WebstaurantStore.com	\$89.96
Round Recycling/white lid w/hole (4)	WebstaurantStore.com	\$43.96
<b>Subtotal</b>		<b>\$5,173.12</b>
<b><i>Educational Materials / Supplies</i></b>		
Commercial Recycling Poster	FedEx/Kinko's	\$382.50
Card Stock	Staples	\$27.80
Binder supplies	Earthbinder	\$145.69
Postcards Printing	Copy Control Management	\$191.30
Brochures Printing	Copy Control Management	\$2,962.10
Postcards Mailing	City of Tampa Mail Room	\$596.24
Brochures Mailing	City of Tampa Mail Room	\$1,165.43
Activity Books	Sol Davis Printing	\$113.80
Bag Clips	AuthenticPromotions.com	\$52.00
Crayons Soy	Weisenbach Specialty Printing	\$27.00
Woven Tote Bags	Keep America Beautiful	\$99.00
Wristbands	EJL Enterprises	\$19.50
Rulers	Weisenbach Specialty Printing	\$105.00
Stickers and Tattoos	Keep America Beautiful	\$74.00
Litter Bags	Keep America Beautiful	\$26.00
Recycling Decals (6"x6") (100)	Recy-cal.com	\$110.00
Recycling Decals (12"x12") (50)	Recy-cal.com	\$97.50
Beverage Containers Only Decals	Recy-cal.com	\$62.50

(5"x7") (50)		
Paper Only Decals (5"x7") (50)	Recy-cal.com	\$62.50
Recycling Decals (65 gallon carts)	Screen Graphics of FL	\$1,757.72
<b>Subtotal</b>		<b>\$8,077.58</b>
<b><i>Incentives</i></b>		
Gasparilla Parade Tickets (40)	Event Fest	\$646.86
Tampa Bay Lightning Tickets (12)	St. Pete Times Forum	\$600.00
Lowry Park Zoo Tickets (24)	Lowry Park Zoo	\$634.80
Busch Gardens Tickets (4)	Busch Gardens	\$299.80
Museum of Science and Industry Tickets(4)	Museum of Science and Industry	\$303.20
<b>Subtotal</b>		<b>\$2,484.66</b>
<b><i>Shipping Costs</i></b>		
Containers and supplies	Webstaurantstore.com	\$201.47
Containers and supplies	Recyclingcontainer.com/Busch Systems	\$70.00
Containers and supplies	Recy-cal.com	\$212.09
<b>Subtotal</b>		<b>\$483.56</b>
<b>Total Costs</b>		<b>\$167,468.06</b>

The table below provides a breakdown of the total in-kind contributions provide by City staff and project partners not directly paid for their services or time on the project. The total in-kind contributions equaled \$106,282.43 for the grant duration. The City is proud to announce that it exceeded its in-kind contribution commitment by \$20,782.43.

*Table 7 – In-Kind Contributions*

<b>Quarter/Work Period</b>	<b>Contribution</b>
<b>Project Budget</b>	<b>\$85,500.00</b>
First Quarter – Period end 3/31/07	\$0.00
Second Quarter – Period end 6/30/07	\$1,919.14
Third Quarter – Period end 9/3/07	\$2,206.49
Fourth Quarter – Period end 12/31/07	\$5,725.56
Fifth Quarter – Period end 3/31/08	\$2,178.12
Sixth Quarter– Period end 6/30/08	\$1,278.52
Seventh Quarter – Period end 9/30/08	\$10,448.09
Eighth Quarter – Period end 12/31/08	\$3,639.97
Ninth Quarter – Period end 3/31/09	\$1,156.12
Tenth Quarter – Period end 6/30/09	\$1,040.53
Eleventh Quarter – Period end 9/30/09	\$5,264.07

Twelfth Quarter – Period end 12/31/09	\$68,543.90
Final	\$2,881.92
<b>Total</b>	<b>\$106,282.43</b>
<b>Ending Balance</b>	<b>(\$20,782.43)</b>

### 3.5.2 Avoided Disposal Fees

The table below details the avoided disposal fees for the duration of the project for both the residential and commercial pilots. A total 55.33 tons of material was diverted from the landfill, resulting in a cost savings of \$3,928.43 in disposal fees.

*Table 8 – Avoided Disposal Fees*

Recycling Collection Route	Tons Collected	Tip Fee (per ton)	Total Avoided Disposal Fees
<b>Residential Pilot</b>			
North Sulphur Springs <b>Carts</b> (incentive)	5.74	\$71.00	\$407.54
North Sulphur Springs <b>Bins</b> (incentive)	21.08	\$71.00	\$1,496.68
Belmont Heights/Ybor <b>Carts</b> (control)	6.82	\$71.00	\$484.22
Belmont Heights/Ybor <b>Bins</b> (control)	12.34	\$71.00	\$876.14
<b>Total</b>	<b>45.98</b>		<b>\$3,264.58</b>
<b>Commercial Pilot</b>			
Acropolis Ybor	0.80	\$71.00	\$56.80
Bernini's	0.14	\$71.00	\$9.94
Gaspar's Grotto	0.55	\$71.00	\$39.05
Green Iguana Ybor	1.24	\$71.00	\$88.04
Kimmins Contracting Corp	6.62	\$71.00	\$470.02
<b>Total</b>	<b>9.35<sup>4</sup></b>		<b>\$663.85</b>
<b>Total</b>	<b>55.33</b>		<b>\$3,928.43</b>

If the 2-month pilot data was applied on a yearly basis (12 months), the City could see a cost savings of \$23,570.55 in avoided disposal fees.

<sup>4</sup> Commercial cubic yards were based on average weight densities per type of recyclable material, which consisted of corrugated cardboard for Acropolis, Bernini, Gaspar's Grotto, and Green Iguana. Kimmins weight densities for mixed recyclables was based on the average breakdown of types of materials in the recyclables stream noted during waste assessments.

### 3.5.3 Cost/Benefit

#### ***Landfill Space Conservation***

The table below details the amount of landfill space conserved from the implementation of the residential and commercial pilots. A total 945.18 cubic yards of landfill airspace was saved for the duration of the project.

*Table 9 – Landfill Space Conservation*

<b>Recycling Collection Route</b>	<b>Cubic Yards Collected</b>	<b>Waste-to-Energy Reduction<sup>5</sup></b>	<b>Total Cubic Yards of Landfill Airspace Saved</b>
<b><i>Residential Pilot</i></b>			
Carts (NSS and BH/Ybor)	504.53	0.90	454.08
Bins (NSS and BH/Ybor)	387.17	0.90	348.45
<b><i>Subtotal</i></b>	<b>891.70<sup>6</sup></b>		<b>802.53</b>
<b><i>Commercial Pilot</i></b>			
Acropolis Ybor	32.00	0.90	28.80
Bernini's	5.50	0.90	4.95
Gaspar's Grotto	22.00	0.90	19.80
Green Iguana Ybor	49.50	0.90	44.55
Kimmins Contracting Corp	49.50	0.90	44.55
<b><i>Subtotal</i></b>	<b>158.50<sup>7</sup></b>		<b>142.65</b>
<b>Total</b>	<b>1,050.20</b>		<b>945.18</b>

#### ***Conserving Natural Resources***

The residential and commercial pilots diverted a total of 55.33 tons of recyclables from disposal, resulting in the following natural resource conservation and green house gas emissions reduction equivalent to:

- 29 passenger cars off the roadway each year<sup>8</sup>
- 18,188 gallons of gasoline saved<sup>9</sup>
- 212.16 tree seedlings grown<sup>10</sup>

<sup>5</sup> The City utilizes a Waste-to-Energy (WTE) facility to process waste. Residual ash is subsequently landfilled, Waste Incineration typically takes up 90% less space than landfilling of unprocessed waste.

<sup>6</sup> Residential cubic yard estimates were based on actual number of set-outs multiplied by container capacity, with the assumption that all carts and bins were full.

<sup>7</sup> Commercial cubic yard estimates were based on actual number of set-outs multiplied by container capacity, with the assumption that all carts and bins were full.

<sup>8</sup> Based on the Environmental Protection Agency (EPA) Waste Reduction Model (WARM) [http://www.epa.gov/climatechange/wycd/waste/calculators/Warm\\_home.html](http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html)

<sup>9</sup> Based on the Environmental Protection Agency (EPA) Waste Reduction Model (WARM) [http://www.epa.gov/climatechange/wycd/waste/calculators/Warm\\_home.html](http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html)

A full analysis could not be conducted because recyclables were collected single stream and environmental benefits were calculated using a *mixed recyclables* formula within the Environmental Protection Agency Waste Reduction Model (WARM) and Northeast Recycling Council Environmental Benefits Calculator.

**Net Benefit / Cost Savings Per Capita**

The table below details the total net benefit from the collection of recyclables for the duration of the residential pilot. A total net benefit cost savings of \$2,233.25 was achieved from the residential pilot. Savings are a result of disposal fees minus processing costs. Additionally, the residential pilot program saved an average of \$1.08 per capita for the pilot areas.

**Table 10 – Residential Pilot Net Benefit and Cost Savings per Capita**

Recycling Collection Route	Tons Collected	Avoided Disposal Fees (\$71 per ton)	Recycling Processing Costs <sup>11</sup> (\$22.43 per ton)	Net Benefit	Per Capita
<b>Residential Pilot</b>					
North Sulphur Springs <b>Carts</b> (incentive)	5.74	\$407.54	\$128.75	\$278.79	\$1.43
North Sulphur Springs <b>Bins</b> (incentive)	21.08	\$1,496.68	\$472.82	\$1,023.86	\$1.14
Belmont Heights/Ybor City <b>Carts</b> (control)	6.82	\$484.22	\$152.97	\$331.25	\$1.94
Belmont Heights/Ybor City <b>Bins</b> (control)	12.34	\$876.14	\$276.79	\$599.35	\$0.75
<b>Total</b>	<b>45.98</b>	<b>3,264.58</b>	<b>1,031.33</b>	<b>\$2,233.25</b>	<b>\$1.08</b>

The table below details the total net benefit from the collection of recyclables for the duration of the commercial pilot. A total net benefit cost savings of \$564.08 was achieved, with an average business net benefit of \$60.34. Savings are a result of disposal fees minus net recycling revenue share.

<sup>10</sup> Based on the Northeast Recycling Council Environmental Benefits Calculator  
[http://www.nerc.org/documents/environmental\\_benefits\\_calculator.html](http://www.nerc.org/documents/environmental_benefits_calculator.html)

**Table 11 – Commercial Pilot Net Benefit**

Recycling Collection Route	Tons Collected	Avoided Disposal Fees (\$71 per ton)	Net Recycling Revenue Share per Ton (revenue - processing costs) <sup>12</sup>	Total Net Recycling Revenue	Total Net Benefit	Net Benefit per Ton
<b>Commercial Pilot</b>						
Acropolis Ybor	0.80	\$56.80	(\$115.00)	(\$92.00)	\$148.80	\$186.00
Bernini's	0.14	\$9.94	\$22.43	\$3.14	\$6.80	\$48.57
Gaspar's Grotto	0.55	\$39.05	\$22.43	\$12.34	\$26.71	\$48.57
Green Iguana Ybor	1.24	\$88.04	\$22.43	\$27.81	\$60.23	\$48.57
Kimmins Contracting Corp	6.62	\$470.02	\$22.43	\$148.49	\$321.53	\$48.57
<b>Total</b>	<b>9.34</b>	<b>663.85</b>		<b>\$99.77</b>	<b>\$564.08</b>	
<b>Average Commercial Pilot Net Benefit Per Ton:</b>						<b>\$60.36</b>

### 3.5.4 Nontraditional Materials

This project successfully tested the use of two nontraditional materials/methods, single stream and automated recycling carts, during the residential and commercial pilots. The City had the opportunity to introduce the use of automated carts because of the recent availability of single stream processing. As described in detail in Task 6, the use of carts significantly increased in both recycling participation rates and pounds of recyclables per household and business on an annual basis.

Additionally, all five targeted businesses who participated in the commercial recycling pilot were given a recycling directory (as a part of their waste assessment binder) that featured local vendors who recycle the following nontraditional materials:

- Paper shredding and recycling services
- Electronics
- Batteries
- Fluorescent bulbs
- Metals
- Pallets
- Wood
- C&D debris
- Grease/cooking oil
- Food donations
- Textiles/clothing
- Hazardous waste
- Reuse center/donation
- Recycling broker
- Other (bulky items, anti-freeze, foam, drums, etc.)

<sup>11</sup> Based on 4<sup>th</sup> Quarter 2009 residential recycling revenue/processing costs reported by Recycle America.

<sup>12</sup> Based on 4<sup>th</sup> Quarter 2009 commercial recycling revenue processing costs reported by Recycle America.