

**Innovative Recycling and Waste Reduction Grant
IG8-02**

**FINAL REPORT
July 31, 2010**

***Building Blocks to Increase
Construction and Demolition (C&D) Recovery Through Incentives***



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Section 1.0 Introduction

1.1 Project Background

Sarasota County (County) established its Construction and Demolition (C&D) recycling program in the mid-1990s to reduce the volume of C&D going to the local landfill. Solid Waste Ordinance #2003-092 states that “all mixed recyclable C&D debris dispensed within unincorporated Sarasota County must be delivered to a C&D Debris Recycling Facility.” The County then established its C&D Debris Recycling Facility at the County landfill based on feedback from building contractors and waste haulers to help provide the infrastructure for the mandate. In 2006, County staff, with assistance from its consultant, reviewed a variety of programs nationwide that were established to increase the recycling of C&D debris.

As a follow-up to the nationwide research gathered in 2006, the County, with the assistance of Kessler Consulting, Inc. (KCI), submitted an FY 2007-2008 Innovative Grant proposal to the Florida Department of Environmental Protection (FDEP) to increase C&D debris recovery through program incentives. The program sought to increase the recovery of C&D debris material in the County from builders, developers, and contractors using innovative incentive techniques appropriate to the County. The project (IG8-02) was selected for funding. KCI worked with Sarasota County to implement its Innovative Grant project in order to fulfill its contractual obligations with the FDEP.

1.2 Project Goals & Objectives

This project’s goals and objectives include:

- Research effective C&D recycling program incentives
- Assess local C&D processing infrastructure
- Develop outreach and educational materials
- Research and assess capital equipment and supply needs
- Identify a program measurement and verification (M&V) plan
- Test C&D recycling program incentives through a pilot project

Innovative Features

This project identified incentives being successfully used in other parts of the country to increase C&D recycling participation, tonnage recovery, and local recycling rates. The jurisdictions researched were located in California, Illinois, North Carolina, Oregon, and Lee County, Florida. The pilot project tested some of those incentives for their applicability in Florida, including a differential tip fee for source separation of materials, on-site outreach and support through on-site worker education, and introduction of a measurement and verification system to local builders.

1.3 Proposed Audience and Information Dissemination

This project targeted over 100 developers and builders from Sarasota County that construct residential homes/developments/communities and commercial buildings/office complexes/industrial parks within the local community.

Section 3.4 of the report details how information about this pilot was disseminated throughout Florida. Most importantly, the County now has a dedicated C&D website page in its Solid Waste section of Environmental Services for the local building community and recycling coordinators throughout the State.

Section 2.0
Project Implementation

2.1 Initial Project Activities & Timeline

Project Schedule

The information listed below details the scope of services listed in the County’s contract with the FDEP, including the project tasks, project schedule, a task description, and the deliverables for the project. The relative deliverables for each task are included in the Appendices of this report. If they are not in the report, they were previously transmitted to the FDEP in a quarterly report. Section 3.0 details deliverables.

Table 1 - Grant Schedule/Timeline

| Task | 1Q | 2Q | 3Q | 4Q | 5Q | 6Q | 7Q | 8Q | 9Q | 10Q | 11Q | Final Report |
|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|---------------------|
| Task 1: Develop and convene a project team | X | X | X | X | X | X | X | X | X | X | X | |
| Task 2: Investigate and identify program incentives and prepare a pilot plan | X | X | X | X | | | | | | | | |
| Task 3: Hire interns/labor support for the building outreach and pilot program | X | X | X | X | X | X | X | X | | | | |
| Task 4: Local C&D infrastructure assessment | X | X | X | X | X | X | X | X | | | | |
| Task 5: Develop and prepare outreach and educational materials | X | X | X | X | X | X | X | X | X | X | X | |
| Task 6: Research and assess capital equipment and supply needs, and procure appropriate items | X | X | X | X | X | X | | | | | | |
| Task 7: Identify and prepare a program measurement and verification (M&V) plan | | | | | X | X | X | X | X | X | X | X |
| Task 8: Institute a pilot program to increase C&D recovery | | | X | X | X | X | X | X | X | X | X | X |
| Task 9: Project management and administration | X | X | X | X | X | X | X | X | X | X | X | |
| Task 10: Quarterly and final Reports | X | X | X | X | X | X | X | X | X | X | X | X |

Table 2 - Grant Scope of Services

| Task | Activities | Deliverables |
|---|---|--|
| Task 1: Develop and convene a project team | Identify team members and secure participation, discuss project objectives, and solicit member input. | Team list and convene meetings/conference calls. |
| Task 2: Investigate and identify program incentives and prepare a pilot plan | Research effective C&D program incentives, identify program incentives appropriate for local building market, and develop a plan. | Prepare a pilot program plan. |
| Task 3: Hire interns/labor support for the building outreach and pilot program | Research external staffing support sources & costs, secure staffing with appropriate skill level, train, and utilize staff. | Prepare and perform a labor training and implementation program. |
| Task 4: Local C&D infrastructure assessment | Research current salvage/reuse, recycling, and disposal infrastructure in the local area. | Prepare a letter report. |
| Task 5: Develop and prepare outreach and educational materials | Research local partners, various distribution channels, research costs; prepare, print, and distribute outreach programs and educational materials. | Develop an education and outreach program and print and distribute materials. |
| Task 6: Research and assess capital equipment and supply needs, and procure appropriate items | Identify capital equipment and supply needs through an assessment. Using this research procure appropriate equipment and supplies. | Prepare an equipment and supply needs assessment plan and procure items. |
| Task 7: Identify and prepare a program measurement and verification (M&V) plan | Research and develop a program M&V plan for the outreach, education and pilot programs. | Prepare and implement an M&V program plan. |
| Task 8: Institute a pilot program to increase C&D recovery | Using the research information gathered and plans developed in Tasks 1-7, institute a pilot program for approximately one (1) year. | Implement a pilot program plan and prepare a report. |
| Task 9: Project management and administration | Coordinate and oversee all project tasks and ensure compliance with FDEP agreement. Identify expenditure items and costs. | Maintain project goals and objectives, project momentum, and project team participation. |
| Task 10: Quarterly and final Reports | Prepare and deliver quarterly and final reports as specified in the terms of the contract. | Quarterly Reports. One Final Report. |

2.2 Equipment and Services Procured

Listed below are the equipment, supplies, technical services, and promotional items procured for the project utilizing grant funds:

- Laptop computer
- Digital camera
- 64 gallon carts
- Job-site participation and Roll-off signs
- Builder rebates
- Job-site support staff
- Technical Consulting Services
- Printing Services

2.3 Problems Encountered

When this grant plan was written, Florida's construction industry was at its peak. By the time the grant was funded and approved for implementation, the industry in Florida had seen a significant decline. All things considered, the project was completed successfully using six pilot builders for the construction pilot incentive program.

Additionally, due to the economic downturn, one of the builders, Vision Homes, ceased operations and went out of business before the Midnight Pass pilot component could be completed. Site monitoring continued until March 2010, when the owner of the residence declined continued participation in the County's C&D recycling pilot. Also, obtaining service for the recycling and garbage carts on the Midnight Pass construction site presented another challenge due to very limited space. Vision Homes attempted to include the site in the municipal collection service operated by a private hauler, but was denied because the home was not yet occupied and was new construction rather than a renovation.

Because of County fiscal constraints, there were delays in procuring the signs and carts. The roll-off and participation signs did not become available until late April, and the carts were not available until May. The delay of the roll-off signs meant that some early educational opportunities were missed and resulted in increased contamination of the roll-offs. Procurement of the promotional support items by the County was eliminated due to the County's decision to curtail spending.

Lastly, a change in ownership of one of the haulers caused invoices and opportunities for rebates to be lost on one project for a specific recyclable debris material.

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Section 3.0 Project Results

3.1 Achievement of Goals and Objectives

Task 1 – Develop and Convene a Project Team

Invitations were sent to a list of potential Project Team Members who together represent a broad spectrum of stakeholders – waste generators such as builders and contractors, haulers, reuse and recycling vendors, and waste processing facilities. Thirty invitees agreed to participate in the project. The initial Team Meeting was held on Tuesday April 28, 2008 at 2:00 p.m. in the office of Solid Waste. Twenty-one team members were in attendance. A copy of the sign-in sheet is attached in Appendix A. Team members were provided with a comprehensive introduction to the project objectives and deliverables, and a summary of the research accomplished thus far. Team members offered ideas and feedback on some of the incentive options mentioned in the research summary.

Project Team members were engaged through conference calls to discuss incentive and pilot plan ideas and to gather feedback. Team members were called upon to recommend potential participants in the pilot program, make pilot program recommendations, and to assist in recruiting interns.

Communication continued with Project Team members as needed via telephone and email throughout the project. Results of the pilot program were transmitted via email to Team members through a PowerPoint presentation on July 6, 2010. A copy of the PowerPoint presentation is attached in Appendix A.

Task 2 – Investigate and Identify Program Incentives and Prepare a Pilot Plan

Research was conducted on programs from across the country featuring incentives and/or regulation to increase C&D materials recovery and recycling. The programs researched included those from Chicago IL, Glendale CA, San Jose CA, King County WA, Lee County FL, Palo Alto CA, Orange County NC, Metro Regional OR, and Portland OR. Additionally, representatives for the programs were contacted later during the project to obtain up to date results, additional insights, and plan modifications, if any, from the original data gathered.

The research identified a number of program elements that include incentive programs specifically designed for the building community.

Examples found included:

- Deposit/refund system based upon the square footage of the property
- Reduced tip fee for source separated loads
- Surcharge for noncompliant loads (based on an established threshold of contamination)
- Mandatory ordinance for construction projects greater than a specified monetary threshold

The program identified for the County was an Incentive Program Plan that included a differential tip fee (in the form of a rebate paid to the builder), educational materials, and outreach activities. A rebate of \$13 per ton would be paid to participating builders upon submission of an invoice and receipts proving that source separated materials had been recycled. Invoices and receipts would be accepted from any C&D facility or recycling vendor located in the County, if such facility agreed to comply with the pilot protocol for documenting source separated loads and the participation forms.

An invitation to participate in the recycling pilot program was distributed to over 100 builders and/or contractors operating in the County. Of these, six builders responded and agreed to participate:

- Fred M. Starling, Inc. (FMS)
- John Cannon Construction (JCC)
- John Cannon Homes, Inc. (JCH)
- My Green Buildings (MGB)
- Tandem Construction (Tandem)
- Vision Homes of Florida (VH)

A seventh builder, Baron Construction and Development, agreed to participate in the program; however, their project was delayed in permitting and could not begin construction before the pilot incentive start date deadline.

All project activities/deliverables listed in this section have already been delivered to the FDEP in a quarterly report.

Task 3 – Hire Interns/Labor Support for the Building Outreach and Pilot Program

An integral part of the program plan was to hire a temporary staff person whose sole purpose was to provide job site motivation, education, and technical support to builders and their workers throughout the duration of their construction project. The County turned full responsibility of this task to KCI.

An internship opportunity was posted with local area colleges including USF, New College, Manatee Community College, Ringling College, and Eckerd College. It was also posted with the Tampa Bay Association of Environmental Professionals. KCI staff participated in the Intern Recruiting Fair on Nov 6, 2009 at the University of Tampa, as well. News of the opportunity also spread through word of mouth via colleagues and acquaintances. Applications were received and resumes and writing samples were reviewed and ranked by qualifications.

Candidates were kept informed of the pilot's development and the anticipated time for scheduling of interviews. Interviews took place between December 4th and December 10th 2008. Beth Connor (BC) was informed of her selection on December 23rd. A Job Site Support Staff (JSSS) training manual was developed and provided to BC along with a full day of training at the KCI offices. Ongoing training and support was provided through weekly calls and periodic meetings at KCI's offices.

Task 4 – Local C&D Infrastructure Assessment

The County's existing C&D debris processing and market infrastructure was reviewed to help determine the appropriateness of incentives to the County, and how best to implement such incentives. The methodology utilized to execute this task included multiple research activities that are listed below.

- ✓ It began with a review of County provided C&D tonnage, customer, and tip fee revenue data. The C&D tonnage reports provided a breakdown by material type and the amount that was recycled rather than disposed. FDEP C&D tonnage reports were also reviewed.

- ✓ The County's solid waste ordinance was read and reviewed to understand its impact on C&D collection and processing.
- ✓ The County's contract with the current operator of the County facility was reviewed to understand the rights and responsibilities of the facility.
- ✓ An existing list of C&D recyclers, reuse/salvage vendors, haulers, and disposal facilities in and around Sarasota County was reviewed and updated by telephoning each vendor on the list to verify information that included name, contact, location, materials accepted, and container availability. The list was uploaded to the County's new C&D website page and is further detailed in Task 5.
- ✓ Several haulers operating in the County were interviewed to assess current market conditions including demand for roll-offs, pull frequencies, and pricing.
- ✓ A telephone survey was conducted of nearby counties to update a database of tip fees assessed for C&D, yard waste, and other debris disposal. This information was used to assess the competitive stance of the tip fees charged at County facilities.
- ✓ KCI staff conducted site visits to the County processing facility and a privately owned facility on the Fruitville Road to determine the operational impact of source separated versus mixed loads and possible tip fee reductions; and to identify possible additional equipment needs.

Lastly, a survey was developed and distributed to the five (5) C&D processing facilities operating in, or providing services to the County, to capture information used to assess the ability of the local infrastructure to process increased levels of C&D materials. The Pilot Program Summary for Facilities accompanied the survey. The survey questions asked for facility background information such as type, square footage, number of employees, and processing capacity expressed in tons. Operational information included sort method, types of materials accepted, and how hazardous waste or treated wood is handled and processed. The survey also asked for information on fees.

Three facilities responded to the survey: WCA of Fruitville, Waste Management/Recycle America, and the Sarasota Central County Solid Waste Disposal Complex (operated by WCA). All questions and responses were entered into the Survey Monkey (SM) online database tool for analysis. Facilities were asked whether they would participate in a certification program, if initiated. They were informed the certification program would be used to educate builders on the availability of C&D recycling services in Sarasota and

possibly to recognize facilities that achieve a high level of material recovery. All facilities responded positively.

All deliverable documents mentioned above have been sent to FDEP in previous Quarterly Reports.

Time and Motion Study

The purpose of a time and motion study is to observe how a task is performed within a measured time period and to use the information to reduce the amount of time and effort required to perform a task, or operate more efficiently in order to increase productivity. The KCI Project Team conducted a time and motion study in order to gauge the time to sort mixed loads of C&D debris materials and the potential labor savings to be achieved in processing source separated loads versus handling mixed loads of debris. The study was conducted at the County C&D processing facility.

The Pilot Program JSSS spent five (5) days in December 2009 (December 10, 11, 17, 23, and 30) at the County C&D processing facility in order to capture data on a sufficient quantity and variety of loads as they were tipped, sorted, and deposited in designated holding areas. The JSSS was equipped with a stop watch and trained to follow a protocol for the consistent capture and recording of data.

A total of 84 loads were observed over the five (5) days in December. Most of the loads (76) contained mixed debris; only eight (8) had been separated and contained a single material. The average effort required to sort all 76 mixed loads was 1,267 seconds (21 minutes), while the average effort required to sort all separated loads was 95 seconds (1.6 minutes), or 13 times less effort.

An analysis of the average effort required for sorting mixed loads of various numbers of types of materials showed that in general, as the number of materials increased, so did the effort required to sort the load. Not unexpectedly the effort required to sort a mixed load also tended to increase as the weight of the load increased. Further, it was found that of loads weighing equal numbers of tons, the effort required to sort those loads increased as the number of debris material types increased.

The results for this one week study suggest that separation of C&D debris materials at the construction site rather than at the facility requires less effort (measured in time), and

thus, fewer man hours by the facility to process the debris. If haulers delivered predominantly separated loads to a processing facility, the facility potentially could operate more efficiently. Further, if C&D processing facilities were designed to accept predominantly separated loads, even more efficiencies might be attained. A reduced tip fee would provide economic incentive for the C&D debris materials to be separated and delivered to the facility in clean, single material loads.

It is interesting to note the two loads of concrete that required no effort by sorters. If haulers could tip clean loads of material directly into a dedicated holding area, the facility could handle more loads due to less handling and manual sorting during peak times or during economic climates with booming construction.

The time and motion study plan, forms, and results have been sent to FDEP in previous Quarterly Reports.

Task 5 – Develop and Prepare Outreach and Educational Materials

Signs were developed based on builder needs, including participation signs, illegal dumping signs, and source separation recycling signs for adherence to the roll-off containers. Information already published on the County website was updated and additional resources were developed for inclusion on a new C&D page. The Introduction page, the Green Building Products Vendor List, and Internet Resource Guide were updated. Additional educational materials developed include:

- Materials and Definitions (M&D)
- Frequently Asked Questions (FAQ)
- 77 Laminated Jobsite Roll-off (11” x 17”) Signage/Artwork¹
- Artwork for Jobsite Illegal Dumping Signs
- Bilingual education notice
- Builders Waste Reduction and Recycling Guide
- County website C&D pages, including an internet resource guide
- Pilot Brochure

The builders have received a copy of the Guide.

¹ 7 each: Cardboard, metal, concrete, wood, drywall, tile, wiring, other C&D debris, garbage, items for salvage, Materials for reuse.

The M&D, FAQ, signage/artwork, and bilingual education notice were sent to FDEP in previous Quarterly reports. The Builders Guide and Brochure are included in this report in Appendix B.

To see all new and updated information on the new County website C&D debris recycling pages, go to:

<http://www.scgov.net/EnvironmentalServices/SolidWaste/Commercial/CDDebris.asp>.

All other materials were previously submitted to the FDEP in a quarterly report.

Task 6 – Research and Assess Capital Equipment and Supply Needs

A Packer 750 grinding machine was researched for its applicability to the WCA facility; it was determined that appropriate debris volume did not exist to warrant its use. Although WCA reported that a top loading, automatic baler would improve efficiency at the Knight's Trail C&D processing facility, they failed to provide information to the Project Team about the equipment features, availability, and cost, so it was not considered for inclusion in the project.

Additionally, County staff purchased:

- Twelve 64 gallon carts to be used for garbage collection on the project sites
- One computer laptop to be used by the job site support staff for daily site-visit logs
- One digital camera used by the job site support staff to document on-site activity

Photos of the carts in use were sent to the FDEP in a previous quarterly report. The laptop and camera were returned by the JSSS to County staff.

Task 7 – Identify and Prepare a Program Measurement and Verification (M&V) Plan

WasteCapTRAC was evaluated for project use by KCI and County staff. Emerge Technologies, developer of the database tool, reprogrammed WasteCapTRAC through KCI to better serve the pilot's needs. An Education Resource Binder was prepared for builder participants as a resource for using the WasteCapTRAC system. On March 23, 2009, the builders participated in a web tutorial of WasteCapTRAC to prepare and assist

them in its use on the jobsite. Seventeen people participated in the webinar. Additional training and assistance was provided by KCI staff throughout the pilot and as needed or requested.

The Table of Contents for the Education Resource Binder was sent to FDEP as part of a previous Quarterly Report.

Task 8 – Institute a Pilot Program to Increase C&D Recovery

As participating projects initiated construction, the JSSS began to conduct periodic (weekly) site visits to document progress, educate workers, and offer technical assistance. Site visits and technical assistance for projects were initiated in 2009 and completed as shown below:

| | <u>Start</u> | <u>End</u> |
|---|---------------------|-------------------|
| • Beeth residence, John Cannon Homes | Jan 8 | Sep 23, 2009 |
| • Midnight Pass residence, Vision Homes | Jan 30 | Feb 5, 2010 |
| • METI Plaza, Fred M. Starling Construction | Mar 3 | Dec 16, 2009 |
| • Dr. Bockhold’s Office, John Cannon Construction | Apr 15 | Aug 5, 2009 |
| • Wilson studio, My Green Buildings | Apr 15 | Nov 18, 2009 |
| • MCC, Tandem Construction | June 5 | Apr 28, 2010 |

The JSSS and KCI staff conducted kick-off meetings on all but the My Green Buildings job site. These meetings generally included all sub-contractors, owners/managers, and their crews who would be working on the project. Attendees were provided an overview of the County’s pilot recycling program, including its purpose and importance, information about C&D recycling in Florida, laws regarding proper disposal in C&D landfills, program rules and contractor enforcement, on-site support, and building materials containing recycled or reused products. It was impressed upon all that the success of the pilot program and recycling participation depended upon them and their workers.

During site visits, the JSSS gathered information that included the number of workers present, the name and type of contractors, and the number and type of dumpsters, if any. She assessed the site’s waste management program, noting source separation of recyclable materials, the level of contamination in recycling roll-offs, illegal dumping, and litter. She documented the visit with photographs and notes. She answered questions and inquired about any challenges faced by the builder. She provided on-site education

to contractors and their workers about recycling, and recycled content and renewable products in the construction industry. In addition, she distributed County literature on topics such as silt fencing and commercial recycling.

Rebates

Rebates were paid to five builders. Approximately \$9,200 was remitted to builders for concrete, metal, and wood recycling. The average rebate amount was \$1,833.

Table 3 - Rebate Program

| Builder | Accumulated Rebate Estimate |
|----------------|------------------------------------|
| JCH | \$38.35 |
| JCC | \$1,040.00 |
| FMS | \$2,637.83 |
| MGB | \$390.00 |
| Tandem | \$5,060.25 |
| Total | \$9,166.43 |

Recycling Rates

An analysis of the debris data reported in the WasteCapTRAC database produced the following recycling rates for the participating builders:² See section 3.3 for these results.

Results

The experiences of the builders on the job sites throughout the pilot program provided valuable lessons, and confirmed earlier held beliefs about the benefits and challenges of source separated recycling of C&D debris on the construction jobsite. An early finding from the pilot program showed that when builders learn that some recycling facilities charge a lower fee to accept clean, source separated loads versus mixed loads, the builders are more apt to make the effort to separate C&D debris materials on the construction site. Many builders did not realize that recycling service vendors offering a source separated collection program at a lower or no tip/collection fee were available in the County.

² Vision Homes was excluded from this analysis because the project was not completed during the pilot period.

Exit interview questionnaires were distributed to the builders as projects were completed and responses were documented for analysis.

Any deliverables stated above were previously transmitted to the FDEP in a Quarterly Report, except the interview questionnaire responses. The Interview Questionnaire Results are included in Appendix C.

3.2 Technology or Process Demonstration

The following describes how Sarasota County was the first County to pilot a comprehensive builder incentive program for their construction community to recover C&D debris. The project demonstrated advanced processes which are not in common use on a statewide basis through the following activities: building community project team driving the pilot plan; pilot incentive national research and plan implementation; intern job-site labor support for each builder's entire building process; local C&D infrastructure assessment; develop, prepare and upload on the County website comprehensive C&D education material; job-site carts to reduce or eliminate job-site garbage contamination in C&D debris containers; identify and test an M&V program; and institute a rebate program for source-separated material in a mixed-material processing market.

3.3 Material Recovery

The participants tracked their disposal and recycling activity in WasteCapTRAC, resulting in the following recovery rates:

- Tandem achieved a 96 percent diversion rate.
- John Cannon Homes (JCH) achieved a 9 percent total diversion rate.
- John Cannon Construction (JCC) achieved a 68 percent total diversion rate.
- Fred M. Starling (FMS) achieved a 68 percent total diversion rate.
- My Green Buildings (MGB) entered only the tons diverted and omitted the tons disposed, so no diversion rate can be calculated.

3.4 Transferability

Articles written and published include:

- SWANA FL Sunshine Chapter, “Talking Trash”, Fall 2009
- Recycle Florida Today, “Renewable News”, Winter 2009
- *C&D World Magazine*, C&D Recycling Programs Across the Country – Informing, Incentivizing, and Partnering, 2009
- *Resource Recycling Magazine*, “Cleaning Up After Breaking Down: Building Blocks to Increased C&D Recovery and Recycling,” February 2010

Presentations to organizations or associations include:

- SWANA FL Sunshine Chapter’s Annual Summer Conference, “Approaches To C&D Recovery: Incentives From Across The USA,” July 2009
- SWANA International’s Thinking Outside the Blue Box Conference, “Incentives Across The USA: Approaches to C&D Recovery,” February 8-9, 2010
- FDEP/SWIX C&D Recycling Workshop, “Construction & Demolition Building Blocks to Recovery,” April 29, 2009

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 on the next page 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 \$202,698.02.

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Table 4 – Innovative Grant Expenditures

| Category/Expenditure Type | Vendor | Total Expenditures |
|---|-------------------------------|---------------------|
| <i>Professional / Technical Services</i> | | |
| Consulting /Professional Services | Kessler Consulting, Inc. | \$164,773.11 |
| Consulting/Jobsite Support Staff | Kessler Consulting, Inc. | \$25,214.60 |
| Subtotal | | \$189,987.71 |
| <i>Containers / Equipment</i> | | |
| Carts | Walmart | \$ 826.32 |
| Dell Laptop computer | Dell | \$1,872.04 |
| Digital Camera | Walmart | \$182.69 |
| Subtotal | | \$2,881.05 |
| <i>Educational Materials / Supplies</i> | | |
| Signs | Signarama | \$484.58 |
| Signs | Sarasota Co Printing Services | \$ 42.12 |
| Supplies | Office Depot | \$ 88.20 |
| Subtotal | | \$614.90 |
| <i>Incentives</i> | | |
| Rebates to builders | | \$9,166.43 |
| Subtotal | | \$9,166.43 |
| <i>Shipping Costs</i> | | |
| FedEx | | \$47.93 |
| Subtotal | | \$47.93 |
| Total Costs | | \$202,698.02 |

The table on the next page provides a breakdown of the total in-kind contributions provided by County staff and project partners not directly paid for their services or time on the project. The total in-kind contributions equaled \$77,015.68 for the grant duration. The County is proud to announce that it exceeded its in-kind contribution commitment by \$29,515.68.

Table 5 – In-Kind Contributions

| Quarter/Work Period | Contribution |
|--------------------------------------|----------------------|
| Project Budget | \$47,500 |
| First Quarter – Period end | \$0 |
| First Quarter – Period end 12/31/07 | \$0 |
| Second Quarter – Period end 3/31/08 | \$12,825.00 |
| Third Quarter – Period end 6/30/08 | \$ 5,175.00 |
| Fourth Quarter – Period end 9/30/08 | \$ 7,372.50 |
| Fifth Quarter – Period end 12/31/08 | \$ 3,622.50 |
| Sixth Quarter – Period end 3/31/09 | \$27,428.64 |
| Seventh Quarter – Period end 6/30/09 | \$10,403.37 |
| Eighth Quarter – Period end 9/30/09 | \$ 4,088.85 |
| Ninth Quarter – Period end 12/31/09 | \$ 3,343.86 |
| Tenth Quarter – Period end 3/31/10 | \$ 1,237.99 |
| Final Quarter – Period end 7/31/10 | \$ 1,517.97 |
| Total | \$ 77,015.67 |
| Ending Balance | \$(29,516.67) |

3.5.2 Avoided Disposal Fees

The table below details the avoided disposal fees for the duration of the project for the participating builders.³ In total, 724.76 tons of material was diverted from the landfill for all projects, resulting in a cost savings of \$37,680.27 in disposal fees. On average, builders diverted approximately 145 tons per project from the landfill for an average savings of \$7,539 per project. The average savings reflects recycling activity on a single project. If this average savings per project could be applied to the other 95 builders that were invited to participate on the project, but did not participate in the pilot, the cost savings or avoided disposal expense to builders would be approximately \$716,205.

³ Vision Homes was excluded from this analysis because the project was not completed during the pilot period.

Table 6 – Avoided Disposal Fees

| Builder | Disposal (Tip) Fee \$51.99 | # Tons Recycled | Avoided Disposal Fees |
|-------------------------------|----------------------------|-----------------|-----------------------|
| John Cannon Homes | | 23.33 | \$1,212.93 |
| Fred M. Starling Construction | | 202.18 | \$10,511.34 |
| John Cannon Construction | | 80 | \$4,159.20 |
| My Green Buildings | | 30 | \$1,559.70 |
| Tandem Construction | | 389.25 | \$20,237.11 |
| Total | | 724.76 | \$37,680.27 |
| Average | | 144.95 | \$7,536.05 |

3.5.3 Cost/Benefit

Landfill Space Conservation

The table below estimates the amount of landfill space conserved from the implementation of the source separated debris recycling. A total of 979.99 cubic yards of landfill airspace was saved for the duration of the project.⁴

Table 7 – Landfill Space Conservation

| Builder | Cubic Yards Recycled |
|-------------------------------|----------------------|
| John Cannon Homes | 36.78 |
| Fred M. Starling Construction | 222.55 |
| John Cannon Construction | 86.49 |
| My Green Buildings | 32.43 |
| Tandem Construction | 601.74 |
| Total | 979.99 |

⁴ Tons of cardboard, wood, asphalt, concrete, and metal were converted to cubic yards using conversion rates developed by Tchobanoglous (1993), CalRecovery (1993), and NAHB (1997).

Conserving Natural Resources

The participating builders diverted a total of 724.76 tons of recyclables from disposal, resulting in the following natural resource conservation and green house gas emissions reduction equivalent to:

- 27 passenger cars off the roadway each year⁵
- 17,129 gallons of gasoline saved⁶
- 6,287 Propane cylinders
- 1,514 million BTUs of net energy savings

See Table 8 – Environmental Benefits Summary on the next page for additional details. This table summarizes data extracted from the WasteCapTRAC Environmental Benefits Report, which is based upon the EPA Warm Model. To better put the information into context, note the square footage and type of each project listed below.

| <u>Builder</u> | <u>Square Footage</u> | <u>Type Construction</u> |
|--------------------------|-----------------------|--------------------------|
| Fred M Starling | 35,500 | Commercial |
| Tandem | 40,000 | Commercial |
| John Cannon Homes, Inc. | 4,405 | Residential |
| John Cannon Construction | 1,000 | Commercial Renovation |
| My Green Buildings | 1,500 | Residential |

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⁵ Based on the WasteCapTRAC Environmental Protection Agency (EPA) Waste Reduction Model (WARM) report

⁶ Based on the WasteCap TRAC Environmental Protection Agency (EPA) Waste Reduction Model (WARM) report

Table 8 – Environmental Benefits Summary

| | Fred M Starling | Tandem | John Cannon Homes, Inc. | John Cannon Construction | My Green Buildings | Total |
|---|-----------------|----------|-------------------------|--------------------------|--------------------|-----------------|
| GHG Emissions from Passenger Vehicles | 5.0 | 19.0 | 1.0 | 2.0 | - | 27.0 |
| Gallons Gasoline per CO2 Emissions per Gallon | 3,090.0 | 11,855.0 | 783.0 | 1,284.0 | 117.0 | 17,129.0 |
| Energy Saved Based on Annual Emissions of Households | 2.0 | 9.0 | 1.0 | 1.0 | - | 13.0 |
| # Propane Cylinders Saved based on CO2 per pound of propane | 1,134.0 | 4,352.0 | 287.0 | 471.0 | 43.0 | 6,287.0 |
| CO2 Emissions Saved per ton of Waste Recycled vs. Landfilled | 9.0 | 36.0 | 2.0 | 4.0 | - | 51.0 |
| Net GHG Reductions by Material Type in Metric Ton Carbon Equivalent: | | | | | | |
| Corrugated Cardboard | 0.9 | 5 | 0 | 0 | 0 | 5.9 |
| Lumber | 0 | 0 | 1.6 | 0 | 0 | 1.6 |
| Mixed Metals | 0 | 7.8 | 0 | 0.2 | 0 | 8 |
| Concrete | 2 | 0.5 | 0 | 0.8 | 0.3 | 3.6 |
| Subtotal | 2.9 | 13.3 | 1.6 | 1 | 0.3 | 19.1 |
| Net GHG Reductions by Material Type in Metric Ton CO2 Equivalent: | | | | | | |
| Corrugated Cardboard | 3.2 | 18.4 | 0 | 0 | 0 | 21.6 |
| Lumber | 0 | 0 | 5.7 | 0 | 0 | 5.7 |
| Mixed Metals | 0 | 28.8 | 0 | 0.7 | 0 | 29.5 |
| Concrete | 10.1 | 47.2 | 0 | 4 | 1.5 | 62.8 |
| Subtotal | 13.3 | 94.4 | 5.7 | 4.7 | 1.5 | 119.6 |
| Net GHG Reductions by Project in Metric Ton Carbon Equivalent: | 2.9 | 29.5 | 1.6 | 1 | 0.3 | 35.3 |
| Net GHG Reductions by Project in Metric Ton CO2 Equivalent: | 13.3 | 111.9 | 5.7 | 4.7 | 1.5 | 137.1 |
| Net Energy Savings by Material Type in Million BTUs: | | | | | | |
| Corrugated Cardboard | 14.4 | 83.6 | 0 | 0 | 0 | 98 |
| Lumber | 0 | 0 | 0.6 | 0 | 0 | 0.6 |
| Mixed Metals | 0 | 406.4 | 0 | 10.5 | 0 | 416.9 |
| Concrete | 127.3 | 0.3 | 0 | 50.4 | 18.9 | 196.9 |
| Subtotal | 141.7 | 490.3 | 0.6 | 60.9 | 18.9 | 712.4 |
| Net Energy Savings by Project in Million BTUs | 41.6 | 1,292.3 | 0.6 | 60.9 | 18.9 | 1,514.3 |

Net Benefit/Cost Savings Per Capita or Building Community

The calculation of net benefit/cost savings per capita does not apply because this project targeted construction debris generators and the savings to be achieved by builders through source separated recycling on the job site.

But, if you utilize the average rebate amount of \$1,833 per builder and multiply that amount by the number of builders identified in the original pilot mailing (100), times two (2) projects per year, it would equate to a total construction industry cost savings of \$348,324 for a reduced tipping fee program for source-separated material.

3.5.4 Nontraditional Method for C&D Debris Recovery

This project successfully tested the use of nontraditional methods to target C&D debris: source separation versus mixed debris program, differential tip fee rebate, carts for recycling, and intensive on-site technical support.