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UNLV residence hall recycling & reuse program for move-in and move-out

Angela Michelson
University of Nevada Las Vegas

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UNLV Residence Hall Recycling & Reuse Program For Move-In and Move-Out



By Angela Michelson
Advisor Tara Pike

May 10, 1999

Abstract

The goal of this thesis was to develop a program for the UNLV Residence Hall Recycling & Reuse Program for Move-In and Move-Out that would collect unwanted and unneeded materials from the residents and put them to use. Move-In collected cardboard boxes for recycling while Move-Out collected usable items such as shoes, clothes, food, bedding, and school supplies for resale. In order to have a good collection turnout, a combination of advertising and resident and staff education was conducted. Letters were sent to Resident Assistants (RA's) and Complex Coordinators and posters and other advertisements were placed in high traffic areas for both Move-In and Move-Out. For Move-In cardboard dumpsters were put into place outside next to garbage dumpsters and for Move-Out collection bins were put into place on each floor in every hall. The collection diverted a total of 8,627.5 pounds of material for the 1998 Move-Out Program and approximately 28 cubic yards of cardboard for the 1998 Move-In Program. Although the collection for Move-In and Move-Out was very successful some important changes need to be made to improve the program. The changes deal more with the administration and coordination of the program, instead of the program design. Some changes include having pre-determined collection schedules and responsible volunteers recruited ahead of time. Other changes include improvements of Move-Out collection bins and increasing the number of collection bins. Overall, the program was an incredible success and should be modified and continued.

Acknowledgments

This thesis could not have been done without the help of many important people. First I would like to acknowledge Tara Pike not only for her development of the idea to expand on the current UNLV Residence Hall recycling program but for her help in getting me started in the right track. Much of the information and material collected could not have been done without her. Next I would like to thank my Mother for all her hours of editing and rewriting involved in this paper, even if we didn't always agree. Last but not least I would like to thank Jerimiah Tipton for his help in collection of all the Move-Out material. Thank you all for your help and support

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CHAPTER 1 Introduction

I. Recycling & Reusing

A. What is Recycling & Reusing?

Recycling is “the processing of wastes to recover materials that can be reused” (World Book, 1988). The most common recovered and collected materials include steel, paper, and aluminum but other materials are collected such as glass, plastic, and motor oil. Reusing on the other hand deals with using a product over again until it can not be reused any more and either needs to be thrown away or recycled. One such product that is reused is clothing. Many organizations such as Goodwill and Salvation Army collect clothing for reuse and resale.

B. Types of Recycling

There are two types of recycling according to G. Tyler Miller, Jr.: primary and secondary. Primary is when “wastes discarded by consumers are recycled to produce new products of the same type” (Miller, 1997). One example of primary recycling is recycling old newspaper into new newspaper. “Primary recycling can reduce the amount of virgin materials, or materials never used before, required by 20-90%.” (Miller, 1997)

Secondary recycling is not quite as efficient but still important, it involves “the conversion of waste materials into different products. One example is recycling plastic jars into other plastic items such as garbage cans. Secondary recycling can reduce the amount of virgin material required by at most, 25%” (Miller, 1997).

C. What Can Be Recycled & Reused

Potentially, anything can be recycled and reused. That does not mean that at this time we have the capability to do so. Currently, the most popular recycled and reused items include:

1. Aluminum
2. Glass
3. Paper (all grades)
4. Plastic
5. Organic Waste (grass clippings, yard waste, food)
6. Clothing
7. One-Sided Paper (resused)
8. Furniture
9. Cardboard
10. Steel/Tin

D. The History of Recycling

Before going into the history of recycling, it must be noted that this is a very extensive subject. Some of the most important and influential aspects have been chosen.

Before 1000 BC, humans were nomadic hunter/gatherers with little need for any waste management strategy. There were very few people and not enough time was spent in any one place to accumulate significant amounts of solid waste. Roughly around 1000 BC, people began to settle into permanent residences. As the populations continued to grow in these settlements so did the amount of waste.

“In 500 BC, Athens Greece developed one of the first waste management plans. It developed a municipal dump and instructed residents not to place their garbage within one mile of the city walls” (Lund, 1993). As time passed, populations grew and so did the problems associated with garbage disposal.

People were living in unsanitary conditions due to the accumulation of garbage within the city limits.

In the 1300's people began to get sick due to the Bubonic Plague, also known as the Black Plague, a disease which was linked to rodents living in improperly disposed garbage. In short, rodents living in the garbage carried fleas, the host for the Bubonic Plague, which eventually spread to people living too close to the garbage. The people were being bitten, and therefore infected, by the infected fleas.

It was determined that one way to stop the Bubonic Plague epidemic was to burn infected items. The people began to burn everything, clothes, homes, bodies, and especially garbage. At that point, the burning of garbage became very popular. It was a way to dispose of garbage and reduce the spread of disease.

In some areas sanitation continued to be a problem, so much so that in the "1840's the "Age of Sanitation" began" (Lund, 1993). "In 1874 in Nottingham England, an incineration system was developed. It caught on in America and in 1885 New York developed their own incineration program" (Lund 1993).

Many years passed before further advances were made. In the Nineteenth Century advances were made in the garbage collection process. Horse-drawn carts were used for garbage collection up until the Nineteenth Century. In 1915, the automobile replaced the horse-drawn carts (Lund, 1993). "Municipalities cleaned streets and sanitary engineers invented new

technologies to reduce costs and volumes" (Lund, 1993). One additional development during the nineteenth century was the advent of corrugated cardboard, tin cans, ready-made clothes, commercial packaging, and factory cut lumber. This development increased the production of garbage and in turn, increased the volume of landfill contents.

Up to this point there were "four basic methods of garbage disposal: dumping, burning, recycling, and minimizing future production, source reduction" (Rathje, 1992). Dumping garbage had been the preferred method of disposal for many years. That all changed in 1941 when the United States entered into World War II.

In order to meet the needs of military forces, two major changes were imposed:

1. Contributions to the war efforts through rationing, reusing, and recycling by the citizens
2. Scientific and technologic advances.

American citizens were required to contribute to the war effort. The government collected metals, including steel, iron and copper in order to make weapons planes, tanks, ships and bullets. Gasoline and food were also rationed in order to have enough supplies to fund the war. The capability to convert everyday household items into weapons, boats, etc. was due to the advances made in the scientific and technologic areas. Scientists and engineers worked round the clock to turn out as many items as they could. This was one of the first experiences for some citizens on the impacts and importance of recycling and reusing.

It was not until after World War II that the concept of finite resources was looked at. Through the rationing, people noticed that there was not an endless supply of materials, primarily metals, food and gasoline.

As time passed a new movement developed that centered on the Earth. People were becoming more aware of environmental issues and effects that were taking place due to war and other environmentally detrimental activities. One example of the change in awareness was the celebration of the first Earth Day on April 22, 1970. Approximately twenty million people participated in peaceful demonstrations all across the country. They joined forces in order to let the government know that the people care and that something needed to be done about the state of the environment.

From the movement's success and the success of other similar programs, times have changed. Programs have been developed across the United States and throughout the world. Many areas have comprehensive recycling programs that include curbside recycling programs. Many businesses and companies have developed in-office-recycling programs, and even schools, such as Oregon State University and the University of Washington, have developed school recycling programs. "In 1994, about 23% of US municipalities solid waste was recycled or composted; 16 states have adopted goals of recycling at least half of their municipal solid waste by 2000" (Miller, 1997).

E. Why Recycle & Reuse

Recycling and reusing is a way of protecting the environment and conserving resources. Recycling reduces the number of invasive activities that

must occur on the land to produce products. One example involves the recycling of paper. If paper can be recycled it reduces the need to harvest and cut new trees to produce paper products.

Recycling and reusing can also protect the environment through the conservation of energy, thus reducing impacts such as acid rain, global warming and air pollution.

“Recycling aluminum uses 95% less energy than producing aluminum products from raw materials, produces 95% less air pollution, and 97% less water pollution. The electricity used to produce one aluminum can from virgin ore can keep a 100-watt light bulb burning for 100 hours. Recycling the Sunday newspaper editions per week could save 500,000 trees. Recycled paper uses 60% less energy than manufacturing paper from virgin timber, reduces air pollution by 74-95%, and reduces water pollution by 35%” (Miller, 1997). Recycling a glass jar saves enough energy to light a 100-watt light bulb for four hours” (Earth Day Resources, OSU).

Even though protection of the environment is critically important, it is not enough to convince everyone to recycle. Many times, people are more easily influenced when money is involved. In some areas of the country it has now become so expensive to dispose of items in landfills that it is cheaper to reuse or recycle them. Also, in some areas raw material has become more expensive than post-consumer material. Therefore, depending on what part of

the country you live in, using recycled material not only benefits the environment but can save companies, factories and businesses money.

Even though protecting the environment and saving money are important, recycling has an additional benefit. Recycling creates thousands of jobs. "Recycling 1 million tons of solid waste in the United States requires about 1,800 workers, compared to 600 workers for landfilling these wastes and only 80 jobs for incinerating them" (Miller, 1997).

One example of job creation can be seen in the video Garbage to Gold. It dealt with the issue of unemployment, job creation, and recycling through one action. In many inner cities there is a large percent of the population, that is unemployed. Some of these inner cities have an old structural foundation in place. Much of this old structural foundation is due to businesses and factories having left the area. The combination of an in place foundation and a ready to work labor force make a great place to set-up a recycling center. In Chicago South and West Side inner city, a recycling center was opened and has been successfully running ever since. The creation of jobs is critical in today's economy.

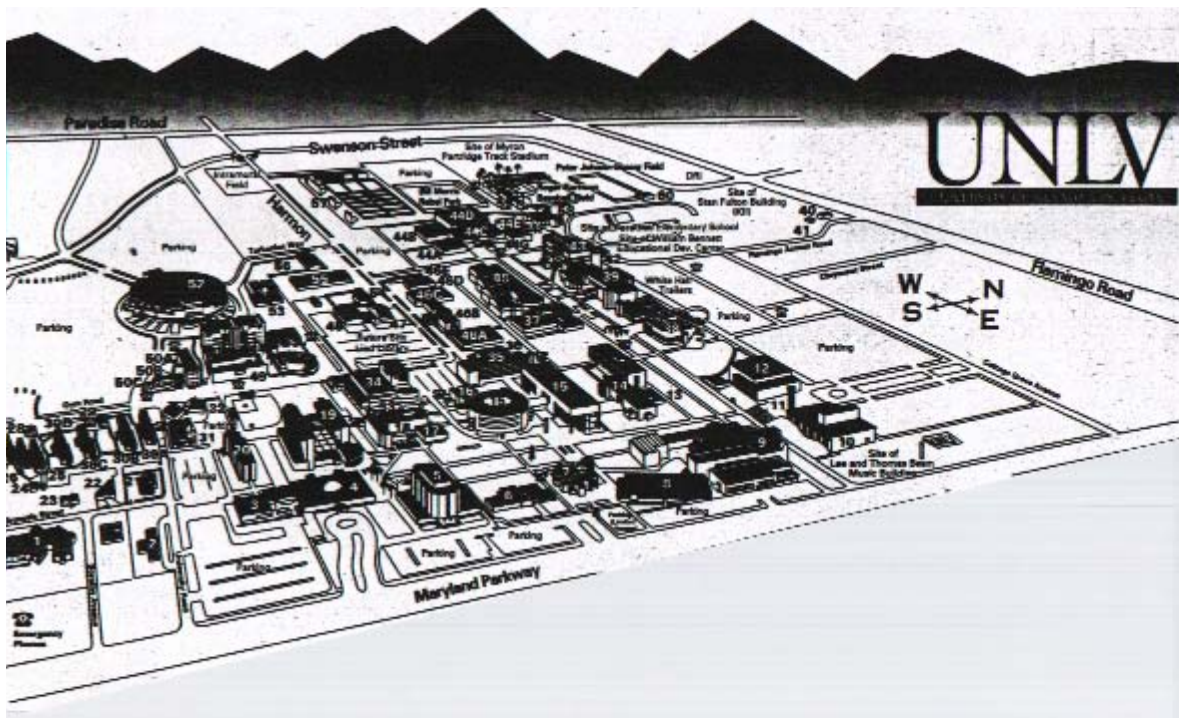
II. Campus Profile

A. Campus Structure

UNLV is a 4-year State co-educational University located in Las Vegas, Nevada. UNLV's first official building, Maude Frazier Hall, was constructed in 1957 on a 60-acre plot and accommodated 300 students. Today UNLV has expanded into a 335-acre campus with approximately 20,000 students attending each semester.

Freshmen are required to live on-campus in the Resident Halls for their first year. Transfer students and non-freshman have the option of either living in one of the eight on-campus Resident Halls or off-campus. There are three complexes consisting of eight halls within the Residence Hall system. South Complex consisting of Boyd, Rodman, and Williams Hall; the Upper Classman Complex (UCC) consisting of Hughes, B, C, and D Halls; and Tonopah Hall.

Figure 1-1 Campus Map



III. Residence Hall Profile

A. South Complex

In the South Complex, each hall is connected to the next through a series of walkways. All three floors of Rodman connect to the first three floors of Boyd and the four floors of Boyd connect to the first four floors of William's. Below are some facts about the South Complex and its halls.

FIGURE 1-2 South Complex Layout

HALL	# OF FLOORS	# OF RESIDENTS	# OF ROOMS	SINGLE OR DOUBLE OCCUPANCY
Rodman	3	120	60	Double
Boyd	4	160	80	Double
William's	5	200	100	Double
Total	12	480	240	

Each floor of the halls in the South Complex is very similar. Each floor has a study and a lounge. The lounges have couches and televisions while the studies have tables and chairs. All mail and laundry facilities are located in a nearby building, South Services Complex.

South's garbage facilities are located in two places: one in the main adjacent parking lot and one between Building D and South Complex. Each disposal area has two 3-cubic yard dumpsters.

B. Upper Classman Complex

UCC is comprised of 4 halls: Hughes, B, C, and D Hall. Unlike South Complex, all buildings in UCC are free standing; there are no connecting walkways between them. Below is a chart showing important features of UCC and its halls.

FIGURE 1-3 Upper Classman Complex Layout

HALL	# OF FLOORS	# OF RESIDENTS	# OF ROOMS	SINGLE OR DOUBLE OCCUPANCY	# OF LAUNDRY ROOMS
Hughes	3	120	60	Double	2 (1 st floor)
B	3	90	45	Double	2 (1 st floor)
C	3	90	45	Double	1 (1 st floor)
D	3	90	45	Double	1 (1 st floor)
Total	12	390	195		6

Each hall in UCC has its own distinguishing features. The most obvious feature in each is the addition of balconies; two rooms share one balcony on each building. Hughes Hall has a large open room on the first floor that can be used for meetings, relaxing and studying. Hughes, B, C, and D have no formal study rooms like South Complex, but instead, have two lounges on each floor and an open game area on the first floor. The mailroom for the UCC Halls is located in an adjacent building called Warner Building.

UCC has two of its own dumpsters and two that it shares with South Complex. One is located between Hughes and Warner Building; one is located between Warner and B Hall. Two are located between South Complex and D building.

C. Tonopah

Tonopah is very different in comparison to UCC and South Complex's layout. The main difference is that it is not comprised of multiple halls. In addition, everything is housed within the building; all laundry and mail areas are within the hall. There is one large lobby/lounge on the first floor for games and television. Below are some important facts about Tonopah.

FIGURE 1-4 Tonopah Layout

HALL	# OF FLOORS	# OF RESIDENTS	# OF ROOMS	SINGLE OR DOUBLE OCCUPANCY	# OF LAUNDRY ROOMS
Tonopah	6	205	100	Double & Triple	1

Tonopah is also unique in its location of the garbage facility; its one dumpster is housed in a room off the lobby and is accessed through a door. The dumpsters are not shared with any of the other complexes due to the location of Tonopah.

D. UNLV Campus Recycling History

As mentioned earlier, some schools have developed on-campus Residence Hall/dorm recycling programs. Some of these programs collect a multitude of items from all areas of campus for reuse or recycling. Others are much more localized and collect items only from certain areas of campus for recycling. The University of Washington and Oregon State University are two examples.

All college campuses differ as to the time when their recycling programs were implemented. Some were many years ago, such as Oregon State University in 1974, and some are more recent, such as Illinois State University in 1992. The University of Nevada Las Vegas began the development of its recycling program in 1992.

Tara Pike, an environmental studies graduate at UNLV, initiated a study to determine what recyclable waste was being produced on campus, how that could be reduced, and the feasibility of having a recycling program. In the

summer of 1994, she completed her thesis entitled "An Improved Recycling Program for the University of Nevada Las Vegas." The document outlined the need for a campus wide recycling program, how it should be run, and who should run it. The proposed program was also given a name, Rebel Recycling. Appendix 1 shows a more detailed history of the campus-recycling program.

E. Residence Hall Recycling History

Rebel Recycling has continued to grow since its conception. In 1996, Rebel Recycling expanded to include the Resident Halls. The first addition was through the implementation of a Move-In Program. This program was done through the collaboration of Silver State Disposal and Rebel Recycling. The purpose was to divert as much cardboard boxes from going to the landfills as possible. Although the program collected at least 18 cubic yards of cardboard, many problems were encountered. These problems included the failure of Silver State Disposal was to pick-up the containers of cardboard in a timely fashion and recycle it.

The second addition to the Residence Hall Recycling Program came on September 23, 1996. A recycling program set up by Rebel Recycling was set up inside the halls to collect aluminum and plastic.

In 1997 collection cabinets designed and paid for by Campus Housing were put into South Complex Residence Hall. A total of twelve cabinets were used at a cost of \$950.00 each, a total cost of \$11,400.00. Cabinets were of poor design due to the use of swinging doors. Each bin had four compartments: two for trash, two for plastic, and one for aluminum. With continued use, the

doors broke and labels came off the compartments. Trash ended up in all of the five collection compartments. Due to this poor design and problems with garbage, this program has since been discontinued.

The third addition to the program was the implementation of a mini Move-Out Program in the Spring of 1997. The purpose was to collect materials and donate them to charities. The program collected:

- 235 lb. of clothing,
- 44 lb. of linens,
- 42.5 lb. of shoes,
- 32 lb. of miscellaneous,
- 353 lb. of total collection.

In 1998, it was decided that a formal plan for Move-In and Move-Out should be developed. Therefore, the purpose of this thesis is to design and implement an improved recycling and reuse program for the UNLV Resident Halls specifically designed for the collection of Move-In and Move-Out materials.

F. Move-In Goals

Fall Move-In is the time when students come to school for the year and bring all their belongings with them. Most of the items that the residents bring with them are packed in corrugated cardboard boxes. Normally, these boxes are thrown away. The goal of the Move-In Program is to divert these corrugated cardboard boxes from the landfill and recycle them.

Prior to Move-In four things were done. They consisted of the development of posters letting the new residents know what to do with their boxes, the composition of a flyer to be included in each residents Move-In

information packet, attendance at one of the residence assistant (RA) meetings, and the setup of collection bins.

G. Move-Out Goals

Spring Move-Out refers to the period when UNLV Residence Hall residents clean out their room for the summer, because they have to Move-Out. It occurs annually during the second week of May. At this time, residents must clean everything out of their rooms by the end of the week. Hundreds of usable items are discarded at each Move-Out and normally go into the landfill. Many of these items are discarded because it is too difficult to transfer them home; either their car is too small, the airlines will not allow them to take everything, or they just don't want the items anymore.

The goal of the Move-Out Program is to divert as much of these reusable and recyclable items from going into the landfill. Any and all usable items can be collected for sale or donation to local charities of the Las Vegas community. Appendix 2 shows a list of possible collection items.

H. Ultimate Goal of Move-In & Move-Out Programs

One of the ultimate goals is to save Campus Housing money. Each year Campus Housing spends additional money to bring in 28 cubic yard dumpsters. Three dumpsters (one for each complex) are brought in four times during the year: Fall Move-In, Fall Move-Out (Christmas break), Spring Move-In, and Spring Move-Out (end of the year).

Fall Move-In and Spring Move-Out generate the most material. So in addition to requiring the dumpsters, an exchange (removal of a full dumpster

and replacement with an empty one), is necessary. That is a cost of \$860.00 for each dumpster, a total cost of \$2580.00. Fall Move-Out and spring Move-In also require dumpsters, although no exchange is necessary. That is a cost of \$560.00 each, a total cost of \$1680.00. If an additional exchange is needed, although rare, it would cost \$300.00. If programs can be developed that reduce the need for exchanges or even the use of dumpsters, Campus Housing can save money.

CHAPTER 2 Materials & Methods

I. Leadership

In order to develop a cohesive Move-In and Move-Out Program, a position needed to be developed. This position allowed one person to get intimately involved in all aspects of program set-up and development. I was able to fulfill this position and develop a Move-In and Move-Out Programs for the UNLV Resident Halls.

II. Move-In

A. Posters

Posters were put into place a few days prior to Move-In and were located on each floor in every Residence Hall, in each hall lobby, in Warner building, and in the South Services building. All are placed in areas with high traffic volume. Posters were also placed on each garbage dumpster indicating that corrugated cardboard boxes should not be discarded.

B. Resident Flyer

When the residents moved into the Resident Halls they received an information packet. The packet contained information on the rules and regulations of the Resident Halls, how to work the air conditioner, the layout of the building, and where the laundry facilities were located. Included in this packet was a flyer informing the residents about what to do with their empty boxes (Appendix 3).

C. Resident Assistant Meetings

Each floor in the Residence Hall system has a Resident Assistant (RA).

His or her role is to oversee and maintain all floor activities. All RA's went through a training process that allowed the Director of Campus Housing, Complex Coordinators, to educate the RA's on the rules, regulations, potential problems, and RA responsibilities.

During this time of training, many meetings were held when the entire group of RA's were together. This offered a great opportunity to meet with the RA's and let them know about the Move-In Program. This was done at one of the RA meetings approximately one week prior to Move-In.

D. Collection Bins & Transportation

Collection bins were placed outside only due to the potential fire and safety hazards. They were placed adjacent to all dumpsters for each complex. The bins were 3 cubic yard white dumpsters labeled "CARDBOARD ONLY" and are owned by the Rebel Recycling Program.

The bins were serviced at least once each day to remove and transport the cardboard. Environmental Studies students (ENV 100 and ENV 490), Tara Pike's work-study students, and any additional volunteers were utilized to remove and transport the cardboard. The dumpsters were emptied either manually by climbing in, using the drop-gate, and removing the cardboard or by attaching the dumpster to the cart and driving it to the Rebel Recycling yard.

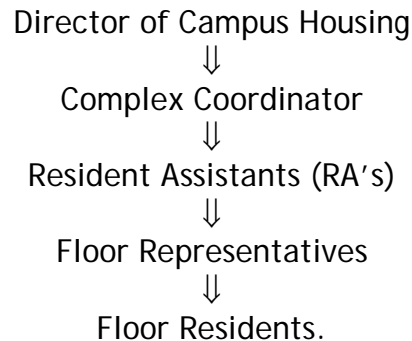
During this time Rebel Recycling awaited the arrival of its own private baler. Therefore, cardboard was unloaded into the Rebel Recycling yard to await its arrival. If the collection pile became too large, the cardboard would be transported to a 28 cubic yard dumpster, owned by RC Farms Waste

Management, to be recycled.

III. Move-Out

A. Staff and Resident Education

Education of the residents and staff was key to the success of the Move-Out Program success. Within the Residence Hall community, a hierarchy of authority exists:



Therefore, the most logical starting point was to begin with education of the director and work down to the residents.

B. Campus Housing Director

The initial starting point was to speak to the Director of Campus Housing. The purpose was to let the director, Karen Strong, know what was planned, what she could do, and to address any concerns or questions she had. She was contacted first because a major change in the Residence Hall Recycling Program was needed. This change involved the development of an improved recycling and reuse program for Move-In and Move-Out.

C. Complex Coordinators & RA Contact

After initial contact with the director, Complex Coordinators were notified. Just as with the director, a meeting was scheduled. Program plans, what they could do, and any questions or concerns were discussed. One

important way Complex Coordinators were involved was using them to distribute RA letters. These letters were distributed prior to the attendance of any Complex Council Meetings (to be discussed later). Approximately four weeks prior to Move-Out, Complex Coordinators were contacted and given the letters to be distributed to the RA's (See Appendix 4 for a copy of the RA letter). These letters allowed contact with the RA's through their Complex Coordinators.

D. Floor Representative

Each week there was a meeting, a Complex Council Meeting, involving floor representatives, RA's, and Complex Coordinators. Floor representatives from each floor of every Residential Hall, brought needs, concerns, and questions from their floor to the Complex Coordinator. The best way to contact the floor representatives was through attendance of these meetings.

A Complex Council Meeting for each Resident Hall complex was attended approximately three weeks prior to the start of the Move-Out Program. Attendance of Complex Council Meetings helped gain support for the program. It allowed for residents and leaders to pass the word on about the program to get more people involved. This support was critical in avoiding problem development and having a successful Move-Out.

E. Resident Letter

Residents received a letter in their mailboxes one-week prior to the start of Move-Out. See Appendix 5 for a copy of the resident letter. The letter was another way of letting them know about the Move-Out Program. Since the

majority of donations would come from the residents, it was felt that this was the most direct way of notifying them.

F. Preliminary Posters

Approximately three weeks prior to Move-Out, preliminary posters were placed around the Resident Halls (See Appendix 6). The purpose of these posters was to prepare the residents ahead of time. The posters let residents know that instead of throwing usable items away, Rebel Recycling would be collecting them for donation.

Posters were placed on each floor or hall lobby depending on the complexes high traffic areas.

FIGURE 2-1 Placement of Preliminary Posters within Residence Halls

Complex	Hall	# OF POSTERS	# PER HALL	LOCATION
South Complex	Rodman, Boyd, and William's	12	1 on each floor	Random high traffic areas
UCC Complex	Hughes and B	8	4 for each building	Laundry room and door
	C and D	6	3 each	On 2 nd & 3 rd floor: directly across from elevator. 1 st floor: next to door
Tonopah	Tonopah	3	3	Lobby, on door to garbage, mailroom
Warner Building	NA	1	NA	Mailbox
South Services Complex	NA	3	NA	Laundry room, game area, near mailboxes

G. Dumpster Posters

In addition to collection bins, dumpster posters were used. They were put into place the same day as the collection bins. The posters reminded the residents to not throw their usable items away and instead donate them. The posters were placed on the outside cement enclosure walls of the dumpster areas and in some cases, directly on the dumpster.

H. Table Tents

Table tents were put into place four days prior to Move-Out bin placement. A copy of the table tent is supplied in Appendix 7. They were placed on all tables in the dining facility. This was a prime location for advertising the program since all residents use the same dining area.

I. Collection Bins

Four days prior to the start of Move-Out, the Saturday before finals week began, collection bins were put into place. With new posters informing the residents of their use.

A total of 28 bins were required: each floor's lounge in South Complex, UCC Complex and two in Tonopah's lobby. In total the bins cost \$171.00 (28 bins @ \$5.00 each)

Bins were large wardrobe boxes with the tops cut off to reduce theft. The tops were removed so the box could not be closed and therefore, would be less desirable as a moving box for residents to use. The UNLV Rebel Recycling Program supplied all collection bins.

The bins were emptied as many times as possible each day, but at least

twice a day, once in the mid-morning (around 10:00 a.m.) and once in the early evening (5:00 p.m.) by Tara Pike, a volunteer, and myself.

J. Collection of Items

In order to collect the items for transportation a method of bagging was used. Large trash bags were used to transfer the contents of each collection bin into bags and then the bags were transported, not the bin.

K. Transportation

Transportation involved the use of golf carts with attached trailers and a donated pick-up truck to transfer all bags. Bags were taken to the Rebel Recycling Office trailer where they were later sorted.

L. Sorting Process

The sorting process started after all items were collected out of the halls and brought to the Rebel Recycling trailer. Before collection began it was thought that items could be collected, transferred, and sorted during each collection run. The large amount that was collected and lack of volunteers did not allow for that to be done. Instead, items had to be sorted after transport of all items was complete.

All bags were opened and separated by categories. Items were placed into the following categories: clothing, shoes, bathroom supplies, cleaning supplies, school supplies, linens, mattress pads, towels, books, magazines, hangers, and miscellaneous items.

During the sorting process all items were weighed. Weighing the items allowed for a unit of measurement so that collection amounts could be

compared to other schools and to future collections. Items such as clothing, linens, and mattress pads were all sorted and then rebagged. Once rebagged, they were placed on a scale and the weight was recorded. This technique was done for most items. Others, such as books and cinder blocks, were placed directly on the scale and then recorded.

M. Yard Sale

Many schools have a large yard or rummage sale to reuse and sell some of the items collected during Move-Out. Because of the success of these yard and rummage sales, it was decided to implement a similar program for the UNLV Residence Hall Move-Out Program.

Some concerns arose in the planning of this sale. The main concern, was where to have it? It was decided that since July is an incredibly hot month, the sale would be inside one of the Rebel Recycling trailers on campus. It was also decided that the sale would run from Friday through Sunday, opening at 7:00 a.m. and closing at 6:00 p.m. each day.

In order to have a successful yard sale, an ad was placed in the local newspaper, signs were posted on surrounding streets, and e-mail letters were circulated throughout campus informing the staff and employees about the event. The ad ran from three days before the sale and continued until the end of the sale. The signs were posted and the e-mail was circulated three days prior to the sale. In addition, large signs were made and placed in front of the Rebel Recycling Trailers and along surrounding streets to direct traffic to the sale.

All items were priced to sell. For instance, all T-shirts were \$.25, jeans and other clothing \$.50, shoes \$1.00/pair, books \$.10, cleaning supplies \$.05-.10, hangers were free, and most other items were under \$1.00. Since there were so many materials we wanted to make sure we could sell as many items as possible. Therefore, it was decided that an easy pricing guide would be used, even if prices were a little low.

CHAPTER 3 Results

I. Move-In

A. Advertising and Promotion

a. Resident Letter & Posters

Promotion and advertising directed at the residents was very successful. Although advertising and collection can not be directly linked, advertising and promotion did contribute to the large amount of generated items.

b. RA Meeting Attendance

Attendance at RA meetings also proved important because it increased program support. It was the first time that many of the RA's had the chance to hear about the program. During the meeting many questions and concerns about the program were addressed and excitement and anticipation for the program was stimulated.

B. Collection Bin Placement

Having all bins located outside the halls allowed ease in collection. Time was not wasted entering, exiting, and transporting material to and from the building to the golf cart.

C. Collection and Transportation of Items

The collection process for Move-In was very simple. Collection dumpsters were attached to the golf cart and transported to the Rebel Recycling yard. As already mentioned, Rebel Recycling was waiting for the delivery of its own baler. Instead of using the schools baler, the cardboard was transported to the Rebel Recycling yard to be baled there.

Use of the schools baler could have taken place, but due to lack of volunteers and space, it was not feasible. The area that houses the schools baler, the North side of Student Services Building, is extremely small. Cardboard would have had to have been piled up and baled later. That is because there were not enough volunteers to bale as cardboard was collected. To avoid potential problems associated with the cardboard pile, it was instead transported immediately to the Rebel Recycling yard to await future baling.

Problems arose when the arrival of Rebel Recycling's baler was postponed causing large piles of cardboard to accumulate in the yard. Instead of baling the cardboard it was placed in a large 28 cubic yard dumpster, owned by RE Farms Waste Management and taken for recycling.

In addition to baler problems, there was also a lack in manpower. Much of the collection was therefore left to two or three people. This lack of manpower was due to two reasons. The first was inadequate volunteer recruitment. The second was that at the beginning of the semester Rebel Recycling is always short staffed. This combination contributed to the lack of volunteers and manpower.

D. Baling, Results, and Dumpster Removal

The ability to transport the cardboard in the dumpster to the trailer made the collection process much less tedious and much more efficient. After each collection run, the cardboard was taken to the Rebel Recycling trailer to await baling. In total, approximately 28 cubic yards of un-baled cardboard was collected from the Move-In Program.

II. Move-Out

A. Advertising and Promotions

a. Floor Meeting

Each floor had a weekly meeting, however many residents did not attend, especially meetings towards the end of the school year. In order to compensate for low attendance, advertising and promotion had to be increased. Program promotion was done through the use of posters, dining facility table tents and letters to the residents.

b. Resident Letter

Once the setup process for Move-Out was underway, some advertising and promotion ideas were eliminated and others were emphasized. For example, the resident letter was discarded as an option, basically because it was a waste of a resource. In order to deliver the letter to each resident, approximately 1,300 sheets of paper would have been required and it was unclear if residents would actually read the letter.

c. Table Tent

The table tents appeared to be an effective communication strategy. One was placed on each table within the Dining Commons. Since all residents eat at this one location, it was hard for any of them to miss the advertising.

d. Posters

Dumpster and preliminary posters proved vital to the success of the Move-Out Program. These posters advertised the program and sparked resident interest in participating.

e. RA Meeting Attendance

The impact of RA meeting attendance on participation was not clear. It was hard to measure because the RA's are such a small group and were not solely responsible for the donated items. However, the RA's still proved important because they informed residents about the recycling program and how to use the collection bins on their floor. The goal being, the more people that knew about the Move-Out Program, the more the successful it would be. The RA's were able to notify Rebel Recycling when a problem occurred with the bin on their floor or when the bin was full.

B. Collection & Transportation of Items

Ultimately, Move-Out was a much larger task than originally anticipated. Within one day of bin placement the bins were full, some even overflowing, and some were missing or destroyed. A total of six collection bins were lost or stolen. For approximately seven days this pace continued and increased two to three fold for the last three days. Each day the bins were emptied, sometimes two, three, and even four times.

The method of collection, utilizing bags to transport the bin contents, at times worked well and at other times proved futile. Many items were easily placed in the bag such as clothing and bedding, other items would tear the bag and the contents would spill. This occurred principally when items such as magazines, school supplies, and hangers were placed into the bag.

Another problem with this method of collection involved the bag itself. One of the purposes of this program was to conserve resources through reuse

and recycling. The use of nearly 200 trash bags only contributed to the problem instead of minimizing it.

Overall, the amount of materials collected was enormous, exceeding 8,000 pounds. This was a large increase when compared to the previous year's collection of 353 pounds.

C. Sorting Process

Although the actual process of separation was not difficult, the amount to be separated made the process incredibly time consuming. For most of the sorting process, little outside help was available. Therefore, most of the sorting was completed by one or two people which increased the length of time needed for sorting. It was originally thought that sorting would take a maximum of two to three weeks, when in actuality, it took approximately two months. The following pictures are of the stacks generated in the sorting process, such as shoes, clothing, food, linens and school supplies.

CLOTHING



SHOES



FOOD



LINEN PILE



SCHOOL SUPPLIES & BOOKS



D. Move-Out Collection Results

As stated earlier, over 8,000 pounds of items were collected. The categories and weights are summarized in Figure 3-1.

FIGURE 3-1 Summary of Collected Item and Corresponding Amount

Item Collected	Amount Collected in Pounds
Total Shoes (Women & Men)	462.8
Cleaning Supplies	59.5
Food	120.5
School Supplies	482
Dishes	141.5
Bathroom Items	91.2
Clothing & Related (Underwear, Bras)	3058
Linens	712
Cinder Blocks (200 blocks X 15 lb.)	3000
Miscellaneous	500
TOTAL	8627.5

A complete break down of each category, its composition, and how much of each type of material was collected is provided in Appendix 8. Due to such a massive collection, a yard sale was organized instead of immediate donation.

E. Yard Sale

Yard Sale Setup



Overall, the yard sale was a tremendous success. A total of \$850.00 was generated. The cost was approximately \$100.00 with a net profit of \$750.00. The amount could possibly have been higher but, as stated earlier, prices were made low in order to guarantee a large sale both in quantity and profit.

Most of the people that attended the garage sale were not from the campus and they found out about the sale through the newspaper and by the signs posted on the surrounding streets.

Garage Sale Signs



One shopper, employed at a local homeless shelter, purchased \$100.00 worth of clothing and linens. She said, "This sale is the first that I've found where I could actually make good use of our money."

Leftover items, approximately 1,500 pounds, were once again re-bagged and then donated to Salvation Army. Below is a picture of all items donated.



Salvation Army was chosen because they offer a pick-up service from any location. Below is a complete break down of all items donated to Salvation Army and there corresponding weight.

FIGURE 3-2 Summary of Item Donated to Salvation Army

Item	Amount Donated in Pounds
Pillows	22
Dishes	38
Blankets	44
Books	97
Linens	112
Miscellaneous	140
Shoes	312
Clothing & Related (Underwear, Bras)	766
TOTAL	1531

Chapter 4 Discussion

A. Recap of Program & Results

The purpose of the programs was to develop and implement a recycling and reuse program for the UNLV Resident Halls for Move-In and Move-Out. The intention of the Move-In Program was to divert and recycle as much cardboard as possible from going to the landfill. The intention behind the Move-Out Program was to divert usable items from going to the landfills.

B. Impacts on Resident Halls

Although no financial savings were realized for Campus Housing, future savings could be great. As discussed earlier, 28 cubic yard dumpsters were put into place during Move-Out. The dumpsters cost \$860.00 for each use and included one exchange. Although additional exchanges were rarely needed, they were available at a cost of \$300.00 each.

Collecting as much reusable material as possible created less of a need for these dumpsters. The collection of 8,627.50 pounds of material from the Move-Out Program & approximately 28 cubic yards for Move-In Program was equivalent to approximately 2 exchanges. All collected cardboard-filled one 28 cubic yard dumpster and all collected reusable material filled approximately one 28 cubic yard dumpster. That figured into a potential savings of \$600 for the Residence Hall Association due to fewer required exchanges (2 exchanges at \$300.00 each).

At this time Campus Housing allows for an exchange to be done even when one is not needed. The exchange is scheduled ahead of time and occurs

whether the dumpster is full or empty. Financial implications would occur if Campus Housing changed their policy to allow for an exchange to be made only when one is required.

C. Optimizing Move-In

a. Increased Volunteers

Lack of volunteers allowed for problems to develop during the Move-In Program. Due to the lack of volunteers, cardboard could not be collected as efficiently as desired, and it could not be baled as it was collected. Additional volunteers would be needed in order to avoid problems such as these in the future. This would allow for more frequent and easier collection and for baling to take place. A possible volunteer collection schedule should be developed and adhered to.

b. Advertising and Promotion

An additional improvement involves increased advertising. On many occasions cardboard boxes were still being thrown into the garbage dumpster. Many of the ones that were placed in the collection bins were not broken down. If advertising was increased this might help in reducing the number of boxes ending up in the garbage. Advertising also needs to be adjusted to direct residents to break down all boxes before they are placed in the bin. This could be done through the placement of more posters in the halls and on and around dumpster areas directing residents to break down their boxes before recycling them.

In conjunction with advertising, the cardboard collection bins could be painted to spark attention. Currently, the bins are white with small lettering indicating "CARDBOARD ONLY." They could be painted a color that stands out, i.e. red and gray (school colors), and have the Rebel Recycling logo painted on all sides of the bin. This may spark people's interest and attention and cause them to utilize the bins more frequently. It may also avoid the few times that garbage found its way into the collection bin. Color differentiation will also allow for the collection bin to stand out and to avoid confusion with the garbage dumpsters.

D. Optimizing Move-Out

The Move-Out Program turned out to be a more difficult and time-consuming process than anticipated. There are a multitude of improvements that could be made to the program in the following years.

a. Collection Bin Improvement

During the collection process, many of the boxes broke open and spilled their contents. Not only did this create a more difficult collection, but it also added required time. The bins need to be made of sturdier material other than cardboard, such as wood or plastic, so they will not break. They also need to be large enough to hold the materials but not too large so that they are too heavy to move.

The bins need to be designed for easy movement but not so easy to allow residents to steal them. This could be achieved by placing locking wheels on the bins. Once the bins are in place a key would be needed to

unlock and transport the bins. In addition, the bins should be able to be removed and replaced with empty ones instead of having to bag the contents before replacing it. The full bins could be taken back to the Rebel Recycling trailer to be emptied.

An additional collection improvement involves using the campus' moving trucks, which have an electric lift. The moving truck could be used to collect much larger amounts of material as compared to a golf cart and trailer. Having a power drop-gate would also reduce the time needed to load the truck.

b. Collection Bin Placement

Not only is bin improvement important, so is bin placement. The bins should continue to be placed on each floor through the South Complex and Hughes. Tonopah can not easily accommodate bins on each floor. It would be easier to place 3 - 4 bins in its lobby.

However, addition large bins should be placed adjacent to each trash dumpster. These bins need to be labeled "REUSABLES ONLY." These bins will be able to accommodate a large amount of reusable items, especially large items such as furniture and lamps. As suggested for the cardboard Move-In collection bins, these could also be painted using bright colors.

c. Removal Schedule Development

A removal schedule for bins needs to be developed. This schedule would involve the assignment of days and times for environmental studies students (ENV 490, ENV 100), volunteers, and Rebel Recycling employees to assist in the collection of items.

For the ten days of the program, at least eight people should be used each day. This would allow four students to remove material from South Complex and South Services Building, and for four students to remove material from buildings Hughes, B, C, D, and Tonopah. These students should conduct removals three removal times each day. Once Move-Out reaches its busiest, days four through ten, three times might not be enough. This would have to be adjusted accordingly. The number of times material would be collected would also fluctuate due to bin improvement. If the bins are easier to transport and collect, it would take less time. Each group should be supplied with a golf cart and an attached trailer for use in transportation. Each student should be paid or receive credit accordingly.

d. Employee Sorting Schedule

An employee schedule for sorting should also be developed. It may, with increased collection efficiency, be possible to sort items as collected. If this were not possible, sorting would have to occur at the end of the entire collection. As many volunteers as possible should be used for sorting, the more people the less time needed to sort. To facilitate an easy sorting process, areas within the trailer should be designated for certain items. Signs should be posted for what that area is to contain, such as shoes, bathroom supplies, and school supplies.

e. Advertising & Promotion

All advertising and promotion should continue with the use of posters, table tents, and RA meeting attendance. All posters that are designed should

be constructed in a manner that they can be used year after year. This could be done by not using any dates, times, or places, and by laminating each poster.

Table tents should be used during the entire collection time and should be picked up the last day of Move-Out. Table tents are very expensive because they are done in color. Collection of them would allow for some savings that could be put to better use elsewhere.

f. Move-Out Bags

One addition to the program involves supplying Move-Out bags to the residents. The residents would be supplied a bag, similar to the one shown in Appendix 9. The purpose of the bag is to allow students to bag their own items before placing them into the collection bins. Having material already bagged will make removal from the bins much easier.

There are multiple options on how to distribute the bags. One idea is to place one in each mailbox with a flyer attached about the program. Another option is to supply students with a flyer about the program and informing them to ask a RA for a bag. This option allows residents to easily obtain additional bags if needed. Or a combination could be used where each resident receives one in their mailbox with an attached flyer and the RA's would have additional bags. It is unclear which option would be the most efficient, therefore different methods should be attempted to determine which is the most effective.

Even though the bin will be marked with posters, one potential problem with using the bags is that there is no guarantee that all the bags will end up in the collection bin and not the garbage dumpster.

Although supplying bags is no guarantee that the residents will use them, this addition should be attempted on a trial run basis. If it is not a feasible commitment, it should be discontinued.

g. Yard Sale

Holding a yard sale should be continued as long as there is enough material collected to warrant one. The use of newspaper advertisements, the posting of signs, and e-mail circulation should continue to be used. Also, it might be possible to advertise on some of the local television and radio stations that have free advertisement sections about local current events. A price guide should again be set that indicates the price of items. The guide, unlike the 1998 sale, should be set to allow for more money to be made. All money collected should then be put back into furthering the Residence Hall Recycling Program.

E. Traditional Recycling

Although collection of cardboard and reusable items is important, so is collection of traditional recycling material. That includes items such as paper, plastic, and aluminum. A recycling program to recycle traditional items needs to be implemented throughout all Resident Halls. This would complete the recycling process and would collect all reusable and recyclable items throughout the year.

F. Expanding Collection

The Move-In and Move-Out Programs could expand in the future to collect material from all four Move-In and Move-Out times. As mentioned earlier, residents Move-In twice a year, beginning of the year and after Christmas break. They also Move-Out twice a year, for Christmas break and for the end of the year. Although the amount generated is much smaller, collection during this time could divert more material from going into the trash and then to the landfill.

Chapter 5 Conclusion

Although this project was directed at the UNLV Resident Halls it is applicable to a wide variety of businesses. Other University Resident Halls, apartment complexes, businesses, and temporary housing could use a similar program with slight modifications to accommodate specific features. If similar programs were implemented at other universities and businesses across the nation, the impact would be tremendous savings of landfill space, money and resources.

My goal was to develop and implement an improved recycling and reuse programs for the UNLV Residence Halls specifically designed for Move-In and Move-Out. The programs, although successful, require improvements before they can prove their full potential.

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Appendix 9

Move-Out Bag Example