Sustainability Solutions

Waste to Resource Assessment™ Report

University of Victoria

University of Victoria
Victoria, BC

February 14-18th, 2011
Prepared by Green Squad℠

Executive Summary
This section provides a summary of findings for University of Victoria.

> Overview
> Summary of Findings
> Recovery Rates

Executive Summary

Overview

From February 14-18, 2011, Green Squad conducted a Waste to Resource™ assessment for the University of Victoria (UVic) located at 3800 Finnerty Road in Victoria, BC. A few goals of the assessment were as follows.

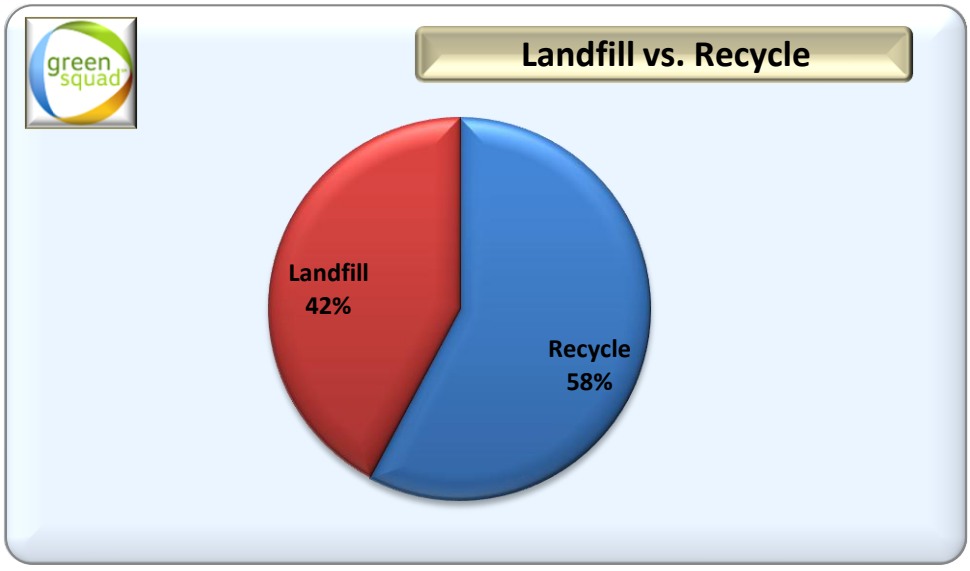
- **Develop baseline inventories for waste generation at UVic**
- **To identify and quantify waste composition and commodity**
- **To determine the recovery performance of existing programs**
- **Identify opportunities to increase recycling and reduce cost**
- **Develop recycling strategies that could be implemented throughout the facility**

During the waste assessment conducted by Green Squad, visual inspections of waste generation points throughout the facility resulted in the discovery of additional recycling opportunities. The assessment identified six primary opportunities that should occur in order to improve your overall waste diversion rate. The following are our recommendations:

- **Increase Awareness of Current Recycling Programs**
- **Expand Current Organics Recycling Program**
- **Assess Campus Waste and Recycling Bin Setup**
- **Education and Promotion of Campus Recycling Programs**
- **Develop 'Green' Purchasing Policies**

Our goal is to provide UVic with strategies that will maximize the efficiency of your waste management system. The facility generated 1614 tonnes of waste and recyclables last year. The current diversion rate in your facility is 58%.

Figure 1 – Current Diversion Rate at UVic



Summary of Findings

A Waste Management Sustainability Consultant performed an assessment that involved a walk through and targeted sort and weigh analysis throughout the university. The following is a summary of key findings identified during the assessment:

- **Annually, it is estimated that 682 tonnes of waste and 933 tonnes of recyclables will be generated at the University.**
- **Of the waste sent to landfill, 18% could have been diverted through current recycling programs at UVic.**
- **Organic materials account for 21% of the total waste landfilled.**
- **Paper Towels and Paper Cups represent 17% of the total waste sent to landfill.**
- **Recyclable Plastics/Tin/Glass represent 12% of the total waste landfilled.**
- **Recyclable paper materials accounted 7% of the total waste landfilled.**
- **If successfully implemented, an organics recycling program that includes Paper Towels and Paper Cups could increase the diversion rate from 58% to 74%.**

Figure 2 – Top 5 Materials Found in the Disposed Waste

Recovery Rates for Recyclable Materials

Table 1 below summarizes the recovery rates for each material that is currently recycled under University of Victoria's diversion program. The recovery rate is the percentage of recyclable material that is collected for recycling divided by the total amount of recyclables generated. Recyclable materials that are not 'recovered' are put in the garbage and sent to landfill. High recovery rates are a strong indicator of how successful your diversion programs are working.

Table 1 – Waste Material Comparison by Category

Material Category	Total Audited Waste (kg)	Total Amount Disposed (Kg)	Total Amount Recycled (kg)	Recovery Rate (%)
Paper	243,705	40,305	203,400	83%
Cardboard	129,248	5,368	123,880	96%
Mixed Beverage Containers	112,022	62,202	49,820	44%
Food Waste	565,430	145,750	419,680	74%
Total	**1,050,404**	**253,624**	**796,780**	**76%**

Photograph 1 – Waste Audit Setup

Diversion Recommendations
This section provides a detailed explanation of the options available to UVic.

> Overview
> Increase Awareness of Current Recycling Programs
> Expand Current Organics Recycling Program
> Assess Campus Waste and Recycling Bin Setup
> Education and Promotion of Campus Recycling Programs
> Develop 'Green' Purchasing Policies

Diversion Recommendations

Overview

Several options have been identified that can help UVic make its operations more sustainable. Each option should be carefully reviewed for operational, financial, social, and strategic fit.

- **Increase Awareness of Current Recycling Programs**
- **Expand Current Organics Recycling Program**
- **Assess Campus Waste and Recycling Bin Setup**
- **Education and Promotion of Campus Recycling Programs**
- **Develop 'Green' Purchasing Policies**

Increase Awareness of Current Recycling Programs

Recycling opportunities represent the largest potential cost savings and landfill diversion opportunity for UVic. While recycling programs are currently in operation, the audit shows that they are not working at their optimal efficiency. It is estimated that 18% of the material sent to landfill is recyclable. This represents a significant opportunity to increase your waste diversion and reduce associated waste removal costs.

Paper Recycling

Annually, 163.3 tonnes of paper products will be sent to landfill, accounting for 24% of the total disposed waste. Of the paper sent to landfill, the largest contributor to the waste stream was Paper Towels. Other notable contributors were Paper Cups, Mixed Recyclable Paper and White Office Paper.

Paper Towels were the largest contributor of the paper sub-categories to the disposed waste stream representing 11.8% of the total waste disposed. An effective way to reduce the amount of paper towel is by removing it from washrooms and other areas of the facility and installing high efficiency hand dryers. While the initial cost of hand dryer installation may be high, the cost savings over time would be substantial. In addition to the reduction of paper towel sent to landfill, installing hand dryers will eliminate the purchasing costs associated with paper towels.

Since paper towel is compostable it is also recommended that UVic contact their current organics hauler to determine if paper towels could be included in their organics program.

Photograph 2 – Paper Towels

Paper Cups also contributed a large amount to the disposed waste stream, representing 6% of the total waste sent to landfill. Currently, paper cups are not accepted in the recycling program but can be placed in the compost bins throughout campus. Although paper cups were present in the disposed waste in all sample areas, significant amounts were found in the waste from the Library, MacLaurin and Cornett. It is recommended that more accessible compost bins be placed at these locations to decrease the total amount of cups being landfilled. In addition, encourage all campus Cafés to promote reusable mugs when purchasing a hot beverage by offering a reasonable price discount if the customer brings their own mug or implementing an eco-incentive (i.e. $0.10) if a disposable cup is needed.

Photograph 3 – Paper Cups from Library Waste

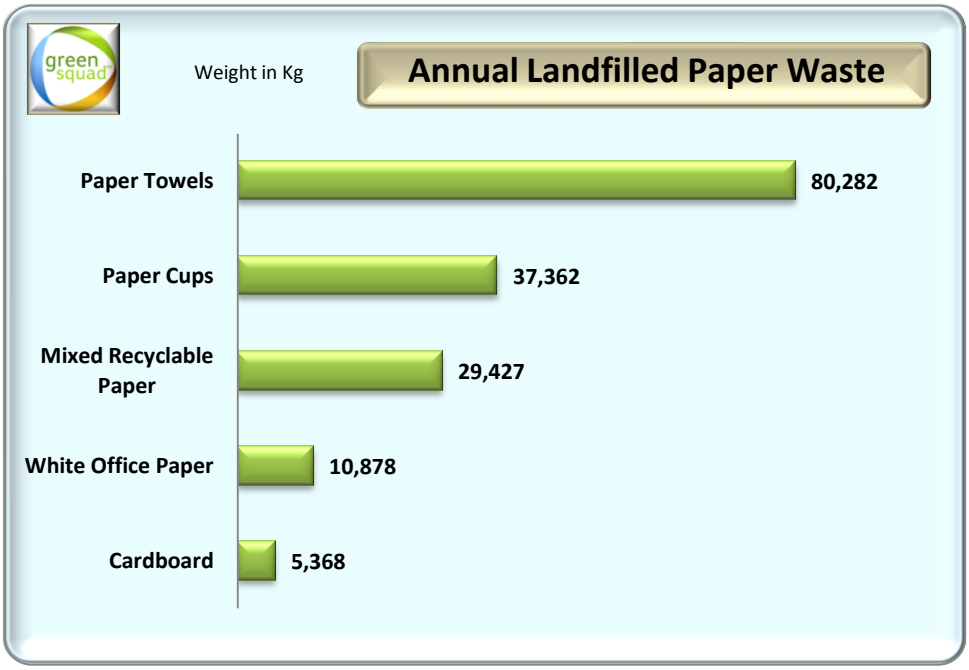
Mixed Recyclable Paper represents 4% of the total waste sent to landfill annually. This category represents recyclable paper such as Newsprint, Kraft Paper and Boxboard. A large amount of mixed recyclable paper was generated in Cornett, Cunningham and the Residences. It is recommended that these areas be assessed to determine if additional recycling receptacles and increased signage is necessary to improve the capture rate of this material.

Photograph 4 – Mixed Recyclable Paper

White Office Paper accounted for 2% of the total annual waste disposed by UVic. This material is currently accepted in the University's recycling program and is easily recognized as a recyclable material. Although white paper was found in the disposed waste from each sample area, the Student Union Building, the Library and the Commons generated significant amounts. Once again, it is recommended that the current bin placement and signage be assessed in these key areas. Additionally, stand alone garbage containers should be removed or paired up with a recycling bin to increase the capture rate.

Photograph 5 – White Office Paper

Figure 3 - Annual Paper Waste – Landfill



Plastics Recycling

Plastic materials account for 12.4% of your waste stream composition. It is estimated that 84.4 tonnes of plastic materials will be sent to landfill this year from UVic. Plastic is generally not a heavy material therefore the high weight generated indicated a large volume of material. Utilizing current recycling programs will ensure this material is diverted. All plastic material will be marked with a number indicating the type of plastic that was used to make the item. This number can be used to determine if recycling programs exist for that item. Most commonly, recycling programs will exist for #1, #2, #4, & #5. Limited recycling programs exist for #3 and #6 plastics.

The largest contributor of the plastic sub-categories is #1 PETE, accounting for 19.5 tonnes per year of waste sent to landfill and representing 3% of the landfilled waste. This material is currently accepted in the recycling program at UVic. #1 PETE is used mainly as a beverage container, particularly for water, pop and juice. These materials are easily identifiable as recyclable but are still being found in the garbage. The Residences, as well as the Library were found to have the highest percentage of #1 PETE in their disposed waste. Placing additional bins with proper signage throughout these areas and campus wide is recommended to raise awareness and encourage students and staff to make the right decisions when approaching a waste station.

Photograph 6 – #1 PETE from 294 Bed Residence Waste

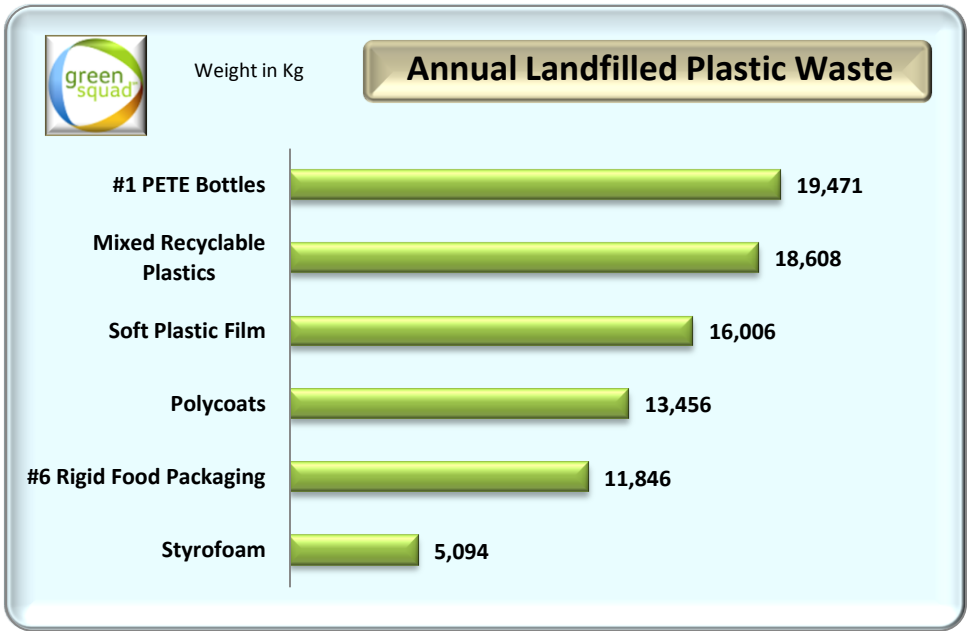
Mixed Recyclable Plastics was also a significant contributor, accounting for 18.6 tonnes and 3% of the total disposed waste at UVic. Mixed recyclable plastics consist mainly of #2 HDPE and #5 PP plastic which are accepted in the mixed containers program at UVic. MacLaurin, the Residences and the Student Union Building were found to have the highest amounts of mixed recyclable plastics in their disposed waste. Since these items are more difficult to recognize as a recyclable material, it is recommended that the signage above or on all recycling bins be updated to account for these items. Below is an example of #2 HDPE and #5 PP plastic.

Photograph 7 – Mixed Recyclable Plastics from Commons Waste

Soft Plastics represent 2% and account for 16 tonnes of the total annual waste sent to landfill. Soft plastics is a collective term that includes items such as grocery carry out bags, food wrap, ziplock bags, and other clear flexible plastic film. UVic currently has a new program in place to capture soft plastics, however the collection bins are sparsely located throughout the campus. The Cafeteria/Food Services, Commons, and the Student Union Building had the highest total of soft plastics in their disposed waste stream. It is recommended that waste stations be set up in these areas to include soft plastics recycling. Update and increase the signage to ensure that staff and students are aware of which types of plastic film are considered acceptable in the program.

Photograph 8 – Soft Plastics

Figure 4 - Annual Plastic Waste – Landfill

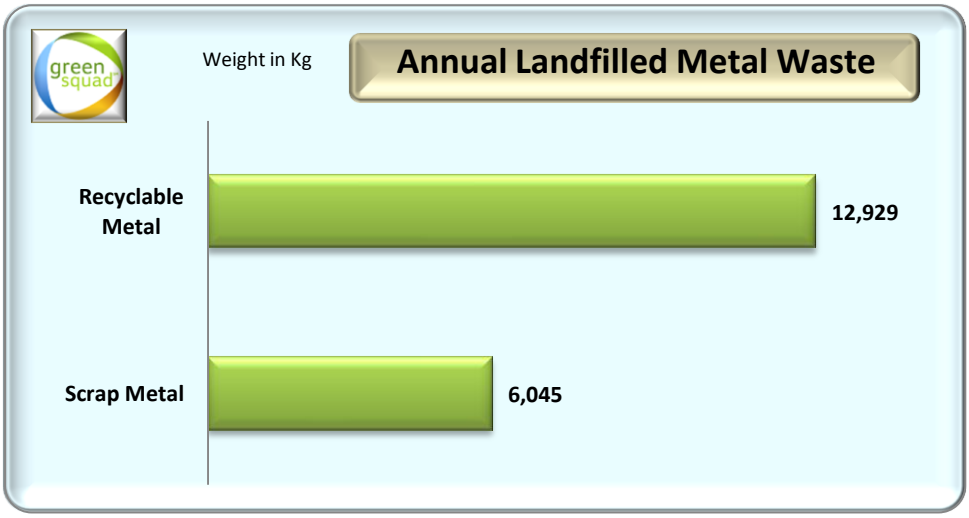


Metal Recycling

It was determined 19 tonnes of metal will be sent to landfill annually by UVic. The largest contributor of the metal sub-categories is Recyclable Metal at 12.9 tonnes representing 2% of the total landfilled waste. Recyclable metal consists of Aluminum Food and Beverage Cans, clean Aluminum Foil and Steel Food and Beverage Cans. Most staff and students will understand these materials to be recyclable indicating the decision to dispose of them in the waste is due to unavailable recycling bins. The collection areas that had high amounts of recyclable metal in their waste were the Residences, the Student Union Building and the Library. To reduce the amount of recyclable metal ending up in the waste stream, examine the current container setup throughout the University to ensure that all garbage receptacles are paired with a recycling bin.

Photograph 9 – Recyclable Metal from 294 Bed Residence Waste

Figure 5 - Annual Metal Waste – Landfill



Glass Recycling

It is estimated that 24.5 tonnes of Recyclable Glass bottles, will be sent to landfill annually. Currently this material is accepted in the mixed containers recycling program at UVic. The Residences, Compound 12, and MacLaurin all had high percentages of recyclable glass found in their waste sample.

Photograph 10 – Recyclable Glass from Residence Waste

Residual Waste Material

It was determined that 231.5 tonnes of additional waste materials will be sent to landfill each year. The majority of the Residual waste are items that currently cannot be separated out or sent for reprocessing. At this time, reduction or reuse are the only options for eliminating these materials from the landfill. However, the item of most concern was a microwave oven found in the waste from the Cunningham Building. The Recycling Council of British Columbia and the Canadian Electrical Stewardship Association have created a program to divert electronic waste and small appliances from landfills electronic waste which are currently banned from all landfills in the area. The Stewardship has set up depots that will accept these types of waste and ensure that they are disposed in a safe and environmentally sound way. The locations of the drop-off depots can be found on the Canadian Electronic Stewardship Association website.

Photograph 11 – Microwave from Cunningham Waste

Expand Current Organics Recycling Program

UVic generates a significant volume of organic waste annually. Based on the audit results, it was determined that 111.2 tonnes of organic material will be sent to landfill, representing an estimated 21% of the total waste disposed. At the moment, UVic is participating in an organics program to capture compostable materials from the Food Services/Cafeteria University Centre, MacLaurin, the Commons and the Student Union Building. This program has been able to divert 282.8 tonnes resulting in a capture rate of 72%. Although the capture rate is quite high for a new program, there are still some areas that can be improved, specifically the Commons.

It is recommended that UVic investigate expanding their compost program to include more areas, as well as the addition of paper towels and paper cups. By including paper towels and paper cups, UVic could potentially divert an additional 117.6 tonnes of material. If this strategy was to be initiated, it is recommended that the expansion be rolled out in stages. The first stage could focus on diverting paper towels from the washrooms. Once this program has shown success, further expansion could include food waste from the Residences and other large compost generators that are not currently participating. By expanding the program slowly, this will also ensure that contamination is minimal.

UVic's Sustainability Action Plan has established a goal of 75% waste diversion by 2012. If the current organics program is successfully expanded campus wide and includes paper towels and paper cups, UVic's potential diversion rate could increase from 58% to 74%. Considering that 18% of the total waste landfilled is recyclable, by improving the current blue box recycling program as well, the goal of 75% diversion is likely to be achieved.

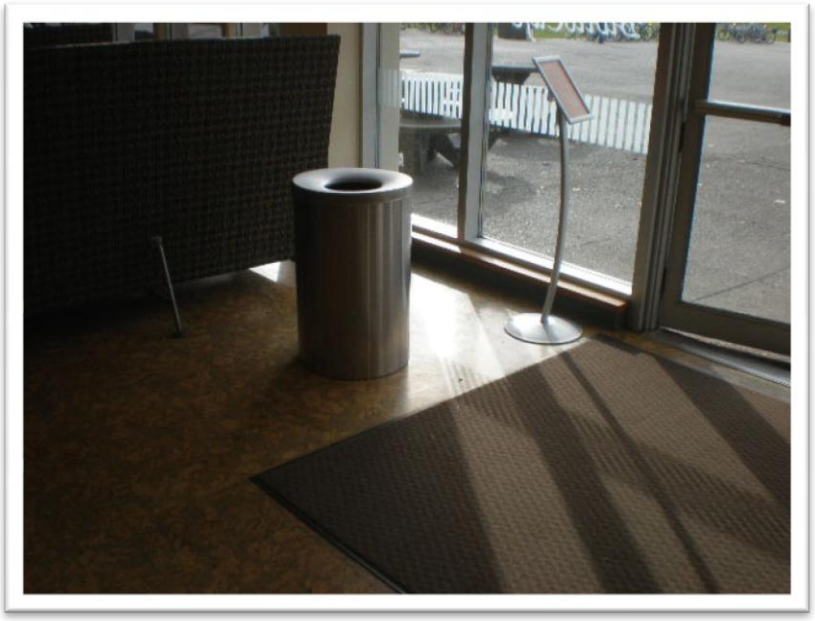
Photograph 12 – Outdoor Compost Receptacle

Assess Campus Waste and Recycling Bin Setup

During the campus tour, it was observed that many garbage containers were placed alone. These free-standing waste containers should be paired up with a recycling container or be removed all together. Most people will recycle if the receptacles are conveniently available, however, participation will decrease significantly if they have to search out the proper disposal bin. With so many garbage cans readily available, most recyclables will end up in the garbage. An example of this is in the Biblio Café. Shown below is a recycling station at the Café which is set up to take recyclables as well as compostable materials. However, this arrangement is located in a low traffic area which students cannot see from the main seating area. The other receptacles (shown below) in the Café are only for waste and are located just inside the main entrance/exit where there is high pedestrian traffic. The audit results show high percentages of recyclable materials in their waste stream and a low diversion rate.

Photograph 13 – Biblio Café Recycling Station

Photograph 14 – Solitary Waste Bin Located in High Traffic Area at Biblio Café



In addition to this, high amounts of recyclable materials were found in the waste from the Residence Buildings. It is understood that students residing in these buildings have access to garbage chutes but to recycle materials they need to walk down to the main floor where the recycling compound is located. This inconvenience to recycle is very apparent in the low diversion rates for the residence buildings. It is recommended that all garbage chutes be closed and have waste receptacles located in the recycling compound as well.

In order to have a successful diversion program, recycling stations need to be consistent throughout the campus. This should include a standard three-stream system (recyclable paper, mixed containers, waste) throughout campus and incorporate other streams such as compost or soft plastics where the program is being piloted. Below are some additional examples of proper bin arrangements found at UVic.

Photograph 15 – Example of Proper Waste Station Setup at UVic

Photograph 16 – Waste Station Setup at Student Union Building

Education & Promotion of Campus Recycling Program

The success of a recycling program is driven by user participation. If those who generated the waste are not utilizing diversion programs success will never be achieved. It is not enough to simply implement programs and expect those programs to be effective. There are two critical factors to necessary to ensure that diversion programs are effective. These factors are education and promotion.

You cannot expect staff and students to use diversion programs if they do not know about them or do not understand their use, therefore, it is vital to educate everyone on the use and importance of waste diversion. There is an ever increasing pressure to become environmentally friendly. When diversion programs have been properly implemented, most will utilize the programs.

Another part of education is visibility. By ensuring recycling mediums are present and conveniently available throughout the facility, the recycling participation rate will improve. Ensuring that there are recycling bins in every area of the facility where waste is generated will allow for the proper source separation of materials.

Promotion is the next critical success factor. Motivated people are more likely to participate in diversion programs than those who are uninterested. Promote UVic's sustainable initiatives to all first year students as pamphlets in their frosh kits or consider taking advantage of the student-run sustainability club. Have the students create new signage for UVic's recycling program or as a project have them design and paint the receptacles on campus.

Also, investigate the option of forming an environmental committee for the University with representatives from building management, the faculty and the student body. Not only will this give students and staff ownership of diversion programs but it will open communication channels and allow the discussion of current challenges and future opportunities.

Develop 'Green' Purchasing Policies

Purchasing departments are where the money is transferred from University to vendor and where contracts are developed. It is at this stage that leverage can be best applied to the vendors, making it an effective place to implement actions that reduce environmental impact. The development of a Green Purchasing Policy may be as simple as buying recycled paper or as complex as considering the environmental impact of a product at each stage of its life, from when it is manufactured to when it is disposed.

Annually, UVic purchases hundreds of different products for dozens of different departments. By eliminating unnecessary packaging, or switching to items that can be diverted from the waste stream, purchasing decisions can have a major impact on your waste disposal costs. The purchasing policy should also address the roles and responsibilities of suppliers. For example, it may be appropriate to require that supply contracts include provisions for suppliers to take back excess packaging materials.

Polycoats are a good example of switching from disposable packaging to an item that can be included in UVic's diversion program. Polycoat is a collective term for gable-top beverage cartons and Tetra-Paks. Polycoats are not recyclable and accounted for over 10 tonnes of waste sent to landfill by UVic. By switching to a recyclable plastic packaging that could be included in the University's diversion program, UVic could eliminate a significant amount of material from their disposed waste.

Photograph 17 – Polycoats

Appendix 1

Six Steps to a Successful Sustainability Program

WM Green Squad has extensive experience in managing on-site sustainability programs safely and in a manner that provides a framework for achieving our customer's waste reduction, continuous improvement and recycling goals. The following are several steps that we have found useful in implementing sustainability programs:

1. ***Make sure that you sustain your company's ability to compete.*** Any improvement or innovation should have economic *and* environmental benefit.
2. ***Make sure that your first recycling initiative provides a quick payback.*** It is important that the first initiative delivers a quick payback to get continued support from operational management.
3. ***Explore the entire value chain.*** For every dollar spent on disposal and transportation, another $3.00 - $10.00 is spent in generating the material in the first place.
4. ***Use quantitative analysis to identify the best opportunities.*** Typically, Pareto charts work best, i.e., 20% of by-products account for 80% of the cost or 80% the cost savings.
5. ***Work with your vendors, suppliers and employees.*** Often times, the best ideas come from those working in a particular area every day. You should push vendors and suppliers to develop programs that positively impact your goals and ask your employees for input.
6. ***Win people over with enthusiasm.*** Enthusiasm and communication of goals and achievements are critical for sustaining a strong program.

Source Reduction and Reuse Strategies

Studies indicate that between 2 and 5 percent of waste streams are reusable. There are many ways to prevent waste at the source and reuse products to reduce waste, including:

Implementing Purchasing Practices that Reduce Waste

- ✓ Purchase reusable rather than disposable products.
- ✓ Request that vendors deliver products in reusable containers, such as plastic totes, rather than cardboard boxes.
- ✓ Purchase in bulk to reduce packaging while purchasing only the amount that is needed.
- ✓ Purchase products with minimal packaging.
- ✓ Work with suppliers to minimize the packaging used to protect their products.

Reducing the Amount of Material Used

- ✓ Establish a facility-wide double-sided copying policy.
- ✓ Make scratch pads from used paper.
- ✓ Use outdated letterhead for in-house memos.
- ✓ Circulate, post on bulletin boards, or send electronically rather than making multiple copies.
- ✓ Use central files to reduce the number of hard copies that are made.

Using Reusable Rather than Single-Use, or Disposable, Products

- ✓ Change to reusable dishes in the cafeteria.
- ✓ Place reusable coffee mugs in break rooms.
- ✓ Offer a discount on drink prices for using reusable beverage containers.
- ✓ Implement a small tax on food items that require disposable packaging.
- ✓ Use rechargeable batteries.
- ✓ Install hot air dryers in public restrooms and remove paper towels.

Reusing Materials for Other Purposes at Your Facility

- ✓ Reuse cardboard boxes and foam peanuts for shipping from your facility.
- ✓ Use newspaper and shredded paper for packaging.

Green Squad Service Offerings

Green Squad offers the following services to make bring environmental sustainability into your business operations.

	Waste Solutions Discover effective, affordable, and complete solutions for managing waste.		**Energy Solutions** Transform the way you view and manage your energy consumption.
	Construction and Demolition Materials Management Solutions Increase diversion and reduce costs on your next job		**Event & Venue Solutions** Make your events environmentally friendly.

Appendix 2

Waste Assessment Categories

Paper	General Descriptions
White Ledger	White Paper, Printer Paper
OCC	Cardboard
Boxboard	Cereal Box Material
Newsprint	Newspapers
Polycoat	Milk Cartons, Tetra Packs
Paper Towels	Paper Hand Towels
Kraft Paper	Paper bags, Heavy Brown Paper
Tissue Paper	Thin Packing Paper
Magazines	Glossy Magazines and Newspapers
Photo Paper	Glossy Paper
Paper Plates	Plates
Wax Paper	Paper for Wrapping or Packaging
Napkins	Paper Napkins
Paper Cups	Paper or Polycoat Cups

Metal	General Descriptions
Aluminum F & B Cans	Aluminum Food and Beverage cans, Pop Cans
Aluminum Foil / Wrappers	Food Wrappers and Packaging
Aluminum	Aluminum Parts and Products
Steel	Steel Parts and Products
Steel Fixture Hangers	Hardware for store displays
Metal Clothes Hangers	Clothes Hangers

Plastic	General Descriptions
#1 PETE	Polyethylene terephthalate, Water Bottles, Soft Drink Bottles
#2 HDPE	High density polyethylene containers, Chemical containers or jugs
#2 HDPE Bags	High density polyethylene bags or film, strong "crispy" bags
#4 LDPE	Low density polyethylene bags and film, garbage bags, shopping bags
#5 PP	Poly propylene, yogurt containers, straws
#6 PS	Poly styrene, Styrofoam, packaging materials, take-out food containers, packing popcorn
#7 Other	Products labeled #7 products
Stretch Wrap	Shipping stretch wrap, food grade stretch wrap
Plastic Strapping	Plastic Shipping Straps
Bubble Wrap	Shipping pads, bubble packaging
Polyfoam	Foam protective packaging materials
Shipping Bags	Strong or thin shipping bags, UPS bags
Polycarbons	Lens shavings
Plastic Signage Board	Advertising signs, variety of plastic coatings
Foam Signage Board	Advertising signs, variety of foam or plastic signs

Textiles	General Descriptions
Tack Cloth	Display Materials
Misc Textiles	Rags
Personal Clothing	Used shirts, Uniforms, Hats

Wood	General Descriptions
Wood Shavings	Scrap Construction Shavings and Debris
Scrap Wood	Construction Materials

Glass	General Descriptions
Clear Glass	Clear Beverage Bottles and Jars

Organics	General Descriptions
Behind Counter Waste	Scrap Food Waste, Coffee Grounds
Animal Waste	Animal Droppings and Matter
Post Consumer Waste	Post Consumer Scrap Food Waste

Others	General Descriptions
Latex Gloves	Thin or thick medical use gloves
Electronics	Electronic products, toasters, TV's, cell phones
Plastic Hangers	Clothing or Display hangers
Construction Waste	Drywall, Sheet rock
Shingles	Construction materials, Roofing shingles
Hair	Hair clippings
Diapers	New or used diapers
Work Boots	Used personal clothing
Plant Waste	Leaves
Floor Sweepings	Debris