



## City and County of Durham

# PURCHASING GUIDE for ENVIRONMENTALLY PREFERRED PRODUCTS



Provided by the Durham City-County Sustainability Office

2009

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# 1 INTRODUCTION TO THE GUIDE

## 1.1 BACKGROUND

This guide was developed by the Durham City-County Sustainability Office, working with the City and County Green Teams and the City and County Purchasing Divisions.

*Disclaimer:* Users of this guide are responsible for complying with all applicable law (including without limitation North Carolina General Statutes 143-129 and 143-131) and the Environmentally Preferred Purchasing Policies adopted by the City of Durham in May 2009 or the County of Durham in September 2009, as well as other directives from the City Council and the City Manager or the Board of County Commissioners and the County Manager. Any specifications presented in this guide are not intended to constitute or render engineering, architectural, legal, or other professional services or advice, nor should they substitute for such services or advice from an experienced professional directed to a specific design situation. While information in any specifications is believed to be accurate, the Sustainability Office and its consultants on this project shall not be liable for damages arising from errors or omissions in specifications.

## 1.2 PURPOSE

This guide introduces and defines “environmentally preferred purchasing” and is intended to support the principle of “including environmental considerations in our procurement decisions” stated within the Environmentally Preferred Purchasing Policies adopted by the City and County of Durham. This guide provides departments with valuable information and resources to incorporate environmental considerations when making purchasing decisions. The guide also offers employees suggestions for following the Environmental Responsibility Expectation Policies for Employees adopted by the City and County, as well as the City of Durham’s Facilities Strategic Energy Conservation Policy.

Included in this guide are the basics of environmentally preferable purchasing, suggested purchasing resources, and purchasing recommendations for many product groups to help you make environmentally preferable buying decisions.

This guide cannot list specific vendors who do not have contracts with the City or County, including vendors that may have the most environmentally friendly products, in order to avoid giving undue preference to individual businesses. We recommend a quick internet search for products without a recommended vendor.

## 1.3 HOW WILL THIS PURCHASING REFERENCE GUIDE HELP ME?

It is not always easy to find or decide which product is better for our employees and environment. Every item we buy has an impact on our health and environment – cleaning products, furniture, lights, motor oil, office supplies, paint, vehicles, and more.

We hope you find this reference guide a helpful resource when looking for products with environmentally-friendly attributes or deciding between products. Most of all, it should encourage buyers to ask the right questions.

## 1.4 WHAT IS ENVIRONMENTALLY PREFERRED PURCHASING?

Environmentally preferred goods and services help promote sustainability: they provide for our current needs without compromising our ability to meet those needs in the future. At the very least, environmentally preferred products have a less harmful effect on human health and the environment than other goods and services that serve the same purpose.

Questions to ask before purchasing a product include

- Is the product reusable or more durable, with a longer life span?
- Is it made from recycled materials?
- Does the product contain hazardous materials? If so, are they less hazardous than alternatives?
- Does it conserve energy or water?

- Does the product meet the environmental standards of a third-party certifying organization?
- What happens to the product at the end of its life? Can it be recycled? Will it biodegrade? Will the manufacturer take the product back? Will it need special disposal?

Depending upon which product you are buying, all or only a few of these questions may apply. One challenge in buying wisely is to know which questions to ask. With this Guide helping to put environmental issues in context, asking these questions will become second nature.

## 1.5 WHAT ARE ENVIRONMENTAL ATTRIBUTES?

Environmental attributes are features of a product that make it preferable to purchase over other products. Some of the environmental attributes to consider are as follows:

<b>Prevents Waste</b>	Preventing waste can conserve natural resources. Our state generates millions of tons of municipal solid waste annually, and a product's packaging can account for a significant portion of the product's contribution to municipal solid waste. You can prevent waste when you (1) reduce the amount of material you buy to accomplish any task; (2) buy durable, long-lived items; (3) buy repairable products; (4) find multiple uses for items; and (5) buy products with minimal packaging.
<b>Recycled Content</b>	Products made with recycled materials save energy and resources and keep waste out of landfills. Recycled content products can be made with pre-consumer content, post-consumer content, or a mixture of both. Pre-consumer content utilizes materials from manufacturer's scrap. Post-consumer content utilizes materials collected from recycling programs and has a higher environmental savings.
<b>Non-Toxic</b>	Avoiding products that are considered hazardous waste or that otherwise threaten human health during use reduces potential serious health risks to people and damage to the environment. Avoid products with precautionary words such as Caution, Danger, Warning, or Poison. Many alternative products are available that are non-toxic. Volatile Organic Compounds (VOCs), chemicals that evaporate easily at room temperature and often have unhealthy and unpleasant vapors, are one type of harmful material. They are found in many products, including adhesives, carpeting, upholstery, paints, solvents, pesticides, and cleaning products. Some VOCs may cause cancer, especially when they are concentrated indoors. Selecting products with low or no VOCs reduces indoor air quality hazards for employees.
<b>Biodegradable</b>	A "biodegradable" product has the ability to break down, safely and relatively quickly, by biological means, into the raw materials of nature and disappear into the environment. These products can be solids biodegrading into the soil or liquids biodegrading into water. Biodegradable plastic is intended to break up when exposed to microorganisms (a natural ingredient such as cornstarch or vegetable oil is added to achieve this result).
<b>Conserves Resources</b>	Many products and services use energy and water as they operate. Conserving energy and water can save money on electricity, water, and sewer bills. Generating electricity from coal contributes greenhouse gases and mercury pollution to the atmosphere. Regularly high water use can deplete environmental resources and put the community at risk during droughts. Products that use energy and water efficiently save money over the life of their use and reduce their environmental impact.
<b>Life Cycle Cost</b>	Consider the product's entire cost over its life cycle – initial purchase, maintenance, and end-of-life disposal – when you buy. Sometimes saving money up-front on a purchase results in spending more in the long term for proper disposal or injuries related to use of a product or disposal. Considering end-of-life management also encourages manufacturers to reduce their products' environmental burden.

## 1.6 WHY IS ENVIRONMENTALLY PREFERRED PURCHASING IMPORTANT?

The purchase and use of environmentally preferable products can have a profound impact – and not just on the environment. From worker safety to budget savings, wise purchasing has a number of additional tangible benefits:

- Products that are reusable, refillable, more durable, or repairable create less waste, conserve landfill space, and are more cost-effective in the long run than disposable or single-use products.
- Buying recycled products conserves valuable landfill space by using goods made from materials that otherwise would have been discarded. Using recycled products and packaging also conserves natural resources and energy.
- Buying less-hazardous products can reduce regulatory liability, improve worker safety, and lower disposal costs.
- Using energy-efficient and water-conserving products can save money.
- Environmentally preferable purchasing compliments other environmental policies in the City and County of Durham, including our Greenhouse Gas Emissions Reduction plan, idle-reduction policies, and green building guidelines.

## 1.7 PRACTICE THE FOUR R'S – REDUCE, REUSE, RECYCLE, AND REBUY

**Reduce** is the best of the four R's—because preventing waste in the first place means you have less waste to worry about in the end!

- Shop for products that have the least amount of packaging
- Buy in bulk quantities whenever possible.
- Rent or borrow items that are used infrequently.
- Maintain and repair items to ensure a long product life.

**Reuse** is the next best—if you can reuse your waste, it is longer considered waste! Giving away old clothes and other unwanted items to charities and thrift stores keeps good items out of the trash and can save money. Why pay extra to dump good usable items when you can donate them for free?

**Recycle:** Sometimes things can't be reused. Recycling keeps raw material in the system and keeps us less dependent on virgin ore, oil and trees for raw materials. If we can keep recycling our products, not only will we reduce the amount of material going to the landfill, we will also reduce mining and logging! All employees in the City and County of Durham are required to recycle corrugated cardboard, aluminum cans, steel cans, newspapers, and glass bottles and jars in the appropriate recycling containers.



**Rebuy:** Close the loop! What good is recycling if nobody buys the recycled products? Buying recycled products creates a larger demand for them. More demand means more manufacturers will try selling more recycled products. Also buy products that are recyclable to facilitate the recycling loop.



## 1.8 THIRD PARTY CERTIFICATION AND ACCEPTABLE STANDARDS & GUIDELINES

There are a number of organizations that put considerable time and effort into evaluating products and services based on their environmental impacts. Below are a few of the most widely recognized organizations that have established environmentally preferred product standards.

	<p><b>Green Seal</b> is a nationally recognized nonprofit organization that certifies a variety of environmental products that pass stringent testing standards. Approved products carry a Green Seal logo that is well-recognized throughout industry and government as a leading environmental standard. Green Seal bases its work on thorough, state-of-the-art scientific evaluations using internationally accepted methodologies. Product evaluations are conducted using a life-cycle approach to ensure that all significant environmental impacts of a product are considered, from raw materials extraction through manufacturing to use and disposal. <a href="http://www.green seal.org">www.green seal.org</a></p>
	<p>Sponsored by the U.S. Department of Energy and the U.S. Environmental Protection Agency, <b>ENERGY STAR</b> labels products such as computer CPUs, monitors, printers, copiers, and other devices that exceed US energy efficiency standards. ENERGY STAR also includes lighting, appliances, windows, and many other products. <a href="http://www.energystar.gov">www.energystar.gov</a></p>
	<p><b>United States Environmental Protection Agency (EPA)</b> works to develop and enforce regulations that implement environmental laws enacted by Congress.</p> <p>The EPA provides Comprehensive Procurement Guidelines (CPG) that are updated every two years. Through the CPG, EPA designates items that must contain recycled materials when purchased with appropriated federal funds by federal, state, and local agencies. <a href="http://www.epa.gov/cpg">www.epa.gov/cpg</a></p> <p>The EPA also offers guidance on Environmentally Preferred Purchasing, including a database of environmentally preferred products. <a href="http://www.epa.gov/opptintr/epp/">http://www.epa.gov/opptintr/epp/</a></p>
	<p><b>American Society for Testing and Materials (ASTM)</b> is one of the largest voluntary standards development organizations in the world and a trusted source for technical standards for materials, products, systems, and services. Known for their high technical quality and market relevancy, ASTM International standards have an important role in the information infrastructure that guides design, manufacturing and trade in the global economy. Standards for over 12,000 items can be downloaded at <a href="http://www.astm.org">www.astm.org</a>.</p>
	<p><b>Greenguard Environmental Institute (GEI)</b> is an industry-independent, non-profit organization that oversees the GREENGUARD Certification Program. As an ANSI Authorized Standards Developer, GEI establishes acceptable indoor air standards for indoor products, environments, and buildings. <a href="http://www.greenguard.org">www.greenguard.org</a></p>
	<p>The <b>Biodegradable Products Institute (BPI)</b> certifies products that are compostable or otherwise biodegradable using ASTM Specifications D6400 and D6868. All BPI-certified products are laboratory-tested to meet these standards, which establish compostability in municipal or commercial facilities (not home composters). <a href="http://www.bpiworld.org">www.bpiworld.org</a></p>

	<p><b>Forest Stewardship Council</b> is a not-for-profit, non-governmental organization that develops standards for sustainable forest management and that certifies sustainably-grown forest products, including wood and paper made from virgin fiber. <a href="http://www.fsc.org">www.fsc.org</a></p>
	<p><b>Scientific Certification Systems (SCS)</b> develops standards and certification programs for claims of environmental impacts, sustainability, food quality, and food purity. Certifications include forestry, energy, green building, and consumer products, with standards for indoor air quality, recycled content, and other environmental attributes. <a href="http://www.scscertified.com">www.scscertified.com</a></p>
	<p><b>EcoLogo</b> compares similar products and services to develop environmental criteria based on the product life cycle and certifies products meeting those standards. Certifications cover thousands of products and a wide array of product types. <a href="http://www.terrachoice-certified.com/en">www.terrachoice-certified.com/en</a></p>
	<p><b>NSF International</b> is a not-for-profit, non-governmental body that certifies products for their public health, safety, and environmental qualities with a scientific and technical approach. Their environmental certification includes carpeting, furniture, flooring, water piping, compostability, and sustainable forestry. <a href="http://www.nsf.org">www.nsf.org</a></p>

## 1.9 WRITING SPECIFICATIONS

When putting together your bid requirements for products and services, consider how environmental attributes can be included in your specifications. Contractors with the City and County of Durham are should follow the City and County Environmentally Preferred Purchasing Policies to the fullest extent possible. Taking some time to consider environmental impacts before purchasing can result in lasting benefit for people and the environment.

Here are a few strategies:

- Specify those environmental attributes that make sense to a product, such as non-toxic, recycled content, mercury-free, biodegradable, energy efficient, low VOC, Energy Star, or vendor recycling and take-back programs.
- Ask vendors to identify environmental attributes that are common to a product and then think about using them when preparing your specifications.
- Require all products have the lowest possible impact on human health and the environment without compromising effectiveness.
- Require recycled content in products and products that can be easily recycled.
- Avoid specifications that would limit the purchase of certain products, e.g., requiring new equipment or virgin materials when refurbished or recycled products would work.
- Watch for over-specification; only specify product qualities that are critical to performance and leave other features open to alternatives. For example, by specifying the color of plastic items you may eliminate recycled-content items.
- Require packaging or containers that are refillable, returnable, or recyclable.
- Packaging should be recycled or recyclable materials and kept to a minimum to avoid waste.
- Limit the use of polystyrene (Styrofoam) in packaging and food utensils.
- Take into account the life-cycle costs, not just the purchase price of a product; consider long-term savings on maintenance, replacement, and disposal costs.
- Buy in bulk when feasible. Facilities can often realize significant cost-savings by buying certain items in bulk.
- Give an evaluation preference to products that offer the environmental attribute that you are looking for, e.g., additional points based an environmental attribute.
- Award contracts using a good, better, and best ranking for products and let the customer choose. This method allows for pricing differences for environmentally preferable products.
- Set environmental purchasing goals and track them for your office, department, and agency.
- Keep track of what works well and any difficulties you encountered in purchasing these products for future purchases.

## 2 GUIDELINES FOR BUYING ENVIRONMENTALLY PREFERRED PRODUCTS

### 2.1 OFFICE SUPPLIES

#### 2.1.1 COPY PAPER AND PAPER PRODUCTS

##### Overview

- Office paper products include, but are not limited to, copy paper, hanging file folders, envelopes, note pads, Post-It notes, and pre-printed forms, brochures, business cards, and archiving boxes.
- Posters, banners, maps, and other signs are additional large-size paper products.
- Recycled paper products are available in many colors, can be equal in quality and performance, and often cost the same or less as virgin products.

##### Potential Environmental Impacts

- In most cases, paper products placed in the trash will be disposed of in a landfill instead of reused or marketed as a commodity.
- Virgin paper products contribute to deforestation, which reduces forested area, increases water run-off, and contributes to greenhouse gas emissions from materials stored in wood and soil.
- Chlorine bleach of paper can contribute to toxic pollution.
- Standard inks are made from petroleum, a non-renewable resource, and printing with them can contribute to release of volatile organic compounds (VOCs), hazardous air pollution, and other environmental hazards.

##### Things to Consider Before Buying or If You Write Your Own Specifications

###### *Reduce waste*

- Circulate memos and policies by email and store documents electronically, when possible.
- Duplex printing and copying wherever feasible, and format documents to reduce the number of pages printed.
- Reformat forms to decrease their size, including multi-part forms that can be replaced with a one-part form.
- Save outdated letterhead and pages with a single blank side to use as scratch paper, printing paper for drafts, or scrap paper tablets. The City Print Shop (919-560-4120) will produce tablets from collected paper and provide them to all City departments.
- Use reusable interoffice envelopes and reuse manila folders, brown envelopes, and other paper products where possible.

###### *Support recycling*

- Look for products made from post-consumer recycled contents.
- Request printing companies to use post-consumer recycled paper for all pre-printed forms, brochures, and other custom printed materials, including business cards. Display the recycling symbol on such printed materials.

###### *Reduce hazardous materials*

- Choose products that have not been bleached with chlorine.
- For pre-printed materials, give preference to biodegradable inks.

###### *Meet standards*

- If no recycled-content products are available, meet Forest Stewardship Council (FSC) standards for virgin office paper products.

##### Availability

- The City Print Shop will stock recycled paper and card stock, including business cards.

##### Disposal

- Recycle all clean paper and paper products.

## 2.1.2 MISCELLANEOUS OFFICE SUPPLIES (NON-PAPER)

### Overview

- Office supply manufacturers increasingly offer a wide range of products made from recycled materials. Many office items made from metal or plastic, such as 3-ring binders, desk accessories, CDs and jump drives, mouse pads, paper clips, and pens & pencils, are available with recycled content materials.
- Manufacturers also increasingly offer reusable and refillable products.

### Potential Environmental Impacts

- Buying recycled products conserves natural resources, saves energy, reduces solid waste, and reduces air and water pollutants.
- Non-toxic products prevent human and environmental exposure to toxic compounds.
- Reusable and refillable products decrease waste.

### Things to Consider Before Buying or If You Write Your Own Specifications

#### *Reduce waste*

- Consider refillable products such as pens, mechanical pencils, and white-out strip dispensers.
- Investigate the ability to reuse or donate the product within your department or the City/County when you are done using it.
- Avoid unnecessary use of binders, plastic covers, and other items that impede paper recycling.
- Look for products with minimal packaging.

#### *Support recycling*

- Look for products that contain post-consumer recycled contents.
- Look for products and for products with packaging that can be recycled.

#### *Reduce hazardous materials*

- Consider non-toxic highlighters, markers, correction fluid, and other items identified in the supply catalogs with environmental symbols for easy recognition.

### Availability

- Most national office supply companies offer environmentally friendly office products, and some have catalogs geared toward environmentally preferred purchasing. Some local office supply companies also have good selection of environmentally friendly office products.

### Disposal

- Recycle products where possible.

## 2.1.3 PACKING MATERIALS

### Overview

- Packing materials are useful for safe shipping.
- They are often discarded after a single use, while still fully functional.

### Potential Environmental Impacts

- Styrofoam-based packing materials are made from petroleum and are difficult to recycle, creating waste in landfills.

### Things to Consider Before Buying or If You Write Your Own Specifications

#### *Reduce waste*

- Store packing materials centrally for future re-use.

#### *Support recycling*

- Purchase packing materials made of recycled materials.

*Reduce hazardous materials*

- Choose packing materials made of paper or cellulose rather than petroleum-based Styrofoam peanuts.

**Availability**

- Large office supply companies offer biodegradable, corn-based packing peanuts, as do other smaller supply companies.
- They also offer recycled Styrofoam peanuts.

**Disposal**

- Recycle paper packing materials.
- Donate packing peanuts to a local mail packaging store.
- Dissolve cellulose-based packing peanuts in water.
- Break down & recycle cardboard boxes.

## 2.1.4 PRINTING CARTRIDGES

### Overview

- Printing cartridges are widely used in photocopiers, facsimile machines, and laser printers.
- Cartridges are often thrown away once the toner inside the cartridge is used up.
- Cartridges contain many components that are in great condition at the end of the expected life of the cartridge. Re-manufacturing printing cartridges involves disassembling the unit, inspecting and cleaning components, replacing or refurbishing the unit's organic photoreceptor cell, and replacing the toner.
- Remanufactured cartridges typically cost 30% to 50% less than new cartridges.

### Potential Environmental Impacts

- Plastics and toners can be detrimental to land and water resources.
- Remanufactured toner cartridges save resources by reusing components instead of disposing of them after a single use.

### Things to Consider Before Buying or If You Write Your Own Specifications

#### *Support recycling*

- If possible, purchase remanufactured cartridges.
- When purchasing new cartridges, buy them from a supplier who will take back used cartridges.

#### *Reduce hazardous materials*

- Soy-based laser cartridges are now available for sale. Check online.

### Availability

- Some companies refill used cartridges for re-sale.
- Major office supply companies offer labeled remanufactured toner cartridges.
- Soy-based laser cartridges have recently become available.

### Disposal

- All used cartridges must be returned to the manufacturer of the cartridge or the vendor the department buys cartridges from so they can be refurbished or recycled. Vendors include with each purchase a postage-paid return label for consumers to use to ship cartridges back to the manufacturer.

## 2.2 EVENT SUPPLIES

### 2.2.1 DISHES & FLATWARE

#### Overview

- Disposable dishes and flatware are inexpensive and convenient for events where food is served.

#### Potential Environmental Impacts

- Disposable dishes and flatware are often a source of Styrofoam & plastic waste in landfills.

#### Things to Consider Before Buying or If You Write Your Own Specifications

##### *Reduce waste*

- Encourage employees to bring and use reusable dishes.
- Keep a supply of reusable dishes in kitchen areas.

##### *Support recycling*

- Purchase recycled paper plates and other dishes for events.

##### *Reduce hazardous materials*

- For disposable dishes, purchase paper cups, plates, and other dishes. Products labeled as 'biodegradable' or 'compostable' will not have a plastic lining or potentially harmful coatings.
- For disposable flatware, purchase compostable flatware whenever possible.

##### *Meet standards*

- Compostable & biodegradable products should meet ASTM specifications D6400 and/or D6868. Look for Biodegradable Products Institute (BPI) certification.

#### Availability

- Compostable dishes and flatware are available from local and national office supply companies.

#### Disposal

- Such products can be thrown away with other landfill waste; compostable paper dishes can also be added to a home compost pile.

### 2.2.2 BANNERS

#### Overview

- Banners for events are often made for short-term use.
- They are also often printed on vinyl for durability, especially in all weather conditions.

#### Potential Environmental Impacts

- Such banners are made of polyvinyl chloride, which does not readily decompose and which can produce dioxin and other toxins that are a high risk for human health. PVC is a substantial source of dioxin globally.

#### Things to Consider Before Buying or If You Write Your Own Specifications

##### *Reduce waste*

- Consider whether a banner is important for its intended use; are less permanent signs, such as a paper banner inside a window, viable alternatives?

##### *Support recycling*

- Look for recycled-content and/or recyclable banner material.

##### *Reduce hazardous materials*

- Avoid PVC-based banners.
- Look for biodegradable banners printed with eco-friendly inks.

#### Availability

- Several sign shops in the Triangle can produce eco-friendly banners (e.g., eco-friendly inks on biodegradable banners).

**Disposal**

- Karen Kimrey (karen.kimrey@ncdenr.gov) accepts banners to be made into tote bags and sold at the North Carolina Museum of Natural Sciences.

## 2.3 ELECTRONICS

### 2.3.1 COMPUTERS AND MONITORS

#### Overview

- Computers are an integral part of most offices.
- Computers are typically replaced before they cease functioning in order to keep up with technological advancements.

#### Potential Environmental Impacts

- Most computers contain materials that can pose a threat to the environment if not managed carefully at the end of their useful life, such as lead.
- Improper disposal of computer equipment can release lead and other toxins into the environment.
- Machines consume unnecessary energy when on but not in use.

#### Things to Consider Before Buying or If You Write Your Own Specifications

##### *Reduce waste*

- Acquire computers that can be expanded or upgraded instead of being replaced.
- Purchasing a computer with near top-of-the-line features can extend the compatibility lifespan of the product.

##### *Support recycling*

- Look for computers made from recycled content.
- Look for products that are more easily recycled.

##### *Reduce hazardous materials*

- Avoid products that contain lead, mercury, hexavalent chromium, cadmium, and other toxic compounds.

##### *Improve resource efficiency*

- Smaller computers use less energy, and laptop computers use less energy than desktops.
- Choose efficient power supply units and processors.
- Graphics cards consume high levels of energy; integrated graphics have the lowest power consumption.
- Turn off the monitor when not in use and, if possible, turn off the computer over the weekend.

##### *Meet standards*

- Purchase computer equipment that is certified by EPEAT ([www.epeat.net](http://www.epeat.net)) for low toxicity, recycled content, low packaging, end-of-life management, and energy efficiency.
- Equipment should be Energy Star® certified.
- Look for a power supply unit that meets 80 Plus standards ([www.80plus.org](http://www.80plus.org)) for energy efficiency.

#### Availability

- In the City, communicate your computer needs to Technology Services. The City leases Energy Star®-compliant computers every four years.

#### Disposal

- The City returns leased computers to the leasing organization for refurbishment and reuse.
- In the County, notify Information Technology of computers to be removed. Computers will be upgraded for re-use, salvaged for parts, or sold at public auction by General Services.

## 2.3.2 PRINTERS, SCANNERS, AND COPIERS

### Overview

- Printers, scanners, and copiers all perform similar, important document management functions.
- Some models combine all three functions in one unit.

### Potential Environmental Impacts

- Printer and copier ink can release VOCs and ultrafine particle pollution into the office air.
- Printers, scanners, and copiers can contain toxic metals, including lead, mercury, cadmium, and selenium.
- All of these devices consume energy; energy production for Durham contributes to greenhouse gas emissions and to mercury pollution.

### Things to Consider Before Buying or If You Write Your Own Specifications

#### *Reduce waste*

- Choose multi-purpose units that print, scan, and copy to reduce the volume of machinery in the office.
- Maintain one central printer rather than personal printers, where possible.
- Purchase new units that duplex.
- Purchase new units that are durable.

#### *Support recycling*

- Purchase equipment with a recyclable design, such as easy dismantling and minimal coatings.
- Look for equipment made from some post-consumer recycled materials.

#### *Reduce hazardous materials*

- Choose devices that contain no lead, mercury, cadmium, or selenium.
- Avoid products with polybrominated byphenyl (PBB) or diphenyl ether (PBDE) flame retardants or substances that can cause dioxins or furans to form, including polyvinyl chloride (PVC).
- Set performance standards for low emissions of ozone, particulates, styrene, benzene, and VOCs.

#### *Improve resource efficiency*

- Look for energy-efficient models.
- If needed, set the units to power down when not in use.
- Turn off units at the end of the day.

#### *Meet standards*

- Choose ENERGY STAR units.

### Availability

- In the City, contact Technology Solutions to acquire new computer peripherals. Consult Purchasing about copiers.

### Disposal

- Contact Technology Solutions in the City of Durham to dispose of worn-out computer peripherals via public auction.
- In the County, General Services collects unusable printers, scanners, and copiers and sells them for recycling.

### 2.3.3 MISCELLANEOUS ELECTRONIC DEVICES

#### Overview

- This class of products includes phones, faxes, computer speakers, power strips, and other small electronic devices.
- These small electronic devices are made of plastic and a variety of metals.

#### Potential Environmental Impacts

- Mining metals has a substantial environmental impact, as large quantities of earth must be moved to produce relatively small quantities of high quality metal. Recycling metals reduces this mining impact.
- Many electronics include toxic metals, such as lead, mercury, and cadmium.
- Plastic casings of electronics can be recyclable as well.

#### Things to Consider Before Buying or If You Write Your Own Specifications

##### *Reduce waste*

- Avoid purchasing unnecessary duplicate small electronic devices.

##### *Support recycling*

- Look for products made from recycled and/or recyclable materials.

##### *Reduce hazardous materials*

- Look for products without toxic metals.

##### *Improve resource efficiency*

- Look for energy-efficient products.

#### Availability

- Major office suppliers offer energy-efficient phones and power strips.

#### Disposal

- In Durham County, General Services collects small electronic devices and sells them for recycling.

### 2.3.4 BATTERIES

#### Overview

- Batteries are typically made with several toxic materials.
- Rechargeable “hybrid” nickel metal hydride batteries come charged and will hold their charge for up to a year.

#### Potential Environmental Impacts

- Most batteries use toxic materials, creating handling and end-of-use disposal concerns.
- Non-rechargeable batteries need to be replaced more frequently, creating more toxic waste and energy demand in manufacturing.
- Although nickel is not considered toxic, manufacturing products from nickel requires environmentally-destructive mining.

#### Things to Consider Before Buying or If You Write Your Own Specifications

##### *Reduce waste*

- Purchase rechargeable batteries that can be reused extensively.

##### *Reduce hazardous materials*

- Avoid nickel-cadmium (Ni-Cd) batteries, which have a higher level of toxicity (because of cadmium) than nickel metal hydride (Ni-MH) batteries.

**Availability**

- Major office supply companies offer rechargeable small batteries, such as AA and AAA.

**Disposal**

- Rechargeable batteries are recyclable. Non-rechargeable batteries should be disposed of with hazardous waste.

## 2.4 APPLIANCES

### 2.4.1 REFRIGERATORS

#### Overview

- A refrigerator in the general-use kitchen facility is highly important for food safety standards.
- Refrigerators run constantly, using energy.
- Refrigerators are typically constructed with several hazardous materials that facilitate cooling.

#### Potential Environmental Impacts

- Refrigerator lifetime energy use can be quite high, with consequent greenhouse gas emissions and pollution from energy production.
- Mistreatment of refrigerators can allow oil from the compressor to leak or can release refrigerant to the atmosphere. If the refrigerant is burned it will generate a dangerous vapor.

#### Things to Consider Before Buying or Writing Your Own Specifications

##### *Reduce waste*

- Avoid purchasing unnecessary refrigerators (e.g., small mini-fridges), which will create unnecessary waste at the end of their life span.

##### *Improve resource efficiency*

- Do not keep a mini-fridge in your office; use a general refrigerator instead. Both the City and the County prohibit redundant refrigerators, which use unnecessary energy to run.
- Choose a model with the freezer above or below the refrigerator, rather than side by side, and avoid models that dispense ice from the door.
- Look for models with an EnergyGuide label indicating that it uses less than 700 kwh per year.
- Clean refrigerator coils periodically to maintain energy efficiency.

##### *Meet standards*

- Choose ENERGY STAR-certified appliances.

#### Availability

#### Disposal

- Recycle old refrigerators.
- Refrigerators built before 1995 may contain chlorofluorocarbons (CFCs), which deplete the ozone layer, in their insulation. Such refrigerators should be disposed of properly as hazardous waste so that the CFCs can be destroyed or recycled.

### 2.4.2 WATER HEATERS

#### Overview

- Traditional water heaters keep a tank of water constantly hot awaiting use.
- Solar thermal water heaters, typically sited on a roof, use solar energy to passively heat water. They may be augmented by water from a traditional heater on overcast or high-use days.
- On-demand water heaters do not maintain a holding tank of hot water. Instead, they use a burst of energy to heat water instantaneously when called for. They are used with gas rather than electric heating.
- Electric heat pump water heaters are highly efficient and provide air cooling and dehumidifying in addition to water heating. These water heaters directly transfer heat from the surrounding air to the tank of water. They are best suited to warm climates with a long cooling season and water heaters inside the conditioned air space.

### **Potential Environmental Impacts**

- Energy use by water heaters contributes to greenhouse gas emissions and air pollution.
- Large appliances like water heaters require large amounts of energy and materials to produce.
- Placement of the water heater can result in substantial wasted water as the tap water heats up.

### **Things to Consider Before Buying or If You Write Your Own Specifications**

#### *Reduce waste*

- Purchase a long-lived model.

#### *Improve resource efficiency*

- Purchase an energy-efficient water heater, such a solar thermal, on-demand, and heat pump water heater. Consider the lifecycle analysis of energy used by that model (including production).
- If the water heater has a tank, keep it well-insulated, either with built-in insulation or a water heater blanket.
- Place the water heater near locations where hot water is used to prevent energy loss through water pipes and to decrease the amount of cold water wasted before hot water reaches the tap.
- Insulate hot water pipes.

#### *Meet standards*

- Purchase models certified by ENERGY STAR.

### **Availability**

### **Disposal**

- Recycle old water heaters.

## 2.4.3 HVAC SYSTEMS

### **Overview**

- HVAC systems provide building heating, cooling, ventilation, and air circulation.
- They are composed of a heater, a chiller, ducts, and fans or blowers.
- The chiller, particularly, may involve several hazardous materials for cooling.
- HVAC systems use a substantial fraction of total building energy. Energy savings in the HVAC system involves not only a large environmental savings but also a large financial savings.

### **Potential Environmental Impacts**

- Energy use contributes to greenhouse gas emissions and air pollution.
- Mistreatment of refrigerators can allow oil from the compressor to leak or can release refrigerant to the atmosphere. If the refrigerant is burned it will generate a dangerous vapor.

### **Things to Consider Before Buying or If You Write Your Own Specifications**

#### *Reduce waste*

- Purchase durable, long-lived items.

#### *Support recycling*

- Purchase products made of recyclable and recycled materials where possible.

#### *Improve resource efficiency*

- Maximize efficiency of the entire HVAC system: purchase high-efficiency heaters and chillers, use efficient fans, and seal ducts to prevent air leaks. Maintain the system regularly.

#### *Meet standards*

- Purchase heaters and chillers certified by ENERGY STAR for efficiency.

### **Availability**

### **Disposal**

## 2.4.4 OTHER APPLIANCES

### Overview

- This class of products includes microwaves, clothes washing & drying machines, and any other appliances not otherwise listed.

### Potential Environmental Impacts

- Energy use, material production, toxic metals, and disposal are the largest environmental considerations with these products.

### Things to Consider Before Buying or If You Write Your Own Specifications

#### *Reduce waste*

- Avoid redundant or unnecessary appliances, which will require unnecessary disposal at their end-of-life.
- Look for durable products.

#### *Support recycling*

- Look for products with recycled and/or recyclable materials.

#### *Reduce hazardous materials*

- Look for models with low or no toxic metals.

#### *Improve resource efficiency*

- Avoid redundant appliances – e.g., radios, clocks, microwaves,
- Turn off or unplug small appliances when not in use.
- Purchase energy and water efficient appliances, as applicable.

#### *Meet standards*

- Meet ENERGY STAR standards, if possible.

### Availability

### Disposal

## 2.5 FURNITURE AND PANEL SYSTEMS

### Overview

- Office furniture and panel systems are made with a variety of materials including gypsum board, metal, wood and wood based products, plastic and fabric.
- As a result of the different materials and processes that may be used in manufacture, various environmental issues must be taken into account.

### Potential Environmental Impacts

- Materials used in office furniture and panel systems may emit VOCs when installed, immediately impacting indoor air quality.
- Building agents such as resins used in composite wood products can affect indoor air quality.
- Waste generated from the manufacture and disposal of these products can be minimized through reuse, remanufacture, and recycling.

### Things to Consider Before Buying or If You Write Your Own Specifications

#### *Reduce waste*

- Re-use existing furniture where possible and refurbish if desired.
- Look for classic designs that will last without looking dated.
- Consider quality carefully. Low-cost products may break more readily and offer fewer repair options.
- Require reusable and demountable panel systems.
- Refurbished office furniture is first touched up or otherwise cosmetically improved before being resold.
- Remanufactured office furniture typically has had greater value added to the product and is commonly completely disassembled; its parts are inspected, cleaned, repaired, or replaced.

#### *Support recycling*

- Look for the highest recycled contents.
- Recycled content may be found in many manufacturers' components of new furniture (composed entirely of original parts), including metal, pressboard, and fabric.

#### *Reduce hazardous materials*

- Avoid products that use ozone depleting substances during manufacture or release volatile organic compounds.
- Avoid fiberglass reinforcements.
- Avoid products with heavy metals or toxic coatings.

#### *Meet standards.*

- Purchase furniture that meets Green Seal standards or that is certified by GREENGUARD.

### Availability

- GREENGUARD® certified furniture includes many manufacturers such as **Knoll, Allsteel, Herman Miller, Dar-Ran, and Steelcase.**

### Disposal

## 2.6 LIGHTING PRODUCTS

### Overview

- Lighting typically accounts for 30% to 50% of energy use in buildings, so finding ways to increase lighting efficiency can produce significant energy and cost savings.
- Using energy efficient lighting products, such as fluorescent lamps and energy efficient ballasts, can reduce electric lighting costs as much as 60%.
- Newer lamps and ballasts generate less heat than older models and last longer.
- According to ENERGY STAR, if every American home replaced just one light bulb with an ENERGY STAR certified bulb, we would save enough energy to light more than 2.5 million homes for a year and prevent greenhouse gases equivalent to the emissions of nearly 800,000 cars.

### Potential Environmental Impacts

- Inefficient lighting fixtures and inefficient lighting design lead to higher energy use, costs, and pollution.
- Fluorescent bulbs use mercury, a toxic compound, and must be disposed of appropriately.

### Things to Consider Before Buying or If You Write Your Own Specifications

#### *Reduce waste*

- Purchase long-lived bulbs.

#### *Reduce hazardous materials*

- Choose bulbs and fixtures with low or no concentrations of mercury. Low-mercury fluorescent bulbs are indicated by a green end cap, factory green lettering, or similar identification.

#### *Improve resource efficiency*

- Compact fluorescent lights (CFLs), T-8 fluorescent lamps, and LEDs are preferred. Use low wattage and reflective bulbs when possible.
- Use task lighting to minimize the need for overhead lighting when possible.
- When ballasts need to be replaced on fixtures with T-12 lamps, replace with electronic ballasts and T-8 lamps or better.
- Instant start ballasts consume less energy than rapid start ballasts. Soft start technology gives the tubes a longer lifespan. Electronic ballasts are preferred, and they consume substantially less energy when operating at very high frequencies; they hum less and do not flicker.
- During construction and renovations, use a qualified design professional to assist with layout and selection of lighting fixtures. Consider extensive daylighting, and require a life cycle analysis as part of the design deliverables. Compare the use of T-12, T-8, and T-5 fluorescents. For high bay fixtures, consider T5HO bulbs. Consider new technologies as they become available.

#### *Meet standards*

- Use ENERGY STAR-certified lighting.

### Availability

- In Durham County, contact General Services at 919-560-0430 for bulb replacement. All bulbs are energy-efficient and low-mercury.

### Disposal

- Upon bulb replacement in County facilities, General Services will remove waste fluorescent bulbs for crushing and hazardous material transport to a recycler. Careful disposal of fluorescent bulbs keeps mercury from the general waste stream.

## 2.7 GENERAL BUILDING MAINTENANCE

### 2.7.1 CARPETING

#### Overview

- Most commercial carpet is made by bonding a face fiber to a backing fiber, using one of a variety of strong bonding agents. The backing fiber can contribute up to 60% of the carpet material
- Nylon, polyester, and plastic, which make up many carpets, are made from petroleum, a non-renewable resource.
- Used carpet fiber and backing can be made into new carpet and backing (and can be recycled into new carpet after its useful life); these closed-loop systems can be highly resource-efficient.

#### Potential Environmental Impacts

- Conventional synthetic carpets are made from non-renewable resources.
- Fumes given off by synthetic materials (new and recycled) can decrease indoor air quality; natural materials such as wool, cocoa matting, and hemp do not release such fumes.
- Disposal at the end of the product's life span can create unnecessary waste. Alternative disposal includes recycling synthetic materials and choosing materials that biodegrade, reducing landfill material.

#### Things to Consider Before Buying or Writing Your Own Specifications

##### *Reduce waste*

- Look for carpets with a minimum 10 year warranty and a minimum of 26 ounces per square yard for loop pile carpet and 34 ounces per square yard for cut pile carpet.
- Choose colors that match natural soiling to hide dirt and stains, increasing the life of the carpet.

##### *Support recycling*

- Look for the highest recycled content. Consider purchasing a nylon face fiber with 100% recycled content backing.
- Consider recyclable products with third-party approval.

##### *Reduce hazardous materials*

- Choose products that minimize volatile organic compound (VOC) emissions.
- Look for carpet that is not backed with Styrene-Butadiene (SB) latex.
- Give preference to products made from natural materials such as wool, cocoa matting, and hemp and to products that contain natural or vegetable dyes and additives.

##### *Meet standards*

- Choose carpets that are rated silver, gold, or platinum by the NSF sustainable carpet assessment standard or that meet Green Seal standards.

#### Availability

- NSF- and Green Seal-recommended carpet brands include, but are not limited to Brintons, Colin Campbell & Sons, Interface, and Milliken.

#### Disposal

- Recycle carpet and/or carpet padding when you replace it.

## 2.7.2 CEILING TILES

### Overview

- Ceiling tiles generally are classified as acoustical products and are designed to be light, acoustically deadening, durable, and low maintenance.
- At one time ceiling tiles had high asbestos content, but they are continuing to improve with the advent of new recycling technologies.
- Some products now on the market have a minimum of 80% recycled content (mineral fibers). They are durable and tear resistant, so they can be reused.

### Potential Environmental Impacts

- Long-lived products reduce unnecessary waste.
- Dust and fumes during and after installation can create health hazards.
- Paints used in ceiling tiles can contain high VOCs.
- Hazardous materials may enter the waste stream at the end of the product's life.

### Things to Consider Before Buying or If You Write Your Own Specifications

#### *Reduce waste*

- Look for durable construction and low maintenance tiles.

#### *Support recycling*

- Tiles should contain a high percentage of recycled content. The EPA recommends a minimum recycled content of 80%.
- Choose tiles that are recyclable.

#### *Reduce hazardous materials*

- NO asbestos fibers are acceptable.
- Look for tiles made from cellulose fibers, mineral and slag wool by-products and/or recycled fiberglass.

#### *Improve resource efficiency*

#### *Meet standards*

- Choose products that meet Collaborative for High Performance Schools Section 01350, Greenguard certification ([www.greenguard.org](http://www.greenguard.org)), or standards of another nationally recognized environmental organization.
- Products must meet all building and fire codes.

### Availability

- The EPA recommends the following ceiling tile manufacturers: **Armstrong** and **USG Corporation**. Ceiling tiles with recycled-content materials are available through many distributors.

### Disposal

- Recycle old tiles (e.g., with **Armstrong**; <http://www.armstrong.com/commceilingsna/article45743.html>).

## 2.7.3 PAINT PRODUCTS

### Overview

- Paints are among the most widely purchased products for building maintenance.
- These products range in environmental impact, but all have the potential to adversely affect the environment through improper use, waste, and end disposal.

### Potential Environmental Impacts

- Volatile organic compounds (VOC) and fumes reduce air quality and are hazardous.
- Improper disposal of unused, toxic product can lead to environmental problems.

## Things to Consider Before Buying or If You Write Your Own Specifications

### *Reduce waste*

- Choose long-lasting paints.
- Buy the right amount of paint.

### *Support recycling*

- Consider purchasing recycled or reprocessed paint.

### *Reduce hazardous materials*

- Architectural paints, coatings and primers applied to interior walls and ceilings: Do not exceed the VOC content limits established in Green Seal Standard GS-11, Paints, First Edition, May 20, 1993.
  - Flats: 50 g/L
  - Non-Flats: 150 g/L
- Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates: Do not exceed the VOC content limit of 250 g/L established in Green Seal Standard GC-03, Anti-Corrosive Paints, Second Edition, January 7, 1997.
- Clear wood finishes, floor coatings, stains, and shellacs applied to interior elements: Do not exceed the VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules in effect on January 1, 2004.
  - Clear wood finishes: varnish 350 g/L; lacquer 550 g/L
  - Floor coatings: 100 g/L
  - Sealers: waterproofing sealers 250 g/L; sanding sealers 275 g/L; all other sealers 200 g/L
  - Shellacs: Clear 730 g/L; pigmented 550 g/L
  - Stains: 250 g/L
- Require low or no fumes and preferably no volatile organic compounds (VOC).
- Absence of mercury, mercury compounds, lead, cadmium, and chrome is desired.

### *Improve resource efficiency*

- Choosing light colors for buildings can help reduce energy consumption: On exterior walls, light paint can reduce summer cooling costs; on interior walls, it can enhance the effectiveness of daylighting and reduce the need for bright interior lights.

### *Meet standards*

- See the Green Seal standard for paints at <http://www.greenseal.org/certification/standards/paints.cfm>.

## Availability

- Nationally, recycled paint is a relatively new product. However, low-VOC and less-toxic paint are more readily available from numerous local and national manufacturers.
- Green Seal lists low VOC paints by the following paint manufacturers: **Benjamin Moore, Dutch Boy, Olympic Paint and Stain, Sico, Inc., PPG, Rodda, and Miller Paint Co.**

## Disposal

- Recycle unused paints.

## 2.7.4 INSULATION

### Overview

- There are many thermal insulation materials on the market, including fiberglass, foam, cellulose fiber, and mineral wool.
- Thermal insulation helps curb the use of energy and prevent emissions of greenhouse gases.
- Using recycled materials will reduce the amount of material entering the waste stream and reduce total resource consumption.
- Cellulose-based insulation is often made of recycled materials and is biodegradable.

### Potential Environmental Impacts

- Dust and fumes during and after installation reduce air quality and can create health hazards.
- Manufacturing insulation can incorporate ozone-depleting substances such as chlorofluorocarbons (CFCs) or hydrochlorofluorocarbons (HCFCs) in foam insulation.

### Things to Consider Before Buying or If You Write Your Own Specifications

#### *Reduce waste*

- Choose long-lived products.

#### *Support recycling*

- Require the highest recycled content materials, such as cellulose and mineral wool. Fiberglass and extruded polystyrene can also contain recycled materials.

#### *Reduce hazardous materials*

- Choose products with low or no fumes and preferably no volatile organic compounds (VOC).
- Avoid products that contain CFCs or HCFCs.
- Give preference to natural, biodegradable fibers like cellulose.

#### *Improve resource efficiency*

- Higher levels of insulation will prevent future energy waste. Roof or attic insulation should be at least R-30 and up to R-38. Wall insulation should be at least R-13.

#### *Meet standards*

- Specify products that meet the standards of the Greenguard Environmental Institute, the EPA, or another nationally-recognized environmental organization.

### Availability

### Disposal

- Older foam insulation is more likely to contain CFCs, which are released upon shredding. Collect such foam insulation for safe disposal.

## 2.7.5 ROOFING

### Overview

- For a properly constructed structure, weather protection begins at the ridge of the roof, continuing down to form an unbroken barrier that keeps out the elements -- rain, snow, and the sun's light and heat.
- Currently, a multitude of roofing materials is available, including asphalt shingles, wood shingles and shakes, roll-roofing, plastic membranes, slate, tiles (clay and concrete), and aluminum, copper, and steel panels.

### Potential Environmental Impacts

- Some materials contain high VOCs, which can have a negative impact over the longer term.
- Some materials used are from non-renewable resources.
- Some roofing products are recyclable at the end of the product life span, while others create bulky and potentially toxic waste.

### Things to Consider Before Buying or If You Write Your Own Specifications

#### *Reduce waste*

- Choose long-lived products.

#### *Support recycling*

- Require the highest recycled content.

#### *Reduce hazardous materials*

- Require low or no fumes and preferably no VOCs.

#### *Improve resource efficiency*

- Light, especially white, roofing will help reduce building cooling costs and the urban heat island effect in the summer.

#### *Meet standards*

- Product should meet all building and fire codes.
- Preference for products with "seals of approval."
- EPA recommends that procuring agencies refer to the 186 standards for roofing products maintained by ASTM's Committee D08 on Roofing, Waterproofing, and Bituminous Materials.

### Availability

#### Disposal

- City construction and demolition waste should be taken to the City of Durham's Waste Disposal and Recycling Center located at 2115 East Club Blvd.
- Recycle materials where possible.

## 2.8 JANITORIAL PRODUCTS

### 2.8.1 INDUSTRIAL AND COMMERCIAL CLEANERS

#### Overview

- The primary function of industrial and commercial cleaners is for facility and machinery cleaning. The selection of a cleaner is influenced primarily by the nature of the surface to be cleaned, the nature of the soiling, and the degree of cleanliness required.
- The major ingredients in cleaners are surfactants, builders, solvents, scouring abrasives, and alkalis.
- This class of products includes hand soap, glass cleaners, general floor cleaners, bathroom cleaners, carpet cleaners, and multi-purpose cleaners.

#### Potential Environmental Impacts

- Cleaners can pollute wastewater and reduce indoor air quality, including with VOC emissions. This pollution can cause environmental health hazards to workers and our community and a greater burden on wastewater treatment. Biodegradable surfactants reduce pollution risk, and non-toxic, low-VOC products reduce health risks to workers.
- Excessive use of cleaners consumes natural resources in production as well as water and energy during cleaner use.
- High levels of packaging also require more resources to produce and can be added to landfills at their end of life.

#### Things to Consider Before Buying or If You Write Your Own Specifications

##### *Reduce waste*

- Choose products with minimal packaging.
- Look for refillable containers.
- Buy in a concentrated form and dilute for use.

##### *Support recycling*

- Look for recyclable containers.

##### *Reduce hazardous materials*

- Give preference to products that are biodegradable, not petroleum-based, not toxic or chlorinated, and standardized to reduce the number of chemicals in use. Products that are made from natural or bio-based materials (like herbs, fruits or trees) include citrus and pine oil.
- Choose pump sprays instead of aerosols. Aerosols produce a finer mist that is more likely to be inhaled by workers, and their containers may be hazardous if punctured.
- Choose products with low volatile organic compound (VOC) emissions.
- Look for products without added fragrance or color.
- Avoid products that include the following cautions on their labels:
  - Warning: Mild to moderate hazard
  - Danger: extremely flammable, corrosive, or highly toxic
  - Poison: highly toxic
- Require a flash point >200°F.

##### *Improve resource efficiency*

- Use the least concentrated form of a cleaner necessary for effective performance, which will require less water to remove from the surface.

##### *Meet standards*

- Specify products that meet Green Seal or EPA standards or those of another nationally recognized environmental organization. Durham County requires Green Seal certification.
- Require current MSDS sheets on all products as a Purchase Order request to be delivered with the product.

#### Availability

- Companies that offer some Green Seal compliant cleaners include, but are not limited to, 3M, Betco,

AmSan, Biotek, American Chemical Co. Nature's Way, and Nexgen. For a complete listing visit Green Seal: <http://www.greenseal.org/findaproduct/index.cfm>

## Disposal

### 2.8.2 JANITORIAL PAPER PRODUCTS

#### Overview

- What products do we use a lot, can use only once, and never use again? Bathroom & facial tissues, paper towels, and toilet seat covers.
- These products cannot be recycled, thereby eliminating the potential to replenish what has been consumed. According to Green Seal, use of post-consumer fibers reduces the impact on landfills by saving 3.3 cubic yards of space for every ton of paper that is re-channeled.

#### Potential Environmental Impacts

- Virgin paper products contribute to deforestation, which reduces forested area, increases water run-off, and contributes to greenhouse gas emissions from materials stored in wood and soil.
- Chlorine bleach of paper can contribute to toxic pollution.

#### Things to Consider Before Buying or If You Write Your Own Specifications

##### *Reduce waste*

- Request minimum packaging of all products.

##### *Support recycling*

- Look for products that are 100% recycled and contain a minimum 20% post consumer content.
- Packaging should be recyclable.

##### *Reduce hazardous materials*

- Require chlorine bleach-free products.

##### *Meet standards*

- Green Seal standards: Bath & facial tissues contain a minimum 20% post consumer content. Paper towels contain a minimum 40% post consumer content. Durham County requires Green Seal certification.
- If recycled content products are not available, look for Forest Stewardship Council certification that the forests producing virgin products were well managed.

#### Availability

- Green Seal lists the following paper manufacturers, among others: **AmSan, Cascades, Hillyard, and Wausau/Baywest.**

## Disposal

### 2.8.3 PLASTIC TRASH BAGS (CAN LINERS)

#### Overview

- A staple in most workplaces, plastic waste bags are used in trash cans or recycling bins.
- Workplaces can save money by instructing staff to replace bags only when they are too dirty or full for the work setting in which they are used.

#### Potential Environmental Impacts

- Use of recycled plastic trash bags conserves energy and promotes recycling.
- Manufacture of products may release substances that contaminate the environment and enter the solid waste stream.

#### Things to Consider Before Buying or If You Write Your Own Specifications

*Reduce waste*

- Replace bags only when they are too dirty or full.
- Any bag can fail if stressed beyond its intended use. Performance features such as puncture and tear resistance should be reviewed before choosing any bag, regardless of whether it has recycled content.
- When purchasing bags, work with the vendor to determine the size, thickness, durability and other performance requirements that are appropriate for your application.

*Support recycling*

- Look for products that contain a minimum 10% post consumer recycled content.

*Reduce hazardous materials*

- Bags should be lead free.
- Bags should be non-toxic when incinerated, disposed of in a landfill, or decomposed in composting.
- Consider biodegradable bags with sufficient strength.

**Availability**

- The availability of bags featuring recycled content is somewhat dependent on the type of bag. For bags ranging in capacity from 7 to 56 gallons and in thickness from 0.35 to 1.35 millimeters, products are widely available with up to 100% post-consumer recycled-content plastic. However, recycled content may be difficult to find in certain colors, sizes, and thicknesses.
- National office supply companies offer both recycled and biodegradable trash bags.

**Disposal**

## 2.9 PEST MANAGEMENT

### Overview

- Integrated Pest Management (IPM) is a pest control management system that combines pest prevention with targeted and sparing use of pesticides.
- Prevention measures can be summarized with, “Starve them out, dry them out, and keep them out”: Prevent sources of food, water, or entry that encourage pests.

### Potential Environmental Impacts

- High pesticide use is toxic for human and environmental health.

### Things to Consider Before Buying or If You Write Your Own Specifications

#### *Reduce waste*

- Apply only the amount of pesticide necessary.

#### *Reduce hazardous materials*

- Use preventive measures before pesticides: Remove or seal food sources, stop leaks and other sources of water, and seal cracks that allow entry or hiding places.
- Apply any pesticides in targeted applications.

### Disposal

### Availability

## 2.10 LANDSCAPE MATERIALS

### 2.10.1 MULCH

#### Overview

- Mulch is an insulating material that is spread over the ground as a decorative soil surface cover and for many horticultural benefits.
- Shredded wood and leaves, as well as straw, are some of the materials that can be used as mulch.
- In landscaping and construction projects, mulch is used as a surface material for erosion control or as a temporary road base.
- Size of material, texture, composition of material, aesthetics, water-holding capacity, and odor vary.

#### Potential Environmental Impacts

- Mulch reduces erosion.
- It suppresses growth of weeds.
- Mulch improves water retention, reducing watering needs.
- In the long term, mulch helps enrich the soil, enhancing plant growth.

#### Things to Consider Before Buying or If You Write Your Own Specifications

##### *Support recycling*

- Horticultural mulch made with recycled land clearing and other wood debris should be used.

##### *Reduce hazardous materials*

- Avoid mulch treated with toxic colorants.

##### *Improve resource efficiency*

- Effective mulching reduces the need for irrigation.

#### Availability

#### Disposal

### 2.10.2 COMPOST

#### Overview

- Compost is a valuable soil amendment that is produced from decomposing organic materials such as yard trimmings, food scraps, and animal waste...or waste products no one else wants or needs.
- From both an environmental and an economic viewpoint, recycling wastes for use as raw material in the manufacture of compost products makes sense.
- Beyond the obvious benefits of compost manufacture are the equally impressive advantages of compost use in conjunction with or instead of synthetic products for farming, gardening, and landscaping.

#### Potential Environmental Impacts

- Improves soil porosity for clay soils
- Improves water retention for sandy soils
- Makes soil more resistant to disease
- Reduces pests and the need for pesticides
- Reduces erosion
- Suppresses weeds
- Enhances storage and slow release of nutrients

#### Things to Consider Before Buying or If You Write Your Own Specifications

##### *Reduce hazardous materials*

- Compost adds nutrients and can reduce erosion, decreasing the need for fertilizer application.

- Compost can decrease the need for pesticide application.

*Improve resource efficiency*

- Adding compost can increase water retention in sandy areas, decreasing the need for irrigation.

*Meet standards*

- Compost should meet the US Composting Council Seal of Testing Assurance ([www.compostingcouncil.org](http://www.compostingcouncil.org)).

**Availability**

**Disposal**

**2.10.3 PLANTS AND TREES**

**Overview**

- Each plant species grows well in a given set of environmental conditions, including temperature, sun, soil moisture, soil volume, and soil pH. Choose plant species that are well-suited to the site to reduce maintenance, including irrigation, fertilization, and pesticide application.
- Vegetation can provide important and useful ecosystem services, such as cooling from shade trees, nitrogen addition from legumes, wildlife support, flood control, and water quality improvements.
- Plants native to a particular area, such as the Piedmont of North Carolina, are those that grew naturally in the area before humans introduced plants from distant places.
- Plant species introduced from elsewhere that grow particularly aggressively are called “invasive exotic” species. In Durham, they include English ivy, Japanese honeysuckle, kudzu, mimosa, and many others.
- Native plants have evolved and adapted to local conditions over thousands of years. They often are vigorous and hardy and can survive well without intense maintenance.
- Not all native plants are hardy, nor is any plant species suited to all environments.

**Potential Environmental Impacts**

- Invasive exotic plant species escape easily into natural areas, reducing plant and often wildlife diversity.
- Carefully matching the species to the site can decrease the need for irrigation, fertilization, and pesticide application -- saving money, time, and water and decreasing pollution.
- Groups of native plants can often foster more diverse insect and animal communities than groups of introduced plant species.
- Vegetation buffers along streams, lakes, and wetlands help improve water quality.

**Things to Consider Before Buying or If You Write Your Own Specifications**

*Reduce hazardous materials*

- Choose pest-resistant species, decreasing the need for pesticide application.
- Include species that support many insect and animal species. These plant species are likely to attract predators of pests, even to other plants nearby in the landscape.
- Plant vegetation buffers with a diversity of species along streams, lakes, and wetlands to improve processing of pollutants such as nitrates.
- Include legumes (e.g., the natives redbud, wild blue indigo, desert false indigo) to increase soil nitrogen content and decrease the need for nitrogen fertilizer application.
- Do not plant invasive exotic species. Invasive species can be determined at <http://www.invasive.org/eastern/srs/> and confirmed at <http://www.invasiveplantatlas.org/> for Durham County.

*Improve resource efficiency*

- Plant drought-tolerant species to reduce the need for irrigation and flood-tolerant plants in wet areas.

**Availability**

- The table below suggests alternative native plants for many invasive species available for purchase.

**Disposal**

### 2.10.3 Prohibited invasive exotic species and suggestions for native alternatives

Scientific Name	Common Name	Suggested Native Alternatives
<i>Ailanthus altissima</i>	Tree-of-Heaven	<i>Juglans nigra</i> (Black walnut)
<i>Akebia quintata</i>	Five-leaf akebia	<i>Gelsemium sempervirens</i> (Carolina jessamine)
<i>Albizia julibrissin</i>	Mimosa	<i>Amorpha fruticosa</i> (Leadplant) <i>Pinckneya pubesens</i> (Georgia feverbark tree) <i>Robinia hispida</i> (Rose-acacia locust)
<i>Ampelopsis brevipedunculata</i>	Porcelain berry	<i>Callicarpa americana</i> (American beautyberry)
<i>Bambusa spp.</i>	Bamboo species	
<i>Berberis thunbergii</i>	Japanese barberry	<i>Itea virginica</i> (Virginia sweetspire)
<i>Buddleia davidii</i>	Butterfly bush	<i>Aesculus parviflora</i> (Bottlebrush buckeye) <i>Aesculus pavia</i> (Red buckeye) <i>Amorpha fruticosa</i> (Desert false indigo)
<i>Clerodendron bungei</i>	Harlequin glorybower	<i>Rhododendron prunifolium</i> (Plumleaf azalea) <i>Callicarpa americana</i> (American beautyberry)
<i>Elaeagnus spp.</i>	Autumn silverberry, Spring silverberry, Autumn olive	<i>Ilex opaca</i> (American holly) <i>Lindera benzoin</i> (Spicebush)
<i>Euonymus alatus</i>	Winged Euonymus	<i>Itea virginica</i> (Virginia sweetspire)
<i>Euonymus fortunei</i>	Creeping wintercreeper	<i>Antennaria plantaginifolia</i> (Southern pussytoes)
<i>Hedera helix</i>	English ivy	<i>Bignonia capreolata</i> (Crossvine) <i>Gelsemium sempervirens</i> (Carolina jessamine) <i>Mitchella repens</i> (Partridge berry)
<i>Ilex cornuta</i>	Chinese holly	<i>Illex glabra</i> (Inkberry)
<i>Lespedeza bicolor</i>	Bicolor lespedeza	<i>Baptisia australis</i> (Wild blue indigo)
<i>Lespedeza cuneata</i>	Sericia lespedeza	<i>Baptisia australis</i> (Wild blue indigo)
<i>Ligustrum spp.</i>	Japanese privet, Chinese privet	<i>Sambucas canadensis</i> (Common elderberry) <i>Ilex opaca</i> (American holly) <i>Lindera benzoin</i> (Spicebush)
<i>Liriope muscari</i>	Liriope	<i>Carex plantaginea</i> (Plantain-leaved sedge) <i>Sisyrinchium angustifolium</i> (Blue-eyed grass)
<i>Lonicera spp.</i>	Sweet-breath-of-spring, Japanese honeysuckle, Amur honeysuckle	<i>Callicarpa americana</i> (American beautyberry) <i>Gelsemium sempervirens</i> (Carolina jessamine) <i>Lonicera sempervirens</i> (Coral honeysuckle)
<i>Lygodium japonicum</i>	Japanese climbing fern	<i>Lygodium plamatum</i> (American climbing fern)
<i>Mahonia bealei</i>	Leatherleaf mahonia	<i>Viburnum nudum</i> (Possumhaw viburnum) <i>Viburnum bracteatum</i> 'Emerald Lustre' (Emerald luster viburnum) <i>Callicarpa americana</i> (American beautyberry)
<i>Miscanthus sinense</i>	Chinese silver grass	<i>Panicum virgatum</i> (Switchgrass) <i>Sorghastrum nutans</i> (Indian grass)
<i>Nandina domestica</i>	Nandina, Sacred-bamboo	<i>Xanthorhiza simplicissima</i> (Yellowroot) <i>Callicarpa americana</i> (American beautyberry) <i>Sambucas canadensis</i> (Common elderberry) <i>Itea virginica</i> (Virginia sweetspire)
<i>Paulownia tomentosa</i>	Princess tree	<i>Chionanthus virginiana</i> (Fringe-tree) <i>Cercis canadensis</i> (Redbud) <i>Tilia americana</i> (Basswood)
<i>Phyllostachys spp</i>	Running bamboo	<i>Arundinaria gigantea</i> (Switch cane)
<i>Polygonum perfoliatum</i>	Mile-a-minute	
<i>Polygonum cuspidatum</i>	Japanese knotweed	
<i>Pyrus calleryana</i>	Bradford pear	<i>Cornus florida</i> (Flowering dogwood) <i>Cercis canadensis</i> (Redbud)
<i>Rosa Multiflora</i>	Multiflora rose	<i>Itea virginica</i> (Virginia Sweetspire)
<i>Spirea japonica</i>	Japanese spirea	
<i>Vinca spp.</i>	Periwinkle species	<i>Bignonia capreolata</i> (Crossvine) <i>Gelsemium sempervirens</i> (Carolina jessamine) <i>Mitchella repens</i> (Partridge berry)
<i>Wisteria spp.</i>	Wisteria species	<i>Wisteria frutescens</i> (American wisteria)

## 2.11 PARK AND RECREATION PRODUCTS

### 2.11.1 PLAYGROUND SYSTEMS AND COMPONENTS

#### Overview

- Slides, swings, climbing equipment, merry-go-rounds, and seesaws are all different types of playground equipment.
- These items can be made with recovered wood, steel, plastic and aluminum.
- A typical set of playground equipment made with recovered-content plastic can contain plastic recovered from between 31,500 and 63,000 milk and water jugs.

#### Potential Environmental Impacts

- Treated wood products may contain chemicals that are hazardous to human health, such as creosote, pentachlorophenol (PCP), or arsenic.
- Paint used to coat playground components may contain lead or other health hazard chemicals.

#### Things to Consider Before Buying or If You Write Your Own Specifications

##### *Reduce waste*

- Choose products with a long warranty.

##### *Support recycling*

- Look for products made of recycled materials, including steel tubing, sheets and wire; aluminum uprights and castings; plastic curbing; and roof and deck materials.
- Also look for recycled packaging materials.
- Look for recovered wood products.

##### *Reduce hazardous materials*

- Avoid wood treated with creosote or pentachlorophenol (PCP). Other preservative chemicals used in pressure-treated wood can also be toxic.

##### *Meet standards*

- EPA recommends that procuring agencies use the specifications found in the US Consumer Product Safety Commission (CPSC) Publication No. 325 (Handbook for Public Playground Safety) and ASTM standard F-1487-95, *Safety Performance Specifications for Playground Equipment for Public Use*, when procuring playground equipment. Playground equipment may also be subject to state and local codes and standards as well as Federal child safety laws.
- If using virgin wood, look for FSC certification.

#### Availability

#### Disposal

### 2.11.2 SITE FURNISHINGS

#### Overview

- Park benches, picnic tables, and recycling containers can be made of recycled milk jugs and aluminum and steel cans.

#### Potential Environmental Impacts

- Buying recycled content products conserves natural resources, reduces solid waste, saves energy, and reduces greenhouse gas emissions and pollutants in air and water.

#### Things to Consider Before Buying or If You Write Your Own Specifications

##### *Support recycling*

- Look for products made of recycled materials, including steel tubing, sheets and wire; aluminum uprights and castings; plastic curbing; and roof and deck materials.

- Also look for recycled packaging materials.
- Look for recovered wood products.

*Reduce hazardous materials*

- Avoid wood treated with creosote or pentachlorophenol (PCP). Other preservative chemicals used in pressure-treated wood can also be toxic.

*Meet standards*

- EPA recommends that procuring agencies use the specifications found in the US Consumer Product Safety Commission (CPSC) Publication No. 325 (Handbook for Public Playground Safety) and ASTM standard F-1487-95, *Safety Performance Specifications for Playground Equipment for Public Use*, when procuring playground equipment. Playground equipment may also be subject to state and local codes and standards as well as Federal child safety laws.
- If using virgin wood, look for FSC certification.

**Availability**

**Disposal**

**2.11.3 SURFACING MATERIALS**

**Overview**

- Playground surfaces should be durable and cushioning to help prevent injuries in children.
- Recovered rubber can provide more cushioning than wood chips, sand, or asphalt.

**Potential Environmental Impacts**

- Surfacing made from shredded tires may release toxic chemicals.
- PVC materials include toxic carcinogens and hormone mimics.

**Things to Consider Before Buying or If You Write Your Own Specifications**

*Reduce waste*

- Look for durable materials.

*Support recycling*

- Where possible, choose 100% post-consumer recycled rubber surfacing.

*Reduce hazardous materials*

- Rubber and wood chips (from wood that has not been pressure treated with preservatives) are non-toxic.
- Avoid materials made from PVC or shredded tires.

*Meet standards*

- EPA recommends that procuring agencies use the specifications found in the US Consumer Product Safety Commission (CPSC) Publication No. 325 (Handbook for Public Playground Safety) and ASTM standard F-1487-95, *Safety Performance Specifications for Playground Equipment for Public Use*, when procuring playground equipment. Playground equipment may also be subject to state and local codes and standards as well as Federal child safety laws.

**Availability**

**Disposal**

## 2.12 TRAFFIC CONTROL PRODUCTS

### Overview

- Traffic cones are used to mark a road hazard or to direct traffic. These are typically made from plastic and/or rubber.
- Traffic barricades can be used to redirect or restrict traffic in areas of highway construction or repair. They are typically made from wood, steel, plastic, fiberglass, or a combination of these materials.

### Potential Environmental Impacts

- Recycled products conserve natural resources, reduce solid waste, and reduce air and water pollutants.

### Things to Consider Before Buying or If You Write Your Own Specifications

#### *Reduce waste*

- Choose durable products to reduce waste and long-term costs. Many products have multi-year warranties.

#### *Support recycling*

- Parking stops made from recycled plastics or rubbers are maintenance free. Unlike concrete stops, they will not crack or crumble.
- Heavier than their plastic-only counterparts, recycled rubber bases on products including traffic cones, safety posts (delineators), and barrels offer greater durability.

#### *Meet standards*

- Transportation products containing recovered materials must conform to the Manual on Uniform Highway Traffic Control Devices used by the Federal Highway Administration, and NC Department of Transportation.

Use the following federal guidelines when purchasing traffic control products and require subcontractors to comply with these guidelines also.

PRODUCT	RECOVERED MATERIAL CONTENT
<b>Traffic Cones</b>	
Plastic (PVC and LDPE)	50% to 100% total recovered content
Rubber	50% to 100% total recovered content
<b>Traffic Barricades (type I and II only)</b>	
Plastic	80% to 100% post-consumer recycled content
Steel	16% to 67% post-consumer recycled content
<b>Parking Stops, plastic or rubber</b>	100% post-consumer recycled content
<b>Channelizers</b>	
Plastic	25% to 95% post-consumer recycled content
Rubber base	100% post-consumer recycled content
<b>Delineators</b>	
Plastic	25% to 90% post-consumer recycled content
Rubber base	100% post-consumer recycled content
Steel base	25% to 50% post-consumer recycled content
<b>Flexible Delineators</b>	25% to 85% post-consumer recycled content

### Availability

### Disposal

## 2.13 VEHICLES

### Overview

- Flexible transportation is an essential part of government operations.
- The energy required to manufacture vehicles is one of their largest environmental impacts.
- Over the life of a vehicle, it will burn fuel and consume other products (see Section 2.14, Vehicle Maintenance Products, below).
- The initial vehicle purchase, products used with the vehicle, driving practices, and vehicle maintenance all contribute to its performance and environmental impact.

### Potential Environmental Impacts

- Running vehicles burns fuel, typically made from petroleum. Transportation contributes nearly 30% of greenhouse gas emissions in the United States.
- Vehicles also produce other air pollutants, including carbon monoxide, ozone-forming hydrocarbons, nitrogen oxides, and particulates.

### Things to Consider Before Buying or If You Write Your Own Specifications

#### *Reduce waste*

- Follow Durham's idle reduction policy to avoid wasting fuel during vehicle use.
- Carpool and/or combine errands into one trip, when possible.
- Purchase vehicles rated well for durability and long life span.

#### *Reduce hazardous materials*

- Look for clean-burning vehicles that produce less air pollution.

#### *Improve resource efficiency*

- Look for flex fuel vehicles, which can run on multiple fuel types.
- Choose vehicles with high gas mileage.

#### *Meet standards*

- Choose EPA Smartway certified vehicles, with preference for Smartway Elite vehicles. Smartway vehicles are scored on both their greenhouse gas emissions and their air pollution.
- Compare vehicles on the EPA Fuel Economy website ([www.fueleconomy.gov](http://www.fueleconomy.gov)). This site includes information on pollution, fuel use, and cost of operation.

### Availability

### Disposal

## 2.14 VEHICLE MAINTENANCE PRODUCTS

### 2.14.1 OILS AND LUBRICANTS

#### Overview

- This category includes motor oil, hydraulic fluids, chassis grease, and transmission fluids.
- Statistics show that over one billion quarts of lubricating and related oils are sold in the United States annually. Less than half of these oils are available for reclamation.
- Used oil can be collected, cleaned, and re-refined into new oil products.
- Re-refined oil has been used throughout the United States with great success for many years, even in high-performance, mission-critical safety vehicles.
- Nationally, the U.S. Postal Service has been using re-refined oil for over a decade in its fleet of almost 73,000 vehicles.

#### Potential Environmental Impacts

- Used motor oil contains pollutants, including organic chemicals and metals which are toxic to humans, wildlife and vegetation.
- Improper disposal of used oil and lubricants into garbage cans, sewers, and backyards results in contamination of soil, drinking water supplies, and ground water. Just one gallon of used oil has the potential to contaminate up to one million gallons of drinking water.
- Used motor oil can be reprocessed into heating fuels, re-refined into lubricating oils or cleaned and reused. Re-refined engine oil conserves resources while saving your agency money.

#### Things to Consider Before Buying or If You Write Your Own Specifications

##### *Reduce waste*

- Purchasing high-quality engine oil and oil filters can decrease the need for frequent oil changes.

##### *Support recycling*

- Recycle vehicle maintenance products in department's specified program. Used engine oil and solvents are considered waste and must be transported accordingly under applicable federal and state regulations.
- Consider re-refined oil. This environmentally preferable and cost-effective product is manufactured to the same high quality standards for refining, compounding, and performance as virgin oil. In fact, according to the Environmental Protection Agency (EPA), extensive testing from the National Institute of Standards and Technology and the U.S. Army shows that it can out-perform virgin oil. Generally, re-refined engine oils can be used without warranty concerns in vehicles made by Ford, General Motors, Chrysler, Caterpillar, and Detroit Diesel. These manufacturers have issued written statements declaring that vehicle warranties will be honored as long as the re-refined engine oil meets requirements. Warranty requirements are based on performance criteria and not on the origin of the base oil.

##### *Reduce hazardous materials*

- Consider biodegradable, bio-based oils made from vegetable or animal fats. These products are less toxic and more renewable than petroleum products and are typically manufactured in the United States.

##### *Improve resource efficiency*

- Maintain oils and lubricants to improve vehicle energy efficiency and reduce energy use.

##### *Meet standards*

- Products should meet EPA standards. A proper disposal plan is required.
- Meet Green Seal standards for vehicle maintenance.

#### Availability

- Re-refined oil comes in a variety of blends suitable for different types of gas and diesel engines. Two refineries in the U.S. produce the base oil: Evergreen Oil in California and Safety-Kleen in Illinois. Oil blenders purchase the base stock, combine it with additives, and sell it as a finished product under various brand names. Re-refined oil is available through oil dealers, auto service centers, and retailers.

#### Disposal

## 2.14.2 ANTIFREEZE

### Overview

- Engine coolant/antifreeze is typically made of ethylene glycol or propylene glycol.
- According to Federal EPA guidelines, recycled engine coolants (antifreeze) may be purer than virgin coolant because the recycling process reduces the chlorides that come from hard water. Testing shows that, like new coolant, recycled coolant meets nationally recognized performance specifications established by the American Society for Testing Materials (ASTM) and the Society of Automotive Engineers (SAE).
- Auto makers are embracing recycled coolants. General Motors (GM) endorses several coolant recycling systems; it also stipulates that the engine warranty will be unaffected if engine coolant recycling is performed as described by the manufacturer and with GM-approved recycling equipment. Ford expressly authorizes the use of certain engine coolant recycling processes and chemicals that meet its specifications. Chrysler allows any coolant to be used as long as it meets Chrysler's and ASTM's specifications. Check with your vehicle manufacturer or dealer to see which coolant recycling equipment or process is appropriate.

### Potential Environmental Impacts

- Coolants are toxic and may be deadly to children and animals attracted by the sweet taste. Propylene glycol is less toxic than ethylene glycol.
- Spent antifreeze may contain metals from the engine (lead, zinc, copper, cadmium, chromium).
- Coolants can disturb the biological action of sewage treatment and septic systems.
- Special rules apply to waste antifreeze and precautions must be taken to ensure its proper management.

### Things to Consider Before Buying or If You Write Your Own Specifications

#### *Reduce waste*

- Extended-life antifreeze is designed to last five years/150,000 miles or longer, greatly reducing the need to purchase replacement antifreeze.

#### *Support recycling*

- Waste antifreeze can be recycled using your own equipment or a recycling service. This solves a waste disposal problem while providing a high quality reformulated product to use in vehicles.
- Replace antifreeze with recycled material. Whether you recycle your own antifreeze or use a service, the recycled product should include the addition of chemicals to recondition the antifreeze. Check with the manufacturer to see which type of recycled product is appropriate for each vehicle.

#### *Reduce hazardous materials*

- Propylene glycol is less toxic than ethylene glycol (although all used antifreeze is contaminated by metals).

#### *Meet standards.*

- The EPA recommends purchasing engine coolant containing only one base coolant to prevent commingling of incompatible types of engine coolant.
- Meet Green Seal standards for vehicle maintenance.

### Availability

### Disposal

### 2.14.3 SOLVENTS AND CLEANERS

#### Overview

- In the course of routine cleaning, many shops use parts washing systems for engines and other equipment parts. Parts washing systems include standard reticulating parts washers, distillation units, and those with multiple filters. In choosing the right parts cleaning system, shops should evaluate both the equipment and the cleaning solvent it uses.
- Solvents clean using a surfactant (such as soap or detergent), a corrosive or alkaline ingredient, or another type of chemical to remove soil from parts.

#### Potential Environmental Impacts

- Whether water-based or petroleum-based, cleaning solvents often pose exposure risks to employees, along with creating waste from usage. Exposure to concentrated vapors from these solvents can cause breathing problems and headaches.
- In most instances, shops must manage wastes produced during parts cleaning as hazardous.
- Improper end-of-use disposal is a potential hazard to the land, water, and human health.
- Many solvents are also ignitable.

#### Things to Consider Before Buying or If You Write Your Own Specifications

##### *Reduce hazardous materials*

- Water-based solvents are usually less hazardous to the user than their petroleum-based counterparts. Although water-based cleaners are often touted as being "non-hazardous," or "environmentally friendly," they must be managed as a hazardous waste unless the waste has been evaluated and found not to exhibit hazardous characteristics.
- Most petroleum-based systems use mineral spirits, Stoddard, or similar petroleum-based solvents.
- Shops using petroleum-based cleaners must take extra precautions when using and storing the product and managing the wastes.
- Cleaners with higher flashpoints (>140°F) reduce the risk of ignition.

##### *Meet standards*

- Solvents and cleaners must meet EPA Standards. A proper disposal plan is required.
- Meet Green Seal standards for vehicle maintenance.

#### Availability

- EPA recommends BioChem System cleaners and solvents. There are many different kinds of equipment, cleaners, and services employing Stoddard solvent, spray cabinets and services that lease equipment and collect waste cleaners. Equipment is available to purchase or lease through both manufacturers and local distributors. Cleaners are available through vehicle maintenance supply outlets, equipment manufacturers, and dealers.

#### Disposal

### 2.14.4 TIRES

#### Overview

- Modern vehicle tires are made of vulcanized rubber, which has been heat-treated and has multiple additives. They are typically made with virgin rubber, as recycled rubber can increase friction & thus fuel consumption.

- Retreaded tires are structurally-sound used tires that have had their old tread removed and new tread applied. Rubber tread is not a core structural part of the tire; retread is applied much as was the original tread. Retreaded tires are fully as safe as new tires: they are used for many high-intensity vehicles, including trucks, airplanes, and military vehicles.
- Retreading consumes approximately 1/3 the oil of manufacturing a new tire.

**Potential Environmental Impacts**

- Vulcanized rubber used in tires contains heavy metals, such as zinc and cadmium, as well as other potentially harmful compounds.
- Most of the energy of tire production is consumed in the tire structure, not the outer tread.

**Things to Consider Before Buying or If You Write Your Own Specifications**

*Reduce waste*

- Maintain tire pressure to specifications to increase the life of the tire.

*Support recycling*

- Purchase retreaded tires.

*Reduce hazardous materials*

- Consider recent innovative tires made with bio-products. These tires use less petroleum in manufacturing. Additionally, they have lower rolling resistance, resulting in greater fuel efficiency.

*Improve resource efficiency*

- Maintain tire pressure to specifications to increase fuel efficiency.
- Purchase tires that facilitate fuel efficiency while maintaining appropriate traction.

**Availability**

**Disposal**

## 2.15 MISCELLANEOUS ITEMS

### 2.15.1 SHRINK WRAP & PLASTIC SHEETING

#### Overview

- Shrink wrap and plastic sheeting can be useful for containing items or protecting them from the weather.

#### Potential Environmental Impacts

- PVC-based shrink wrap is not recyclable and contains toxic vinyl chlorides.

#### Things to Consider Before Buying or If You Write Your Own Specifications

##### *Reduce waste*

- Use as much shrink wrap as necessary without creating excessive waste.

##### *Support recycling*

- Low and high density polyethylene (LDPE & HDPE) shrink wrap and plastic sheeting is recyclable with grocery store bags if clean.

##### *Reduce hazardous materials*

- Avoid PVC-based plastics.

#### Availability

#### Disposal

- Recycle LDPE (#4) and HDPE (#2) plastics with other plastic films. Such recycled plastic can be made into plastic lumber.