State Department of Transportation

Environmentally Preferable Purchasing Guide

September 2010

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1. Introduction

Environmentally preferable purchasing (EPP) is a supply chain management tool designed to promote internal and external "greening" of an organization. In many organizations, decentralized authority for product purchases creates obstacles to purchasing environmentally preferable products. Purchasing agents within organizations, however, provide a central location from which to promote environmentally beneficial initiatives to reduce environmental impacts in the supply chain. In their simplest form, EPP programs allow purchasing agents to ensure that products purchased for use in an organization meet certain environmental criteria or have specific environmental benefits or aspects that reduce potential harm. As a result of such programs, state departments of transportation (DOTs) can increase the environmentally benign materials they use and reduce toxics, with their attendant safety and environmental risks.

This manual was created for use by state DOTs. The goal of the manual is to promote EPP programs in these agencies by providing guidance on EPP programs generally, and also by providing EPP specifications for 19 of the most commonly used hazardous or toxic products used in the maintenance of DOT offices, maintenance and operations facilities, and rest stops. In many cases, DOTs have decentralized authority for making purchasing decisions or specifying purchasing requirements. EPP programs provide a central focus – and set of requirements – for environmentally preferable products that can help align environmental efforts by ensuring that products purchased for use within DOTs reduce environmental harm and negative human health impacts, and in some cases even provide environmental benefits. In addition, to the extent that EPP products are less toxic, there can be attendant reduction in DOT waste disposal costs.

This manual contains four sections in addition to this brief introduction. Sections 2 through 5 include an overview of the product specification structure; guidance for implementing the product specifications; a description of the exemption clause; and, finally, 19 product specifications.

2. Specification Overview

This manual contains product specifications for purchasing agents to use as a guide for acquiring products that are environmentally preferable to existing products because they (1) have reduced toxicity, and (2) reduce negative impacts on human health and/or the environment. By reducing these harmful effects, they provide benefits to the environment.

Each specification contains information on required criteria that should be used to select products for purchasing. These specifications do not recommend specific brands of products that achieve these characteristics. Where products have been evaluated by neutral third parties, a web link has been included for reference in the background information of the respective product specification. In addition, each specification has been developed to allow purchasing agents flexibility in selecting the product that best fits an individual agency's needs.

Each specification includes guidance on the types and quantity of products that should meet the specification, background information on the environmental impacts and benefits, and the rationale for the purchasing criteria selected for the specification, as shown in Figure1. For those specifications where cost information was identified, an additional section outlining the cost impact of implementing the specification or acquiring products that meet the specification is included. Finally, each of the specifications contains a list of potential metrics that can be used to measure and track the implemented specification within an overall EPP program.

Each of the specifications contains the following sections:

A) **Technical Specifications** – This section contains the specific purchasing criteria that should be included in bidding documents or used in purchasing decisions. These criteria are individually numbered, and correlate to instructions on how to apply the criteria in Section B (Application).

   The environmental attributes included in the technical specifications do not cover all of the possible environmental impacts associated with the product. In many cases certain environmental impacts associated with the product are not included in the technical specifications, due to potential cost, performance, or availability concerns.

B) **Application** – This section contains information on the types of products covered by the product specification and the quantity of products that should be covered. For example, a specification might recommend that 100% of a purchased product type meet the specification (e.g., that the DOT switch 100% of its purchasing within a specific product category to green alternatives that are known to be available and better for the environment and/or human health). In other instances, a specification might recommend that a smaller portion, say 20%, be covered and increased as feasible. Sometimes products that meet the product specification are too expensive, are unavailable in sufficient quantity, or have performance concerns. For these reasons a

purchasing agent might be unable to purchase all of the products within a product category to meet the specification.

Within this specification, there are two sub-parts: (1) Product Types and (2) Quantity. The Product Types section lists the specific product types covered by the specification. The Quantity section lists the recommended purchasing quantities for each of the criteria in Section A.

This section is for internal use by the DOT.

C) **Environmental Impacts** – This section lists the environmental or human health impacts addressed by the product specification. Each product specification contains a summary chart listing the impacts addressed by the product specification and how the specification addresses these concerns. In addition, this section includes specific information and resources to help educate purchasing agents about the products being purchased. It should be noted that the benefit of an EPP specification is the reduction or elimination of the environmental or human health impacts from the product previously used.

This section is for internal use by the DOT.

D) **Rationale and Background** - This section contains background information on how the specification was developed, including the resources and reference materials used to create the product criteria. Some links to the World Wide Web are included that provide information on products that meet the EPP specification. Where applicable, information about performance concerns is also provided.

This section is for internal use by the DOT.

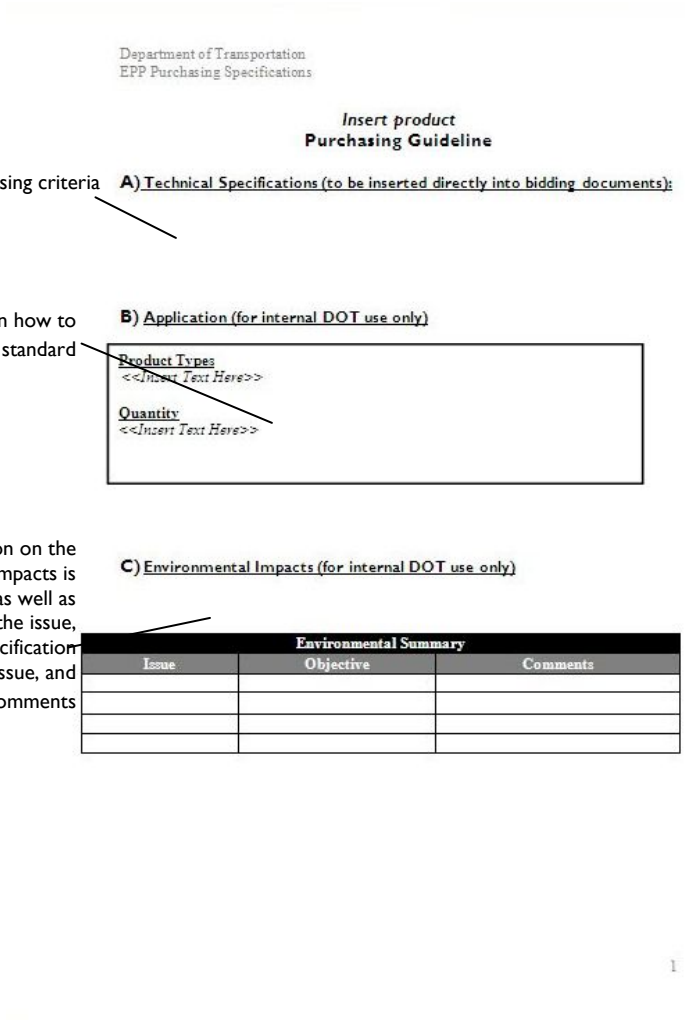
E) **Cost Impacts** – Some cost concerns were identified during the course of developing particular specifications. In these instances, the product specification contains a summary chart of these concerns. The cost analysis provided here is considered a good general estimate. It is important to note, however, that relevant cost data are limited, market factors can vary considerably, and prediction of future costs is uncertain.

F) **Purchasing Metrics** - In the final section, the product specification lists some recommended purchasing metrics that can be included in utilization reports for vendors. There are two main types of metrics: measuring performance by the dollars spent annually on the specific product and measuring performance by quantity or volume purchased annually (or as determined necessary by the DOT). These metrics are included in a summary chart with the metric listed in the left column and any calculations needed to quantify the metric in the right column.

Each of the metrics is numbered (1, 2, 3, etc.) and corresponds to a number used in the quantification instructions in the right column of the metrics table. For example, if the total dollars spent on a product category, listed as metric 1, is $10,000, and the total dollars spent on products that meet the category, listed as metric 2, is $1,000, the

quantification instructions for determining the percentage of products meeting the specification may read (2)/(1) or 1,000/10,000, or 10%.

Figure 1



Department of Transportation
EPP Purchasing Specifications

Insert product
Purchasing Guideline

Purchasing criteria

A) Technical Specifications (to be inserted directly into bidding documents):

Instructions on how to apply standard

B) Application (for internal DOT use only)

Product Types
<<Insert Text Here>>

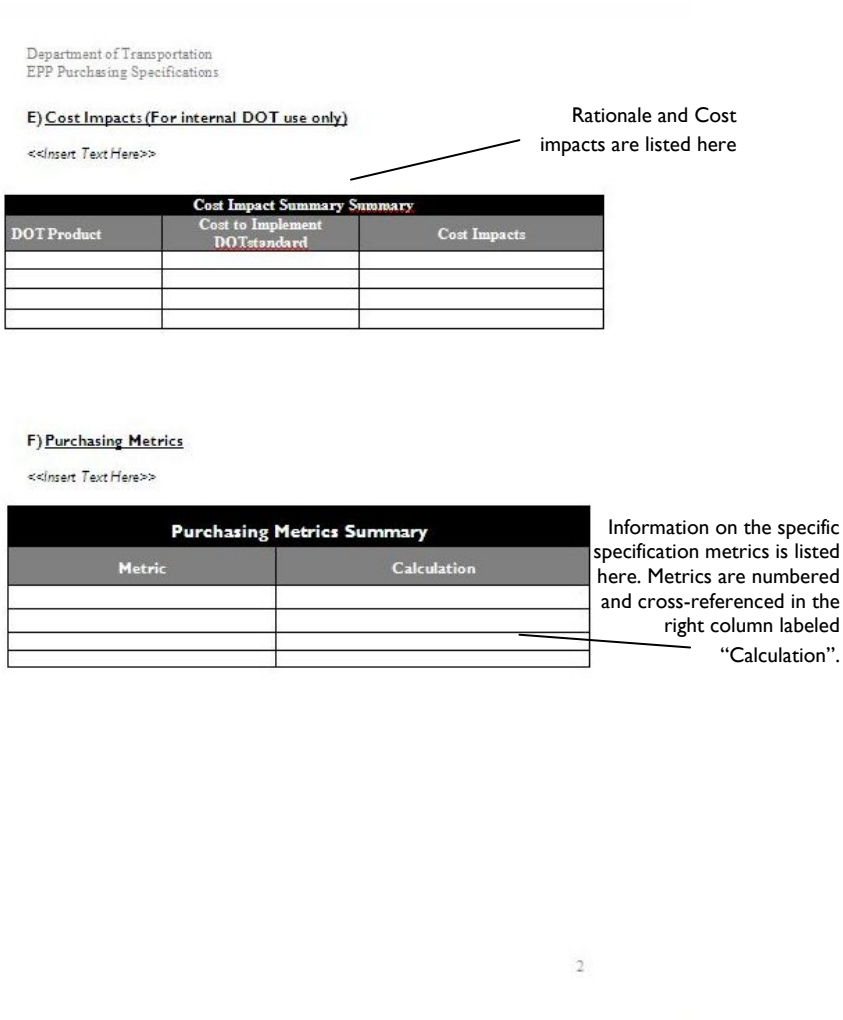
Quantity
<<Insert Text Here>>

Information on the environmental impacts is listed here, as well as information on the issue, how the specification manages the issue, and additional comments

C) Environmental Impacts (for internal DOT use only)

Environmental Summary		
Issue	Objective	Comments

1



Department of Transportation
EPP Purchasing Specifications

E) Cost Impacts (For internal DOT use only)

<<Insert Text Here>>

Rationale and Cost impacts are listed here

Cost Impact Summary Summary		
DOT Product	Cost to Implement DOT standard	Cost Impacts

F) Purchasing Metrics

<<Insert Text Here>>

Purchasing Metrics Summary	
Metric	Calculation

Information on the specific specification metrics is listed here. Metrics are numbered and cross-referenced in the right column labeled "Calculation".

2

3. Implementing Product Specifications

The product specifications in this manual can be implemented individually or in a group. The specific strategy for implementing the product specification will depend on the needs and resources of each DOT and on the specific purchasing rules and regulations for each state.

Selecting a Product Specification to Implement

The product specifications included in this manual were selected and developed based on information provided by, and interviews with, state DOT maintenance and purchasing specialists (see NCHRP 25-25/60 *Increased Use of Environmentally Preferable, Non-Toxic Products to Reduce Costs, Liabilities, and Pollution at DOT Offices, Maintenance and Operations Facilities and Rest Stops (August 2010)* for more information on the approach used to develop the list of product specifications). Once a list of target products was identified, the final list of specifications was determined based on three main parameters: portion of overall spending for the product category; overall toxicity or environmental impacts; and the feasibility of implementing the product specification. Not every specification will meet the needs of each DOT, and therefore some care should be taken when selecting which specifications should be implemented and in what order. In general, each DOT should understand their purchasing needs and prioritize which specifications to implement. These priorities may be based on the total amount spent for each product category or on the dates of expiring contracts or non-exclusive purchasing agreements, which provide an opportunity to use new product specifications and identify and contract with new vendors if needed.

Selecting a Purchasing Strategy

Once a product specification has been selected for implementation, the DOT should consider a number of different purchasing strategies to implement the product specification. The strategies that can be considered include the following:

i) Contract/Bidding Documents – In this strategy, the language in Section A can be inserted in a Request for Proposals (RFP) or other product bidding document. The vendor then warrants that products offered in response meet the product specification. In this strategy, the "burden of proof" (i.e., the responsibility for identifying products that meet the specification) falls on the vendor. However, the DOT purchasing agent has less control over the specific environmental benefits (e.g., how low the volatile organic compounds (VOC) emissions will be) and types of products offered. This strategy allows for a relatively low level of effort for the DOT to meet the product specification.

ii) Identify Products that Meet the Specification – In this strategy, the specification is used as a criterion for identifying products to purchase. The DOT purchasing agent identifies a specific product and verifies that it meets the EPP product specification. The

burden of proof now lies with the DOT, but this approach allows the agency to have greater control over the types of products purchased. For example, these products could include items listed on a pre-established non-exclusive purchasing agreement. This strategy requires a relatively high level of effort for the DOT to meet the product specification. This strategy could be implemented in instances where the DOT has a preferred vendor or product within a product category and wishes to find out if that product meets the EPP product specification.

iii) Non-Exclusive Purchasing Agreements – Depending on the specific purchasing policies, some DOTs may be able to negotiate and contract with vendors in non-exclusive purchasing agreements. In this strategy, prices for products from a vendor are set by the contract, but the DOT is not required to exclusively buy that product from the vendor. This strategy is most effective for product categories for which the DOT is not able to purchase 100% of the product type to meet the product specification. With a non-exclusive purchasing agreement, the DOT can purchase a portion of the products that meet the specification (sometimes at a higher price) without requiring that all products purchased within the product category meet the EPP specification.

Developing a Pilot Project

Before full implementation of any EPP product specification, the DOT should pilot test the product to determine if it will meet the performance and end-user needs. This pilot test can be as simple as purchasing a limited number of products and requesting feedback from end-users or developing a more elaborate controlled pilot project to address and answer major performance questions.

Implementing EPP Specifications

With a purchasing strategy selected and a successful pilot project completed, the DOT can implement the new EPP product specifications. Once the product has been purchased, the DOT should ensure that purchasing metrics are being recorded, as detailed below.

Reviewing Performance

Each product specification includes recommended metrics to measure purchasing and implementation of that specification. These metrics can be implemented as a group or individually as needed by the DOT.

In setting up these metrics, it is recommended that vendor utilization reports be used to collect data and report on progress for the product categories. In one possible strategy, the DOT can require vendors to establish regular utilization reporting and include the mandated metrics for the products acquired under that contract or purchasing agreement. In this way, the DOT will only need to compile reported numbers for products from different vendors that are under the same product category.

Specific DOT rules on data collection and reporting may apply here. Any data collected as part of this program should conform to those rules.

In addition to monitoring purchasing metrics, the product specification should be reviewed annually. During this review, the DOT should review the cost implications realized by implementing the specification, obtain end-user feedback on the performance of the product, and determine if any environmental gains were realized. As part of this process, DOT purchasing staff should determine if the product specification needs to be revised or clarified in any way. They should also make sure that information on how much of the EPP product is being purchased is being collected.

4. Exemption Clause

As part of their EPP program, each DOT should establish and document a procedure for implementing an exemption clause to the product specifications. This exemption clause will allow the DOT to implement a green product category in general, while allowing purchasing agents the freedom to make responsible purchasing decisions when the EPP products are not appropriate due to cost, availability, or performance concerns, as detailed below. For example, the DOT may wish to purchase an EPP product, but products that meet that specification may be unavailable or too costly in some locations. Through the exemption clause, the DOT can document the situations where it is acceptable for the purchasing agent to exclude a particular product or location from the implemented product specification.

In general, these clauses include the following provisions:

- *Cost* – A product or product type can be excluded from an implemented product specification if acquiring that product will result in a greatly increased cost. In some instances, EPP programs may establish a "price preference" for a given product type to allow purchasing agents to acquire products that are more expensive, but will result in environmental or human health benefits. Typically, this price preference is around 5%. Each DOT should consider the price preference in terms of each product specification and communicate this to the DOT purchasing agents. If a DOT purchasing agent needs to execute this portion of the exemption clause, they should report the matter directly to the EPP program manager or their respective supervisor so it can be considered during the annual product specification review.

- *Availability* – In some instances, products that meet a product specification cannot be acquired in sufficient quantity to meet large needs. In this case, a DOT purchasing agent should be able to exempt the purchase from the product specification so that business needs will continue to be met. If a DOT purchasing agent needs to execute this portion of the exemption clause, they should report the matter directly to the EPP program manager or their respective supervisor so it can be considered during the annual product specification review.

- *Performance* – In other instances, acquired products that meet the product specification may do so at the expense of performance or quality. In this case, DOT purchasing agents should collect feedback from end-users either as the product is in use or at the end of the year during the product specification review. If performance issues are significant, the product should be discontinued and the use of the product specification should be reviewed.

5. Product Specifications

Anticoagulant Rodenticides

A) Technical Specifications (to be inserted directly into bidding documents):

Anticoagulant rodenticides that meet the following specifications:

1. Rodenticides with brodifacoum, bromadiolone, difethialone, chlorophacinone, diphacinone, warfarin, zinc phosphide, bromethalin, and cholecalciferol are contained in tamper-resistant, anchored bait stations with solid bait blocks.

2. Vendor shall warrant that rodenticide does not contain any chemicals listed as a possible carcinogen or reproductive toxin by California Proposition 65 or as an endocrine disruptor by the Illinois State Environmental Protection Agency.

B) Application (for internal DOT use only)

Product Types

- Pesticides /Rodenticides

Quantity

- 100% of product types purchased meet criteria 1.
- 100% of product types purchased meet criteria 2.

C) Environmental Impacts (for internal DOT use only)

The information in the table below is based on Green Shield certifications and Integrated Pest Management (IPM) standards for pest control.

Environmental Summary		
Issue	**Objective**	**Comments**
Toxicity	Reduce toxicity to help protect non-targeted wildlife	Use of tamper-resistant bait stations may reduce chances of non-targeted wildlife exposure to anticoagulant rodenticides.
Carcinogens	Carcinogen-free	Pest management practices shall not utilize products manufactured with any chemicals that are included in the International Agency for Research on Cancer http://monographs.iarc.fr/ENG/Classification/ClassificationsAlphaOrder.pdf

D) Rationale and Background (for internal DOT use only)

The primary environmental concern regarding pesticide use is the potential toxicity to human health and environmental health. However, reduced toxicity pesticides, especially rodenticides, are likely to be less effective.

As a result, reduced toxicity pesticides should be utilized in IPM programs, which utilize complementary practices for pest control. One of the principles of IPM is to use less toxic pesticides where possible and to employ them strategically to reduce the quantity needed for pest control. Potentially less effective pesticides will be complemented by additional environmental and mechanical controls, such as trapping and removal of food sources. IPM programs can qualify for up to two points under the Leadership in Energy & Environmental Design (LEED) Existing Building: Operations and Maintenance rating system. While LEED offers credit for IPM programs, it does not provide sufficient guidance for defining "least toxic" pesticides. As such, additional guidance was obtained from the EPA and Green Shield, a non-profit organization established to promote effective IPM measures.

This specification aims to use toxicity class I rodenticides in a manner which reduces the potential for human exposure as well as storm-water contamination. If and where available, the use of the above mentioned rodenticides will be employed using bait stations, which will contain solid bait traps, replacing the need for

scattering bait granules. The EPA considered this measure in a proposal put forward on January 17, 2007. A significant comment document was prepared by the Rodenticide Registrant Task Force (RRTF) and submitted on May 18, 2007. In May of 2008, EPA developed a revised risk management decision for ten rodenticides. These rodenticides include the following:

- Brodifacoum
- Bromadiolone
- Bromethalin
- Chlorophacinone
- Cholecalciferol
- Difenacoum
- Difethialone
- Diphacinone
- Warfarin
- Zinc Phosphide

The EPA expects that products meeting these risk management plans will be commercially available by the middle of 2011.

The revised EPA Risk Management decision on rodenticides can be found at:

http://www.regulations.gov/search/Regs/home.html#documentDetail?D=EPA-HQ-OPP-2006-0955-0764

A copy of the initial proposed decision can be found at:
http://www.regulations.gov/fdmspublic/component/main?main=DocumentDetail&o=09000064801f4ce7

A copy of the initial RRTF comments:
http://www.regulations.gov/fdmspublic/component/main?main=DocumentDetail&o=090000648023f645

While the EPA is considering this decision, the requirement for tamper-resistant bait traps has been included in the Green Shield IPM certification standard. This standard is based on the requirements of the Integrated Pest Management Institute Star program, which has certified IPM programs in schools since 2003. In addition, the Green Shield IPM certification standard also requires that the chemicals used in the rodenticides are not carcinogens or reproductive toxins as listed under California Proposition 65 or endocrine disruptors by the Illinois State Environmental Protection Agency.

Illinois State list of endocrine disruptors:

http://www.scorecard.org/health-effects/chemicals-2.tcl?short_hazard_name=endo&all_p=t

The California Proposition 65 list of carcinogens and reproductive toxins:

http://www.oehha.org/prop65/prop65_list/files/P65single092807.pdf

In addition to banning carcinogens, reproductive toxins, and endocrine disruptors, the California Department of Pesticide regulation and the California school system have also worked to ban pesticides and herbicides that contain new ingredients until such time as they can be proven relatively safe.

For a list of these chemicals:
http://www.schoolipm.info/school_ipm_law/prohibited_prods.pdf

For additional information about IPMs in California:
http://www.schoolipm.info/

For the School IPM handbook:

http://www.cdpr.ca.gov/cfdocs/apps/schoolipm/managing_pests/guidebook.cfm

For additional information on IPMs from the IPM Institute:

http://www.ipminstitute.org/pdf/ISS%20V3.2%20073004.pdf

Anticoagulant Rodenticides

State DOTs should avoid use of anticoagulant rodenticides if possible and, when used, should be combined with tamper resistant bait stations to avoid accidental ingestion by children, family pets, and wildlife. Integrated pest management programs certified by Green Shield should be implemented.

Green Shield Standard for Pest Integrated Management

Pest Control companies certified by Green Shield utilize an integrated approach in managing pests. http://www.greenshieldcertified.org/about/.

E) Cost Impacts

No cost impacts were identified during the course of development of this specification.

Cost Impact Summary		
DOT Product	**Cost to Implement DOT Standard**	**Cost Impacts**
Green Shield Certified Pest Control Company	Site Inspection/Assessment & Monitoring	Integrated Pest Management approach relies on non-chemical or least-toxic approaches that include inspection, monitoring, rodent proofing, and sanitation.

(The cost analysis provided here is considered a good general estimate. It is important to note, however, that relevant cost data are limited, market factors can vary considerably and prediction of future costs is highly uncertain. The actual costs may vary.)

F) Purchasing Metrics (for internal DOT use only)

Purchasing Metrics Summary	
Metric	**Calculation**
1) Total rodenticide purchased by volume	
2) Total rodenticide purchased by spend	
3) Total rodenticide meeting spec by volume	
4) Total rodenticide meeting spec by spend	
5) Percentage rodenticide meeting spec by volume	3/1
6) Percentage rodenticide meeting spec by spend	4/2

Brake Cleaner

A) Technical Specifications (to be inserted directly into bidding documents):

Brake cleaners that meet the following specifications:

1. Brake cleaner shall not contain greater than 25 g/L of volatile organic compounds (VOCs) as defined in South Coast Air Quality Management District (SCAQMD) rule 1171 – Solvent Cleaning Operations; and

2. Brake cleaner shall not contain chlorinated VOCs.

B) Application (for internal DOT use only)

Product Types

- Automotive brake cleaner (aerosol and non-aerosol)

Quantity

- 100% of product types meet criteria 1.
- 100% of product types meet criteria 2.

C) Environmental Impacts (for internal DOT use only)

The information in the table below is based upon the provisions of the SCAQMD Rule 1171 governing solvent cleaning operations.

Environmental Summary		
Issue	**Objective**	**Comments**
Volatile Organic Compounds	Reduce VOC content in brake cleaner	The product shall not contain greater than 25 g/L of VOCs in accordance with SCAQMD Rule 1171
Chlorinated VOCs	Reduced chlorinated VOC content	The product shall not contain chlorinated VOCs

In addition to the environmental impacts mentioned above, many parts cleaners may also contain n-hexane which is a known neurotoxicant that can damage nerves in the feet, hands, and arms. The damage can last a long time or become permanent.

Switching to a water-based cleaner can provide an n-hexane free substitute. The California Labor Federation reports that some water-based parts cleaners can work as well as the solvent based cleaners, however, the scope of this effort was not able to confirm the performance aspects of these cleaners.

The California Labor Federation report can be found at:

http://www.cdph.ca.gov/programs/hesis/Documents/nhexane.pdf

D) Rationale and Background (for internal DOT use only)

The primary environmental issues associated with brake cleaner are the VOCs present in most formulations. VOCs are chemicals that can have short- and long-term health effects. Further, VOCs can react with sunlight to generate ground level ozone, a significant component of smog. Other human health impacts include eye, nose, and throat irritation; headaches, loss of coordination, nausea; damage to liver, kidney, and central nervous system. Some VOCs can cause cancer in animals; some are suspected or known to cause cancer in humans. Key signs or symptoms associated with exposure to VOCs include conjunctival irritation, nose and throat discomfort, headache, allergic skin reaction, dyspnea, declines in serum cholinesterase levels, nausea, emesis, epistaxis, fatigue, dizziness.

In addition, one specific VOC, n-hexane, is a known neurotoxicant. While the standard outlined here does not require solvents that do not contain n-hexane, use of any parts cleaner should be consistent with proper handling and ventilation to ensure as minimal of an exposure for workers as possible. State DOT agencies may encounter performance concerns with water-based solvents that are n-hexane solvent alternatives, and therefore this standard only manages VOC and chlorinated VOC compounds as outlined in Section A. State DOT agencies should seek to minimize the use of n-hexane as much as possible and alert staff to any safety measures they can take while using these products.

E) Cost Impacts (for internal DOT use only)

No significant cost impacts are expected to be associated with purchasing brake cleaner in accordance with this specification. Several compliant formulations are available at costs comparable to non-compliant products.

F) Purchasing Metrics

Purchasing Metrics Summary	
Metric	**Calculation**
1) Quantity Non-EPP brake cleaner purchased	
2) Dollars Non-EPP brake cleaner purchased	
3) Quantity EPP brake cleaner (green spend) purchased	
4) Dollars EPP brake cleaner (green spend) purchased	
5) Quantity brake cleaner purchased: Total	1 + 3
6) Dollars brake cleaner purchased: Total	2 + 4
7) Percentage EPP brake cleaner purchased	3 ÷ 5
8) Percentage spend EPP brake cleaner purchased	4 ÷ 6

Building Paint (Interior, Exterior)

A) Technical Specifications (to be inserted directly into bidding documents):

Internal and external paint for buildings that meet the following specifications:

1. Building Paint should meet the VOC requirements of Rule 1113 Architectural Coatings for South Coast Air Quality Management District. "Super-compliant paints" should be used when possible.

2. Building paint shall meet EcoLogo CCD-047, or Green Seal Environmental Standard GS-11.

3. Building paint shall meet recycled-content requirements of the Resource Conservation and Recovery Act (RCRA) when available.

B) Application (for internal DOT use only)

Product Types

- Flat paint
- Non-flat paint
- Quick dry enamels

Quantity

- 100% of product types will meet criteria 1.
- 100% of product types will meet criteria 2.
- 100% of product types will meet criteria 3.

C) Environmental Impacts (for internal DOT use only)

Environmental Summary		
Issue	**Objective**	**Comments**
Volatile Organic Compounds	Low VOC content	50 g/L VOC for flat and non-flat coating/ 10g/L for super-compliant coatings (SCAQMD)
Lead	No heavy metals	Shall not contain heavy metals including lead, mercury, cadmium, hexavalent chromium, or antimony (GS-11)
Carcinogen	Carcinogen-free	Shall not contain methylene chloride, benzene, vinyl chloride, naphthalene, diphthalate, isophorone, formaldehyde, acrolein, acrylonitrile (GS-11)
Toxicity	Low toxicity	Shall not contain methylene chloride, benzene, toluene, ethylbenzene, vinyl chloride, naphthalene, 1,2-dichlorobenzene, butyl benzyl phthalate, di-n-butyl phthalate, di-n-octyl phthalate, dimethyl phthalate, diethyl phthalate, isophorone, formaldehyde, methyl ethyl ketone, methyl isobutyl ketone, acrolein, acrylonitrile (GS-11)
Ozone	Reduce use of ozone-depleting substances	Shall not contain 1,1,1-trichloroethane (GS-11)

D) Rationale and Background (for internal DOT use only)

Indoor Air Pollution

Paint is one of the biggest contributors to indoor air pollution due to VOCs, chemicals that can have short and long-term health effects. The EPA reports that indoor concentrations of many VOCs can be up to ten times higher than outdoor concentrations. Green Seal published a revised paint standard, GS-11, in 2010 to reduce health and environmental impacts of paints and create a set of guidelines for paint manufacturers.

Alternative Paint Ingredients and Low VOC Paints

Low-VOC paints are manufactured to the same performance standards as any other high-quality paint. More than 70 environmentally friendly paint products have been certified by Green Seal. These paints meet the Green Seal Environmental Standard for Architectural Coatings (GS-11), which establishes minimum criteria for performance standards such as hideability, wearability, and scrubability.

Super-compliant coatings are also available. According to the South Coast Air Quality Management District "Super-compliant coatings are defined as those coatings that have a VOC content less than the VOC content limits set forth for the current and/or future limits in the Table of Standards found in paragraph (c)(2)of Rule 1113 and specify a VOC content less than 10g/l VOC." http://www.aqmd.gov/prdas/brochures/Super-Compliant_AIM.pdf

Recycled Content

The Comprehensive Procurement Guideline (CPG) program is part of EPA's continuing effort to promote the use of materials recovered from solid waste. Buying recycled-content products ensures that the materials collected in recycling programs will be used again in the manufacture of new products. The CPG implements section 6002 of the RCRA, which requires the EPA to designate items that are or can be produced with recovered materials and to recommend practices for the procurement of designated items by procuring agencies. Once EPA designates an item, RCRA requires any procuring agency using appropriated Federal funds to procure that item to purchase it with the highest percentage of recovered materials practicable. Millions of gallons of paint are collected, reprocessed, and re-blended. The post-consumer/recycled paints are high quality and meet the same standards of virgin paints. Using recycled paint reduces the amount of paint disposal, conserves landfill space, reduces energy consumption, and is often cheaper than purchasing virgin paint.

There are two types of recycled-content paint:

- **Reprocessed** paint or remanufactured paint is mixed with virgin materials such as resins and colorants. These paints are tested, generally the same as virgin paints, then packaged for resale. Reprocessed paint typically contains a minimum of 50 percent postconsumer content and is as durable as virgin paint.
- **Re-blended** or consolidated paint is remixed, screened (minimal testing is conducted), and packaged. Re-blended paints contain more than 95 percent postconsumer content, with ranges between 75 percent to 100 percent postconsumer content. These paints are considered a "good quality" or "high grade" paint.

Latex paint is an EPA CPG designated item. Federal procuring agencies include all federal agencies, and any state or local government agencies or government contractors that use appropriated federal funds to purchase the designated items. Executive Order 13101 and the Federal Acquisition Regulation also call for an increase in the federal government's use of recycled-content and environmentally preferable products.

EPP Standards

The Environmental Choice EcoLogo program has certified products meeting the CCD-047 standard.

The Environmental Choice Ecologo standard CCD-047 can be found at:

http://www.environmentalchoice.com/common/assets/criterias/CCD-047.pdf

These products can be found at:

http://www.environmentalchoice.com/en/certifiedgreenproducts/details.asp?product_type_id=85&cat=2

Green Seal has a list of GS-11 certified paints and GS-43 certified recycled paints The criteria address performance characteristics (abrasion resistance, opacity, stain removal), and prohibit or restrict the presence of certain heavy metals and toxic organic substances (VOC levels, aromatic compounds, chemical restrictions, toxics in packaging).

The Green Seal GS-11 standard can be found at:

http://www.greenseal.org/certification/standards/GS-11_paints_and_coatings_standard.pdf

The Green Seal GS-43 standard can be found at:

http://www.greenseal.org/certification/standards/GS-43_Recycled_Content_Latex_Paint_Standard.PDF\

Products meeting the GS-11 and GS-43 standards can be found at:

http://www.greenseal.org/findaproduct/index.cfm

SCAQMD has a list of super-compliant manufactures, which can be found at: (http://www.aqmd.gov/prdas/brochures/Super-Compliant_AIM.pdf

E) Cost Impacts (for internal DOT use only)

Recycled latex paint is generally available at a lower cost than a similar virgin paint. According to a California State contract, 1-04-80-10, costs "for recycled paint indicated pricing at approximately 60 percent of the cost of similar virgin paint."

The Portland Water Bureau uses 100% recycled paint for all concrete water towers. In 2006, the bureau cut costs by 75% by using recycled paint instead of virgin paint. http://www.portlandonline.com/omf/index.cfm?a=157998&c=44701

Low and No-VOCs paint can be applied in exactly the same way as conventional, high-VOC paints. In general, low-VOC paints are comparable in price to conventional paints; no-VOC paint tends to be slightly more expensive. Additionally, low-VOC and no-VOC paints are not considered hazardous waste materials, so disposal is much easier than with standard paints.

Recycled latex paint is generally available at a lower cost than a similar virgin paint. The expired State contract 1-04-80-10 for recycled paint indicated pricing at approximately 60 percent of the cost of similar virgin paint.

http://www.green.ca.gov/EPP/building/paint.htm#R21

Cost Impact Summary		
Vendor	**0 VOC Content**	**<50g/L VOC Content**
Example Paint 1	$ 49.99/gallon	$31.99/ gallon
Example Paint 2	$ 37.00/gallon	NA
Example Paint 3	$ 38.99/gallon	$45.99/ gallon

(The example paints provided here are from major brand manufacturers as quoted from manufacturers' catalogs. The "example paint" placeholder has been used to protect their identity.)

(The cost analysis provided here is considered a good general estimate. It is important to note, however, that relevant cost data are limited, market factors can vary considerably and prediction of future costs is highly uncertain. The actual costs DOT can negotiate with suppliers at any given time may be higher or lower than the estimates presented here.)

F) Purchasing Metrics

Purchasing Metrics Summary	
Metric	**Calculation**
1) Total paint purchased by spend	
2) Total paint purchased by volume	
3) Total paint meeting spec by volume	
4) Total paint meeting spec by spend	
5) Percentage paint meeting spec by spend	3/2
6) Percentage paint meeting spec by volume	4/1

Carpet

A) Technical Specifications (to be inserted directly into bidding documents):

Carpet and carpet adhesives that meet the following specification:

1. Carpet and carpet adhesives shall meet the requirements of the Carpet and Rug Institute (CRI) Green Label Plus Standard. Proof of certification for specific products must be included with bid submission.

B) Application (for internal DOT use only)

Product Types

- Indoor carpet
- Indoor carpet adhesive

Quantity

- 100% of purchased products meet the specification.

C) Environmental Impacts (for internal DOT use only)

The information in the table below is based upon the CRI Green Label Plus Standard.

Environmental Summary		
Issue	**Objective**	**Comments**
Volatile Organic Compounds	Low VOC emissions	Minimize indoor air VOCs
Carcinogens	Carcinogen Free	Minimize indoor air carcinogenic VOCs
Formaldehyde	Low formaldehyde emissions	Minimize indoor air formaldehyde

D) Rationale and Background (for internal DOT use only)

The CRI Green Label Plus program establishes VOC emission requirements for carpet and adhesive products. Carpet products are monitored for 13 different VOCs, and must pass quarterly and annual emission tests to ensure the products remain in compliance over the life of the product. These 13 VOCs include 7 that are monitored in the California Gold Sustainable Carpet Standard, the American National Standards Institute/National Science Foundation (ANSI/NSF) Sustainable

Carpet standard, and the (Collaborative for High Performance Schools) (CHPS) 01350, but also includes an additional 6 VOCs that are not monitored by these standards.

The CRI Green Label Plus standard is the specification that is cited in the LEED new construction and commercial interior rating systems for low-emitting carpet systems and as such, carpet products meeting this standard will qualify for this credit. Some carpet products that are certified by the CRI Green Label Plus program can also achieve additional LEED credit for recycled content or innovation, depending on the other environmental attributes of the carpet product.

Adhesive products that meet the Green Label Plus requirements are monitored for 15 different VOCs and are subject to the same quarterly and annual testing as carpet products, of which 5 are not monitored by the California Gold Sustainable Carpet Standard, the ANSI/NSF Sustainable Carpet standard, and the CHPS 01350.

In addition to the CRI Green Label Plus requirements, adhesives used in Los Angeles also have to conform to the South Coast Air Quality Management District requirements for VOC emissions. The LEED new construction and commercial interior rating systems also used the SCAQMD requirement as the specifications for low-emitting adhesives and glues, and therefore adhesives meeting this standard can also qualify for LEED credit.

Link to the CRI Green Label Plus Program:

http://www.carpet-rug.org/commercial-customers/green-building-and-the-environment/green-label-plus/index.cfm

Products meeting the CRI Green Label Plus can be found at (searchable for product types):

http://www.carpet-rug.org/commercial-customers/green-building-and-the-environment/green-label-plus/green-label-plus-carpet-list.cfm?ProductType=0&IDNumber=0

E) Cost Impacts (for internal DOT use only)

Carpets meeting the CRI Green Label Plus certification are fully competitive with carpet lacking these attributes. Many carpet manufacturers now manufacture carpet products that meet the CRI Green plus or other sustainable carpet criteria with no cost premium over comparable performing carpets.

F) Purchasing Metrics

Purchasing Metrics Summary	
Metric	**Calculation**
1) Total carpet purchased by spend	
2) Total carpet purchased by volume	
3) Total carpet purchased meeting spec by spend	
4) Total carpet purchased meeting spec by volume	
5) Percentage carpet purchased meeting spec by spend	3/1
6) Percentage carpet purchased meeting spec by volume	4/2

Cleaners/Degreasers without Trichloroethylene

A) Technical Specifications (to be inserted directly into bidding documents):

Cleaners/degreasers that meet the following specifications:

1. Cleaners/Degreasers shall not contain the solvent Trichloroethylene.

2. Cleaners/Degreasers shall meet or exceed requirements in EcoLogo Program's Standard CCD-146E, and/or EPA Design for the Environment Standard for Safer Cleaning Products, and/or Green Seal Environmental Standard GS-34.

B) Application (for internal DOT use only)

Product Types

- Cleaners/Degreasers

Quantity

- 100% of product types meet criteria 1.
- 20% of product types meet criteria 2, and increase as feasible.

C) Environmental Impacts (for internal DOT use only)

This product specification for Cleaners/Degreasers aims to address the following set of issues:

Environmental Summary		
Issue	**Objective**	**Comments***
Volatile Organic Compounds	Reduce VOC content in cleaning/degreasing agents	The product shall not contain VOC's in excess of 3% as used and 25% as sold.
Carcinogens	Reduce carcinogens in cleaning/degreasing agents	The product shall not be formulated or manufactured with any chemicals that are included in the IARC – spell out first use http://monographs.iarc.fr/ENG/Classification/index.php
Trichloroethylene	Reduce or eliminate Trichloroethylene in cleaning/degreasing agents	The product shall not use the solvent known as Trichloroethylene (aka Trimar, Trilene, and Trethylene)
Toxicity (Aquatic Life)	Reduce toxicity of cleaning/degreasing agents to preserve aquatic life	The product shall not be toxic to aquatic life defined as Acute LC50 daphnia or fish > or = 100 mg/L and Acute LC50 algae > or = to 100 mg/L
Aquatic Biodegradability	Increase biodegradability of product and product ingredients	The whole product formulation shall be readily biodegradable
Eutrophication	Reduce phosphates/phosphonates in cleaning/degreasing agents	Sodium salts and potassium salts shall not be present in quantities above 0.5% by weight of total phosphorus

*Note: The Environmental Choice, DfE, and Green Seal programs all include provisions to manage the issues outlined in this table. Specific measures outlined in the comments section are taken from the Green Seal standard.

D) Rationale and Background (for internal DOT use only)

Trichloroethylene

State DOT's should not purchase solvent based cleaners that contain Trichloroethylene (TCE). TCE is an industrial or organic solvent used for vapor degreasing and cold cleaning of fabricated metal parts. TCE has been used in the past as a carrier solvent for active ingredients of insecticides and fungicides; as a solvent for wax, fats, resins, and oils; as an anesthetic for medical and dental use; and in the extraction of oleoresins and caffeine from coffee. TCE is classed as a VOC, which can contribute to the formation of harmful ground level ozone or smog, which can in turn cause damage to multiple eco-systems as well as have devastating effects on human health.

Investigations into the effects of TCE on the environment show that it has a significant impact on waterways and human systems. It is likely that TCE has a wide distribution in the environment, but usually at low levels. TCE quickly evaporates from surface water, so it is commonly found as vapor in the air; however, it evaporates less easily from soil, where it may stick to particles and remain for a long time. Studies have shown that TCE may cause cancer and genetic defects in individuals who receive excessive exposure to the solvent.

TCE is present in 34% of the nation's drinking water supply and tends to quickly percolate through soil with rainwater adsorbing to soil particles as it goes. Once it reaches groundwater, it attaches to groundwater particles and continues to migrate until it reaches an impermeable surface. Industrial discharges of wastewater streams are a primary means of release for TCE into waterways. A study that evaluated 28 industrial facilities in 1995 found that each released more than 10 pounds of TCE to waterways during the course of the year. Five of these facilities released 250 to 280 pounds of TCE to waterways for a total of 1,477 pounds of TCE for the year. Four of the five facilities were metalworking plants and one of the facilities produced TCE for on-site use and disposal.

Human exposure to TCE can occur in a variety of ways including inhalation of TCE vapors; drinking, swimming, or showering in water contaminated with TCE; coming into contact with TCE contaminated soil such as near a landfill, and/or using it at work to wash paint or grease from skin or equipment. Prolonged or recurring exposure to the solvent may cause impaired heart function, unconsciousness, birth defects, and death. Inhalation of the solvent over an extended period of time may result in nerve, kidney, and liver damage. TCE is known to be a human carcinogen based on evidence of carcinogenicity from studies in humans.

Aqueous-based cleaning systems with a neutral pH have been shown just as effective in cleaning and degreasing metal parts as solvent-based cleaning systems. Aqueous-based cleaners are safer for workers, the environment, and tend to be less costly to use. Oil and grease can be separated and removed allowing for

recycling of the water based solution resulting in an extended usefulness lifetime for the cleaner.

Links to the sources for the rationale and background summary regarding TCE are at: http://ntp.niehs.nih.gov/ntp/newhomeroc/roc10/TCE.pdf

http://www.itwfpg.com/daraclean/daraclean_advantage.html

EPP Standards

Ecologo Certification Criteria Document CCD-146E Hard Surface Cleaners

http://www.ecologo.org/common/assets/criterias/CCD-146.pdf

Products meeting the Ecologo CCD 146E standard:

http://www.environmentalchoice.com/en/certifiedgreenproducts/details.asp?product_type_id=226&cat=2

EPA Design for the Environment (DfE) Standard for Safer Cleaning Products

http://epa.gov/dfe/pubs/projects/gfcp/standard_for_safer_cleaning_products.pdf

Products meeting the EPA Design for the Environment Standard can be found at:

http://epa.gov/dfe/pubs/projects/formulat/formpart.htm

GS-34 Green Seal Environmental Standard for Cleaning and Degreasing Agents

http://www.greenseal.org/certification/standards/GS-34_Cleaning_and_Degreasing_Agents_Standard.pdf

GS-20 Green Seal Environmental Criteria for Fleet Vehicle Maintenance

http://www.greenseal.org/certification/standards/GS-20_Fleet_Vehicle_Maintenance_Operations_Standard.pdf

Green Seal certified products can be found at:

http://www.greenseal.org/findaproduct/index.cfm

E) Cost Impacts (for internal DOT use only)

Cost impacts for aqueous-based cleaners will vary based upon the brand and quantity of cleaner purchased. Additionally, state DOTs can expect to receive discounts on bulk purchases based upon contracts and purchasing agreements.

Aqueous-based cleaners that can be used alone or in conjunction with parts washers are safer for workers, the environment, and tend to be less costly to use then solvent-based cleaners. The longer fluid life of aqueous-based cleaners vastly reduces disposal requirements. Products listed on Environmental Choice/EcoLogo's and Green Seal's websites are available in sizes ranging from 5-gallon buckets to 55-gallon drums. Products listed on EPA DfE's website are available in ready-to-use and concentrated options. Purchasing costs will vary widely, depending upon locale (transportation costs), quantity purchased, and availability of regional suppliers of compliant products.

Cost Impact Summary		
DOT Product	**Cost to Implement DOT standard**	**Cost Impacts**
Aqueous-Based Cleaners	Initial purchase of aqueous-based cleaners	Aqueous based cleaners are more cost effective in the long term; cost of cleaners will be offset by the longer fluid life, reduction in disposal requirements, and the recyclability of the cleaner.

(The cost analysis provided here is considered a good general estimate. It is important to note, however, that relevant cost data are limited, market factors can vary considerably and prediction of future costs is highly uncertain. The actual costs may vary.)

F) Purchasing Metrics (for internal DOT use only)

Purchasing Metrics Summary	
Metric	**Calculation**
1) Quantity solvent-based cleaner purchased	
2) Dollars solvent-based cleaner purchased	
3) Quantity aqueous-based cleaner (green spend) purchased	
4) Dollars aqueous-based cleaner (green spend) purchased	
5) Quantity solvent-based cleaner purchased: Total	1 + 3
6) Dollars solvent-based purchased: Total	2 + 4
7) Percentage aqueous-based cleaner purchased	3 ÷ (3 + 1)
8) Percentage spend aqueous-based cleaner purchased	4 ÷ (4 + 2)

Computers

A) Technical Specifications (to be inserted directly into bidding documents):

Computers that meet the following specification:

1. Certified bronze level or better by the Electronic Product Environmental Assessment Tool (EPEAT) or meet the requirements to achieve a bronze or better rating.

B) Application (for internal DOT use only)

Product Types

- Desktops
- Laptops
- Computer Monitors
- Integrated Desktop Systems

Quantity

- 100% of product types purchased meet standard.

C) Environmental Impacts (for internal DOT use only)

The information in the table below is based on EPEAT standards for computers, laptops, monitors and integrated desktop systems.

Environmental Summary		
Issue	**Objective**	**Comments**
Heavy Metals	Heavy-Metal Free	European RoHS Directive Compliant
		Elimination of intentionally added cadmium, mercury, lead, and/or hexavalent chromium
		Report on amount of mercury used in light sources
		Low threshold for amount of mercury used in light sources
		Batteries free of lead, cadmium, and mercury
Toxic Chemicals	Carcinogen Free Bioaccumulative Toxic-free Low toxicity	Elimination of intentionally added short chain chlorinated paraffin (SCCP) flame retardants and plasticizers in certain applications
		Large plastic parts free of certain flame retardants classified under European Directive 67/548/EEC
		Large plastic parts free of polyvinyl chloride
Renewable, Bioplastic Materials	Made from renewable materials	All plastic parts, except packaging shall contain an average of at least 10% renewable or biobased plastic
Recycled Content	Recycled Content	Declaration of post-consumer content
		All covered products that contain plastic, except printed circuit boards, shall contain an average of at least 10% post-consumer recycled plastic
		All covered products that contain plastic, except printed circuit boards, shall contain an average of at least 25% post-consumer recycled plastic

D) Rationale and Background (for internal DOT use only)

Due to rapidly progressing technology, computers and monitors have a relatively short shelf life, sometimes only 2-4 years before they are replaced. Coupled with this, computers have a relatively high environmental footprint with respect to energy consumption, materials, and disposal.

The EPEAT tool was developed to provide a standard for environmentally preferable computers. Based on the Institute of Electrical and Electronics Engineers (IEEE) standard 1680, EPEAT establishes criteria across the computer product's environmental footprint, including energy consumption, material composition, toxic materials usage and end-of-life management.

The EPEAT tool is similar to LEED certification in that points are awarded for complying with a variety of criteria, only some of which are required, and products can achieve bronze, silver, or gold certification based on the number of categories the product meets.

Because computers have a wide environmental impact, the EPEAT tool draws on a number of established standards, directives, and programs to address the computer product's environmental footprint. EPEAT certified computers meet Energy Star requirements for power consumption and therefore meets the EPA standards for energy efficiency.

Other measures incorporated within EPEAT reduce the number of heavy metals, polyvinyl chloride, and bio-accumulative flame retardants as well as increase the number of recycled and recyclable components that make up the computer.

Finally, computer products certified by EPEAT address a number of end-of-life issues, such as design for recyclability, removal of non-recyclable or non-recycling compatible paints and materials, and information regarding take-back programs in which machines that have reached their end-of-life can be discarded in an environmentally responsible manner.

The EPEAT program, including the criteria and products meeting the criteria can be found at:

http://www.epeat.net/

E) Cost Impacts (for internal DOT use only)

According to statements from major computer manufacturers, EPEAT bronze computers will not cost more than non-EPEAT equivalents. A slight increase in cost for silver and gold EPEAT computers is possible. Use of EPEAT bronze computers is expected to result in an overall lower cost throughout the lifetime of the computer due to lower energy usage and less costly end of life disposal.

F) Purchasing Metrics

Purchasing Metrics Summary	
Metric	**Calculation**
1) Quantity Non-EPP computers purchased	
2) Dollars Non-EPP computers purchased	
3) Quantity EPP computers purchased	
4) Dollars EPP computers purchased	
5) Quantity computers purchased total	1+3
6) Dollars computers purchased total	2+4
7) Percentage EPP computers purchased	3/5
8) Percentage Spend EPP computers	4/8

Electronics Cleaner

A) Technical Specifications (to be inserted directly into bidding documents):

Electronic cleaners that meet the following specifications:

1. Electronics Cleaner should be chlorofluorocarbon (CFC) free when possible.
2. Electronics Cleaner should be non-flammable when possible.
3. Electronics Cleaner with low odors should be favored when possible.

B) Application (for internal DOT use only)

Product Types

- Electronic parts cleaning sprays

Quantity

- 33% of product types meet criteria 1.
- 33% of product types meet criteria 2.
- 33% of product types meet criteria 3.

C) Environmental Impacts (for internal DOT use only)

The primary environmental concerns associated with electronics cleaners stem from the use of CFCs in the cleaner as both propellants and solvents. CFCs are recognized ozone-depleting chemicals and greenhouse gases that contribute to depletion of the ozone layer and global warming. Many of these compounds are also associated with adverse health effects in exposed populations.

Environmental Summary		
Issue	**Objective**	**Comments**
CFC Content	Zero CFC content	Numerous HFC and HFE based substitute products are available and identified under EPA's Significant New Alternatives Program (SNAP)
Flammability	Reduce flammability hazard	SNAP has identified numerous products for use where flammability of cleaner is of particular concern. Non-flammable alternatives may contain other substances with may pose a health hazard.

D) Rationale and Background (for internal DOT use only)

The EPA has identified a number of CFC alternatives for propellants and solvent cleaners under the Significant New Alternatives Policy (SNAP). A list of EPA approved substances can be found at:
http://www.epa.gov/spdpublc/snap/aerosol/index.html

E) Cost Impacts

No cost impacts were identified during the course of development of this specification.

F) Purchasing Metrics

Purchasing Metrics Summary	
Metric	**Calculation**
1) Total Cleaner purchased by spend	
2) Total Cleaner purchased meeting spec by spend	
3) Total Cleaner purchased by volume	
4) Total Cleaner purchased meeting spec by volume	
5) Percentage Cleaner meeting spec by volume	4/3
6) Percentage Cleaner meeting spec by spend	2/1

Engine Coolant/Anti-Freeze

A) Technical Specifications (to be inserted directly into bidding documents):

Engine Coolant that meets the following specifications:

1. Contains at least 70% postconsumer content.
2. Mixed content engine coolant/anti-freeze (ethylene glycol: propylene glycol mixtures) shall not be purchased.
3. All engine coolant/anti-freeze purchased shall meet the American Society for Testing and Materials (ASTM) D15 Engine Coolant Standards.
4. All engine coolant/anti-freeze purchased shall include denatonium benzoate at a minimum of 30 ppm as a bittering agent.

B) Application (for internal DOT use only)

Product Types

- Ethylene glycol based coolant
- Propylene glycol based coolant

Quantity

- 50% by spend of product types meet criteria 1.
- 100% by spend of product types meet criteria 2.
- 100% by spend of product types meet criteria 3.
- 100% by spend of product types meet criteria 4.

C) Environmental Impacts (for internal DOT use only)

A sudden release of ethylene / propylene glycol into a waterway can produce adverse impacts upon fresh water and marine environments. Glycol degradation in the environment has a high oxygen demand and as a result threatens the existing aquatic life. Ammonia gas is also released to the environment by the degradation of glycols. http://www.ccar-greenlink.org/Canada/nf-antifreeze.pdf

According to the safety data sheets of industrial chemical manufacturers, Ethylene Glycol will cause serious health conditions, including liver and heart damage and damage to the central nervous system if a sufficient amount is absorbed by the body. Propylene glycol is generally considered to be much less toxic to people and animals than ethylene glycol.

Environmental Summary		
Issue	**Objective**	**Comments**
Ethylene glycol and propylene glycol cause high oxygen demand upon degradation in waterways	Reduce the amount of glycols released into nearby water bodies	Recover and recycle used engine coolant/antifreeze. Purchase 70% post consumer content engine coolant/antifreeze or virgin extended life engine coolant/antifreeze
Antifreeze mixtures (ethylene glycol/propylene glycol) cannot be recycled	Reduce amount of mixed content engine coolant/antifreeze purchased	Purchase engine coolant/antifreeze which contains only one constituent (propylene glycol or ethylene glycol)
Liver, kidney, heart, and central nervous system damage	Reduce toxicity of engine coolants/antifreeze towards children and animals	Purchase antifreeze with denatonium benzoate as a bittering agent

D) Rationale and Background (for internal DOT use only)

Purchasing Recycled Antifreeze

EPA's Wastes-Resources Comprehensive Procurement Guidelines states that 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). (http://www.epa.gov/epawaste/conserve/tools/cpg/products/engine.htm)

Under federal procurement guidelines resulting from Executive Order 13101, it is recommended that federal fleet managers establish a program for antifreeze recycling that consists of reclaiming spent antifreeze on-site or establishing a service contract for recycling it off-site. (http://www.epa.gov/epp/pubs/13101.pdf)

The state of Minnesota's environmentally preferred purchasing website suggests recycling engine coolant/antifreeze and purchasing extended-life antifreeze when purchasing virgin engine coolant/antifreeze. (http://www.rethinkrecycling.com/government/eppg/-buy-products-services/vehicles/antifreeze#eppg_overview)

The California DOT's best management practice guidelines for environmentally preferred purchasing of engine coolant/antifreeze state that the product purchased must contain at least 70% postconsumer content. (http://www.green.ca.gov/EPP/Vehicles/Antifreeze.htm)

Recycling antifreeze onsite has been shown to be more cost effective than recycling using an offsite vendor. (http://agri.nv.gov/brochures/antifreeze-recycling.pdf)

Toxicity of Propylene and Ethylene Glycol

Engine coolant/antifreeze contains highly biodegradable organic materials which results in the depletion of oxygen in water bodies; killing fish and aquatic life and increased anaerobic (without oxygen) bacterial activity resulting in noxious gases or foul odors. (http://www.epa.gov/ORD/NRMRL/pubs/600r04184/600r04184chap1.pdf)

Propylene glycol is considerably less toxic to people and animals than ethylene glycol. http://des.nh.gov/organization/commissioner/pip/factsheets/ard/documents/ard-ehp-12.pdf

E) Cost Impacts (for internal DOT use only)

Cost Impact Summary		
DOT Product	**Details**	**Cost Impacts**
Example Anti-freeze 1	Extended Life Antifreeze	$9.99 - $11.99 / gallon
On site batch recycling	In-house Recycled Antifreeze (cost does not include labor) http://agri.nv.gov/brochures/antifreeze-recycling.pdf	$0.74 - $4.50 / gallon
On site mobile service	Mobile service antifreeze recycler (cost does not include labor) http://agri.nv.gov/brochures/antifreeze-recycling.pdf	$1.75 - $3.00 / gallon
Off site service	Off site antifreeze recycler http://agri.nv.gov/brochures/antifreeze-recycling.pdf	$3.20 - $3.70 / gallon
Various virgin products	Virgin Antifreeze	$2.75 - $5.00 / gallon

(The example anti-freeze product listed and the various service costs provided here are from a major brand manufacturer and determined from research conducted by the state of Nevada. The "example anti-freeze" placeholder has been used to protect their identity.)

(The cost analysis provided here is considered a good general estimate. It is important to note, however, that relevant cost data are limited, market factors can vary considerably and prediction of future costs is highly uncertain. The actual costs may vary).

F) Purchasing Metrics

Purchasing Metrics Summary	
Metric	**Calculation**
1) Total Volume non-EPP virgin coolant purchased	
2) Total Volume EPP recycled content (RC) coolant purchased	
3) Total Volume EPP virgin extended life coolant purchased	
4) Total Volume Coolant Purchased	1 + 2 + 3
5) Volume percent recycled content EPP Coolant	2÷4
6) Volume percent virgin extended life coolant purchased	3÷(1+3)
7) Total Non-EPP virgin coolant purchased by spend	
8) Total EPP recycled content (RC) coolant purchased by spend	
9) Total EPP virgin extended life coolant purchased by spend	
10) Total Coolant Purchased by spend	7 + 8 + 9
11) Percent spend recycled content coolant	8÷10
12) Percent spend virgin extended life coolant	9÷(7+9)

Herbicides

A) Technical Specifications (to be inserted directly into bidding documents):

Herbicides that meet the following specification:

1. Herbicides are classified by EPA as category 1 and/or 2 only.

B) Application (for internal DOT use only)

Product Types

- Pre-Emergence Herbicides
- Post-Emergence Herbicides
- Aquatic Herbicides

Quantity

- 60% of product types by volume meet the specification.

C) Environmental Impacts (for internal DOT use only)

Environmental Summary		
Issue	**Objective**	**Comments**
Toxicity of numerous synthetic organisms	Reduce toxicity level by banning level 3 and 4 herbicides. Encourage use of alternatives to herbicides in an Integrated Pest/Vegetation Program.	
De-oxygenation of water bodies due to the application of aquatic herbicides	Reduce use in water bodies	Use of Integrated Pest/Vegetation Management practices to reduce use of herbicides
Soil erosion and bare ground due to over application of herbicides	Reduce use on vegetation	Encourage use of alternatives to herbicides in an Integrated Pest/Vegetation Program and avoid over application

D) Rationale and Background (for internal DOT use only)

A pesticide cannot be legally used if it has not been registered with EPA's Office of Pesticide Programs. EPA's definition of a pesticide is "Any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. Pests can be insects, mice and other animals, unwanted plants (weeds), fungi, or microorganisms like bacteria and viruses. Though often misunderstood to refer only to *insecticides*, the term pesticide also applies to herbicides, fungicides, and various other substances used to control pests. Under United States law, a pesticide is also any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant." (U.S. EPA Office of Pesticide Programs)

"EPA registration of pesticides intends to promote the safety and well-being of public health and the ecosystem. The EPA evaluates the chemicals in the pesticide in relation to the location or crop on which it is to be used; the amount, frequency and timing of application; and storage and disposal methods. Pesticide evaluation also seeks to ensure that the pesticide will not have unreasonable adverse effects on humans, the ecosystems, and non-target species of plants and animals." (University of Florida, Center for Aquatic and Invasive Plants)

http://plants.ifas.ufl.edu/guide/sup7herb.html#reltoxtab

After EPA approval, the herbicide must also be registered with each state government. State registration may require additional testing for specific environmental or agricultural conditions.

The EPA Toxicity Category is based on acute toxicity testing and LD50 concentrations. LD50 concentrations are the lethal dose of active ingredient which causes death to 50% of a population of organisms tested. In most cases, rats are used as the test organism.

http://www.fs.fed.us/r6/invasiveplant-eis/Region-6-Inv-Plant-Toolbox/Herbicide%20Info/EPA-Toxicity-Categories-081607ver.pdf

EPA Conventional Reduced Risk Pesticide Program

Advantages of pesticides with reduced risk over existing conventional pesticides include low impact to human health, lower toxicity to non-target organisms, low potential for groundwater contamination, lower use rates, lower resistance by pests, and compatibility with EPA's Integrated Pest Management (IPM) practices.

http://www.epa.gov/opprd001/workplan/reducedrisk.html

The US Department of Agriculture USDA) Regional IPM Centers Information System

The USDA Regional Integrated Pest Management Centers provide information on pesticide commodities, pests and pest management practices, and issues in the U.S.

http://www.ipmcenters.org/

USDA National Organic Program

The USDA National Organic Program (NOP) rule allows certain nonsynthetic soap-based herbicides for use in farmstead maintenance (roadways, ditches, right-of-ways, building perimeters) and in ornamental crops. In addition, several products that contain natural or nonsynthetic ingredients are classified as "Allowed or Regulated by the Organic Materials Review Institute (OMRI)". Regulated substances are listed with a restriction on the USDA National List or in the NOP rule. The OMRI listing does not imply product approval by any federal or state government agency. It is the licensed user's responsibility to determine the compliance of a particular product.

http://www.ams.usda.gov/AMSv1.0/nop

Additional links can be found at:

Washington State DOT Integrated Vegetation Management Plan

http://www.wsdot.wa.gov/NR/rdonlyres/994CEDFE-BC18-4A75-BBFA-F9AA5CDC705F/0/Chapter8INTEGRATEDVEGETATIONMANAGEMENTPLAN2.pdf

New York State DOT Integrated Management Program

https://www.nysdot.gov/regional-offices/region4/other-topics/roadside-vegetation-management-program

California DOT Vegetation Control

http://www.dot.ca.gov/hq/maint/manual/Ch_C2.pdf

E) Cost Impacts

No cost impacts were identified during the course of development of this specification.

F) Purchasing Metrics

Purchasing Metrics Summary	
Metric	**Calculation**
1) Total Category 1 and 2 Herbicides by spend	
2) Total Category 3 Herbicides by spend	
3) Total Category 4 Herbicides by spend	
4) Total OMRI approved organic herbicides by spend	
5) Total Herbicides by spend	1+2+3
6) Total Category 1 and 2 Herbicides by volume	
7) Total Category 3 Herbicides by volume	
8) Total Category 4 Herbicides by volume	
9) Total OMRI approved organic herbicides by volume	
10) Total Herbicides by volume	6+7+8
11) Percentage herbicides meeting spec by spend	(1) / (2+3)
12) Percentage herbicides meeting spec by volume	(6) / (7+8)
13) Percentage organic herbicides by spend	(4) / (5)
14) Percentage organic herbicides by percentage	(9) / (10)

Isocyanate Automotive Paints

A) Technical Specifications (to be inserted directly into bidding documents):

Automotive paints that meet the following specification:

1. Waterborne based and free of isocyanates.

B) Application (for internal DOT use only)

Product Types

- Toluene diisocyanate (TDI) and TDI polyisocyanate paints
- Methylene bisphenyl isocyanate (MDI) and polymeric MDI paints
- Hexamethylene diisocyanate (HDI) and HDI polyisocyanate paints

Quantity

- 50% by spend of product types meet the specification, and increase as feasible.

C) Environmental Impacts (for internal DOT use only)

Toluene diisocyanate can be toxic to wildlife and is a volatile organic compound (VOC) which can contribute to harmful ground-level ozone formation.

Exposure to toluene diisocyanate can cause irritation to eyes, skin, nose, throat; choking, paroxysmal cough; chest pain, retrosternal (occurring behind the sternum) soreness; nausea, vomiting, abdominal pain; bronchitis, bronchospasm, pulmonary edema; dyspnea (breathing difficulty), asthma; conjunctivitis, lacrimation (discharge of tears); dermatitis, skin sensitization. Toluene diisocyanate is considered a potential human carcinogen. (http://www.cdc.gov/niosh/npg/npgd0621.html)

Acute (short-term) exposure to high concentrations of hexamethylene diisocyanate in humans can cause pulmonary edema, coughing, and shortness of breath. Hexamethylene diisocyanate is also extremely irritating to the eyes, nose, and throat. Human studies have suggested that chronic (long-term) exposure to hexamethylene diisocyanate may cause chronic lung problems. Animal studies have reported respiratory effects from chronic inhalation exposure and skin irritation and sensitization from dermal exposure to hexamethylene diisocyanate. No information is available on the reproductive, developmental, or carcinogenic effects

of hexamethylene diisocyanate in humans. EPA has not classified hexamethylene diisocyanate for carcinogenicity. (http://www.epa.gov/ttnatw01/hlthef/hexa-dii.html)

Environmental Summary		
Issue	**Objective**	**Comments**
Isocyanate toxicity to humans	0% Content in Paint	Purchase waterborne based paints only

D) Rationale and Background (for internal DOT use only)

In Washington State, the Department of Labor and Industries discovered that workers in the spray-on truck bed lining industry are at risk for developing work-related asthma. Both liner applicators and painters apply two-part polyurethane products using a spray gun. Both of these processes use isocyanates as hardeners. In spray-on truck bed linings, the hardener is mostly MDI (methyl diphenyl diisocyanate); in automotive paints, the hardener is typically based on HDI (hexamethylene diisocyanate). Polyurethanes are some of the most useful coatings available, and there's often no substitute for them. Isocyanate components of polyurethanes can cause severe health problems like asthma if they're not handled correctly. Isocyanates are known to pass through latex gloves.

Various types of isocyanates are often added to paint to act as a primer. In addition, hexamethylene diisocyanate is used as an activator/hardener in paints. (http://www.epa.gov/dfe/pubs/auto/gloves/text.htm)

Toluene Diisocynates

Toluene diisocyanates (TDI) are highly reactive compounds widely used in the manufacturing of polyurethane foams and coatings. TDI or TDI derivatives are used in polyurethane-modified alkyd paints and coatings (automotive and marine paint, wood varnish, floor treatment, wire coatings) and sealants, adhesives, and elastomers.

TDIs are "reasonably anticipated to be human carcinogens" based on sufficient evidence of carcinogenicity in experimental animals. (http://ntp.niehs.nih.gov/ntp/roc/eleventh/profiles/s177tdi.pdf)

TDI is currently listed on California's Proposition 65 List, which requires businesses to notify Californians about significant amounts of chemicals in the products they purchase, in their homes or workplaces, or that are released into the environment. (http://www.oehha.org/prop65/background/p65plain.html)

National Institute for Occupational Safety and Health (NIOSH): Immediately Dangerous to Life and Health (IDLH) = 2.5 ppm (toluene-2,4-diisocyanate)

Toluene-2,4-diisocyanate listed as a potential occupational carcinogen (http://www.cdc.gov/niosh/npg/npgd0621.html)

Hexamethylene Diisocyanate

Hexamethylene diisocyanate is used as a polymerizing agent in polyurethane spray paint formulations and coatings (e.g., automobile paint).

The general public may be exposed to hexamethylene diisocyanate through inhalation of air containing the chemical after it is released during spray applications of polyurethane paints.

E) Cost Impacts

No cost impacts were identified during the course of development of this specification.

F) Purchasing Metrics

Purchasing Metrics Summary	
Metric	**Calculation**
1) Total Paint purchased by spend	
2) Total paint purchased by volume	
3) Total paint meeting spec by spend	
4) Total paint meeting spec by volume	
5) Percent paint meeting spec by spend	3/1
6) Percent paint meeting spec by volume	4/2

Janitorial Cleaning Supplies

A) Technical Specifications (to be inserted directly into bidding documents):

Cleaning supplies that meet the following specification:

1. General-purpose cleaners shall meet or exceed the requirements of Environmental Choice Ecologo Standards CCD 146 or 148, or EPA Design for the Environment Program Standard for Safer Cleaning Products, or Green Seal standard GS-37 as applicable.

B) Application (for internal DOT use only)

Product Types

- General purpose, bathroom, glass, and carpet cleaners

Quantity

- 100% of product types purchased meet criteria 1.

C) Environmental Impacts (for internal DOT use only)

Public and private sector purchasers now recognize that traditional cleaning products can contain harmful chemicals that can cause cancer, reproductive disorders, major organ damage, and permanent eye damage. Indoor air pollution from volatile organic compounds from cleaning chemicals can cause other common health problems including asthma and other respiratory ailments, headaches, dizziness, and fatigue. These health problems can affect any office worker breathing indoor air. Cleaning workers are at special risk – nationally, 6 out of every 100 janitorial staff are injured by the chemicals they are using.

Cleaning products currently in use at a state DOT may contain the following chemicals:

- Alkyl phenol ethoxylates (APE), including nonylphenol ethoxylates (NPEs) – degrade to increasingly toxic compounds, which can persist in the environment. Some degradates are suspected endocrine disruptors.
- 2-Butoxyethanol – has numerous health concerns, should be avoided in all products.
- Dibutyl phthalate – is suggested by numerous health organizations to be a developmental and reproductive toxicant as well as endocrine disruptors.

- Ethanolamine (MEA) – is corrosive to eyes and skin, and toxic to the liver, kidneys and pancreas.

- Tetrafluoroethane – many of the fluorinated compounds have known or suspected health and environmental concerns.

- Trisodium nitrilotriacetate (NTA) – is a confirmed kidney and liver toxicant and suspected carcinogen.

- Formaldehyde-donating preservatives – is a known carcinogen (occurs over long-term exposure) and may also cause allergic reactions (occurs over short-term exposure).

- Inorganic phosphates – contribute to depletion of oxygen in waterbodies, which can kill fish and other aquatic life.

- Musk xylene and galaxolide – are fragrance ingredients which degrade slowly, may be bioaccumulative, and are found in the environment.

Cleaning chemicals are also routinely washed down the drain where they find their way into drinking water, lakes, and streams, adversely affecting plant and animal life and threatening public health. Green cleaning products can help reduce negative environmental effects. Santa Monica, a small resort community in Southern California, for example, eliminated 3,200 pounds of hazardous materials by replacing traditional cleaning products with safer alternatives.

Environmental Summary		
Issue	**Objective**	**Comments***
Volatile Organic Compounds	Low VOC emissions	South Coast Air Quality Management District's "Clean Air Choices Cleaner Certification Protocol," June 2007
Toxicity	Low Toxicity	Undiluted concentrations shall meet low toxicity requirements for both humans and aquatic systems
		Products shall not be skin sensitizers, skin, or eye irritants
		Products do not contain toxic substances such as APEs, dibutyl phthalate, and heavy metals
Carcinogen	Carcinogen Free	Undiluted formulations shall not be reproductive toxins or carcinogens
Eutrophication	Reduce use of nutrients that contribute to eutrophication	Product adheres to standard specific phosphorous limits (0.5% by weight in GS-37)

*Note: The Environmental Choice, DfE, and Green Seal programs all include provisions to manage the issues outlined in this table. Specific measures outlined in the comments section are from the Green Seal standard.

D) Rationale and Background (for internal DOT use only)

The proposed specification was adapted from LEED for Existing Buildings: Upgrades, Operations and Maintenance, Version 2.0 (MR Credits 4.1-4.3); and LEED for Existing Building: Operations and Maintenance (EQ Credits 3.4-3.6). Purchases of products that meet the proposed specification will automatically qualify towards 1-3 credits in either LEED EB 2.0 or LEED EB: O&M. Specifically, for either rating system one point will be awarded for each 30% of the total annual purchases of these products (on a cost basis) that meet the proposed specification, up to a total of 3 points if 90% of annual cleaning product purchases meet the specifications.

The Environmental Choice Ecologo standard CCD-146 can be found at:

http://www.environmentalchoice.com/common/assets/criterias/CCD-146.pdf

The Environmental Choice Ecologo standard CCD-148 can be found at:

http://www.environmentalchoice.com/common/assets/criterias/CCD-148.pdf

Products meeting the Ecologo criteria can be found at:

http://www.environmentalchoice.com/en/certifiedgreenproducts/category.asp?category_id=21

Products that meet the EPA Design for the Environment Standard can be found at:

Consumer cleaning products:

http://www.epa.gov/dfe/pubs/projects/formulat/formpartc.htm#consumerclean

Industrial cleaning products:

http://www.epa.gov/dfe/pubs/projects/formulat/formparti.htm#iiclean

Information on the Standard for Safer Cleaning Products can be found at:

http://www.epa.gov/dfe/standard_for_safer_cleaning_products.pdf

As of August 2010, LEED does not specifically mention the DfE program. However, DOTs can petition LEED for credit for the use of DfE-labeled products. Contact EPA DfE for more information (dfe@epa.gov).

Green Seal's GS-37 standard can be found at:

http://www.greenseal.org/certification/standards/GS-37_cleaning_products_for_industrial_and_Institutional_use_standard.pdf

A list of GS-37 certified products can be found at:

http://www.greenseal.org/findaproduct/i&icleaners.cfm

E) Cost Impacts (for internal DOT use only)

According to the US Office of the Federal Environmental Executive (US-OFEE), in most cases green cleaning products do not cost any more than traditional cleaners. Many public purchasers report that safer cleaners are cost competitive, including the US Department of Interior, the Chicago Public School System, the City of Seattle, WA, and the states of Illinois, Massachusetts, Minnesota, Missouri, Pennsylvania, and Vermont. The City and County of San Francisco found that it can use preferable products in place of existing products in 13 out of 14 product-types with no increased cost.

Some public purchasers have even lowered costs by switching from traditional to green cleaners. Santa Monica, CA for example, documented a 5% price savings

after its switch to safer cleaners. The United States Department of Energy's Pacific Northwest National Laboratory found that green cleaning products cost much less than what they paid for non-green cleaning products.

In some cases environmentally preferable products appear to cost more but in practice do not. Concentrated products that are priced higher may actually be less costly to use when properly mixed. To accurately compare prices, assess the cost-per-application rather than cost-per-volume.

US-OFEE reports that using green cleaning chemicals can actually produce additional savings when other benefits are taken into account. According to one study cited by government purchasers, using safer cleaning products, in addition to better ventilation and cleaning, could improve worker productivity by between 0.5 percent and 5 percent. Researcher and consultant Judith Heerwagen, PhD, who has evaluated numerous well-documented studies, found that increased productivity from improved air quality can range from 0.5% to 7% (approximately 3 to 34 minutes per worker per day).

This cost analysis did not review specific cost impacts with products certified to the Eco Logo, EPA DfE program, or Green Seal.

(The cost analysis provided here is considered a good general estimate. It is important to note, however, that relevant cost data are limited, market factors can vary considerably and prediction of future costs is highly uncertain.)

F) Purchasing Metrics

Purchasing Metrics Summary	
Metric	**Calculation**
1) Total cleaning chemicals purchased by spend	
2) Total cleaning chemicals purchased by volume	
3) Total cleaning chemicals purchased meeting spec by spend	
4) Total cleaning chemicals purchased meeting spec by volume	
5) Percentage cleaning chemicals purchased meeting spec by spend	3/1
6) Percentage cleaning chemicals purchased meeting spec by volume	4/2

Paint Primer

A) Technical Specifications (to be inserted directly into bidding documents):

Paint primer that meets the following specifications:

1. Primer shall meet the VOC requirements of Rule 1113 Architectural Coatings for South Coast Air Quality Management District.

2. Primer shall meet Green Seal Environmental Standard GS-11.

3. Primer shall meet recycled-content requirements of the Resource Conservation and Recovery Act (RCRA) when available.

B) Application (for internal DOT use only)

Product Types

- Primers, Sealers and Undercoaters
- Specialty Primer
- Quick Dry Primer
- Pre-Treatment Wash Primers

Quantity

- 100% of product types meet criteria 1.
- 100% of product types meet criteria 2.
- 100% of product types meet criteria 3.

C) Environmental Impacts (for internal DOT use only)

Environmental Summary		
Issue	**Objective**	**Comments**
Volatile Organic Compounds	Low VOC content	100 g/L VOC for primers, specialty primers and quick dry primers. 420 g/L for pre-treatment wash primers. (SCAQMD)
Lead	No heavy metals	Shall not contain heavy metals including lead, mercury, cadmium, hexavalent chromium, or antimony (GS-11)
Carcinogen	Carcinogen-free	Shall not contain methylene chloride, benzene, vinyl chloride, naphthalene, diphthalate, isophorone, formaldehyde, acrolein, acrylonitrile (GS-11)
Toxicity	Low toxicity	Shall not contain methylene chloride, benzene, toluene, ethylbenzene, vinyl chloride, naphthalene, 1,2-dichlorobenzene, butyl benzyl phthalate, di-n-butyl phthalate, di-n-octyl phthalate, dimethyl phthalate, diethyl phthalate, isophorone, formaldehyde, methyl ethyl ketone, methyl isobutyl ketone, acrolein, acrylonitrile (GS-11)
Ozone	Reduce use of ozone-depleting substances	Shall not contain 1,1,1-trichloroethane (GS-11)

D) Rationale and Background (for internal DOT use only)

Indoor Air Pollution

Paint is one of the biggest contributors to indoor air pollution due to volatile organic compounds (VOCs), chemicals that can have short and long-term health effects. The EPA reports that indoor concentrations of many VOCs can be up to ten times higher than outdoors. Green Seal published a paint standard, GS-11, in 1993 (updated in 2010) to reduce health and environmental impacts of paints and create a groundbreaking set of guidelines for paint primer manufacturers.

Alternative Paint Ingredients and Low VOC Paints

Low-VOC primers are manufactured to the same performance standards as any other high-quality paint. Numerous environmentally friendly primer products have been certified by Green Seal. These paints meet the Green Seal Environmental Standard for Architectural Coatings (GS-11), which establishes minimum criteria for performance standards such as hideability, wearability, and scrubability.

Recycled Content

Post-consumer/recycled primers are high quality and meet the same standards of virgin primers. Using recycled primer reduces the amount of primer disposal, conserves landfill space, reduces energy consumption, and is often cheaper than purchasing virgin primer.

There are two types of recycled-content primer:

- **Reprocessed** primer or remanufactured primer is mixed with virgin materials such as resins and colorants. These primers are tested, generally the same as virgin primers, then packaged for resale. Reprocessed primer typically contains a minimum of 50 percent postconsumer content and is as durable as virgin primer.
- **Reblended** or consolidated primer is remixed, screened (minimal testing is conducted), and packaged. Reblended primers contain more than 95 percent postconsumer content, with ranges between 75 percent to 100 percent postconsumer content. These primers are considered a "good quality" or "high grade" paint.

EPP Standards

Green Seal has a list of GS-11 certified paints. The criteria address performance characteristics (abrasion resistance, opacity, stain removal), and prohibit or restrict the presence of certain heavy metals and toxic organic substances (VOC levels, aromatic compounds, chemical restrictions, toxics in packaging).

The Green Seal GS-11 standard can be found at:

http://www.greenseal.org/certification/standards/GS-11_paints_and_coatings_standard.pdf

Products meeting the GS-11 standard can be found at:

http://www.greenseal.org/findaproduct/paints_coatings.cfm

E) Cost Impacts (for internal DOT use only)

Low and No-VOCs primer can be applied in exactly the same way as conventional, high-VOC primers. In general, low-VOC primers are comparable in price to conventional primers; no-VOC primer tends to be slightly more expensive. Additionally, low-VOC and no-VOC primers aren't considered hazardous waste materials, so disposal is much easier than with standard paints.

F) Purchasing Metrics

Purchasing Metrics Summary	
Metric	**Calculation**
1) Total primer purchased by volume	
2) Total primer purchased by spend	
3) Total primer purchased meeting spec by volume	
4) Total primer purchased meeting spec by spend	
5) Percentage primer meeting spec by spend	4/2
6) Percentage primer meeting spec by volume	3/1

Paint Strippers & Thinners

A) Technical Specifications (to be inserted directly into bidding documents):

Paint strippers and thinners that meet the following specifications:

1. Paint strippers and thinners shall not contain N-Methylpyrrolidone (NMP).

2. Paint strippers and thinners should meet the VOC requirements of Rule 1143 Consumer Paint Thinner & Multi-Purpose Solvents for South Coast Air Quality Management District Rule 1143.

3. Paint strippers and thinners shall meet EcoLogo Program's Standard CCD-051.

B) Application (for internal DOT use only)

Product Types

- Paint and Varnish Thinners/Removers
- Paint Strippers

Quantity

- 100% of product types meet criteria 1.
- 100% of product types meet criteria 2.
- 100% of product types meet criteria 3.

C) Environmental Impacts (for internal DOT use only)

Many paint strippers/thinners contain chemicals that can pose significant risks. Some may cause cancer, reproductive problems, or damage the liver, kidney, or brain.

Methylene chloride, commonly found in paint thinners, is classified as a Hazardous Air Pollutant (HAP) by EPA and as a Toxic Air Contaminant (TAC) in California. An alternative ingredient, n-methylpyrrollidone (NMP), also causes damage to the nervous and reproductive systems. Methylene chloride and NMP are listed on California's Proposition 65. Methylene chloride is also a listed hazardous waste under the Resource Conservation and Recovery Act (RCRA).

Environmental Summary		
Issue	**Objective**	**Comments**
Volatile Organic Compounds	Low VOC content	25 g/L VOC or less (SCAQMD)
Toxicity	Low toxicity	Shall not contain N-methylpyrrolidone (NMP), methyl ethyl ketone (MEK), toluene, trichloroethylene, xylene
Carcinogen or Toxic Risks	Carcinogen-free	Shall not contain methylene chloride (EcoLogo CCD-051)

D) Rationale and Background (for internal DOT use only)

Many paint strippers contain toxic solvents. Methylene chloride, a cancer-causing agent, is one of the oldest and most common solvents used in paint and varnish strippers. It often affects the central nervous system (the brain) causing headaches, nausea, dizziness, clumsiness, and drowsiness. At very high levels, it can cause unconsciousness and death. Methylene chloride has been shown to cause cancer in animals and is regulated as a cancer-causing substance. It metabolizes in the blood to form carbon dioxide causing the heart to pump harder and can trigger a heart attack.

Some of the non-methylene chloride alternative strippers on the market today contain ingredients that have other toxicity problems. For example, some strippers contain n-methylpyrrollidone (NMP), which is a reproductive and developmental toxin. In addition, the chemical also poses risks of solvent-induced acute and chronic nervous system damage, dermatitis and respiratory irritation.

A study titled *Methylene Chloride Consumer Product Paint Strippers: Low-VOC, Low Toxicity Alternatives* was prepared for California Environmental Protection Agency's (Cal/EPA's) Department of Toxic Substances Control (DTSC) in May 2006. Evaluation of the toxicity of the materials was conducted by The Department of Health Services Hazard Evaluation System & Information Service (HESIS). The project evaluated and compared the toxicity of the methylene chloride strippers and the alternative non-methylene chloride strippers. HESIS concluded the alternate non-methylene chloride strippers that performed the best contained

benzyl alcohol as the active ingredient. The products that contained benzyl alcohol were safer and less toxic than methylene chloride or NMP based strippers.

- Rule 1143 can be found on South Coast Air Quality Management District's website at http://www.aqmd.gov/rules/reg/reg11/r1143.pdf
- The CCD-051standard can be found on the Environmental Choice website at http://www.ecologo.org/common/assets/criterias/CCD-051.pdf
- Products meeting EcoLogo CCD-051 standard can be found at http://www.environmentalchoice.com/en/certifiedgreenproducts/details.asp?product_type_id=90&cat=2
- Methylene Chloride Consumer Product Paint Strippers: Low-VOC, Low Toxicity Alternatives can be found at http://www.irta.us/PaintStrippers06.pdf

E) Cost Impacts (for internal DOT use only)

A cost analysis was conducted as part of *Methylene Chloride Consumer Product Paint Strippers: Low-VOC, Low Toxicity Alternatives* report. For this analysis, it was assumed that twice the amount of methylene chloride was used to perform the stripping task over the alternatives.

Cost Comparison of Consumer Hand Strippers

Vendor	Type	Cost per Quart	Amount Used	Total Cost
Example Stripper 1	Methylene Chloride	$7.47	2 quarts	$14.94
Example Stripper 2	Methylene Chloride	$5.97	2 quarts	$11.94
Example Stripper 3	NMP	$10.99	1 quart	$10.99
Example Stripper 4	NMP, benzyl alcohol	$17.69	1 quart	$17.69
Example Stripper 5	Benzyl alcohol	$7.95	1 quart	$7.95

(The example paint strippers provided here are from major brand manufacturers as quoted from manufacturers' catalogs. The "example stripper" placeholder has been used to protect their identity.)

(The cost analysis provided here is considered a good general estimate. It is important to note, however, that relevant cost data are limited, market factors can vary considerably and prediction of future costs is highly uncertain. The actual costs DOT can negotiate with suppliers at any given time may be higher or lower than the estimates presented here.)

F) Purchasing Metrics (for internal DOT use only)

Purchasing Metrics Summary	
Metric	**Calculation**
1) Total paint stripper/thinner purchased by volume	
2) Total paint stripper/thinner purchased by spend	
3) Total benzyl alcohol-based (green spend) stripper purchased by volume	
4) Total benzyl alcohol-based (green spend) purchased by spend	
5) Percentage benzyl alcohol-based stripper purchased meeting spec by spend	4/2
6) Percentage spend benzyl alcohol-based stripper purchased by volume	3/1

Polyvinyl Chloride (PVC) Pipe Cement

A) Technical Specifications (to be inserted directly into bidding documents):

PVC pipe cement that meets the following specifications:

1. PVC pipe cement should contain less than 510 g/L (less water) of total VOCs.

2. Adhesive primers used on PVC pipe should contain less than 550 g/L (less water) of total VOCs.

B) Application (for internal DOT use only)

Product Types

- PVC Pipe Cement
- PVC Adhesive Primer

Quantity

- 100% of product types meet criteria 1.
- 100% of product types meet criteria 2.

C) Environmental Impacts (for internal DOT use only)

Primary environmental concerns associated with PVC pipe cement are associated with air quality impacts resulting from VOCs in the products. These components are odorous, unpleasant and potentially hazardous to workers using them. Additionally, many PVC cementing products are flammable, which can pose an acute risk to installers using these products. Tetrahydrofuran is also present in these products and has been associated with depression of the central nervous system and decreased white blood cell count in workers exposed frequently and is a respiratory tract irritant. Numerous products are commercially available that meet LEED and SCAQMD standards.

Environmental Summary		
Issue	**Objective**	**Comments**
Volatile Organic Compounds	Low VOC content	LEED standards and SCAQMD guidelines specify limits of 510 g/L and 550 g/L for PVC pipe cement and primer, respectively.
Flammability	Use non-flammable products	Use of flammable adhesive materials increases risk to installers
Tetrahydrofuran	Low tetrahydrofuran content	Tetrahydrofuran is a nervous system depressant and can leach from water supply pipes cemented with PVC pipe cement

D) Rationale and Background (for internal DOT use only)

LEED criteria outline various VOC limits (less water) which can guide purchasers in selecting adhesives for building projects. The requirements can be found at:

http://www.usgbc.org/ShowFile.aspx?DocumentID=7244

South Coast Air Quality Management District Rule # 1168 specify 510 g/L limit for pipe cement and 550 g/L VOC limit for adhesive primer.

Further information on standards and potential health effects:

http://www.usgbc.org/Docs/Archive/MediaArchive/710_Vittori_PA336.pdf

LEED V 2.2 does require the use of low VOC solvent cements in Environmental Quality credit 4.1. In order to obtain the credit point, all adhesives and sealants used on the interior of the building are to meet SCAQMD rule #1168. Low-VOC solvent cements manufactured to comply with SCAQMD and are commercially available.

E) Cost Impacts

No cost impacts were identified during the course of development of this specification.

F) Purchasing Metrics

Purchasing Metrics Summary	
Metric	**Calculation**
1) Quantity Pipe Cement purchased by total spend	
2) Quantity Pipe Cement purchased by total volume	
3) Quantity Pipe Cement purchased meeting spec by spend	
4) Quantity Pipe Cement purchased meeting spec by volume	
5) Percent product purchased meeting spec by spend	3 / 1
6) Percent product purchased meeting spec by volume	4 / 2

Road Marking Paint

A) Technical Specifications (to be inserted directly into bidding documents):

Road marking paint that meets the following specifications:

1. Road marking paint shall contain less than 100 grams per liter (g/L) of total volatile organic compounds.

2. Road marking paint shall be lead free.

3. Road marking paint shall be chromium free.

4. Where feasible, water based acrylic paints should be favored over solvent based alkyd paints.

B) Application (for internal DOT use only)

Product Types

- White, Yellow and Blue colors
- Thermoplastic paints

Quantity

- 100% of product types meet criteria 1.
- 100% of product types meet criteria 2.
- 100% of product types meet criteria 3.
- 20% of product types meet criteria 4, increase as feasible.

C) Environmental Impacts (for internal DOT use only)

Road marking paint is commercially available in a number of formulations to suit the specific needs of the purchaser. The primary environmental impacts associated with road marking paint are the toxicity of the specific paint components and the impact on air quality associated with VOC based paints. Toxicity of road marking paint is driven by volatile organic compounds, which are used in most alkyd based paints, lead, which is used as both a coloring and drying agent in select paints, and chromium which is used as a coloring agent in yellow road marking paint. Water based (no VOC) acrylic paints are generally considered the least harmful to the environment.

Environmental Summary		
Issue	**Objective**	**Comments**
Volatile Organic Compounds	Reduce VOC content in marking paint	EPA recommends using low solvent content paint with less than 150 g/L total VOCs
Lead	Reduce Lead content of marking paint	Used as a drying and coloring agent in paints. Select lead free paint where possible. Select paints with alternate drying agents. Lead chromate used as a dye in yellow thermoplastic resin and yellow paint which generates toxic fumes when heated and potentially constitutes a hazardous waste when removed
Chromium	Use Chromium-free paint	Compounds of chromium used as coloring agent in paints. Chromium free paints should be favored

D) Rationale and Background (for internal DOT use only)

Volatile Organic Compounds

DOTs should purchase only low-solvent paints containing less than 150 g/L VOCs. VOCs may pose an inhalation hazard to individuals working with the product and may adversely affect air quality.

Lead

DOTs should purchase only lead-free road marking paints. Lead exposure has been associated with adverse neurological affects, particularly in children.

Chromium

Chromium toxicity depends upon the oxidation state of the metal. Exposure to chromium VI has been associated with an increase in the incidence of lung cancer. Chromium is an essential nutrient that can be toxic to humans and wildlife in large doses.

E) Cost Impacts

No cost impacts were identified during the course of development of this specification.

F) Purchasing Metrics

Purchasing Metrics Summary	
Metric	**Calculation**
1) Quantity Road Marking Paint Purchased	
2) Dollars Road Marking Paint Purchased	
3) Quantity Road Marking Paint meeting specification	
4) Dollars Road Marking Paint	
5) Quantity Purchased: Total	1+3
6) Dollars Road Marking Paint Purchased: Total	2+4
7) Percentage specified Road Marking Paint Purchased	3/1
8) Percentage spend on specified Road Marking Paint	7/6

Silicone Lubricants

A) Technical Specifications (to be inserted directly into bidding documents):

Industrial and institutional lubricants that meet the following specifications:

1. Lubricants shall be rated "low-VOC" or "no-VOC."

2. Lubricants not contain petroleum-based, silicone or silicone-derived components.

B) Application (for internal DOT use only)

Product Types

- Product types include but are not limited to industrial and institutional silicone lubricants.

Quantity

- 100% of product types meet criteria 1.
- 100% of product types meet criteria 2.

C) Environmental Impacts (for internal DOT use only)

The information in the table below is based on EcoLogo Program's CCD-068 Standard for Vegetable-Based Lubricants used for industrial and institutional purposes.

Environmental Summary		
Issue	**Objective**	**Comments**
Volatile Organic Compounds/Petroleum Content	Eliminate VOC content in lubricants	The product shall not contain petroleum oil or additives containing petroleum oil, as confirmed by EPA TPH 418.1 measuring ≤10.6 g/kg.
Hazardous Rating	Eliminate use of hazardous products	The product shall not be labeled according to Class D, Poisonous and Infectious Material, as set out in the Controlled Products Regulations portion of the Hazardous Products Act.
Compounds and/or Metals	Eliminate the use of specific compounds and/or metals in lubricants	The product shall not contain organic chlorine or nitrite compounds, nor shall it contain lead, zinc, chromium, magnesium, or vanadium.
Flammability/Flash Point	Reduce use of highly/extremely flammable lubricants	The product shall not have a flash point lower than 200° C if ISO Grade VG 32 and higher and not lower than 190° C if ISO Grade VG15-22, when measured according to one of the following: ASTM D92, ASTM D93, or ASTM D56. The product will also produce a minimum fire point of 311C as per ASTM D 92.
Additive Content	Reduce additive content in lubricants	The product shall contain no more than 5% (w/w) total additives.
Toxicity (aquatic life)	Reduce toxicity of lubricants to preserve aquatic life	The product shall not be toxic to aquatic life, defined as LC_{50}≥40,000mg/L for the biological test method: Acute Lethality Test Using Rainbow Trout, Report EPS 1/RM/9, July 1990, Env. Canada, or test data acceptable to the ECP.
Biodegradability	Increase biodegradability of product and product ingredients	The whole product formulation shall be readily biodegradable, according to CEC-L33-T82 or one of OECD 301 A-F. The product shall not contain more than 3% (w/w) of an additive that is not verifiably biodegradable.
Peroxide Content	Reduce or limit peroxide production	The product shall produce a peroxide value no greater than 15 meq after 1,000 hours as per AOCS CD 12-57.
Rust Prevention	Reduce or eliminate rust	The product shall pass when tested against ASTM D 665 "Standard Test Method for Rust Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water".
Viscosity	Suitability of product	The product will have a viscosity index of at least 200 as per ASTM D 2270.
Bacterial Growth	Prevent growth of harmful bacteria	The product shall not support growth of the test organism *Pseudomonas aeruginosa* ATCC # 13388 as per ASTM G 22.

D) Rationale and Background (for internal DOT use only)

State DOTs should not purchase petroleum-based lubricants because of the presence of volatile organic compounds, which may present hazards from initiation of application to the end stage of degradation of the products.

The link to the sources for the rationale and background summary is provided below:

http://www.epa.gov/epp/pubs/guidance/finalguidance.htm#guidingprinciples
http://www.dm.usda.gov/procurement/programs/biobased/VehicleMaintenanceFY08.pdf
http://www.epa.gov/epp/pubs/guidance/fr73no94.pdf
http://www.warrenoil.com/msds/l80w90.pdf

Traditional silicone lubricants/general purpose lubricants contain significant VOCs, up to 97% in some heavy duty lubricants. There is little available specific information regarding the ecotoxicological impacts of these products; however, most petroleum-based lubricants contain additional additives that are also of concern, such as naphtha, Stoddard solvent, diphenyl amine, and methylchloroform. The hydrocarbons are often present as "propellants", with many products in spray form.

Many silicone lubricants contain polysiloxanes and other ingredients that can convert to potentially harmful by-products, either during natural degradation or as a result of exposure to extreme heat. Multiple Material Data Safety Sheets (MSDSs) list silicates, carbon monoxide, carbon dioxide, and formaldehyde as commonly encountered degradation by-products, listing hydrochloric acid and phosgene as less commonly encountered. In multiple instances, the MSDS states that fumes can be generated at temperatures as low as 120° F. Given many of the applications for use of silicone lubricants, the potential to reach or exceed that temperature will be relatively commonplace. Prolonged exposure to or inhalation of petroleum-based lubricants can result in skin, eye, and respiratory irritation, as well as nausea, dizziness, headaches, and impaired coordination.

F) Cost Impacts (for internal DOT use only)

Cost impacts for lubricants will vary based upon the brand and quantity purchased. State DOTs may receive discounts based on bulk purchases, depending on the terms of the contracts and purchasing agreements, with costs varying from state-to-state, depending upon shipping costs and transportation distance. The cost impacts presented in the summary table below provide a general idea of cost per individual can and per case of 12 cans all-purpose penetrating lubricant that meet the EcoLogo Program's CCD-068 Standard.

Cost Impact Summary		
DOT Product	**Cost to Implement DOT Standard**	**Cost Impacts**
Example Lubricant 1	None	$10.99/11 oz. can $130.00/12-can case
Example Lubricant 2	None	$4.76/10.5 oz. can $57.12/12-can case

(The example lubricants provided here are from major brand manufacturers as quoted from manufacturers' catalogs. The "example lubricant" placeholder has been used to protect their identity.)

(The cost analysis provided here is considered a good general estimate. It is important to note, however, that relevant cost data are limited, market factors can vary considerably and prediction of future costs is highly uncertain. The actual costs may vary).

F) <u>Purchasing Metrics (for internal DOT use only)</u>

Purchasing Metrics Summary	
Metric	**Calculation**
1) Total lubricant purchased by volume	
2) Total lubricant purchased by spend	
3) Total lubricant purchased meeting spec by volume	
4) Total lubricant purchased meeting spec by spend	
5) Percent lubricant meeting spec by volume	3/1
6) Percent lubricant meeting spec by spend	4/2

Snow and Ice Control Chemicals

A) Technical Specifications (to be inserted directly into bidding documents):

Snow and ice controls that meet the following specifications:

1. Snow and Ice control chemical constituents will not exceed the following parameters (listed in ppm):
    - Arsenic 5.0.
    - Barium 100.0.
    - Cadmium 0.20.
    - Chromium 1.0.
    - Copper 1.0.
    - Lead 1.0.
    - Mercury 0.05.
    - Selenium 5.0.
    - Zinc 10.00.
    - Phosphorus 2500.
    - Cyanide 0.20.

2. Snow and ice controls will meet EPA Design for the Environment labeling criteria and/or the Pacific Northwest Snowfighters Snow and Ice Control Chemical product specification.

B) Application (for internal DOT use only)

Product Types

- Anti-icing agents (applied to prevent snow/ice accumulation)
- De-icing agents (applied to remove accumulated snow and ice

Quantity

- 100% of products meet criteria 1.
- 20% of products meet criteria 2, and increase as feasible.

C) Environmental Impacts (for internal DOT use only)

Snow and ice control chemicals consists primarily of salt products formulated to work over varying temperature ranges. The primary environmental issues associated with these products are summarized below.

Environmental Summary		
Issue	**Objective**	**Comments**
Heavy Metals	Reduce heavy metal content	Products shall not contain greater than the allowable concentrations
Phosphorous	Reduce phosphorous content	Products shall not contain phosphorous in excess of 2,500 ppm
Cyanide	Reduce cyanide content	Products shall not contain cyanide in excess of 0.20 ppm

D) Rationale and Background (for internal DOT use only)

Snow and Ice control chemicals act by lowering the melting point of snow and ice. Different types of products are used in different temperature regimes. Two main categories of snow and ice control chemicals are anti-icing agents and de-icing agents. Anti-icing agents are applied to prevent the accumulation of snow and ice on roadways. These agents often are a mixture of salt and sugar which increases adhesion of the substance to the road surface and makes them last longer. De-icing agents are applied to icy or snowy roads to remove accumulated snow and ice.

De-icing chloride salts contain 60% chloride and 40% positive ion. Generally, the positive ion is sodium, but to a lesser degree calcium, potassium, and magnesium chlorides can be used. The use of some of these salts can contribute to heavy metal and eutrophication concerns listed below.

In addition, sodium ferrocyanide is often added to chloride salts to prevent clumping. These compounds once distributed photolyze to release cyanide ions into the environment.

Heavy Metals

Heavy metals are naturally occurring elements present to varying degrees within the earth's crust. Heavy metals pose an acute and chronic health risk to exposed humans and wildlife. When released to the environment, these compounds can impact drinking water supplies and are particularly toxic to aquatic wildlife.

Phosphorous

Phosphorous is an essential nutrient for plants and wildlife in the environment. When released in excessive concentrations, phosphorous compounds can create algae blooms in surface water bodies followed by eutrophication, a process by which available oxygen is

consumed through the decay of organic matter. Eutrophication of surface water bodies is extremely harmful to fish and wildlife that rely upon sufficient oxygen to survive.

Cyanide

Cyanide can be extremely toxic to humans and wildlife when present at elevated concentrations in the environment. Cyanide exposure causes severe metabolic effects and exposure can result in death.

EPA Design for the Environment

The EPA DfE labels safer de-icers as part of its Safer Product Labeling Program. De-icers approved by DfE achieve a 30% reduction in both sodium and total chlorides, and comply with Pacific NW Snow Fighters' criteria for reduction in corrosivity to steel. Additionally, DfE ensures that all other ingredients in the product, such as corrosion inhibitors, are safer for human health and the environment.

Approved product types can be found at:

http://www.epa.gov/dfe/pubs/projects/formulat/formparte.htm#deicers

Pacific Northwest SnowFighters Requirements

The Pacific Northwest SnowFighters have developed a specification designed to minimize the impacts from heavy metals and eutrophication-fueling nutrients. The direct specification can be found at:

http://www.wsdot.wa.gov/partners/pns/pdf/4-06FinalPNSSPECS.pdf

E) Cost Impacts (for internal DOT use only)

Purchasing snow and ice control chemicals in accordance with this specification is not expected to result in significant cost impact. While prices for differing formulations vary considerably (e.g. calcium chloride versus sodium chloride), numerous products are available that meet this specification and costs are competitive with other, non-conforming products.

F) Purchasing Metrics

Purchasing Metrics Summary	
Metric	**Calculation**
1) Quantity non-EPP snow control chemical purchased	
2) Dollars non-EPP snow control chemical purchased	
3) Quantity EPP snow control chemical purchased	
4) Dollars EPP snow control chemical purchased	
5) Quantity snow control chemical purchased total	1+3
6) Dollars snow control chemical purchased total	2+4
7) Percentage EPP snow control chemical purchased	3/5
8) Percentage spend EPP snow control chemical purchased	4/6

Treated Lumber

A) Technical Specifications (to be inserted directly into bidding documents):

The preferred treatment for lumber will vary considerably based upon the intended use of the lumber and the expected frequency of human contact. Treated lumber that meets the following specifications:

1. Treated lumber shall not contain chromated copper arsenate (CCA).

2. Lumber intended for use in saltwater contact environments where little to no human contact is expected shall be treated using creosote or ammoniacal copper zinc arsenate (ACZA).

3. Lumber intended for use in freshwater contact environments shall be treated with alkaline copper quaternary (ACQ) or copper azole (CA) or shall meet criteria 2 (where minimal human contact is expected).

4. Lumber intended for use in interior spaces (with minimal water contact) shall be treated using dispersed copper azole (DCA).

5. Naturally decay resistant wood should be used where feasible.

B) Application (for internal DOT use only)

Product Types

- Lumber used in outdoor structures
- Lumber used in building interiors
- Lumber used in utility poles or pier pilings

Quantity

- 100% of product types meet criteria 1.
- Quantities meeting criteria 2-5 will vary depending on intended use of lumber.

C) Environmental Impacts (for internal DOT use only)

A wide variety of wood preservatives are used to treat lumber intended for different uses. End use of the product must be carefully considered prior to purchase. The primary end use issues associated with treated lumber include water repellency, frequency of human contact, and solubility. The major environmental issues associated with treated lumber are summarized below.

Environmental Summary		
Issue	**Objective**	**Comments**
Toxicity	Eliminate CCA	Chromate copper arsenate shall not be used to treat lumber for any intended end use.
Water Repellency	Increase water repellency in salt or freshwater contact environments	Oil based treatments such as creosote or pentachlorophenol are appropriate in water contact environments where little human contact will occur.
Solubility	Select appropriately soluble wood preservatives	The least toxic wood treatment preservatives are also the most soluble and are not suitable for use in water contact environments. Borate based wood preservatives are non-toxic alternatives where water contact is not anticipated.
Aquatic Toxicity	Reduce copper content in sensitive marine habitats	Copper is particularly toxic to marine life. Alternatives to treated wood (e.g. concrete) should be strongly considered in these environments.
Hazardous Waste	Reduce hazardous waste generation	Many wood treatments (such as CCA or pentachlorophenol) can cause waste lumber to be classified as hazardous.

D) Rationale and Background (for internal DOT use only)

Treated lumber is used to extend the useful life of wooden structures. Pesticides and fungicides are bonded to the lumber to prevent decay by boring insects, fungus and other organisms. The use of wood preservatives in treated lumber greatly reduces the amount of maintenance, repair and replacement of wooden structures. This decreases the amount of lumber needed for construction and decreases the need to harvest timber from our forests.

While the specific formulations of the wood treatment vary greatly, most treated lumber is prepared through pressure treating, a process by which the treatment is forced into the

lumber under pressure to penetrate deep into the wood. By their very nature, wood preservatives used in treated lumber are toxic to certain wildlife. Selection of the appropriate wood treatment compound is determined by the end use of the product.

Chromated Copper Arsenate (CCA)

Until recently CCA was widely used as a wood treatment for lumber due to its effectiveness and lower cost. However, the arsenic used in this wood treatment is highly toxic to humans in small doses and its use has been phased out throughout the use in applications where direct contact is likely (such as in children's playsets, park benches etc.). Further, the risk that the toxic compounds in this formulation could leach into surrounding soil, surface water and groundwater have restricted its use.

Aquatic Toxicity

Copper is the most widely used wood preserving chemical. While not toxic to humans, copper is extremely toxic to aquatic wildlife, and wood treated with certain copper compounds can leach copper into surface water and sediment and cause long term damage. While copper is appropriate for use as a wood preservative in aquatic environments, the selected wood treatment compound should not be leachable into surrounding sediment and surface water to decrease the impact on these ecosystems.

Hazardous Waste

Some wood treatments render the lumber to which it is applied hazardous waste. This increases the cost to dispose of wood scraps and demolished structures at the end of their useful life. In many cases, lumber treated with non-hazardous preservatives are more costly, but do not have restrictions on disposal, saving time and money in the long term.

E) Cost Impacts (for internal DOT use only)

Costs for lumber treated with various wood preservatives vary greatly depending on the treatment applied. CA and AQC based treatments are reportedly 10-20% higher than CCA treated alternatives. In many cases, the increase in cost is off set by the lower cost to dispose of wood treated with non-hazardous treatments.

F) Purchasing Metrics

Purchasing Metrics Summary	
Metric	**Calculation**
1) Total treated lumber purchased by volume	
2) Total treated lumber purchased by spend	
3) Total treated lumber purchased meeting spec by volume	
4) Total treated lumber purchased meeting spec by spend	
5) Percentage treated lumber purchased meeting spec by volume	3/1
6) Percentage treated lumber purchased meeting spec by spend	4/2

Windshield Washing Fluid

A) Technical Specifications (to be inserted directly into bidding documents)

Windshield washing fluid that meets the following specifications:

1. Windshield washing fluid shall be free of volatile organic compounds (VOCs).

2. Windshield washing fluid shall be free of methanol and phosphate.

3. Concentrated windshield washing fluid should be favored over ready-to-use formulations.

B) Application (for internal DOT use only)

Product Types

- Summer, winter and all-season windshield washing fluid

Quantity

- 100% of products meet criteria 1 and 2.
- 40% of products meet criteria 3 and increase as feasible.

C) Environmental Impacts (for internal DOT use only)

Environmental Summary		
Issue	**Objective**	**Comments**
Volatile Organic Compounds	Reduce VOC content in windshield washing fluid	The product shall not contain VOCs.
Methanol	Reduce methanol content	The product shall not contain methanol.
Phosphate	Reduce phosphate content	The product shall be phosphate free.
Biodegradability	Increase biodegradability of product and ingredients	The whole product formulation shall be readily biodegradable or each ingredient shall be biodegradable.
Packaging	Reduce packaging Recyclable packaging	The product shall be packaged in recyclable packaging and purchased as a concentrate, where possible, to reduce packaging.

D) Rationale and Background (for internal DOT use only)

Volatile Organic Compounds

Automotive windshield wiper fluid can contain up to 25% by volume of VOCs which are a major contributor to ground-level ozone formation, one of the main contributors to smog. Within the past several years, more stringent regulations governing the VOC content of automotive windshield wiper fluid have been adopted by numerous states. California's regulations for reducing emissions from consumer products specifies that windshield washer fluid shall contain no more than 1% total VOCs by volume (http://www.arb.ca.gov/consprod/regs/2008/cp.pdf). Numerous VOC-free formulations are currently available that provide additional environmental benefits including characteristics such as being methanol free, phosphate free and biodegradable.

Methanol

Methanol is toxic to humans and their pets when inhaled or ingested. Methanol may be fatal or cause blindness if swallowed and may cause gastrointestinal irritation with nausea, vomiting and diarrhea. Additionally, methanol may cause systemic toxicity with acidosis and central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness,

coma and possible death due to respiratory failure. Methanol is also suspected of damaging automotive paint.

Phosphate

While phosphorous is an essential nutrient for humans and wildlife, it is usually present in very small quantities in the environment. Excess phosphorous in surface waters can raise the growth of phosphate-dependent organisms, such as algae and duckweed. These organisms use great amounts of oxygen and prevent sunlight from entering the water. This makes the water environments unsupportive for other organisms. This phenomenon is commonly known as eutrophication.

E) Cost Impacts (for internal DOT use only)

Cost impacts for windshield washer fluid will vary based upon the brand and quantity purchased. State DOTs can expect to receive discounts for purchasing windshield washer fluid in bulk based upon purchasing agreements with vendors. In general, the increased costs associated with purchasing windshield washer fluid in accordance with this specification are expected to be minimal, although a slightly higher price can be expected.

F) Purchasing Metrics

Purchasing Metrics Summary	
Metric	**Calculation**
1) Total washer fluid purchased by volume	
2) Total washer fluid purchased by spend	
3) Total washer fluid purchased meeting spec by volume	
4) Total washer fluid purchased meeting spec by spend	
5) Percentage washer fluid purchased meeting spec by volume	3/1
6) Percentage washer fluid purchased meeting spec by spend	4/2

End Manual