Santa Clara Valley
Urban Runoff
Pollution Prevention Program

MEMORANDUM

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TO: **BMP O & M Verification Work Group**

FROM: **Paul Randall and John Fusco, Program Staff**

DATE: **May 20, 2004 [FINAL]**

SUBJECT: **Information Regarding the Disposal of BMP Residuals at County Landfills**

The purpose of this memorandum is to provide relevant information regarding the disposal of BMP residuals at landfills within Santa Clara County.

Background

During the March 13, 2003 BMP O & M Verification Work Group meeting, Program staff was requested to develop a fact sheet explaining the procedures for disposing residuals (e.g., testing material and transporting to appropriate disposal locations) collected during treatment control BMP maintenance. Residuals are defined as trash, oil & grease, filter media and fine sediments that are collected from stormwater treatment BMPs that may or may not be contaminated. In May 2003, Program staff distributed a fact sheet entitled *Storm Water O&M Fact Sheet: Handling and Disposal of Residuals*. This fact sheet, prepared by the United States Environmental Protection Agency (EPA), describes BMP maintenance programs and discusses methods for handling and disposing of residuals from stormwater BMPs. To supplement the information provided within EPA's fact sheet, Program staff gathered information from local agencies and private companies on the procedures and associated costs for testing, handling and disposing of stormwater BMP residuals in the Santa Clara County.

Existing Information Resources

EPA Stormwater O & M Fact Sheet

The EPA Stormwater O & M fact sheet provides information relevant to the handling and disposal of solids/residuals collected from stormwater BMP facilities. Information provided within the fact sheet includes: 1) properties of residuals collected from a variety of stormwater BMP treatment systems; 2) general description of BMP operation and maintenance requirements; 3) key program elements for handling and disposing residuals; and 4) specific information on residual disposal from case studies. This memorandum will summarize information relevant to handling and disposal of residuals.

The fact sheet presents three general approaches to handling and disposing stormwater residuals. These include:

- Centralized treatment;
- Treatment at satellite facility or landfill; and

- On-site treatment.

Centralized treatment involves temporarily storing stormwater solids followed by their regulated release into a publicly-owned treatment works (POTW) during dry weather flow conditions. This approach is the least practical for a number of reasons. Problems include depositing large amounts of grit in the POTW; potential for exceeding the capacity of the dry weather treatment facility; and possible interference with the POTW's operation and efficiency due to characteristics of urban stormwater residuals.

Treatment at satellite facilities or landfills involves handling and disposing stormwater residuals at an off-site facility other than a POTW. Handling processes may include chemical treatment; gravity thickening; stabilization through lime addition; dewatering through vacuum or pressure filtration; and disposal through land application or landfill. Associated costs include time and materials for treatment, transportation, landfill tipping fees and analytical testing for hazardous constituents prior to disposal. Despite these costs, this option may be the best alternative in dense urban environments (e.g., Santa Clara Valley) when there is limited space for on-site disposal.

Since it does not require transportation or tipping fees, on-site handling and disposal is the most cost effective option. In addition, this option does not require analytical testing for hazardous constituents and the removal and dewatering of solids. One limitation of this option is that it requires enough space for on-site disposal. If space is not available, solids/residuals can be transported off-site for land application. However, EPA recommends that solids/residues be de-watered on-site, if feasible.

The EPA Stormwater O & M fact sheet also presents information on handling and disposal strategies implemented by stormwater agencies in the Eastern United States. Prince George and Montgomery Counties, Maryland have been phasing out oil/grit separators due to additional maintenance attention, elevated maintenance costs and in some cases, landfills not accepting residuals. Montgomery County is proposing to replace oil/grit separators with sand filters. In addition, the State of Maryland conducted a four-year study on oil/grit separators within the Metropolitan Washington Council of Governments. The purpose of the study was to determine if residuals are hazardous. Results indicated that residuals were not hazardous. As a result, residuals could be disposed of at landfill after dewatering.

The State of Florida does not have a specific regulation stating that each jurisdiction must dredge or remove material from BMPs periodically. Instead, a guidance manual was issued to supplement the regulations. The guidance manual recommends testing all BMP sediments using the Toxicity Characteristic Leaching Procedure (TCLP) prior to disposal. In most cases, BMP sediments must have the appropriate TCLP results before landfills will accept them for disposal. The State of Florida has performed numerous analytical tests on BMP sediments (except sediments from oil/water separators). Test results indicated that BMP sediments (from all locations) are non-hazardous. The State of Delaware considers BMP residuals to be non-hazardous based on studies conducted in Florida.

EPA performed a cost analysis for handling and disposing urban stormwater residuals for six different scenarios. The most cost effective solids handling scenario, based on annual costs, was lime stabilization, gravity thickening, pressure filtration, and landfilling. Cost is estimated at $289/hectare (all estimates were updated to July 1995 dollars) in an urban storm water runoff area of 6,071 hectares. A separate EPA report from Marquette University concluded that the most cost-effective means for handling and disposing residuals was gravity thickening followed by lime stabilization and land application or landfilling.

Local Resources

To gain a better understanding of how residuals from BMP maintenance should be managed, Program staff reviewed and compiled information from the Santa Clara County (www.reducewaste.org) and California Integrated Waste Management Board (CIWMB) (www.ciwmb.ca.gov) websites. In addition, Program staff contacted persons knowledgeable with disposal requirements and waste acceptance criteria for landfills in Santa Clara County (Stan Chau, personal communication, SCCIWM; Dennis Ferrier, personal communication, City of San Jose; and Terry Seward, personal communication, Regional Water Quality Control Board). Landfill tipping fees were obtained from Santa Clara Valley Water District (SCVWD) staff (Uday Mandlekar, personal communication) and local landfill operators. In addition,

Program staff contacted persons who handle and dispose residuals collected from stormwater BMPs in the Santa Clara County (Ric Campos, personal communication, Stormwater Inspection and Maintenance Service (SWIMS) and Ryan Bradford, personal communication, Disposal Protection Systems (DPS)).

Landfills and Acceptance Criteria

Table 1 provides a list of disposal facilities and locations provided by the County Integrated Waste Management website. This table also indicates which facility accepts sediment and the approximate cost for disposing non-hazardous residuals. All landfills in Santa Clara County are classified as Class III. This type of landfill only accepts non-hazardous waste which contains a minimum of 50 percent solids and no free liquids. Waste Acceptance criteria for certain landfills within Santa Clara County include:

- Palo Alto Landfill - In accordance with the *Draft Palo Alto Landfill Soil Acceptance Policy*, the soil acceptance review may require a certification statement of clean sources or a bulk chemistry sample.
- Kirby Canyon Landfill- Laboratory analysis of soil material is required on a case-by-case basis (Ed Petite, personal communication). The *Kirby Canyon Recycling and Disposal Facility: Waste Acceptance Criteria* provides sampling and disposal information.
- Newby Island Sanitary Landfill - Provides a list of site-specific waste constituent levels.

Waste characterization requirements are usually based on land use; type of facility where sediments are generated; and past sampling results (i.e., additional testing is not necessarily required after first waste characterization).

Handling and Disposal of Residuals

Table 2 provides a list of typical maintenance activities (for stormwater catch basin inserts and interceptor units) provided by Storm Water Inspection and Maintenance Services (SWIMS), a local BMP maintenance company. SWIMS require an annual maintenance contract (with the property owner) for each stormwater BMP. Services typically provided include inspection, maintenance, handling and disposal of all residuals. Stormwater BMPs are usually cleaned two to three times each year. Debris and sediment is pumped out (using vacuum trucks), transported and disposed of at Altamont Landfill in Livermore, CA, a local Class III landfill (Dave Fitzpatrick, SWIMS, personal communication). The gray water collected from stormwater treatment systems is usually left within, placed back into the system (catch basin inlet filters) or removed and properly disposed of.

The cost of maintaining catch basin inlet filters ranges from $42 (Ric Campos, SWIMS, personal communication) to $55-$100 (Ryan Bradford, DPS, personal communication). In addition, the cost of maintaining stormwater interceptors ranged from $200 – $400 (inspection and monitoring). An additional $500 is charged for pumping, removing and disposing stormwater, silt and/or sediment (recommended every year) (Ric Campos, SWIMS, personal communication). Annual maintenance costs for both systems provided within Table 2 includes costs associated with the disposal and testing of residuals. Actual maintenance costs for each stormwater BMP is influenced by local conditions (e.g., land use activity and size of drainage area).

Analytical testing requirements of residuals are determined by the landfill and are based on the stormwater BMP type and land use activity (e.g., parking lots in commercial areas) occurring within the drainage area of the stormwater BMP (Charlie Fleischmann, REM, personal communication). For example, landfills usually require different analyses for residuals collected from BMPs located within pre-construction land uses then for residuals collected from BMPs located within developed sites. In general, landfills require more stringent testing (i.e., additional constituents) for land uses that have a higher potential for stormwater pollution. If the initial analytical results are below the landfill's waste acceptance criteria threshold, the landfill will continue to accept residuals collected from stormwater treatment systems in the future, as long as the land use does not significantly change. Analytical testing costs range from $400 (Charlie Fleischmann, REM, personal communication) to $2,000 (Dave Fitzpatrick, SWIMS, personal communication).

Filter media and contaminate pillows used in stormwater treatment systems are designed to absorb petroleum hydrocarbons present in stormwater runoff. As a result, all filter media is considered a Class II hazardous waste (when removed for disposal) and requires proper disposal in accordance with California EPA and RCRA regulations. The responsible party (hazardous waste generator) is required to assign all applicable California and EPA waste codes and place hazardous filter media within a Department of Transportation-approved shipping container for transport to a Class II landfill. The three stormwater BMP maintenance companies (provided in Table 3) contacted (by Program staff) ensure proper handling and disposal of residuals and provide the property owner with certification of disposal in accordance with applicable regulations.

Revel Environmental Manufacturing has developed an alternative for handling spent filter media. This alternative, which involves using a solvent extraction process to remove contaminates, renders the spent filter media as a non-hazardous waste (Charlie Fleischmann, REM, personal communication). Treated filter media is reused as an absorbent material in other applications. After processing, treated filter material does not require analytical testing for hazardous constituents. Treatment costs are slightly higher than hazardous waste disposal costs.

Other Information Resources

Additional information regarding the proper management of BMP residuals is attached in the document entitled *Recommendations for Management of Street Wastes* (prepared by the Washington State Department of the Ecology- Water Quality Program). The State of Washington recommendations do not constitute rules or regulations. They are suggestions for street waste handling, reuse and disposal using current regulations within the State of Washington and are based on the present knowledge of street waste constituents.

References

Charlie Fleischmann, Revel Environmental Manufacturing, personal communication, October 2003

City of Palo Alto, CA, *Draft Palo Alto Landfill Soil Acceptance Policy*.

Dennis Ferrier, City of San Jose, personal communication, June 2003.

Newby Island Sanitary Landfill, *Site Specific Waste Constituent Levels*.

Ric Campos, Storm Water Inspection & Maintenance Services, personal communication, October 2003

Ryan Bradford, Drainage Protection Systems, personal communication, October 2003

Santa Clara Valley Water District. *2001 Sediment Characterization Sampling*, June 14, 2001.

Stan Chau, Santa Clara County Integrated Waste Management, personal communication, June 2003.

Terry Seward, San Francisco Bay Regional Water Quality Control Board, personnel communication, June 2003.

Uday Mandlekar, Santa Clara Valley Water District, personal communication, June 2003.

United States Environmental Protection Agency, Office of Water. EPA 832-F-99-015: Storm Water O & M Fact Sheet: Handling and Disposal of Residuals. [Online] Available http://www.epa.gov/npdes/pubs/handdisp.pdf, September 1999.

Washington State Department of the Ecology, Water Quality Program. Appendix IV-G: Recommendations for Management of Street Wastes. [Online] Available http://www.ecy.wa.gov/pubs/9914.pdf , August 2001.

Waste Management, Inc. *Kirby Canyon Recycling and Disposal Facility: Waste Acceptance Criteria*, July 2002.

Table 1. Disposal facility location, contact information and acceptable waste materials identified in the SWIS database.

Disposal Facility	**Type**	**Location**	**Contact**	**Sediment ("Soil") Accepted**	**Cost**
Pacheco Pass Landfill	III	3675 Pacheco Pass Hwy Gilroy, CA	408-847-4142	Yes	$3.00/ton
Newby Island Landfill	III	1601 Dixon Landing Rd Milpitas, CA	408-432-1234	Yes	$7.15/ton
Kirby Canyon Landfill	III	910 Scheller Ave. San Jose, CA	408-779-2206	Yes	$12.50/ton
Palo Alto Landfill*	III	2380 Embarcardero Rd Palo Alto, CA	650-329-2655	Yes	Unknown
Guadalupe Rubbish Disposal Co.	III	15999 Guadalupe Mines Rd San Jose, CA	408-268-1666	No	NA
Zanker Road Landfill	III	705 Los Esteros Rd San Jose, CA	408-263-2385	No	NA
Sunnyvale Transfer Station	III	301 Carl Rd Sunnyvale, CA	408-683-4443	No	NA
San Martin Transfer Station	III	14070 Llagas Ave San Martin, CA	408-847-4142	No	NA

* Palo Alto Landfill only accepts wastes generated by City of Palo Alto residents or businesses.

Table 2. Typical maintenance activities for selected BMPs, including handling, disposal and testing of collected residuals, reported by local company[1] that provides stormwater BMP maintenance services in the Santa Clara Basin.

Stormwater BMP	Maintenance Frequency	Handling & Disposal of Residuals	Testing Performed[2]	Costs[3]
Storm Water Catch Basin Inlet Filters	Three site visits/year - Vacuum and pressure wash twice/year - Replace filter media once/year	- Remove debris (litter, organic material) and sediment; disposed at Class III Landfill - Replace filter media; placed in 55-gallon drum and disposed at Class II Landfill	- Annual test of sediment sample requested by landfill; - Obtain EPA Profile # for filter media	Maintenance: $126 annually per unit (includes testing costs)
Storm Water Interceptors and CDS Units	Two site visits/year - Inspect, measure and clean twice/year - Replace filter media once/year	- Remove debris (litter, organic material) and sediment; disposed at Class III Landfill - Replace filter media; placed in 55-gallon drum and disposed at Class II Landfill	- Annual test of sediment sample requested by landfill; - Obtain EPA and CA waste codes for filter media	Maintenance: $1,000 annually per unit (includes testing costs)

[1] Information was obtained from Ric Campos, President, Storm Water Inspection and Maintenance Services, Discovery Bay, CA.
[2] Cost for a single sediment sample was reported to be approximately $2,000. Analytical testing requirements of residuals are determined by the landfill and are based on the stormwater BMP type and land use activity (e.g., parking lots in commercial areas) occurring within the drainage area of the stormwater BMP.
[3] Costs are approximate and will vary by land use type and drainage area.

Table 3. Stormwater BMP maintenance companies contacted in the Santa Clara Basin.

Company Name	**Contact**	**Phone**
Storm Water Inspection & Maintenance Services (SWIMS)	Ric Campos	925-516-8966
Drainage Protection Systems (DPS)	Ryan Bradford	800-579-8819
Revel Environmental Manufacturing (REM)	Charlie Fleischmann	888-526-4736

[1] Other Stormwater BMP maintenance companies exist and should be contacted to determine services and costs.