

Clean



Sweep



Over the years we have worked with facilities that faithfully practice good housekeeping and their outside surfaces look very clean. So naturally they would anticipate that when the rains came they would see the fruits of their labor in the form of good analytical results;” but when the analytical results returned, they find a benchmark exceedance or two.

In this issue of the “*Rain Events*” we will a look at sweepers and how you may consider using a street, riding or walk behind sweeper to supplement your good housekeeping efforts.

Studies have been performed by municipalities, the USEPA, and other organizations that show that sweeping, when performed correctly with the right equipment, can be very effective in removing pollutants. A 2007 study conducted for the Contra Costa Clean Water Program¹ showed that significant pollutant loads were removed by performing regularly scheduled sweeping. Not

only were typical pollutants such as sediment, trash, and organic debris removed, but also other toxic pollutants. The study estimated that over 2 pounds of PCBs and 2 pounds of mercury were removed by the sweeping.

What type of sweeper you use really depends on your and surrounding business’s activities, the size of your industrial areas and your budget. For some, all they need to get their storm water sampling numbers below benchmarks is to use a walk behind sweep, while others may need something a little bigger like a riding sweeper. Some businesses use both a riding vacuum and street vacuum sweepers.



Our guess is that your business, like most, operates in an open system; pollutants from your own activities or the activities of those around you will end up on the outside surfaces and will come into contact with storm water runoff. Whatever you ultimately choose to use; using a sweeper may be a good option for you to consider.

¹ http://www.ccleanwater.org/_pdfs/StreetSweepingReportFinal.pdf



Comparing Street Sweepers

Not all sweepers are created equal or work in the same way. We have our opinions about which type of street sweeper we would recommend; however, we did a little investigating to see what types of sweepers are out there and which has the highest percentage of pollutant removal.

The U.S. Department of Transportation's Federal Highway Administration (FHWA), compared different types of street sweepers and their pollutant removal efficiencies.²

The FHWA article outlined following types of street sweepers:

Mechanical sweepers employ a rotating gutter broom to remove particles from the street gutter area, with a water spray used to control dust. The particles removed are placed in the path of a cylindrical broom that rotates to carry the material onto a conveyor belt and into a storage hopper.

Vacuum-assisted sweepers also use gutter brooms to remove particles from the street. However, the refuse is then placed in the path of a vacuum intake that transports the dirt to the hopper. The transported dirt is usually saturated with water. The overall efficiency of vacuum-assisted cleaners is generally higher than that of mechanical cleaners, especially for particles larger than the dust and dirt range (larger than about 3 mm).

Tandem sweeping operations involve two successive cleaning passes, first by a mechanical (broom and conveyor belt) sweeper, followed immediately by a vacuum-assisted sweeper.

Regenerative air sweepers blow air onto the pavement and immediately vacuum it back to entrain and capture accumulated sediments. Air is regenerated for blowing through a dust separation system.

Vacuum-assisted dry sweepers combine the important elements of tandem sweeping into a single unit. The mechanical sweeping component in these sweepers is completely dry. A specialized rotating brush is used to scratch and loosen dirt and dust from impervious surfaces, allowing the vacuum system to recover practically all particulate matter. A continuous filtration system prevents very fine particulate matter from leaving the hopper, which prevents the formation of the dust trails typically seen with conventional mechanical sweepers.

The following is a summarization of the FHWA's assessment of the effectiveness of street sweeping equipment and programs:

- Vacuum-assisted and regenerative air sweepers are generally more efficient than mechanical sweepers at removing finer sediments, which often bind a higher proportion of heavy metals
- The performance of sweepers can be enhanced by operating them at optimal speeds (6 to 8 mph), ensuring that brushes are properly adjusted, and ensuring that appropriate rotation rates and sweeping patterns are used.
- Tests conducted on the newer vacuum-assisted dry sweepers have shown they have significantly enhanced capabilities to remove sediment compared to conventional sweepers

How much Metal Particulates are on your Facility's Surface?

Run a test and find out! Purchase a magnetic sweeper like the one pictured below for about \$25 at a hardware store. Roll it around your facility's yard or storm water drainage area and see how many metals are picked up off the surface. Tests that we have run at many facilities have shown that most metals in storm water samples are in particulate form. If a discharger is struggling with benchmark exceedances for metals and you find metallic dust on the magnetic sweeper, then street sweeping would be a good BMP to consider.



- Newer vacuum-assisted dry sweepers are extremely effective at removing respirable (PM-10) particulate matter (particles with an aerodynamic diameter less than or equal to 10 microns) compared to conventional sweepers.

Below are the comparative tables FHWA used to outline the “Efficiencies of mechanical (broom) and vacuum-assisted sweepers” and the “PM-10 Particulate removal efficiencies for various sweepers.”

Table 18. Efficiencies of mechanical (broom) and vacuum-assisted sweepers

Constituent	Mechanical sweeper efficiency (%)	Vacuum-assisted sweeper efficiency (%)
Total Solids	55	93
Total Phosphorus	40	74
Total Nitrogen	42	77
COD	31	63
BOD	43	77
Lead	35	76
Zinc	47	85

Source: NVPDC (1992), as cited in Young et al. (1996).

² Source: <http://environment.fhwa.dot.gov/ecosystems/ultraurb/3fs16.asp>

The FHWA article went on to discuss:

- Sweeping frequency and number of passes over an area
- Climate and its affects on sweeping effectiveness
- Considerations for selecting your sweeper
- Sweeper maintenance and operational requirements
- Range of equipment cost considerations

If you would like to read the entire article, along with its referenced sources, go to <http://environment.fhwa.dot.gov/ecosystems/ultraurb/3fs16.asp>.

Table 19. PM-10 Particulate removal efficiencies for various sweepers

Sweeper type	Removal Efficiency (%)
Mechanical - Model 1	-6.7
Mechanical - Model 2	8.6
Regenerative Air	31.4
Vacuum-assisted wet - Model 1	40.0
Vacuum-assisted wet - Model 2	82.0
Vacuum-assisted dry	99.6

“To Do List” for November:

- Sample the first qualifying storm event if you have not yet done so.
- Perform and document your monthly storm water inspections (Form 4).



Fee Increase!

On September 24, 2013 the State Water Board adopted new 2013-14 fiscal year Water Quality fee schedules which took effect on October 23rd, new IGP annual fee went from **\$1,359 to \$1,791**. An outline of the 2013 September 24th Water Board meeting detailing the reasons for the fee increase can be viewed at:

http://www.waterboards.ca.gov/board_info/agendas/2013/sept/092413_8dr.pdf

We Have a November Contest Winner! Ricardo Castillo submitted the winning answer!

The question was...

Name an "Allowable" Non-Storm Water Discharge (NSWD)?

Ricardo submitted the following correct answers...

"Water Line Flushing, Landscape Irrigation and Diverted Stream Flows"

Remember, if it is not on this list it is likely a non-allowable NSWD!

Ricardo wins \$25 at



Great job!

"The following non-storm water discharges are authorized by this General Permit provided that they satisfy the conditions specified in Paragraph b. below: fire hydrant water sources, including potable water related to the operation, maintenance, or testing of potable water systems; drinking fountain water; atmospheric condensates including refrigeration, air conditioning, and compressor condensate; irrigation drainage; landscape watering; springs; ground water; foundation or footing drainage; and sea water infiltration where the sea waters are discharged back into the sea water source."

Still need your crew trained to take storm water samples, measure pH in the field, and do monthly observations?

WGR will come to your facility and provide a two-hour training session for **\$425**.

Appointments must be booked with aortiz@wgr-sw.com and facilities must be located within 30 miles of our Lodi or Los Alamitos offices. Discount pricing is also available for facilities farther than 30 miles, please contact Aaron Ortiz for more details. Offer does not apply to prepaid compliance programs.

Please contact us if you have any questions ...

Rain Events Newsletter Editor:

John Teravskis jteravskis@wgr-sw.com
(209) 334-5363 ext. 110

Technical Questions about Storm Water Compliance? Call ...

Aaron Ortiz, aortiz@wgr-sw.com, (209) 810-5151
Steve Teravskis, steravskis@wgr-sw.com, (209) 642-5020
Chelsea Dreyer, cdreyer@wgr-sw.com, (310) 629-5259

December Storm Water Contest

Try it out! You can win!

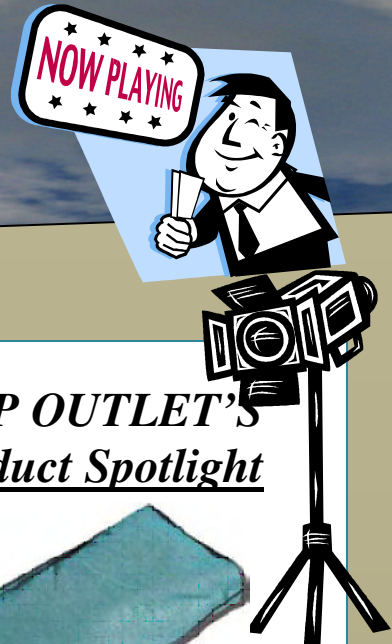
By **December 6, 2013**, submit a response for the following question by email to steravskis@wgr-sw.com.

Question: In last month's Rain Events we discussed pH. According to CFR 136 what is the official hold time for pH?

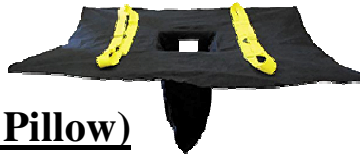


Those submitting a correct answer will be placed in a drawing for a **\$25** Starbucks gift card.





Hornet's Nest Drain Inlet Filter

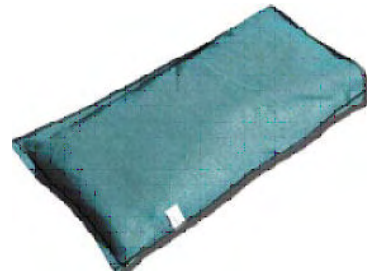


\$49.50 (Bag Only) or \$66 (w/ Oil Pillow)

A unique, under-grate storm drain filter. The oversized base allows the filter to be used with a variety of size and shape drain inlets. Simply insert the filter, place the grate into place and trim the excess material for a custom fit and clean appearance. The yellow webbing secures the filter to the grate and doubles as lifting straps to quickly and easily remove the filter, grate and all, for simple cleaning. The sediment collection cone has 4 overflow portals to ease congestion during heavy storm events.

- Material - 8 ounce non-woven geotextile
- Strapping - Weather resistant 2" polypropylene webbing
- Flow Rate - 90 gpm/ft
- Dimensions - 48" x 36"

BMP OUTLET'S Product Spotlight



Silt Sifter® is the ultimate solution! The patented dual-component, bag-within-a-bag design, Silt Sifter® Bag is the original cushioned sediment control device incorporating materials specifically chosen for both 'filtration' and 'high-flow' performance. Squared on one end to better hug the curb, the Silt Sifter® Bag comes either pre-filled with 30 pounds of 1" natural rock or empty. The sewn-in Heavy Duty 2" Velcro enclosure makes it a snap to fill and provides a solid barrier to prevent any rock from escaping making for a cleaner and tidier job site.

Product Specifications:

- Outer Material High density polyethylene - Poly thread (4) lock stitching
- Filtering Media Pine Wood Excelsior*
- Rock Bag High density polyethylene - Poly thread (4) lock stitching
- Stabilization 1" rock (filled)
- UV Rating 85% with 364° flammability point
- Dimensions 30"L x 16"W x 6"H
- Weight (Dry) Approximately 30 lbs. (filled)
- Durability 500 lb. burst strength
- Maintenance Clean with power wash or strong hose

*Pine wood excelsior acts as a filter for capturing silt, sediment and soils. Also a cushioning agent to substantially reduce product damage under normal conditions.

Flow Test Results

- Free Flow Water (no debris) 30 GPM (gallons per minute)
- Sand 29 GPM
- Top Soil 28 GPM
- Clay 24 GPM Patent US 6,905,289

Need Maintenance or BMPs?



Are you in the Northern California region? If so, our BMP mobile service team can come to you. Our BMP expert will perform a free storm water compliance evaluation and make recommendations on areas needing improvement. Our BMP expert can also provide...

- BMP Material Quotes
- BMP Installation Quotes
- BMP Implementation advice

Schedule your visit today! (209) 334-5363 x 130

