

Green Infrastructure Stormwater Solutions

First Flush - Pre-Sewer >95% Effective

Green Permeable Pavements/Sidewalks

Parking Lots, Industrial Plants, Commercial Yards,
Golf Courses, Agriculture

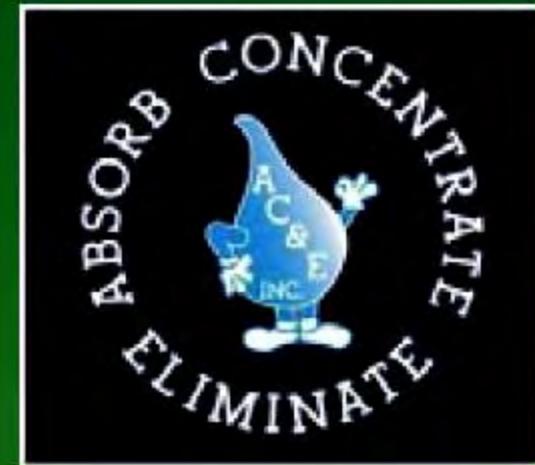
Clean - Then Protect

Bays, Harbors, Estuaries, Wetlands
Contaminated Sites, Contaminated Aquifers

Destroy PCE, TCE, PAH, PCB

In Groundwater & Insitu >99% Effective

A C & E, Inc.
Exclusive California Distributors for
ABS Materials, Inc.



Point of Contact:
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714-337-4323
A C & E, Inc.
6693 Moonriver Street
Eastvale, CA 91752

300ppb to <5ppb In <60Seconds-PCE, TCE, PAH

21st Century Science - Nano Technology

>99% Effective

Trichloroethylene (TCE), Perchloroethylene (PCE), Toluene, Napthalene, Benzenes, P.A.H., PCBs, Atrazine (herbicide), Xylene, Nitrate, Perchlorate, Phosphate, Many Pharmaceuticals

Approved Uses

USEPA Superfund Remediation for Chlorinated Solvents
USEPA Regions: 2, 5, 8, Ohio EPA, all districts,
Chlorinated Solvents, PAH,
Stormwater Retention - Filtration - BMPs
90-95% Effective

Groundwater, Bays, Harbors, Estuaries,
Wetlands, Silt & Soil, Lakes,
Ponds & Reservoirs

OSORB >99% Effective

**Miracle of Nano Technology
is an Inert Glass**

Nothing Is Added - Toxics Eliminated

Lake Erie - Port of Cleveland, USEPA,
Ohio EPA, Army Corps of Engineers -
PAH destruction in Annually Dredged
Harbor Bottom Silt, Soil - Re-Use
No more land filling

No more monitoring or
long term liability

Cost Savings Significant

AC&E, Inc.

www.waterace.net

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**Pelican
Bay**

**Sacramento
Delta**

**SF / OAK
Richmond**

**Malibu
Wetlands**

**LA / LB
Harbor**

**Newport Bay
Wetlands**

**San
Diego**



For Immediate Release:

August 1, 2012



Cancer causing chemicals have proven resistant to efficient and effective cleanup in our drinking water, groundwater, bays, harbors, lakes and wetlands from coast to coast.

To clean and protect our waters, S&S introduces **OSORBtm and AC&E, Inc.** using state of the art first flush and remediation solutions to Absorb, Concentrate and Eliminate non-beneficial VOC, Hydrocarbons Pesticides, Herbicides, Endocrine Disruptors, Endocrine Mimics, PCB and PAH from storm water runoff, groundwater, drinking water, bay & harbor water, silt and soil, wetlands and estuaries.

This 21st century **miracle of technology** is in the system for BAT (Best Available Technology) certification and has received agency approvals for use from multiple USEPA regions along with the Ohio EPA, the Port of Cleveland, NASA, Superfund and the US Army Corps of Engineers.

VOC's, Volatile Organic Compounds were developed in the 1900's and used extensively as *best available cleaning technology* to effectively clean everything from equipment being manufactured during WWII, the Korean War, the Vietnam War and the Cold War to the cleaning fluid of choice in Dry Cleaners throughout the United States and effective grease removal in septic systems where no public sewers were available. VOC in the form of PCE and TCE was also used to thin or reduce lacquers so that wood furniture could be mass produced efficiently and box ends could be glued competitively for box and carton makers in a world market. PCB was used extensively as a metals cleaner and as a heat insulator in electronic products. PAH (Poly Aromatic Hydrocarbon) materials come in 32 different forms, one of which is in coal based waterproofing on the hulls of boats small and large in salt and fresh water bays, harbors and fresh water lakes.

While VOC's continue to be used in controllable situations, the physical properties that made them work so well were found to be cancerous in small amounts and allowed VOC, PCB and PAH to contaminate our groundwater supplies and basins throughout California and the rest of the United States.

The A C & E OSORBtm technology solution, is a patented, chemically inert silica material that swells and physically absorbs a wide variety of organic pollutants from water while destroying volatile hydrocarbons. Osorb is a sponge to pollutants in fresh and salt water while remaining transparent to water and repelling same. ***It also absorbs a range of organics and toxic hydrocarbon, pesticide and herbicide compounds up to 99% in a first flush storm water cleansing scenario*** and eliminates transport, long term toxic landfill and cradle to grave liability for future remediation.

Proven 98% Removal Rate while returning clean water for beneficial use

Effective On:

- **PCE & TCE** (Perc) Chlorinated Solvents - Dry Cleaning Fluid, Parts Cleaners, Septic System Cleaner, Equipment Cleaner, Reducer for Lacquer and Glue
- **PAH** (Poly Aromatic Hydrocarbons) also including Coal Tar and Marine Hull Sealants
- **BTEX** (Complex Hydrocarbons) Gasoline Additives
- **Herbicides & Pesticides**
- **Pharmaceuticals**

A C & E also provides:

Green Infrastructure Solutions with up to **90 – 95%** removal of Stormwater Volume and Peak Flows and up to **99%** removal of pollutants when treating **Storm Water** creating a 40% or More Reduction in mitigation costs as compared to grey infrastructure solutions

Phase 2 Investigations to determine the contaminant(s)

Phase 3 remediation of groundwater aquifers, surface water, storm water runoff solutions and Toxic Landfill CSO

Fracking Water Reclamation technology to use up to two thirds less water in fracking process.

Osorb® for Offshore Water Treatment Cleans water to less than 1ppm
Reusable material

Modular and Scalable

Hydrocarbon capture
Removes heavy oils, WSO, and BTEX
Cartridge system for easy operations
Eliminates oil sheens
75+ compounds present

Osorb removes >98% of hydrocarbons

Safe and Easy

- No power required
- Operates as inline unit or with a pump module.
- No dangerous pressure vessels or off-gassing.
- One operator cartridge changeover in minutes.

For More information and References:

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**GREEN INFRASTRUCTURE
STORMWATER SOLUTIONS**



22 May 2012

Fellow Port Professionals,

As the Director of Sustainable Infrastructure Programs for the Port of Cleveland, one of my responsibilities includes finding sustainable solutions for managing dredged sediments. Each year, the Corps of Engineers must dredge about 210,000 cubic yards from the Cuyahoga ship channel to facilitate commerce for the steel mill and other bulk material users. The dredged materials are contaminated with PAHs from on-going discharge from combined sewer overflows (CSOs) in the center of Cleveland's industrial Cuyahoga valley. PAHs are high-priority EPA contaminants, and the agency has historically required the dredged materials be placed in Confined Disposal Facilities (CDFs). Based on current Corps operating procedures, our current CDFs will be completely filled in the near future. In an effort to gain new capacity, we have actively pursued and evaluated emerging sustainable practices to promote beneficial uses of dredge materials for a variety of upland applications.

Much of our dredged material placed in our CDFs is contaminated with polycyclic aromatic hydrocarbons (PAHs). Earlier this year we worked with ABSMaterials, who has developed a technology for remediating PAHs, which we tested at bench scale. ABSMaterials treated the PAH-contaminated silt with a product called Iron-Osorb. The Iron-Osorb is blended into the spoils at a 0.05-0.2% concentration by soil weight. The Port provided silt samples to ABS from the 2011 dredging season, and after ABS performed Iron-Osorb treatment. The treated samples were provided to the Port and Ohio EPA. ABSMaterials labs and independent testing by Ohio EPA determined that the Iron-Osorb had effectively treated the soils. They had no detectable PAHs and less environmental metals contamination than the baseline soil conditions. In the meeting where the results were presented to the Port, the SWCD USEPA and Ohio EPA, were pleased to note that the treatment worked as well as the company had claimed.

We are currently developing a long duration, large scale pilot project to evaluate treatment alternates for remediating dredge soils to allow unrestricted placement. Because of the success of the bench test, ABSMaterials will be a key technology we plan to evaluate. Our Pilot project includes participation by OEPA and USEPA as well as key stakeholders.

ABSMaterials claims that since the Iron-Osorb, which is a form of sand that destroys PAHs, will continue to be active in the soil for years, the Port and City of Cleveland can use this material at sites where runoff may be laden with other PAHs. We have not yet tested this, but

are now in the “thinking” stage of what we can do with a value-added material coming out of the dredge process. ABSMaterials is working with us on this, bringing experience from other sites supervised by various state EPAs and DEQs where Iron-Osorb is being used to capture and remediate PAHs, polychlorinated biphenyls (PCBs), pesticides, and pharmaceuticals.

ABSMaterials advised me that Iron-Osorb solutions are being considered by a number of other Ports across the nation and overseas. The Port of Cleveland may be the first Port to complete testing

and validation of Iron-Osorb for PAH remediation from dredge-spoils, but I would encourage your Port to look at this form of PAH remediation. Our initial testing has been very promising.

Sincerely,

1st Jim White

Jim White
Director, Sustainable Infrastructure Programs



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Winner of two SBIR awards for produced water:

2010 DOE SBIR Phase I

2011 DOE SBIR Phase II

2012 NSF SBIR Phase II

Osorb is an advanced adsorption media that can clean thousands of environmental toxins in water.

- Large carrying capacity (up to nine times dry weight)
- Hydrophobic and regenerative
- Reduces many organics to <1ppm

Lauded by the US DOE National Energy Technology Laboratory:

Osorb® “was found to remove >99% of oil and grease, >90% of dissolved BTEX, and significant amounts of production chemicals.”

-DOE NETL News Release, 2011



energy ventures

ATM | TEXAS A&M UNIVERSITY

Osorb® is an engineered, regenerative, silica-based nanomaterial capable of capturing and destroying a wide spectrum of contaminants that are common to water runoff, including petroleum, biocides, industrial solvents, drug compounds and other organics.

Our systems prevent these contaminants from reaching groundwater and local waterways, where they threaten human health and natural ecosystems, and keep you in compliance with local, state and federal regulation.

Specialty Osorb materials have been embedded with reactive metals in order to **capture** and/or **break down**:

Polyaromatic hydrocarbons (PAHs)

BTEX

Alcohols

Organic acids

Pesticides

Volatile organic compounds (VOCs)

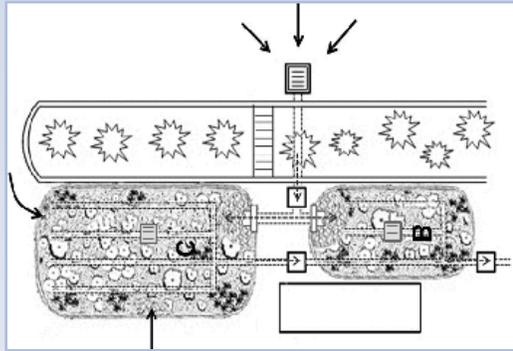


Osorb is integrated into stormwater management systems (e.g. bioswales and pad runoff control) in order to remediate targeted species during extreme stormwater events.

Benefits of Osorb for stormwater systems:

- Reduces many contaminants to <1ppm
- Has a high absorption capacity and can swell to 9x dry weight with organics
- Can integrate into existing stormwater systems
- Aesthetically remediates a large spectrum of contaminants
- Does not affect natural soil composition
- Prevents groundwater contamination

Iron-Osorb® is one of a family of specialty Osorb materials used by ABSMaterials to target and break down various volatile organics in water.

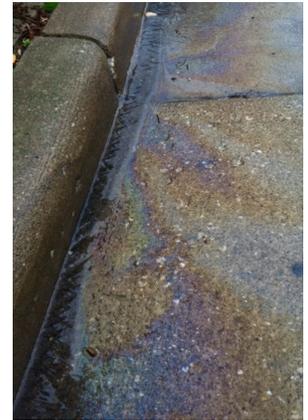


Runoff control design for industrial maintenance garage.

How it works:

All Metal-Osorb products have embedded reductive or catalytic metals. Metal-Osorbs capture and breakdown volatile organic chemicals into benign phenols, salts, and bio-accessible hydrocarbons.

Osorb® improves bioswales and other stormwater systems by mixing our absorptive nanomaterial amended with reactive metals in the soil to capture and break down common water contaminants. Not only do Osorb-laden bioswales reduce the volume of stormwater runoff with a large area of control, but they also remediate runoff water, sending a clean effluent back into the environment.

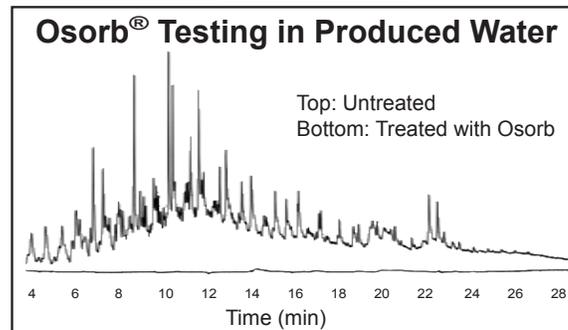


Osorb bioswales and rain gardens **meet or exceed** all local, state and federal requirements for water quality discharge.

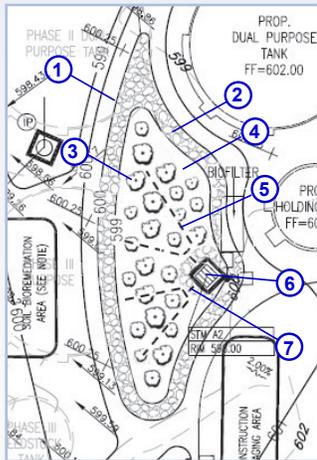


In a side-by-side bioswale study funded by the National Science Foundation, a control garden and Osorb bioswale with a 1% Iron-Osorb soil amendment were exposed to identical runoff and weather conditions.

Both gardens reduced runoff by >95% of the normal flooding and sewer system overflow. However, the Osorb bioswale showed no signs of petroleum leaching in the effluent compared to the control garden's effluent.



Gas Chromatogram of Gulf of Mexico waters
75+ compounds present
Osorb removes >98% of hydrocarbons



9 Mile Creek Bioretention Schematic

1. Top of Bank
2. No. 2 Aggregate
3. Plant
4. Osorb Fill Media
5. Underdrain (6")
6. Overflow Grate
7. Underdrain (8")

ABSMaterials, Inc.

For sales inquiries, please call 330-234-7661.

Dr. Hanbae Yang, Environmental Engineer
h.yang@absmaterials.com

Voc Eater

Osorb® captures dissolved and dispersed organics, including hydrocarbons, BTEX, and volatile organic compounds with as much as 99% efficiency. Moreover, Osorb can be reused, and no solid waste is generated in the treatment process. The treatment is a dual-phase process. First, we treat flowback water and removes dissolved and dispersed hydrocarbons and BTEX with the treatment unit. Second, we recover any collected materials and regenerate our absorptive nanomaterial for reuse with the RegenUnit.



Mobile 1.5 bbl/minute (65gpm) unit Manual



Trailer Mounted 1.5 bbl/minute (65gpm) unit Fully Automatic

CA Representation - AC&E, Inc. Steve Quartararo, President (714)337-4323

AC&E, Inc.
714-337-4323

Osorb[®] Rain Gardens

Absorb, Concentrate & Eliminate



Osorb soil amendments can capture and eliminate:

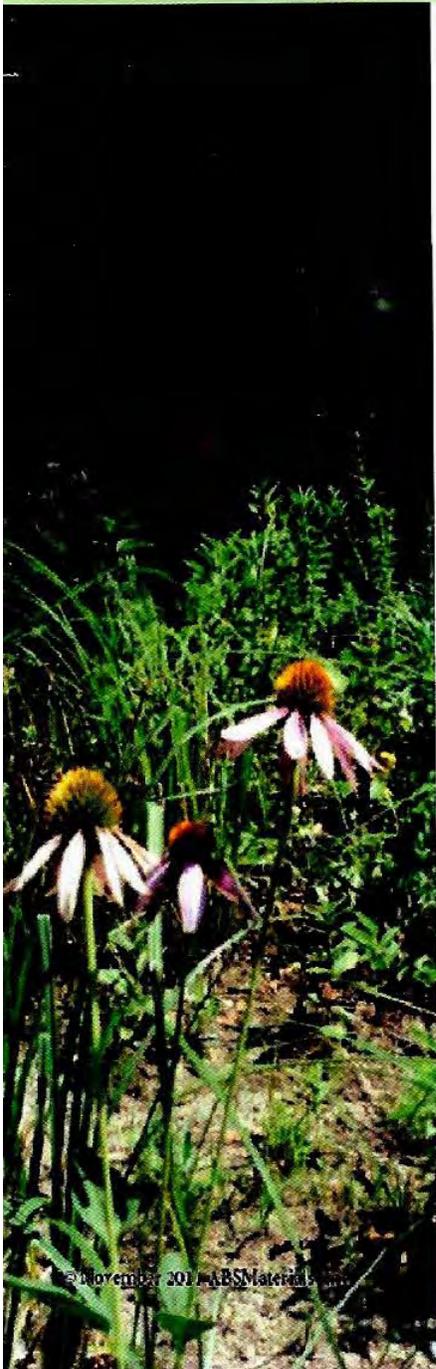
- Herbicides and insecticides
- Fuels, oils, & lubricants
- Hydrocarbons
- Chlorinated solvents
- Most drugs and endocrine disrupters

ABSMaterials, Inc. provides you with service options for your future rain garden:

- Complete design
- Prepackaged Osorb soil
- Runoff water analysis
- Technical design
- Landscaping
- Construction

"Prior to the rain garden being put in, when it rained, water would come shooting out the drain tube, across the street, and a fair amount of it would end up running down my driveway into my garage (especially when it rained hard). Since it has been installed, it is rare that I see water running onto the street."

—John E. Veney,
Happy Neighbor



Benefits of an Osorb® Rain Garden

Water Management

Bioretention systems increase water perc in impervious environments. Osorb systems greatly improve water quality, reduce runoff volume, and address turbidity and hydrocarbons. Our rain gardens are living machines that treat runoff while preventing it from overloading stormwater systems.

Cost Savings

Osorb keeps water out of combined sewer overflow (CSO) and out of municipal separate stormwater systems (MS4). Clients found that it was 25% cheaper to use green infrastructure than to retrofit existing stormwater facilities.

Urban Heat

A Philadelphia case study concluded the primary economic benefit of building green infrastructure.

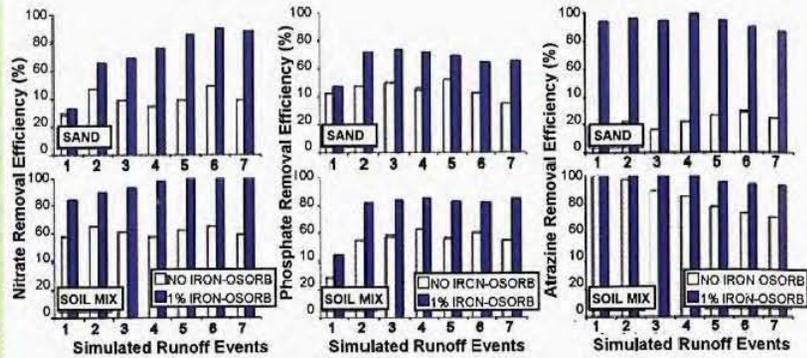
Aesthetics

Green infrastructure increases property values, provides a habitat for native birds, and makes settings more enjoyable.

Use and Recreations Benefits

Santa Monica, CA invested in stormwater controls to protect and enhance the beach front. Similar development efforts are ongoing in Cleveland, Chattanooga, and other cities that are developing their water fronts.

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A well-designed rain garden reduces the volume of stormwater runoff by 95%. Unfortunately, stormwater is often laden with contaminants that are detrimental to a rain garden's health. These contaminants can damage plants in rain gardens and are ultimately sent into groundwater, where they can harm ecosystems and even human health.

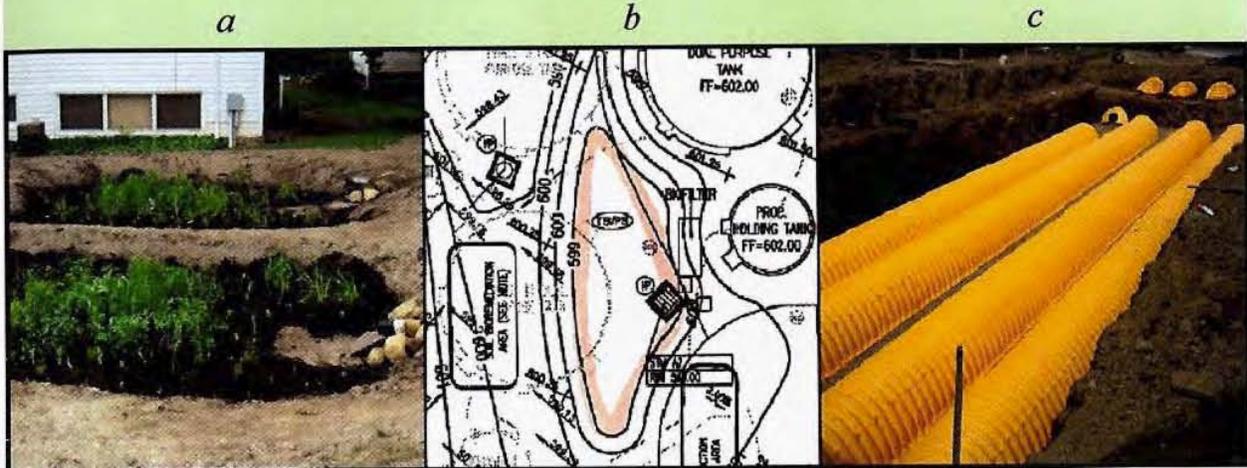
Rain gardens with Osorb destroy up to 99% of contaminants in stormwater. ABS designs rain gardens that include Osorb swelling glass. Osorb glass will capture and remediate up to 99% of common pollutants, including fuels, pesticides, herbicides, pharmaceuticals, and most chemical runoff common to suburban office parks and residential areas.

In side-by-side testing of identical rain gardens, one garden was planted with Osorb soil and one without. As the charts above show, the Osorb rain garden was 3 to 10 times more effective at reducing all tested pollutants.

Osorb can be embedded with iron, nickel, zinc, and other common metals selected to match the runoff problems at the rain garden's location. Osorb will even capture and eliminate atrazine (the most commonly used herbicide in America) and a wide range of chlorinated pesticides and solvents. As a result, ABS Materials' rain gardens are incredibly robust, reducing the volume of runoff and the pollutants carried in runoff. These gardens are more effective than any other runoff design.



Previous Projects and Pricing



ABSMaterials teams can design total systems or work with architects, civil engineers, and/or landscapers to bring our specific expertise in contaminant remediation to any stormwater runoff program.

Prices for complete design, landscaping, and construction services are listed below. These are examples of sample projects, with pricing, effects, and outcomes.

A. College Research Site - 500ft² (47 m²) -

- Twin chamber system, 3 ft (1m) Osorb media layer (1% Osorb)
- Drain field: 120 parking spaces and 5 nearby rooftops
- Captures 99% of water flow by volume
- Remediates 99% of hydrocarbons and 70% of nutrients
- Research piping installed for college environmental class work

B. Industrial Facility Runoff Control - 2200ft² (205 m²) -

- Triangular shape, 5 ft (1.6m) Osorb media layer (0.25%)
- Drain field: 80 parking spaces, industrial loading zone, and multiple buildings
- Captures 90% of water flow by volume
- Remediates 80% of hydrocarbons/toxins and 65% of nutrients
- Protects a critical habitat adjoining the site and counts for LEED Certification points

C. Stormwater Catchment - 1/2 Acre (2000m²) - Osorb Layer Only -

- Deep basin stormwater catchment
- Drain field: 320 parking spaces, 9 buildings, and nearby roadways
- Retention system providing slow percolation into groundwater
- Captures 100% of flow by volume
- Remediates 85% of hydrocarbons and 95% of pesticides and herbicides
- Protects groundwater from surface pollutants and counts for LEED Certification Points

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