Drainage Program Guide

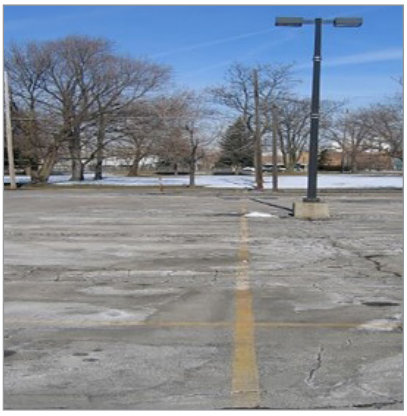
Green Stormwater Infrastructure (GSI)

Best Management Practice: Impervious Area Removal

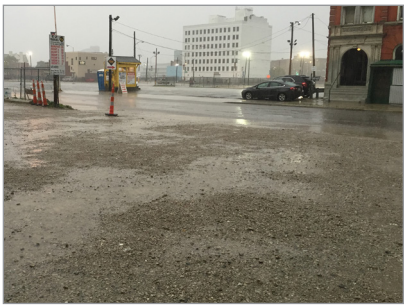
Impervious area is a hard surface area which either prevents or slows down the entry of water into the soil. Impervious area includes, but is not limited to, such surfaces as roof tops, gravel, asphalt or concrete paving, driveways and parking lots, walkways and sidewalks, patio areas, storage areas, or other surfaces which similarly affect the natural infiltration or runoff patterns existing prior to development. **Important note:** Any surface that experiences routine vehicular traffic (e.g., gravel, dirt) is considered impervious regardless of surface material as the vehicles cause soil compaction similar to impervious areas. Any locations where impervious area is removed should remain vegetated, with no vehicle traffic allowed.

The City of Detroit applies a drainage charge to parcels with impervious surfaces. The drainage charge is calculated on a per impervious acre per month basis. Any reduction in impervious area results in a lower drainage charge.

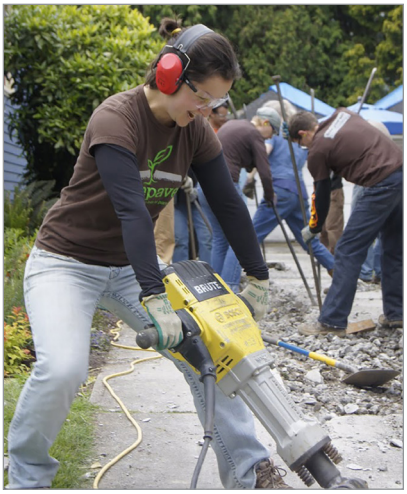
If parking will be eliminated, ensure you are still in compliance with minimum parking code requirements. See the Permits section at the end of this guide for additional information.



Parking lot with impervious area



Hard-packed gravel lot



Jackhammer removing surfaces
Photo credit: Eric Rosewall - Depave.org

How can I reduce my drainage charge through impervious area removal?

Impervious area reductions are not a credit, but rather an adjustment to the basic data used to calculate the bill. Since the drainage charge is based on the total amount of impervious area at a site, a reduction in impervious area results in a lower drainage charge. Therefore, the charge for areas where impervious surface is removed is eliminated. To receive a reduced drainage charge based on impervious area removal, submit an impervious adjustment application to DWSD.

How do I remove impervious area?

Before you start removing impervious area from a parking lot, confirm your parking requirements. See the Permits section at the end of this guide.

The process of removing impervious area depends on the existing surface. If the existing surface is pavement, it will need to be broken up and removed.

For areas where only part of the impervious area is removed, make sure there is a clear barrier between the impervious area and the pervious area (such as a curb, boulders or other barrier) so vehicles do not drive on the pervious area.

The existing impervious surface that is being removed must also be disposed of properly (preferably reused or recycled), the underlying soil amended, and landscaping installed. Impervious area (including pavement removal) can generally

be subdivided into “contractor scale” and “volunteer scale”. A professional designer and qualified contractor should be considered for large projects (typically greater-than 500 square feet of impervious area removal).

For smaller projects (less-than 500 square feet), follow the steps below. The organization Depave (www.depave.org) has a Guide on how to remove impervious area that includes more detailed information:

1. **Check for underground utilities and if any permits are required.** Call MISS DIG (811) at least 72 hours prior to performing any work for free utility locating. Also create a detailed drawing of the site to mark impervious areas, elevation points, stormwater flow, stormwater drains, and structures and trees. If parking will be eliminated, check the minimum parking requirements. See the Permits section at the end of this guide for additional information.

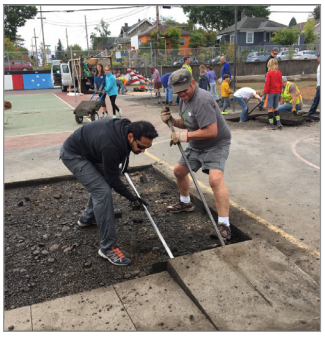
2. **Check for potential soil contamination.** If there is known soil contamination at the site, determine if the impervious surface is intended as a cover over the contamination that was used for remediation. If so, the impervious surface should not be removed.

3. **Break up impervious area into smaller pieces.** Using a jackhammer (for concrete) or walk-behind pavement saw (for asphalt), break the impervious area up into smaller pieces that can be physically lifted into a dumpster. If the concrete has rebar, assistance from professionals may be needed for removal. Concrete can often be reused as a base in other projects, while asphalt can often be recycled. See the Additional Resources section at the end of this guide for vendors that recycle concrete or asphalt.

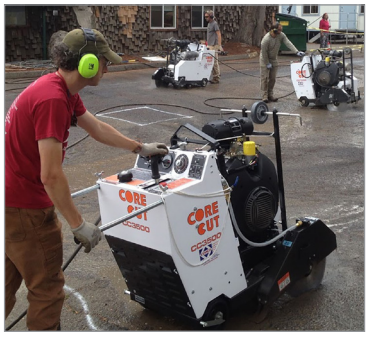
4. **Remove subsurface.** Beneath the impervious area there are typically several inches of gravel. Remove the gravel to get to the soil. Again, the gravel should be recycled where possible. If gravel cannot be used on-site, concrete recycling locations will often also take gravel.

5. **Restore the existing soil.** The soil under impervious surfaces will be compacted from the impervious surface. Break up the soil to a depth of at least 6 to 8 inches to create spaces in the soil that will allow the rain to easily soak into the soil. Smaller areas (e.g., less-than 500 square feet) can use pickaxes or rototillers to break up the soil, while larger areas may require machinery with deep-reaching attachments, such as a chain trencher to create trenches that can be filled with compost and then surface rototilled. After the soil has been broken up and aerated, mix in compost or a blended topsoil mix to help create a healthier soil. Add approximately 2 to 3 inches of compost across the entire project area and incorporate into the soil. Provide enough topsoil or blended topsoil mix to bring the soil surface level with surrounding grade after light compaction. If permeable pavement, bioretention, or other practice will be installed instead of grass, refer to DWSD’s design information on those practices.

6. **Plant vegetation.** Plant grass or develop a planting plan. Detroit Future City (dfc-lots.com/lot-designs) has design plans for various types of lots, including grass, rain garden, and others.

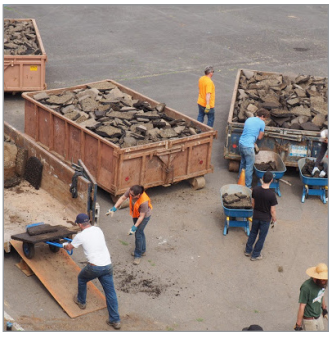


Volunteers removing section of concrete
Photo credit: Eric Rosewall - Depave.org



Concrete cutter to remove pavement
Photo credit: Eric Rosewall - Depave.org

Rototillers break up the soil.



Recycling pavement
Photo credit: Eric Rosewall - Depave.org

For larger projects (greater-than 500 square feet), a qualified contractor should be hired. Consider hiring a contractor for pavement removal and a separate contractor who specializes in soil restoration and/or planting to reduce costs. The contractor will need to accomplish steps 1 – 6 noted for smaller projects, but may use heavy equipment such as a subsoiler or ripper to till the soil.

Some questions to consider when hiring a contractor include:

- What is their experience in removing, disposing, and replacing impervious area with landscaping or permeable surfaces?
- How will the removed impervious area be reused or recycled?
- Can they develop a planting plan, and will they provide a guarantee for the plants?
- Can they supply references from previous clients with similar projects?
- Are they insured and bonded? A bond helps protect property owners if the contractor fails to complete the job.
- What is included in their services? Will they haul away excavated materials? Will they provide all equipment needed?
- How long do they expect the project to take?
- How much will their services cost?

Ask for receipts from a landfill or other approved place of disposal prior to payment to help prevent illegal dumping.

What is the typical cost of impervious area removal?

The cost of impervious area removal varies considerably and depends on factors such as: the size of the project; type of impervious surface; and whether the work is conducted with volunteers or a contractor. In addition to labor, typical costs also include equipment rental (for jackhammers or walk-behind pavement saws) and concrete or asphalt disposal/recycling.

Suggested planning level costs for different types of existing impervious area removal and planting of grass from seed are: $0.50 - $1.00/square foot (compacted soil); $1.00 to $1.50 per square foot for existing gravel areas that require additional soil amendment; and between $2.00 to $3.00 per square foot (existing asphalt or gravel pavement to be removed).

ITEM	$/1,000 sf
Concrete removal	$600 - $1,600
Asphalt removal	$600 - $1,600
Excavation	$100 - $300
Soil ripping/amending	$200 - $6,000
Landscaping	$200 - $8,000
Total Costs	$1,700 - $17,500

What is the expected return on my investment?

For every 1,000 square feet (0.02 acres) of impervious area removed, the yearly drainage charge would be reduced by 0.02 multiplied by the prevailing rate.

For impervious area removal of a one acre area (approximately 209 foot x 209 foot area), the yearly drainage charge would be reduced by 1.0 multiplied by the prevailing drainage charge rate. This does not factor in the potential additional savings you may see from no longer having to maintain an impervious area. For example, a parking lot can cost approximately $9,000 more per year to maintain than a grass lot.

Amount of Impervious Area Removed		Monthly Reduction in Drainage Charge
Square Feet	Acres	
1,000	0.02	0.02 x rate
5,000	0.11	0.11 x rate
10,000	0.22	0.22 x rate
43,560	1.0	1.0 x rate

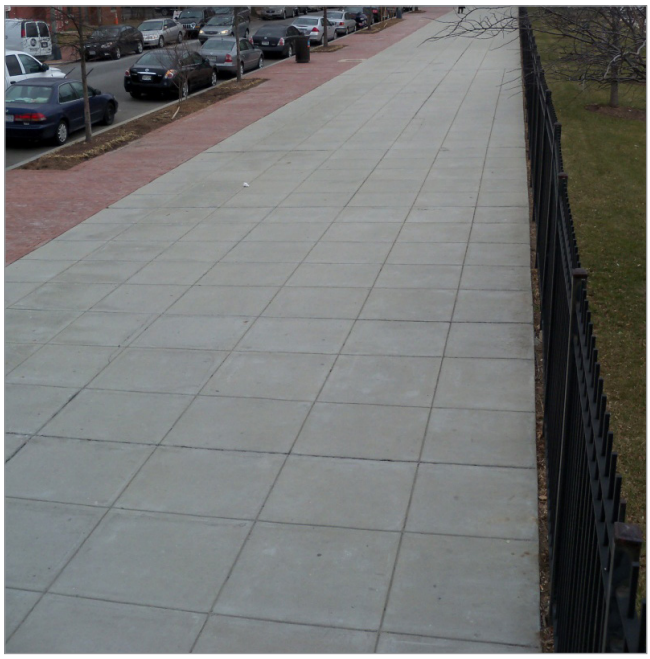
Maintenance Comparison:

Impervious surfaces such as parking lots require preventative maintenance that includes crack sealing, filling potholes, and seal coating.

In addition, major rehabilitation of the lot may be necessary every 17 to 22 years. Preventative maintenance of a parking lot can cost up to $10,000 per acre per year, while maintenance of a grass lot can cost $1,000 or less.

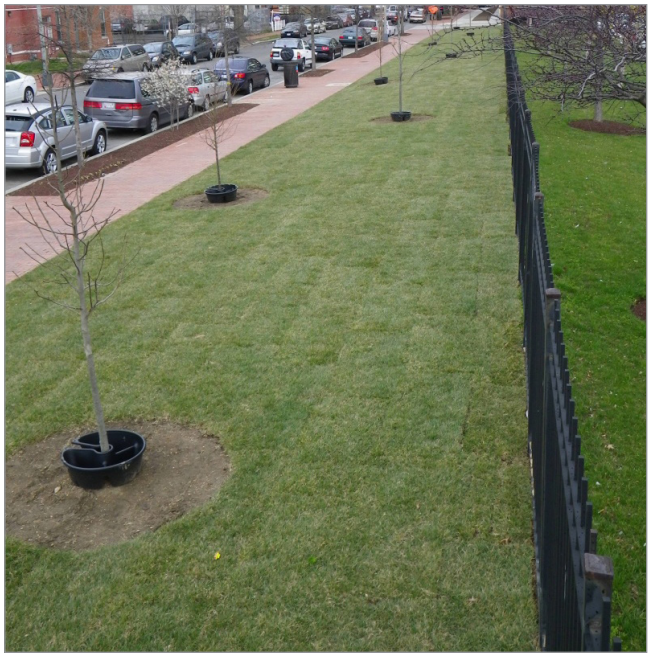
What are examples of impervious area removal?

The photos at the right are an example of a large impervious sidewalk removed and replaced by grass.



Permits

- Impervious area removal that reduces parking or driveways may require approval from the City of Detroit to address minimum parking code requirements. See Sec. 61.14.21 for the parking schedule and Sec. 61.14.151 for parking space dimension information. http://www.detroitmi.gov/Portals/0/docs/BSEE%20-%20Zoning/Ch61Mar012016.pdf. Sec. 61.14.21b. Contact the Building, Safety, Engineering and Environmental Department (BSEED) Zoning Department for more information.
- Make sure to identify and avoid utilities by contacting MISS DIG at 811 or 1.800.482.7171 before starting the project.
- If the project will disturb 1 acre or more, or is within 500 feet of a water of the state, contact Wayne County Environmental Services for a Soil Erosion and Sedimentation Control (SESC) permit.



BEFORE and AFTER: Large area greening at P and North Capitol Streets, NE - Washington, DC (Photo credits: DDOT Urban Forestry)

Additional Resources

DWSD's drainage website:
www.detroitmi.gov/drainage

Depave. 2009. How to Depave: The Guide to Freeing Your Soil
depave.org/learn/low-to-depave

Prince George's County, MD. Undated. Guidelines for Pavement Removal
http://www.princegeorgescountymd.gov/DocumentCenter/View/15434

Minnesota Pollution Control Agency. Undated. Alleviating compaction from construction activities
https://stormwater.pca.state.mn.us/index.php/Alleviating_compaction_from_construction_activities

For concrete and asphalt recycling:
www.gbmrecycledconcrete.com (Brighton, MI)
http://cadillacasphalt.com/ (Detroit and western MI)

For utility location:
MISS DIG - Call 811 or 800.484.7171
www.missdig.org

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