

## **BIRD Update**

Pervious concrete pavement is exposed to various sources of contamination which may clog the void structure and reduce the permeability during the service life of the pavement. If there is reason to believe that the pavement was originally built with enough interconnected voids to drain well, permeability can be sustained or restored.

Consider the most cost effective ways to deal with contamination or to prevent contamination. Being prompt and proactive about sources or incidents of contamination is the best approach. Most types of debris and loose aggregate can be easily removed with a dry vacuum. Mobile vacuum sweepers in standard configuration will gather loose material from the surface and deploy a light spray. This type of vacuum is designed to cover a lot of area, quickly. Some vacuum trucks are equipped with a vacuum hood which typically does not seal tightly and travels too rapidly for pervious extraction but is useful for preventative maintenance.

Organize the operation and maintenance of pervious concrete pavement to include regularly scheduled, dry vacuum cleaning to deal with the routine landscaping and airborne debris. However, if contaminants become impacted in the surface openings of the void structure, more aggressive measures of extraction can be used. The extraction method is more costly than dry methods and sometimes is required because dry maintenance was neglected.

Truck mounted vacuum equipment can be used to extract contaminants from pervious concrete pavement using a Bunyan Infiltration Restoration Device (BIRD, for short), to apply the vacuum force to the pavement surface. In order to manage this vacuum force, and move slowly over the surface, certain objectives become apparent.

This extraction process pulls air and water through the slab. A tight seal is maintained around the edges of the vacuum hood to hold head pressure through the voids of the slab. The device is propelled with a hydraulic drive and is tethered to the vacuum source with an extension hose. The height of the hood is set in contact with the surface and adjusted as the rubber belting of this seal wears away. The BIRD is configured on a triangular wheel base and covers an area that is 42 inches wide.



Vacuum pumps fall into two categories, positive displacement type and fan type. Performance is measured in pressure and volume. The BIRD Vacuum needs at least 3,000 cfm of air volume to operate effectively and the negative pressure starts at around 7 inches of mercury (Hg). Another expression of vacuum pressure is stated as feet of water.

Fan type vacuum equipment usually generates higher volume (up to 17,000 cfm) and less pressure (7 to 12 inches Hg).

The most available among units are popular for sewer cleaning and some will provide high pressure wash water for the optional water circuit on the BIRD Vacuum. The wash nozzle manifold may be configured either inside or outside the intake hood. The BIRD Vacuum may be used dry or in tandem with separate pressure wash devices.



Pressure Washing should be used with certain limits applied. Contaminants that are lifted and carried in a wake, tend to settle back into the slab in another location. Pressure washing alone tends to drive contaminants into the slab and if repeated, will choke the slab. Pressure washing is best done concurrently with a vacuum to remove the loose contaminants before they reenter the slab. The pressure washer works best to dislodge impacted contaminants. But, it should not be used to sweep the surface.



Positive displacement type vacuum trucks will typically displace 3,000 to 6,000 cfm of air at significantly greater pressure. For vacuum units with sufficient horsepower and positive displacement, you can expect up to 27 in.Hg. This configuration brings the BIRD Vacuum to high performance. This is not an economy mode of operation but is certainly effective in restoring permeability.



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We have encouraged some of the more bold and creative people to improvise and experiment with different configurations. Rick Hildebrand found the high performance vacuum systems can collapse the intake hose. He fixed the intake hose by inserting rings of PVC inside the hose to prevent collapse. Rick also made a drive system from an improvised lawn mower with some great maneuverability.

