



Williams Hill Site update

Cleanup vic4-01 • November 2011

This fact sheet provides information on the investigation and cleanup activities at the Williams Hill Site in St. Paul. The site is approximately 31 acres located north of University Avenue and east of Interstate-35E and Mississippi Street (see Figure 1 on page 2). The site was acquired by the Saint Paul Port Authority (Port Authority) in 1995-96 and remediated from 1996 through 1998. Six new businesses which employ about 500 people were built at the Williams Hill Business Center from 1998 to 2002.

Site history

The site was used from the 1880s to the 1990s for a wide variety of industrial activities, including borrow and demolition material storage, road construction equipment staging and storage, an asphalt plant, a scrap yard, rail and railroad service activities, and an industrial waste dump (the John Street Dump). Many of these activities resulted in contaminant releases to the soil and groundwater. Although the Port Authority was not responsible for, or connected with, the contamination, it realized that in order to host new development, the Williams Hill site had to be cleaned up.

Soil and groundwater cleanup activities

The Port Authority conducted environmental investigations and soil and groundwater cleanup activities at the site from 1996-2000 under the regulatory oversight and approval of the Voluntary Investigation and Clean-up (VIC) Program at the Minnesota Pollution Control Agency (MPCA). Information about this investigation is found in MPCA File No. VP5980. The investigation and remediation of the site, which involved the installation of many borings, test pits and monitoring wells and the excavation and disposal of contaminated soil and debris, cost over \$2.5 million. The Port Authority received grants to fund this work from the Minnesota Department of Employment and Economic Development and other sources.

The primary contaminants or compounds of concern (COCs) found in the soil and groundwater were volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), heavy metals, and petroleum-related compounds. Soils and groundwater, particularly in the vicinity of the former John Street Dump, were heavily impacted by VOCs associated with wastes dumped there.

Contaminated soil and debris from throughout the site was, depending on contaminant concentrations and regulatory requirements, either disposed offsite or used for road base between Pennsylvania Avenue, Phalen Boulevard or Olive Street. Following soil cleanup activities, air sparging and soil vapor extraction (AS/SVE) technologies were utilized in the southern part of the site to remove VOCs from the soil and groundwater. AS/SVE involves the injection of air in the subsurface beneath contaminated groundwater, which allows VOCs dissolved in groundwater to be transferred vertically above the water table where the contaminated vapors are collected and discharged to the atmosphere by the SVE system. The

AS/SVE system was removed in 1998 to prepare for site redevelopment. One of the more intense cleanup efforts at the site involved the excavation and disposal of approximately 20,000 cubic yards (yd³) of waste and soil from the area identified as the John Street Dump. This area was located on the southeast boundary of the site and was reportedly used by railroads and other industries in the 1950s and 1960s as a location for waste disposal. The excavation of the dump site extended to 12 to 14 feet below ground surface; this material was disposed off site. In total, about 31,000 yd³ of contaminated soil and debris were removed and disposed off-site in connection with the remediation of Williams Hill. In addition, approximately 18,200 yd³ of less contaminated soil were used for road base.

In 1998, after soil and waste remediation had been completed, the MPCA issued a Certificate of Completion for the site to the Port Authority to enable the commencement of redevelopment. The Certificate of Completion was conditioned upon the Port Authority's performance and execution of a Voluntary Response Action Agreement (VRAA), which included the requirement that groundwater monitoring continue at the site and, if necessary, additional remedial actions be conducted to address the remaining groundwater contamination.

Site redevelopment

Following completion of the soil response actions, the site was divided into six parcels served by a new north-south road (Olive Street) that intersects with Phalen Boulevard. Six commercial/light industrial businesses were developed in the Williams Hill Business Park between 1998 and 2000. These businesses include a printing operation, a uniform cleaning and servicing company, a custom millwork and fixtures business, computer-imaged graphics, union offices and training facilities, a credit union, a jobs center, and a commercial warehouse. This redevelopment has been successful in terms of additional employment and increased tax base.

Post-redevelopment investigation and cleanup activities

Dual phase extraction (DPE) system

Following redevelopment, the Port Authority continued to monitor groundwater conditions. In 2006, in response to a continuation of elevated groundwater monitoring results, the Port Authority installed a dual-phase extraction (DPE) system along the southeast border of the site within the John Street right-of-way. The DPE system uses four wells to extract contamination from both soil vapor and groundwater. Extracted vapors are exhausted to the atmosphere through a stack and are tested frequently to ensure contaminant air emission rates are below health risk criteria. The extracted groundwater is discharged to the sanitary sewer in accordance with a Metropolitan Council of Environmental Services (MCES) permit. Since its start-up in July 2006, the DPE system has removed over 30 pounds of VOCs from groundwater and about 5,400 pounds of VOCs from soils.

Verification monitoring of the DPE system will be required by the MPCA as a component of system closure evaluation in the future. Operation of the DPE system has likely helped prevent the spread of contaminated groundwater off site and in time is expected to contribute to both a reduction in groundwater contamination and associated vapor concentrations.

Vapor intrusion risks and screening criteria

In 2002 the U.S. Environmental Protection Agency (EPA), based on various studies, began to publicize concern about potential human health problems/risks attributable to vapor intrusion. Vapor intrusion occurs when contaminant vapors from contaminated soil or groundwater beneath or near buildings migrate upwards through soil and into buildings via small openings, such as cracks, sumps or utility penetrations. Building occupants who breathe volatile compounds that have accumulated in indoor air may be subject to increased health risks if there is long-term exposure (e.g., over a



Figure 1. The Williams Hill Site location

lifetime) to elevated contaminant concentrations. Because of the concern about vapor, the EPA and many states began new regulatory programs which required organizations or entities that had or were going to develop contaminated sites to test and, if necessary, address/mitigate vapor intrusion. The MPCA first published guidance for investigating and addressing vapor-intrusion in 2005, with guidance updates and screening criteria published in 2008 and 2010.

Vapor intrusion investigations conducted in accordance with MPCA guidance involve (1) identifying the source of the contaminant vapors, (2) sampling for contaminants in soil vapor, (3) and conducting a building-specific investigation if soil vapor concentrations collected near buildings exceed screening values. Soil screening criteria have been developed to be protective of human health. Soil vapor concentrations that exceed screening criteria indicate a risk that vapor intrusion into the building may be occurring, which could result in indoor air impacts. The next step is conducting a building investigation, which includes collecting vapors from beneath the building slab to compare with screening criteria. If vapor intrusion risks are indicated based on the results of vapor sampling from beneath the building slab and considering all collected evidence, the MPCA will recommend building mitigation in addition to conducting cleanup of the vapor sources.

Vapor intrusion and Williams Hill

The MPCA requested that the Port Authority test for the presence of vapor concentrations in the southern part of the site where groundwater and deep soil remained contaminated. Tests were performed beginning in 2006 with the sampling of vapors within well casings and it was determined that contaminant vapor concentrations near the two buildings in the southeast part of the site were sufficiently elevated to warrant additional investigation. These buildings are close to and potentially impacted by residual contamination from the John Street Dump.

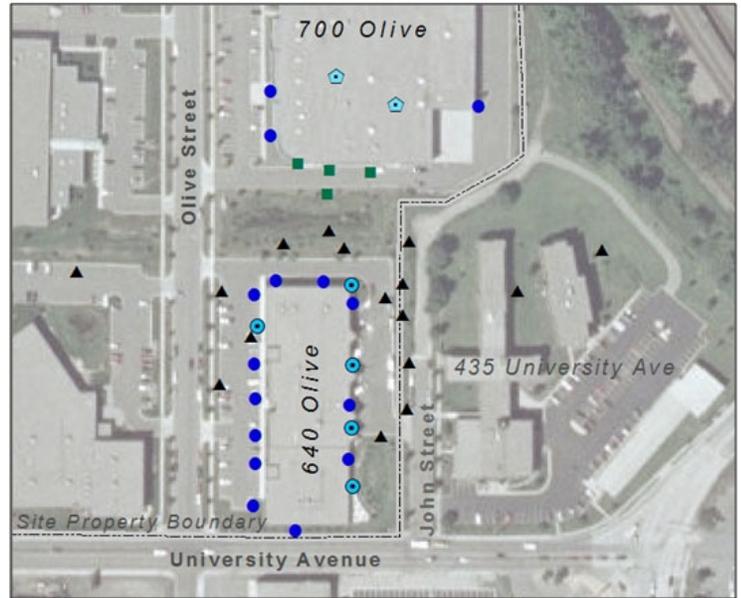


Figure 2: Vapor Sampling Locations 2007-2010

-  2009 and 2010 Soil Vapor
-  2009 Soil Vapor
-  2008 Soil Vapor
-  2009 Sub-Slab
-  2007 Soil Vapor

Testing of soil vapor was conducted in 2007 in the southeast part of the site and again in 2008 and 2009 (Figure 2). Contaminants in soil vapor which exceeded screening values included trichloroethene (TCE), perchloroethylene (PCE), vinyl chloride (VC) and 1,2-dichloroethane (1,2-DCA). The testing, along with historical site information, indicated that vapor-intrusion risks on the site property were most likely limited to the southeastern part of the site at and near the former John Street Dump.

Vapor investigation and mitigation at the 700 Olive St. property and the nearby Union Gospel Mission

Soil vapor samples collected in 2008-2009 adjacent to the southern third of the 700 Olive St. property identified levels of TCE and PCE that exceeded soil vapor screening levels. The contaminant vapor concentrations below the building slab indicated that the southern third of the building could be impacted by vapor intrusion. In 2009 the Port Authority conducted diagnostic tests to determine the extent of air pressure and vacuum influence beneath the slab, and using this information prepared a design for an interior vapor-mitigation system. The MPCA approved the design, and the system was installed in June 2010. The vapor-mitigation system installed at this building was a sub-slab depressurization (SSD) system. System monitoring indicates that the SSD system at 700 Olive St. is working as intended and is preventing vapor intrusion.

The Union Gospel Mission is just southeast of the Williams Hill site at 435 University Ave. In 2010-2011 the MPCA conducted a sub-slab vapor investigation at this property to determine vapor intrusion risks. After confirming the presence of vapor intrusion concerns, the EPA assisted the Union Gospel Mission remedy these concerns by successfully installing SSD systems at the three buildings at 435 University Ave. These SSD systems are continuing to operate effectively.

What's a sub-slab depressurization (SSD) system?

SSD systems use powered fans to create a slight negative pressure beneath the building slab relative to the interior building pressure. It is constructed by installing vertical PVC piping through six-inch-diameter openings (suction points) in the concrete slab floor of a building. The piping runs vertically to the exterior of the building at the roof, where the collected vapors are exhausted. An SSD system is the same technology used to protect homes from the intrusion of radon gas from the subsurface and has proven to be very effective at eliminating long-term risks of vapor intrusion. The SSD system installed in the 700 Olive St. building uses seven suction points and three fans or blowers on the roof.

Vapor investigation at the 640 Olive St. property

Soil vapor samples collected around the exterior of the 640 Olive St. building, particularly on the east, north and northwest sides, have sample results exceeding soil vapor screening values for at least four VOCs. The location of this building and these results raise concern about possible vapor intrusion. When the building was constructed in 1998, however, measures were taken to protect against the possibility of vapor intrusion, including the installation of a sand blanket and vinyl membrane under the concrete slab and the installation of a heating and air conditioning system that provides building ventilation with frequent air exchanges.

Next steps: proposed sub-slab investigation at 640 Olive St.

The MPCA believes that additional vapor investigation at the 640 Olive St. property is necessary to fully evaluate whether vapor intrusion risks are present and whether further mitigation is needed. Since February 2009, the Port Authority, which is obligated to complete this work under the VRAA, has been requesting authorization from the building owner, Guinee Family Limited Partnership, to conduct a sub-slab vapor investigation by collecting vapor samples from small-diameter openings drilled through the concrete slab in the building. Agreement between the Port Authority and the building owner regarding access and long-term responsibilities for a potential SSD system has not been reached. In August the MPCA took steps to develop an investigation work plan to conduct this work and is currently seeking access from the building owner. Occupants of the building may be facing continuing exposure to chronic low-level chemical vapors until access is provided and investigations have been conducted to determine whether there are unacceptable chronic vapor intrusion risks present that require mitigation.

Any work would be carefully coordinated with the businesses in this building. The results of the investigation will be provided to the building owner and the Port Authority.

Vapor mitigation design and installation

If the investigation results indicate the presence of a vapor intrusion risk, a vapor mitigation system such as an SSD system will be constructed to serve the 640 Olive St. building once it is authorized by the building owner.

Additional information

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For more information on vapor intrusion, see www.health.state.mn.us/divs/eh/hazardous/topics/vaporintrusion.pdf and www.pca.state.mn.us/index.php/view-document.html.