

The Sigma Building
MILWAUKEE, WISCONSIN

In 2003, The Sigma Group completed construction of a new 28,000 SF corporate office located on a 3-acre brownfield site in the heart of the Menomonee Valley. The property was originally a shallow marsh that over time was filled with a variety of materials and adapted for industrial use. Significant efforts were made to characterize the site, plan and design the building and grounds, and coordination of project elements with agencies and stakeholder groups.

Brownfield Redevelopment: Several grants were observed to help off-set the environmental repair of the site including the Wisconsin Department of Commerce and the Redevelopment Authority of the City of Milwaukee.



View of Sigma building property pre-development

Phase 1 Environmental Site Assessment: An environmental site assessment conforming to ASTM and the WDNR Phase 1 Guidance was completed by Sigma. The process involved the review of many historical records and regulatory documents, local area geology and hydrogeology information, and conducting a site inspection. The Phase 1 revealed environmental conditions such as land filling and the release of petroleum hydrocarbon substances.

Site Investigation: Sigma performed a soil, groundwater, methane and geotechnical investigation to characterize the subsurface conditions. Collecting soil samples from borings and test pits, installing and sampling monitoring wells to determine groundwater quality and to define the presence of methane gas being generated by underlying natural deposits and imported fill. Sigma elected to partner with the WDNR by participating in the VPLE Program with a goal of obtaining a certificate of completion upon closure.

Site Remediation: Based on investigation data and consistent with the WDNR regulations, Sigma developed a remedial action plan integrating building and site design elements to a cap soil, apply attenuation to address groundwater impacts, and passively vent potential methane.

Nearly all impacted soils that were disturbed during construction were managed on-site and placed beneath engineered barriers, including the new building, asphalt parking lot, and greenspace areas. Methane being generated by the underlying fill is vented by a passive collection and venting system. Vent pipes placed beneath the building were embedded in a porous aggregate called Minergies, a beneficial reuse by-product primarily made of fly ash. Natural attenuation groundwater monitoring was completed at the property following building construction to evaluate post-construction groundwater conditions and position the site for WDNR case closure.

Funding Sources: Several grants were secured to help off-set the environmental repair of the site including the Wisconsin

Department of Commerce and the Redevelopment Authority of the City of Milwaukee. The City also established tax incentives as the development increased the property value and is expected to generate over \$50,000 in annual tax revenue.



Site Development: Obtained exemptions from WDNR to build on a landfill (NR506) and to excavate and reuse impacted soil near a navigable waterway, within a flood plain, and within 1 meter of the high groundwater level (NR 718).

The back-filled former boat slip located in proximity to the corner, was a factor as the soil conditions were particularly poor and methane generation was the highest at this area of the site. As a result, the building footprint was shifted 200 feet east of the corner to avoid the higher cost of deeper piles and a more aggressive methane control system. The site also accommodates public access to the Menomonee River with a walkway that borders the site's river edge and loops from Canal Street linking up with the Hank Aaron Trail.

Civil/Site Engineering: Sigma self-performed the site civil design for the project including the development and design of storm water management measures to meet City of Milwaukee, MMSD and WDNR requirements. Several best storm water management practices were implemented at the site to meet applicable storm water management regulations, reduce initial construction costs, reduce long-term maintenance costs and reduce long-term municipal storm water fees. Strategies implemented include the surface discharge of the majority of roof runoff from the building (rather than hard piping to public storm); use of overland flow to convey storm water across the site (rather than collection and conveyance in storm sewers); use of native planting areas to attenuate storm discharge rates and provide treatment; use of a vegetated drainage swale to capture, convey and treat storm water runoff from the site prior to discharge and discharge of storm water directly to the Menomonee River (rather than discharge to public storm sewer). The implementation of these strategies has resulted in a significantly reduced municipal quarterly storm water fee for the site.

Building Features: The building and site incorporates several aspects of "Green Building" concepts. Features include natural daylighting, maximizing sunlight in occupied areas, specialized stormwater management, beneficial reuse of materials for constructing the floor slab, and high efficiency HVAC system. A prominent building element was the use of bow truss structure for the main roof, which created an open space and added a window course for natural light.

Awards:
2003 Wis. Builders Association Top Projects Award
2003 Mayor's Design Award, City of Milwaukee
2004 MANDI (Milwaukee Award for Neighborhood Development Innovation)
State Farm Insurance Building Blocks Award
2004 Wisconsin Business Friend of the Environment Award
2004 Certificate of Special Recognition from U.S. Senator Russ Feingold on Relocation to the Menomonee Valley

