

## Case Study: Foundry Sand in Land Application

### Kurtz Bros., Inc. and the City of Seven Hills, Ohio

A family-owned business for over 60 years, Kurtz Bros., Inc. is a commercial landscape supply company with recycling operations throughout Ohio. Kurtz Bros. prides themselves on “closing the loop” by offering waste-to-reuse products that are high quality and environmentally safe. Kurtz Bros. offers a number of different mixes and blends to meet different soil specifications and market requirements. The majority of these blends contain foundry sands.

In June 2007, Kurtz Bros. partnered with the City of Seven Hills, Ohio to install a raingarden on community property near City Hall. A raingarden is a type of landscape in which the soils and plantings are designed to absorb and filter stormwater runoff to remove impurities before the water enters storm drains or surface waters.

The site of the raingarden is a well-traveled area without curbing that abuts a parking lot and sidewalk. The 20 by 60 foot plot was eroded from stormwater runoff coming from the parking lot. Runoff containing salt used on the parking lot and sidewalk during winter storms had been most damaging to the area.

Kurtz Bros. came to the attention of the City of Seven Hills when, in response to a request from the City, the Cuyahoga County Soil and Water District provided names of landscaping companies that supply soils that are ideal for raingardens. Kurtz Bros. is one of the suppliers. The soil that Kurtz Bros. used for the City’s raingarden contained spent foundry sands that Kurtz Bros. obtained from area foundries.



Figure 1. The site before raingarden installation.

To install a raingarden, the City excavated the existing soil and replaced it with a layer of gravel, then a layer of Kurtz Bros.’s raingarden soil mix, which contained the spent foundry sand, and then a layer of mulch on top. These layers are specially designed to create a filtration system that removes pollutants from stormwater runoff.



Figure 2. The site after excavation. Gravel and soil mix layers in place.

In order for the soil to provide effective filtration of the water entering the raingarden, the soil must meet the specifications identified in Table 1. Spent foundry sand used in the soil mix was key to achieving the proper the infiltration rate.

**Table 1. Soil Mix Specifications**

Parameter	Value
Particle density	2.61 grams/cubic centimeter (g/cc)
Bulk density	1.54 g/cc
Infiltration rate	3.9 inches/hour
Total porosity	41.0%

Prior to installation of the raingarden, Kurtz Bros. helped the City put together marketing materials (e.g., brochures) to promote the project to the community. The City invited the public to help plant vegetation in the raingarden. The City used the event as an opportunity to educate the public about raingardens and their benefits to the environment as a stormwater management technique. According to the City of Seven Hills, about 100 people attended the event.



Figure 3. Community members begin to plant vegetation in the raingarden.

The City of Seven Hills reaped several benefits from the raingarden project. In terms of project costs, by purchasing bioretention soil made with spent foundry sand, the City paid approximately half of what it would have cost for bioretention soil made with virgin sand. Economically, the City saved ongoing resources because the raingarden needed very little maintenance, whereas previously the City mowed the grass-covered area and tended to the eroding plot. Also, Kurtz Bros. provided the City with free marketing materials on the project. The project provided aesthetic benefits because it beautified an area that was previously eroded and unsightly. Lastly, the project resulted in improved stormwater management in the area surrounding the raingarden.

With regard to technical advantages, the spent foundry sand used in the project provided a soil mix that was ideal for achieving the right infiltration rate.

The foundries and Kurtz Bros. benefited economically from this project as well. The foundries which supplied the spent sands paid Kurtz Bros. to take the sand. However, the foundries paid less than what they would have paid to landfill the spent foundry sand.

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<b>Personnel</b>	<p><b>End User:</b> City of Seven Hills, Ohio</p> <p><b>Contractor:</b> Kurtz Bros., Inc.</p>
<b>Site</b>	<p><b>Recycling Location:</b> Seven Hills, Ohio</p> <p><b>Site Description:</b> The City of Seven Hills wanted to revitalize a 20 by 60 foot eroded patch of land on community property by installing a raingarden.</p>
<b>Materials Utilized</b>	Spent foundry sand used in a bioretention soil.
<b>Project Costs and Benefits</b>	<p><b>Costs Include:</b></p> <ul style="list-style-type: none"> <li>• The City of Seven Hills paid Kurtz Bros. for the soil mix containing foundry sand.</li> </ul> <p><b>Benefits Include:</b></p> <ul style="list-style-type: none"> <li>• The foundries supplying the sand to Kurtz Bros. forgo the cost to landfill spent sand.</li> <li>• By purchasing bioretention soil made with spent foundry sand, the City paid about half of what it would have cost for bioretention soil made with virgin sand.</li> <li>• Bioretention soil made with foundry sand achieves the optimal infiltration rate needed in a raingarden.</li> <li>• The City of Seven Hills received free marketing materials from Kurtz Bros. for their raingarden event.</li> <li>• The resulting landscape is maintenance-free for the City.</li> <li>• Aesthetically, the raingarden is more appealing than the previous unsightly area.</li> </ul>