

## C350 armors the waterfront against ohio river flooding



*Photo courtesy The Louisville Courier-Journal*

### Background:

The revitalization of metropolitan areas is an ever increasing concern for maintaining the aesthetic appeal of inner cities. A rapidly growing method of revitalization is using greenways to provide recreational areas, wildlife habitat and improved environmental quality in the midst of an otherwise urban landscape. Greenways can often be used to convert abandoned industrial lands into useful nature and recreation areas.

Waterfront Park is an excellent example of such an area, occupying 22 acres in the heart of Louisville, Kentucky next to the I-65 bridge along the southern shore of the Ohio River. Previously the site of a metal scrap yard and barge docks, Waterfront Park will provide much needed recreational areas for downtown Louisville in the form of walking and bike paths, a playground and an amphitheater. The use of various natural plants for stabilizing the many steep slopes within the park will simultaneously improve the quality of air, water, and wildlife habitat in metropolitan Louisville and the adjacent Ohio River.

### Problem:

The hilly topography directly adjacent to the Ohio River and use of several types of natural vegetative covers could pose immediate and long-term erosion control concerns for Waterfront Park. Flow induced shear forces from the Ohio River during flood events will impact the site and may result in the loss of soil and vegetative cover. The use of trees, shrubs and mulch beds add to the area's aesthetic appeal, but would provide minimal protection against the tremendous shear forces generated by the raging Ohio River during flood conditions.

### Solution:

Tom Ryan of Hargreaves Associates, the lead design firm for the Waterfront Park project, approved the use of North American Green C350, a permanent geosynthetic turf reinforcement matting to combat the numerous potential erosion problems. The unique design of the C350 would provide both the immediate and long-term erosion protection necessary for the flood prone slopes in Waterfront Park.



The C350's permanent three-dimensional net structure would function as a stem reinforcement system to enable the vegetation to resist the excessive flow induced shear forces during Ohio River Flooding. The coconut fiber of the C350 would provide immediate erosion protection for the slopes during storm events and flooding prior to vegetation establishment. The coconut fiber matrix would also act as an excellent mulch to improve seed germination and vegetation establishment. Steep areas at or below the 10 year flood line were seeded with turf grasses and covered with C350 for immediate erosion protection. The matting was also applied under the mulch beds surrounding the many deciduous and coniferous trees planted in the park to function as the sole means of permanent erosion protection.



The risk of flooding prior to vegetation establishment called for special installation procedures. Tim Lancaster of North American Green, Inc., and John Meador with Water Works Supplies, Inc., met with Tom Ryan of Hargreaves Associates and Mike Puckett of Korfhage Nursery in January, 1997 to walk the site and discuss appropriate installation measures. It was determined that for optimal performance and physical resistance to flood waters and ice flows, the C350 would be placed at an angle down the slopes to minimize the number of adjacent seams while allowing each individual matting to be anchored in a trench at the crest of the slopes. The diagonal installation would also position the adjacent blanket seams so they were not directly perpendicular to the river flow, reducing the chance of undermining.

### Results:

The C350 matting installation began in February, 1997 and continued through the winter as weather permitted. The first phase of matting installation was near completion when a 50 year flood event occurred along the Ohio River in early March. Much of the park was inundated, testing the initial erosion control capabilities of the then unvegetated C350 matting.



*Photo courtesy The Louisville Courier-Journal*

Following subsidence of flood waters, the C350 had remained intact and secured to the shoreline slopes with no sign of significant erosion of the underlying soils. According to Mike Kimmel, Deputy Director of the Waterfront Development Corp., as quoted in the March 15, 1997 edition of the Louisville Courier-Journal, the matting [C350] “held beautifully”. However, areas where the C350 matting had not yet been placed, and locations above the 10 year floodline where a single net excelsior product had been installed, were washed out and required extensive repair.



Turf seed applied under the C350 was also held in place as was apparent when it began to germinate and grow later in the spring. The remainder of the matting was installed in the summer of 1997.

The use of the North American Green C350 geosynthetic turf reinforcement matting in Waterfront Park has afforded numerous short-term and long-term benefits to both the environment and City of Louisville. The C350 effectively prevented erosion and sediment migration directly into the Ohio River and onto the many

paved trails located in the park, thus, reducing environmental impact to the river and maintenance problems for the park.

With its vegetative plantings permanently reinforced by the C350 matting, Waterfront Park will provide an aesthetically pleasing, environmentally friendly, highly functional recreation area for Louisville, Kentucky in years to come.

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