

From Rooftop Gardens to Deep Tunnels

Chicago tackles its stormwater problems. *By Allison Fore*

THE CITY OF CHICAGO IS WELL KNOWN FOR ITS ROOFTOP GARDENS, which capture rainwater and offer heating and cooling benefits. Similar efforts are being directed at ground level and below to prevent combined sewer overflows, neighborhood flooding, and basement backups.



One of the city's most recent projects culminated in October, with the completion of the "Greenest Street in America." During the four years it took to complete the street, the city partnered with the Metropolitan Water Reclamation District of Greater Chicago to model and monitor it. Total cost: \$14 million.

In the nation's first effort of its sort, an array of sustainable technologies was installed into a single urban roadway—a two-mile stretch of Blue Island Avenue in the Pilsen neighborhood. The sidewalks and part of the roadway were reconstructed with permeable pavements, and vegetated planters, bioswales (rain gardens), and subsurface infiltration basins were installed, as were wind- and solar-powered LED pedestrian lights.



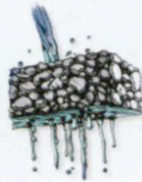
Images courtesy CDOT

Green Energy Hybrid Light Fixtures

These multipurpose fixtures gather solar and wind energy and emanate light through high-efficiency LED nodules. Pole-mounted educational panels inform the public.

Porous Asphalt

Less stormwater runoff means more manageable peak flow, which lowers the risk for flooding downstream.



CERMAK

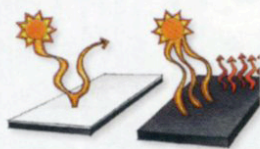
Recycled Materials

Post-industrial furnace slag, tires, shingles, and aggregates are some of the recycled materials used.



Heat-Reflecting Coatings

A thin, light-colored concrete overlay and other paving materials help to reduce urban heat island effects and save energy.



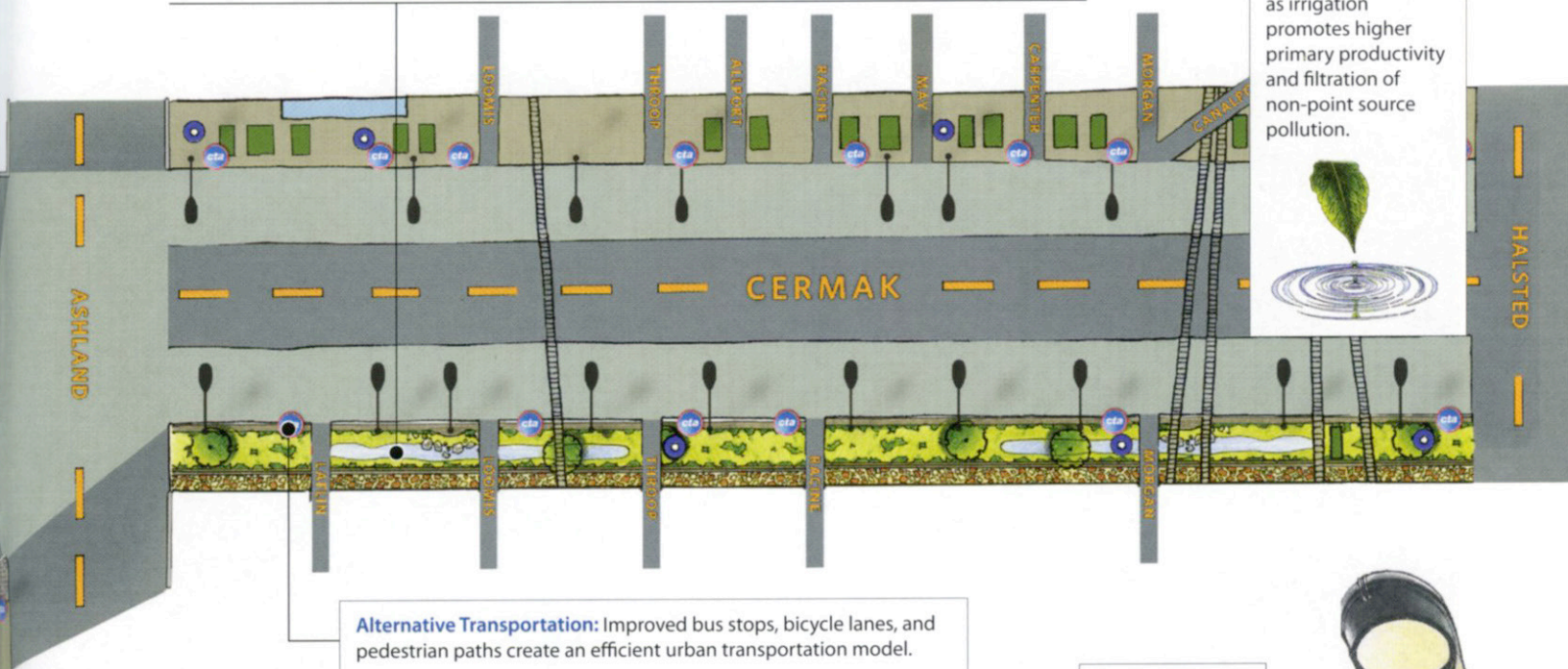
LEGEND

- bioswales
- bus stop
- hybrid light fixture
- infiltration planter
- micro-thin concrete overlay
- permeable pavers
- street light



Rainfall Harvesting
Bioswales: Bioswales (far left) were integrated into sidewalks and public spaces as visual features. Using native, drought-resistant plants (left), reduces maintenance and upkeep and promotes natural landscape evolution.

Stormwater Reuse
 Using the runoff from precipitation as irrigation promotes higher primary productivity and filtration of non-point source pollution.



Alternative Transportation: Improved bus stops, bicycle lanes, and pedestrian paths create an efficient urban transportation model.

High-Efficiency Luminaires
 Zero upright luminaires are dark-sky compliant—they do not cause light pollution—and use less energy.



A view of Cermak Avenue at Racine, before and after.

Source: Chicago Department of Transportation Streetscape and Sustainable Design Program

MWRD commissioner Debra Shore says simulated results have shown that this street could capture up to 80 percent of the precipitation produced by a storm delivering three-quarters of an inch of rain in five hours. Postconstruction monitoring to quantify the actual performance in reducing stormwater will continue for the next two to three years.

Gabe Klein, commissioner of the city's Department of Transportation, and Janet Attarian, the project director, note that the introduction of 95 drought-tolerant, native

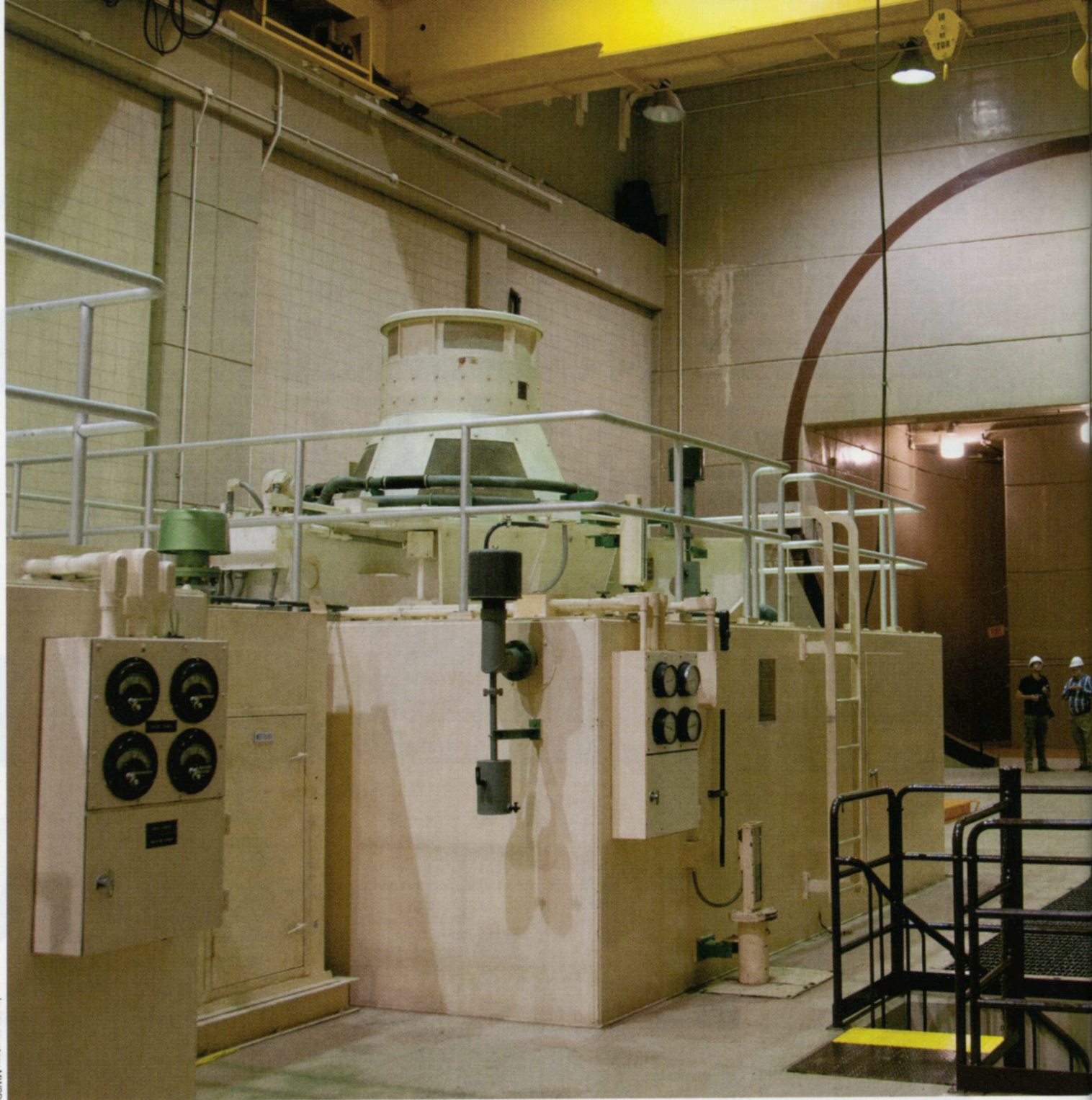


Image courtesy MWRD

Massive pumping stations are key elements of Deep Tunnel—Chicago’s solution to combined sewer overflows that has been decades in the making.

plant species in bioswales and infiltration planters will eliminate the need to use potable water for landscape irrigation and will result in a 131 percent increase in landscape and tree canopy cover.

More than 60 percent of the project’s construction waste was recycled, and more than 23 percent of all new materials contained recycled content. The street’s energy use has decreased by 42 percent.

Water has always been a major concern here. Chicago sits at the junction of

two major watersheds—those of the Great Lakes and the Mississippi River. In 1900, the Chicago River was reversed so that it would flow away from Lake Michigan and into the Mississippi. Since Lake Michigan supplies the city’s drinking water, that was an important anti-pollution effort, but it didn’t suffice. Lake Michigan is still where combined sewer overflows can ultimately wind up during extreme storms.

The MWRD, established by the Illinois General Assembly in 1889, began work on

an innovative and ambitious solution to those overflows in the 1970s. The Tunnel and Reservoir Plan, or “deep tunnel,” is one of the largest civil engineering projects ever undertaken in the U.S.

TARP consists of a system of large underground tunnels and vast reservoirs designed to capture overflows and to hold the polluted water until it can be fully treated at water reclamation plants.

TARP is being built in two phases: Phase I, completed in 2006, consists of 109.4 miles



Image courtesy Google Earth

As part of the Deep Tunnel project, Thornton Quarry, just south of Chicago, will soon have a 7.9-billion gallon stormwater storage capacity.

of tunnels with a total storage capacity of 2.3 billion gallons. Phase II, currently under construction, consists of three reservoirs whose total storage capacity will be nine times greater—more than 18 billion gallons.

The Gloria Alitto Majewski/CUP reservoir, completed by the U.S. Army Corps of Engineers in 1998, can hold 350 million gallons. The Thornton Composite Reservoir, being built in former quarries, will have 7.9 billion gallons of storage capacity when completed in 2015. Stage 1 of the Mc-

Cook Reservoir—with a capacity of 3.5 billion gallons—will be finished in 2017, and McCook Stage 2 will add another 6.5 billion gallons of capacity by 2029.

TARP has already been effective. Since the first tunnels went online in 1985, the average number of days per year with combined sewer overflows has been cut in half, from about 100 to 50. An estimated 85 percent of the pollution from TARP's service area is now being captured and treated, which means all the city's waterways are

cleaner these days.

The entire Chicagoland region has come a long way since its early days of development in a marshy swamp. As community partnership efforts continue, the need to mop up backed-up basements could become a thing of the past. ■

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