A NEW CIVIC IDENTITY IS BORN

Located in downtown Minneapolis, Target Field Station is more than simply a light-rail hub. In addition to facilitating the flow of large crowds to the home of the Minnesota Twins, the station offers an amphitheater, public gathering spaces, and economic development opportunities. Designed with the environment in mind, it also features innovative measures for collecting and reusing stormwater runoff and snowmelt.

By Justin Gese, P.E., M.ASCE

The station’s upper-level plaza includes an area called the Light Garden, which features nine programmable light-emitting diode fixtures interspersed among the plaza’s tree trenches, along with the Great Lawn, a green expanse complete with a 15 by 30 ft video screen located on top of the elevator bank.
Station embodies the five primary design principles of open transit in that it incorporates all modes of transit; promotes development; creates iconic indoor and outdoor spaces; appeals to passengers, residents, office workers, and visitors alike; and integrates culture with mass transit by placing the latter in the heart of the public square. Incorporating these design principles resulted in a project that offers significant benefits in the heart of the public square. Incorporating these design and integrates culture with mass transit by placing the latter appeals to passengers, residents, office workers, and visitors alike; 

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Yet another feature of the plaza is the light-rail bridge, which comprises 13 precast-concrete spans ranging in length completed in April 2014, and the station opened to the public the following month.

In addition to dealing with a pronounced lack of space, the project team, as part of its construction planning and logistics efforts, had to remove contaminated soil from areas in which excavation pertaining to foundation construction and piling installation was planned and to demarcate utilities that would be either abandoned or relocated. Construction phasing also was essential given the critical operations of the HERC. That facility generates enough steam energy to provide electricity to 25,000 homes, as well as to power heating and cooling systems in nearby buildings. Therefore, the project team had to ensure that the 200 garbage trucks that visit HERC each day would continue to have access during construction. This required a detailed phasing plan and

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The project team opted to use large geofoam blocks as a lightweight alternative, in some areas stacking them to a height of 15 to 20 ft. from 40 ft to 90 ft. Approximately 1,050 ft long, the bridge supports the rail tracks, the station terminal, and the platforms for the METRO Blue and Green lines. Its design will facilitate connections to two other light-rail lines planned for the future. This level also includes tail, or storage, tracks having sufficient capacity to store six light-rail trains. The tail tracks were constructed to stage as many cars as necessary to handle the rush of spectators leaving Target Field at the conclusion of a large event. Beginning at the west end of the bridge, the tail tracks wrap around the south side of the HERC. Built on grade, the tails require the construction of large retaining walls, and because of poor soil conditions, these walls were built on pilings. These same poor soils ruled out the use of traditional fill in many locations within the retaining walls because the sheer weight of the fill and the waiting trains would have caused settling. As a result, the project team opted to use large geofoam blocks as a lightweight alternative, in some areas stacking them to a height of 15 to 20 ft. Located at street level, the second level is home to Station Square and to a coffee shop and other planned businesses. The square gives pedestrians and cyclists access to the sidewalks and trails in the surrounding community. It is also home to a massive outdoor amphitheater featuring a curved design and a built-in cascading stairway that leads to the third level. Visiters entering Station Square from the street proceed past the coffee shop and beneath the light-rail platforms and bridge. This and other challenges complicated efforts to meet contamination plumes in the area that drains to the waterway. This and other challenges complicated efforts to meet the design team’s goal of preventing any movement of existing contamination plumes in the area that drains to the waterway. This and other challenges complicated efforts to meet the design team’s goal of preventing any movement of existing contamination plumes in the area that drains to the waterway. This and other challenges complicated efforts to meet.

Certain site considerations led the design team to develop an innovative system for collecting and reusing stormwater. For example, the presence of petroleum-based contamination in various places precluded the possibility of allowing stormwater to infiltrate into the ground. With the Mississippi River only about 1 mi downstream of the project site, the design team sought to prevent any movement of existing contamination plumes in the area that drains to the waterway. This and other challenges complicated efforts to meet the stormwater management requirements specified by the city of Minneapolis, Hennepin County, and the Mississippi Watershed Management Organization, which is based in Minneapolis.

Rising to these challenges, the project team developed an innovative stormwater collection and reuse system, a circulatory snowmelt system, and a low-impact landscape design. Although largely invisible to the thousands of people who pass through the station each day, these novel approaches to stormwater management are among the station’s most notable features.

The first of its kind in Minnesota, the stormwater collection system captures rainfall and snowmelt runoff year-round from the plaza on the third level, from two large green roofs, and from the light-rail bridge and station platforms. Rainwater and snowmelt enter surface drains on the plaza and the bridge and flow through pipes to two cisterns located below the bridge on the station’s second (ground) level. The two 15 by 15 ft cisterns have a combined storage capacity of 40,000 gal. Stored temporarily in the cisterns, the stormwater is pumped at a rate of 9 gpm to the HERC, which passes the water through a sand filter and reuses it in various industrial processes. Because every square inch of the site was needed for commuters and other users of the station, the area around the station afforded little room for snowplows, and there was even less room for shoveled snow. In devising a solution, the project team took advantage of the waste heat from the nearby HERC and created a system for melting snow. All of the station’s concrete surfaces and the HERC parking areas form part of an integrated snowmelt system designed by the Minneapolis-based firm Michael Cooley Erickson.

A snowfall, accumulated snow is melted by approximately 50 mi of glycol-filled tubing that runs beneath a significant part of the station’s paved areas and plazas. Once the snow has melted, the glycol is returned to the HERC, reheated, and then routed back through the tubing in a continuous process. This system will eliminate the maintenance and labor costs associated with shoveling and plowing snow and distributing sand and salt, which is normally used in the winter to help melt residual snow and ice. The snowmelt system will also extend the life of all of the project’s concrete since it will reduce the amount of expansion and contraction that the concrete undergoes in response to the melting and refreezing that are typical of a Minnesota winter. All rail, including runoff from melted snow, the water system will capture approximately 3 million gal of runoff per year and convey it to the HERC, reducing the center’s overall demand on the municipal water supply.

In addition to the system for collecting and reheating runoff, Target Field Station implements several low-impact landscape and stormwater collection systems. Situated in a highly urbanized site, the 104,000 sq ft Target Field Station was carefully laid out to accommodate elevated light-rail train tracks and a supporting bridge, as well as such features as pedestrian plazas and a 1,000-seat amphitheater.
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(Continued from Page 73) design practices, including tree trenches, landscaped bioretention planters, and the two green roofs. Although the cisterns capture rainwater from the plaza and surfaces on the top level, the stormwater that falls elsewhere at the site is captured by storm sewer inlets, permeable pavers, and bioswales, the pavers and swales dispersing the water to the 150 trees, 1,300 shrubs, and 5,400 native plants on site. To address concerns about the contamination within the site, a liner was included at the base of the infiltration features, and clean soil was added to help filter runoff.

Any runoff that is not routed to the cisterns is captured by the storm sewer inlets and conveyed directly to a 7,000 cu ft underground storage system consisting of three rows of 300 ft long, 60 in. diameter pipes. This system is used to control the rate at which stormwater is discharged into the city’s collection system. Any rainfall that falls on Station Square is captured on the parking deck. From there it drains to the bioswales, where it is filtered and routed to the same underground storage system. Furthermore, any overflow from the cisterns is routed to the bioswales and the station’s permeable pavers, which feed water to the street trees.

In combination with the stormwater and snowmelt collection system, these features reduce the amount of runoff from the Target Field Station site by 27 percent, lower the total suspended solids in the runoff by 97 percent, and decrease total phosphorus in the runoff by 62 percent. Ultimately, inclusion of the stormwater management system is in keeping with an environmentally responsible design that will benefit Hennepin County and Minneapolis and endure for decades.

As with most projects, the design adhered to local, state, and federal standards, criteria, and regulations. In compliance with the Americans with Disabilities Act, the station includes an elevator bank and has ramps that can be used by those in wheelchairs. Moreover, the station’s waiting areas are covered and have on-demand heating for increased passenger comfort during Minnesota’s cold winters.

The project design also included a plan to reduce the effects of construction on the nearby 10-story Ford Center, which was constructed in 1914 and used as a manufacturing facility for the Model T. Because the building is listed in the National Register of Historic Places, the station design was subject to review and approval by Minnesota’s State Historic Preservation Office.

To help inform the public about the sustainable aspects of Target Field Station, Short Elliott Hendrickson installed permanent signs in and around the project site. These information boards highlight the system used to capture and reuse stormwater and snowmelt and illustrate how the system operates. They also explain how the system reduces the amount of runoff from Target Field Station, enables water to be reused on-site at the HERC, and significantly improves the overall quality of water that leaves the site and enters the Mississippi. The informational signs help visitors understand how these sustainable features directly benefit the environment and the community.

Target Field Station is the center of a well-planned network with connections to residential areas, an employment center, shopping and retail destinations, education and training institutions, and a medical clinic. By offering access to so many amenities, the station has reduced the need for city residents to rely on automobiles, thereby lowering transportation costs. Because the station can easily be accessed by bike and on foot, the project may enable some residents to do away with a vehicle altogether, further helping to lower transportation costs.

The Target Field Station project reflects a passion to devise innovative, sustainable solutions that directly benefit the environment, community residents, and businesses. In approaching this project, the team incorporated many elements and features embodied in the sustainability goals of Hennepin County and Minneapolis. With ecofriendly mass transit, a focus on bicycling instead of driving, and the construction of rain gardens and green roofs, the project helps place Hennepin County and Minneapolis far ahead of the curve when it comes to caring for the environment.

In August 2014, the U.S. Green Building Council, of Washington, D.C., and Green Business Certification, Inc., announced that the station had met the requirements for certification in the Leadership in Energy and Environmental Design (LEED) program. The project earned a total of 44 points, 4 more than required for certification. It was also built in accordance with the Minnesota energy conservation program known as Building, Benchmarks, and Beyond (B3).

The term “sustainability” has been defined in many ways. However, the most fundamental definitions are the “ability to sustain” and the “capacity to endure.” The Target Field Station project offers the community and mass transit users an insight into what is possible through sustainable engineering and construction. The community and visitors alike are deriving benefits from a project realized by a team that refused to disregard the natural environment. The station will meet the mass transit needs of people today and tomorrow, and its design gives full scope to opportunities for future economic development. Ultimately, the $79.3-million project created more than 300 construction jobs. With its mix of uses, its central location, and its purposeful design, Target Field Station has helped to create a new civic identity and instill pride within Minneapolis and Hennepin County.

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PROJECT CREDITS
Owner: Hennepin County, Minnesota Architecture and station design: EEE&K, a Perkins Eastman company, New York City Civil engineering, landscape architecture, geotechnical engineering, and stormwater management design services: Short Elliott Hendrickson, Inc., Minnetonka, Minnesota Snowmelt system design: Michael Cooley Erickson, Minneapolis Design/build team leader: Knutson Construction, Minneapolis, office...