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Skanska U.S.A. Civil Highway Projects, U.S.A.

Case Study 106

Skanska U.S.A. Civil conducts highway projects that bring about financial and environmental savings through the efficient use of resources. Two such projects are the 11th Street project in the District of Columbia and the Interstate-215 project in California.

Aspects of Sustainability

This project highlights the following:

Green Aspects

- Energy
- Carbon
- Materials
- Water
- Local Impacts

Social Aspects

- Human Resources
- Corporate Community Involvement
- Business Ethics
- Health and Safety



11th Street Project

11th Street Project, District of Columbia

The 11th Street Design Build to Budget (DBB) project is a US\$ 379 million dollar road and bridge redevelopment project in the District of Columbia that began in late 2009 and is scheduled for completion in November 2015. The project is designed to reduce severe traffic congestion in the area, and Skanska is conducting the scheme in a Joint Venture for the District of Columbia Department of Transportation.

The 11th Street project involves the redevelopment of the Southeast/Southwest Freeway and Anacostia Freeway interchange to provide increased accessibility, greater capacity and improved safety. It also includes the demolition of 8 existing bridges, the creation of 19 new bridges, 26 lane-km of new pavement and ramps, and 11 lane-km of road resurfacing. Three of the new bridges are 300 m in length across the Anacostia River.

The project team established a target to crush and reuse all concrete and asphalt demolition materials on site as fill material.

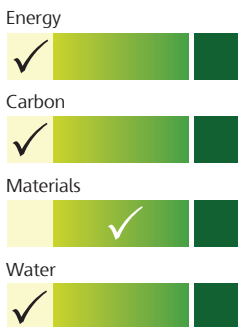
Interstate 215 Widening Project, California

The Interstate 215 highway widening project in San Bernardino is a four-phase scheme carried out by the California Department of Transportation (Caltrans) in association with San Bernardino Associated Governments (SANBAG) and the Federal Highway Administration. The section of highway is a major corridor in Southern California that was used by 83,000 vehicles per day on average in 2003, and is projected to carry 135,000 vehicles per day by 2030.

A Skanska joint venture is performing phase 3 of the project to improve and widen a 6.4 km section of the highway (segments 1 and 2) from Rialto Avenue to Massachusetts Avenue. The contract is valued at US\$ 154 million, of which Skanska has a 60 percent share. The project involves the creation of two new highway lanes in each direction, one carpool and mixed flow, new on- and off-ramps on 5th Street and Baseline Street, the construction of sound and retaining walls, and the demolition of

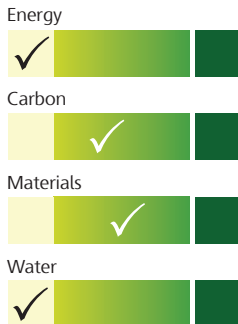
11th Street Project

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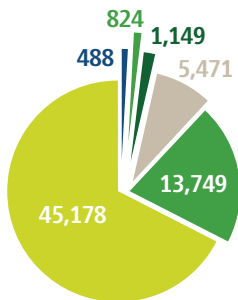
Interstate 215 Widening Project Skanska Color Palette™



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Interstate 215 Widening Project



Interstate 215 material carbon footprint summary (tCO₂e)

Concrete and concrete products – 45,178
Metal – 13,749
Asphalt – 5,471
Wood – 1,149
Quarry materials – 824
Plastics – 488

eight bridges and the construction 19 new bridges. The widening project began in September 2009 and will be complete in August 2013.

The project will increase traffic flow, eliminate fast-lane entrances and exits, widen freeway bridges, aid traffic merging by adding auxiliary lanes, improve air quality, reduce noise with sound walls, and enhance access to both the east and west sides of the city. The Skanska joint venture is aiming to maximize the reuse of waste concrete and asphalt materials on site.

Contributing Toward Sustainable Development

Skanska U.S.A. Civil conducts highway projects that bring about significant financial and environmental savings by reusing asphalt, concrete and demolition materials waste materials. Further financial and environmental savings can be realized on highway projects by minimizing energy use, carbon emissions and potable water use. Highway improvement projects can also minimize their environmental impacts associated with construction activities, promote urban accessibility, enhance highway safety and improve stormwater management. During construction, highway projects can minimize public disturbance, and bring about significant local economic benefits by utilizing regional construction workers and materials.

Green Aspects

Carbon

Carbon footprinting

Carbon footprinting tools can quantify carbon emissions and help guide carbon reduction measures on projects. The Interstate 215 team used Skanska's carbon footprinting tool to conduct a preliminary carbon footprint, which calculated that the project reduced carbon emissions by over 16 percent by incorporating recycled aggregates rather than sourcing virgin materials off site. The project's carbon footprint was reduced from 79,807 tCO₂e to 66,859 tCO₂e by reusing waste concrete and asphalt materials on site.

Materials

Waste management during construction

On the 11th Street project, 100 percent of the asphalt and concrete from resurfacing and demolition works will be recovered and reused on site, and less than 5 percent of the total demolition and construction waste will be sent to landfill. During construction, an estimated 35,000 tons of waste concrete and asphalt will be crushed to specific sizes and used on site, for example as embankment fill. The reuse of waste materials is also estimated to reduce trucking hours for hauling demolition materials off site by approximately 320,000 km during construction, which avoids fuel costs, vehicle emissions, noise and traffic congestion. The project will also recover 5,400 tons of structural steel and rebar demolition materials from bridge

structures, which will be dealt with by a recycling subcontractor off site. Office waste is sorted at the site office in collection bins.

The Interstate 215 project team is working to reuse as much of the waste concrete and asphalt materials from the site and will send less than 5 percent of the project's waste to landfill. In total, approximately 150,000 tons of base and aggregate material will be produced from recycled materials from the project, which accounts for around 30 percent of all materials used on the project.

Water

Stormwater management

Highway projects can improve stormwater management by upgrading inadequate urban drainage infrastructure. For example, the Interstate 215 project incorporates new urban drainage systems, which have larger stormwater retention capacity that is designed to deal with a 100-year rain event.

Other Green Aspects

Minimizing environmental impacts

Plans to manage the sustainability and occupational health and safety aspects of the 11th Street project were subject to third party review and audits as part of Skanska's ISO 14001 and OHSAS 18001 certification. This work resulted in zero non-conformances and confirmed that Skanska's programs were in place and achieved their objectives.

The entire 11th Street project team, including subcontractors, were given environmental training. Concrete washout pits are strategically placed around the site, and the residue concrete is crushed on site by a portable crusher and reincorporated



11th Street Project

into the project as backfill. Equipment operators are encouraged to shut off equipment that would be idle for more than three minutes to reduce fuel costs and site emissions. Environmental evaluations are conducted weekly and immediately after a major weather event by the project Environmental Auditor. The evaluations identify potential environmental risks and are intended to ensure that standards are maintained.

Both projects underwent third party audits as part of their ISO 14001 and Safety, Health and Environmental Management Programs (SHEMPs), which included a comprehensive set of procedures to mitigate and eliminate workplace and environmental hazards. A SHEMP was created for every hazardous environmental aspect. Dust was controlled by using water trucks and by covering all embankment slopes.

Social Aspects

Project partner cooperation

The 11th Street team was encouraged to cooperate throughout the project to identify how environmental and financial savings can be made.



Interstate 215 Widening Project



Interstate 215 Widening Project

For example, the team developed Alternative Technical Concepts (ATCs) and Value Engineering (VE) proposals in which the Skanska joint venture identified possible cost savings and schedule improvements. Any cost savings approved through the ATCs and VE proposals were shared with the client.

Stakeholder communication

The Interstate 215 project issues website information and Twitter feeds that notify stakeholders of the project's progress, timeline and possible public disruptions. The team held monthly business stakeholder meetings to inform and discuss the project with local businesses and how the project would affect them. Project presentations were also offered to interested organizations.

Occupational health and safety

The 11th Street project team had two lost time incidents and a Lost Time Accident Rate of 1.85 per million hours worked between 2010 to September 2012. SHEMPs were rolled out and used on the project. Additionally, every employee underwent Skanska's Injury Free Environment training and 30 hours of OSHA (Occupational Safety and Health Administration) classes.

The Interstate 215 project had a Lost Time Incident Rate of 2.75 per million hours worked as of November 2012. Comprehensive SHEMPs and a full-time Safety Engineer promoted high standards of safety on the project. All supervisors and foremen attended 30 hours of OSHA classes and the Skanska Project Executive was assigned to the California Executive Safety Committee.

The Interstate 215 team produced information brochures in English and Spanish that were directed at children and parents to inform about the dangers of entering the construction site. Warning signage and barriers were also installed to deter unauthorized access into the site.

Improved highway safety

Highway upgrade projects can enhance highway safety by improving or replacing outdated infrastructure. For example, the Interstate 215 project involved replacing fast lane exits and entrances, with safer more conventional on- and off-ramps on the far right lane of the highway.

Minimizing public disturbance

Mitigation of public inconveniences was a key topic addressed by the 11th Street team throughout the design process. Many construction activities were performed at night when daily traffic volumes were significantly lower to reduce public disruption.

On the Interstate 215 project, there was a specific SHEMP created for traffic disturbance. Much of the work involving lane closures was conducted at night to minimize public and traffic disturbance. An extensive public relations and outreach program was conducted to inform the public of when noise disturbance from loud construction activities were scheduled to occur. Noisy procedures, such as pile driving operations, were conducted during the day when the majority of the public was either at work or school. The ambient background noise of the highway generally exceeded noise levels from project construction activities.

Improved urban accessibility

The 11th Street project involves rebuilding sections of highway in order to improve access over the Anacostia River and between downtown Washington and the underserved Anacostia neighborhood.

The previous Interstate 215 arrangement brought all traffic to the east side of the City of San Bernardino in order to avoid navigating a railroad immediately to the west side of the highway. The new design includes 19 bridges and provides access to both the east and west sides of the city, which will improve accessibility, and avoid unnecessary vehicle journeys and congestion.



11th Street Project

Carpool lanes

The Interstate 215 project involves the addition of carpool lanes in both directions, which maximize highway capacity by providing incentives to use buses, vanpools, and carpools. Carpool lanes are designed to move more people per vehicle, and can reduce travel times and vehicle emissions.

Economic Aspects

Regional construction employment and materials

Over 650 people were involved in the construction of the Interstate 215 project. Approximately 70 percent of the workers were from the Inland Empire metropolitan area. Skanska's partner on the project is a local company that sources materials locally, such as aggregate from local mining operations, and steel reinforcing mesh from local producers.

Efficiency financial savings

The use of recovered site waste materials on the 11th Street project will save approximately US\$ 420,000 (estimate based on 35,000 tons of reused waste material and US\$ 12 savings per ton) over

the course of the project by avoiding the financial costs associated with disposal and the sourcing of virgin materials. Similarly, the Interstate 215 project will save approximately US\$ 1.8 million by reusing waste project materials (estimate based on 150,000 tons of reused waste material and US\$ 12 savings per ton). The 11th Street team also made financial savings by completing sections of the project more efficiently. For example, the reconstruction of the 11th Street Bridge was constructed 6 months ahead of schedule and US\$ 20 million under budget.

Learning From Good Practice

The reuse of waste materials on highway projects can result in significant financial and environmental savings. Skanska U.S.A. Civil intends to further improve its environmental performance on future projects by working to reduce site energy and potable water use. The Skanska Color Palette™ serves as a guide for such efforts and Skanska's Journey to Deep Green™, which entails projects with minimal or zero environmental impacts.



11th Street Project