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A2 Pepperhill to Cobham Highway Widening project, UK

Case Study 40

The A2 highway widening project in Kent, UK, has improved road safety, reduced congestion, boosted the regional economy and mitigated the potential impacts on sensitive species.

Aspects of Sustainability

This project highlights
the following:

Social Aspects

Human Resources
Corporate Community
Involvement
Business Ethics
Health and Safety

Environmental Aspects

Energy and Climate
Materials
Ecosystems
Local Impacts

Economic Aspects

Project Selection
Supply Chain
Value Added



Project Introduction

The A2 highway between the Pepperhill and Cobham junctions in Kent, UK, has been partially relocated and widened. The section of highway is 7km long and carries over 110,000 vehicles per day. The old stretch of highway was severely congested during peak hours, suffered frequent accidents and ran close to the town of Gravesend, significantly disrupting local residents. Congestion was forecast to worsen as traffic volumes continue to increase and as the Kent Thameside regeneration project progresses.

Skanska is carrying out the US\$ 242 million project for the Highways Agency, and is scheduled for completion in early spring 2009. The project was implemented as a Highways Agency Early Contractor Involvement initiative. Skanska was involved in the planning, design and management of the entire project, which has involved widening

the highway from three to four lanes in both directions as part of a strategy to provide a consistent standard of highway from the M25 to the M2 in Kent. The existing A2 route between Pepperhill and Marling Cross has been relocated south away from Gravesend, adjacent to the Channel Tunnel Rail Link, and the stretch between Marling Cross and Cobham has been widened. The redundant stretch of highway close to Gravesend has been landscaped to provide a green corridor.

The area is of archaeological interest and the adjacent Shorne and Ashenbank Woods, which is a Site of Special Scientific Interest, is home to protected and endangered species, such as badgers and great crested newts. As a major transport route linking London with Dover and Continental Europe, the project could have had serious economic consequences if not properly managed.

Contributing Toward Sustainable Development

The A2 improvement has reduced journey times, enhanced safety and reduced disruption for the residents of Gravesend. The project has also improved run-off quality from highway drainage, sustainable transport provision and has enhanced biodiversity in the area. During design and construction, local stakeholders were informed and involved in the project, and public disruption was avoided as much as possible. The project had an exemplary occupational safety record and strived to create good relationships with all project partners and staff. Charitable community donations were made and local schools have been involved in the project. An archaeological study documented and preserved archaeological remains unearthed during the project. The project promoted regional economic development by employing local people, materials and services. Environmental impacts were minimised during construction and special mitigation plans were implemented to manage waste, safely deal with asbestos and to ensure that protected species were not compromised.

Social Aspects

Stakeholder involvement and communication

As part of the Early Contractor Involvement initiative, Skanska was responsible for developing the design and managing the public inquiry process. Skanska organised a series of public meetings attended by over 2,200 people and developed the design accordingly with the local authorities. The highway was open throughout construction and public communication was a vital component of the project. Skanska appointed a public liaison officer to manage a public information strategy, which included a telephone information line, project newsletters distributed among the surrounding communities and media coverage of potentially disruptive road works. The Highways Agency website advised the public on lane closures and potential traffic disruptions, allowing motorists to receive email updates. Skanska signed up to the Considerate Constructors Scheme and the project fulfilled the Scheme's requirements for being considerate to the public.

Minimising public disruption during construction

Dual three-lane traffic flow was maintained throughout the project during peak hours due to the socio-economic importance of the A2 route,

with over 80 million vehicle movements through the site to the end of August 2008. However, reduced speed limits and restricted junction access were unavoidable consequences of the project. The project was planned to minimise the effects on local people by maintaining public walking, cycling and vehicular rights of way or by providing alternative routes.

Project partner collaboration

The project team strived to create a friendly and productive working environment by using open and transparent site communications, not applying excessive or unrealistic pressures to get work done and by encouraging managers and supervisors to be out on site. Consequently, the team received positive feedback from subcontractors who felt they were valued and fairly treated.

Occupational health and safety

As of August 2008, 1.4 million hours had been worked with no major injuries and no accidents resulting in more than 2 days of lost time. The project induction was longer than normal, which allowed health and safety staff to fully brief the team and demonstrated a genuine commitment toward the prevention of accidents. Small wash-proof cards were provided to the induction attendees listing emergency contact information.



The Near Miss initiative encouraged workers to report over 800 near miss incidents throughout the project, and helped to address many safety and operational issues before they resulted in incidents. Project specific safety considerations included the enforcement of 80 km/h highway speed restrictions during roadside construction activities.

Motorist safety

The old highway had a poor safety record, with 285 personal injury accidents and 1 fatal accident on the 7km route between July 1998 and June 2003. This was largely the result of substandard access onto the highway, which has been removed from the realigned and improved section. Computer modelling has estimated that the new design will prevent five fatalities, 28 serious injuries and 489 slight injuries in the first 30 years of operation.

School education

Skanska initiated project-related educational topics, such as local history, archaeology, safety and environmental management during presentations at local schools and school site visits. As of July 2008 approximately 420 children had visited the site and approximately 700 children had participated in presentations about the project at their schools. Skanska also organised educational school walks along the route at different stages of the construction.

Reduced local resident disturbance

The A2 has been relocated approximately 200m away from Gravesend town, and a low-noise surface and earth mounds have reduced noise disturbance by an average of 4.5 dBA for 2,500 homes, and levels have halved for residents in over 250 properties. 400 properties have also been removed from the Air Quality Management Area as a result of the project. Minor increases in noise and air pollution for a small number of households were anticipated and weighed up against the benefit for the majority of local residents.

Sustainable transport

The redundant A2 route between Pepperhill and Marling Cross has been developed into a safe pedestrian, cycle and equestrian route, and is well connected to the new footbridges and existing local public rights of way. Existing footpaths have been widened and now incorporate cycleways.

Archaeological study

A team of archaeologists monitored the initial construction stages, to excavate and record any archaeologically significant finds. Topsoil was

removed from an area 3 km long and 50 m wide for archaeological investigation. Archaeological finds included Neolithic tools over 10,000 years old, Bronze Age and medieval settlements, a Roman cemetery and three high status Roman burial sites. The Roman burial sites, dating from the 1st century AD, were among the best examples found in Britain and included bronze wear and pottery. The finds were displayed at an archaeological exhibition at Shorne Wood Country Park in May 2007, which invited local schools and attracted 1,400 visitors.

Charitable donations

Skanska organised fundraising events, made school improvements and donated to local charities. In spring 2008, a sponsored walk was organised for 600 children and their parents along the new highway, prior to opening, to raise money for their schools. School improvements included the redevelopment of a disused swimming pool into a playground, the construction of a mural wall to hide a local pub from the school's view and a playground extension. US\$ 10,000 was donated to local organisations and charities, including a special needs school and a tree planting project.

Economic Aspects

Construction employment

The project employed between 150 and 250 workers at different stages of the project. Well over half of the workforce was from the Kent area.

Local materials and services

34 percent of the value of project materials and services were purchased from companies based within 30 km of the project, and 64 percent within 80 km. A local Gravesend company was contracted to undertake the structural concrete and reinforcement work and all trees and shrubs were sourced from a local nursery.

Regional economic development

The project is of significant strategic economic importance and is part of the government's continued investment in regional infrastructure to support economic development. The A2 widening project has reduced congestion and improved journey time reliability along the route. The project has also improved transport links to the Ebbsfleet International Railway Station and the Thames Gateway, which is the largest regeneration project in Europe.



Environmental Aspects

Minimising environmental impacts during construction

As part of the Early Contractor Involvement initiative Skanska was responsible for producing the Construction Environmental Management Plan to detail the environmental control, mitigation and compensation measures for the project, including water use, energy consumption and noise. The 4.5 million litres of water required each month for dust suppression during the earthworks and demolition activities were obtained from a borehole to reduce the burden on the public water supply. Site electricity consumption was within Action Energy's good practice guideline of 128 kWh/m² annually, and was estimated to be reduced by approximately a third in 2008 compared with 2007, equating to a saving of over 70 tonnes of carbon dioxide emissions. Noise disturbance during construction was below the normal levels from A2 traffic.

Asbestos management

Asbestos surveys were carried out for four houses, a hotel, two petrol filling stations and old highway structures that had to be demolished. Asbestos Containing Materials (ACMs) were identified in most of the structures and a report for each documented the location, quantity and type, along with recommended action for each material. The reports were submitted to the demolition subcontractor who safely removed all ACMs prior to demolition.

Badger mitigation

A badger survey identified five active setts close to the site. Three of which had to be closed, including

a "main sett", which required the construction of a replacement, and Skanska ensured that two other setts within 30m of the site were not disturbed. Natural England and a licensed badger specialist were consulted on the design of the artificial sett, which was constructed a year in advance of the main works to ensure that the overall construction programme was not affected. The new sett was constructed in the badger clan's territorial area and consisted of a network of plastic drainage pipes and chambers, constructed using untreated timber. The chambers and pipes were partially filled with soil and straw to encourage the badgers to dig and investigate the sett and many of the pipes were open ended to allow the badgers to form new tunnels and chambers. Temporary exclusion fencing and gates were used to gradually evict the badgers over a four-week period. The setts were then carefully excavated and a single remaining badger encouraged towards the new sett. Permanent badger fencing has been erected to prevent animals venturing onto the highway.

Great crested newt mitigation

Skanska conducted a biodiversity survey in 2004, which identified great crested newts, a protected species in the UK, on the northern verge of the A2 adjacent to the Shorne Wood Country Park. Mitigation plans were agreed with Natural England and carried out under the supervision of a licensed herpetologist. Preconstruction search and capture exercises were conducted, 1,200m of one-way reptile exclusion fencing was installed and maintained along the boundary of the park throughout the construction, and bucket traps were placed at 10 m intervals to trap and remove newts from construction areas. Vegetation in areas where winter construction activities were

scheduled was trimmed in October to make the area less desirable for amphibian hibernation. A cable trench within the amphibian habitat was dug under an existing footpath to reduce ground disturbance, and temporarily excavated soil was placed on protective mats on sub-optimal habitat.

Promoting biodiversity

The redundant section of highway has been developed into a 25 hectare green corridor for the residents of Gravesend by landscaping and planting 45,000 trees. 30,000 native trees and shrubs have also been planted in an 18 hectare area within the new highway boundary to blend the route into the surrounding environment. Wild flower meadows have been promoted to enhance biodiversity and to complement the adjacent natural habitats. A biodiversity net gain is expected to develop as the land lost to the project was agricultural and had little ecological value.

Improved water run-off quality

A highway drainage system has been designed to minimise impacts on the water quality in the Ebbsfleet River and the underlying chalk aquifer, which is a source of potable water. The project has significantly improved the quality of water entering the aquifer as the previous highway provided no pollution control measures for road run-off. Six settlement ponds, with a capacity of 16,894 m³, remove contaminated silt from road run-off and reed beds filter hydrocarbon and heavy metal pollutants. The highway is also equipped to contain accidental spills to prevent potentially dangerous substances reaching water systems.

Waste management and recycling

96 percent of waste materials from the demolition and construction were either reused on-site or recycled off-site. Approximately 34,000m³ of road planings and 50,000m³ of crushed concrete were reused on the project or other projects. 235,000 m³ of surplus excavated material was used to create 4km of landscaping along the redundant highway alongside the residential areas of Gravesend, which reduced the need to transport and dispose of the material off-site. Chalk excavated from the site was used for a 600mm capping layer, and reduced the need to import 154,800 m³ of aggregate. Over 13km of redundant safety barrier was reused off-site, including in industrial parks and a tin mine. Lighting columns were reused on another Skanska highway project. Over 200 tonnes of scrap metal was recycled in total, and plastic and timber waste was recycled using local companies.

Learning From Good Practice

Skanska and the Highways Agency have benefited from the Early Contractor Involvement process, which allowed Skanska to develop an approach to the scheme, which integrated community work, environmental activities and archaeological investigations. Overall the scheme has delivered benefits to all interested parties and sets the standard for future projects with the Highways Agency.