

Construction of the M60 Junction 5-8 Widening Scheme

This case study looks at the very effective resource efficiency measures that were undertaken as part of the widening of the Manchester Orbital Motorway at Junctions 5-8.



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Summary

This M60 case study illustrates the incorporation of the resource efficiency aspects of sustainability into a highway construction project. The client, designers and contractors worked together to identify the environmental and social aspects of sustainability and then worked to minimise their impacts within the project. The scheme provided extensive opportunities for resource efficiency including waste minimisation and the use of recycled or secondary materials.

The overall scheme was awarded a CEEQUAL rating of excellent based on the successful incorporation of environmental, resource efficiency and social aspects of sustainability into a highways construction scheme.

Introduction

The M60 case study provides a good example of a highway construction project team taking full account of resource efficiency issues and aiming to minimise waste, the overall use of materials and particularly the use of virgin materials.

The scheme was commissioned by the Highways Agency under an Early Contractor Involvement (ECI) contract. The ECI contract enabled the project team to identify risk early and to resolve issues more quickly between the partners; it also fostered a more open approach within the team and with stakeholders. The parties participating in the scheme were:

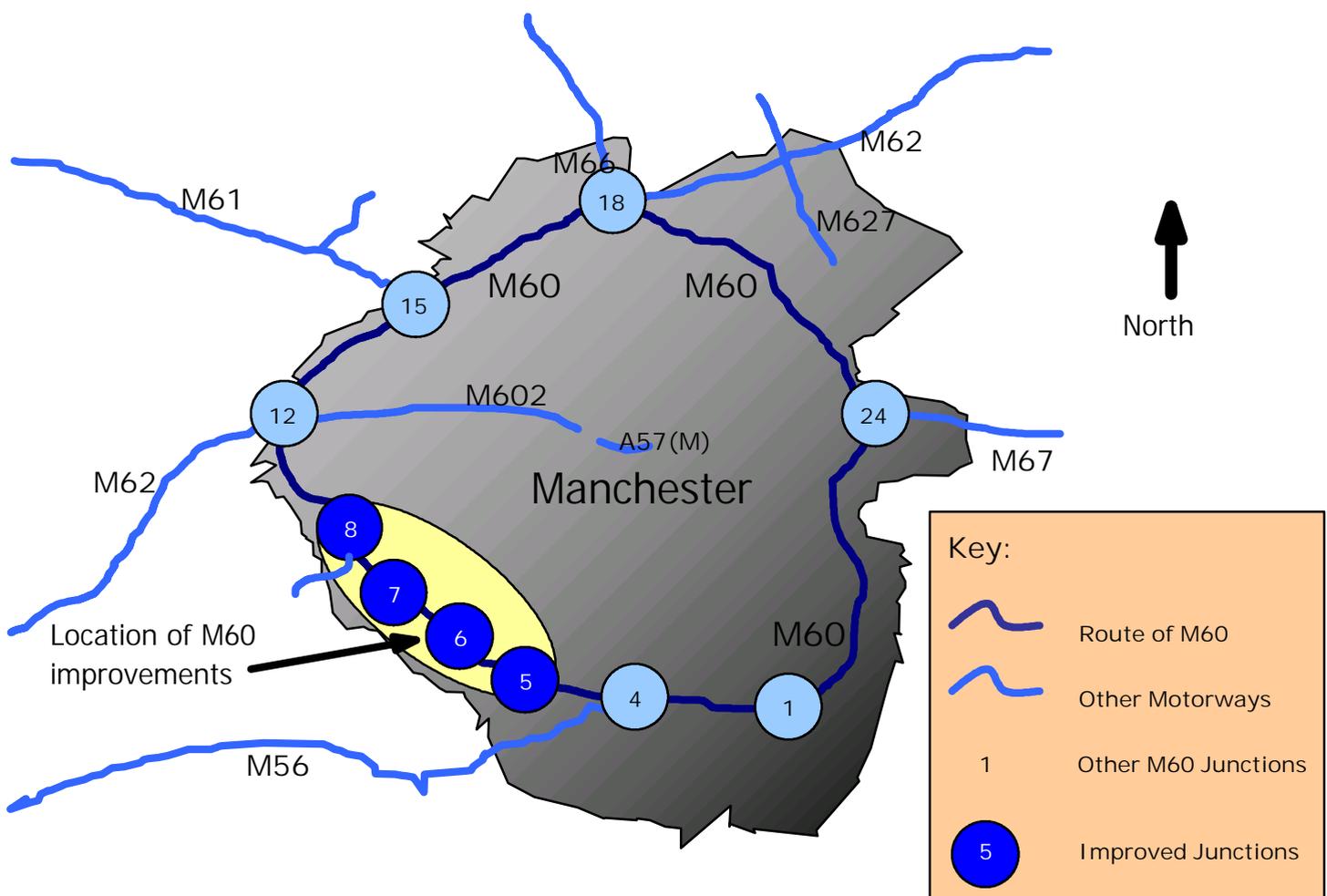
- n Highways Agency (Client)
- n Mouchel Parkman (Client Representative)
- n Halcrow (Designer)
- n AMEC-Alfred McAlpine Joint Venture (Contractor)

Description of the scheme

The scheme involved the widening of the M60 orbital motorway between J5 and J8 around the City of Manchester. This widening scheme was aimed at reducing journey times at peak hours and improving junctions to improve traffic flow. The work included the construction of 16 new bridges, new signal gantries and new retaining walls as well as the demolition of 11 bridges and older sign gantries. The scheme took 3 years to complete, starting in 2003 and finishing in 2006, and required that disruption to the traffic flow around the M60 was kept to a minimum.

The scheme provides additional lanes of traffic and improved junctions to improve journey times as set out below.

- n Between junctions 8 - 6, widening to a dual three lane motorway with parallel link roads which are two lanes wide with a hard shoulder, (except for the northbound link road from Junctions 6-7, which was already three lanes wide).
- n The existing parallel link road between Junctions 8 and 7 was extended to Junction 6 to reduce the number of 'weaving' movements on the motorway, as the junctions are very close together making it difficult for traffic to change lanes.
- n Widening to a dual four-lane motorway between junctions 6 and 5.
- n Improvements at the four junctions.



The main challenges of the scheme were identified as:

- n Maintaining the flow of traffic on the M60 and surrounding roads during construction with the minimum of disruption.
- n Minimising the impact of the development on local residents as some live only a few meters from the works.
- n Reducing traffic noise from the route once completed to minimise nuisance to residents

How the resource efficiency issues were addressed

The project team focussed on minimising overall material consumption and waste minimisation. This is in line with the HA's aim for sustainable construction to minimise resource use and waste. Wherever possible, site-won materials were used and recycling and reuse activities were undertaken. Actions included:

- Cold milling of redundant asphalt pavements for reuse in the construction of new pavements.
- Some waste concrete (from redundant pavements, bridges or access roads) was crushed and graded to a uniform size and reused in the new pavement construction.
- Crushed concrete not suitable for use in pavement construction was recycled and used as part of the new earthworks.
- The steel reinforcement from demolished structures such as bridges was separated out and sent for recycling.
- Pulverized Fuel Ash (PFA) was reused as fill for bridges or as lightweight embankment fill.
- Timber/trees were shredded for use in embankment fill.
- Polystyrene fill and surplus off cuts were returned to the supplier for reuse.
- Ash and glass material was used as general embankment fill.

Three existing bridges in the scheme were adapted for reuse rather than being completely demolished and replaced which was the original proposal. This was done by strengthening them and then jacking them up into their new positions. This decision reduced material consumption and waste considerably.

Economic benefits of resource efficiency

The decision to reuse, rather than demolish and replace, three bridges resulted in estimated savings of £2m and a 6 month reduction in the scheme programme.

Over 25,000 tons of waste materials were recycled or reused on this scheme and resource efficiency activities including recycling, reuse and waste minimisation are estimated by Amec to have saved £4.5million in project and energy costs.

Conclusions

This case study on the M60 shows that innovative engineering solutions and a strong desire to minimise waste and maximise resource efficiency using a wide range of activities led to substantial savings in terms of cost, virgin materials, energy and time.