

demonstration project

Aerial view of the completed road

Cadishead Way Stage2 Bypass

Contractor:	Birse Civils Ltd
Client:	Salford City Council / Urban Vision Partnership
Case Study Ref:	325
Project Number:	1213
Publication Date:	August 2008
Region:	North West
Sector:	Local Government, Infrastructure
Contract Value:	£11.8m
Project Timescales:	February 2004 – September 2005
Themes:	Partnering, Value Engineering, Sustainability

Cadishead Way is a new build road commissioned by Salford City Council. The project involved building a 2.4km single carriageway road between Brinell Drive, Irlam and Salford's boundary with Warrington at Glazebrook. The project was commissioned to ease congestion by diverting traffic away from the centre of Cadishead.

This was the first major civil engineering project fully committed to partnering for Salford City Council. The type of contract that was used for this scheme was the Engineering and Construction Contract (ECC) Option C: Target Cost with Activity Schedule. The form of contract was chosen to encourage the true spirit of partnering and to ensure that all parties would benefit from innovation and efficient working methods. To consolidate this amongst the team members a Partnering Charter was signed at a one-day partnering workshop with Birse Civils Ltd, Urban Vision Partnership Ltd (formerly Salford City Council Development Services) and Gifford Ltd.

Through a preferred contractor stage, the team developed the buildability of the scheme. This level of early contractor involvement also ensured value engineering savings were taken early to firm up the Target Cost for the scheme. The value engineering options were progressed using the partners' inhouse resources, knowledge and design skills to mutually agree on solutions.

The project team was fully integrated and there was no 'them and us' culture. The team employed joint problem-solving methods both pro-actively and reactively and carried out joint reprogramming of works, open-book accounting and ensured transparency of costs. Early contractor involvement and team integration led to several benefits such as value engineering, sustainable solutions to site works and early completion of the project.

Value Engineering

There were extensive meetings between the team to develop value engineering ideas, which were contributed to by both parties to provide a better product in terms of the overall project. Salford had a strong commitment to ensure that all parties benefited mutually from any value engineering savings on the project. Ideas included:

- An innovative approach to embankment excavation to avoid major temporary works
- Redesign of a retaining wall to minimise construction and financial risk
- Rationalisation of a testing programme to save on time and cost

Embankment Excavation

- Re-evaluation of temporary works from sheet piling to open cut excavation led to £20,000 cost saving to scheme
- An increase in the site boundary 6-10m was required on the railway embankment to permit open cut temporary works solution
- Birse Civils Ltd provided Salford City Council with information on an area of additional land required for this proposal and SCC then enquired with Network Rail to successfully obtain the land
- Excavation of approximately 32,000m^3 of material, partly used for surcharge

Retaining Wall Re-design

- The original design for the retaining wall along the Manchester Ship Canal involved bored piles, augered into rock and alluvial material. Birse assessed this as a high risk operation due to the instability of the alluvial material and the potential pollution to the canal. With extensive Environment Agency liaison the new steel pile design reduced the potential for negative environmental impact and reduced the overall risk.
- Total Length of Wall: 855m, Total Length of Sheet Piles: 6,700m, Total Length of 'H' Piles: 3,900m, Total Length of Raking Anchor Piles: 2,600m, Volume of Structural Concrete: 3,000m^3, Tonnage of Structural Steel: 1,100 Tonnes
- The alternative design of 'H' piles and raking anchors in lieu of CFA (continuous flight augered) piling led to cost saving of £355,000 – 3.1% saving from tendered cost
- Value engineering idea removed the risk of CFA piling and anchoring into existing rock head
- Use of Bunter Sandstone structural fill in lieu of 6F2 saved a further £5,000
- There was no increase in risk as a result of creating increased pathway for contamination of controlled waters i.e. H pile solution provides no more environmental risk than original CFA piling design

The scheme commenced in February 2004 and Target Completion Date was December 2005. The contract duration was 110 weeks. The Scheme was actually completed 16 weeks ahead of schedule in September 2005. Initial Target Cost was £11.3m, Final Target Cost £11.7m while Final Actual Cost was £10.1m

Sustainable Solution to Site Works

Unsuitable material excavated from the bridge embankment was originally due to be removed to landfill. Instead, it was re-used as surcharge for the road embankment. After the surcharge period this material was treated with lime stabilisation techniques and reused in a structural fill area. The lime stabilization technique was adopted because the existing material was unacceptable silty sand. The technique involved in-situ spreading and mixing of lime in 300mm layers followed by appropriate compaction. The material was rotivated to gain specific Moisture Condition Value (MCV), compacted and trimmed. The lime particle size specified was 6-20mm to guard against wind action and spread of particles. This promoted easier mixing and less waste. The lime reduced the moisture content of the clay, altered the MCV and ultimately increased the California Bearing Ratio (CBR). The CBR target was 3% in intermediate layers and 30% at top of embankment.

Existing poor ground conditions were combated by placing site won material on top of a capping layer along the route of the proposed carriageway. This worked towards eliminating initial and long term creep settlement. This was a linear scheme and the surcharge was placed in phases so as to not render the site completely idle in this section and hinder in other sections. Re-use of site won material equated to a saving of £5,000.

Other examples of recycling within the scheme included the use of by-products such as demolition materials for the piling working platform for the retaining walls. Planings from Hayes Road were reused within the footway fill which reduced the need for imported material. Crushed concrete material from the site was reused as Class 1A material. Vegetation including trees mulched during site clearance was used offsite by external parties. A Sustainable Urban Drainage System (SUDS) at Ch250-360 was used as bottom of batter drain.

Community engagement

Irlam and Cadishead Community Committee, along with the Friends of Princes Park and the local history society had a challenge of relocating the town's historical steam train engine for £10,000 or send it to the scrap yard for £1,000 – an option they wanted to avoid. Birse, as contractor came to the rescue by arranging for a 100-ton crane and a lorry to move the engine to a new location two miles away.

Bob Gibbon, project manager for Birse, said: "This was a way of saying thanks to the local community of Irlam and Cadishead for their patience during the construction works. We thought it would be a great idea to assist with the relocation of the engine for future generations to enjoy. We will be restoring the engine to its former glory with a new paint job when it is finally in place."

Lessons learned

- Early involvement of the contractor and extensive meetings between the team helped in developing value engineering ideas, which led to a better product
- The use of experts in technology of materials during the value engineering process and a proactive, flexible positive approach led to substantial reductions in volumes of materials required
- The Bypass was opened approximately 16 weeks ahead of the contract date and within budget. This performance was achieved mainly because of teamworking that enabled a reprogramming of the sequence of works

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