Exemplar Project
A465 Heads of the Valleys Dualling Section 3

23rd October 2014

Welcome
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Constructing Excellence in Wales

A465 Heads of the Valleys Dualling Section 3 Brynmawr to Tredegar

Exemplar design stage case study
23 October 2014
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Welsh Government Project Engineer
Mike Cummine
Carillion Project Director

Heads of the Valleys Dualling Programme

A465 Abergavenny to Hirwaun –
Current Conditions

Existing road is 3 lanes – 2 uphill & 1 downhill
Route has poor accident record
Limited opportunity for overtaking
Poor forward visibility in places
Lack of resilience in trunk road network in the area
At-grade junctions along its length
Congestion & unstable traffic flows at peak times – affects journey times & journey time reliability
Passes through area of long-standing area of social & economic depravation
Long-standing severe deprivation

A465 runs through HOV Strategic Regeneration Area (SRA)

SRA - 15 year plan to tackle root causes of poverty and other social problems

Wales Spatial Plan, Turning Heads & Wales Infrastructure Investment Plan (WIIP) identified regional problems linked in part to poor connectivity –

- Physically remote from major south Wales cities – Cardiff, Swansea, Newport
- Poor access to other cities in the UK
- Poor access to major ports
- Poor access within HOV region itself

Hence the “Dualling of the A465 is a major opportunity for the region”

A465 Programme

Section 3

BBNP

5 km Off Line

7.8 km New Dual Carriageway

4,813,683m$^3$ Earthworks

400,000m$^3$ Rock
Post Contract

- ECI Project
- Awarded in March 2010

Welsh Government ECI Process

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Contract

- Key Stage 3
  - NEC Professional Services Contract
  - Pain Gain incentive mechanism

- Key Stage 4
  - Continuation of PSC no incentive

- Key Stage 6 and 7
  - Engineering and Construction Contract Option C (Target Cost)
  - Pain Gain incentive mechanism
  - FTC with inflation mechanism £116m (Jan 2013)

Customer and Contract

- ECI Project
- Awarded in March 2010
- 70:30 Quality Financial Split
- Financial Element made up of:
  - Fee
  - Key Stage 3 Target Price (Preliminary Design)
  - Key Stage 6 Target Price (Construction and Aftercare)

Risk Transfer

Tender

Tender model required bidders to submit a mid tender budget assumptions report this highlighted areas of uncertainty (risk).

Client team took this uncertainty out of the tender by including a small number of Mandatory Budget Assumption for all bidders to follow:

- Mine workings
- Earthworks disposal (handling, haulage and fees £30/m3 £22.5m)
Shared Risk Management Process

Collaborative approach explored opportunities in road alignment & landscape mitigation to bring disposal down

- March 2010 – 750,000m³
- December 2010 – 400,000m³
- June 2011 – 150,000m³
- March 2012 – 50,000m³

Client View

Final Target Cost Earthworks 50,000m³ = £4m disposal cost

Transferred to Contractor’s risk allowance - party best able to influence the outcome for £4m increase in Target Cost

Contract pain/gain mechanism – WG only exposed to a max. 50% of any overspend & recovers min 50% of any under spend – Extra protection

Risk reduction £22m to £4m – Achieved through a proactive shared ownership approach to risk management.

Collaboration

One Team

Client View

What the Client really wants

- Make the economic and environmental case for the road
- Safe, on time, on budget delivery
- Deliver real and measurable benefit in the community

Aligned Objectives

Reduce waste responsibility, source materials and protect the environment

Make real contributions to the communities we work in

Community Engagement

Making sure the right scheme is delivered:

- 4 public information exhibitions
- 5 targeted community information days
- A ‘meet the buyer day’ for local businesses
- Personal visits with 83 landowners and 39 businesses
- 4 Orders exhibitions

Community Engagement

- 4 supermarket road shows
- 9 presentations to local interest groups
- 8 local schools events
Commitment

- Carillion
  - the largest employer of young apprentices in the construction sector
- Contract
  - 52 additional new jobs
- Targets
  - 18 Apprenticeships
  - 90% Local (HOV) Employment and Supply Chain
  - 90% Welsh Employment and Supply Chain
  - Supporting education and inspiring young people

Making it happen

AM55 Heads of the Valleys Section 3 – Sustainable Communities Model
Maximising local employment

- Employed 660 Welsh people
- Equates to 15,000 weeks
- Almost 45% from HoTV.

Up-skilling tomorrow’s workforce

- Wales’ 1st National Skills Academy for Construction

Up-skilling tomorrow’s workforce

- 27 Apprenticeships
- A465 Apprenticeship Academy – 50 New Apprentices
- Employment to 70 New Entrant Trainees

Inspiring the next generation

- Engaging them in the ‘world of work’
- Supporting and delivering curriculum
- Inspiring them to achieve more

Supporting Sustainable Communities

Site Safety Talks
Environmental Projects
Concrete Challenge
Careers Awareness

Primary Schools
Secondary Schools
Inspiring the next generation

Delivering Curriculum
Site Visits
Further Education
Higher Education
Supporting Sustainable Communities

Supporting local Communities
Glanhowy Primary
Glencoe Primary
Festival Park Refurb

Inspiring the next generation
Keeping it Equal Event
Girls into Construction
Challenging Gender Stereotypes
Supporting Sustainable Communities

Welsh Government
Jane Hutt, Finance Minister

“The dualling of the A465 is an ambitious project which the Welsh Government is fully committed to. Transport has a critical role to play in improving Wales’ economic competitiveness and it is vital that we get the most out of the construction phase of these projects.

“This is exactly what we want to see from public sector construction projects and Carillion should really be congratulated on the work they have done to ensure local businesses and people are benefiting from the project.

Application of BIM on highway Infrastructure Projects
Current 3D Planning Practice

- Some building projects
  - Rarely maintained to the end
  - Rarely adopted by the maintainer
- Some civil projects
  - Underground
  - Complex industrial process

What have we learned about BIM

Information Management

Capability Development

Options Appraisal
Clash detection

Communication Tool

Contractor developing 3D skills

Cemetery Rd Bridge & Retaining Wall

Benefit/Outcome
- Sequence - RC works with piling not an option
- Design - Value Engineering to delete piles
- Communication – Visual aid to explain intent at sensitive cemetery location

Capability Development

Carno Underpass & Embankment

Existing

Proposed
Hopes

- Creation of ideas and innovation
  - early and invest in 3D
- Clash detection particularly of services and drainage
  - supporting full GPS machine control
- Improved communication and understanding of plan
  - standardised Client handover information
  - realising the real value in asset management
Fears

- Planner (who can model) or Modeller (who can plan)?
- IT Constraints
  - Internal barriers and external constraints
- Value on highway schemes
  - Client's intention for Asset Management
  - Match model detail to complexity

Asset Management of the Trunk Road Network

- 1000 miles Trunk Road; 75 miles of motorway;
- 5% of road length; One third of traffic
- Asset Value approx £16 billion
- Over 3200 structures, 1400 retaining walls and 10 tunnels
- Local Road Network over 32,300km – all classes

Managing of the Trunk Road Asset

- What role is there for BIM?

Low Carbon Economies – Reducing Emissions at The Heads of the Valleys

Highway Construction Phase Carbon
Whole Life Carbon

- The 'in uses' phase represents 78% of the total carbon.

Whole Life Carbon – Network Efficiency

- Reduced construction carbon by 10% or 5,400 t.
- Reduced in services carbon by 18,300 t in the first 15 years.
- Effectively offsetting 35% of the construction carbon.

Offsetting Construction Carbon

- Engage with the designer - Efficient construction will never recoup inefficient design.
- Understand where the real long term carbon cost lies.
- Target high carbon materials.

Environmental Benefits

Earthworks

- Overemphasis on construction phase carbon efficiency may be misplaced?
- Should we adjust the alignment to make it as fuel efficient as possible to drive rather than to balance the earthworks?

Vs
Questions?

Project Rules - Visitors

- You must be escorted at all times.
- If you lose your escort – Black Hat - return to the Site Office.
- Follow all instructions given by your escort and traffic marshals.
- Mobile Phones are only to be used in designated areas.
- Beware of activities going on around and above you.
- Smoking is only permitted in designated smoking areas.

Minimum PPE
As a Visitor going onto site you must wear:

- Safety Helmet
- Safety footwear including steel toe and midsole protection and laces. S3 Only
- Long sleeve High-viz vest or coat
- Task Specific Gloves
- Light eye protection at all times and over glasses if wearing reading glasses.