


Appendix Q

Bolton to Blackburn QCRA Report (Feb 2014)

117353 Bolton to Blackburn QCRA Report

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GRIP Context

Current GRIP Stage:	3
GRIP Stage(s) to which this report relates:	4-8
Estimated start of significant physical works:	2015

1. Executive Summary

A Quantitative Cost Risk Analysis (QCRA) workshop was held in Square One, Manchester on 28th January 2014 with the objective of reviewing the risk exposure and proposing a contingency figure for the Bolton to Blackburn project.

- The mean risk exposure for the project is £913,169 representing 6.9% of the total Anticipated Final Cost (AFC) (cost estimate plus mean exposure).
- The P80 risk exposure for the project is £1,139,909 representing 8.4% of the total AFC (cost estimate plus P80 exposure).
- The biggest risks are: Serviceable sleepers not being available and the Commissioning Possession not being available.
- Key Assumptions that the model was based on are that no additional strengthening works will be required to the abutments and not additional retaining walls will need to be renewed.

2. Background

A previous study was commissioned by Blackburn and Darwen Borough Council to undertake a desktop timetable study for potential service improvements to the Manchester to Blackburn / Clitheroe rail corridor. The work was contracted to Arup with the key objective of examining in simplistic terms the viability of implementing an extended half-hourly service to complement the existing 2 tph peak service, such that the duration of the off-peak timetable rail service between Manchester and Blackburn was diminished and the peak service duration increased.

The main conclusions were:-

- Assuming the current infrastructure, the December 2008 timetable and current ROTP, a half-hourly off-peak train service could not be run reliably.
- A compliant solution could be achieved by extending Darwen loop approximately 1 mile in each direction, but this did create significant performance risk at Darwen, and possibly at Astley Bridge Junction, due to the tight margins for trains leaving and entering the single line sections.
- Converting Turton AOCL level crossing to full MCB-CCTV specification would save one minute on Blackburn to Bolton journey times, which could be used to improve service reliability.
- The total number of trainsets required to run the service will increase from the current three to five if a half-hourly service were introduced, assuming it ran only as far as Blackburn.

Subsequent work was performed by Mott MacDonald on behalf of Network Rail to develop the potential infrastructure changes in greater detail and established the associated indicative costs in order to achieve a nominal GRIP 2 project stage level of confidence

The scope is now defined as:

Extend both ends of the loops at Darwen station:

- Southern extension from 19m 20ch to 20m 10ch (where it ties in with the existing loop at Darwen) = 70ch (1540yds = 1410metres)
- Northern extension from 20m 40ch (where it ties in with the existing loop at Darwen) to 21m 20ch near Goose House Road = 60ch (1320yds = 1210metres)

The current progress is as follows:

- Option Selection Report completed and signed off.
- Track, Telecoms, E&P, Civils and Signalling Approval-in-Principle Designs completed by Mott MacDonald.
- Drainage – Culvert identified for possible discharge of proposed track drainage. Liaison ongoing with Blackburn with Darwen Borough Council (BwDBC) to determine likelihood of being able to discharge in to it.

3. Methodology

A Quantitative Cost Risk Analysis (QCRA) workshop was held in Square One, Manchester on 28th January 2014 with the objective of reviewing the risk exposure and proposing a contingency figure for the Bolton to Blackburn project. Representatives of Network Rail, Mott MacDonald, Transport for Greater Manchester and Blackburn Council were present. All participated in the deliberations.

The objectives of the meeting were to:

- identify significant risks to the achievement of the project objectives
- establish a project risk register in Active Risk Manager (ARM)
- identify actions to be undertaken to increase the probability of project success
- conduct an assumption analysis and identify any constraints

The risks to the project were identified in a brainstormed session. Mott MacDonald's risk register was also reviewed. Each risk was then analysed to understand the probability of occurrence and impact of the risks on the project outcome. A risk owner was allocated and a treatment strategy decided upon.

Evaluation was conducted using Monte Carlo analysis, using @Risk software, 10,000 simulations were used. A tornado graph was created to identify the uncertainty that has the most influence on the project.

4. Assumptions Analysis

Assumptions were discussed in detail in previous workshops.

Table 4.1 Assumptions Analysis Key

Stability	Sensitivity
A B C D	A B C D
A – Very Confident	A – Minor Impact
B – Fairly Confident	B – Manageable Impact
C – Uncomfortable	C – Significant Impact
D – Very Uncomfortable	D – Critical Impact
Will the assumption turn out to be correct?	How much does it matter if the assumption turns out to be true?

Assumption	Stability	Sensitivity	Justification
No additional retaining wall will need to be renewed	C	B	Allowed for 1 retaining wall – repair gabions and added support. Asset condition unknown
No additional cable routes will need to be renewed (small lift and shifts)	C	B	Possible opportunity if amount required is less than anticipated.
No additional culverts will be identified	C	B	Surveys still ongoing
No additional strengthening work will be required to abutments	B	C	Intrusive investigations have been specified and are underway some trial holes and window samples have been abandoned and no results obtained. Further investigations to take place.
The blockade and other possessions will be available as planned	B	C	Possession agreed. Commissioning possessions to be agreed.
There will be no contaminated ballast to be removed from site	B	B	WAC Analysis to be carried out as part of the GI by Bridgeways.
There will be no additional protected flora or fauna identified (apart from the 1 x badger already identified).	C	B	Additional surveys to take place
There will be no additional invasive species	C	B	Known Jap knotweed allowed for in estimate.
No highways work will be required	A	C	Confident that none is required
No UTXs will be required	A	B	Confident that no UTXs are required
No 3 rd party compensation	B	B	None identified as yet.

Infrastructure Projects

No land purchases will be required	B	B	None identified as yet.
Serviceable sleepers (F27s) will be available	C	C	Additional costs (approx 100%) if not available
No stagings will be required for the locs	C	B	£15k-£20k per stagings. Possibly 3 or 4 may be required.
Additional formation treatment works will not be required.	C	B	Formation treatment isn't finalised. Awaiting GI

5. Results

The point estimate of the project is approximately £12.399 million. The mean risk exposure for the project is £913,169 representing 6.9% of the total Anticipated Final Cost (AFC) (cost estimate plus mean exposure). This is represented as follows:

	Risk Exposure	
	Mean	80%
Exposure	£913,169	£1,139,909

The graph below shows the range of simulated total risk exposures:

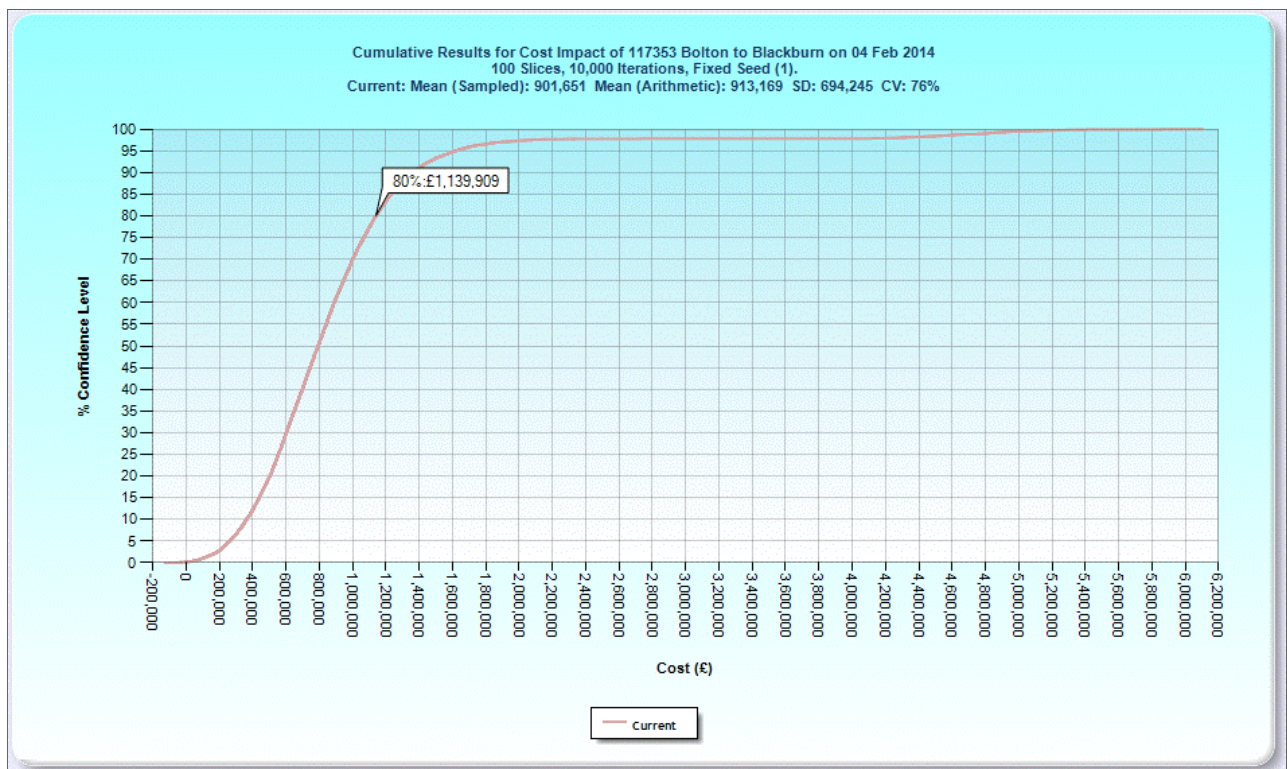


Figure 5.1 S Curve from ARM

The table below displays the top five cost risks and actions;

Table 5.1 Top 5 Threats

Risk ID	Risk Title	Risk Owner	Mean Risk Exposure	Action(s)	Action Owner	Action Due
117353-016	Serviceable sleepers not available	Martin Whyatt	130,944	Check the availability of F27 serviceable sleepers from NDS	Yemi Ajayi	28/02/2014
117353-030	Commissioning possession for Blackburn Interlocking	Martin Whyatt	118,400	Testing and commissioning strategy to be agreed as early as possible	Yemi Ajayi	01/12/2014
117353-040	Estimating Uncertainty	Martin Whyatt	98,292	N/A	N/A	N/A
117353-023	Additional works to the abutments of U/B 47 may be required	Martin Whyatt	90,000	Deliverable of AiP GRIP 3	Stephen Smith	01/03/2014
117353-011	Existing Track Formation is unsuitable for track slews	Martin Whyatt	82,500	Awaiting the results of the GI	Yemi Ajayi	28/02/2014

Table 5.2 Top 5 Opportunities

Opportunity ID	Opportunity Title	Opportunity Owner	Mean Risk Exposure	Action(s)	Action Owner	Action Due
117353-018	Extension of drain at Sudell Road	Martin Whyatt	-4,950	Await GRIP 4 designs	Yemi Ajayi	01/12/2014
117353-037	Opportunity - bridge 42 - reduced headroom	Martin Whyatt	-51,300	Start the process in GRIP 4 to apply to change the current status of the road.	Yemi Ajayi	01/12/2014

The evaluation also categorised the risks into the following breakdown structure;

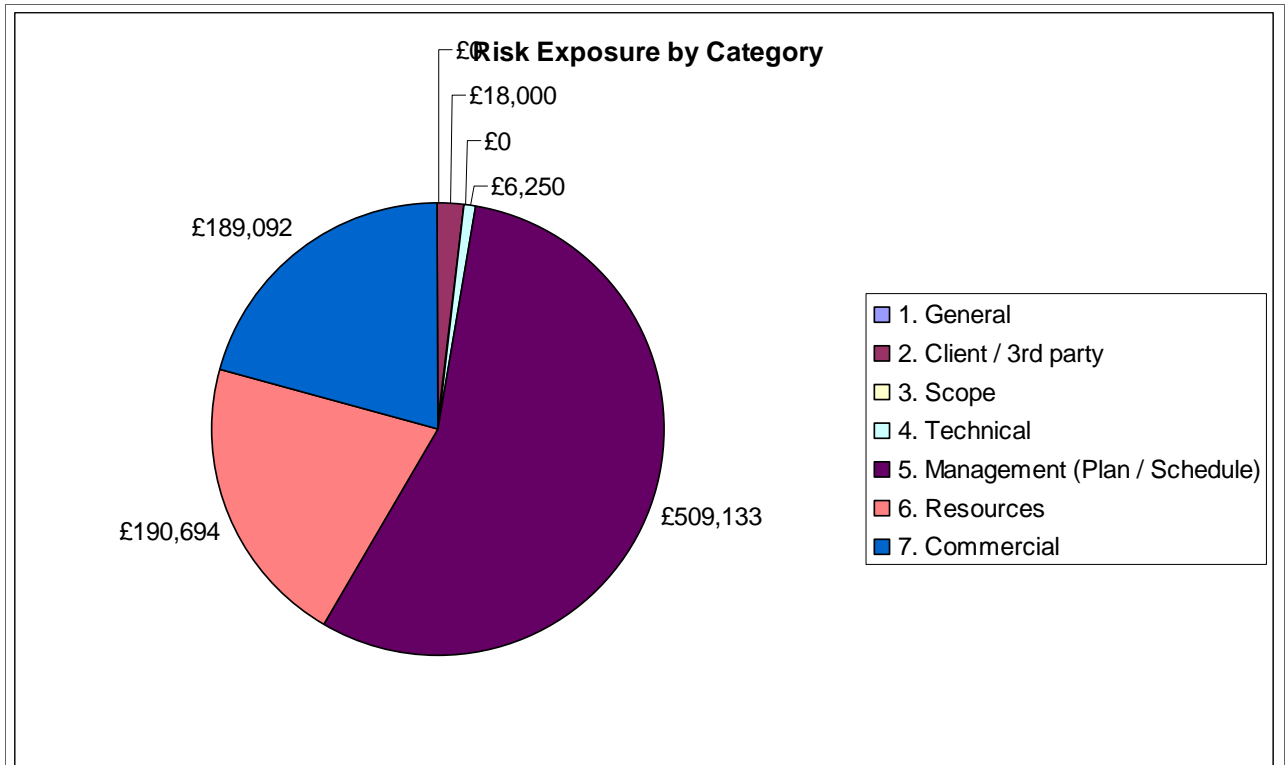


Figure 5.2 RBS Category Pie Chart

6. Actions

The following actions were recorded in the workshop. Owners were assigned from people within the room. These actions should be entered in to the project plan where capital expenditure or time is taken to complete the action.

Table 6.1 Action Table

Action	Owner	Close Out Date
Chase Bridgeway for GI information and subsequent report from Motts	Yemi Ajayi	Closed
Confirm mining risk figures	Iain Ellis	Closed
Make allowance in estimate for community relations work and for accommodating residents elsewhere if necessary.	Mick Casey	Closed
Price for commissioning possession to be included within the weekend?	Mick Casey	Closed
Include training for the In-bearer clamplocks (IBCL)	Mick Casey	Closed
Discharge consent, planning consents...to be included in the estimate	Mick Casey	Closed
Confirm with whether NR is confident that it will be in a position to award a Grip 4-8 contract in April?	Yemi Ajayi	Closed

7. Appendix A – Attendees

Table 7.1 Attendees List

Name	Role	Company
Melvyn Jones	Lead Estimator	Mott MacDonald
Iain Ellis	Contractors Engineering Manager	Mott MacDonald
Neil Larder	Project Engineer (Track)	Network Rail
Stephen Smith	DPE/PE (Civils)	Network Rail
Noel Connolly	Programme Manager	Network Rail
Martin Whyatt	Project Manager	Network Rail
Tom Drury	Sponsor	Network Rail
Mick Casey	Estimator	Network Rail
Yemi Ajayi	Scheme Project Manager	Network Rail
Roy Chapman	Rail Services Development	Transport for Greater Manchester
James Syson	Transport Strategy Team Leader	Blackburn Council
Faye Sellers	Risk & Value Analyst	Network Rail

8. Revision History

Table 8.1 Document History

Version	Date	Author	Comments
1.0	07/02/14	F Sellers	Draft for QA review by R&V team
1.1	17/02/14	F Sellers	Issued to PM for approval