

## **Independent Reporter**

Office of Rail Regulation and Network Rail

Quality Review

North London Line Project (CH002)

Executive Summary

December 2009

**Halcrow Group Limited**

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# 1 Executive Summary

## 1.1 Introduction

The Independent Reporter (IR) was instructed by Network Rail (NR) and ORR to undertake a Quality Review of the North London Railway Infrastructure Project (NLRIP). The ORR expressed a desire to review a sample of enhancement projects to check whether they are being designed, specified and installed to the appropriate quality, therefore delivering minimum life cycle costs.

The Mandate instructing this review states the following aims:

- understand the scope, objectives and current position of the project;
- understand the relevant project quality assurance processes, and key project roles that relate to end-product quality, and assess how effectively they are being implemented;
- review a specific asset category in terms of providing an expert engineering view of whether the project is demonstrating best practice in the design and delivery of the asset work-scope;
- make observations relating to the above, including any recommendations that would help the project achieve better life-cycle costs.

## 1.2 Scope

The Scope of this review is to:

- undertake a quality review of the NLRIP, focussing on the works funded by the Periodic Review.

The review was instructed in two distinct parts:

- A review of the quality assurance processes relevant to developing high quality engineering solutions that consider life cycle costs; this will not include a detailed review of any cost models or cost estimating, but needs to check that there are adequate processes in place to consider life cycle costs.
- An engineering review of whether the final engineering solution (scope and specification) is in line with accepted good practice relevant to delivering low life cycle costs. This more detailed review shall focus on one or two key assets in order to achieve a reasonably in-depth spot check on a particular asset category. The dominant asset category by spend for the particular project should be reviewed wherever possible, although the asset chosen may depend on resource availability at the time of the review.

### **1.3 Methodology**

The IR proposed and agreed with ORR to adopt the following methodology to complete this remit and prepare the report.

- Background study of relevant documents including NR Corporate Policies, Business Strategy Plans, Asset Policies, Product Acceptance System and AMCL report;
- “Desk Top” study of NLRIP Project related documentation / design process;
- Specific focus on examples of good practice that directly affect life cycle costs – agreed to focus on two asset groups, Track and Overhead Line Equipment (OLE);

### **1.4 Independent Definition of Whole Life Approach**

The report reviews the general guidance that is available, from Office of Government Commerce (OGC) and PAS55 (Publicly Available Specification), with regard to good practice in Asset Management which is seen to be an essential component of the management of large, infrastructure companies. Equally there is a wealth of experience in applying “whole life” cost approach to long term management of assets, with BS ISO standards providing a recognised methodology.

In some infrastructure industries, such as electrical generation, certification against PAS55 has become in effect mandatory via the efforts of Ofgem.

### **1.5 Network Rail’s Approach to Asset Management**

The IR has reviewed a number of documents from NR to identify their approach to Asset Management, both in terms of the Strategic Business Plans and the supporting documents, the Asset Policies. The review also looked into the development of the supporting asset data management systems being developed to comply with Licence Condition 24. The IR recognises the progress that has been made by NR and the fact that the Asset Policies do embody specific technical expertise which is applied to achieve minimum whole life costs.

In terms of the version of Asset Policies available to NLRIP, the IR notes that the analysis of the life cycle for whole track systems had not been completed by the issue date (December 2007) by NR but was due for completion March 2008.

There is an obvious need for long term planning where assets have long design lives and this is the foundation for “whole life cost” planning particularly in infrastructure sectors. The IR understands that when developing their CP4 submission NR consider the long term whole life cost of sustaining the assets which is then translated into a 5 year plan.

This raises a dichotomy of attempting to apply “whole life” asset management to an organization such as NR, in that the financial funding horizon for NR is the “control period” which is only five years. Whilst this is subject of a separate workstream, the IR supports the view taken by AMCL in their latest report “that this incentive is misaligned with the optimum Asset Management solution”.

In order that NR achieves minimum life cycle costs, it is important that durable materials and equipment are used in construction and maintenance of assets. The Product Acceptance process aims to ensure that NR Contractors only use approved materials. The IR supports the recent changes made to the process of Product Acceptance to ensure that new product introductions provide long term benefits, that the product aligns with Business Strategy and that the Sponsor is chosen to ensure the new product is promoted internally.

## **1.6 NLRIP – Scope, Objectives and Current Status**

The primary objective of the NLRIP is to reduce overcrowding now and in the future, cater for the Olympics, achieve compliance with desired frequency and first/last train standards and improve the railway.

This report outlines the current scope of the project to support significant increases in trains per hour by London Overground (LO) and the impact of the implementation of new rolling stock (type 378 – a separate project) which will achieve the above objectives.

The project has passed through GRIP Stage 4 and is now progressing through detailed design (GRIP 5). The project is being procured via a Design and Build (D&B) contract (based on ICE Conditions of Contract, Target Cost Version) which was placed with Carillion as “Prime Contractor” for Core Infrastructure work, in January 2009 and the anticipated “in use” date of early 2011.

## **1.7 NLRIP – Quality Process Review**

NR has developed the idea of an “Engineering Remit” for major enhancement projects and has now issued a Network Rail standard which mandates the Engineering Remit and makes it a GRIP deliverable (NR/L3/EBM/017).

The IR is given to understand that the NLRIP project was the first enhancement project to be managed under the new process, whereby Enhancement Engineering (EE) have issued a Engineering Remit, referred to as the “Programme Specification” to outline the approach required during design and the required performance criteria. This Programme Specification includes references to applicable standards, asset Policies and includes the mandatory functional outputs required for the NLRIP.

The IR notes that the Programme Specification NLRIP - Doc Ref: NR/EE/SPE/00103 Issue: A03 is listed in the “post Tender Amendments” to the contract with Carillion.

Whilst there are many references to achieving minimum lifecycle costs for the various asset groups, the main “whole life cost” requirements is defined in section 4.4 “Performance Assessment Process”, where there is a specific section on “Life Cycle Assessment” – with the explicit requirement to create a 25 year, lifecycle model, applicable at all GRIP stages beyond stage 3.

Whilst the IR recognises the significant design effort invested to achieve minimum lifecycle costs and consideration of future maintenance activities, NR has decided that conducting an analysis of “whole life” cost at this stage would not provide any useful benefits. Thus the NLRIP team are seeking an NCR against this specific deliverable. The IR understands that following a detailed technical review by Enhancement Engineering, NR believe the scheme is compliant to the whole life cost objectives and hence an application for an NCR is being supported.

### **1.8 Project Based Quality Assurance Procedures**

One of the major factors that affects the durability of constructed assets and thus has a major influence on “life cycle” cost is the quality of construction. The Product Acceptance process controls the “components” and materials that NR’s Contractor can use but equally important is the quality of workmanship to ensure the design is built as intended. The IR would accept that the Contractors used by NR for this work been accredited through the “Link up” process but it is a concern that there does not seem to be a process for monitoring or spot checks on the quality of build.

Item 21 listed in the GRIP 4 Checklist is Quality Assurance Controls. A reference is made to the Programme Assurance Plan (as defined in the Project Management Plan) but no document reference given. The IR would expect to see a standalone Assurance Plan which not only defined the quality assurance through the design process but how NR intends to manage the quality of construction.

### **1.9 NLRIP – Specific Asset Quality Review**

Following a number of interviews with the NLRIP design team, the IR would conclude that a substantial effort has been made to achieve the best practice in both P-Way and OLE design on a network that has many constraints, both physical and the electrical complexities of a congested urban rail environment.

There are numerous examples of the application of “best practice” and “novel” techniques and materials that should ensure the achievement of minimum maintenance interventions.

However the IR has not been provided with documented evidence, in the form of as lifecycle model that supports the design decisions. It is the IR’s opinion that this mandatory compliance requirement, as stated in the Programme Specification should be completed at GRIP 5 but as stated above, the project are seeking an NCR. The IR acknowledged that whole

life cost decisions are most effective up to GRIP 4 therefore detailed evaluation would not yield further benefit in GRIP 5.

### **1.10 Conclusion**

The IR has drawn the following conclusions from this review:-

- NR has stated in its Strategic Business Plan Update that it intends to manage their assets to achieve minimum lifecycle costs
- Asset Policies were published in 2007, the IR understands that whole life costs were considered but these Policies were not fully supported with documented whole life cost analysis. The IR understands that these are due to be re-issued in March 2010 which will be based on lifecycle analysis (not available for review by the IR as evidence).
- The IR understands that the creation of a Programme Specification originated as an ‘improvement project’ to address the issues learned on West Coast Mainline and other major enhancement projects. NR developed the idea from there and it now refers to it as “Engineering Remit” for all work of which the Programme Specification for NLRIP is the specific example for complex works.
- The implementation of a Programme Specification document on the NLRIP project which makes reference to the Asset Policies and includes mandatory requirements on the project team and D&B Contractor to follow a lifecycle approach.
- The IR was not provided with evidence by NR of a Programme specific Assurance plan which focuses on the achieving long term durability of constructed assets.
- The IR has evidence that the designs for assets reviewed (Track and OLE) do follow “best practice” and have incorporated a minimum life cycle approach but whether the final design achieves minimum life cycle cost could not be demonstrated by way of a life cycle cost model.

### **1.11 Recommendations**

As a result of this review, the IR would recommend the following actions:

- NR should develop a Whole Life Methodology which includes a standardised template for estimating whole life costs.
- NR should ensure that future projects do comply with the Programme Remit and its requirements for “whole life” cost estimates at GRIP 3 and beyond.
- NR should consider including a clause in the Procurement Contract or technical documentation to ensure that the objectives of achieving a final design solution with minimum “whole life” cost was achieved and that there is a formal, robust mechanism for measuring and documenting this objective.

- the Product Acceptance process should include a whole life cost analysis, to be completed as part of the assessment of proposals for new products.
- One of the major factors that affects the durability of constructed assets and thus has a major influence on “life cycle” cost is the quality of construction. The IR recommends that to ensure that the whole life cost objectives are met, a more rigorous Construction Assurance regime is implemented by NR that focuses on the long durability of assets.

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