

**Rolling Stock PPP  
Double Deck Trains**

**Exhibit 2**

**Contract Management Requirements**



## Change Log

Issue	Date	Author	Change
v9	CONTRACT		
v10	14/01/2009	ARJS	Addition of text changes from: Deed of Variation No.1 – Attachment 4 Deed of Variation No.3 – Key Personnel
v11	08/04/2009	ARJS	Addition of text changes from RFTA 00305 (RFTA Group 10)
v12	16/06/2009	ARJS	Addition of text changes from RFTA 00337 (RFTA Group 13)
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# 1 Introduction

## 1.1 Scope

These Contract Management Requirements describe the processes that RailCorp requires PPP Co to implement in order for RailCorp to assure itself that PPP Co is and remains capable of carrying out its obligations under the Contract.

These Contract Management Requirements are a tool by which RailCorp will minimise its risk during the Project, both during the Delivery Phase and the Through Life Support Phase. PPP Co must ensure that it has in place appropriate management plans and systems that must:

- a) detail the evidence that PPP Co and its Associates must provide to ensure that appropriate monitoring, auditing and control measures are in place to ensure that the products and services provided by PPP Co comply with the requirements of the Contract;
- b) document PPP Co's approach to delivering its contractual obligations;
- c) require PPP Co's Associates, when carrying out PPP Co's Activities, to comply with the relevant plan;
- d) define PPP Co's approach to managing the Contract and provide the necessary detail for effective control and delivery of the required project outcomes;
- e) define the method by which PPP Co will demonstrate the performance of PPP Co's Activities and the provision of safe and reliable Sets for operation by RailCorp;
- f) enable RailCorp to monitor and audit PPP Co's Activities (including those subcontracted to all PPP Co's Contractors) and, if necessary, require PPP Co to take remedial actions, in order to mitigate the possibility of RailCorp having to exercise its step-in rights or other contractual remedies through a lack of effective and adequate control regimes by PPP Co;
- g) ensure risks are identified, allocated and managed; and
- h) enable RailCorp to obtain a variation to, and subsequently maintain, its Accreditation throughout the Contract Term.

Without limiting clause 9 (Contract Management System and Project Plans) of the Conditions of Contract, PPP Co must develop, implement, monitor, review, amend and update the Project Plans throughout the period of currency of each Project Plan during the Contract Term. PPP Co must ensure that the Project Plans are fully vertically integrated with each other. Each Project Plan must explain how it integrates with other Project Plans, including PPP Co's Contractors Project Plans.

PPP Co must submit all Project Plans and records of the monitoring, review and updating process for all Project Plans to RailCorp for review in accordance with the Conditions of Contract. PPP Co must ensure that comments on the Project Plans made by RailCorp are recorded together with actions taken as a result of RailCorp's comments. Notwithstanding the above, the responsibility for meeting the

requirements of the Contract (including all aspects of the Project Plans) rests with PPP Co throughout the Contract Term.

At all times throughout the Contract Term RailCorp is entitled to inspect, audit and review any or all of the Project Plans and to review progress on the implementation of the Project Plans. Upon request from RailCorp, PPP Co must provide access for RailCorp to inspect the records and project information maintained by PPP Co and PPP Co's Associates for the Project.

## **1.2 List of Project Plans**

The overall contract management process has been divided into eight Project Plans. The scope and purpose of these Project Plans is summarised in an over-arching Contract Management Plan, which is itself a Project Plan and also controls the issue status of each of the other Project Plans. Each Project Plan in turn incorporates subsidiary Project Plans and supporting documents to define and describe specific activities and requirements under the Contract.

Each Project Plan must integrate with all other Project Plans, subsidiary Project Plans, and supporting information and documentation.

The Project Plans are:

- (a) Contract Management Plan;
- (b) Safety Management Plan;
- (c) Systems Assurance Plan;
- (d) Configuration Management Plan;
- (e) Train and Simulator Delivery Plan;
- (f) Maintenance Facility Works Delivery Plan;
- (g) Transition Plan; and
- (h) Through Life Support Plan.

A list of Project Plans, subsidiary Project Plans, supporting documents and information is included in Attachment 1.

All Project Plans, subsidiary Project Plans, supporting documents and information must be submitted as set out in Attachment 1 both in hard copy (written document) and soft copy (computer-readable document) forms. Hard copies must be clearly legible. Soft copies must be in a form which is compatible with standard office automation software, preferably using Microsoft Office and portable document format (pdf, generated from original files not by scanning) for documents, and drawing exchange format (dxf, for use with MicroStation) for drawings.

## **1.3 Project Plans included in the Contract**

Included in Exhibit 17 (Project Plans) are those Project Plans which PPP Co was required to submit prior to Contractual Close.

#### **1.4 Dates for submission of Project Plans**

Attachment 1 also specifies:

- (a) the status of each Project Plan and subsidiary Project Plan as at Contractual Close;
- (b) the dates on which the initial drafts of the Project Plan, subsidiary Project Plan and supporting information and documents must be submitted to RailCorp;
- (c) the dates on which the final completed versions of the Project Plans, subsidiary Project Plans, and supporting information and documents must be submitted to RailCorp; and
- (d) the frequency of the review and resubmission to RailCorp of each Project Plan, subsidiary Project Plan and supporting information and documents by PPP Co.

#### **1.5 No lessening of rights and obligations**

These Contract Management Requirements summarise certain rights and obligations of the parties under the Contract. They do not in any way limit, lessen or affect:

- (a) PPP Co's obligations under the Contract or otherwise according to law; or
- (b) RailCorp's rights against PPP Co whether under Contract or otherwise according to law.

#### **1.6 Definitions**

Words defined in clause 1.1 (Definitions) of the Conditions of Contract have the same meaning in these Contract Management Requirements. Other technical definitions, and a list of acronyms and abbreviations used within these Contract Management Requirements and other Specifications, are listed in the Dictionary of Technical Definitions and Abbreviations.

## 2 Contract Management Plan

### 2.1 General Requirement

The purpose of the Contract Management Plan is to act as an umbrella document that sets out at a high level how PPP Co will manage each of the other Project Plans in order to ensure that PPP Co's Activities are carried out in accordance with the requirements of the Contract. The Contract Management Plan forms PPP Co's quality management plan. All Project Plans, subsidiary Project Plans, supporting documents and information must conform to the requirements of these Contract Management Requirements, clause 9 (Contract Management System and Project Plans) of the Conditions of Contract and to the requirements of the Contract Management Plan. The Contract Management Plan must also refer to PPP Co's risk management process for the Project.

To facilitate self-review for adequacy by PPP Co and review by RailCorp, each Project Plan must contain a schedule of reference that cross-references the content of each of the Project Plans with the requirements detailed in these Contract Management Requirements.

### 2.2 Contract Management Plan

PPP Co must demonstrate its understanding of each phase of the Project and overall management tasks through a description of the tasks involved and its proposed approach to those tasks. In particular, PPP Co must demonstrate in the Contract Management Plan how it will bring together all the management requirements described in the Contract Management Requirements and Project Plans into a coordinated and integrated plan. PPP Co must demonstrate that the implementation of the Contract Management Plan will include the management of all PPP Co's Activities.

PPP Co must develop, deliver and maintain a Contract Management Plan. The Contract Management Plan must include:

- (a) the purpose of each other Project Plan and subsidiary Project Plan;
- (b) a plan and programme for the development and implementation of each Project Plan and its subsidiary Project Plans, and supporting documents and information, including timescales and resource requirements, including responsibilities, resources and processes for carrying out PPP Co's Activities;
- (c) an overview of PPP Co's approach to the performance of PPP Co's Activities in accordance with the requirements of the Contract, including processes for ensuring the performance of PPP Co's Contractors complies with the requirements of the Contract;
- (d) details of the latest issue status of each Project Plan and the process by which PPP Co will ensure that all Deliverables are delivered and updated in a timely manner;
- (e) a Risk Management Plan containing a description of the processes to be applied in identifying risks to the successful performance of PPP Co's Activities. The Risk

Management Plan will also describe processes for the regular review of risks and updating of the Risk Register throughout all phases of the Project. The Risk Management Plan must explain in detail how PPP Co will ensure that all of its activities and documentation meet the requirements of the Safety Management Plan, including the HAZOP, ALARP and FMECA analyses;

- (f) a Risk Register specifying all identified risks to the performance of PPP Co's Activities, including safety, programme, technical (non-safety), operational, environmental and financial risks, together with their risk ranking and controls;
- (g) an Occupational Health, Safety and Rehabilitation (OHS&R) Plan containing a description of the processes to be applied to the management of OHS&R requirements in respect of any persons who may be affected by PPP Co's Activities;
- (h) a Human Resources Plan containing a description of the processes to be used in managing human resources in respect of PPP Co's Activities throughout the Contract Term;
- (i) a Contractor's Work Breakdown Structure (CWBS);
- (j) an Organisational Accountabilities Plan identifying governance, project structures, single point of accountability (including organisational accountabilities, not only for financial accountability, but also for compliance accountability against contract obligations of safety, reliability, compliance management, programme and performance specification requirements, organisational accountabilities, key personnel and resources) along with appropriate authority to discharge those accountabilities;
- (k) an Environmental Management Plan containing a description of the processes to be used in managing environmental issues and interfaces in respect of PPP Co's Activities throughout the Contract Term;
- (l) a Programme Management Plan containing a description of the processes to be used for managing the programme and time progress of the Contract;
- (m) a Compliance Management Plan containing a description of the processes to be used for managing compliance with the requirements of the Contract throughout the Contract Term;
- (n) a Communications Management Plan containing a description of the processes for managing the communications between PPP Co, PPP Co's Associates, RailCorp and other organisations involved in or affected by the Project;
- (o) an Interface Management Plan containing a description of the processes for managing the interfaces between PPP Co, PPP Co's Associates, RailCorp and other organisations involved in or affected by the Project;
- (p) a Human Factors Integration Plan containing a description of the processes for ensuring that human factors are properly integrated into the Project; and
- (q) a process for the engagement of independent Verification experts to conduct independent Verification as required by clause 4.4.10 of these Contract Management Requirements.

PPP Co must prepare, implement and maintain a quality management system in accordance with Australian/New Zealand Standard AS/NZS ISO 9001 *Quality*

*management systems - Requirements.* The quality management system must include a Quality Manual, procedures and work instructions for all Delivery Phase and TLS Phase Activities to assure the on-going safety and Reliability of the Sets, the Simulators, the Maintenance Facility Works and the Maintenance Facility.

The quality management system must describe the processes for managing the supply chain between PPP Co and PPP Co's Contractors in order to assure compliance to requirements throughout the Delivery Phase and TLS Phase.

PPP Co must ensure that effective processes are in place for ensuring that the Cars and Simulators are manufactured, and the Maintenance Facility Works are constructed, in accordance with the Final Design Documentation and the other requirements of the Contract; and that effective processes are in place to ensure that PPP Co's Activities are coordinated with RailCorp's requirements, at least including timetabling and timetable change.

The Contract Management Plan must demonstrate how PPP Co intends to ensure that PPP Co's Contractors employed in connection with the Delivery Phase Activities and the TLS Phase Activities hold management system (including quality management) certification appropriate to the scope of the work and how spare parts, Consumable Spares and Rotable Spares items identified as Configuration Items are tracked under the Configuration Management Plan.

PPP Co must provide assurance and quantified evidence that applicable technical requirements are included in all subcontracts and purchase orders.

The quality management system must also address processes for the management of risk and issues registers, document transmittal and management systems, integrated document indexing and retrieval systems, and jointly accessible data management systems.

PPP Co must undertake regular audits of the quality management systems operated by PPP Co and PPP Co's Associates, and the documents and records held. RailCorp may audit these quality management systems.

Notwithstanding the above PPP Co will retain responsibility for ensuring the compliance of all Deliverables under this Contract.

### **2.3 Risk Management Plan**

For the purposes of the Risk Management Plan a risk is any event that could affect the performance of PPP Co's Activities, including PPP Co's Activities carried out by PPP Co's Associates, and on the performance of RailCorp and RailCorp's Associates. The Risk Management Plan must conform to the requirements of Australian/New Zealand Standard AS/NZS 4360 *Risk Management*.

PPP Co must immediately draw to the attention of RailCorp any newly identified or changed risk.

Various categories of risk may be identified in the Risk Management Plan. As a minimum, risks must be assessed and categorised under the following headings:

- (a) **Safety** - safety risks include all risks that have the potential to result in harm to people (including passengers, employees and the general public) and/or property;

- (b) **Programme** - programme risks are those which may adversely affect PPP Co's ability to complete a Deliverable by the date shown in the Delivery Programme;
- (c) **Technical** - technical risks are those which are likely to be encountered in achieving the technical and performance requirements of the Contract;
- (d) **Interface** – interface risks are those that are likely to be encountered as a result of interfaces between RailCorp, PPP Co and other parties and organisations involved in or affected by the Project;
- (e) **Operational** – operational risks are those that may adversely affect rail operations by RailCorp or others;
- (f) **Environmental** - environmental risks are those that have the potential to result in harm to the Environment in any way; and
- (g) **Financial** - financial risk relates to the potential failure to perform PPP Co's Activities within PPP Co's budget established for the Project.

Each identified risk must be assessed in terms of its likely impact in each area and recorded in the Risk Register.

Risk assessment by PPP Co will be a continuous process throughout the Contract Term. The risk management process and the classification and control of all identified risks in the Risk Register must be submitted to RailCorp for review. The Risk Management Plan must provide the means, consistent with the performance requirements from the RailCorp System Requirement, SMS-06-SR-0030 Safety Risk Management, to identify and quantify risk situations as they emerge and to initiate corrective action immediately, regardless of the timing relative to planned risk management process reviews.

## 2.4 Risk Register

PPP Co must develop, deliver and maintain a Risk Register. The Risk Register must be in a format compatible with the format of RailCorp's Risk Register. The Risk Register must, as a minimum, contain the following information:

- (a) a list of each actual and potential risks identified, together with its source and classification;
- (b) a record of the risk ranking that has been assigned to each identified risk;
- (c) details of the control plan(s), including the responsibility for implementing control measures, for each identified risk, consistent with the identified risk level;
- (d) a record of the current status of each control plan for each identified risk; and
- (e) a traceable record of any changes in the classification of risks over time and of the control actions taken.

The Risk Register must be an active Risk Register providing the means to identify and quantify risk situations as they emerge and to initiate corrective action immediately. The current version of the Risk Register must be made available continuously to RailCorp.

## 2.5 OHS&R Plan

PPP Co must establish and maintain an OHS&R Plan. The OHS&R Plan must describe the processes to be applied to managing OHS&R requirements in

accordance with AS/NZS 4801 *Occupational health and safety management systems - Specification with guidance for use* and with the requirements of clause 10.3 (Occupational health and safety) of the Conditions of Contract. The OHS&R Plan must cover arrangements in respect of:

- (a) PPP Co employees, including permanent, contract and casual staff;
- (b) PPP Co's Contractors' employees, including permanent, contract and casual staff;
- (c) RailCorp's employees, including permanent contract and casual staff, and staff seconded to RailCorp from other organisations; and
- (d) any other persons who may be affected by PPP Co's Activities.

The OHS&R Plan must cover the full duration of the Contract Term and any period thereafter during which disease, injury or death may occur as a foreseeable result of PPP Co's Activities.

The New South Wales Occupational Health and Safety Management Systems Guidelines dated June 2004 shall be followed for all physical construction works.

PPP Co must identify the process to ensure that all personnel (including RailCorp personnel, PPP Co's Contractors' personnel and visitors) are familiar with the OHS&R Plan and have been inducted on the safety and evacuation requirements for the Maintenance Site and that all plant and equipment is maintained to a safe working standard.

The OHS&R Plan must explain the procedure for notifying all reportable incidents to the appropriate Authorities and also how and when RailCorp will be advised of all incidents. PPP Co must also explain how an incident will be reported when RailCorp property or personnel are involved including how RailCorp will receive the incident report and the intended remediation actions and the close out action taken to resolve each incident.

## **2.6 Human Resources Plan**

### **2.6.1 General requirement**

PPP Co must establish and maintain a Human Resources Plan. The Human Resources Plan must describe the processes to be applied to managing human resources in respect of PPP Co's Activities. The Human Resources Plan must include arrangements for PPP Co's employees and PPP Co's Associates' employees, including permanent, contract and casual staff, and for the interface with RailCorp's and other organisations' human resources activities where these are or may be affected by PPP Co's Activities.

### **2.6.2 Industrial relations**

The Human Resources Plan must cover industrial relations matters in accordance with the requirements of clause 10.5 (Industrial relations) of the Conditions of Contract.

The Human Resources Plan must cover, on an individual or collective basis as appropriate, selection, recruitment, termination, consultation, negotiation, discipline, grievance and welfare arrangements.

The Human Resources Plan must cover requirements for drug and alcohol testing, and fatigue management, for personnel undertaking railway safety work as defined in the Rail Safety Act.

### **2.6.3 Competency and training**

The Human Resources Plan must describe arrangements for competency and training. The Human Resources Plan must include:

- (a) Induction and training processes and procedures;
- (b) Training and competency certification processes for personnel undertaking railway safety work; and
- (c) Specific competency and certification processes and procedures for personnel carrying out systems assurance activities, and Testing and Verification activities.

The training must be based on the RailCorp Human Factors Integration Framework, Section 5 *Human Factors in Training, Selection and Performance* and must incorporate a risk-based approach.

The Human Resources Plan must include details of PPP Co's apprenticeship policy and demonstrate how PPP Co will meet the Apprenticeship Requirement throughout the Contract Term.

## **2.7 Contractor's Work Breakdown Structure**

PPP Co must develop, deliver and maintain a Contractor's Work Breakdown Structure (CWBS) as a basis for all planning activity undertaken in connection with PPP Co's Activities. The CWBS must be used as the basis for documentation referencing (including Design Documentation) project planning and control, development of the Delivery Programme and programme management purposes.

The CWBS must include, as a minimum, the elements of the Work Breakdown Structure (WBS) prepared by RailCorp (which it has developed to the third level), which in respect of the Cars is consistent with RailCorp document RS-0041 *CM Passenger Fleet Maintenance Fleet Architecture*. A copy of the WBS is at Attachment 2 to these Contract Management Requirements. This WBS identifies Major Subsystems of the Cars, the Simulators, the Maintenance Facility Works and the Maintenance Facility as well as major activities to be undertaken in compliance with the Contract.

PPP Co must develop its CWBS to at least the fourth level and where necessary to lower levels, to include all discrete products and services to be provided under the Contract. The CWBS must be included as part of the Contract Management Plan and must be in a format consistent with the RailCorp MMIS.

Development of the CWBS must follow the structure indicated in the WBS, to include each significant Subsystem/item forming part of the level 1 system. Products and services to be provided by PPP Co must be included in the CWBS and further breakdown is to follow the same pattern as shown in the WBS.

The CWBS must include a brief description of the scope of each CWBS element, which must be tabulated as a CWBS dictionary.

The CWBS must be in a form and format consistent with DEF (AUST) 5664 *Work Breakdown Structures for Defence Materiel Projects*.

The CWBS provided as part of the Contract Management Plan will form part of the planning baseline for PPP Co's Activities.

## 2.8 Organisational Accountabilities Plan

PPP Co must establish and maintain an Organisational Accountabilities Plan, describing the management and control of organisation accountabilities in respect of PPP Co's Activities throughout the Contract Term. The plan must include details of the following:

- (a) PPP Co board governance and director responsibilities for all board levels (including entities such as trusts and trustees) in PPP Co;
- (b) Project structures including, contract structure, equity structure, organisational structure - PPP Co must provide a proposed organisation structure for each phase of the Project including levels down to the Core Contractors and Significant Contractors involved, clearly detailing relationships and responsibilities;
- (c) Single point of accountability – provide an explanation of how contractual, equity and organisational structures will deliver a single point of accountability for compliance with **all** of PPP Co's contractual obligations (including organisational accountabilities, not only financial accountability, but also for compliance accountability against contract obligations of safety, reliability, compliance management, programme and performance specification requirements) in respect of the Project. The explanation must ensure consistency with the risk allocation in the Project Agreements, through to the Significant Contractor level of the contractual structure;
- (d) Organisational accountabilities along with appropriate authority to discharge those accountabilities (for specific safety accountability requirements refer to section 3.4 of the Contract Management Requirements);
- (e) Key Personnel - Key Personnel are identified in Attachment 5 to these Contract Management Requirements. PPP Co must employ the Key Personnel identified in the first table in Attachment 5 in the positions specified and otherwise comply with the requirements of clause 10.6 (Key Personnel) of the Conditions of Contract;
 

PPP Co must ensure that PPP Co's Contractors employ the Key Personnel (as identified in the second table in Attachment 5) in the positions specified.

PPP Co must submit to RailCorp a current CV together with the names of two independent referees for each of the Key Personnel. If Key Personnel are changed at any time then CV for replacements must be provided.
- (f) Resources – PPP Co must provide details of the proposed resources for each of PPP Co's Contractors in the organisation identified under (b) above. It must also provide, in the Organisational Accountabilities Plan, a summary of the proposed resources under all relevant Project Plans (such as the Train and Simulator Delivery Plan, Maintenance Works Delivery Plan and Through Life Support Plan), Full details of the resources must be included in each relevant Project Plan. These details must include:

- the number of qualified competent staff, tradespeople and apprentices required for each phase of the Project, the tradespeople to apprentices ratio (including justification of the validity of this ratio), numbers of staff currently available, the committed utilisation of staff currently available and details of where additional staff will be obtained from;
  - the proposed facilities and premises needed to achieve the Delivery Programme that are to be used for each phase of the Project, those currently available, the committed utilisation of the proposed facilities and premises currently available, and details of where additional facilities and premises will be obtained from; and
  - the proposed major equipment to be used for each phase of the Project, quantities currently available, the committed utilisation of the major equipment currently available, and details of where major equipment will be obtained from;
- (g) Management and continuity of PPP Co's Contractors - without limiting RailCorp's rights under clause 49.5 (PPP Co Events of Default) and PPP Co's obligations under clause 49.7 (Cure Plan) of the Conditions of Contract, PPP Co must identify its proposed approach to the management and continuity of services under circumstances where a PPP Co's Contractor becomes insolvent and as such can not support services or supplies for PPP Co's Activities.

## 2.9 Environmental Management Plan

PPP Co must establish and maintain an Environmental Management Plan in accordance with the requirements of AS/NZS ISO 14001 *Environmental Management System – Specification with guidance for use*. The Environmental Management Plan must describe the assessment, management and control of environmental impacts in respect of PPP Co's Activities throughout the Contract Term, and in particular how it will meet its responsibilities with regard to:

- (a) the requirements of the *Protection of the Environment Operations Act 1997* ("POEA");
- (b) noise;
- (c) vibration;
- (d) energy consumption;
- (e) air emissions;
- (f) hazardous materials and substances;
- (g) recycling and waste minimisation; and
- (h) storm water discharge.

The Environmental Management Plan must demonstrate how the Environmental Management System complies with all applicable legislation. It should be noted that

the Environmental Management System need not necessarily be third party certified to AS/NZS ISO 14001 but it should be structured in such a way that it can be reviewed and audited by RailCorp against AS/NZS ISO 14001.

The Environmental Management Plan must describe the procedure for notifying all reportable incidents to the appropriate authorities and also how and when RailCorp will be advised of all such incidents. The Environmental Management Plan must also describe how an incident will be reported when RailCorp property or personnel are involved including how RailCorp will receive the incident report and the intended remediation actions and the close out action taken to resolve each incident.

The Environmental Management Plan must also set out how PPP Co intends to deal with Clean Up Notices and other requirements of the Contract (see clause 12 (Environmental issues) of the Conditions of Contract).

The Environmental Management Plan must demonstrate how PPP Co intends to ensure that its environmental management procedures and policies are fully understood by PPP Co's Contractors and RailCorp staff working at the Maintenance Site and also any third party suppliers or subcontractors delivering materials to the Maintenance Site.

From time to time, RailCorp may conduct audits of PPP Co's Environmental Management System to assure itself that the system is providing the necessary outcomes.

## **2.10 Programme Management Plan**

### **2.10.1 General requirement**

PPP Co and PPP Co's Contractors must develop and implement a Programme Management Plan.

The purpose of the Programme Management Plan is to demonstrate how PPP Co will manage progress on the Project to ensure that Practical Completion of the Sets, the Simulators and the Maintenance Facility Works is achieved by the relevant Date for Practical Completion.

The Programme Management Plan must include:

- (a) processes for the management of Delivery Programme requirements from RailCorp as well as PPP Co's Contractors, particularly relating to interface matters;
- (b) Processes for review of and recovery from delays;
- (c) Monitoring and progress reporting against the Contract as well as detailed programmes, including variance between actual and planned progress for:
  - (i) Delivery Phase Activities on the Sets, the Simulators and the Maintenance Facility Works;
  - (ii) Operational readiness including all required documentation, Practical Completion of the Sets, the Simulators and the Maintenance Facility Works, and training; and
  - (iii) Management of transition-in and transition-out processes.

### **2.10.2 Delivery Programme**

The Delivery Programme, as required by clause 15.3 (Delivery Programme) of the Conditions of Contract, must include:

- (a) all the activities necessary to plan, design (including the submission of Design Documentation), obtain all necessary Approvals, manufacture or construct, and commission the Sets (including the Mock-ups), the Simulators and the Maintenance Facility Works;
- (b) the planned dates for commencement and completion of each of these activities; and
- (c) the planned float for each of these activities.

The Delivery Programme must indicate how the delivery of the Cars and the Maintenance Facility Works are to be coordinated.

The Delivery Programme must be displayed in Gantt format or other format acceptable to RailCorp's Representative, using Primavera compliant \*.XER format (in order to be compatible with RailCorp systems. Interdependencies between activities are to be clearly identifiable from the programme information.

The Delivery Programme must display and evaluate progress of individual activities and processes within the Project. Programmes at each CWBS level must display the critical path for the progress of the Delivery Phase Activities or for individual activities, as applicable.

All activities of PPP Co's Contractors must be integrated into the Delivery Programme.

The Delivery Programme must display actual progress against planned progress, for all activities.

### **2.10.3 Delivery Phase Progress Reports**

Delivery Phase Progress Reports must be provided by PPP Co to RailCorp at least 5 Business Days before each meeting of the Senior Project Group and at such other times as RailCorp may reasonably require.

Delivery Phase Progress Reports must be in a form acceptable to RailCorp and must include details of:

- (a) project progress - this must be in the form of an updated Delivery Programme, accompanied by a narrative section explaining the utilisation of float, any significant variations from the previous report and Delivery Programme, causes for the deviation and, where adverse, the planned corrective action;
- (b) technical progress - this will be critical during the design stage and must include details of problems encountered in meeting or achieving the requirements of the Contract;
- (c) financial progress – this must identify and include details and explanations of any cost variations compared with the Project budget, and any remedial actions proposed;

- (d) risk assessment - this will include information on the status of previously identified risks as well as any new risks identified since the previous report as identified in the Risk Management Plan and the Risk Register;
- (e) progress activities carried out in accordance with the Systems Assurance Plan;
- (f) status of any Variations proposed under the Contract, including the effect which each proposed Variation will have on the Delivery Programme;
- (g) an updated document and drawing register which includes all technical documents and drawings (existing and proposed) together with the hierarchy of and associations between documents;
- (h) a general assessment of the status of the Delivery Phase Activities, including any unresolved issues which may impact on the performance of PPP Co's Activities; and
- (i) a general assessment of any reasonably foreseeable events, which may impact on the performance of PPP Co's Activities.

Each Delivery Phase Progress Report is to be provided in electronic and hard copy formats. 1 electronic copy and 4 hard copy reports are required by RailCorp. The electronic copy must be in a format agreed between RailCorp and PPP Co, or, failing agreement, as reasonably required by RailCorp.

The Delivery Phase Progress Reports must identify any significant deviations from the Train and Simulators Delivery Plan, and the Maintenance Facility Works Delivery Plan, including changes to the critical path, and must be cross-referenced to the risk assessment required as a part of the Delivery Phase Progress Report. Without limiting clauses 15.6 (Delays) and 15.7 (Corrective action plan) of the Conditions of Contract, proposed recovery action and planned dates for making good any delays must be included within each Delivery Phase Progress Report.

## **2.11 Compliance Management Plan**

### **2.11.1 General requirement**

PPP Co must develop and implement a Compliance Management Plan, which must include:

- (a) Technical Reviews in accordance with clause 4.6 (Technical Reviews) of these Contract Management Requirements;
- (b) Testing and Verification in accordance with clause 4.12 (Testing and Verification) of these Contract Management Requirements;
- (c) Internal auditing by PPP Co and PPP Co's Contractors in accordance with AS/NZS ISO 9001 *Quality management systems - Requirements*, AS/NZS ISO 14001 *Environmental Management System – Specification with guidance for use*, AS/NZS 4801 *Occupational health and safety management systems - Specification with guidance for use* and AS 4292 *Railway Safety Management*;
- (d) External compliance audits in accordance with clause 2.11.3 (Access for compliance audit and surveillance) of these Contract Management Requirements;

- (e) Close out of nonconformance and audit findings in accordance with clause 2.11.4 (Close out of nonconformance and audit findings) of these Contract Management Requirements; and
- (f) Records of technical and management systems compliance in accordance with clause 2.11.5 (Compliance records) of these Contract Management Requirements.

PPP Co must submit an internal audit programme for review by RailCorp. RailCorp may request that specific audit records be submitted to RailCorp for review. Such submission must be made within 10 Business Days of the request.

### **2.11.2 Compliance Activities of PPP Co's Contractors**

PPP Co must ensure that all PPP Co's Contractors are appointed on the basis that they are assuring that those parts of PPP Co's Activities which they perform are carried out in accordance with the requirements of the Contract.

PPP Co and all PPP Co's Contractors must plan and undertake compliance activities to confirm the validity of the assurance. The compliance planning and performance must include:

- (a) Review of PPP Co's and PPP Co's Contractors' plans to perform PPP Co's Activities;
- (b) Ensure the compatibility of PPP Co's management procedures with those of all PPP Co's Contractors;
- (c) Assess the implementation of management procedures;
- (d) Review procedures for adequacy and compliance;
- (e) Review of plans for self-verification of work;
- (f) Confirm the implementation of self-verification processes; and
- (g) Review and assess compliance records for completeness and applicability.

PPP Co and PPP Co's Contractors must maintain records of the performance of these activities.

RailCorp may undertake audit and surveillance of PPP Co's management of the compliance activities and the effective implementation of these compliance procedures by PPP Co's Contractors.

### **2.11.3 Access for compliance audit and surveillance**

PPP Co must permit RailCorp or RailCorp's Representative to undertake compliance audits and surveillance of the management systems of PPP Co and PPP Co's Contractors. These compliance activities may include the attendance at the premises of PPP Co and PPP Co's Contractors. PPP Co must ensure that contracts with PPP Co's Contractors permit such access.

Access must be permitted for declared programmed audits, for short-notice audits (typically 12 hours notice) and immediate audits such as may be necessary following incidents.

RailCorp may elect to participate in the audit and surveillance activities of PPP Co on PPP Co's Contractors, or the Core Contractors on any other of PPP Co's Contractors. PPP Co, the Core Contractors and PPP Co's Contractors must notify RailCorp of the proposed dates for such audits and must provide the required assistance and access to enable RailCorp to participate in the audit and surveillance activities.

#### **2.11.4 Close out of nonconformance and audit findings**

PPP Co and all PPP Co's Contractors must maintain registers of nonconformance and audit findings. These nonconformance and audit findings must be closed out and the registers submitted as part of the certificates of compliance required by clause 27.4 (Payment claims for Milestone Advances and other amounts for Delivery Phase Activities) of the Conditions of Contract.

PPP Co must submit statistical details of the non-conformances and audit findings and their close out activities.

#### **2.11.5 Compliance records**

Compliance records must include:

- (a) Design reports including records of sign-offs obtained through internal design reviews;
- (b) Design certification;
- (c) Certificates of compliance relating to the supply of parts used in the manufacture of the Sets and Simulators, and plant and equipment required for the provision of Through Life Support;
- (d) Records required to demonstrate compliance with authority approvals (including those relevant to environmental conditions) and regulations;
- (e) Registers of supporting information for certificates of compliance, including:
  - (i) Register of compliance records of work performed prior to completion of the relevant Milestone required by the Contract;
  - (ii) Registers of compliance records of work required by the Contract prior to Practical Completion of the Sets, the Simulators and the Maintenance Facility;
  - (iii) Register of identified nonconformances that have been satisfactorily rectified and closed out excepting any minor nonconformance noted in (iii) below;
  - (iv) Register of minor nonconformances applicable to the works performed that have not been accepted by RailCorp, if applicable;
  - (v) Register of audit findings and system nonconformances confirming acceptance by RailCorp of closeout to prevent recurrence; and
  - (vi) Register of Variations showing their satisfactory completion;
- (f) Records referred to in the registers submitted with certificates of compliance; and

(g) Compliance records of Project Plans and processes.

PPP Co and all PPP Co's Contractors must retain compliance records and must permit RailCorp to review these records at the premises of PPP Co and PPP Co's Contractors. RailCorp may also request that specific compliance records be submitted to RailCorp for review. Such submission must be made within 10 Business Days of the request.

## **2.12 Communications Management Plan**

PPP Co must develop and implement a Communications Management Plan, which must be submitted to RailCorp for approval. The Communications Management Plan must conform to the requirements of clause 47 (Disclosure, confidentiality and publicity) of the Conditions of Contract. The Communications Management Plan must include:

- (a) details of procedures implemented for the communication of information between RailCorp, PPP Co, PPP Co's Contractors, Authorities, and other parties involved in or affected by the Project; and
- (b) incident reporting processes.

## **2.13 Interface Management Plan**

PPP Co must develop and implement an Interface Management Plan. The Interface Management Plan must include:

- (a) Interfaces between each of PPP Co, PPP Co's Contractors, RailCorp technical personnel, RailCorp operating & maintenance personnel (including RailCorp Crews and station staff), Authorities, and other parties involved in or affected by the Project;
- (b) Preparation of an interface information schedule covering the whole of the Contract Term setting out the information required, priority of the information and dates for the provision of the information;
- (c) Coordination of the RailCorp Enabling Works with the carrying out of the Maintenance Facility Works and the integration of the commencement of operations at the Maintenance Facility; and
- (d) Establishment and implementation of collaborative interface problem resolution processes.

Management of interfaces during the Through Life Support Phase must be through the implementation of Interface Protocols, which form part of the RailCorp Through Life Support Specification.

PPP Co must develop and implement Safety Interface Agreements to the extent that these are required under the Rail Safety Act.

## **2.14 Human Factors Integration Plan**

PPP Co must ensure that human factors considerations are integrated fully into the Project. Human factors integration must be carried out in accordance with RailCorp Safety Management System, and must include:

- (a) The development of a Human Factors Integration Plan (HFIP) defining how human factors will be considered in the Project;
- (b) The identification and tracking of human factors issues throughout the Contract Term, either through the Risk Register or other means; and
- (c) The ability to demonstrate the application of human factors design principles to any human interfaces that are not otherwise specifically defined in the Specifications.

### **2.15 Local Industry Participation Plan**

Without limiting clause 29 (Local Industry participation and apprenticeships) of the Conditions of Contract, PPP Co must implement and comply with, and ensure that its Core Contractors implement and comply with, the Local Industry Participation Plan.

### 3 Safety Management Plan

#### 3.1 General requirement

PPP Co must develop, deliver, implement and maintain a Safety Management System, which includes the preparation and maintenance of a Safety Management Plan compliant with the following as a minimum;

- Performance requirements of the System Requirements within the RailCorp Safety Management System;
- the Rail Safety Act;
- AS 4292 *Railway Safety Management*;
- AS 4360 – *Risk Management*; and
- all statutory and regulatory requirements.

The Safety Management System shall also be developed upon a safety management lifecycle framework that integrates safety, quality and Reliability, Availability and Maintainability (RAM) assurance activities. An example of such an acceptable safety management lifecycle framework is identified within the group of standards that include EN50126, EN50128 and EN 50129.

The purpose of the Safety Management Plan is to identify all actual and potential safety hazards resulting from PPP Co's Activities and to demonstrate that each identified hazard has been eliminated or adequately controlled through the implementation of suitable corrective action(s).

The Safety Management Plan must contain specific provisions for the identification of all safety hazards associated with the Contract and the procedures for managing appropriate treatment of each such item within the safety management lifecycle framework.

Any changed hazards or risks must be managed within the PPP Co Safety Management System and be advised to RailCorp as soon as they become known.

The Safety Management Plan shall include Safety Accountability Statements in accordance with clause 3.4 of these Contract Management Requirements.

#### 3.2 System Hazard Analysis

PPP Co must complete a System Hazard Analysis (SHA).

The SHA must identify potential hazards to the Cars, the Maintenance Facility Works, the Maintenance Facility, the Simulators, RailCorp's customers, RailCorp's employees, PPP Co's staff, the public and the Environment as a result of using and maintaining the Systems proposed or used by PPP Co. The SHA must pay particular attention to innovative technologies, approaches or designs.

The SHA must be carried out in accordance with the general requirements of AS 4292.3 *Railway safety management – Rolling stock*, within the requirements of RailCorp System Requirement SMS-06-SR-0030 Safety Risk Management and within the structure of the safety management lifecycle framework. One input to the

SHA is the FMECA process required by clause 4.8.3 (Failure Modes, Effects and Criticality Analysis (FMECA)) of these Contract Management Requirements. The SHA must include an estimate of the probability of occurrence of each hazard, identification of the possible consequences of each hazard and details of the methods proposed to eliminate or control the hazard.

The SHA must as far as possible be quantitative and must be consistent with the RailCorp System Requirement, SMS-06-SR-0030 Safety Risk Management, from the RailCorp Safety Management System.

The SHA must include:

- (a) a review of pertinent historical safety experience and data for similar designs;
- (b) a categorised listing of basic energy sources, Hazardous Substances and Environmental Hazards incorporated in the design;
- (c) a categorised listing of the hazards associated with operation or failure of the Cars, the Maintenance Facility and the Simulators, including Subsystems, with analysis of how these affect the overall safety of the Cars, the Maintenance Facility and the Simulators;
- (d) a categorised listing of the hazards associated with the maintenance, repair, support and disposal of the Cars, the Maintenance Facility and the Simulators, including their Subsystems and components for passengers, crew, maintainers, externals systems and facilities and the Environment;
- (e) combinations of more than one failure that can cause hazards to the Cars, the Maintenance Facility, the Simulators, passengers, crew or maintainers, external systems and facilities;
- (f) examination of Subsystem interfaces for compliance with the safety requirements of the Contract;
- (g) how normal operations of the Cars, the Maintenance Facility and the Simulators can or may degrade the safety of the Cars, the Maintenance Facility and the Simulators;
- (h) how it is planned that residual risks will be controlled; and
- (i) identification of the pertinent safety requirements and regulations with which the System must comply.

The SHA is to consider the hazards associated with all operating states and modes. The operating context for the data must be presented and full details of assumptions and methods must be included to show how the data has been modified to take account of RailCorp's operational, environmental and other contexts.

The SHA must also include a thorough human factors review and analysis in accordance with performance requirements from the RailCorp System Requirement for Human Factors, SMS-06-SR-0034 Human Factors Integration.

As an element of the Deliverables under the safety management lifecycle framework, the SHA must be submitted with reference to the applicable design status at the following design review periods (complete as at the date of submission):

- at the System Definition Review stage;

- at the Preliminary Design Review stage;
- at the Critical Design Review stage; and
- at the System Verification Review stage.

To support the Tender Safety Assurance Report a complete SHA must be included.

The results of the SHA must be incorporated into the Risk Management Plan in accordance with clause 2.3 (Risk Management Plan) of these Contract Management Requirements.

The Safety Management Plan must include procedures for the regular review of safety hazards and updating of the SHA throughout the Contract Term.

### **3.3 Accreditation Plan**

#### **3.3.1 General requirement**

PPP Co must develop, deliver and maintain an Accreditation Plan containing the procedures for submission of the applications for Accreditation by PPP Co and its Associates and for compliance with the requirements of clause 8.2 (RailCorp's Accreditation Variation) of the Conditions of Contract, including the preparation and submission of any Accreditation Variation Document.

The Accreditation Plan must describe how PPP Co proposes to fulfil its obligations under clause 8 (Rail Safety Accreditation and Certificates of Competency) of the Conditions of Contract, including its obligations to:

- liaise and co-operate with, and do everything necessary to enable, RailCorp to obtain RailCorp's Accreditation Variation in accordance with clause 8.2 (RailCorp's Accreditation Variation) of the Conditions of Contract;
- meet its obligations in accordance with clause 8.3 (Continuing RailCorp Accreditation and rail safety obligations) of the Conditions of Contract;
- hold Accreditation and comply with all conditions of its Accreditation and all obligations of accredited persons under the Rail Safety Act;
- ensure that its Associates engaged in or in connection with PPP Co's Activities hold Accreditation and comply with all conditions of their Accreditation and all obligations of accredited persons under the Rail Safety Act; and
- develop, execute (where relevant), maintain and submit to RailCorp and (where relevant) to ITSRR documentation in accordance with clause 8.4 (c) (PPP Co's Accreditation – Documentation) of the Conditions of Contract.

#### **3.3.2 RailCorp Accreditation**

RailCorp will require a variation to its existing Accreditation as a result of the withdrawal of the old trains, the introduction of the Cars and the use of the Maintenance Facility to maintain the Cars.

The Project has already been assessed through the Safety Case, Assessment and Reporting Determination (SCARD) process defined in the RailCorp Safety Management System as having "major" impact. The development and submission of the RailCorp Safety Assurance Reports is therefore necessary.

The standard format of RailCorp Safety Assurance Reports to be provided shall conform to a published standard such as that defined within EN50129 (irrespective of the technology defined). As a minimum the following sections shall be included:

- Introduction;
- Description of Works and Scope of Safety Assurance Report;
- Safety Requirements;
- Responsibilities and accountabilities;
- Evidence of Quality Management;
- Evidence of Safety Management;
- Technical Safety Report;
- Operations and Maintenance Requirements;
- Recommendations and Restrictions;
- Conclusions; and
- References.

Each RailCorp Safety Assurance Report must be submitted by PPP Co to RailCorp. RailCorp, after following the process set out in clause 8.2 (RailCorp's Accreditation Variation) of the Conditions of Contract will, if satisfied with the RailCorp Safety Assurance Report, integrate this RailCorp Safety Assurance Report with RailCorp's Accreditation Variation Application for submission to ITSRR.

In addition to the RailCorp Safety Assurance Reports PPP Co must prepare and submit to RailCorp the PPP Co Safety Assurance Reports for integration with RailCorp's Accreditation Variation Application as required to enable RailCorp to obtain RailCorp's Accreditation Variation.

The RailCorp Safety Assurance Reports for the Project are as follows:

- (a) Tender Safety Assurance Report – for the entire Project – which was required to be submitted by PPP Co prior to Contractual Close;
- (b) System Definition Safety Assurance Report – for the entire fleet of Cars – to be developed at the same time as the System Definition Review and submitted as part of the Systems Definition Review;
- (c) Critical Design Safety Assurance Report – for the entire fleet of Cars – to be developed at the same time as the Critical Design Review and submitted as part of the Critical Design Review;
- (d) Implementation Safety Assurance Report – (Testing and Commissioning) – for the entire fleet of Cars – to be developed at the same time as Type Testing, Production Testing and Integration Testing and submitted before the commencement of Delivery Testing on RailCorp tracks. Delivery Testing may be restricted to specific conditions, such as possession, no trains on adjacent tracks, etc.;
- (e) Implementation Safety Assurance Report (Interim) – for Sets 1 to 6 (or Sets 1 to 7 if one of Sets 1 to 6 is withdrawn from service under clause 19.3 (Withdrawal of

one of the first 6 Sets) of the Conditions of Contract) – to be developed and submitted prior to the commencement of Operational Testing on RailCorp tracks and as a condition precedent to Practical Completion of Set 1 (note that if Operational Testing extends to further Sets then an Implementation Safety Assurance Report (Interim) will be required for all additional Sets undergoing Operational Testing); and

- (f) Implementation Safety Assurance Report (Revenue Operation) – for the entire fleet of Cars – to be developed as a condition precedent to Practical Completion of Set 7 (or Set 8 if one of Sets 1 to 6 is withdrawn from service under clause 19.3 (Withdrawal of one the first 6 Sets) of the Conditions of Contract) and subsequent Sets.

### **3.3.3 PPP Co Accreditation**

PPP Co's obligations with respect to its and its Associates' Accreditation are set out in clause 8 (Rail Safety Accreditation and Certificates of Competency) of the Conditions of Contract.

Without limiting the requirements in clause 8 (Rail Safety Accreditation and Certificates of Competency) of the Conditions of Contract PPP Co must, whether or not it is required to hold Accreditation, prepare the PPP Co Safety Assurance Reports which comprise:

- (a) Construction Safety Assurance Report - for the manufacture and Commissioning of the Cars;
- (b) Maintenance Facility Works Safety Assurance Report - for the design, construction and Commissioning of the PPP Co Maintenance Facility Works; and
- (c) Through Life Support Safety Assurance Report - for the Through Life Support of the Cars and the Maintenance Facility including during the Transition-in Phase and Transition-out Phase.

The PPP Co Safety Assurance Reports must comply with the performance requirements of the RailCorp System Requirement for managing change, SMS-06-SR-0048, Safety Change Management from the RailCorp Safety Management System.

Where a specific permit or certificate of competency is required to work at the Maintenance Facility Works, the Maintenance Facility, at any other site controlled by PPP Co, or to work on the Cars, PPP Co must ensure that all personnel have the permits, certificates or authorisation required by law or by RailCorp's rules and regulations, and the necessary site specific or equipment specific knowledge to work safely.

PPP Co must also ensure that its Associates carrying out PPP Co's Activities on the RailCorp network or within RailCorp facilities (including stabling yards and maintenance centres) have the necessary safeworking requirements, permits, certificates or authorisations to work in those areas required by law or by RailCorp's rules and regulations.

PPP Co must also provide all necessary training and certification to permit RailCorp and its Associates to carry out work within the Maintenance Site.

### 3.4 Safety Accountability Statements

PPP Co must ensure that Safety Accountability Statements are prepared, signed (by the individual) and endorsed (by the PPP Co Project Manager) for all personnel engaged on railway safety work and also all managers and supervisors of personnel engaged on railway safety work.

Safety Accountability Statements for managers and supervisors are required for, but not limited to, the following roles:

- PPP Co directors;
- All PPP Co Key Personnel (as detailed in Attachment 5 to these Contract Management Requirements); and
- All PPP Co's Contractors Key Personnel (as detailed in Attachment 5 of these Contract Management Requirements);

It remains the responsibility of PPP Co to ensure that the requirements of the Safety Accountability Statements are complied with at all times.

## 4 Systems Assurance Plan

### 4.1 General requirement

PPP Co must implement a Systems Assurance Process. The Systems Assurance Process must use systems engineering processes and techniques to ensure that:

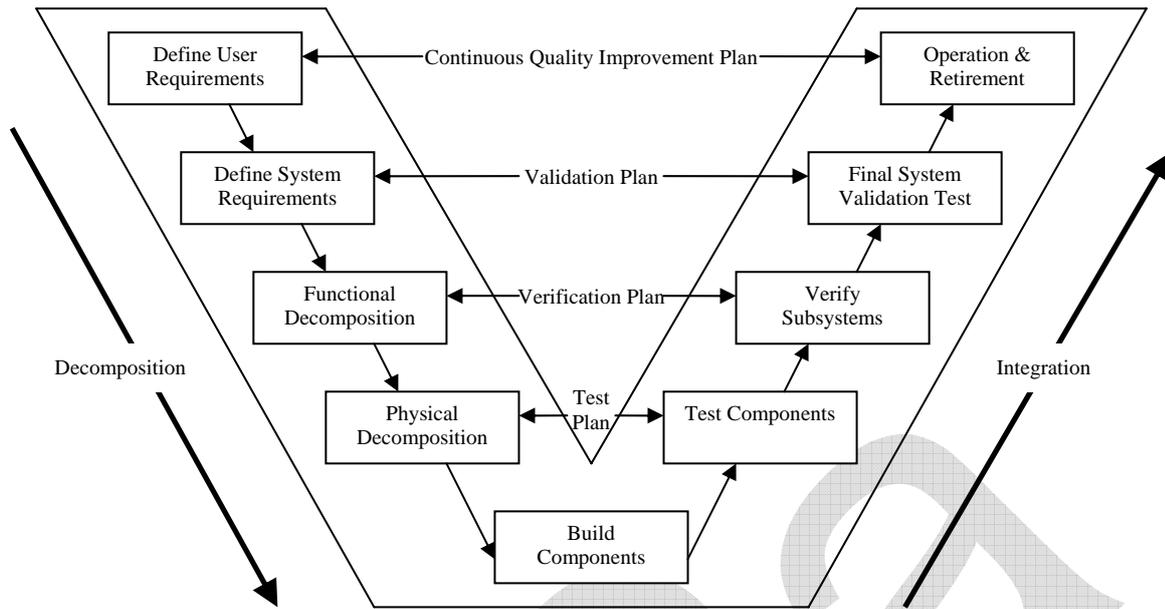
- (a) the Cars, the Maintenance Facility Works and the Simulators are designed in accordance with all of the requirements of the Contract, including the Specifications;
- (b) the Cars and the Simulators are manufactured and the Maintenance Facility Works are constructed in accordance with the Final Design Documentation and the other requirements of the Contract;
- (c) the Cars and the Simulators as manufactured and the Maintenance Facility Works as constructed satisfy the requirements of the Contract, including the Specifications;
- (d) the Cars, the Maintenance Facility and the Simulators are maintained throughout the Through Life Support Phase in a manner so as to ensure their continued compliance with the defined safety, Availability, Reliability, quality and performance requirements of the Contract; and
- (e) information is provided throughout the Contract Term to assure RailCorp that the requirements of the Contract are being met.

The Systems Assurance Process must also ensure that the solution is capable of delivering the specified level of performance and of being adequately supported during the Through Life Support Phase.

The Systems Assurance Process must be consistent with the V-Process of systems engineering<sup>1</sup> illustrated in Figure 4.1 below, or other suitable systems engineering process, as agreed between RailCorp and PPP Co.

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<sup>1</sup> *DERA Systems Engineering Practices, Reference Model*. DERA/LS(SEC-FH)/PROJ/018/G01 (1997). Farnborough (UK): Defence Evaluation and Research Agency.



**Figure 4.1: The V-Process of Systems Engineering**

The V-Process model provides an effective summary of the stages of the Project, which aims to ensure that the requirements of the Contract are met. In the left-hand arm of the 'V', the user requirements are decomposed, or analysed, and described in increasing degrees of detail, ultimately achieving a level that is sufficient to permit the manufacture or construction of each element of the System. In the right-hand arm of the 'V', the manufactured or constructed elements are integrated with one another, or synthesised, first as Subsystems and then as a complete System. Across the 'V', links are drawn which correspond to the nature of the Testing activity that is required in order to confirm that the System as manufactured or constructed, and operated and maintained, meets the requirements of the Contract.

The V-system is commonly used for design and build projects, but is equally applicable during the TLS Phase of the Project. The TLS Phase is represented by the "Operation and Retirement" element in figure 4.1. This covers the continuing compliance of the Project with RailCorp's requirements, through Variations, modifications (whether as a result of a drive for improvement or the need to overcome obsolescence), In-service Testing, and compliance management throughout the Contract Term.

The Systems Assurance Process must address details of the following requirements:

- (a) organisation and responsibilities;
- (b) Systems Assurance Process planning and reporting;
- (c) design requirements and design management;
- (d) Technical Reviews;
- (e) Configuration management;
- (f) Reliability programme;
- (g) Maintainability Programme;
- (h) Availability prediction;

- (i) Testing and Verification;
- (j) safety; and
- (k) integration between the design and the integrated support programme.

## 4.2 Systems Assurance Plan (SAP)

PPP Co must develop, deliver and maintain a Systems Assurance Plan. The Systems Assurance Plan will describe each stage in the Systems Assurance Process that PPP Co will apply in order to ensure that the Cars are designed, manufactured, tested, commissioned and configured in accordance with the requirements of the Contract and can properly be accepted for passenger service by RailCorp. The Systems Assurance Plan will also describe the process by which PPP Co will validate that on achievement of Practical Completion, the Cars have a performance that is consistent with the requirements of the Contract.

As part of the Systems Assurance Plan, PPP Co must adopt and implement a suitable systems engineering methodology to the management of the Project. An example of such a methodology that is acceptable to RailCorp is set out in EIA-632 *Processes for Engineering a System*, published by the US Government Electronics and Information Technology Association.

### 4.2.1 RAMS Plan

The Required Availability which PPP Co must provide is specified in clause 22 (Required Availability) of the Conditions of Contract. The Initial Reliability Requirements are specified in clause 19 (Initial Reliability Requirement) of the Conditions of Contract.

The Reliability, Availability, Maintainability and Safety (RAMS) Plan shall be fully compliant with the requirements in EN 50126 *Railway applications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)*. The safety management aspects shall be incorporated in the Safety Management Plan in accordance with clause 3.1 of these Contract Management Requirements.

The RAMS Plan shall include as a minimum details of the following:

- (a) Project lifecycle;
- (b) Verification;
- (c) RAMS assurance requirements in accordance with EN50126;
- (d) Safety integrity; and
- (e) Apportionment of safety and reliability targets.

The RAMS Plan must include details of the following:

- (a) a detailed description of the Design Review Process and Systems Assurance Process. The Design Review Process will include three stages:
  - (i) System Definition Review (SDR);
  - (ii) Preliminary Design Review (PDR); and
  - (iii) Critical Design Review (CDR);

- (b) the review and feedback process associated with the Mock-Ups as required by clause 12 (Mock-Ups) of the RailCorp Train Performance Specification;
- (c) RAMS predictions, in accordance with EN 50126 *Railway applications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)* as defined in clauses 4.8.2 for Reliability, 4.9.2 for Maintainability and 4.10 for Availability of these Contract Requirements;
- (d) Testing process and plans;
- (e) Commissioning process;
- (f) Practical Completion and Final Completion process, including the process and requirements for a final System Verification Review (SVR) to ensure that the Cars meet the requirements of the Contract and are fit for passenger service;
- (g) Technical Maintenance Plan;
- (h) in service RAMS Verification process – to demonstrate that the RAMS predictions have been achieved in practice and to identify and remedy any cases where service performance is considerably below the predicted level;
- (i) RAMS organisation and responsibilities within PPP Co's organisation. This must include the names and details of experience of the personnel to be employed on systems assurance and is to identify design signatories and approvals;
- (j) reference to specific standard procedures and instructions for RAMS within the PPP Co's organisation, including design procedures;
- (k) the process for requirements analysis, including allocation and traceability of the requirements of the Specifications;
- (l) the process for managing individual sets of requirements within the Specifications including:
  - (i) Reliability;
  - (ii) Maintainability;
  - (iii) manufacture or construction;
  - (iv) electromagnetic compatibility;
  - (v) interchangeability;
  - (vi) software development and integration;
  - (vii) human interfaces;
  - (viii) energy use; and
  - (ix) environmental compliance;
- (m) integration of design activity with the Integrated Test Plan;
- (n) integration of design activity with Through Life Support requirements;
- (o) ongoing demonstration of compliance with the requirements of the Contract throughout the Contract Term, including compliance with Configuration management requirements; and

- (p) technical risks and intended actions for control of these risks in accordance with the Risk Management Plan.

### **4.3 Variation management**

PPP Co must implement a system of Variation management as part of the SAP. The Variation management system must conform to the requirements of clauses 30 (RailCorp initiated Variations) and 31 (PPP Co initiated Variations) of the Conditions of Contract and the performance requirements from the RailCorp System Requirement for managing change, SMS-06-SR-0048, Safety Change Management. The Variation management system must encompass the requirements for Configuration management described in clause 5 (Configuration Management Plan) of these Contract Management Requirements.

As a minimum, the Variation management system must provide the means of:

- (a) establishing and managing a system of Variation control, which ensures that all Variations are identified, properly authorised and incorporated in relevant documentation and result in changes to support requirements where necessary;
- (b) formally identifying and describing proposed Variations in terms of their impact on performance and on support activities. This includes aspects such as operation, Reliability, Maintainability and interchangeability;
- (c) managing the approval (including approval by ITSRR where appropriate) and incorporation of approved Variations, including any Testing requirements and any complementary Variations in support provisions such as Technical Maintenance Plans, technical publications, spares support and Configuration management;
- (d) assessing and managing, including the recording and documentation of, Variations in risk resulting from the Variation; and
- (e) assessing and managing, including the recording and documentation of, whole of life cost changes arising from the Variation.

### **4.4 Design Management Plan**

PPP Co must produce a Design Management Plan fully detailing an integrated design management approach adopted, which must be consistent with the Contract Management Requirements for quality, safety, environmental and risk management, and which must set out the processes that PPP Co will employ to satisfy its obligations under clauses 4.4.1 to 4.4.7 of these Contract Management Requirements.

The Design Management Plan and the Technical Review process described in clause 4.6 of these Contract Management Requirements must be integrated as an overall process for ensuring that PPP Co satisfy RailCorp that their design proposals will comply with the Specifications.

The Design Management Plan must describe:

- a) how PPP Co will identify the design inputs from RailCorp and from relevant legislation and regulations;
- b) PPP Co's internal processes for production of the Design Documentation described in section 4.7 of these Contract Management Requirements. This

documentation output is required for submission to RailCorp under the Technical Review process; and

As part of the Design Management Plan, PPP Co must conduct internal design reviews (clause 4.4.4 of these Contract Management Requirements), which RailCorp may attend and audit.

The Technical Review process must allow RailCorp to assess whether the design proposals from PPP Co fulfil the requirements defined in the design inputs. The process is in four stages;

1. System Definition Review (clause 4.6.3 of these Contract Management Requirements) to compare PPP Co's concept design with the Specifications and establish the system definition design for the Contract.
2. Preliminary Design Review (clause 4.6.4 of these Contract Management Requirements) to establish the preliminary design for the Contract, defining the status of previously developed items and describing the proposals for development items.
3. Critical Design Review (clause 4.6.5 of these Contract Management Requirements) to produce the Final Design Documentation for the Contract.
4. System Verification Review (clause 4.6.6 of these Contract Management Requirements) to review the outcome of Testing and Verification.

Each stage requires that specific outputs are generated from the Design Management Plan process. These include the following;

1. The Project Plans listed in Attachment 1 to these Contract Management Requirements
2. The materials necessary for customer focus groups to be delivered successfully within the Technical Review process in order to optimise the exterior and interior design as defined in 4.5.1 of these Contract Management Requirements.
3. A trade-off study as defined in clause 4.5.2 of these Contract Management Requirements.
4. An accessibility report as defined in clause 4.5.3 of these Contract Management Requirements.
5. Design Verification certification from PPP Co as defined in clause 4.4.7 and clause 4.4.8 of these Contract Management Requirements.
6. Independent Verification certification for critical areas defined in 4.4.10 of these Contract Management Requirements at each of the above stages of Technical Review.

#### **4.4.1 General**

Design management represents a major aspect of the Systems engineering process. For the purposes of this Contract, PPP Co must ensure that design management includes:

- (a) analysis and validation of the requirements of the Contract to ensure that they are complete in terms of the performance required to meet the Specifications and that they do not conflict;
- (b) identification of design input to meet the requirements of the contract;

- (c) allocation of requirements to specific Systems, Subsystems and Configuration Items;
- (d) tradeoffs and optimisation of the design including changes or modifications to the design throughout the Contract Term, to ensure that the final product is compliant and remains compliant with the requirements of the Contract, and that the results of studies of engineering aspects such as Safety, Reliability, Maintainability and manufacture and construction are incorporated into the design;
- (e) submission of Design Documentation developed by PPP Co to RailCorp's Representative in accordance with clause 13.4 (Submission of Design Documentation) of the Conditions of Contract;
- (f) coordination of design reviews;
- (g) definition and management of interfaces and interface protocols, both external to and between Sub-systems;
- (h) validation of component, Subsystem and System performance including transition activities;
- (i) selection of components and materials;
- (j) obtaining design certification;
- (k) coordination of provision of design support during the Through Life Support Phase by providing information to establish the connection between the design during the Delivery Phase and for continuing support during the Through Life Support Phase; and
- (l) Coordination of compilation and submission of asset management information.

Accordingly, PPP Co and PPP Co's Contractors are required to develop, maintain and implement Design Management Plans.

The existence of well developed design procedures and controls within PPP Co's organisation will provide the basis for effective systems assurance and is fundamental to aspects such as Testing and Verification.

PPP Co must include details of the procedures and controls to be provided for design management throughout the Contract Term as part of the Design Management Plan. These procedures and controls must include a design input management and review process, to manage the analysis of requirements, assumptions, constraints and lessons learned from previous experience (including lessons learned from accidents and incidents). The design input management and review process must demonstrate how PPP Co has applied this analysis to the design of the Sets, the Simulators and the Maintenance Facility Works to ensure its relevance, adequacy and completeness.

Design support will be required during the Through Life Support Phase. PPP Co must provide information to establish the connection between the design during the Delivery Phase and for continuing support during the Through Life Support Phase.

The Design Management Plan must be consistent with the requirements of ISO 9001:2000 and must set out the processes that PPP Co will employ to satisfy its obligations under clauses 4.4.2 to 4.4.6 of these Contract Management Requirements.

#### 4.4.2 Design development planning and packaging

As part of the Design Management Plan, PPP Co must plan the design development processes to include:

- (a) design stages in developing the design documentation;
- (b) packaging of design components. The packaging must reflect the design inputs for each of the design packages and the interface and inter-relationship between such packages. For the Rolling Stock Manufacturer, this must be consistent with the CWBS developed in accordance with these Contract Management Requirements;
- (c) skills and competency assessments for design personnel of PPP Co and PPP Co's Contractors (these processes are to ensure the adequacy of skills and competency of all design personnel engaged in the design of the Sets, the Simulators and the Maintenance Facility Works. RailCorp may conduct audits to determine the effective implementation and maintenance of these processes); and
- (d) a process for managing the interface between design teams and disciplines having regard to the functional responsibilities of each organisation undertaking the design activities.

As part of the design development, planning processes, procedures and controls must be included to manage the design input identification and review process. These include:

- The analysis of requirements and validation of requirements of the Contract to ensure that they are complete in terms of the performance required to meet the Specifications and that they do not conflict;
- To comply with the requirements relating to specific functional management processes, eg, the operation & maintenance hazards;
- Allocation of requirements to specific design packages and the management of interfaces, both external to and between design packages;
- Definition of assumptions, constraints and lessons learned from previous experience (including lessons learned from accidents and incidents); and
- The design input management and review process must demonstrate how PPP Co has applied this analysis to the design of the Sets, the Simulators and the Maintenance Facility Works to ensure its relevance, adequacy and completeness.

#### 4.4.3 Design Verification planning

PPP Co must plan the design Verification process for each design package required to determine whether the Sets, the Simulators and the Maintenance Facility Works have been designed in accordance with the design input requirements and Contract Management Requirements. These requirements are to be taken into account in the Design Verification Plan. Design Verification planning must include:

- (a) Methods for the definition and review of the adequacy, relevancy and completeness of those design inputs identified for the relevant design package;
- (b) Self-verification methods for each of the design outputs (including those design outputs required for design review purposes);

- (c) independent Verification and the nominated person to conduct the independent Verification; and
- (d) the persons responsible for undertaking design and design self-verification activities.

The following information must be maintained as part of the compliance records referred to in clause 2.11.5 of these Contract Management Requirements:

- (e) Design Verification plans; and
- (f) Design input registers identifying the design inputs for the design package.

Design Verification shall be undertaken to determine whether each design package has been designed in accordance with the design input requirements. Such activities must include those set out in the Design Verification Plan.

Design Verification shall include certification from PPP Co that the designs for the Sets, Simulators and Maintenance Facility are consistent with each other and from the TLS Contractor that the designs meet the requirements for Through Life Support throughout the Contract Term.

Specific requirements for independent Verification are detailed in clause 4.4.10 of these Contract Management Requirements.

#### **4.4.4 Design review**

PPP Co must conduct internal design reviews during all the design stages including:

- (a) all stages of conceptual design;
- (b) design development activities (including detail design) leading to the completion of design documentation for the SDR, PDR and CDR;
- (c) determination of internal acceptance criteria for manufacture, procurement, installation and construction;
- (d) the development of validation processes (including Testing and Commissioning where applicable); and
- (e) other design validation activities.

The planned design reviews must include representatives of all persons involved in the design being reviewed eg. manufacturer / constructor representative, maintenance representatives, safety personnel and independent Verification experts. RailCorp may attend and audit any design review. The design review process applied is to be consistent across the Project and throughout PPP Co's complete supply chain.

For the design of trains, design reviews must review whether:

- any trade-offs in or optimisation of the design, including changes or modifications to the design throughout the Contract Term are compliant and remain compliant with the requirements of the Contract; and
- the results of studies of engineering aspects such as Safety, Reliability, Maintainability and manufacture have been incorporated into the design.

Design review records must be maintained as part of the compliance records referred to in clause 2.11.5 of these Contract Management Requirements.

#### 4.4.5 Design validation planning

Design validation (including any Testing and Commissioning as required by the Contract) must be planned and conducted to ensure that the Sets, the Simulators and the Maintenance Facility Works comply with the requirements of the Contract.

To facilitate the achievement of such design validation, each package of design must identify the design validation requirements, including the responsibility of a suitably qualified and experienced person for certification that validation has been achieved, as required by clause 4.12.2 of these Contract Management Requirements.

For Testing and Commissioning these design validation activities are to be undertaken in accordance with the requirements of Testing and Verification contained in clause 4.12.11 of these Contract Management Requirements.

Design validation planning and records must be maintained as part of the compliance records referred to in clause 2.11.5 of these Contract Management Requirements.

#### 4.4.6 Design output requirements for manufacture & construction (including procurement and installation of plant and equipment)

PPP Co must ensure that the design outputs to be used for manufacture, construction, procurement and installation include:

- (a) Characteristics and associated criteria for acceptance;
- (b) Temporary works (associated with the construction of the Maintenance Facility) which recognise the operating status of the rail system;
- (c) Tests and measurements for which availability of technical information pertaining to inspection measuring and test equipment is required;
- (d) Nomination of those processes that require validation;
- (e) Witness and hold points for inspections to be applied by PPP Co or PPP Co's Contractors to ensure that manufacture, procurement, installation and construction meet the requirements of the Design Documentation;
- (f) Tracing of relevant items and materials;
- (g) manufacture and construction requirements to preserve integrity of plant and material;
- (h) Maintenance processes; and
- (i) Any other requirements of the Contract.

PPP Co must certify design outputs as being suitable for their intended purposes. Evidence of such certification is to be maintained as required by clause 2.11.5 (b) of these Contract Management Requirements.

#### 4.4.7 Design certification

PPP Co must provide design certification completed by the verifier of the work package to support:

- the requirements traceability and allocation described in clause 4.4.8 (Requirements traceability and allocation) of these Contract Management Requirements; and

- the Test Specifications and Test Reports required by clause 4.12.10 (Test Specifications and Reports) of these Contract Management Requirements.

It should be noted that this Verification is separate from the independent Verification specified in clause 4.4.10.

#### **4.4.8 Requirements traceability and allocation**

Details of the requirements and functions allocated to individual Systems, Subsystems and Configuration Items must be provided as traceability records in a form approved by RailCorp.

These traceability records must include:

- (a) a requirements hierarchy, showing how the technical requirements of the Contract, including the Specifications, have been interpreted and decomposed by PPP Co;
- (b) a functional hierarchy, showing how the functions of the Cars, the Maintenance Facility Works, the Maintenance Facility and the Simulators defined in the Specifications have been interpreted and decomposed by PPP Co;
- (c) a definition of the physical hierarchy of the components, interfaces and links that form the Cars, the Maintenance Facility Works, the Maintenance Facility and the Simulators, sufficient to identify each one, including both hardware and software. The physical hierarchy must be consistent with the RailCorp MMIS;
- (d) a definition of the purpose of each component, interface or link, including the functions it performs, its capabilities, capacity, operating states and modes;
- (e) identification of the non-functional requirements allocated to each component; and
- (f) cross-reference indexes showing the methods and specific Test procedures to be applied to validate the requirements, functions, capabilities, capacity, operating states and modes for each component.

PPP Co must conduct functional analysis and allocation, using either a CASE tool or other method proposed by PPP Co and not rejected by RailCorp's Representative, to demonstrate that all requirements have been incorporated within the Final Design Documentation.

Design certification must take the form of a certificate, to be provided by PPP Co as a pre-condition to payment of the Milestone Payment associated with the Critical Design Review, to the effect that the design complies with the Contract including the Specifications and other relevant standards and codes.

#### **4.4.9 Software design and development**

Functional requirements for software are incorporated in the Specifications.

PPP Co must implement specific procedures and controls for the development, integration and documentation of software as part of the design programme. Procedures must clearly specify the approach to the development of new code as well as to the integration and Testing of Commercial-Off-The-Shelf (COTS) products.

Software development must be conducted in accordance with the requirements of ISO/IEC 90003, *Software engineering – Guidelines for the application of ISO 9001:2000 to computer software*, and in the case of safety-related software with the requirements of IEC 61508 part 3, IEC 62279 or EN50128.

Software development procedures must be submitted for review, as appropriate to the level of new development included within PPP Co's design. Software test requirements must be incorporated by PPP Co in the Integrated Test Plan as required by clause 4.12 (Testing and Verification) of these Contract Management Requirements and must require the application by PPP Co of a systematic process of Development Testing, Integration Testing and Qualification Testing prior to the release of software for incorporation or use within the design.

At the System Definition Review PPP Co must identify:

- (a) the software components to be developed or modified for use in the Cars, the Maintenance Facility Works, the Maintenance Facility and the Simulators;
- (b) previous experience with the development, application and support of similar software;
- (c) the programming languages to be used, including interpreters, compilers, databases and any other necessary support items;
- (d) the software development environment, including hardware and software components; and
- (e) the processes and procedures to be followed for safety validation of the software.

PPP Co must develop and deliver software documentation that provides sufficient detail to enable the software products to be supported and maintained throughout the planned life of the Cars, the Maintenance Facility and the Simulators. All software products must include the following:

- (f) Software Detail Design Document (SDDD): the SDDD is a knowledge-transfer document that must be supplied by PPP Co to RailCorp for each of the software products being provided under the Contract. ICT development, design and architecture audiences must reference the SDDD for an "in-depth" understanding of each software product. The SDDD must be maintained by PPP Co throughout the life of each of the software products to support on-going maintenance and change management.

The content of the SDDD must include the following information:

- (i) the purpose of the software product within the broader ICT architectural context;
- (ii) the services provided by the software product with reference to the business requirements being satisfied;
- (iii) design alternatives and decision rationale;
- (iv) design standards and patterns that have been adhered to;
- (v) design assumptions made to enhance the quality of the software product;
- (vi) ICT infrastructure required to operate the software product;
- (vii) detailed design views of the software product detailing both the structural and behavioural characteristics ; and

(viii) application programming interfaces, interface protocols, and procedures to be followed to successfully integrate the software product with other software products.

- (g) **Software Product Technical Specification (SPTS):** the SPTS is a document that must be supplied by PPP Co to RailCorp for each of the software products provided under the Contract. Each SPTS must provide sufficient detail to support the on-going maintenance and management of all software products. The SPTS must provide both PPP Co and RailCorp with an “as is” architectural view for identifying ICT product dependencies.

The SPTS must include the following information:

- (i) **feature set:** itemising the features of the software product and the business requirement each feature satisfies;
- (ii) **interface integration:** identifying and describing the interfaces supported by the software product and the requirements for the correct integration and operation of each interface;
- (iii) **quality of service:** covering such areas as the levels of security, availability, reliability and scalability of the software product;
- (iv) **supporting infrastructure:** detailing the supporting environment (such as hardware, network, application infrastructure, space, and ambient temperature) required to ensure the through-life sustainability of the software product; and
- (v) **additional information** that would benefit the effective management of the software product.

#### **4.4.10 Independent Verification**

A number of critical areas of the design, manufacturing, Testing and project management processes are subject to independent Verification in respect of Technical Review submissions, Test reports and configuration changes to provide assurance to RailCorp that the requirements of the Contract are being achieved satisfactorily. PPP Co must engage suitably qualified and competent experts who are independent from PPP Co and PPP Co’s Contractors to conduct these independent Verification activities in respect of the areas stated in paragraphs (a) to (t) below. This Verification is separate from that described in clause 4.4.7.

PPP Co must provide to RailCorp for review a Certificate of Competency and the proposed terms of engagement for each nominated person to be appointed to conduct any independent Verification before PPP Co engages the nominated person. The engagement of the nominated person must not proceed if the Certificate of Competency or terms of engagement are rejected by RailCorp, provided that RailCorp must not unreasonably withhold or delay its consent.

PPP Co must not replace a nominated person without agreement from RailCorp.

Each nominated person must sign a deed, prior to engagement, in favour of RailCorp acknowledging that it owes a duty of care to RailCorp in a form satisfactory to RailCorp.

Submission of independent Verification reports, for each Technical Review stage, related to the matters stated in paragraphs (a) to (t) below and which have not been independently verified by the person accepted by RailCorp to undertake the nominated independent Verification must be recorded as a nonconformance in the register described in clause 2.11.5(e)(iii) of these Contract Management Requirements. Such nonconformance will not be regarded as being minor in nature, as referred to in clause 2.11.5(e)(iii) of these Contract Management Requirements.

Independent Verification is required for critical areas listed in the table below, which includes the relevant reference in clause 4.6.2 where applicable:

<b>Critical Area for Independent Verification</b>	<b>Major Subsystem (as listed in clause 4.6.2)</b>
Bodyshell (including glazing, crashworthiness)	(b)
HVAC (including fresh air ventilation)	(k)
Compressed Air	(r)
Car mass	
Bogies, wheels and axles	(i)
Finite element analysis of Car body and bogie structures	
EMC / EMI Analysis	
Traction (including performance and energy calculations)	(d)
Brakes (including integration with traction)	(g)
Doors (including traction interlocks and passenger interfaces)	(h)
Couplers (including interoperability) and gangways	(c)
Passenger seating	(u)
TOS (including display layouts)	(x)
Software	
Acoustics	
Car ride	
Interior and exterior appearance	(a)

and layout	
Accessibility requirements	(p)
Driver Safety System	(l)
Fire safety	
Project programming	

A certificate (together with supporting documentation) from the independent verifier certifying that the relevant Design Documentation complies with the requirements of the Contract must be submitted for review by RailCorp as part of the Design Documentation required by clause 13.4 (Submission of Design Documentation) of the Conditions of Contract. If PPP Co fails to submit this certificate (and supporting documentation) RailCorp will be entitled to indicate that the relevant Design Documentation is “Rejected” in accordance with clause 13.5(a)(ii)C of the Conditions of Contract.

#### **4.5 Exterior and interior design optimisation and Mock-ups**

##### **4.5.1 Exterior and interior design optimisation**

Designs for both the exterior appearance and the interior arrangement and furnishings of the Cars, the Maintenance Facility Works and the Simulators must be established early in the design process in conformance with the concept established at the date of Contractual Close and in accordance with the Specifications. Design optimisation must take place through the use of customer focus groups and RailCorp reviews, as part of the Technical Review process, and the use of the Mock-ups specified in clause 12 (Mock-ups) of the RailCorp Train Performance Specification. Minor changes will be permitted from the concept, to accommodate requirements arising from the design optimisation process, but primary characteristics of the appearance, as accepted by RailCorp at the date of Contractual Close and including all relevant drawings, images, visualisations and other documentation, must be preserved.

PPP Co must provide a detailed design study prepared by a design specialist covering development of the exterior and internal design optimisation of the Sets. Aspects to be considered must include:

- (a) Human factors and ergonomics;
- (b) operating efficiency;
- (c) durability;
- (d) Maintainability including cleaning and restoration of damage through Vandalism;
- (e) Passenger and Crew comfort and aesthetic considerations;
- (f) Life Cycle cost considerations; and
- (g) TLS component replacements.

PPP Co shall also submit a final report from its interior design consultant confirming that all aspects of the design consultation have been fully implemented and identified and explaining all changes from concept.

#### **4.5.2 Trade-off study**

PPP Co must provide a detailed trade-off study covering development of the exterior and internal appearance of the design of the Cars, the Maintenance Facility Works and the Simulators, including the advantages and disadvantages of various alternatives considered as part of the development process. Aspects to be considered must include operating efficiency, durability, Maintainability including cleaning and restoration of damage caused by Vandalism and Graffiti, passenger safety, passenger comfort, accessibility and aesthetic considerations and life cycle cost considerations. The trade-off study must include detailed sketches and layouts of the proposed design and must include the Mock-ups, models, samples of materials, and other visual aids.

#### **4.5.3 Accessibility and human factors and ergonomics sign-off**

On completion of the exterior and interior design optimisation and the trade-off study, PPP Co must submit an accessibility report, certified by an accredited access consultant experienced in railway work, confirming that the designs of the Sets, the Simulators and the Maintenance Facility Works are compliant with DSAPT and all other access requirements. PPP Co must also submit a human factors and ergonomics report, certified by an experienced transport human factors and ergonomic specialist, confirming that the designs of the Sets, the Simulators and the Maintenance Facility Works meet all ergonomic requirements, or, if they do not, what other issues have been considered and accepted by RailCorp during the design process.

#### **4.5.4 Mock-up programme**

The Mock-up programme must be integrated into the Delivery Programme. PPP Co must provide RailCorp with at least four weeks' notice of when the Mock-up will be ready for assessment by RailCorp.

PPP Co must initially allow five weeks for RailCorp to assess the Mock-ups following which PPP Co must allow a further two months for RailCorp to access review and comment on the Mock-up and its design and layout. On completion of the full Mock-ups and conclusion of the initial Mock-up consultation period, RailCorp reserves the right to require changes to be made to the design and the Mock-ups to address identified concerns. Subsequent changes to the approved design and layout must be submitted to RailCorp for review and must address any RailCorp comments in a satisfactory manner.

### **4.6 Technical Reviews**

#### **4.6.1 Technical Review process**

Technical Reviews form part of the Systems Assurance Plan and will be conducted for the purpose of establishing progress toward achievement of technical and integrated support requirements of the Contract. PPP Co has the primary

responsibilities to manage and conduct the reviews, and to achieve the objectives of each review.

The Technical Reviews must:

- (a) assess PPP Co's intended approach to meeting all of the Contract requirements;
- (b) review any specific requirements agreed between RailCorp and PPP Co; and
- (c) resolve problems associated with the design of technical and support aspects of the Project.

The Technical Review process must conform to the framework set out in RailCorp document AM 0022 PM *Technical Reviews Policy Manual – Rail Services Authority*.

#### **4.6.2 Technical Review programme and purpose**

PPP Co must carry out Technical Reviews in accordance with clause 13.3 (Technical Reviews) of the Conditions of Contract. The Technical Reviews will be conducted in accordance with the principles established in AM 0022 PM, to meet the following specific objectives.

Each of the Technical Reviews may be completed as a single event or may take place progressively, according to the Delivery Programme. These Technical Reviews may be conducted for Systems as a whole, or may be held for separate Subsystems, groups of Subsystems or Configuration Items as appropriate. Each Technical Review must include a presentation by PPP Co to RailCorp of the design elements covered by the Technical Review, and a meeting between RailCorp and PPP Co to discuss the design elements covered by the Technical Review.

A plan for the breakdown of the design into design elements at each Technical Review stage, and a programme for submission and review of the design elements at each Technical Review stage, must be agreed between RailCorp and PPP Co to ensure that submissions and review are properly programmed to avoid delay to the process caused by congestion or overloading of resources. This programme must be incorporated into the Delivery Programme.

PPP Co may conduct informal technical reviews of Systems, Subsystems or Configuration Items with PPP Co's Contractors. However PPP Co must keep RailCorp's Representative informed of the outcome of all such informal technical reviews.

PPP Co must submit Design Documentation in accordance with clause 13.4 (Submission of Design Documentation) of the Conditions of Contract, together with supporting documentation including PPP Co's responses to RailCorp's comments on previous submissions for the same design element, if any. The format for design submissions, comments and responses will be agreed between PPP Co and RailCorp or, failing agreement, as reasonably required by RailCorp.

The design submissions for the Sets must be comprehensive and cover all aspects of the Set performance required by the RailCorp Train Performance Specification and must include all of the items set out in Attachment 4.

Each submission of Design Documentation must be accompanied by a declaration and checklist confirming that all the requirements of the Contract relevant to that submission have been addressed.

RailCorp's Representative may (but is not obliged to) review and respond to the Design Documentation, or any resubmitted Design Documentation, provided by PPP Co in accordance with clause 13.5 (Review of Design Documentation) of the Conditions of Contract.

The Major Subsystems for the Cars must include:

- (a) the interior and exterior appearance and layout;
- (b) the bodyshell (including glazing, crashworthiness);
- (c) the couplers (including interoperability) and gangways;
- (d) traction (including performance and energy calculations);
- (e) current collection and return equipment;
- (f) High Speed Circuit Breaker;
- (g) brakes (including integration with traction);
- (h) doors (including traction interlocks and passenger interfaces);
- (i) bogies, wheels and axles;
- (j) auxiliary power (EAPS), battery and control circuits and lighting;
- (k) HVAC (including fresh air ventilation);
- (l) Driver Safety System;
- (m) security systems;
- (n) fire and life safety systems (including emergency facilities and equipment);
- (o) emergency access and egress;
- (p) accessibility requirements;
- (q) Passenger safety Systems;
- (r) compressed air;
- (s) Passenger-operated controls;
- (t) signage space;
- (u) Passenger seating;
- (v) communications and information systems ;
- (w) Cab layouts (including controls and indicators, and crew amenities);
- (x) TOS (including display layouts);
- (y) human factors;
- (z) safety circuits and fail-safe design requirements;
- (aa) diagnostic systems (including data logger and train preparation self-test);
- (bb) energy consumption profiles;
- (cc) equipment examiner facilities;
- (dd) provisions for future support for design life; and

(ee) infrastructure interfaces (e.g. track, power supply, signalling).

The Major Subsystems and equipment for the Maintenance Facility Works must include:

- (ff) civil and structural works;
- (gg) electrical & mechanical (E&M) works;
- (hh) track (including gradient profile);
- (ii) Overhead Wire (OHW) (including electrical isolation System and high level platform protection System);
- (jj) signalling and safeworking (including route control and main line access protection);
- (kk) communications;
- (ll) cranes, jacks and lifting equipment;
- (mm) powered mobile plant;
- (nn) manual handling equipment;
- (oo) fixed powered tools;
- (pp) fixed Test equipment including electronic Test equipment;
- (qq) energy consumption monitoring equipment;
- (rr) reticulated air, oil, electrical and water systems;
- (ss) storage systems;
- (tt) high voltage Test facilities;
- (uu) waste management and disposal facilities;
- (vv) access roads and paths (including safe walking routes);
- (ww) staff amenities and facilities (for PPP Co and RailCorp staff) and accessibility requirements;
- (xx) lighting (including yard, shed, pit and walkway lighting);
- (yy) fire protection systems;
- (zz) security systems;
- (aaa) utilities and services;
- (bbb) Underfloor Wheel Reprofileing Machine;
- (ccc) Car wash plant (if provided); and
- (ddd) painting equipment (if provided).

The Major Subsystems for the Simulators must include:

- (eee) Drivers' Simulator (DS);
- (fff) Guards' Simulator (GS);
- (ggg) Part-Task Simulator (PTS);
- (hhh) Driver Vision System;

- (iii) Train Performance Display (TPD);
- (jjj) DS Audio System;
- (kkk) DS Radio/Intercom System;
- (III) DS CCTV;
- (mmm) DS Procedural Trainer;
- (nnn) GS Audio System;
- (ooo) GS Radio/Intercom system;
- (ppp) GS CCTV;
- (qqq) GS Procedural Trainer;
- (rrr) Simulator Control Station (SCS);
- (sss) SCS management system; and
- (ttt) SCS recording and replay system.

#### **4.6.3 System Definition Review (SDR)**

The SDR must:

- (a) compare the requirements of the Specifications to PPP Co's concept design and resolve any differences or misunderstandings arising from the initial functional analysis of the requirements of the Specifications;
- (b) review PPP Co's intended approach to systems assurance required as part of the Contract; and
- (c) establish the system definition design for the Contract.

The SDR must include a review of individual Systems, Subsystems and Configuration Items proposed by PPP Co as part of the concept design. The SDR will confirm the structure of Systems, Major Subsystems and Configuration Items (which includes all level 2 items in the CWBS), the suppliers for Systems and Major Subsystems, and any design alternatives for consideration.

The SDR will be complete when all Design Documentation for all Systems, Subsystems and Configuration Items for the SDR has been submitted to RailCorp's Representative and is Not Rejected (NR) or Not Rejected Subject to Comments (SC) within 20 Business Days of submission.

#### **4.6.4 Preliminary Design Review (PDR)**

The PDR must address key aspects of the PDR process as described within AM 0022 PM. PPP Co must propose an approach to the carrying out of the PDR, for review by RailCorp's Representative, to take account of the extent to which previously developed items will be incorporated in the Final Design Documentation.

The PDR must include:

- (a) the design status of previously developed hardware items and COTS hardware and software, including compliance with specification requirements, the status of previous qualification listing, planning for additional qualification and Integration

Testing, definition of interfaces, the level of documentation available and integrated support aspects; and

(b) for development items:

- (i) functional analysis and requirements allocation, including functional flow block diagrams, performance requirements and the status of the development of additional specifications;
- (ii) preliminary design detail of individual Systems and equipment, including sketches, drawings, analysis and trade off studies carried out in developing the preliminary design;
- (iii) interface definition, in the form of specifications and/or drawings;
- (iv) environmental design criteria, security criteria, fire and life safety, accessibility and passenger safety;
- (v) preliminary plans for qualification of the item/System;
- (vi) proposed Configuration of computer resources including processor type operating systems, development environment, capacity, interfaces and timing diagrams;
- (vii) preliminary Reliability, mass, centre of gravity forecasts for the Cars;
- (viii) ease of manufacture aspects, including special materials tooling and processes to be developed or used in the building of the Cars, the Maintenance Facility Works and the Simulators;
- (ix) preliminary design for the exterior and internal appearance of the Cars, the Maintenance Facility Works and the Simulators;
- (x) consideration of the operational interfaces, including depot facilities, and their effect on the System design
- (xi) consideration of the requirements for future support; and
- (xii) establish the preliminary design for the Contract.

The PDR will be complete when all Design Documentation for all Systems, Subsystems and Configuration Items for the PDR has been submitted to RailCorp's Representative and is Not Rejected (NR) or Not Rejected Subject to Comments (SC) within 20 Business Days of submission.

#### **4.6.5 Critical Design Review (CDR)**

A Critical Design Review (CDR) must be conducted for the Cars, the Maintenance Facility Works and the Simulators as a whole and their respective Systems, Subsystems and Configuration Items, at the completion of the detailed design stage for each of the Major Subsystems of the Cars, the Maintenance Facility Works and the Simulators.

The purpose of the CDR is to establish the Final Design Documentation for the Contract.

The CDR must:

- (a) determine the compliance of the proposed Final Design Documentation to the preliminary design and to the Specifications;
- (b) establish areas of the proposed design which require further development during the Delivery Phase;

- (c) review progress on the development of integrated support elements of the Project;
- (d) review the intended approach to Verification and Testing, including the results of any Testing completed prior to the CDR;
- (e) review the Design Documentation produced; and
- (f) establish the Final Design Documentation for the Contract.

PPP Co must present detailed information and Design Documentation covering the progress and results of the design, including tradeoffs and decisions on alternatives as well as specific reports identified within the Specifications, equipment and System drawings, technical specifications, operating details and Testing and Verification procedures, as part of the CDR process.

The CDR will be complete when all Design Documentation for all Systems, Subsystems and Configuration Items for the CDR has been submitted to RailCorp's Representative and is Not Rejected (NR) or Not Rejected Subject to Comments (SC) within 20 Business Days of submission.

#### **4.6.6 System Verification Review (SVR)**

A System Verification Review (SVR) must be conducted for each System, Subsystem and Configuration Item at:

- (a) The completion of Production Testing for Set 1, the Simulators and the Maintenance Facility Works; and
- (b) the completion of Operational Testing of Sets 1 to 6 (or Sets 1 to 7 if one of Sets 1 to 6 is withdrawn from service under clause 19.3 (Withdrawal of one of the first 6 Sets) of the Conditions of Contract),

for the purpose of:

- (c) reviewing the results of Testing and Verification completed as part of the Integrated Test Plan;
- (d) verifying compliance of the Test results with Test objectives; and
- (e) agreeing corrective action.

PPP Co must present details and results of Testing completed and must identify areas requiring further action to meet fully the requirements of the Specifications.

#### **4.6.7 Physical Configuration Audit (PCA)**

The primary purpose of the PCA is to establish conformity between the Sets and the Final Design Documentation.

The PCA for the Sets must be conducted for each System, Subsystem and Configuration Item by RailCorp's Representative prior to delivery of Set 1, Set 2, Set 7 (or Set 8 if one of Sets 1 to 6 is withdrawn from service under clause 19.3 (Withdrawal of one of the first 6 Sets) of the Conditions of Contract), Set 10, every 10<sup>th</sup> subsequent Set and the last Set to the Maintenance Site, for the purpose of comparing the Sets with the Final Design Documentation. The PCA for the Simulators and the Maintenance Facility Works must be conducted for each System, Subsystem and Configuration Item prior to Practical Completion of the Simulators and the Maintenance Facility Works respectively, for the purposes of comparing the

Simulators and the Maintenance Facility Works with the Final Design Documentation. The PCA may be performed progressively on a sampling basis during the manufacturing or construction stage and may include physical checks of completed hardware with drawings and other detailed design and manufacturing documentation, to verify compliance of the final product with the Final Design Documentation.

PPP Co must support the process by making equipment available to meet a programme submitted by PPP Co as defined in clause 5.1.2 of these Contract Management Requirements and by providing suitable inspection facilities.

#### **4.6.8 Technical Review meetings**

Technical Review meetings may take place as required by RailCorp as part of the Technical Review process.

(a) PPP Co's responsibilities:

Review meetings must take place at the Manufacture Site, unless otherwise directed by RailCorp.

PPP Co must:

- (i) develop a detailed agenda for each Technical Review meeting;
- (ii) deliver all relevant Design Documentation and associated supporting documentation and reports not later than 10 Business Days prior to the programmed date for each Technical Review meeting;
- (iii) provide a suitable venue and facilities for each Technical Review meeting;
- (iv) present information at each Technical Review, in support of previously delivered data; and
- (v) manage PPP Co actions arising from each review to meet agreed timescales.

(b) RailCorp's responsibilities

RailCorp will:

- (i) establish the scope and timing of Technical Reviews;
- (ii) chair Technical Review meetings; and
- (iii) prepare minutes of each Technical Review meeting covering actions and decisions taken as a result of the Technical Review.

### **4.7 Design Documentation**

#### **4.7.1 General requirement**

PPP Co must develop and submit to RailCorp comprehensive Design Documentation in accordance with clause 13 (Design) of the Conditions of Contract.

All Design Documentation must be in English. PPP Co must provide any necessary translations of supporting documentation at the time of submission of the Design Documentation.

All Design Documentation must be produced and submitted in formats that comply with the requirements of RailCorp document SPC 000X *Engineering Document Control*.

Design Documentation must include:

- (a) Drawings - a complete set of design and manufacturing drawings must be provided. Drawings are to comply with the general requirements of Australian Standard AS 1100 *Technical Drawing*. PPP Co must deliver:
  - (i) 3 printed copies and 1 electronic copy of all drawings. Irrespective of the original size of drawings, the electronic copy must be capable of generating legible prints when reduced to A3 size; and
  - (ii) 3 printed copies and 1 electronic copy of the drawing index. The drawing index must itself form the first drawing in the series;
- (b) Specifications - specifications prepared as part of the Project or necessary for full understanding of the drawing requirements, such as product or procurement specifications, must form part of the Design Documentation;
- (c) Test specifications - the Design Documentation must include copies of all Test specifications required to manufacture or commission the Cars and the Maintenance Facility Works;
- (d) Calculations – calculations necessary to support the design proposals;
- (e) Reports - design reports necessary to understand or interpret the design drawings or other reports specifically identified within the Contract, such as Reliability Prediction Reports, must be included as part of the Design Documentation;
- (f) Software documentation - software documentation developed as part of the Project must form part of the Design Documentation;
- (g) Vendor drawings - drawings and specifications for vendor items which form part of the design of the Cars and the Maintenance Facility Works must be incorporated within the Design Documentation; and
- (h) Any other information necessary to enable RailCorp to undertake the Technical Review.

#### **4.7.2 As-built Design Documentation**

In addition to the submission of the Design Documentation required for the Technical Review process, in accordance with clause 13.4 (Submission of Design Documentation) of the Conditions of Contract, PPP Co must submit a full set of as-built Design Documentation that describes fully, and is consistent with, the 'As Built' Configuration.

### **4.8 Reliability Programme**

#### **4.8.1 Purpose**

PPP Co must implement a Reliability Programme.

The purpose of the Reliability Programme is to:

- (a) provide a means of establishing a quantitative assessment of the compliance of the proposed design with Reliability and Availability targets established in the Contract and thus ensuring PPP Co can provide the Required Availability;
- (b) identify areas of the design which require modification or improvement to meet the required Reliability performance;
- (c) introduce design improvements and changes that will ensure that the specified targets are met; and
- (d) measure the levels of Reliability achieved during the Through Life Support Phase and identify any corrective action necessary if performance fails to meet the requirements of the Contract.

#### **4.8.2 Modelling and prediction**

PPP Co must develop Reliability block diagrams and models to calculate the predicted Reliability performance of the selected design throughout the Contract Term.

Models must be developed to represent the System to at least the lowest replaceable subassembly level. Commercially available computer modelling tools may be used at the option of PPP Co.

Data for inclusion in the models must include:

- (a) demonstrated performance for previously developed items, where available. Such data must reflect the operation of equipment in an environment that must be shown to be representative of the environmental and dynamic performance conditions specified. PPP Co must provide evidence in support of the validity of operating performance data; and
- (b) estimated performance for newly developed items, based on manufacturers' data or other method agreed by RailCorp's Representative.

The results of the modelling are to be presented by PPP Co as a formal Reliability Predictions Report.

PPP Co must demonstrate:

- (a) that the Reliability predictions for the Sets, in steady state, will achieve Reliability of not less than one Incident per 50,000 Set kilometres; and
- (b) that the requirements for Reliability predictions are specified within their contractor agreements.

#### **4.8.3 Failure Modes, Effects and Criticality Analysis (FMECA)**

PPP Co must complete, document and maintain a Failure Modes, Effects and Criticality Analysis (FMECA), in accordance with the requirements of MIL-STD-1629A *Procedures for performing a Failure Modes, Effects and Criticality Analysis*.

The purpose of the FMECA process is to review and analyse the design to establish:

- (a) potential or demonstrated failure modes for each significant item within the design. This will be carried out at least down to the replaceable subassembly level and below this level, as necessary, in order to analyse effectively the failure

modes to identify any single-point failures and to fulfil the safety and reliability analysis requirements of the Contract;

- (b) the likelihood of failure for each identified failure mode, where possible expressed in terms of failure probability;
- (c) the effect of failure in terms of the impact on safety, operating performance, environmental impact, human factors and economic consequences, including damage to other equipment; and
- (d) the criticality of failure in terms of operation of the System, i.e. whether operation can continue after the failure has occurred.

The FMECA process is closely linked to the Reliability Programme and the Reliability modelling described in clauses 4.8.1 (Reliability programme – purpose) and 4.8.2 (Reliability programme – modelling and prediction) of these Contract Management Requirements. FMECA serves to identify potential failure modes which must be considered as part of the Reliability estimation process for a specific item and to provide information on those which should receive highest priority for Reliability improvement. FMECA also provides the basis for development of programmed maintenance requirements, and for identifying failure modes and effects for consideration as an input to the System Hazard Analysis (see clause 3.2 (System Hazard Analysis) of these Contract Management Requirements).

The initial analysis is to be completed in conjunction with the Reliability modelling and prediction activity and results are to be available for review as part of the Critical Design Review.

The results obtained from FMECA throughout both the Delivery Phase and the Through Life Support Phase must be used to update the Technical Maintenance Plan.

#### **4.8.4 Reliability Demonstration**

PPP Co must implement a Reliability Demonstration for the Sets, in accordance with the requirements of EN 50126 *Railway applications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)*. The purpose of this demonstration will be to provide assurance to RailCorp that the Reliability predictions provided in the Reliability Predictions Report will be achieved in practice throughout the Contract Term.

The methods to be employed for the Reliability Demonstration of the Sets will be submitted by PPP Co for review by RailCorp's Representative and include two separate phases, namely:

- (a) the first phase, to be undertaken during Delivery Testing of Set 1, will be aimed at identifying any areas where there appears to be a substantial departure from the predicted Reliability for the Cars. Corrective actions will be identified and agreed between PPP Co and RailCorp as a result of this initial assessment, for incorporation in all Cars; and
- (b) the second phase, to begin at the Date of Practical Completion of Set 1, will continue until the Date of Final Completion of the last Set. This phase will involve the continuous assessment of achieved Reliability under service conditions and

will also result in the identification and incorporation of agreed improvements to correct identified deficiencies.

PPP Co must document the process to be followed for both of these phases in a Reliability Demonstration Plan.

#### 4.9 Maintainability Programme

##### 4.9.1 Purpose

PPP Co must implement a Maintainability Programme. The purpose of the Maintainability Programme will be to demonstrate that Maintainability features have been considered and incorporated into the design and that the claimed Mean Time to Maintain (MTTM) and Mean Time to Repair (MTTR) can be achieved.

##### 4.9.2 Maintainability estimation

PPP Co must submit to RailCorp for review a selection of most common faults and the corresponding estimates of MTTM and MTTR for repair and for completion of inspection and replacements required as part of the Technical Maintenance Plan.

Technical Reviews to be conducted under clause 4.6 (Technical Reviews) of these Contract Management Requirements must include a review of the Maintainability features incorporated within the design, together with PPP Co's MTTR estimates.

The Maintainability estimation shall follow the approaches defined in MIL-HDBK-472 Maintainability Prediction.

##### 4.9.3 Maintainability demonstration

PPP Co shall produce a Maintainability Demonstration Plan, in accordance with the approach defined in MIL-HDBK-470 Maintainability Verification/Demonstration/Evaluation.

PPP Co must demonstrate that MTTM and MTTR figures can be achieved in practice.

Demonstration requirements must be proposed by PPP Co for review by RailCorp's Representative and will depend on the Final Design Documentation. The demonstrations must include the elapsed time to perform specific servicing and Scheduled Maintenance on, and the time required for replacement of, significant items of equipment as indicated in the following tables:

<b>Sets</b>
Passenger side door actuator
Bogie
Air conditioning unit
Windows (passenger side; all car end glazing; door windows)
Seats (all saloon areas)
Air compressor (pneumatic brake)
Braking systems brake valves

<b>Sets</b>
Train Radio
Passenger Saloon lighting: replace tube/light fitting
Public Address system: replace Public Address speaker

<b>Maintenance Facility Works</b>
Drop table
Overhead crane
Wheel re-profiling machine
1500 Volt overhead 'swing away' system
Maintenance road lighting (tube and light fitting)
Public address system: replace public address speaker
Security camera
Interlocking systems (1500Volt overhead and drop table)
Pumps
Switch machine replacement
Rail replacement
Signal lamp replacement
Overhead wiring replacement

#### 4.10 Availability Prediction and Measurement

Availability predictions must be reviewed at CDR as part of the Technical Review process. The approach for calculation of Availability will follow the following principles.

Achieving the intended Availability depends on the long term or underlying availability characteristics for the complete System. This is a function of both the Reliability and Maintainability characteristics of the design, as well as the support provisions implemented as part of the TLS Contract, including the availability of spares, trained staff and facilities. Availability must be calculated from the total time required less the sum of the downtime for maintenance and the downtime for failure, all divided by the total time required and expressed as a percentage:

$$\text{Availability} = \frac{\text{Total time required} - \left( \sum \left( \begin{array}{c} \text{downtime} \\ \text{maintenance} \end{array} \right) + \sum \left( \begin{array}{c} \text{downtime} \\ \text{failures} \end{array} \right) \right)}{\text{Total time required}} \times 100\%$$

where:

Total time required = the total time during which the Sets are required to be in operational service, on a daily basis from the commencement of the first Availability Period on a day until the end of scheduled operation for that day;

Downtime maintenance = the time during which a Set is not available for operational service due to Unscheduled Maintenance; and

Downtime failures = the time during which a Set is not available for operational service due to failure.

Scheduled Maintenance must not be carried out on a Set whilst it is Available.

Estimates for downtime exclude Reimbursable Through Life Support.

Unscheduled failure rates must be based on Reliability predictions included in the Reliability Predictions Report.

#### **4.11 Technical Maintenance Plan**

PPP Co must develop, deliver and maintain a Technical Maintenance Plan (TMP). The TMP must address the outcomes of the Technical Review process.

The TMP must also include details of:

- (a) all Scheduled Maintenance recommended for completion on equipment in the Cars and the Maintenance Facility;
- (b) the maintenance Tasks (including periodic refurbishment) required to sustain the level of external and internal appearance, and passenger comfort, of the Cars;
- (c) the intervals (frequency) at which each Task should be performed;
- (d) the grouping of individual Tasks on an industrial engineering basis into work packages;
- (e) proposed responsibility for completion of each Task. Note that for the purposes of the TMP a Task may comprise a number of actions performed as part of a scheduled inspection;
- (f) the location at which each Task is to be completed;
- (g) special facilities or equipment necessary for completion of the Task;
- (h) the procedures for carrying out each Task;
- (i) the test requirements applicable to the Task;
- (j) the human resources required to complete each Task (including quantity, qualifications and competencies);
- (k) the references to technical data or inspection schedule required for completion of the Task; and
- (l) checklists for recording the results of the maintenance processes.

The TMP will form the baseline for maintenance to be performed during the Through Life Support Phase. Development of the TMP will commence during the Delivery Phase and will continue through the Through Life Support Phase, using operational experience and the results obtained from the FMECA to modify and update the TMP.

PPP Co must demonstrate that all maintenance activities identified as control measures in the Risk Register are incorporated in the TMP. In particular, the TMP

must include specific maintenance activities relating to safety critical systems as defined in AS 4292 *Railway Safety Management*.

PPP Co must include in the TMP details of how spares support will be provided during the Through Life Support Phase, including the expected quantities of Rotable Spares, Consumable Spares and Insurance Spares to be held.

The TMP must include a Wheelset Management Plan, covering at least:

- (m) Preventive and corrective maintenance philosophy, including reprofiling, crack detection, bearing maintenance and lubrication, balancing and assembly/disassembly;
- (n) Configuration, batch control and traceability;
- (o) Protection, handling and storage; and
- (p) Wear and damage limits and tolerances for wheels, axles, bearings and wheelset-mounted equipment such as gears/gearboxes and brake disks (if fitted).

## **4.12 Testing and Verification**

### **4.12.1 Purpose**

The purpose of Testing and Verification is to demonstrate:

- (a) that the Final Design Documentation conforms to the requirements of the Contract;
- (b) that the Final Design Documentation is capable of meeting the requirements of the Contract;
- (c) that the Cars and Simulators are manufactured, and the Maintenance Facility Works is constructed, in conformity with the Final Design Documentation; and
- (d) that all necessary evidence, supporting information and documentation is available for the purposes of obtaining RailCorp's Accreditation Variation.

This clause 4.12 of the Contract Management Requirements defines the management and conduct of the Testing and Verification activities.

All Testing of the Cars must be undertaken in compliance with BS EN 50215:1999 *Railway applications – Testing of rolling stock after completion of construction and before entry into service*. Initial Testing processes and Test Specifications must be submitted to RailCorp for review as part of the Integrated Test Plan.

PPP Co's Testing activities must include the Tests defined in RSU 280: Vehicle Compatibility Tests (Draft).

### **4.12.2 Integrated Test Plan**

PPP Co must develop, document and deliver an Integrated Test Plan (ITP) covering all Tests and Test procedures to be applied by PPP Co to all Major Subsystems and equipment, for review by RailCorp's Representative.

The ITP must include:

- (a) Development Testing of individual equipment;
- (b) Integration Testing of all Systems and Subsystems;
- (c) Qualification Testing and Software Testing of all Systems and Subsystems;

- (d) the Production Testing and Delivery Testing of all Sets; and
- (e) the Operational Testing of Sets 1 to 6 (or Sets 1 to 7 if one of Sets 1 to 6 is withdrawn from service under clause 19.3 (Withdrawal of one of the first 6 Sets) of the Conditions of Contract).

The ITP must also indicate where each Test will take place.

The ITP must also include any additional 'stress/burn in' testing of equipment, Systems, Subsystems, Cars and Sets to be undertaken at PPP Co, PPP Co's Contractors and ex-factory in order to prevent premature failures and assure the reliability prediction of each Set prior to Practical Completion.

PPP Co must comply with RailCorp's acceptance processes, as detailed in RailCorp document RSS 001 *Minimum Operating Standards for Rolling Stock*, at all times, especially with regard to Delivery and Operational Testing.

RailCorp's Representative may witness any Test proposed by PPP Co or required by the Contract or by RailCorp's Representative in accordance with clause 14.4 (Testing of Delivery Phase Activities) of the Conditions of Contract.

PPP Co must provide at least 10 Business Days' notice of Test dates to enable RailCorp's Representative to attend.

Tests may fall into one of two categories:

- (f) functional, where the Test item is required to perform a specific function in order for the Test to take place; and
- (g) indicative, where the performance of the Test item can be inferred from other parameters.

The ITP must include details of:

- (h) the range of Tests proposed within each category of Tests;
- (i) the purpose of each series of Tests;
- (j) the equipment, facilities and personnel required during each Test; and
- (k) a programme for completion of each Test.

The ITP must be updated by specific test plans, specifications and procedures covering individual requirements within each series of Tests. Test plans are to be provided for the review of RailCorp's Representative by PPP Co progressively through the Delivery Phase, as required by the ITP. The ITP must include a Verification Requirements Matrix, defining how each functional, performance and design requirement will be verified, the stage at which Testing will occur during integration, the Test method and acceptance criteria to be applied.

The methods of Testing and Verification nominated must be adequate to provide objective evidence of compliance with the requirements of the Contract, including the Safety Management Plan, and must include the following:

**(a) Nil (no Verification required)**

This identifies non-requirements which PPP Co does not intend to verify.

**(b) Analysis**

This identifies requirements, performance indices, physical characteristics, constraints or functions which will be validated by mathematical modelling, analysis of compliance with lower-level requirements, or by the achievement of other (related) performance objectives.

**(c) Similarity**

This identifies requirements, performance indices, physical characteristics, constraints or functions which will be validated by means of comparisons to similar existing equipment performing similar tasks in a similar environment. This includes components for which prior Tests have been conducted elsewhere which show that the component satisfies the requirements allocated to it, and where appropriate Test results are available.

**(d) Demonstration**

This identifies requirements, performance indices, physical characteristics, constraints or functions which will be validated by means of a demonstration. This includes abstract parameters which cannot be quantified, such as aesthetics and appearance.

**(e) Inspection**

This identifies requirements, performance indices, physical characteristics, constraints or functions which do not need to be quantified, or for which a yes/no result can be obtained directly by means of a simple physical inspection. Examples include colour, elimination of internal corners, labelling.

**(f) Test**

This identifies the performance characteristics which will be validated by means of direct Tests. The results will be used to demonstrate compliance with the performance requirements of the Contract. Examples of Test activities include functional Tests, physical Tests, Configuration audits, Testing of the materials used, and environmental Tests.

**(g) Simulation**

This identifies requirements, performance indices, physical characteristics, constraints or functions which will be validated by means of a simulation undertaken by PPP Co. This includes mathematical modelling, finite-element analysis, computer-based simulation as well as physical simulators which attempt to recreate part or all of the functionality of the deliverable System, including its interaction with the environment and other external systems.

**(h) Review**

This identifies requirements for which no further verification is necessary, which will be validated by means of reviews of the Design Documentation submitted by PPP Co.

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### **4.12.3 Development Testing**

PPP Co must perform Development Tests during the design stage of the Delivery Phase to verify the performance or characteristics of designs developed or modified for this Project.

PPP Co must identify and conduct Development Tests required as part of the design. Information on significant Tests planned, and the results of completed Tests, must be included in the Systems Assurance element of the Delivery Phase Progress Reports and during the Technical Reviews.

Development Testing must be completed before manufacture or construction of the relevant Systems, Subsystems or Configuration Items commences.

### **4.12.4 Integration Testing**

PPP Co must conduct formal Integration Testing as part of the development process, to ensure that the operation of newly developed or modified items or Systems, including both hardware and software elements, is verified prior to PPP Co submitting a request in accordance with clause 18.2(b) (Notice of Practical Completion of a Set) of the Conditions of Contract for RailCorp's Representative to issue a Certificate of Practical Completion for Set 1.

Integration Testing must include progressive functional Testing of integrated Systems and Sub-systems, under both normal operation and fault conditions over the full operating range, to ensure that the complete System operates as intended and that there are no unintended consequences associated with failure of any item. This includes the integration of hardware and software elements of the design.

PPP Co must propose and carry out to the satisfaction of RailCorp's Representative an Integration Test programme to demonstrate that each System or Sub-system which incorporates new items or significant modifications is subjected to comprehensive Integration Testing prior to Operational Testing of Set 1.

### **4.12.5 Qualification Testing (or Type Testing)**

Qualification Testing or Type Testing is the process of demonstrating that the requirements of the Contract are capable of being met by the proposed design. This includes demonstration that equipment will continue to function at the extremes of the defined operating environment eg at elevated temperatures and humidity and under specified levels of vibration.

PPP Co must provide evidence of compliance with each requirement of the Specifications, using the methods described in clause 4.12.2 (Integrated Test Plan) of these Contract Management Requirements.

With the exception of Delivery Testing of Set 1, PPP Co may propose the use of operating data in support of the qualification requirement for equipment which has previously been used in a design, and for which a substantial body of actual successful and functional operating experience has been accumulated. Where the use of operating experience is proposed as a qualification method the onus will be on PPP Co to demonstrate that the data is valid for PPP Co's design and the RailCorp track network.

Irrespective of the provision of operating data in support of the Qualification Testing requirement, RailCorp may require PPP Co to complete Qualification Testing on other Sets.

For newly developed equipment, or that which has been substantially modified, PPP Co must propose a Test programme to demonstrate that the equipment is capable of meeting functional and physical performance requirements over the specified range of operating conditions. Functional Testing under normal ambient conditions will not be accepted as satisfactory evidence of compliance.

Where formal Testing is not feasible or appropriate PPP Co may propose alternative methods, including a combination of Test and analysis, to demonstrate compliance of the design with the requirements of the Contract.

#### **4.12.6 Production Testing and Delivery Testing**

PPP Co must develop, document and deliver a formal Test programme covering all Tests to be performed on each Car, the Maintenance Facility Works and each Simulator during the manufacture, construction and integration of the components prior to delivery.

PPP Co must provide a record of the Tests performed on each Car, the Maintenance Facility Works and each Simulator, including the results achieved, as part of the delivery documentation for each Car, the Maintenance Facility Works and each Simulator.

##### **(a) Production Testing**

PPP Co must perform inspections, Tests and audits of requirements nominated by PPP Co, to ensure the variations between different Sets are minimised in accordance with the Design Documentation. These Tests must be performed during the manufacture and integration of each Car, the Maintenance Facility Works and each Simulator, and must be completed before delivery of each Set, delivery of the Simulators, or Practical Completion of the Maintenance Facility Works as appropriate.

##### **(b) Delivery Testing (Commissioning)**

PPP Co must perform Delivery Testing or Commissioning of each Set after it is delivered to the Maintenance Site and prior to Practical Completion of the Set. These Tests must be performed after the integration of the Cars into a Set.

Delivery Testing must follow a logical sequence and must verify the following requirements before the Set is permitted to operate on the RailCorp network:

- (i) Static configuration and conformance to Rolling Stock Outline;
- (ii) Mechanical fitness;
- (iii) Electrical fitness of EAPS and control power systems;
- (iv) Electrical fitness of Main Power Supply;
- (v) Fitness of traction equipment; and
- (vi) Fitness of braking equipment.
- (vii) Demonstration by installation (on one Set only) of ETCS Level 1 equipment from any one supplier that

- a) the equipment fits the allocated space;
- b) the human/machine interface meets RailCorp's requirements; and
- c) the equipment as installed functions according to the ETCS Level 1 specifications.

PPP Co is not required to provide the track infrastructure to undertake these Tests. In the event that RailCorp did not provide the track infrastructure, these Tests would not form part of the Practical Completion requirements for those Sets presented for Practical Completion whilst the track infrastructure was unavailable.

### **(c) Delivery Testing period**

For the period during which Delivery Testing is taking place PPP Co must:

- (i) obtain the necessary Network Access Rights in accordance with the Conditions of Contract;
- (ii) provide all Test resources except those required for signal interference Testing measurements upon the RailCorp infrastructure (PPP Co must indicate to RailCorp in the plans when these resources will be required, and update this information as necessary);
- (iii) prepare a plan to complete all necessary Delivery Testing to demonstrate that each Set meets the Contract requirements within a 3 month period commencing on the date when the Set is delivered to the Maintenance Site. This test plan must not schedule any Tests during the hours of 0400 to 1000 or 1400 to 2000 on any Business Day, or during periods when track possessions are already scheduled, unless otherwise agreed by RailCorp. The Network Access Rights requirements must be set out in a Train Testing and Commissioning Network Access Plan; and
- (iv) pay for any Crew or other resources to be supplied by RailCorp required beyond the 3 months test plan for each Set in accordance with the RailCorp Schedule of Rates.

#### **4.12.7 Train Testing and Commissioning Network Access Plan**

PPP Co must develop and submit to RailCorp a Train Testing and Commissioning Network Access Plan, which must define the network access requirements for the purposes of Delivery Testing and Operational Testing of the Sets. RailCorp will provide Network Access rights in accordance with clause 11.5 (Network Access Rights) of the Conditions of Contract. PPP Co must design the Testing and Commissioning requirements to minimise the number and duration of occupancies and possessions. The requirements for network access are defined in RailCorp document NWT 300 Network Rules and Procedures. PPP Co is responsible for all arrangements and resources required for testing to be carried out within the bounds of the Maintenance Site.

Access to the network will fall into the following hierarchy:

- (a) Timetabled train test run – there will be timetabled train runs from the Maintenance Site for Testing purposes. These train runs will also be utilised by MainTrain. These train runs must only be used for Tests that have no impact on the timetable.
- (b) Non-timetabled train test run – may be used to provide train runs for test train access to the network from 22.00 until exiting the network prior to 04.00 on Monday to Thursday nights inclusive. These train runs must not be used if it is likely that the train may not be able to exit the network prior to 04.00 or where any personnel may need to access the Danger Zone as defined in RailCorp document NGE 200 *Walking in the Danger Zone*.
- (c) Controlled Signal Blocking – provides a safe place behind a protecting signal to work within the Danger Zone. However this will require consideration of the requirements of the rules for adjacent line protection in accordance with RailCorp document NPR 712 *Protecting Work from Rail Traffic on Adjacent Lines* to determine whether Controlled Signal Blocking is sufficient protection. This level of protection requires the appropriate Authority and Protection Officers to be in attendance.
- (d) Track Occupancy Authority – is used to occupy a defined portion of track within specified limits for an agreed period to work within the Danger Zone. This also requires consideration of the requirements of the rules for adjacent line protection in accordance with NPR 712 to determine whether Track Occupancy Authority is sufficient protection. Track Occupancy Authorities may involve one or more Sets or track vehicles and machines working within the specified limits. This level of protection requires the appropriate Authority and Protection Officers to be in attendance.
- (e) Local Possession Authority (LPA) – closes a defined portion of track for a specified period to access the Danger Zone. An LPA is issued exclusively to the Possession Protection Officer for the specified period of the possession. Work within the portion of track included in the LPA limits must only be done with the agreement of the Possession Protection Officer. No other work on track authority can be issued for the defined portion of track for the period of the LPA. A number of separate work groups and their Sets or track vehicles and equipment may occupy the portion of track defined by an LPA. Portions of line included in the LPA must have been advertised. The intention to take an LPA must be advertised in a Special Train Notice (STN) in advance.

To assist RailCorp in determining the level of protection required for each of the train test runs, PPP Co must supply sufficient detail of the following in the Train Testing and Commissioning Network Access Plan:

- (f) The nature and purpose of the Testing, including any specific requirements for traction power to be on or off;
- (g) The level of access required to the 'Danger Zone' for each test run;
- (h) The number of people (including RailCorp personnel) requiring access to the 'Danger Zone'; and
- (i) Whether any special equipment is required to be placed in or near the 'Danger Zone' during the test.

#### **4.12.8 Software Testing**

PPP Co must develop and propose a formal programme of Tests to be undertaken on newly developed or modified software.

These Tests serve the same purpose as the Development Testing, Integration Testing and Qualification Testing covered by the preceding clauses, and must be conducted under conditions that are consistent with good software development practice and in accordance with clause 4.13.1 (ICT Standards) of these Contract Management Requirements.

#### **4.12.9 Operational Testing**

Sets 1 to 6 (or Sets 1 to 7 if one of Sets 1 to 6 is withdrawn from service under clause 19.3 (Withdrawal of one of the first 6 Sets) of the Conditions of Contract) must undergo a programme of Operational Testing after Practical Completion and prior to the Practical Completion of Set 7 (or Set 8 if one of Sets 1 to 6 is withdrawn from service under clause 19.3 (Withdrawal of one of the first 6 Sets) of the Conditions of Contract).

The purpose of the Operational Testing is to assess all aspects of Car performance under actual operating conditions prior to Practical Completion of Set 7 (or Set 8, if one of Sets 1 to 6 is withdrawn from service under clause 19.3 (Withdrawal of one of the first 6 Sets) of the Conditions of Contract) and prior to Final Completion of each Set. The Operational Testing must include assessment against Initial Reliability Requirement.

Information gained through the Operational Testing will be used to assess the performance of the Cars against the requirements of the Contract and to identify any changes or corrective actions necessary before establishing the Configuration Baseline for Set 7.

PPP Co must support the Operational Testing through the provision of integrated support aspects defined within clauses 8 (Transition Plan) and 9 (Through Life Support Plan) of these Contract Management Requirements, and through the FRACAS.

#### **4.12.10 Test Specifications and Reports**

PPP Co must provide Test Specifications describing the step-by-step procedures to perform a specific Test Activity. Each Test Specification must be written to satisfy the requirements of the Integrated Test Plan. Test Specifications must at least include the following information:

- (a) relationship to the data in the Integrated Test Plan and Verification Requirements Matrix;
- (b) the components or interfaces to be validated by the Test procedure;
- (c) nomenclature and identification of the Test article(s);
- (d) the assumptions, requirements, capability, capacity or constraints to be validated by the Test procedure;
- (e) the location and/or facilities required during the Test;
- (f) identification of the objectives and criteria established for the Test;
- (g) identification of computer software required;

- (h) characteristics and design criteria to be inspected or Tested, including values, with the ranges or tolerances for acceptance or rejection;
- (i) description of the steps and operations to be taken to perform the Test;
- (j) certification that computer hardware and software, and Test equipment have been verified and calibrated prior to use during the Test Activity;
- (k) any special requirements for trained, qualified, licensed or certificated personnel to carry out the Test;
- (l) any special instructions for operating data recording equipment or other automated Test equipment;
- (m) layouts, schematics or diagrams showing identification, location and interconnection of Test equipment, Test articles and measuring points;
- (n) identification of hazardous situations or operations;
- (o) precautions and safety instructions to ensure the safety of personnel and prevent the degradation of Test articles, Test equipment or facilities;
- (p) environmental conditions to be maintained during the Test, with tolerances;
- (q) constraints on inspections;
- (r) instructions for dealing with non-conformance or anomalous occurrences or results; and
- (s) specifications for facilities, calibration, equipment maintenance, housekeeping, certification, inspection, safety, handling and packaging before, during and after the Test activity.

PPP Co must prepare a Test Report for each Test carried out. Test Reports must include a copy of the Test Specification, together with the results of the Tests carried out.

PPP Co must provide the following information as part of each Test Report:

- (t) Test number;
- (u) Test date;
- (v) the name, competency and qualification of the person(s) carrying out the Test;
- (w) Car number;
- (x) Set number;
- (y) equipment designation;
- (z) equipment location;
- (aa) equipment serial number
- (bb) Test equipment used including calibration certification details;
- (cc) tested parameter designation;
- (dd) Test value obtained; and
- (ee) target value (equal to or better than the specified value).

PPP Co must provide a Test Report Summary including the following information, for all equipment Tested up to that date, as required during the course of Testing:

- (ff) equipment designation;
- (gg) quantity of each type of equipment Tested; and
- (hh) quantity of Test failures for each type of equipment tested.

For each Test parameter the data must state:

- (ii) whether or not the data has been filtered during processing and, if so, the details of such filtering;
- (jj) the distribution of all recorded values, in numerical and graphical form;
- (kk) the mean of all recorded values;
- (ll) the standard deviation of all the recorded values from the mean;
- (mm) the standard deviation of all the recorded values as a percentage of the mean;
- (nn) the minimum (lowest) recorded value;
- (oo) the maximum (highest) recorded value;
- (pp) the number of recorded values having a deviation from the mean which exceeds 2 standard deviations;
- (qq) the target value (equal to or better than the specified value), and
- (rr) the value, or range of values which comply with the requirements of the Test Specification.

Test Reports must be delivered to RailCorp's Representative and will form part of the Design Documentation.

Test certification must take the form of a certificate, to be provided by PPP Co after the completion of Delivery Testing and before Practical Completion for each Set, each Simulator and the Maintenance Facility Works, to the effect that PPP Co has completed the Test and Verification Programme required by the Contract.

During the Tests, if any equipment does not meet all of the specified performance or design requirements, or if the Test is unsuccessful due to other circumstances within the responsibility of PPP Co, the Test will be taken to have failed. In the event of a Test failure, PPP Co must comply with its obligations under clause 16.5 (Failure of Test) of the Conditions of Contract and provide RailCorp's Representative with a Test failure report which describes the following:

- (ss) equipment designation;
- (tt) Test description;
- (uu) Test results obtained;
- (vv) description of failure;
- (ww) failure investigation;
- (xx) mechanics of failure;
- (yy) cause of failure;
- (zz) corrective action proposed; and
- (aaa) proposal for retesting.

Failures occurring during a Test must be documented on the appropriate reporting system and a proposed resolution should be defined before Testing resumes. Major non-conformances or those which cannot be readily rectified and retested, may require resolution by a decision by RailCorp.

#### 4.12.11 Failure Reporting and Corrective Action System

PPP Co must develop, implement and maintain a Failure Reporting and Corrective Action System (FRACAS).

The purpose of FRACAS is to provide a systematic method of recording, investigating and correcting defects or deficiencies observed during the Test programme and during operation and maintenance. This must be applied during the formal Integration Testing, Qualification Testing and Operational Test programmes and during the Through Life Support Phase.

Essential features to be incorporated by PPP Co as part of the FRACAS process are:

- (a) a means of identifying and recording significant faults;
- (b) a process for investigating and determining the primary cause of the fault;
- (c) a process for determining and agreeing corrective action, where the investigation shows that the fault is indicative of a shortcoming in the design, manufacture or maintenance; and
- (d) a process for updating technical documentation, at least including the Technical Maintenance Plan, to reduce the likelihood of a recurrence.

PPP Co must submit FRACAS reports as they are generated during the course of Testing.

#### 4.13 Information and communications technology

##### 4.13.1 ICT Standards

RailCorp has identified the following standards as appropriate to the development and introduction of ICT equipment. PPP Co must demonstrate to the satisfaction of RailCorp that its ICT systems approach is compliant with the following standards (except to the extent that RailCorp agrees otherwise):

ICT Area	Standard
Architecture Methodology	DODAF
Service Management Infrastructure	ITIL
System Life Cycle Process	EIA 632
Systems Engineering Practice	CMMI
Risk Management	AS 4360
Security Management	ISO/IEC27001
Systems Integration	EIA 632, EN 50126 and EN50129
Software Safety	EN 50128
Software Requirements Specification	MIL STD-498
Business Continuity Management	HB 221:2004

#### 4.13.2 Sustaining ICT Capability over the Contract Term

There will be a change in many aspects of both on train and general ICT systems over the Contract Term. The ICT environments in place when the Sets go into service will continue to change and evolve as new technologies, practices, frameworks and paradigms emerge.

PPP Co must develop an approach to both the business and technology aspects of ICT, at least including such areas as traceability of requirements, formal processes for validating requirements, a rigorous solution architecture and design process, and an adherence to a standard development methodology.

PPP Co must describe its strategy for sustaining appropriate ICT capability over the Contract Term, and for transitioning-out ICT aspects of the PPP Co environment at the end of the Contract Term.

PPP Co must develop an overall systems architecture for all ICT systems, subsystems, equipment and components. PPP Co must provide a description of its ICT systems architecture management strategy for the Contract Term.

#### 4.13.3 Software Systems Management Plan

PPP Co must provide a Software Systems Management Plan in line with EN 50128 or IEC 62279 or AS 61508 Pt3 for the active management of all ICT systems, subsystems, equipment and components. System integration must be undertaken in line with EN 50126 and EN 50129, or AS 61508.

The Software Systems Management Plan must describe clearly its strategy for actively managing all ICT systems, subsystems, equipment and components over the Contract Term. This must cover the initial processes, methods, standards etc., which are applied to all ICT systems, subsystems, equipment and components, including:

- (a) initial development;
- (b) deployment to operation;
- (c) ongoing operational support;
- (d) change, defect and release management;
- (e) maintenance, both urgent and periodic;
- (f) incident and problem management;
- (g) enhancement; and
- (h) transition;
  - (i) to a major new version;
  - (ii) to a new infrastructure base; and
  - (iii) through replacement by a different software system.

The strategy must also cover the approach to sustaining these processes, methods and standards as covered in clause 4.13.2 (Sustaining ICT Capability over the Contract Term) of these Contract Management Requirements.

#### 4.13.4 Fleet Management Systems

Please refer to section 2.2.3 of the RailCorp Through Life Support Specification, for further details regarding Fleet Management Systems.

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## 5 Configuration Management Plan

### 5.1 General requirement

PPP Co must develop, deliver and maintain a Configuration Management Plan (CMP) that complies with the requirements of Australian Standard AS ISO 10007 *Quality Management - Guidelines for configuration management*, with RailCorp document RS-0042 *CM Passenger Fleet Maintenance Configuration Management Manual* for the Cars and with RailCorp document ED 0014 P *Configuration Management* for the Maintenance Facility Works and the Maintenance Facility. The Configuration management process must also be consistent with the Variation management system described in clause 4.3 (Variation management) of these Contract Management Requirements, and with the requirements of clause 3 (Safety Management Plan) of these Contract Management Requirements.

The Configuration Management Plan must describe how PPP Co will manage the process of ensuring that all Cars, the Maintenance Facility Works and the Maintenance Facility and the Simulators have an accurate Configuration record and are upgraded to the latest Configuration status in a timely manner throughout the Contract Term.

Upgrades to Configuration status may be physical or procedural, and must conform to the requirements of clause 4.3 (Variation management) of these Contract Management Requirements, including (where relevant) Testing requirements and variation to RailCorp's Accreditation in accordance with clause 8.3 (Continuing RailCorp Accreditation and rail safety obligations) of the Conditions of Contract.

#### 5.1.1 Configuration Management Plan

The Configuration Management Plan must include:

- (a) a description of the Configuration management process and procedures, which PPP Co will employ to meet the requirements of the Contract;
- (b) assigned responsibility for Configuration management within PPP Co's organisation;
- (c) a description of the system for defining and recording current Configuration;
- (d) the Master Configuration Status List – a record of the latest intended Configuration status of all items that are subject to Configuration control; and
- (e) the Configuration Register – a record of the actual Configuration status of each Car, the Maintenance Facility Works, the Maintenance Facility and the Simulators, including clear identification of any non-conformances with the Master Configuration Status List.

The primary purpose of the Configuration Management Plan during the Delivery Phase is to:

- (f) establish and maintain a Configuration architecture of hardware and software elements of the Systems, including interfaces;

- (g) fully and precisely define the intended modification status of each of the elements identified in the Configuration architecture, within the Master Configuration Status List;
- (h) fully and precisely define the actual modification status of each Car, the Maintenance Facility Works and the Simulators for each of the elements identified in the Configuration architecture, within the Configuration Register; and
- (i) develop a process for ensuring the timely updating of the modification status of each Car, the Maintenance Facility Works and the Simulators so as to match the intended modification status.

The primary purpose of the Configuration Management Plan during the Through Life Support Phase will be to:

- (j) monitor the exchange of Rotable Spares which are safety critical and Reliability critical, to ensure that component and repair history is traceable;
- (k) monitor all interfaces between the Cars, the Maintenance Facility, the Simulators and RailCorp's network;
- (l) monitor software revision levels for relevant elements of the Cars, the Maintenance Facility and the Simulators;
- (m) control the modification status of Systems, Subsystems and Configuration Items which have been subjected to engineering change, within the Master Configuration Status List; and
- (n) maintain an accurate database of the Configuration status of every monitored element on each Car, the Maintenance Facility and the Simulators throughout the Contract Term, within the Configuration Register.

### **5.1.2 Physical Configuration Audits**

PPP Co must establish a programme of Physical Configuration Audits (PCA) as defined in clause 4.6.7 of these Contract Management Requirements. The programme must enable PPP Co to confirm the continuing compliance of the Cars, the Maintenance Facility Works, the Maintenance Facility and the Simulators with the current modification status and the requirements of the Contract. The results of each PCA must be provided to RailCorp within 2 Business Days of the completion of the audit. Additionally, RailCorp may request additional PCAs to be carried out on individual Cars, the Maintenance Facility Works, the Maintenance Facility and the Simulators. Such additional PCAs must be carried out within 5 Business Days of receipt of the request by PPP Co.

### **5.1.3 TLS Phase Configuration Management**

The Through Life Support Plan must explain how the Configuration of the Cars, the Maintenance Facility and the Simulators will be managed through the Through Life Support Phase. This must include the tracking of all Configuration Items identified during the HAZOP and FMECA analyses, any other major Subsystems (including the associated Rotable Spares) which are changed out as part of the regular maintenance of the Cars, the status of any modifications or upgrades to the Cars, the Maintenance Facility and the Simulators and change to the TMP arising from Configuration changes.

The TLS Plan must include a section on Configuration management which provides:

- (a) A description of the Configuration management process which PPP Co will employ to meet the requirements of the Contract;
- (b) Designated responsibilities for Configuration management within PPP Co's organisation;
- (c) A description of the system for defining and recording current Configuration and Configuration changes;
- (d) A description of the process for controlled distribution of revised operating and maintenance documentation including operating and maintenance manuals; and
- (e) The audit programme to confirm the continuing compliance of the Cars, the Maintenance Facility and the Simulators with the current modification status.

## 6 Train and Simulator Delivery Plan

### 6.1 Introduction

PPP Co must develop, deliver and maintain a Train and Simulator Delivery Plan.

The purpose of the Train and Simulator Delivery Plan is to demonstrate the ability of PPP Co to plan and undertake the design, manufacture and Commissioning of the Sets and the Simulators.

### 6.2 General requirement

The Train and Simulator Delivery Plan must describe how RailCorp will be provided with an effective overview of PPP Co's progress in delivering all elements associated with the design, manufacture and Commissioning of the Cars and the Simulators in accordance with the requirements of the Contract.

For the purposes of this clause 6, Project Management requirements include:

- (a) project management organisation and responsibilities;
- (b) project planning;
- (c) project management plans;
- (d) contract variation procedures and status reporting;
- (e) deliverable documents;
- (f) programme management;
- (g) cost management;
- (h) risk management;
- (i) subcontract management; and
- (j) meetings and reports.

### 6.3 Train and Simulator Delivery Plan

The Train and Simulator Delivery Plan must include:

- (a) the project management systems and controls that PPP Co will apply in order to manage the design, manufacture and Commissioning of the Cars and Simulators in accordance with the requirements of the Contract, including the requirement for regular meetings of the Senior Project Group in accordance with clause 6.6 (Senior Project Group) of the Conditions of Contract. The project management systems and controls must ensure that:
  - (i) all work to be completed in connection with the design, manufacture and Commissioning of the Cars and Simulators is fully and clearly specified;
  - (ii) plans are developed for the completion of all Tasks and requirements;
  - (iii) controls provide clear visibility of progress toward completion of all Tasks; and

- (iv) risks are identified and managed continuously throughout the Delivery Phase;
  - (v) certification is provided by the Rolling Stock Manufacturer that the Cars and Simulators have been constructed in accordance with the Design Documentation;
- (b) a detailed and systematic description of PPP Co's proposed Delivery Phase plan to achieve the design, manufacture and commissioning of the Sets and Simulators in accordance with the requirements of the Contract. The plan must detail the locations and resources required for all activities for the Sets and Simulators, including all Systems, Subsystems and Configuration Items (refer to clause 2.8 (f) of the CMR), and by gap analysis and demonstrable action plans address all identified capacity and capability deficiencies to achieve the Delivery Programme. A recovery strategy should be part of the Delivery Plan;
- (c) a detailed Manufacturing Plan which must specify planning, control and certification aspects of the complete manufacturing process. The level of information must incorporate:
- (i) all procurement and logistics activities;
  - (ii) how inputs from other activities are to be used for manufacturing processes and planning;
  - (iii) process for Verification, inspection and Testing required, and records to be maintained, to evidence that the Cars and Simulators have been manufactured in accordance with the Design Documentation;
  - (iv) process for co-ordination between manufacturing activities; and
  - (v) inspection and test points; and
- (d) the requirements and arrangements for delivering the Cars to the Maintenance Site and the Simulators to the location specified by RailCorp, including track access and other interface requirements with RailCorp.

The level of information included in the Train and Simulator Delivery Plan must be tailored in those areas that are covered by plans relating to design, manufacture, testing and commissioning, to ensure that the level of duplication is minimised.

## 7 Maintenance Facility Works Delivery Plan

### 7.1 Introduction and purpose

PPP Co must develop, deliver and maintain a Maintenance Facility Works Delivery Plan.

The purpose of the Maintenance Facility Works Delivery Plan is to:

- (a) demonstrate the ability of PPP Co to plan and undertake the coordination, design, construction and Commissioning of the Maintenance Facility Works (including temporary works);
- (b) (not used);
- (c) ensure that the Maintenance Facility achieves Practical Completion by the Date for Practical Completion of the Maintenance Facility Works;
- (d) ensure that continuous access to adjoining properties is maintained;
- (e) understand the requirements of RailCorp to deliver the RailCorp Enabling Works required for the construction and Commissioning of the Maintenance Facility Works; and
- (f) provide the process for monitoring PPP Co's delivery of the design, construction and Commissioning activities of the Maintenance Facility Works, and to enable RailCorp to co-ordinate the delivery of the RailCorp Enabling Works in accordance with Schedule 19 of the Project Contract.

### 7.2 General requirements

The Maintenance Facility Works Delivery Plan must include:

- (a) a description of PPP Co's intended Maintenance Facility Works delivery philosophy, including the use of the systems assurance methodology;
- (b) the location where PPP Co's Activities are to be carried out during the Delivery Phase for the Maintenance Facility Works, including all Systems, Subsystems and Configuration Items, will take place;
- (c) a description of the Delivery Phase progress reporting arrangements;
- (d) a detailed description of the Technical Reviews that will be applied to the determination of requirements, coordination and design of the Maintenance Facility Works (including temporary works);
- (e) a detailed description of the process that will be applied to ensure the conditions of the Planning Approvals are complied with and the procedures for managing modifications to the Planning Approval if required;
- (f) a detailed description of:
  - (i) all procurement and logistics activities;
  - (ii) how inputs from other activities are used for the construction processes and planning;
  - (iii) processes used for the coordination between construction activities; and

- (iv) process for Verification, inspection and Testing required, and records to be maintained, to evidence that the Maintenance Facility Works have been constructed in accordance with the Design Documents;
- (g) a detailed test plan, in accordance with clause 4.12.2 (Integrated Test Plan) of these Contract Management Requirements, and the procedures to manage the Commissioning of the various elements of the Maintenance Facility Works;
- (h) a detailed description of the procedures for achieving Practical Completion of the Maintenance Facility Works, including certification from the Maintenance Facility Contractor that the Maintenance Facility Works have been constructed in accordance with the Design Documentation;
- (i) the management structure, roles and responsibilities of all Maintenance Facility Works design, construction and Commissioning personnel; and
- (j) details of how the Plans developed during the Maintenance Facility Works construction stage will be transitioned into the Project Plans for the TLS Phase.

### **7.3 Maintenance Facility Works Delivery Philosophy**

The Maintenance Facility Works Delivery Plan must explain PPP Co's approach to the delivery of the Maintenance Facility Works. This must include details of:

- (a) how the design will accommodate each of the Through Life Support tasks needed on the Sets;
- (b) the proposed layout of the Maintenance Facility Works;
- (c) the activities that will be necessary to coordinate, design, construct and commission the Maintenance Facility Works;
- (d) the approach to co-ordination with RailCorp Enabling Works; and
- (e) the approach to resolving Defects in the Maintenance Facility Works.

### **7.4 Maintenance Facility Works Technical Review process**

The Maintenance Facility Works Delivery Plan must detail the Technical Review process in accordance with clause 4.6 (Technical Reviews) of these Contract Management Requirements that will be followed in coordinating and designing the Maintenance Facility Works.

### **7.5 Planning Approval Management Process**

The Maintenance Facility Works Delivery Plan must detail the process that will be applied to manage obtaining all necessary Approvals (other than the Planning Approval), and complying with the conditions of the Planning Approval.

### **7.6 Commissioning Test Plan and Process**

PPP Co must provide a Commissioning Test Plan within the Maintenance Facility Works Delivery Plan, in accordance with clause 4.12.2 (Integrated Test Plan) of these Contract Management Requirements, that details the Tests and processes necessary to handover and commission the Maintenance Facility Works. The

Commissioning Test Plan must include a detailed timeline (critical path method). If PPP Co requires the use of RailCorp rolling stock in order to commission the Maintenance Facility Works, this must be planned and programmed to minimise the impact on fleet availability.

### **7.7 Organisational Structure**

PPP Co must include an organisation chart in the Maintenance Facility Works Delivery Plan showing all personnel and staff numbers in the Maintenance Facility Works planning, design, construction and Commissioning teams. The Maintenance Facility Works Delivery Plan must include job descriptions and responsibilities for each position including identification of the responsible authorities for Variations.

### **7.8 Artefacts management process**

The Maintenance Facility Works Delivery Plan must explain PPP Co's approach to the management of Artefacts in accordance with clause 11.13 (Artefacts) of the Conditions of Contract, including compliance with all applicable laws and regulations, and RailCorp's policies.

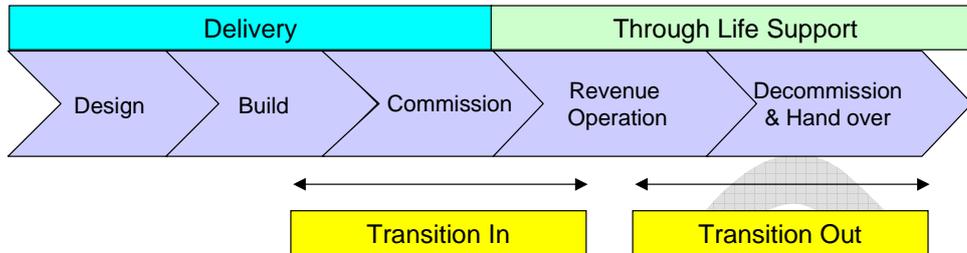
### **7.9 Interface coordination**

The Maintenance Facility Works Delivery Plan must detail the process for coordination and inclusion of the requirements of RailCorp, and must demonstrate that these requirements have been met, in accordance with clause 2.13 (Interface Management Plan) of these Contract Management Requirements.

## 8 Transition Plan

### 8.1 Introduction

The Transition Plan must cover both the Transition-in Phase and the Transition-out Phase of the Contract as defined in the Conditions of Contract and as shown in Figure 8.1.1 below.



**Figure 8.1.1: Transition Phases**

PPP Co must achieve a smooth transition during the Transition-in Phase and the Transition-out Phase, and to facilitate this must develop a comprehensive Transition Plan that clearly details PPP Co's Activities of PPP Co during each phase.

The Transition-in Phase will involve replacing a large proportion of RailCorp's rolling stock, mobilising the Maintenance Facility and training PPP Co's staff, RailCorp's Crew and other RailCorp staff in the Cars' Systems and operations. PPP Co must develop a Transition-in Plan which will ensure that PPP Co's Activities do not impact RailCorp's ability to maintain service Reliability and safety during the Transition-in Phase.

PPP Co must also develop a Transition-out Plan for transitioning the Sets out of Revenue Operation and vacating the Maintenance Site in a manner that minimises the impact on RailCorp's operations and returns the Maintenance Facility, the Unfixed Maintenance Plant and Equipment and the Maintenance Parts and Materials in a state and condition that complies with schedule 15 (Return Conditions) to the Conditions of Contract.

PPP Co must develop and maintain the Transition Plan during the Transition-in Phase and the Transition-out Phase.

The Through Life Support (TLS) Plan must be integrated with the other Project Plans to address any continuing requirements of the Transition Plan after the Transition-in Phase is complete and prior to the Transition-out Phase.

### 8.2 Purpose of the Transition Plan

The purpose of the Transition Plan is to:

- (a) ensure that the introduction of the Sets into service and the Commissioning and commencement of operation of the Maintenance Facility occurs in a predictable and efficient manner enhancing RailCorp's operations;

- (b) ensure that the retirement of the Sets from service and the decommissioning and handover of the Maintenance Facility occurs in a predictable and efficient manner not detracting from RailCorp's operations;
- (c) provide details of PPP Co's planned activities, timing and responsibilities during the Transition-in Phase and Transition-out Phase; and
- (d) include details of RailCorp's activities and necessary timing during the Transition-in Phase and Transition-out Phase to facilitate co-ordination.

### **8.3 Transition-in Plan**

PPP Co must develop, deliver and maintain a Transition-in Plan that defines the activities, timing and responsibilities within PPP Co's organisation during the Transition-in Phase. The Transition-in Plan must include the following sub-plans:

- (a) Transition-in Support Sub-plan;
- (b) Operations Mobilisation Sub-plan;
- (c) Training Management Sub-plan;
- (d) Testing & refinement of the Interface Protocols & Procedures Sub-plan;
- (e) Transition-in Stabling Sub-plan; and
- (f) Transition-in Communications Sub-plan.

#### **8.3.1 Transition-in Support Sub-plan**

PPP Co must provide support to RailCorp during the Transition-in Phase to ensure that the Sets and RailCorp crew have adequate support. PPP Co must detail in the Transition-in Support Sub-plan its identified risks during the Transition-in Phase and its plans to control these risks in support of the transition in accordance with the Risk Management Plan and the Risk Register.

#### **8.3.2 Operations Mobilisation Sub-plan**

The Operations Mobilisation Sub-plan must include the following clauses and any other information necessary for the effective co-ordination between PPP Co and RailCorp during the Transition-in Phase.

##### **(a) Interface Coordination Plan**

PPP Co must develop and maintain an Interface Coordination Plan which is consistent with the Safety Interface Agreement and covers all parties interfacing with the Maintenance Facility.

##### **(b) Recruitment of Through Life Support staff**

PPP Co must select the Through Life Support (TLS) staff in a timely manner as required by the RailCorp Through Life Support Specification. PPP Co is to provide details of the timing of the selection of the TLS staff for the Sets and for the Maintenance Facility; in particular the timing for the selection of the TLS management, supervisory and technical support staff, and the qualifications, competence and experience requirements for these staff. Where practicable, PPP Co

must consider utilising staff from the train manufacturing organisation in the TLS Phase to provide continuity.

**(c) Take up Maintenance Site management by TLS staff**

PPP Co will be responsible for the management of the Maintenance Site. PPP Co is to provide details of the activities, timing and responsibilities for the development of plans for the management of the operations on the Maintenance Site including:

- (i) Set movements on the Maintenance Site;
- (ii) Maintenance Site Safety Interface Agreement Management for movements of Sets between the Rail Corridor, the MainTrain facility and the Maintenance Site;
- (iii) Maintenance Site security; and
- (iv) Maintenance Site services.

**(d) Systems Commissioning & Data Population Plan**

PPP Co must detail in the Operations Mobilisation Sub-plan its intended approach and timing for the Commissioning of the Through Life Support systems on the Maintenance Site including:

- (i) establishing the Configuration Baseline in the PPP Co Maintenance Management Information System (PPP Co MMIS);
- (ii) establishing the maintenance schedules in the PPP Co MMIS;
- (iii) establishing the inventory, Consumable Spares and Rotable Spares data in the PPP Co MMIS;
- (iv) establishing the telephony support for Mechanical Control, Equipment Examiners and other RailCorp personnel;
- (v) commencement of the work management requirements in the PPP Co MMIS;
- (vi) Testing of the safe working design of the Maintenance Site and the Maintenance Facility Works;
- (vii) installation and Commissioning of the Simulators;
- (viii) installation and operation of the Environment Management System;
- (ix) installation and operation of the Quality Management System; and
- (x) installation and operation of the OHS&R Plan.

**(e) Out Depots strategy**

RailCorp may use the Sets throughout the RailCorp network and stable the Sets at any of its Out Depots when not in service. PPP Co must provide details in the Operations Mobilisation Sub-plan of its intended strategy to support Cars located in RailCorp Out Depots during the Transition-in Phase and details of how this will change for the TLS Phase.

### 8.3.3 Training Management Sub-plan

The Training Management Sub-plan must conform to the requirements of clause 2.6.3 (Competency and Training) of these Contract Management Requirements.

Training of the Crew, Mechanical Control officers, Equipment Examiners and others (including training the trainers) nominated by RailCorp must be co-ordinated with RailCorp to minimise the impact upon revenue fleet operations.

The Training Management Sub-plan must demonstrate how PPP Co will satisfy the requirements of the Specifications and detail the Tasks and timing for PPP Co to train:

- (a) RailCorp's staff; and
- (b) the Through Life Support staff of PPP Co and its Associates.

The Training Management Sub-plan must be consistent with the Operations Mobilisation Sub-plan.

The Training Management Sub-plan must be capable of allowing alterations and retraining if required as a result of Set System changes during the initial deliveries. It must also include requirements for follow-up and refresher training during the TLS Phase.

### 8.3.4 Testing & Refinement of the Interface Protocols & Procedures Sub-plan

The Interface Protocols and procedures form a fundamental basis for the successful management of PPP Co's Activities and must be tested during the Transition-in Phase and refined prior to Practical Completion of each Set.

The Testing & Refinement of the Interface Protocols & Procedures Sub-plan must detail the activities, timing and responsibilities for the Testing of the Interface Protocols and procedures.

### 8.3.5 Transition-in Stabling Sub-plan

During the Transition-in Phase it may be necessary for PPP Co to stable Sets prior to them entering Revenue Operation or in the event that Defects are discovered on the Sets during Revenue Operation that require their withdrawal from service. PPP Co must detail in the Transition-in Stabling Sub-plan its approach to identifying the risks during the Transition-in Phase and the activities and responsibilities within PPP Co's organisation to manage these risks including the average and peak transition-in stabling requirements.

### 8.3.6 Transition-in Communications Sub-plan

The Transition-in Communications Sub-plan must be consistent with the Communications Management Plan described in clause 2.12 (Communications Management Plan) of these Contract Management Requirements, and must detail the activities, timing and responsibilities within PPP Co's organisation for:

- (a) communications with Local Government prior to and during construction and commencement of operations on the Maintenance Site;
- (b) communications with neighbouring properties (owners & lessees) prior to and during construction and commencement of operations on the Maintenance Site;

- (c) communications with other Authorities; and
- (d) communications with RailCorp as appropriate at each phase of the Project.

#### **8.4 Transition-out Plan**

PPP Co must establish and maintain a Transition-out Plan that defines the activities, timing and responsibilities within PPP Co's organisation during the Transition-out Phase. The Transition-out Plan must include the following sub-plans:

- (a) Transition-out Support Sub-plan;
- (b) Staff Outplacement Sub-plan;
- (c) Maintenance Facility Works & Enabling Works Handover Sub-plan;
- (d) Decommissioning of the Sets Sub-plan; and
- (e) Technical Support Continuity Sub-plan.

##### **8.4.1 Transition-out Support Sub-plan**

PPP Co must provide support to RailCorp during the Transition-out Phase to ensure that the Sets have adequate support to maintain Revenue Operation. PPP Co must detail in the Transition-out Support Sub-plan its identified risks during the Transition-out Phase and its plans to control these risks in support of the transition.

##### **8.4.2 Staff Outplacement Sub-plan**

The Staff Outplacement Sub-plan must provide details of PPP Co's philosophy and approach to the staff of PPP Co and its Associates during the Transition-Out Phase, including:

- (a) stakeholder consultation process (Unions NSW, site unions and others);
- (b) support, both financial and human resources, for staff exiting PPP Co and its Associates; and
- (c) redeployment opportunities within PPP Co and its Associates.

##### **8.4.3 Maintenance Facility Handover Sub-plan**

PPP Co must prepare a plan to hand over the Maintenance Facility, the Unfixed Maintenance Plant and Equipment and the Maintenance Parts in good working order with all Scheduled Maintenance up to date in accordance with the Maintenance Facility Asset Management Plan. PPP Co must include in the Maintenance Facility Handover Sub-plan details of its approach to ensure that the Maintenance Facility complies with the requirements of the Contract. The Maintenance Facility Handover Sub-plan must allow for handover either to RailCorp, to another organisation, or for continuation by PPP Co.

##### **8.4.4 Decommissioning of the Sets Sub-plan**

PPP Co is responsible for the decommissioning of the Sets, as required by clause 25 (Decommissioning of Sets) of the Conditions of Contract. PPP Co must prepare a detailed Decommissioning Sub-plan that includes its approach to:

- (a) managing the decommissioning process; and

(b) ensuring that the decommissioning activities and outcomes comply with requirements of the Contract and all laws.

The Decommissioning of the Sets Sub-plan must detail the activities, responsibilities within PPP Co's organisation and timing for the gradual withdrawal of the Sets from service on each Decommissioning Date. PPP Co must detail the plans for continued support during this phase of the Project covering all of the Through Life Support requirements.

The Decommissioning Sub-plan must provide for the spares and other associated equipment unique to the operation and maintenance of the Sets to be offered in the first instance to RailCorp before disposal to third parties. Decommissioning of the Sets must comply with RailCorp policies on sustainability and environmental management.

#### **8.4.5 Technical Support Continuity Sub-plan**

RailCorp may extend the Contract Term in accordance with clause 24 (Extension of Contract Term) of the Conditions of Contract. The Technical Support Continuity Sub-plan must detail PPP Co's approach and the responsibilities of the parties to enable continued technical support for the Sets.

## 9 Through Life Support Plan

### 9.1 Introduction and purpose

The Through Life Support (TLS) Plan will describe all of the processes and procedures that PPP Co will follow in order to ensure that the Cars, the Simulators, the Maintenance Facility, the Unfixed Maintenance Plant and Equipment and the Maintenance Parts and Materials continue to meet the safety, operational performance and other requirements of the Contract from their respective Dates of Practical Completion (and in the case of the Maintenance Facility, the Date of Practical Completion of the Maintenance Facility Works) until the end of the Contract Term.

The Through Life Support Plan must detail how PPP Co will provide this Through Life Support of the Sets, the Simulators, the Maintenance Facility, the Unfixed Maintenance Plant and Equipment and the Maintenance Parts and Materials for the Contract Term in accordance with the requirements of the RailCorp Through Life Support Specification.

The TLS Plan must address any continuing requirements of the Transition Plan after the Transition-in Phase is complete.

PPP Co must define in the TLS Plan all the detailed support requirements necessary to meet the operational and maintenance requirements of RailCorp for the Contract Term.

The RailCorp Through Life Support Specification provides a detailed explanation of the RailCorp requirements through the Through Life Support Phase and reference should be made to the RailCorp Through Life Support Specification and its subsidiary documents in the preparation of the TLS Plan.

The purpose of the TLS Plan is to:

- (a) demonstrate the capability and capacity of PPP Co to undertake the support of the Cars and the Maintenance Facility for the Contract Term to meet the Required Availability, Reliability and safety requirements;
- (b) understand PPP Co's requirements of RailCorp to deliver the support required; and
- (c) provide a baseline for monitoring PPP Co's delivery of the support.

### 9.2 General requirements

PPP Co must develop, deliver and maintain a TLS Plan that demonstrates that the handover of Sets for operational use is achieved in a safe, planned and efficient manner. The TLS Plan must include the matters set out in clauses 9.4 (RailCorp Interfaces) to 9.11 (Maintenance Facility Asset Management Plan) inclusive of these Contract Management Requirements together with any other obligations set out in the Specifications and not covered in the other Project Plans.

The TLS Plan must complement and be consistent with the continuing use of the other Project Plans which are required during the Through Life Support Phase.

## **9.3 Policies and plans**

### **9.3.1 Asset management philosophy**

The TLS Plan must demonstrate PPP Co's approach to the TLS Phase Activities, how Cars are scheduled for maintenance, revision of the Technical Maintenance Plan based on trends and unexpected failures, the triggers for equipment modifications to improve safety, Reliability, the philosophy for maintaining passenger amenity and cleanliness and the approach to resolving Defects at locations other than the Maintenance Facility.

### **9.3.2 Organisational structure**

PPP Co must include an organisation chart in the TLS Plan showing all personnel and staff numbers at each level. The TLS Plan must include job descriptions and responsibilities for all positions, including identification of the responsible authorities for maintenance and Variations, and also include Safety Accountability Statements for each management and supervisory position within the structure.

## **9.4 RailCorp Interfaces**

### **9.4.1 Introduction**

Attached to the RailCorp Through Life Support Specification are draft Interface Protocols which must be updated during the Contract Term in accordance with clause 23.3 (Interface Protocols) of the Conditions of Contract. The Interface Protocols will be owned by RailCorp but agreed between RailCorp and PPP Co.

### **9.4.2 Availability of Sets**

The TLS Plan must demonstrate how PPP Co intends to provide the Required Availability in accordance with clause 22 (Required Availability) of the Conditions of Contract and, in particular, how it informs RailCorp of any inability to meet the schedule and its approach to rectifying defective Sets prior to, or during, any one Availability Period, in accordance with clause 26 (TLS Phase performance monitoring) and Schedule 7 (Payment regime) of the Conditions of Contract.

The TLS Plan must demonstrate how PPP Co intends to report the number and location of Available Sets for each scheduled start. This should include information maintained in real time on any substituted or failed Sets.

When required in accordance with the Interface Protocols to the RailCorp Through Life Support Specification, PPP Co and RailCorp must meet to determine the assignment of responsibility for all Incidents resulting in a failure to deliver the Required Availability for a given Availability Period based on the Interface Protocols.

The TLS Plan must describe the process for reporting the outcome of the Incident review process analysing and reporting on the causes of PPP Co Related Incidents.

### **9.4.3 Certificate of Readiness**

The TLS Plan must demonstrate the method to be used to produce, certify and monitor Certificates of Readiness on Available Sets in accordance with the RailCorp Through Life Support Specification. The method must include reporting on the current

status of each Set, missing Certificates of Readiness, Certificates of Readiness expiry dates and cross-referencing to any outstanding permitted Defects. The TLS Plan must demonstrate how PPP Co proposes to supply RailCorp with a listing of current Certificates of Readiness, Certificates of Readiness expiry dates and planned inspection dates for all available Sets and the process to capture any expired or revoked Certificates of Readiness.

#### **9.4.4 Defect reporting**

The TLS Plan must demonstrate the method and procedures for accepting, monitoring and reporting of Defects and how this will be electronically interfaced between the PPP Co MMIS and RailCorp's defect reporting system (the RailCorp MMIS), in accordance with clause 2.7.6 (Maintenance Management Information) of the RailCorp Through Life Support Specification. The Defect reporting system for the Sets must conform to the minimum specification included in the Specifications.

#### **9.4.5 Handover and pick-up protocols**

PPP Co must develop and maintain a set of protocols and procedures for the delivery and collection of Sets to and from the Maintenance Facility, in accordance with the Interface Protocols to the RailCorp Through Life Support Specification. PPP Co must also develop its own procedures for the movement of Sets within the Maintenance Site.

In the TLS Plan, PPP Co must describe the relevant protocols and procedures to be used by RailCorp train crew handing over Sets from service and accepting Sets for service.

#### **9.4.6 Use of RailCorp facilities**

The TLS Plan must demonstrate how PPP Co intends to perform servicing and defect maintenance on any Car at a RailCorp facility. The approach must conform to the availability of these facilities indicated in the Interface Protocols to the RailCorp Through Life Support Specification.

The TLS Plan must also include the procedure for accepting Sets from RailCorp and scheduling those Sets through the wheel profiling machine at the Maintenance Facility.

#### **9.4.7 Incident Response Plan**

PPP Co must establish and maintain an Incident Response Plan that is integrated with the RailCorp Incident Management Framework and which incorporates procedures, instructions and checklists for the management of Incidents involving Sets and the management of Incidents occurring at the Maintenance Facility.

The availability of RailCorp personnel to provide assistance to PPP Co in responding to In-service Incidents is not guaranteed. The TLS Plan must describe what provision has been made for PPP Co attendance at defective Cars and how it will respond to Incidents when RailCorp personnel are unavailable.

## **9.5 Passenger amenity & presentation services**

### **9.5.1 Introduction**

The TLS Plan must demonstrate the approach to be taken to maintaining the passenger amenity of the Cars through the TLS Phase and thereby minimising risk to passengers. This should include the method of monitoring presentation standards, the frequency of auditing Cars in service, reporting of substandard items and the rectification process.

To the extent that PPP Co is responsible for cleaning and presentation of the Cars, The TLS Plan must demonstrate the process to be followed for Major Cleaning, Daily Cleaning and Turnaround Cleaning, and Graffiti and Vandalism rectification. The approach should include an explanation of the process for auditing standards and responding to complaints, and external audits relating to cleaning and presentation standards.

### **9.5.2 Graffiti and Vandalism**

The TLS Plan must describe the process for identifying Graffiti and Vandalism and recording incidents for inclusion in the RailCorp database. These processes must be aligned wherever possible with RailCorp's current reporting processes for Vandalism and Graffiti.

## **9.6 Simulators**

The TLS Plan must demonstrate how PPP Co will maintain the currency of the Simulators used to train Drivers, Guards and other personnel as required by RailCorp. The TLS Plan must describe the process that PPP Co will follow to ensure that the Simulators are reconfigured to reflect any changes to the Cars, RailCorp's infrastructure, operational and/or human interface requirements which they are intended to simulate. These processes must conform to the requirements of clause 5 (Configuration Management Plan) of these Contract Management Requirements.

## **9.7 Maintenance Services**

### **9.7.1 Introduction**

PPP Co is responsible for defining the approach to, and conducting, all maintenance as required by the Technical Maintenance Plan (TMP) and the RailCorp Through Life Support Specification.

Apart from additional Cars, which are held by PPP Co for maintenance purposes, Cars will only be made available for maintenance outside the hours specified for Availability Periods in the Conditions of Contract. The TLS Plan must explain how the planned workload for all maintenance Tasks combined with the intended staffing and operating hours for the Maintenance Facility will satisfy the Required Availability during the TLS Phase.

### **9.7.2 Scheduled Maintenance**

PPP Co must extract from the TMP the planned scheduled service intervals and summarise the intended scheduled service intervals and the scope of work for each scheduled service or inspection in the TLS Plan.

The TLS Plan must explain how PPP Co intends to monitor the status of scheduled services and the running kilometres of the Sets to ensure timely scheduling of Sets for maintenance inspections. The approach must include an explanation of the monitoring process to capture “past due” or “overdue” inspections and how RailCorp will be advised of any such events.

The TLS Plan must also explain the procedure to be used in the Interface Protocols for the call-in of Sets to the Maintenance Facility for routine inspections and servicing.

### **9.7.3 Unscheduled Maintenance**

The TLS Plan must demonstrate how PPP Co will manage Unscheduled Maintenance both at the Maintenance Facility and at other RailCorp sites. The details must include a description of the approach to Unscheduled Maintenance, where repairs will be carried out (in the field versus in the Maintenance Facility), the anticipated quantities and types of repair, and how the impact on service availability will be minimised.

### **9.7.4 Reporting**

PPP Co must include in the TLS Plan a description of the reporting system, the data storage method (both information and photographs) for the identification of Reimbursable Through Life Support, including procedures for interfacing with the PPP Co MMIS.

### **9.8 Fleet Condition**

RailCorp (or any person authorised by RailCorp) may regularly audit a sample of Sets to assess their condition, presentation and compliance with Minimum Operating Standards for Available Sets and other requirements under the Contract, including the Specifications. PPP Co must describe in the TLS Plan how Sets for audit will be made available at the Maintenance Facility and what access will be given to facilities, Test equipment and engineering support to undertake the audits.

Without limiting any of RailCorp’s other rights under the Contract or otherwise, RailCorp reserves the right to require PPP Co to institute corrective action for any unsatisfactory aspect within a time scale to be nominated by RailCorp.

### **9.9 Operations support**

PPP Co must provide services to RailCorp in support of RailCorp’s operations in accordance with the RailCorp Through Life Support Specification. PPP Co must include in the TLS Plan its approach to providing these services, including:

- (a) interfaces with ITSRR;
- (b) reporting of incidents by RailCorp or, where necessary, by PPP Co directly, to the Office of the Transport Safety Investigator (OTSI);

- (c) Event Recorder and Train Operating System (TOS) download and analysis;
- (d) CCTV image retrieval;
- (e) updating the network route maps, passenger information posters and other RailCorp decals within the Sets;
- (f) updating the train destination signage and codes;
- (g) updating the Digital Voice Announcements;
- (h) updating the Train Operations Manual and/or other manuals and procedures stored in the TOS;
- (i) changes to train destination signage and codes; and
- (j) other services that may be required from time to time.

### **9.10 Reporting and KPIs**

PPP Co must provide information and reports in accordance with the Contract. The information and reports will be used in assessing the performance of PPP Co in each of the KPI areas.

PPP Co must detail in the TLS Plan its approach to the collection and quality control of the information reported to RailCorp in accordance with the Specifications and its relationship to the KPIs.

### **9.11 Maintenance Facility Asset Management Plan**

PPP Co must develop and maintain a Maintenance Facility Asset Management Plan (MFAMP) as an attachment to the TLS Plan. The MFAMP must describe how PPP Co will operate, maintain and repair the Maintenance Facility, the Unfixed Maintenance Plant and Equipment and the Maintenance Parts and Materials from the Date of Practical Completion of the Maintenance Facility until the end of the Contract Term, and must include details of the arrangements for security and crime management.

The MFAMP must provide details of what will be required to continue to use the Maintenance Facility after the expiry of the Contract Term.



## ATTACHMENT 1 – LIST OF PROJECT PLANS, SUBSIDIARY PROJECT PLANS, SUPPORTING DOCUMENTS AND INFORMATION

Title	Conditions of Contract clause(s)	Contract Management Requirements clause(s)	Level of detail required at Contractual Close	Initial draft required	Complete document required	Review frequency
<b>Contract Management suite</b>						
Contract Management Plan	1 9	1.2 2.1 2.2	Complete			SDR, PDR, CDR, then annually or as required when changes occur
Risk Management Plan <i>Subsidiary to Contract Management Plan</i>		2.2 (e) 2.3	Complete			SDR, PDR, CDR, then annually or as required when changes occur
Risk Register <i>Subsidiary to Contract Management Plan</i>		2.2 (f) 2.3 2.4	Complete			Quarterly or as required when changes occur
OHS&R Plan <i>Subsidiary to Contract Management Plan</i>	10.3	2.2 (g) 2.5	Complete			Annually or as required when changes occur

<b>Title</b>	<b>Conditions of Contract clause(s)</b>	<b>Contract Management Requirements clause(s)</b>	<b>Level of detail required at Contractual Close</b>	<b>Initial draft required</b>	<b>Complete document required</b>	<b>Review frequency</b>
Human Resources Plan (incorporating industrial relations arrangements; competency and training arrangements) <i>Subsidiary to Contract Management Plan</i>	10.5 21	2.2 (h) 2.6	Complete			Annually or as required when changes occur
Contractor's Work Breakdown Structure <i>Subsidiary to Contract Management Plan</i>		2.2 (i) 2.7	Complete (to 4 <sup>th</sup> level)		Preliminary Definition Review	As required when changes occur
Organisational Accountabilities Plan <i>Subsidiary to Contract Management Plan</i>	1 10.6	2.2 (j) 2.8	Complete			Annually or as required when changes occur
Environmental Management Plan <i>Subsidiary to Contract Management Plan</i>	12.3	2.2 (k) 2.9	Draft		Three months after the date of Contractual Close	Annually or as required when changes occur
Programme Management Plan (incorporating Delivery Programme; Mock-up programme) <i>Subsidiary to Contract Management Plan</i>		2.2 (1) 2.10.1, 2.10.2 4.5.4	Complete			SDR, PDR, CDR then quarterly or as required when changes occur

<b>Title</b>	<b>Conditions of Contract clause(s)</b>	<b>Contract Management Requirements clause(s)</b>	<b>Level of detail required at Contractual Close</b>	<b>Initial draft required</b>	<b>Complete document required</b>	<b>Review frequency</b>
Delivery Phase Progress Reports <i>Subsidiary to Programme Management Plan</i>	15.8	2.10.3	Complete template			Monthly
Compliance Management Plan <i>Subsidiary to Contract Management Plan</i>		2.2 (m) 2.11	Complete			Annually or as required when changes occur
Communications Management Plan <i>Subsidiary to Contract Management Plan</i>		2.2 (n) 2.12	Draft		Three months after the date of Contractual Close	Annually or as required when changes occur
Interface Management Plan <i>Subsidiary to Contract Management Plan</i>		2.2 (o) 2.13 7.9	Draft		Three months after the date of Contractual Close	Quarterly during the Delivery Phase, annually during the Through Life Support Phase, or as required when changes occur

<b>Title</b>	<b>Conditions of Contract clause(s)</b>	<b>Contract Management Requirements clause(s)</b>	<b>Level of detail required at Contractual Close</b>	<b>Initial draft required</b>	<b>Complete document required</b>	<b>Review frequency</b>
Local Industry Participation Plan		2.15	Complete			SDR, PDR, CDR, then annually or as required when changes occur
Human Factors Integration Plan <i>Subsidiary to Contract Management Plan</i>		2.2 (p) 2.14	Draft		Three months after the date of Contractual Close	SDR, PDR, CDR then annually or as required when changes occur
<b>Safety Management suite</b>						
Safety Management Plan <i>Subsidiary to Contract Management Plan</i>	1 9	1.2 3.1	Complete			SDR, PDR, CDR, then annually or as required when changes occur
System Hazard Analysis <i>Subsidiary to Safety Management Plan</i>		3.1 3.2	Complete			SDR, PDR, CDR then quarterly or as required when changes occur

<b>Title</b>	<b>Conditions of Contract clause(s)</b>	<b>Contract Management Requirements clause(s)</b>	<b>Level of detail required at Contractual Close</b>	<b>Initial draft required</b>	<b>Complete document required</b>	<b>Review frequency</b>
Accreditation Plan <i>Subsidiary to Safety Management Plan</i>	8.1 8.2 8.3 8.4	3.1 3.3.1	Complete			As required when changes occur
Tender Safety Assurance Report <i>Subsidiary to Accreditation Plan</i>		3.3.2	Complete			As required when changes occur
System Definition Safety Assurance Report <i>Subsidiary to Accreditation Plan</i>		3.3.2	-		System Definition Review	As required when changes occur
Critical Design Safety Assurance Report <i>Subsidiary to Accreditation Plan</i>		3.3.2	-		Critical Design Review	As required when changes occur
Implementation Safety Assurance Report (Testing & Commissioning) <i>Subsidiary to Accreditation Plan</i>		3.3.2	-		Before Delivery Testing	As required when changes occur
Implementation Safety Assurance Report (Interim) <i>Subsidiary to Accreditation Plan</i>		3.3.2	-		Before Practical Completion of Set 1	As required when changes occur

<b>Title</b>	<b>Conditions of Contract clause(s)</b>	<b>Contract Management Requirements clause(s)</b>	<b>Level of detail required at Contractual Close</b>	<b>Initial draft required</b>	<b>Complete document required</b>	<b>Review frequency</b>
Implementation Safety Assurance Report (Revenue Operation) <i>Subsidiary to Accreditation Plan</i>		3.3.2	-		Before Practical Completion of Set 7	As required when changes occur
Construction Safety Assurance Report <i>Subsidiary to Accreditation Plan</i>		3.3.3		System Design Review	Before commencing manufacture of the Sets	As required when changes occur
Maintenance Facility Works Safety Assurance Report <i>Subsidiary to Accreditation Plan</i>		3.3.3	--	System Design Review	Before commencing work at the Maintenance Site	As required when changes occur
Through Life Support Safety Assurance Report <i>Subsidiary to Accreditation Plan</i>		3.3.3	-	System Design Review	Before Practical Completion of the Maintenance Facility Works	As required when changes occur
Safety Accountability Statements <i>Subsidiary to Safety Management Plan</i>		3.4	-Complete			Annually or as required when changes occur
<b>System Assurance suite</b>						

Title	Conditions of Contract clause(s)	Contract Management Requirements clause(s)	Level of detail required at Contractual Close	Initial draft required	Complete document required	Review frequency
Systems Assurance Plan (incorporating design review and systems assurance processes; Mock-ups feedback and review process; Practical Completion and Final Completion process; In-service RAMS Verification process; systems assurance organisation and responsibilities; requirements analysis; Design Documentation; design management systems and controls; Maintenance Facility Works organisational structure; TLS organisational structure) <i>Subsidiary to Contract Management Plan</i>	1 9	1.2 4.1 4.2 4.5 4.7	-Complete	-		SDR, PDR, CDR, then annually or as required when changes occur
Reliability, Availability, Maintainability and Safety (RAMS) Plan <i>Subsidiary to Systems Assurance Plan</i>		4.2.1	Complete			Annually or as required when changes occur
Technical Maintenance Plan (incorporating spares support arrangements; Wheelset Management Plan) <i>Subsidiary to Systems Assurance Plan</i>	1	4.11	Draft		System Definition Review	PDR, CDR then annually or as required when changes occur

<b>Title</b>	<b>Conditions of Contract clause(s)</b>	<b>Contract Management Requirements clause(s)</b>	<b>Level of detail required at Contractual Close</b>	<b>Initial draft required</b>	<b>Complete document required</b>	<b>Review frequency</b>
Variation management system <i>Subsidiary to Systems Assurance Plan</i>	30 31	4.3	Draft		System Definition Review	Annually or as required when changes occur
Design Management Plan <i>Subsidiary to Systems Assurance Plan</i>		4.4.1-4.4.7	Complete			Annually or as required when changes occur
Design certification <i>Subsidiary to Systems Assurance Plan</i>		4.4.1 (j) 4.4.7 4.4.8 4.12.10	-		For design: Critical Design Review  For Testing and Verification: Practical Completion	As required when changes occur
Requirements and functions allocation traceability data <i>Subsidiary to Systems Assurance Plan</i>		4.4.8	Draft		System Definition Review	PDR, CDR then annually or as required when changes occur
Software Detail Design Document <i>Subsidiary to Systems Assurance Plan</i>		4.4.9	Draft		System Definition Review	PDR, CDR then annually or as required when changes occur

<b>Title</b>	<b>Conditions of Contract clause(s)</b>	<b>Contract Management Requirements clause(s)</b>	<b>Level of detail required at Contractual Close</b>	<b>Initial draft required</b>	<b>Complete document required</b>	<b>Review frequency</b>
Software Product Technical Specification <i>Subsidiary to Systems Assurance Plan</i>		4.4.9	Draft		System Definition Review	PDR, CDR then annually or as required when changes occur
Exterior and interior design optimisation study <i>Subsidiary to Systems Assurance Plan</i>		4.5.1		System Definition Review	Critical Design Review	As required when changes occur
Appearance trade-off study <i>Subsidiary to Systems Assurance Plan</i>		4.5.2		System Definition Review	Critical Design Review	As required when changes occur
Accessibility report <i>Subsidiary to Systems Assurance Plan</i>		4.5.3		System Definition Review	Critical Design Review	As required when changes occur
Human factors and ergonomics report <i>Subsidiary to Systems Assurance Plan</i>		4.5.3		System Definition Review	Critical Design Review	As required when changes occur
Technical Review Plan and programme (incorporating System Definition Review; Preliminary Design Review; Critical Design Review) <i>Subsidiary to Systems Assurance Plan</i>	13.3	4.6	Complete (4.6.2)		SDR (4.6.3) PDR (4.6.4) CDR (4.6.5)	SDR, PDR, CDR then annually or as required when changes occur

Title	Conditions of Contract clause(s)	Contract Management Requirements clause(s)	Level of detail required at Contractual Close	Initial draft required	Complete document required	Review frequency
System Verification Review (SVR) <i>Subsidiary to Technical Review Plan</i>	1 13.3	4.6.6		Critical Design Review	Completion of Production Testing for Set 1, the Simulators and the Maintenance Facility Works; and completion of Operational Testing of Sets 1 to 6 (or Sets 1 to 7 if one of Sets 1 to 6 is withdrawn from service under clause 19.3 (Withdrawal of one of the first 6 Sets) of the Conditions of Contract)	As required when changes occur
Physical Configuration Audit (PCA) <i>Subsidiary to Technical Review Plan and Configuration Management Plan</i>	1 13.3	4.6.7 5.1.2		Critical Design Review	Sets: before delivery of Set 1, Set 2, Set 7(or Set 8 if one of Sets 1 to 6 is withdrawn from service under clause 19.3 (Withdrawal of one of the first 6 Sets) of the Conditions of Contract), Set 10, every 10th subsequent Set and the last Set.  Simulators and Maintenance Facility Works: before Practical Completion.	As required when changes occur

<b>Title</b>	<b>Conditions of Contract clause(s)</b>	<b>Contract Management Requirements clause(s)</b>	<b>Level of detail required at Contractual Close</b>	<b>Initial draft required</b>	<b>Complete document required</b>	<b>Review frequency</b>
As-built Design Documentation <i>Subsidiary to Systems Assurance Plan</i>		4.7.2	-		Before Practical Completion of Set 1, the Simulators or the Maintenance Facility Works as appropriate	As required when changes occur
Reliability Programme <i>Subsidiary to Systems Assurance Plan</i>		4.8.1		System Definition Review	Critical Design Review	As required when changes occur
Reliability modelling and prediction <i>Subsidiary to Systems Assurance Plan</i>		4.8.2	Draft		Critical Design Review	PDR, CDR then as required when changes occur
Failure Modes, Effects and Criticality Analysis (FMECA) <i>Subsidiary to Systems Assurance Plan</i>		4.8.3		System Definition Review	Critical Design Review	As required when changes occur
Reliability Demonstration Plan <i>Subsidiary to Systems Assurance Plan</i>		4.8.4		System Definition Review	Critical Design Review	As required when changes occur
Maintainability Programme <i>Subsidiary to Systems Assurance Plan</i>		4.9.1		System Definition Review	Critical Design Review	As required when changes occur

Title	Conditions of Contract clause(s)	Contract Management Requirements clause(s)	Level of detail required at Contractual Close	Initial draft required	Complete document required	Review frequency
Maintainability estimation <i>Subsidiary to Systems Assurance Plan</i>		4.9.2	Draft		Critical Design Review	PDR, CDR then as required when changes occur
Maintainability Demonstration Plan <i>Subsidiary to Systems Assurance Plan</i>		4.9.3		System Definition Review	Critical Design Review	As required when changes occur
Availability prediction <i>Subsidiary to Systems Assurance Plan</i>		4.10	Draft		Critical Design Review	PDR, CDR then as required when changes occur
Integrated Test Plan (incorporating Testing process and plans; Development Testing requirements; Integration Testing requirements; Qualification Testing (Type Testing) requirements; Production Testing requirements; Delivery Testing (commissioning) requirements; Software Testing; Operational Testing) <i>Subsidiary to Systems Assurance Plan</i>	1 17.1	4.12.1 4.12.2 4.12.3 4.12.4 4.12.5 4.12.6 4.12.8 4.12.9 4.12.10	Draft		System Definition Review	PDR, CDR then every two months

<b>Title</b>	<b>Conditions of Contract clause(s)</b>	<b>Contract Management Requirements clause(s)</b>	<b>Level of detail required at Contractual Close</b>	<b>Initial draft required</b>	<b>Complete document required</b>	<b>Review frequency</b>
Train Testing and Commissioning Network Access Plan <i>Subsidiary to Integrated Test Plan</i>		4.12.7	Complete			Quarterly or as required when changes occur
Test Specifications <i>Subsidiary to Integrated Test Plan</i>		4.12.10		Critical Design Review	30 Business Days before test	As required when changes occur
Test Reports <i>Subsidiary to Integrated Test Plan</i>		4.12.10		Critical Design Review	10 Business Days after test	As reports are generated
Test Report Summary <i>Subsidiary to Integrated Test Plan</i>		4.12.10	-		After the final test report for the relevant equipment	As required when changes occur
Failure Reporting and Corrective Action <i>Subsidiary to Systems Assurance Plan</i>		4.12.11	Draft		Preliminary Design Review	CDR then as required when changes occur
Design Verification Plan <i>Subsidiary to, Design Management Plan</i>		4.4.3	Complete			SDR, PDR, CDR then annually or as required when changes occur

<b>Title</b>	<b>Conditions of Contract clause(s)</b>	<b>Contract Management Requirements clause(s)</b>	<b>Level of detail required at Contractual Close</b>	<b>Initial draft required</b>	<b>Complete document required</b>	<b>Review frequency</b>
Independent Verification Reports <i>Subsidiary to Design Verification Plan</i>		4.4.10	Programme: Complete		Technical at SDR	As reports are generated
ICT capability strategy <i>Subsidiary to Systems Assurance Plan</i>		4.13.1	Draft		Three months after the date of Contractual Close	SDR, PDR, CDR then annually or as required when changes occur
ICT systems architecture management strategy <i>Subsidiary to Systems Assurance Plan</i>		4.13.2	Draft		Three months after the date of Contractual Close	SDR, PDR, CDR then annually or as required when changes occur
Software Systems Management Plan <i>Subsidiary to Systems Assurance Plan</i>		4.13.3	Draft		Three months after the date of Contractual Close	SDR, PDR, CDR then annually or as required when changes occur
<b>Configuration Management suite</b>						

<b>Title</b>	<b>Conditions of Contract clause(s)</b>	<b>Contract Management Requirements clause(s)</b>	<b>Level of detail required at Contractual Close</b>	<b>Initial draft required</b>	<b>Complete document required</b>	<b>Review frequency</b>
Configuration Management Plan <i>Subsidiary to Contract Management Plan</i>	1 9	1.2 5.1	Complete			SDR, PDR, CDR, before Practical Completion of Set 1 then annually or as required when changes occur
Master Configuration Status List <i>Subsidiary to Configuration Management Plan</i>		5.1.1 (d)		System Definition Review	Critical Design Review	As required when changes occur
Configuration Register <i>Subsidiary to Configuration Management Plan</i>		5.1.1 (e)		Critical Design Review	Practical Completion of Set 1	As required when changes occur
<b>Train and Simulator Delivery suite</b>						
Train and Simulator Delivery Plan <i>Subsidiary to Contract Management Plan</i>	1 9	1.2 6.1 6.2 6.3	Complete			SDR, PDR, CDR, then quarterly or as required when changes occur

Title	Conditions of Contract clause(s)	Contract Management Requirements clause(s)	Level of detail required at Contractual Close	Initial draft required	Complete document required	Review frequency
Manufacturing Plan Subsidiary to Train and Simulator Delivery Plan		6.3 (c)	Complete			SDR, PDR, CDR, then quarterly or as required when changes occur
<b>Maintenance Facility Works Delivery suite</b>						
Maintenance Facility Works Delivery Plan (incorporating Maintenance Facility Works delivery philosophy; Planning Approval Management process) <i>Subsidiary to Contract Management Plan</i>	1 9	1.2 7.1 7.2 7.3 7.5 7.7 7.9	Complete			SDR, PDR, CDR, then annually or as required when changes occur
Maintenance Facility Works Technical Reviews <i>Subsidiary to Maintenance Facility Works Delivery Plan</i>	13.3	7.2 (d) 7.4	Draft		Three months after the date of Contractual Close	SDR, PDR, CDR then annually or as required when changes occur

<b>Title</b>	<b>Conditions of Contract clause(s)</b>	<b>Contract Management Requirements clause(s)</b>	<b>Level of detail required at Contractual Close</b>	<b>Initial draft required</b>	<b>Complete document required</b>	<b>Review frequency</b>
Maintenance Facility Works Commissioning Test Plan and Process <i>Subsidiary to Maintenance Facility Works Delivery Plan</i>		7.2 (f, h) 7.6	Draft		System Definition Review	PDR, CDR then as required when changes occur
Artefacts management process <i>Subsidiary to Maintenance Facility Works Delivery Plan</i>	11.13	7.8	Draft		Before commencing work at the Maintenance Site	As required when changes occur
<b>Transition suite</b>						
Transition Plan <i>Subsidiary to Contract Management Plan</i>	1 9	1.2 8.1 8.2	Complete			SDR, PDR, CDR, then quarterly or as required when changes occur
Transition-in Plan <i>Subsidiary to Transition Plan</i>		8.1 8.3	Complete			Quarterly or as required when changes occur
Transition-in Support Sub-plan <i>Subsidiary to Transition-in Plan</i>		8.3.1	Complete			Quarterly or as required when changes occur

<b>Title</b>	<b>Conditions of Contract clause(s)</b>	<b>Contract Management Requirements clause(s)</b>	<b>Level of detail required at Contractual Close</b>	<b>Initial draft required</b>	<b>Complete document required</b>	<b>Review frequency</b>
Operations Mobilisation Sub-plan (incorporating Through Life Support staff recruitment process; take up Maintenance Site management by TLS staff plan; systems commissioning and data population plan; Out Depots strategy) <i>Subsidiary to Transition-in Plan</i>		8.3.2	Draft		Three months before Practical Completion of the Maintenance Facility Works	Quarterly or as required when changes occur
Interface Coordination Plan <i>Subsidiary to Transition-in Plan</i>		8.3.2		Critical Design Review	In time to meet Accreditation requirements	As required when changes occur
Training Management Sub-plan <i>Subsidiary to Transition-in Plan</i>		8.3.3	Complete			Quarterly or as required when changes occur
Testing & Refinement of the Interface Protocols & Procedures Sub-plan <i>Subsidiary to Transition-in Plan</i>		8.3.4	Initial Draft		Critical Design Review	Quarterly or as required when changes occur
Transition-in Stabling Sub-plan <i>Subsidiary to Transition-in Plan</i>		8.3.5	Initial Draft		Three months after the date of Contractual Close	Quarterly or as required when changes occur

<b>Title</b>	<b>Conditions of Contract clause(s)</b>	<b>Contract Management Requirements clause(s)</b>	<b>Level of detail required at Contractual Close</b>	<b>Initial draft required</b>	<b>Complete document required</b>	<b>Review frequency</b>
Transition-in Communications Sub-plan <i>Subsidiary to Transition-in Plan</i>		8.3.6	Draft		Critical Design Review	Quarterly or as required when changes occur
Transition-out Plan <i>Subsidiary to Transition Plan</i>		8.1 8.4	Complete			As required when changes occur
Transition-out Support Sub-plan <i>Subsidiary to Transition-out Plan</i>		8.4.1	Draft		Critical Design Review	As required when changes occur
Staff Outplacement Sub-plan <i>Subsidiary to Transition-out Plan</i>		8.4.2	Draft		Critical Design Review	As required when changes occur
Maintenance Facility Handover Sub-plan <i>Subsidiary to Transition-out Plan</i>		8.4.3	Draft		Critical Design Review	As required when changes occur
Decommissioning of the Sets Sub-plan <i>Subsidiary to Transition-out Plan</i>		8.4.4	Draft		Critical Design Review	As required when changes occur

Title	Conditions of Contract clause(s)	Contract Management Requirements clause(s)	Level of detail required at Contractual Close	Initial draft required	Complete document required	Review frequency
Technical Support Continuity Sub-plan <i>Subsidiary to Transition-out Plan</i>		8.4.5	Draft		Critical Design Review	As required when changes occur
<b>Through Life Support suite</b>						
Through Life Support Plan (incorporating asset management philosophy; availability requirements process; Defect reporting; procedures for use of RailCorp facilities; passenger amenity maintenance approach; Graffiti and Vandalism management process; Simulators currency maintenance process; Scheduled Maintenance management process; Unscheduled Maintenance management process; fleet condition audit management process; operations support procedures; KPI reporting process) <i>Subsidiary to Contract Management Plan</i>	1 9 23	1.2 9.1 9.2 9.3 9.4.2 9.4.4 9.4.6 9.5 9.6 9.7 9.7 9.8 9.9 9.10	Complete			SDR, PDR, CDR, then annually or as required when changes occur

<b>Title</b>	<b>Conditions of Contract clause(s)</b>	<b>Contract Management Requirements clause(s)</b>	<b>Level of detail required at Contractual Close</b>	<b>Initial draft required</b>	<b>Complete document required</b>	<b>Review frequency</b>
Interface Protocols <i>Subsidiary to Through Life Support Plan</i>	23.4	9.4.1	Draft		Critical Design Review	Annually or as required when changes occur
Certificates of Readiness <i>Subsidiary to Through Life Support Plan</i>		9.4.3	Draft		Critical Design Review	As required when changes occur
Handover and pick-up protocols <i>Subsidiary to Through Life Support Plan</i>		9.4.5	Draft		Three months before Practical Completion of the Maintenance Facility Works	Annually or as required when changes occur
Incident Response Plan <i>Subsidiary to Through Life Support Plan</i>		9.4.7	Draft		Three months before Practical Completion of the Maintenance Facility Works	Annually or as required when changes occur
Maintenance Facility Asset Management Plan <i>Subsidiary to Through Life Support Plan</i>		9.11	Draft		3 months before Practical Completion of the Maintenance Facility Works	Annually or as required when changes occur

## ATTACHMENT 2 – WORK BREAKDOWN STRUCTURE

WBS ELEMENT NUMBER	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
PPP.01	PPP train			
PPP.01.01		Body		
PPP.01.01.01			Shell	
PPP.01.01.02			Underframe	
PPP.01.01.03			External fittings	
PPP.01.01.04			Internal fittings	
PPP.01.01.05			Windows	
PPP.01.01.06			Crew emergency equipment	
PPP.01.01.07			Drains	
PPP.01.01.08			Seats	
PPP.01.01.09			Hatches	
PPP.01.01.10			(not used)	
PPP.01.01.11			Signage	
PPP.01.02		Bogie		
PPP.01.02.01			Frame assembly (motor car and trailer car)	
PPP.01.02.02			Primary suspension	
PPP.01.02.03			Secondary suspension system	
PPP.01.02.04			Axle box	
PPP.01.02.05			Wheel and axle	
PPP.01.02.06			Motor and gear box mount	
PPP.01.02.07			Piping assembly	
PPP.01.02.08			Sanding equipment	
PPP.01.03		Intercar connectors		
PPP.01.03.01			Automatic coupler	

WBS ELEMENT NUMBER	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
PPP.01.03.02			Semi-permanent coupler	
PPP.01.03.03			Emergency coupler	
PPP.01.03.04			Intercar gangway	
PPP.01.03.05			Intercar electrical connections	
PPP.01.03.06			Intercar air hoses	
PPP.01.04		Door systems		
PPP.01.04.01			Terminal end door	
PPP.01.04.02			Crew body side door	
PPP.01.04.03			Crew transverse door (cab/saloon security)	
PPP.01.04.04			Passenger bodyside door	
PPP.01.04.05			Intermediate end door	
PPP.01.04.06			Saloon transverse door	
PPP.01.04.07			Crew internal door (other)	
PPP.01.04.08			(not used)	
PPP.01.04.09			Emergency Access Ramp	
PPP.01.05		Braking systems		
PPP.01.05.01			Safety apparatus	
PPP.01.05.02			Brake controller	
PPP.01.05.03			Automatic	
PPP.01.05.04			Electro pneumatic unit	
PPP.01.05.05			Anti skid	
PPP.01.05.06			Parking brake	

<b>WBS ELEMENT NUMBER</b>	<b>LEVEL 1</b>	<b>LEVEL 2</b>	<b>LEVEL 3</b>	<b>LEVEL 4</b>
PPP.01.05.07			Brake cylinders	
PPP.01.05.08			Brake rigging	
PPP.01.05.09			Brake piping and hoses	
PPP.01.05.10			Filters and strainers	
PPP.01.05.11			Guard's emergency brake cock	
PPP.01.06		Pneumatics (air delivery and supply)		
PPP.01.06.01			Main air compressor	
PPP.01.06.02			Pantograph air compressor	
PPP.01.06.03			Compressor control governor	
PPP.01.06.04			Cocks and valves	
PPP.01.06.05			Air drier filter system	
PPP.01.06.06			Reservoir	
PPP.01.06.07			Pressure switch	
PPP.01.06.08			Hoses and pipework	
PPP.01.06.09			(not used)	
PPP.01.07		Auxiliary equipment		
PPP.01.07.01			Windscreen wipers	
PPP.01.07.02			Windscreen washer	
PPP.01.07.03			Air horn	
PPP.01.07.04			Bell (body)	
PPP.01.07.05			Fire protection equipment	
PPP.01.08		Climate control		
PPP.01.08.01			Air conditioner module (passenger)	
PPP.01.08.02			Crew heat	

WBS ELEMENT NUMBER	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
PPP.01.08.03			Duct work	
PPP.01.08.04			Air conditioning module (crew)	
PPP.01.09		Traction systems		
PPP.01.09.01			Traction motor	
PPP.01.09.02			Traction high tension elements	
PPP.01.09.03			Traction control systems	
PPP.01.09.04			Drive train	
PPP.01.10		Auxiliary power supply		
PPP.01.10.01			Static inverter	
PPP.01.10.02			Batteries	
PPP.01.10.03			Battery charger	
PPP.01.10.04			Shore supply	
PPP.01.10.05			Supply set	
PPP.01.10.06			Motor alternator	
PPP.01.10.07			Cab air conditioner power supply unit (APSU)	
PPP.01.10.08			Auxiliary relay	
PPP.01.10.09			(not used)	
PPP.01.11		Main power supply		
PPP.01.11.01			Pantograph	
PPP.01.11.02			Auxiliary high tension switch	
PPP.01.11.03			Auxiliary contactor	
PPP.01.11.04			High speed circuit breaker	
PPP.01.11.05			No volt supply system	
PPP.01.11.06			Compressor supply	
PPP.01.11.07			(not used)	

WBS ELEMENT NUMBER	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
PPP.01.11.08			Earth return axle cap	
PPP.01.11.09			Earth return	
PPP.01.11.10			Lightning arrestor/surge diverter	
PPP.01.12		Lighting		
PPP.01.12.01			Saloon lights	
PPP.01.12.02			Crew lights	
PPP.01.12.03			Headlight/foglight	
PPP.01.12.04			Marker and ancillary lights	
PPP.01.12.05			(not used)	
PPP.01.12.06			Passenger exit light	
PPP.01.13		Indicators, control and monitoring systems		
PPP.01.13.01			Driver's interface	
PPP.01.13.02			Guard's interface	
PPP.01.13.03			Indicators	
PPP.01.13.04			Destination indicator	
PPP.01.13.05			Train management system/train operating system	
PPP.01.13.06			Speedometer sender and cable	
PPP.01.13.07			Automatic train control	
PPP.01.13.08			Data logger	
PPP.01.13.09			(not used)	
PPP.01.14		Communications		
PPP.01.14.01			Metronet radio	

<b>WBS ELEMENT NUMBER</b>	<b>LEVEL 1</b>	<b>LEVEL 2</b>	<b>LEVEL 3</b>	<b>LEVEL 4</b>
PPP.01.14.02			Country net radio	
PPP.01.14.03			Public address	
PPP.01.14.04			Inter comm	
PPP.01.14.05			Passenger emergency	
PPP.01.14.06			Digital voice announcements	
PPP.01.14.07			AEI tags	
PPP.01.14.08			Telephone	
PPP.01.14.09			Global positioning system	
PPP.01.15		(not used)		
PPP.01.16		(not used)		
PPP.01.17		Crew & passenger amenities		
PPP.01.17.01			Crew amenities	
PPP.01.17.02			Passenger amenities	
PPP.01.17.03			Wheelchair boarding ramp	
PPP.02	Project management			
PPP.02.01		Project control and administration		
PPP.02.01.01			Project Planning	
PPP.02.01.02			Programme Management	
PPP.02.01.03			Risk Management	
PPP.02.01.04			Subcontract Management	
PPP.02.01.05			Reports and Meetings	
PPP.02.02		Quality management		
PPP.02.02.01			Planning	
PPP.02.03		Systems Assurance		

WBS ELEMENT NUMBER	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
PPP.02.03.01			Planning and reporting	
PPP.02.03.02			Configuration management	
PPP.02.03.03			Design management	
PPP.02.03.04			Technical reviews	
PPP.02.03.05			Reliability program	
PPP.02.03.06			Safety program	
PPP.02.03.07			Verification and test	
PPP.02.04		Integrated support		
PPP.02.04.01			Planning	
PPP.02.04.02			Maintenance	
PPP.02.04.03			Spares	
PPP.02.04.04			Manuals	
PPP.02.04.05			Support equipment	
PPP.02.04.06			Training	
PPP.02.04.07			Integrated support database	
PPP.03	RailCorp Enabling Works			
PPP.03.01		Design		
PPP.03.01.01			Coordinated design brief (SDR)	
PPP.03.01.02			Master plan	
PPP.03.01.03			Approval of master plan	
PPP.03.01.04			Design development and design reviews (PDR, CDR)	
PPP.03.01.05			Confirmation of coordination	

<b>WBS ELEMENT NUMBER</b>	<b>LEVEL 1</b>	<b>LEVEL 2</b>	<b>LEVEL 3</b>	<b>LEVEL 4</b>
PPP.03.01.06			Authority Approvals	
PPP.03.01.07			Information and advice required from RailCorp	
PPP.03.02		On-site works		
PPP.03.02.01			Site establishment	
PPP.03.02.02			RailCorp Enabling Works	
PPP.03.02.03			Works required by others	
PPP.03.02.04			Services relocation and capping	
PPP.03.02.05			Site remediation	
PPP.03.02.06			Earthworks	
PPP.03.02.07			Retaining structures	
PPP.03.02.08			Utility services	
PPP.03.02.09			Site services	
PPP.03.02.10			Trackwork	
PPP.03.02.11			Overhead wiring	
PPP.03.02.12			Signalling	
PPP.03.02.13			Communications	
PPP.03.02.14			Roads, paths and car parks	
PPP.03.02.15			Fencing and security	
PPP.03.02.16			Landscaping	
PPP.03.02.17			Interface works with adjoining properties	
PPP.03.02.18			Interface works with RailCorp	
PPP.03.02.19			Arrivals and departures nest	

WBS ELEMENT NUMBER	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
PPP.03.02.22			Practical Completion of Maintenance Facility Works necessary for PPP Co to commence operations	
PPP.03.03		Wheel profile facility		
PPP.03.03.01			Site establishment	
PPP.03.03.02			Detailed earthworks	
PPP.03.03.03			Substructure	
PPP.03.03.04			Building structure	
PPP.03.03.05			Building cladding and finishes	
PPP.03.03.06			Profiling plant and equipment	
PPP.03.03.07			Testing, commissioning and completion	
PPP.04	Maintenance Facility			
PPP.04.01		Design		
PPP.04.01.01			Design brief (SDR)	
PPP.04.01.02			Coordination with RailCorp Enabling Works	
PPP.04.01.04			Design development	
PPP.04.01.05			Design reviews (PDR, CDR)	
PPP.04.01.06			Confirmation of coordination	
PPP.04.01.07			Authority Approvals	
PPP.04.01.08			Information and advice required from RailCorp	

WBS ELEMENT NUMBER	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
PPP.04.02		Construction		
PPP.04.02.01			Works by others	
PPP.04.02.02			Site establishment	
PPP.04.02.03			Footings and foundations	
PPP.04.02.04			Substructure	
PPP.04.02.05			Structure	
PPP.04.02.06			Cladding	
PPP.04.02.07			Finishes	
PPP.04.02.08			Fit out	
PPP.04.02.09			Services	
PPP.04.02.10			Special equipment	
PPP.04.02.11			Testing and commissioning	
PPP.04.02.12			Authority Approvals	
PPP.04.02.13			Practical Completion	
PPP.05	Simulator			
PPP.05.01		Driver's simulator		
PPP.05.01.01			Vision system	
PPP.05.01.02			Train performance display	
PPP.05.01.03			Audio system	
PPP.05.01.04			Radio/intercom system	
PPP.05.01.05			CCTV	
PPP.05.01.06			Procedural trainer	
PPP.05.02		Guard's simulator		
PPP.05.02.01			Audio system	
PPP.05.02.02			Radio/intercom system	
PPP.05.02.03			CCTV	

<b>WBS ELEMENT NUMBER</b>	<b>LEVEL 1</b>	<b>LEVEL 2</b>	<b>LEVEL 3</b>	<b>LEVEL 4</b>
PPP.05.02.04			Procedural trainer	
PPP.05.03		Simulator control system		
PPP.05.03.01			Training session control system	
PPP.05.03.02			Training session management system	
PPP.05.03.03			Recording and replay system	
PPP.05.04		Part task simulator		
PPP.05.04.01			Part task training tool	
PPP.05.05		System support		
PPP.05.05.01			User manuals	
PPP.05.05.02			Maintenance and support	
PPP.06	Transition			
PPP.06.01		Transition In		
PPP.06.01.01			Support	
PPP.06.01.02			Operations Mobilisation	
PPP.06.01.03			Training Management	
PPP.06.01.04			Interface Protocol Refinement	
PPP.06.01.05			Transition Stabling	
PPP.06.01.06			Communications	
PPP.06.02		Transition Out		
PPP.06.02.01			Support	
PPP.06.02.02			Staff Outplacement	
PPP.06.02.03			Maintenance Facility handover	
PPP.06.02.04			Decommissioning of Sets	

<b>WBS ELEMENT NUMBER</b>	<b>LEVEL 1</b>	<b>LEVEL 2</b>	<b>LEVEL 3</b>	<b>LEVEL 4</b>
PPP.06.02.05			Technical support	
PPP.07	Through Life Support			
PPP.07.01		Maintenance & Repair		
PPP.07.02		Wheel Profiling		
PPP.07.03		Help Desk Support		
PPP.07.04		Incident Response		
PPP.07.05		Depot cleaning		
PPP.07.06		Out Depot cleaning		
PPP.07.07		Operations services		
PPP.07.08		Technical services		
PPP.07.09		Training		
PPP.07.10		Documentation and manuals		
PPP.07.11		Support equipment		
PPP.07.12		Maintenance Management Information System		
PPP.07.13		Simulator Support		
PPP.07.14		Facility Maintenance		
PPP.07.15		Reimbursable TLS		

## ATTACHMENT 3 – NOT USED

## ATTACHMENT 4 – MINIMUM DESIGN SUBMISSION REQUIREMENTS

This schedule represents a list of requirements that must be included in PPP Co design submissions and the items included are additional to any requirements included in the RailCorp Train Performance Specification

Each submission must be developed to a level of detail and completeness commensurate with the Technical Review stage concerned. At CDR, each submission must be complete and must form part of the Final Design Documentation.

	Clause in RailCorp Train Performance Specification	Clause Heading	Clause Description	SDR	PDR	CDR
Deed of Variation No.1, Schedule 1	General	Prototypes, Pilot Lots and Samples	<p>Unless RailCorp agrees otherwise during PDR, PPP Co must provide functioning prototypes of the following equipment:</p> <ul style="list-style-type: none"> <li>a) Train Operating System, (basic operation that will be subject to stages of further development during the design process).</li> <li>b) Event Recorder;</li> <li>c) remote latching Trip Gear;</li> <li>d) Passenger Emergency Intercom;</li> <li>e) destination indicators, both internal and external;</li> <li>f) Digital Voice Annunciator;</li> <li>g) Intercar door control;</li> <li>h) Emergency Door Release;</li> <li>i) wheelchair boarding ramp;</li> <li>j) end detrainment ramp;</li> <li>k) Seats including Saloon, tip-up and Crew seats;</li> <li>l) CCTV Camera Systems.</li> </ul>	✗	X	<u>X</u>

	Clause in RailCorp Train Performance Specification	Clause Heading	Clause Description	SDR	PDR	CDR
Deed of Variation No.1, Schedule 1	General	Software	<p>PPP Co must confirm the following:</p> <p>a) the software to be developed or modified for use in the Set;</p> <p>b) previous experience with the development, application and support of similar software;</p> <p>c) the programming languages to be used, including interpreters, compilers, databases and 4GLs;</p> <p>d) the software development environment, including hardware and software components.</p> <p>e) whether all aspects of the communications protocol and data transfer are totally open for other equipment suppliers to use without license fees or other charges, and if not, the details of license fees or other charges.</p>	X	<u>X</u>	<u>X</u>
Deed of Variation No.1, Schedule 1	2.1	Standards to be used	PPP Co must propose suitable recognised national or international standards for acceptance by RailCorp where no standards relevant to the requirements are indicated in the Train Performance Specification.	X	X	<u>X</u>
Deed of Variation No.1, Schedule 1	2.1	Alternative Standards	If PPP Co wishes to use alternative standards a list of relevant standards and clauses must be provided to RailCorp for review.	X	X	<u>X</u>

	Clause in RailCorp Train Performance Specification	Clause Heading	Clause Description	SDR	PDR	CDR
Deed of Variation No.1, Schedule 1	3.2.3	Material and End of Life Disposal	<p>PPP Co must advise, which items are considered capable of being recycled, a component cost to de-commission the train including an estimate of labour and resources required to disassemble, recycle or scrap. The estimate must be current day dollars. These requirements must be reviewed and confirmed at the CDR.</p> <p>PPP Co must advise the need for the disposal of any toxic or hazardous materials during the de-commissioning of the Set.</p> <p>PPP Co must supply a trade-off study to support the use of toxic or hazardous materials for the Set during its life cycle. PPP Co's proposed methods for the use of such materials and any changes to such proposed methods must be submitted to RailCorp for review.</p>	✗	<u>X</u>	X
Deed of Variation No.1, Schedule 1	4.5	Rolling Stock Outline	The theoretical maximum Kinematic Rolling Stock Outline of each car type under the stated operating conditions, including the calculation and assumptions must be provided.	✗	<u>X</u>	<u>X</u>
	5.2.1	Energy Consumption	PPP Co must confirm the energy consumption of the proposed Set design.	X	X	X
Deed of Variation No.1, Schedule 1	6.2.1	Mass	PPP Co must conduct a trade-off study to demonstrate how the overall train mass can be minimised. PPP Co must submit the trade-off study and declare the expected mass configuration.	X	X	<u>X</u>

	Clause in RailCorp Train Performance Specification	Clause Heading	Clause Description	SDR	PDR	CDR
	6.2.8	Passenger Seats	<p>PPP Co must provide an assessment report of all seating for review by RailCorp. This assessment must ensure that the design of the seats addresses each of the following:</p> <ul style="list-style-type: none"> <li>a) ergonomics, comfort and maximising seat space and access,</li> <li>b) maintainability, including cleanability</li> <li>c) reliability,</li> <li>d) Vandalism and Graffiti resistance,</li> <li>e) aesthetics, including with respect to the livery of the Set, and</li> <li>f) trade-offs between cost, durability, longevity and each of the above throughout its operating life.</li> </ul>		X	X
Deed of Variation No.1, Schedule 1	6.2.10	Flooring	Proposals for flooring including details adjacent to stairs, doors and other potential hazards for cues, both visual and textual must be submitted for review.		X	<u>X</u>
Deed of Variation No.1, Schedule 1	6.2.14	Design Loads	Detailed calculations associated with all load cases must be submitted for review to RailCorp.	✗	X	<u>X</u>
Deed of Variation No.1, Schedule 1	6.2.15	Car body Fatigue Life Evaluation	PPP Co must supply a complete FEA model of the Car body and other Car body structural components, together with loadings, stress concentrations and fatigue analysis generally as detailed in Appendix E.	✗	<u>X</u>	X
Deed of Variation No.1, Schedule 1	6.2.18	Centre of Gravity and Roll Centre	PPP Co must nominate and show by full analysis the location of the centre of gravity and roll centre of each car type under AW0 and AW3 loaded conditions.		X	<u>X</u>

	Clause in RailCorp Train Performance Specification	Clause Heading	Clause Description	SDR	PDR	CDR
Deed of Variation No.1, Schedule 1	6.2.21	Livery	The external appearance, signage and livery of Set must be submitted for review.	X	X	<u>X</u>
	6.2.22	Vehicle and Major Component Identification and Labelling	The design, location and legends of all signage must be submitted to RailCorp for review. Character fonts must be submitted for review.			X
Deed of Variation No.1, Schedule 1	6.2.23	Protective Coating	PPP Co must provide for acceptance by RailCorp, samples which reflect the agreed quality standards of flatness, surface finish, maximum allowable local defect, attachment methods applicable to external and internal panels and fixtures.		X	<u>X</u>
Deed of Variation No.1, Schedule 1	6.4.7	Bogie Fatigue Life Evaluation	PPP Co must supply a complete FEA model of the bogie and other bogie structural components, together with loadings, stress concentrations and fatigue analysis generally as detailed in Appendix E.	✗	<u>X</u>	X
Deed of Variation No.1, Schedule 1	6.4.4	Curving Performance	Details of positive features specifically included to minimise wheel squeal when negotiating curves. The expected performance of these features must be verified by simulation methods to ensure their effectiveness.	✗	X	<u>X</u>
	6.4.8	Listing and Justification of Applied Bogie Loads	PPP Co must identify and describe all bogie loads, including bogie to body connection loads, used during the design. The descriptions must include the basis for nominating the particular values adopted.			X
Deed of Variation No.1, Schedule 1	6.4.9	Axleboxes and Bearings	PPP Co must advise the proposed methodology to prevent axlebox bearings from overheating for review. This should include methods to monitor axlebox temperatures if provided.	X	X	<u>X</u>

	Clause in RailCorp Train Performance Specification	Clause Heading	Clause Description	SDR	PDR	CDR
Deed of Variation No.1, Schedule 1  <u>RFTA</u> <u>00337</u>	6.4.14	Ride	<p>A graph showing theoretical maximum curving force versus curve radius (down to 200m) for superelevation deficiencies of 75, 110, 140 and 175mm for all car types must be supplied.</p> <p>The calculations, including formulae and examples on which the graph is based must also be provided.</p> <p>PPP Co must provide a detailed simulation of the ride qualities including the following:</p> <p>a) dynamic loads and their effect on bogie performance,</p> <p>b) wheel unloading, curving performance and stability;</p> <p>The above simulations must be performed at various speeds and passenger loadings using the track data supplied by RailCorp covering a range of track, varying from straight track to 200m curves. <u>Alternative sources of data may be proposed supported by a technical justification for their use.</u></p>		X	X (Priority)
Deed of Variation No.1, Schedule 1	6.7.3.6	Intercar Door Obstruction Detection System	PPP Co must provide calculations to show that intercar doors meet the same injury avoidance requirement as for bodyside Passenger doors.	✗	<u>X</u>	X
Deed of Variation No.1, Schedule 1	6.7.4.2	Door open when running	Where the design of the Crew doors would result in the car width exceeding the kinematic envelope with the doors open, PPP Co must advise the details of the dimensions.	✗	<u>X</u>	X
	6.8	Crashworthiness	Validation of crashworthiness at all speed ranges must be fully verified by computer simulation modelling of the structural behaviour / collapse, using 2D and 3D, static and dynamic, linear and non-linear models and loadings for review.			X

	Clause in RailCorp Train Performance Specification	Clause Heading	Clause Description	SDR	PDR	CDR
Deed of Variation No.1, Schedule 1	6.9.2	Fire Resistance and Toxicity	Toxicity values, and the quantity and location of each material used must be provided for review.		<u>X</u>	X
Deed of Variation No.1, Schedule 1	6.11.1	Cleaning Materials	The cleaning materials proposed for use on the Set interior must be submitted for acceptance by RailCorp.		X	<u>X</u>
	6.12	Corporate Information and Advertising	The design, location and legends of all signage must be submitted to RailCorp for review. Character fonts must be submitted for review.			X
Deed of Variation No.1, Schedule 1	7.3.3	Power/Brake Controller	Details of the feature that permits the Driver to test the holding power of the friction brake system by the application of a full service EP brake whilst allowing the Driver to apply up to full tractive power.		X	<u>X</u>
	7.4	Train Operating System	PPP Co must provide a schedule of the signals monitored or controlled by the TOS, including: a) the name and description of the signal, b) the source of the signal, c) the type of signal (e.g. analog or digital) and the range of possible values which may be recorded or displayed, d) the normal state or range of the signal, e) details of the alarms and messages generated by the signal.		X	X
	7.4	Train Operating System	A fully functioning sample of the TOS must be provided by PPP Co for review of the proposed system including the ability of the Driver to interrogate various levels of the TOS while the train is moving.		X	X

	Clause in RailCorp Train Performance Specification	Clause Heading	Clause Description	SDR	PDR	CDR
	7.6	Event Recorder	A Reliability assessment in accordance with Military Handbook MIL-HDBK-217E must be provided for the Event Recorder System.			X
	8.1	EMC	Set electromagnetic emissions, radiation and immunity shall be in accordance with the requirements of SC0018 00 00 SP, EN 50121 and ENV 50166.	X	X	X
Deed of Variation No.1, Schedule 1	8.3	High Speed Circuit Breaker	The details of the High Speed Circuit Breaker and arc box design must be submitted.		X	<u>X</u>
	9.2.4	EAPS Batteries	The timing of equipment power down after loss of OHW power must be submitted for review.		X	X
Deed of Variation No.1, Schedule 1	9.4.1	EAPS Protection	PPP Co must nominate the fault conditions to be detected, the protection devices used, setpoints and time delays and submit this information for review.		<u>X</u>	X
Deed of Variation No.1, Schedule 1	9.7.9	Piping	PPP Co to submit a piping schedule identifying all piping locations and materials.	✗	X	<u>X</u>
Deed of Variation No.1, Schedule 1	9.16	Guard's Blue Light	PPP Co must supply the colour to be used.	✗	<u>X</u>	X
Deed of Variation No.1, Schedule 1	9.25	Heating Ventilation and Air Conditioning	The air velocity impinging on standing passengers must be advised.		X	<u>X</u>

	Clause in RailCorp Train Performance Specification	Clause Heading	Clause Description	SDR	PDR	CDR
Deed of Variation No.1, Schedule 1	9.25.14	Condensation	The proposed design features to minimise the formation of condensation must be submitted.	✗	X	<u>X</u>
Deed of Variation No.1, Schedule 1	10.2.18	50 Hz Detection System	Details of the design of the 50 Hz line ripple current detector including ripple current detection level and time period settings.		<u>X</u>	X
Deed of Variation No.1, Schedule 1	10.3	Braking	Brake simulations to show that the most suitable trade-off for brake disc material, pad composition, performance and life cycle cost is provided.	X	X	<u>X</u>
Deed of Variation No.1, Schedule 1	10.3.15.2	Emergency Brake	PPP Co must state the pressure at which the Automatic Emergency Brakes are fully applied.		<u>X</u>	X
Deed of Variation No.1, Schedule 1	10.4	Wheel Slide Protection	PPP Co must nominate the WSP system and provide on-train or test rig simulation report for review.	✗	<u>X</u>	<u>X</u>
	11.1.2	Communications Requirement Protection	For each protection device the operating values, any time delays and the means of detecting the fault must be provided for review.			X
	11.7	Door Warning Device	PPP Co must submit details of the Door Closing Warning tone.			X

	Clause in RailCorp Train Performance Specification	Clause Heading	Clause Description	SDR	PDR	CDR
Deed of Variation No.1, Schedule 1	11.11	Digital Voice Annunciator	PPP Co must demonstrate the messages, chimes, volume levels and tones for review. PPP Co must provide text of the DVA messages.		<u>X</u>	X
Deed of Variation No.1, Schedule 1	11.13	Data Link	The international standards used for the data link system interface must be detailed by PPP Co and submitted.	X	X	<u>X</u>
Deed of Variation No.1, Schedule 1	13.2	Driver Only Operation	<p>PPP Co must describe the provisions for one-person operation of the Set addressing:</p> <ul style="list-style-type: none"> <li>a) Driver's ability to monitor and operate doors,</li> <li>b) ability to view the entire train - platform interface;</li> <li>c) passenger safety while boarding or leaving the Set,</li> <li>d) passenger security,</li> <li>e) train preparation and continuity tests,</li> <li>f) Driver's operation of announcements inside and outside the Set,</li> <li>g) ability of passengers to communicate with the Driver, and vice-versa,</li> <li>h) safe and ergonomic access to the controls used during normal operation of the train,</li> <li>i) safe operation of the train in the event of an accident,</li> <li>j) receiving of video signals from on-board cameras,</li> <li>k) modifications necessary to receive and process video signals from equipment on the platform.</li> </ul>	X	<u>X</u>	<u>X</u>

	Clause in RailCorp Train Performance Specification	Clause Heading	Clause Description	SDR	PDR	CDR
Deed of Variation No.1, Schedule 1	13.2	<del>Future Provision- External Surveillance</del>	<del>Full details of all installation procedures for all items to be installed later to complete the external surveillance system must be submitted for review.</del>	X		X
Deed of Variation No.1, Schedule 1	13.3	Spare Cables and Wiring	Spare wiring provisions to be detailed.	X	<u>X</u>	X
Deed of Variation No.1, Schedule 1	13.9	Future Train Protection and Automatic Train Control	Advise likely space requirements and possible integration methods with potential Automatic Train Control (ATO and ATP) equipment.	X	<u>X</u>	X
	Appendix V	Acceleration Performance	For both performance characteristics in Appendix V, the expected achievable speeds in a 5 km, 10 km, and 15 km long tunnel based on a residual acceleration level of 0.05m/s <sup>2</sup> must be confirmed at SDR and subsequent reviews, for  Single track tunnel of 36 m <sup>2</sup> cross section Single track tunnel of 58 m <sup>2</sup> cross section Double track tunnel of 67 m <sup>2</sup> cross section.  These tabulations must be provided for gradients of 1 in 30, 1 in 40, 1 in 50 and 1 in 60.	X	X	X

## ATTACHMENT 5 – KEY PERSONNEL

The tables below indicate the Key Personnel defined in clause 2.8 of the Contract Management Requirements to be employed by PPP Co and the Core Contractors respectively.

<b>Key Personnel employed by PPP Co</b>				
	<b>Name</b>	<b>Position</b>	<b>Responsibilities</b>	<b>Position Description Attributes</b>
Deed of Variation No.3, Schedule 2	<del>Greg Pauline</del> <u>Terry Kearney</u>	Project Manager	Full executive authority on behalf of PPP Co to manage the Project as a whole, and to direct the sequence and timing of all activities undertaken by all personnel reporting to the Project Manager	The Project Manager shall be highly experienced in the management of major rolling stock development projects.  <b>Years of relevant experience:</b> 15  <b>Qualification:</b> Relevant engineering or management degree with post graduate management training, or equivalent  <b>Professional status:</b> Status enabling full membership of Engineers Australia, or equivalent
Deed of Variation No.3, Schedule 2	<del>Thomas Lau</del> <u>Graeme Bell</u>	Financial Controller	Full executive authority on behalf of PPP Co to manage financial matters for the Project as a whole	The Financial Controller shall be highly experienced in financial management of major multi disciplinary projects.  <b>Years of relevant experience:</b> 15  <b>Qualification:</b> Relevant degree in finance, commerce or economics, or equivalent  <b>Professional status:</b> Status enabling full membership of the Institute of Chartered Accountants in Australia, or equivalent

**Key Personnel employed by PPP Co**

Deed of Variation No.3, Schedule 2

Name	Position	Responsibilities	Position Description Attributes
Andrew Phillip	Safety Compliance and Accreditation Manager	Full executive authority on behalf of PPP Co to manage safety compliance matters for the Project as a whole, and to manage all aspects of Accreditation and PPP Co's obligations in respect of RailCorp's Accreditation Variation, including Safety Assurance Reports for submission to RailCorp	<p>The Safety Compliance Accreditation Manager shall be highly experienced in safety management, safety compliance and safety accreditation with respect to major railway projects</p> <p><b>Years of relevant experience: 15</b></p> <p><b>Qualification:</b> Relevant engineering or management degree, or equivalent</p> <p><b>Professional status:</b> Status enabling full membership of Engineers Australia, or equivalent. Qualified to enable membership as a Member of the Safety and Reliability Society.</p>
Stephen Myers	Programme Manager	Full executive authority on behalf of PPP Co to manage project programme matters for the Project as a whole	<p>The Programme Manager shall be experienced in the dynamic programming of multi disciplinary major projects.</p> <p><b>Years of relevant experience: 10</b></p> <p><b>Qualification:</b> Relevant engineering or management degree, or equivalent</p>

Deed of Variation No.3, Schedule 2

**Key Personnel employed by PPP Co**

	Name	Position	Responsibilities	Position Description Attributes
Deed of Variation No.3, Schedule 2	[ ]	Project Controls Manager	Full executive authority on behalf of PPP Co to manage project control matters for the Project as a whole	The Project Controls Manager shall be highly experienced in control, management and implementation for major rail Projects <b>Years of relevant experience: 10</b> <b>Qualification:</b> Relevant engineering or management degree with post graduate studies in business administration, or equivalent.
Deed of Variation No.3, Schedule 2	[ ] <u>David Stone</u>	Documentation Manager	Full executive authority on behalf of PPP Co to manage documentation matters for the Project as a whole	The Documentation Manager shall be experienced in manual and automated documentation control systems and shall have applied these skills to previous major multi disciplinary projects. <b>Years of relevant experience: 10</b> <b>Qualification:</b> Relevant engineering or management degree, or equivalent
Deed of Variation No.3, Schedule 2	[ ] <u>David Jehan</u>	Configuration Manager	Full executive authority on behalf of PPP Co to manage Configuration matters for the Project as a whole	The Configuration Manager shall be experienced in manual and automated configuration control systems and shall have applied these skills to previous major multi disciplinary projects. <b>Years of relevant experience: 10</b> <b>Qualification:</b> Relevant engineering or management degree, or equivalent

**Key Personnel employed by PPP Co**

	Name	Position	Responsibilities	Position Description Attributes
Deed of Variation No.3, Schedule 2	<p><del>Ian Mash</del>  <u>Vince Sandrone</u></p>	Systems and Contract Compliance Manager	Full executive authority on behalf of PPP Co to manage systems and contract compliance matters, including quality management, for the Project as a whole	<p>The Systems and Contract Compliance Manager shall be experienced compliance management on major infrastructure projects</p> <p><b>Years of relevant experience:</b> 10</p> <p><b>Qualification:</b> Relevant engineering or quality management degree or equivalent, with further post graduate studies in contract management</p> <p><b>Professional status:</b> Status enabling full membership of the Institute of Quality Assurance, or equivalent</p>
Deed of Variation No.3, Schedule 2	Natalie Bond	RAM Manager	Full executive authority on behalf of PPP Co to manage and implement Reliability, Availability and Maintainability requirements, for the Project as a whole	<p>The RAM Manager shall be highly experienced in the prediction, analysis, demonstration and achievement of RAM requirements with respect to major railway projects</p> <p><b>Years of relevant experience:</b> 10</p> <p><b>Qualification:</b> Relevant engineering or management degree, or equivalent</p> <p><b>Professional status:</b> Status enabling full membership of Engineers Australia, or equivalent. Qualified to enable membership as a Member of the Safety and Reliability Society.</p>

**Key Personnel employed by PPP Co**

Deed of Variation No.3, Schedule 2

Name	Position	Responsibilities	Position Description Attributes
<p>[ ] <u>Kate Burrows</u></p>	<p>Interface and Communications Manager</p>	<p>Full executive authority on behalf of PPP Co to manage interface and communications matters for the Project as a whole</p>	<p>The Interface and Communications Manager shall be experienced in interface management and communications processes proven in application on previous multi disciplinary major projects. <b>Years of relevant experience: 10</b> <b>Qualification:</b> Relevant communications degree, or equivalent</p>

Deed of Variation No.3, Schedule 2

<p>[ ]</p>	<p>Transition Manager</p>	<p>Full executive authority on behalf of PPP Co to manage transition matters for the Project as a whole, including readiness for Revenue Operation of the Sets</p>	<p>The Transition Manager shall be highly experienced on the application of project Deliverables in an operating railway environment. <b>Years of relevant experience: 10</b> <b>Qualification:</b> Relevant engineering or management degree, or equivalent</p>
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**Key Personnel employed by PPP Co's Contractors**

Name	Position	Responsibilities	Employer	Position Description Attributes
<p><del>Jerry Jirasek</del> <u>Mark Baxter</u></p>	<p>Train Engineering Design Manager</p>	<p>Full executive authority on behalf of PPP Co to approve and authorise the design of the Sets, including signing design certification</p>	<p><u>Downer</u> EDI Rail</p>	<p>The Train Engineering Design Manager shall be experienced in the management of passenger train design proven over previously successful projects.</p> <p><b>Years of relevant experience: 15</b></p> <p><b>Qualification:</b> Relevant engineering or management degree, or equivalent, with post graduate management training.</p> <p><b>Professional status:</b> Status enabling full membership of Engineers Australia, or equivalent</p>
<p>Warwick Simpson</p>	<p>Simulator Engineering Design Manager</p>	<p>Full executive authority on behalf of PPP Co to approve and authorise the design of the Simulators, including signing design certification</p>	<p><u>Downer</u> EDI Rail</p>	<p>The Simulator Engineering Design Manager shall be experienced in the management of train simulator design proven over previously successful projects.</p> <p><b>Years of relevant experience: 10</b></p> <p><b>Qualification:</b> Relevant engineering or management degree, or equivalent, with post graduate management training.</p> <p><b>Professional status:</b> Status enabling full membership of Engineers Australia, or equivalent</p>

Deed of Variation No.3, Schedule 2

Deed of Variation No.3, Schedule 2

**Key Personnel employed by PPP Co's Contractors**

Name	Position	Responsibilities	Employer	Position Description Attributes	
<p>Deed of Variation No.3, Schedule 2</p>	<p><u>Nick Loveday</u> <u>Steve Boyd</u></p>	<p>Systems Engineering Manager</p>	<p>Full executive authority on behalf of PPP Co to manage all systems engineering matters for the Project</p>	<p><u>EDI – Rail</u> <u>Downer EDI Rail</u></p>	<p>The Systems Engineering Manager shall be experienced in the management of passenger train system engineering and integration proven over previously successful projects.</p> <p><b>Years of relevant experience:</b> 15</p> <p><b>Qualification:</b> Relevant systems engineering degree with post graduate management training, or equivalent</p> <p><b>Professional status:</b> Status enabling full membership of Engineers Australia, or equivalent</p>
<p>Deed of Variation No.3, Schedule 2</p>	<p>[ ] <u>Jean-Marc Chevaugeon</u></p>	<p>Train Manufacturing Manager</p>	<p>Full executive authority on behalf of PPP Co to manage all manufacturing matters for the Sets</p>	<p>[ ] <u>Downer EDI Rail</u></p>	<p>The Train Manufacturing Manager shall be experienced in the manufacturing management of passenger train builds proven over previously successful projects.</p> <p><b>Years of relevant experience:</b> 15</p> <p><b>Qualification:</b> Relevant manufacturing engineering or management degree with post graduate management training, or equivalent</p> <p><b>Professional status:</b> Status enabling full membership of Engineers Australia, or equivalent</p>

**Key Personnel employed by PPP Co's Contractors**

Name	Position	Responsibilities	Employer	Position Description Attributes
Dr. Duncan Ward	Simulator Manufacturing Manager	Full executive authority on behalf of PPP Co to manage all manufacturing matters for the Simulators	Sydac	<p>The Simulator Manufacturing Manager shall be experienced in the manufacturing management of train simulators proven over previously successful projects.</p> <p><b>Years of relevant experience:</b> 10</p> <p><b>Qualification:</b> Relevant manufacturing engineering or management degree with post graduate management training, or equivalent.</p> <p><b>Professional status:</b> Status enabling full membership of Engineers Australia, or equivalent.</p>
Michael Brushe	Testing and Commissioning Manager	Full executive authority on behalf of PPP Co to manage all testing and commissioning matters for the Sets and the Simulators	<del>EDI – Rail</del> <u>Downer EDI Rail</u>	<p>The Testing and Commissioning Manager shall be experienced in all aspects of passenger train testing and commissioning proven over previously successful projects.</p> <p><b>Years of relevant experience:</b> 10</p> <p><b>Qualification:</b> Relevant engineering or management degree or equivalent</p> <p><b>Professional status:</b> Status enabling full membership of Engineers Australia, or equivalent.</p>

Deed of Variation No.3, Schedule 2

Deed of Variation No.3, Schedule 2

**Key Personnel employed by PPP Co's Contractors**

Name	Position	Responsibilities	Employer	Position Description Attributes	
Deed of Variation No.3, Schedule 2	Peter Edwards	Through Life Support Manager	Full executive authority on behalf of PPP Co to manage all Through Life Support matters for the Project	EDI – Rail <u>Downer EDI Rail</u>	The Through Life Support Manager shall be experienced in the maintenance of passenger trains within a multi disciplinary maintenance facility proven over previous maintenance and through life support experience  <b>Years of relevant experience:</b> 15  <b>Qualification:</b> Relevant engineering or management degree with post graduate management training, or equivalent,  <b>Professional status:</b> Status enabling full membership of Engineers Australia, or equivalent.
Deed of Variation No.3, Schedule 2	[ ] <u>Shawn Rippon</u>	Maintenance Facility Works Project Manager	Full executive authority on behalf of PPP Co to approve and authorise the design of, and to manage the construction of, civil and structural engineering aspects of the Maintenance Facility Works, including signing design certification	[ ] <u>Downer EDI Rail</u>	The Maintenance Facility Works Project Manager shall be experienced in the construction of railway maintenance facilities and buildings of a similar type.  <b>Years of relevant experience:</b> 10  <b>Qualification:</b> Relevant civil engineering degree, or equivalent.  <b>Professional status:</b> Status enabling full membership of Engineers Australia, or equivalent.

**Key Personnel employed by PPP Co's Contractors**

Name	Position	Responsibilities	Employer	Position Description Attributes	
<p>Deed of Variation No.3, Schedule 2</p>	<p>Bob Tracy</p>	<p>Maintenance Facility Works Building Services Manager</p>	<p>Full executive authority on behalf of PPP Co to approve and authorise the design of, and to manage the construction of, building services engineering aspects of the Maintenance Facility Works, including signing design certification</p>	<p>John Holland</p>	<p>The Maintenance Facility Works Building Services Manager shall be experienced in the design installation and commissioning of building services within a multi disciplinary building service team for major facilities.</p> <p><b>Years of relevant experience: 10</b></p> <p><b>Qualification:</b> Relevant electrical or mechanical engineering degree or equivalent.</p> <p><b>Professional status:</b> Status enabling full membership of Engineers Australia, or equivalent.</p>
<p>Deed of Variation No.3, Schedule 2</p>	<p><u>Brad Johnson</u></p>	<p><u>Core Contractor Project Director</u></p>	<p><u>Full executive authority on behalf of PPP Co to manage the design, manufacture and commissioning of the Rolling Stock, Maintenance Facility and Simulators.</u></p>	<p><u>Downer EDI Rail</u></p>	<p><u>The Project Director shall be highly experienced in the successful management and delivery of major rolling stock and rail related projects</u></p> <p><b><u>Years of relevant experience: 15</u></b></p> <p><b><u>Qualification:</u></b> <u>Relevant engineering degree supported by post graduate management qualifications.</u></p> <p><b><u>Professional status:</u></b> <u>Status enabling full membership of Engineers Australia, or equivalent.</u></p>

**Key Personnel employed by PPP Co's Contractors (at each manufacturing plant should train manufacturing occur outside of NSW, additional to those key personnel detailed above)**

Deed of Variation No.3, Schedule 2

Name	Position	Responsibilities	Employer	Position Description Attributes
<p>[—————]  <u>Craig Smith</u></p>	<p>CRC                      Manufacturing                      Manager</p>	<p>Full executive authority on behalf of PPP Co to manage all manufacturing matters for the Sets</p>	<p>[—————]  <u>Downer EDI Rail</u></p>	<p>The Train Manufacturing Manager shall be experienced in the manufacturing management of passenger train builds proven over previously successful projects.</p> <p><b>Years of relevant experience:</b> 15</p> <p><b>Qualification:</b> Relevant manufacturing engineering or management degree with post graduate management training, or equivalent</p> <p><b>Professional status:</b> Status enabling full membership of Engineers Australia, or equivalent</p>

**Key Personnel employed by PPP Co's Contractors (at each manufacturing plant should train manufacturing occur outside of NSW, additional to those key personnel detailed above)**

Deed of Variation No.3, Schedule 2

Name	Position	Responsibilities	Employer	Position Description Attributes
[ ]	Systems Assurance Manager	Full executive authority on behalf of PPP Co to manage and implement System Assurance, Compliance and RAM activities related to the manufacturing of the sets	[ ]	<p>The Systems Assurance Manager shall be highly experienced in application of Systems Assurance, Compliance and RAM management for rolling stock manufacture</p> <p><b>Years of relevant experience:</b> 10</p> <p><b>Qualification:</b> Relevant engineering, quality or management degree, or equivalent</p> <p><b>Professional status:</b> Status enabling full membership of Engineers Australia, or equivalent. Qualified to enable membership as a Member of the Safety and Reliability Society.</p>