This is Appendix 1 referred to in the foregoing Variation to the Franchise Agreement between The Scottish Ministers and Serco Caledonian Sleepers Limited

Appendix 1

This Appendix 1 comprises the attached 49 page updated Schedule 6.1 and 6.1A

SCHEDULE 6.1

THIS IS SCHEDULE 6.1 REFERRED TO IN THE FOREGOING FRANCHISE AGREEMENT BETWEEN THE AUTHORITY AND SERCO CALEDONIAN SLEEPERS LIMITED

Rolling Stock

1. The composition of the New Train Fleet

Subject to such fluctuations due to seasonality as the Authority may approve in writing the New Train Fleet consists of passenger rolling stock vehicles specified in New Train Fleet Table 1 with the capacity characteristics referred to there, until the lease expiry dates referred to there.

New Train Fleet Table 1

Column 1	Column 2	Column 3			Column 4	Column 5
Class of Vehicles	No of Vehicles and unit configuration	Passenger Carrying Capacity			Owner/ Lessor	Lease Expiry Date
		Berths	Cradle Seats	Total Passengers		
coach	Accessible Coach x 12	1 x PRM berth 2 x Berths 2 x double berths 1 x double PRM	N/A	Depending on configuration of beds	Caledonian Sleepers Rail Leasing	31st March 2030
coach	Seated Coach x 9	N/A	30 (plus 1 wheelchair space)	31	Caledonian Sleepers Rail Leasing	31st March 2030
coach	Sleeper Coach x 36	[6x Ensuite Berths 4 x Berths	N/A	Depending on configuration of beds	Caledonian Sleepers Rail Leasing	31st March 2030
coach	Club Car x 9		N/A	0	Caledonian Sleepers Rail Leasing	31st March 2030

2. Passenger facilities in the New Train Fleet

The New Train Fleet consists of the rolling stock vehicles in New Train Fleet Table 1 with the facilities and characteristics in New Train Fleet Table 2 until the lease expiry dates referred to in New Train Fleet Table 1.

New Train Fleet Table 2

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9
Class of Vehicles	***Internal CCTV***	***Toilets***	***Wifi***	***Bicycle and Luggage Carriage/Storage***	***Power sockets***	***Secure door lock to cabins***	***Windows for all berths/seated areas***	***Individual luggage locker for seats***
Seated Coach	Yes	Yes	Yes	Yes	Yes	N/A	Yes	Yes
Club Car	Yes	No	Yes	No	Yes	N/A	Yes	N/A
Accessible Coach	Yes (Corridor area and gangways)	Yes	Yes	Luggage storage in Cabins	Yes	Yes	Yes	N/A
Sleeper Coach	Yes (Corridor area and gangways)	Yes	Yes	Luggage storage in Cabins	Yes	Yes	Yes	N/A

2.1 Each formation shall, wherever split, include at least one EA and TSI PRM compliant Berth and toilet.

3. New Train Fleet Availability Requirement

The New Train Fleet available for service shall, subject to any fluctuations due to seasonality as the Authority may approve in writing, be no less than that identified in columns 4 and 5 of New Train Fleet Availability Table 3 below.

New Train Fleet Availability Table 3

Column 1	Column 2	Column 3	Column 4
Class of Vehicles	***Total Fleet***	***Fleet available for Passenger Services***	***Spare /Reserve /Maintenance***
Seated Coach	11	9	2
Club Car	10	9	1
Accessible Coach	14	12	2
Sleeper Coach	40	36	4

4. Project Management

4.1 The Franchisee shall manage the Project (including the design, procurement and delivery phases) with that degree of skill, diligence, prudence and foresight which would be appropriate to a train operating company experienced in the successful delivery (on time and within budget) of projects comparable to the Project. As considered appropriate by the Franchisee, the Franchisee shall employ third party consultants to assist in the delivery of the Project.

4.2 The Franchisee shall develop risk management and contingency plans in respect of the Project. Such risk management and contingency plans shall be presented by the Franchisee for the approval of the Authority (such approval not to be unreasonably withheld or delayed). Once approved, the Franchisee shall comply with such risk management and contingency plans.

4.3 The Franchisee shall carry out the tasks and activities assigned to the Franchisee under the New Train Fleet Lease and the Franchise Agreement in accordance with the Project Plan.

4.4 The Franchisee shall not, by any act or omission, prejudice the delivery of the Project Plan.

5. Contract Management and Provision of Information

5.1 In response to a reasonable request from the Authority, the Franchisee shall copy all relevant material information in respect of such request as soon as reasonably practicable to the Authority in order to enable the Authority to manage their interests in respect of the Project. Such information (including any contractual notices received or issued) may include, but not be restricted to, information in relation to any issue which may have an adverse impact on the success of the Project, the Project Plan and/or the New Train Fleet Lease (including issues associated with delivery, issues associated with infrastructure, termination, payment-related issues, design review, mock-ups, correspondence and minutes associated with the testing, certification and approval process, notification of any delays and situations where extension of time have been granted including proposals for mitigation of delays and associated costs, rectification proposals and programme in respect of epidemic defects and endemic defects, modifications to the Coaches, variations under the New Train Fleet Lease, variations which impact on the Project Plan or quality plans).

5.2 The Franchisee shall use reasonable endeavours to procure that representatives of the Authority are invited to attend any meetings in connection with the New Train Fleet Lease (including design reviews and progress meetings) and to attend any testing, commissioning or other activities associated with the New Train Fleet Lease. The Franchisee agrees to set up any meetings (as may be reasonably required by the Authority) with the Owner and/or the Manufacturer.

5.3 The Franchisee agrees to use reasonable endeavours to comply with any reasonable instructions received from the Authority in respect of the introduction of the New Train Fleet which may include the Authority requesting the Franchisee to enforce its rights pursuant to the New Train Fleet Lease or enforce any rights the Franchisee may have against third parties, at no cost to the Authority.

6. Delivery and Consents

The Franchisee shall:

6.1 use all reasonable endeavours to ensure that the New Train Fleet is delivered and brought into service in accordance with the Project Plan;

6.2 prior to delivery of the New Train Fleet, procure all necessary consents, permissions and approvals to allow it to operate and put into service the New Train Fleet including consents,

permissions and approvals from Network Rail and any other body, whether incorporated or unincorporated, whose consent, permission or approval is required;

6.3 upon request by the Authority, exhibit to the Authority all such consents, permissions and approvals referred to in this paragraph 6 and shall confirm in writing to the Authority on, or prior to, the New Train Fleet Service Date that all such consents, permissions and approvals have been obtained;

6.4 complete successfully any pre-service inspections required by Railway Group Standards or the Safety Certificate or otherwise required (including pre-service inspections for confirming acceptance of delivery under the terms of the relevant lease for the New Train Fleet) prior to putting into service the New Train Fleet. The Authority may attend any such inspections and the Franchisee shall notify the Authority of the date of any such inspections in good time to allow the Authority to arrange for a representative of the Authority to attend;

6.5 upon the reasonable request by the Authority, permit the Authority (including any advisers or authorised representatives of the Authority) to inspect all records (including financial records) of the Franchisee and the relevant leasing company (to the extent that the Franchisee is entitled to this information under the relevant lease or any other agreement with the relevant leasing company) in connection with the delivery of the New Train Fleet; and

6.6 if the date in the Project Plan for introduction of the New Train Fleet into service has passed or passes without the New Train Fleet being brought into service:-

6.6.1 not take any action(s) or step(s) which is or are designed or intended directly or indirectly to delay further the introduction of the New Train Fleet;

6.6.2 not knowingly or negligently omit to take any action or step if such omission would directly or indirectly delay further the introduction of the New Train Fleet; and

6.6.3 enforce all rights it may have against third parties to ensure the introduction of the New Train Fleet or the recovery of damages or other appropriate remedy as soon as possible thereafter and to take such action as the Authority may reasonably require in this regard.

7. Training/Rolling Stock

7.1 The Franchisee shall from time to time operate one or more of the Coaches ("Training Rolling Stock") on a non-revenue earning basis in order to train employees of the Franchisee in the safe and efficient operation of the New Train Fleet.

7.2 The operation of the Training Rolling Stock shall be at the risk of the Franchisee. For the avoidance of doubt, all operating costs (excluding the cost of any insurances) and staff training costs for the Training Rolling Stock shall be to the account of the Franchisee.

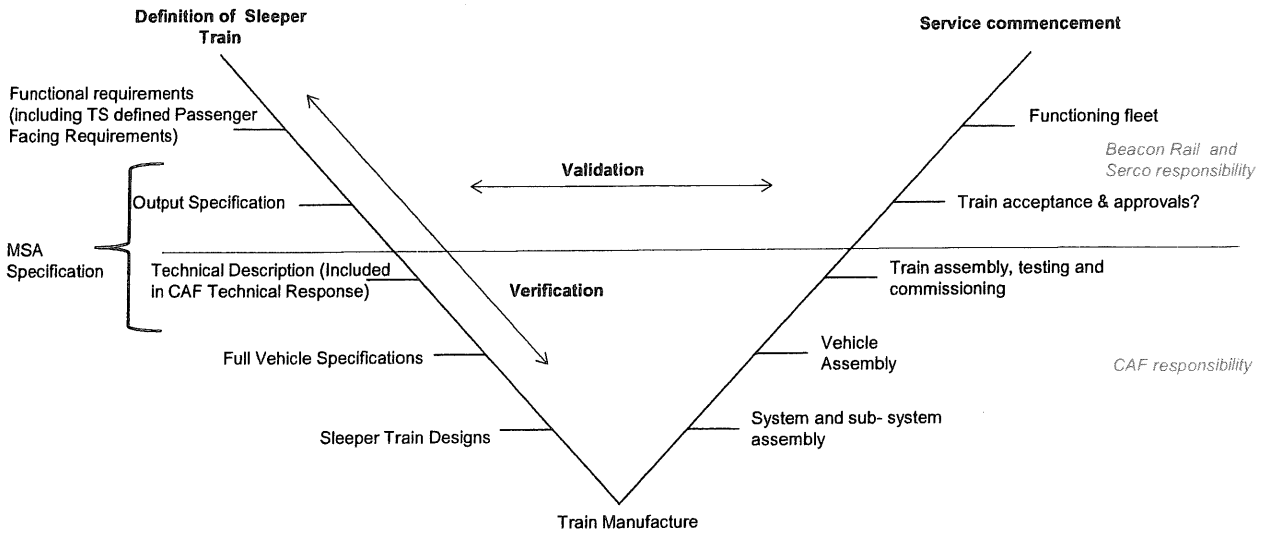
8. Direct Agreement

8.1 The Franchisee shall procure the Relevant Direct Agreements.

9 DESIGN REVIEW PROCESS

9.1 The Franchisee and the Authority wish to ensure that the design of the New Train Fleet is in accordance with the Franchise Agreement, the New Train Fleet Output Specification, the Passenger Facing Requirements and the Specification. In order to achieve this, the Franchisee shall procure that a robust design review process is included within the Manufacture and Supply Agreement (the "Design Review Process").

9.2 The Franchisee shall procure that the Design Review Process shall follow the best practice 'V' model principles described in EN 50126 (illustrated in the diagram below) which shall ensure the progressive verification and validation of the design of the New Train Fleet.



9.3 The Franchisee shall pursuant to paragraph 9.1 procure that the Design Review Process shall include:

9.3.1 the elements of the train which will be subject to design review;

9.3.2 the process for making design submissions;

9.3.3 the dates by which individual design submissions will be submitted for review;

9.3.4 the reasonable time scales for return of comments following each review and the process to be followed in terms of dealing with any comments received (including the resubmission of any revised design);

9.3.5 the subject and technical areas for which mock-ups will be included in design submissions;

9.3.6 the provision to the Authority of such additional information or materials relating to design submissions as the Authority may reasonably request;

9.3.7 if required by the Authority, procuring reasonable access for the Authority, its authorised representatives and advisors to the Franchisee's consultants and advisors engaged in relation to the design and manufacture of the New Train Fleet, the Owner and the Manufacturer, as reasonably required by the Authority to enable it to understand and review the design submissions; and

9.3.8 permitting attendance at design review meetings for the Authority, its authorised representatives and advisors.

9.4 The Authority shall be entitled to comment on any aspect of the design of the New Train Fleet. Without prejudice to the Authority's rights under paragraph 9.5, the Franchisee and the Authority shall discuss such comments and the Authority and the Franchisee shall agree (both acting reasonably) on whether any comment or objection should be raised as part of the Design Review Process. Without prejudice to the Authority's rights under paragraph 9.5, the Authority acknowledges that the Design Review Process is not intended to allow the Franchisee, the Owner or the Manufacturer to request changes to the design of the New Train Fleet, where

such changes would result in any increased costs other than de minimis increased costs or anything delays other than de minimis delays to the manufacturing programme for the New Train Fleet. Without prejudice to the Authority's rights under paragraph 9.5, if the Franchisee, the Owner or the Manufacturer request any changes which would result in increased costs or delays to the manufacturing programme for the New Train Fleet, such changes shall be subject to the variation procedure in the Manufacture and Supply Agreement.

9.5 If requested by the Authority, the Franchisee shall procure that the design of the New Train Fleet is revised, at no cost to the Authority, if:

9.5.1 the design does not comply with the Franchise Agreement, the New Train Fleet Output Specification, the Passenger Facing Requirements or the Specification; or

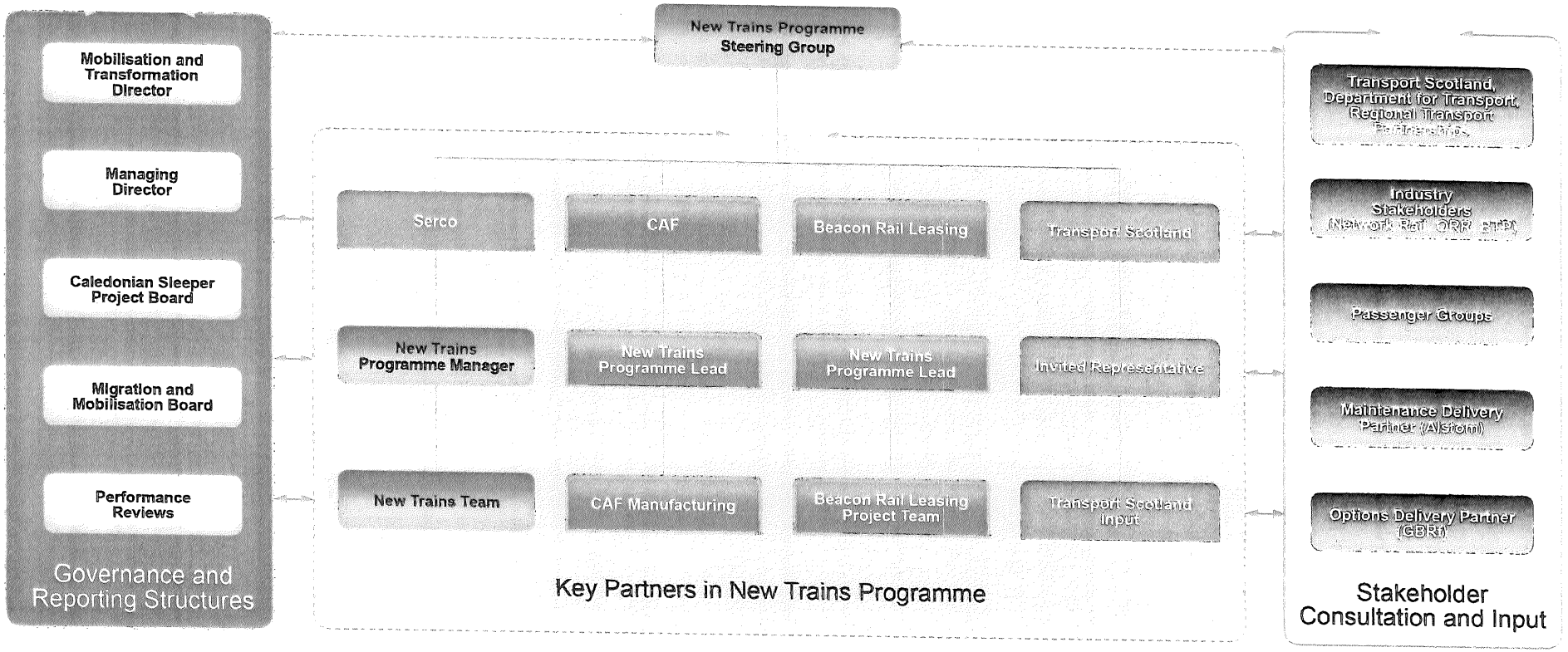
9.5.2 the Authority reasonably believes the effect of the design could mean that the Franchisee may not comply with its obligations in the Franchise Agreement.

9.6 The Franchisee shall submit advance drafts of the Design Review Process to the Authority for information on a regular basis. By no later than 1 August 2014, the Franchisee shall submit a final draft Design Review Process to the Authority for approval (such approval not to be unreasonably withheld) as soon as practicable and, in any event, within 14 days of receipt of such draft. If reasonably requested by the Authority, the Franchisee shall procure that the Design Review Process is revised and shall re-submit the revised Design Review Process to the Authority for approval as soon as practicable and, in any event, within 7 days of receipt of such revised Design Review Process.

9.7 As part of the Design Review Process, the Franchisee shall undertake comprehensive stakeholder engagement in accordance with the Governance and Programme Management diagram set out below.

9.8 As part of the Design Review Process, the Franchisee shall procure any mock ups, electronic or physical, that are necessary to enable the evaluation of designs and functionality of the Coaches. The mock ups may include breadboard mock-ups, prototypes, models and 3D visualisations. Such mock ups may be used by the Franchisee and the Authority to assess, in accordance with the Design Review Process, the final vehicle interior and schedule of finishes in combination with interior renderings and signage.

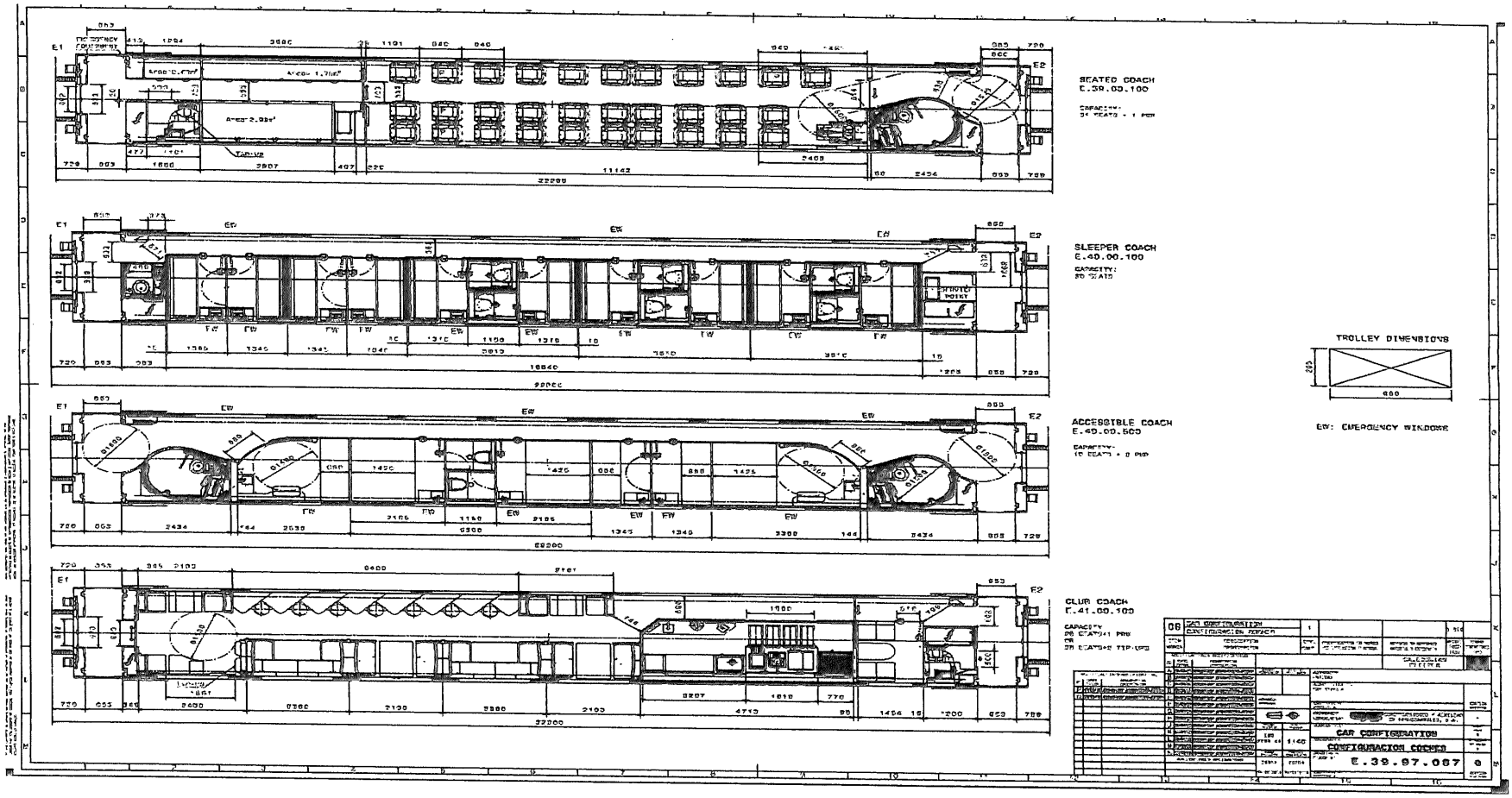
Governance and Programme Management Diagram



Note: references in the above table to Beacon Rail Leasing shall be read as referring to Caledonian Sleepers Rail Leasing Limited ("**CSRL**")

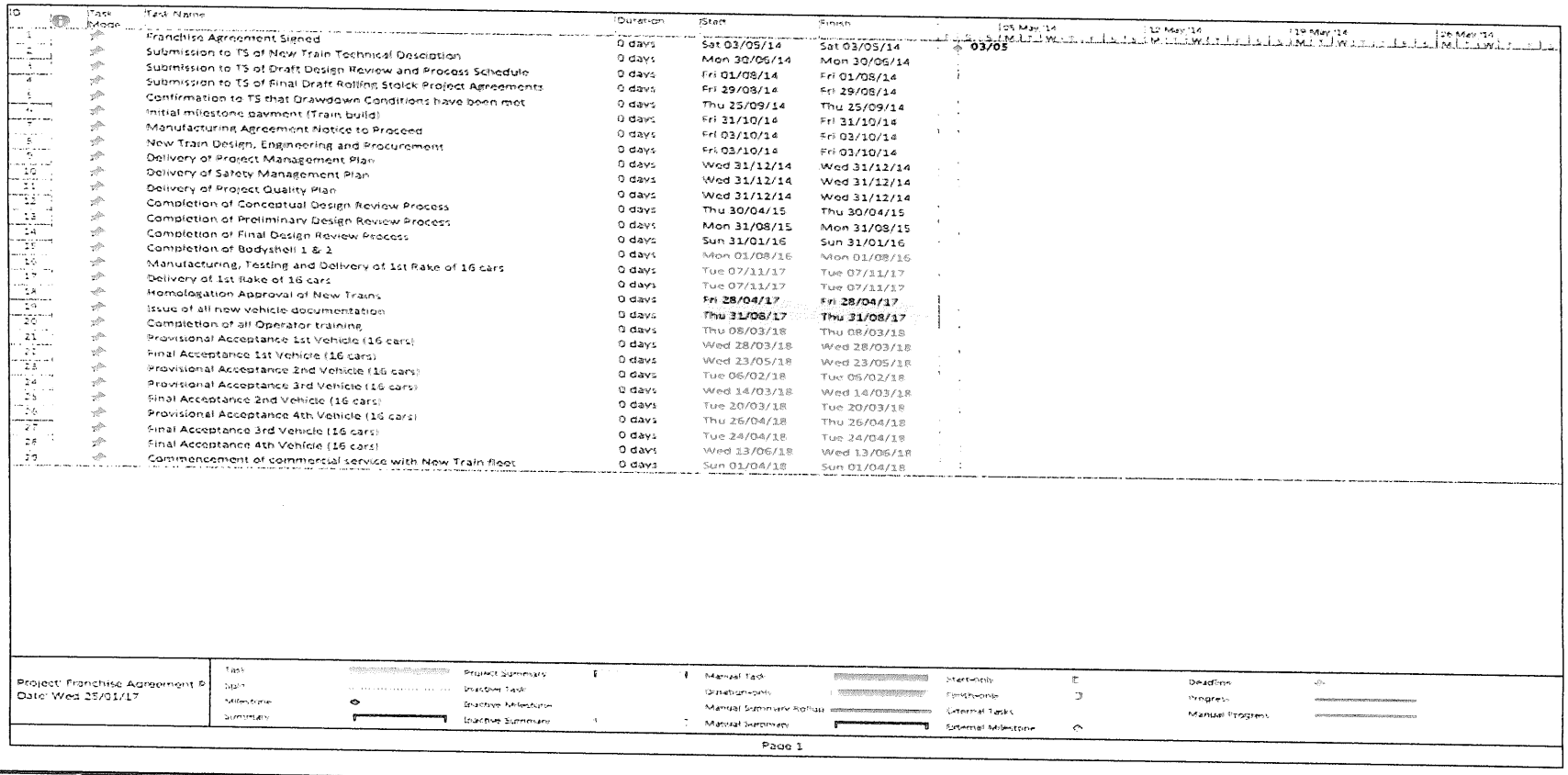
APPENDIX 1 TO SCHEDULE 6.1

COACH LAYOUTS



APPENDIX 2 TO SCHEDULE 6.1

PROJECT PLAN



ID	Task Mode	Task Name	Duration	Start	Finish
1		Franchise Agreement Signed	0 days	Sat 03/05/14	Sat 03/05/14
2		Submission to TS of New Train Technical Description	0 days	Mon 30/06/14	Mon 30/06/14
3		Submission to TS of Draft Design Review and Process Schedule	0 days	Fri 01/08/14	Fri 01/08/14
4		Submission to TS of Final Draft Rolling Stock Project Agreements	0 days	Fri 29/08/14	Fri 29/08/14
5		Confirmation to TS that Drawdown Conditions have been met	0 days	Thu 25/09/14	Thu 25/09/14
6		Initial milestone payment (Train build)	0 days	Fri 31/10/14	Fri 31/10/14
7		Manufacturing Agreement Notice to Proceed	0 days	Fri 03/10/14	Fri 03/10/14
8		New Train Design, Engineering and Procurement	0 days	Fri 03/10/14	Fri 03/10/14
9		Delivery of Project Management Plan	0 days	Wed 31/12/14	Wed 31/12/14
10		Delivery of Safety Management Plan	0 days	Wed 31/12/14	Wed 31/12/14
11		Delivery of Project Quality Plan	0 days	Wed 31/12/14	Wed 31/12/14
12		Completion of Conceptual Design Review Process	0 days	Thu 30/04/15	Thu 30/04/15
13		Completion of Preliminary Design Review Process	0 days	Mon 31/08/15	Mon 31/08/15
14		Completion of Final Design Review Process	0 days	Sun 31/01/16	Sun 31/01/16
15		Completion of Bodyshell 1 & 2	0 days	Mon 01/08/16	Mon 01/08/16
16		Manufacturing, Testing and Delivery of 1st Rake of 16 cars	0 days	Tue 07/11/17	Tue 07/11/17
17		Delivery of 1st Rake of 16 cars	0 days	Tue 07/11/17	Tue 07/11/17
18		Homologation Approval of New Trains	0 days	Fri 28/04/17	Fri 28/04/17
19		Issue of all new vehicle documentation	0 days	Thu 31/08/17	Thu 31/08/17
20		Completion of all Operator training	0 days	Thu 08/03/18	Thu 08/03/18
21		Provisional Acceptance 1st Vehicle (16 cars)	0 days	Wed 28/03/18	Wed 28/03/18
22		Final Acceptance 1st Vehicle (16 cars)	0 days	Wed 23/05/18	Wed 23/05/18
23		Provisional Acceptance 2nd Vehicle (16 cars)	0 days	Tue 06/02/18	Tue 06/02/18
24		Provisional Acceptance 3rd Vehicle (16 cars)	0 days	Wed 14/03/18	Wed 14/03/18
25		Final Acceptance 2nd Vehicle (16 cars)	0 days	Tue 20/03/18	Tue 20/03/18
26		Provisional Acceptance 4th Vehicle (16 cars)	0 days	Thu 26/04/18	Thu 26/04/18
27		Final Acceptance 3rd Vehicle (16 cars)	0 days	Tue 24/04/18	Tue 24/04/18
28		Final Acceptance 4th Vehicle (16 cars)	0 days	Wed 13/06/18	Wed 13/06/18
29		Commencement of commercial service with New Train fleet	0 days	Sun 01/04/18	Sun 01/04/18

SCHEDULE 6.1A

THIS IS SCHEDULE 6.1A REFERRED TO IN THE FOREGOING FRANCHISE AGREEMENT BETWEEN THE AUTHORITY AND SERCO CALEDONIAN SLEEPERS LIMITED

NEW TRAIN FLEET OUTPUT SPECIFICATION

Unless agreed otherwise by the Authority (such agreement not to be unreasonably withheld or delayed), the Franchisee shall procure that the New Train Fleet complies with all aspects of the New Train Fleet Output Specification set out in this Schedule 6.1A.

The Franchisee shall otherwise comply with the obligations expressed in this Schedule 6.1A.

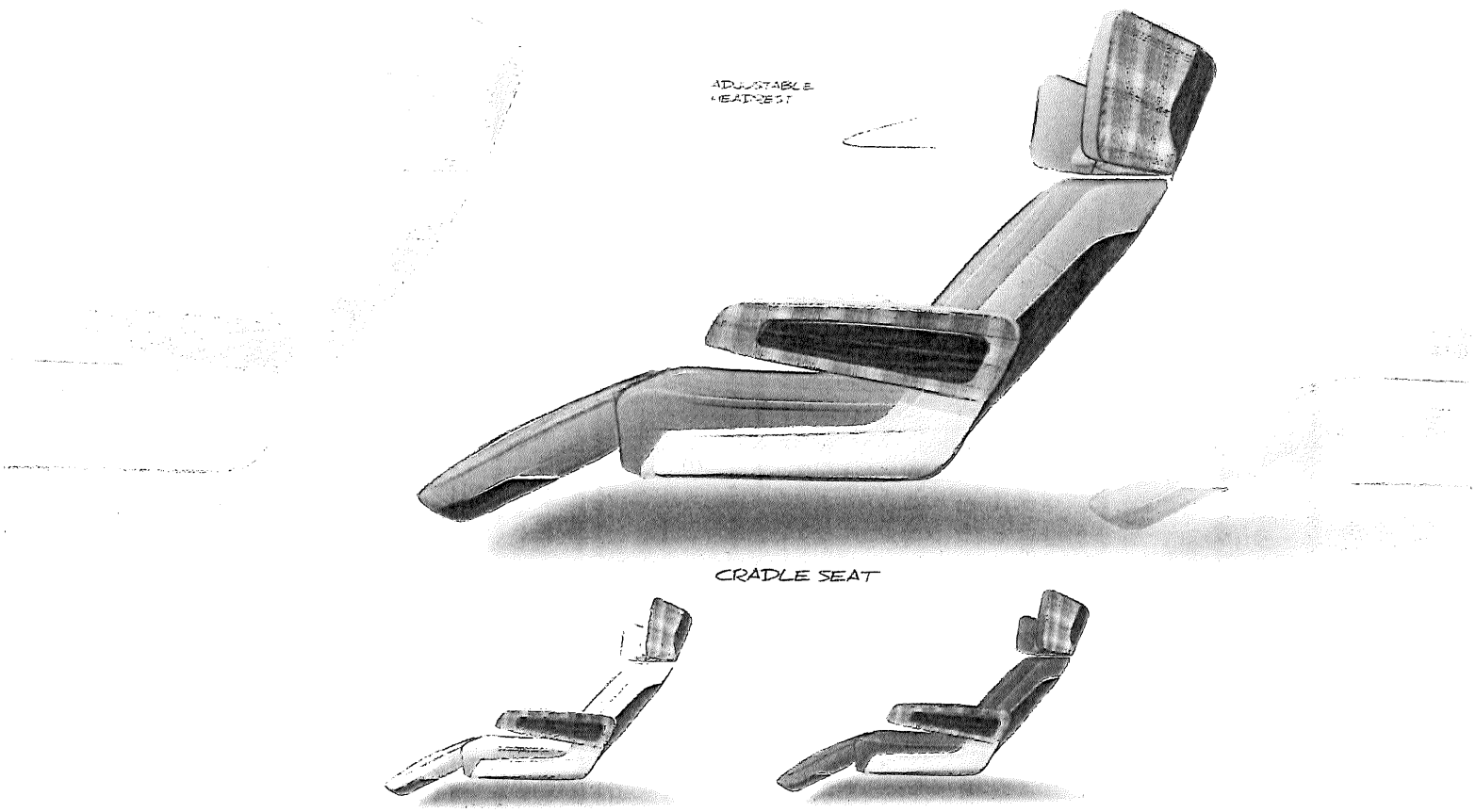
1. Overview of the New Train Fleet

1.1. The Franchisee shall offer the following four accommodation types in the New Train Fleet: Cradle Seats, Berths (including double Berths), En-Suite Berths.

1.2. Each Cradle Seat shall have an improved seated experience compared to the Initial Train Fleet including the following features:

- comfortable reclining seat with footrest;
- generous leg room;
- 3 pin power socket;
- USB point;
- small lockable storage for small luggage, laptops, purses etc;
- in-built host call bell;
- sleep kit; and
- wi-fi.

An indicative drawing of the Cradle Seat is set out below. Such indicative drawing shall be subject to change as a result of the Design Review Process.

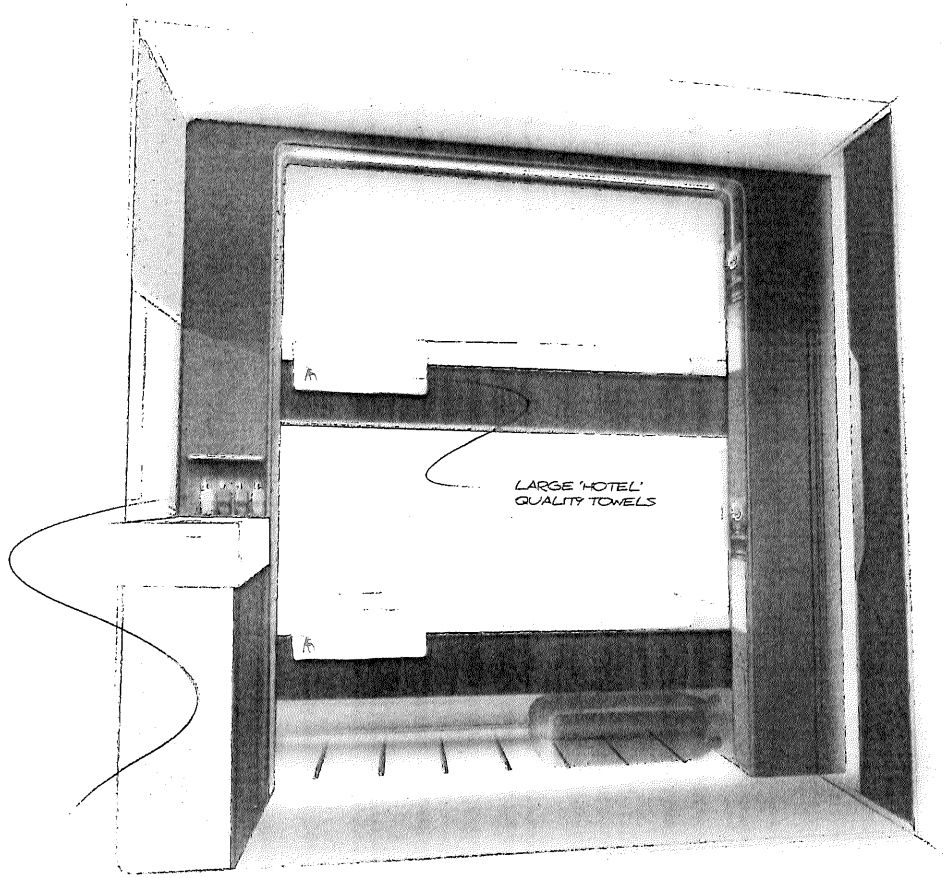

ADJUSTABLE
HEADREST
CRADLE SEAT
CALEDONIAN
SLEEPER

1.3. Not Used:

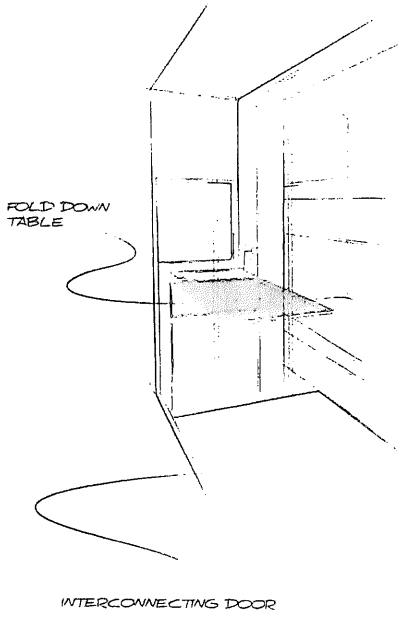
1.4. Each Berth (including double Berths) shall provide a very good level of accommodation ensuring privacy and personal security as well as all the facilities the modern traveller needs and shall have the following features:

- sole or shared occupancy;
- 2 x 3 pin power sockets and 4 USB sockets;
- intercom for passenger(s) to be able to contact train staff without leaving their Berth;
- basin with a plug and a hot and cold water supply;
- high specification mattress(es);
- a good quality linen bedding including duvet(s);
- larger 'hotel' quality towels;
- Scottish toiletries sourced from a partner SME;
- variable lighting options to allow for a calm and relaxed atmosphere or alternatively for working and reading;
- storage area for luggage;
- desk table to allow working with mobile devices and eating;
- air conditioning;
- interconnecting door between Berths (for family or larger group use);
- sleep kit;
- room service;
- wi-fi; and
- each basin in the berth shall have suitable fixings to accommodate a toiletries tray.

An indicative drawing of the Berth is set out below. Such indicative drawing shall be subject to change as a result of the Design Review Process.



BERTH

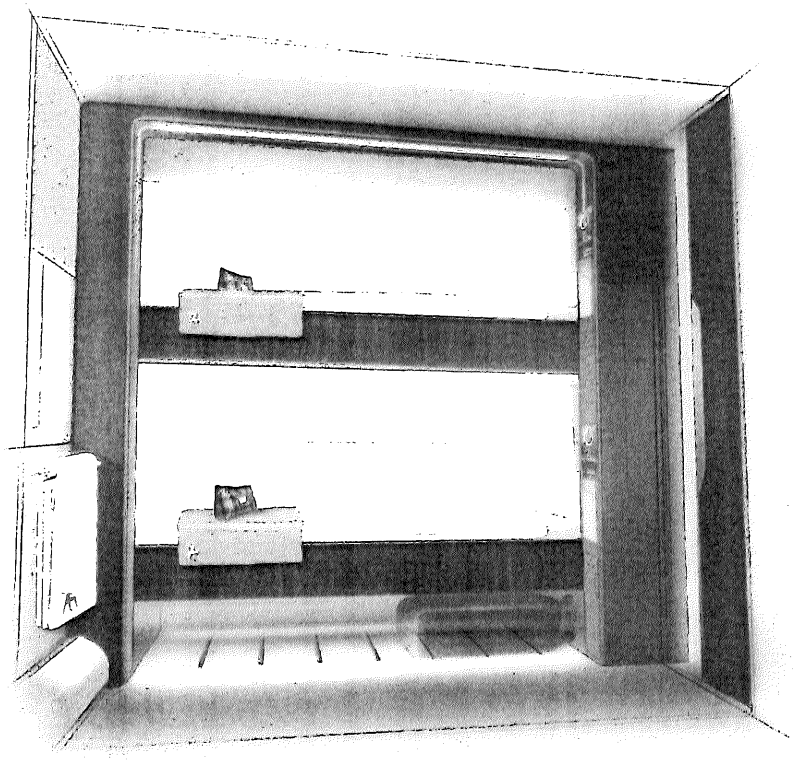


CALEDONIAN SLEEPER

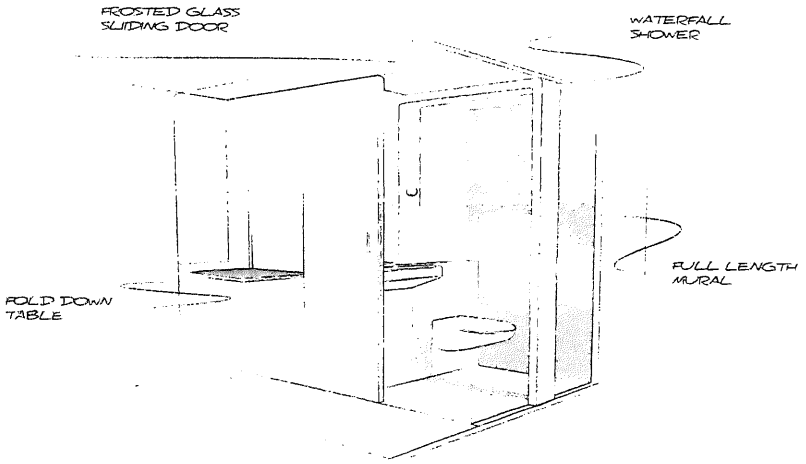
1.5. Each En-Suite Berth shall have the following features:

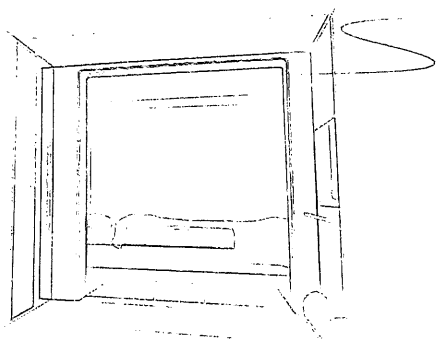
- sole or shared occupancy;
- en-suite toilet and shower;
- larger premium 'hotel' quality towels;
- premium linen and duvet(s), with Shetland wool blanket(s);
- 2 x 3 pin power sockets and 4 USB sockets;
- intercom for passenger(s) to be able to contact train staff without leaving their En-Suite Berth;
- basin with a plug and a hot and cold water supply;
- high specification mattress(es);
- not used;
- storage area for luggage;
- a Caledonian Sleeper branded amenity kit which will contain:
  - sleep kit
  - ear plugs
  - eye mask
- premium Scottish toiletries sourced from a partner SME;
- room service;
- wi-fi; and
- each basin in the berth shall have suitable fixings to accommodate a toiletries tray.

An indicative drawing of the En-Suite Berth is set out below. Such indicative drawing shall be subject to change as a result of the Design Review Process.



EN-SUITE BERTH





CALEDONIAN SLEEPER

2. Abbreviations and Definitions

In this Schedule 6.1A the following terms shall have the following meaning:

Term	Meaning / Definition
ASDO	Automatic Selective Door Operation
ATOC	Association of Train Operating Companies (or its replacement from time to time including RDG – Rail Delivery Group)
CCP	Control and Communication Point
CCTV	Closed Circuit Television
CfA	Call for Aid
CR Loc & Pas TSI	Conventional Rail Locomotives and Passenger Rolling Stock Technical Standard for Interoperability
CRS	Central Reservation System (Station 3 Alpha Code)
DfT	Department for Transport
EN	Euro Norme
fps	frames per second
GPS	Global Positioning System
HMI	Human Machine Interface
HMRI	Her Majesty's Railway Inspectorate
ISO	International Standardization Organization
MDBSAF	Mean Distance between Service Affecting Failures
MRP	Main Reservoir Pipe
ORR	Office of the Rail Regulator
OTDR	On Train Data Recorder
PIS	Passenger Information System
PRM	Persons With Reduced Mobility
RCD	Residual Current Detector
RCF	Rolling Contact Fatigue
RGS	Railway Group Standard
STI	Speech Transmission Index
TfG	Track for Gauging
TIPLOC	Timing and Location Point
TMS	Train Management System
Train	A formation of one or more Coaches for the purpose of operating the Passenger Services
TSI	Technical Specification for Interoperability.
VPN	Virtual Private Network
WSP	Wheel Slide Protection

Operational Mass Definitions.

Design Mass in Working Order (Tare Load)	In accordance with the definition in EN15663.
Design Mass under Normal Payload (Full Load)	In accordance with the definition in EN15663.
Design Mass under Exceptional Payload (Crush Load)	In accordance with the definition in EN15663.

3. STANDARDS, APPROVAL AND ENVIRONMENT

3.1. Standards and Legislation

3.1.1. The Coaches shall comply with the requirements of all relevant European and UK legislation

3.1.2. The Coaches shall comply with all relevant requirements to achieve authorisation into service under the Railways (Interoperability) Regulations 2011, which includes compliance with the mandatory standards mandated therein.

3.1.3. The Coaches shall be fully compatible with the infrastructure over which they are to operate (including potential diversionary routes) and neighbouring railway operations.

3.1.4. The Coaches shall comply with national and international standards as appropriate to the scope of supply.

3.2. Operating Environment

3.2.1. Each Coach shall be capable of continuous operation within the full range of ambient and environmental conditions that will be encountered in Passenger Services.

3.2.2. Each Coach and all its constituent parts shall comply with the requirements of climatic zone T1 and altitude range A2 as specified in EN50125-1: 1999 Railway Applications – Environmental conditions for equipment.

3.2.3. Each Coach shall be resistant to the effects of exposure to salt water spray, which shall not cause excessive corrosion or degradation of exposed surfaces, components and equipment.

3.2.4. Each Coach shall be resistant to the effects of any fluids (such as graffiti removal or vehicle washing chemicals) or particles likely to be encountered in the railway environment.

3.2.5. Each Coach exterior, when all doors and windows are closed, shall prevent the ingress of snow, rain, wash plant spray, draughts, dust, exhaust fumes and leaves under all environmental conditions.

3.2.6. In the vicinity of externally opening windows and doors, all controls, equipment and enclosures shall be designed to ensure continued operation with no adverse effects due to local ingress of water, dust, snow and leaves. Guttering shall be provided above all openings.

3.2.7. Each Coach shall be capable of operating normally through snow or flood water, up to the maximum depths for normal operation and thereafter (subject to speed restriction) up to the absolute maximum depths for operation.

3.2.8. Each Coach shall be designed to cope with predicted climate change which may result in more extreme weather conditions, higher summer temperatures and higher winter rainfall.

4. TRAIN REQUIREMENTS

4.1. Train Configuration

4.1.1. The Franchisee has identified four (4) types of coach to operate the Passenger Services. These types of coach are classified as follows:

4.1.1.1. Sleeper Coach

4.1.1.2 Club Car

4.1.1.3 Seated Coach (including a luggage area and the guard's accommodation area)

4.1.1.4 Accessible Coach

The defined term "**Coach**" shall mean any one of the above.

The basic service pattern to be operated by the Franchisee requires the following configurations to be operated in each direction

Highland Sleeper

- *Euston – Fort William 2 x Sleeper + 1 x Accessible + (1 x Club Car + 1 x Seating Edinburgh – Fort William only)*
- *Euston – Inverness 5 x Sleeper + 1 x Club Car + 1 x Seating + 1 x Accessible*
- *Euston – Aberdeen 2 x Sleeper + 1 x Club Car + 1 x Seating + 1 x Accessible*

Lowland Sleeper

- *Euston – Edinburgh 4 x Sleeper + 1 x Club Car + 1 x Seating + 2 x Accessible*
- *Euston – Glasgow 5 x Sleeper + 1 x Club Car + 1 x Seating + 1 x Accessible*

The following table sets out the requirements for service and spare vehicle numbers to be procured by the Franchisee.

Coach Type	Required for Service	Spare vehicles
Accessible Coach	12	2
Seated Coach	9	2
Sleeper Coach	36	4
Club Car	9	1
Total	66	9

4.1.2 Each service pattern detailed above shall meet the PRM-TSI requirements. This will require not less than two (2) wheelchair accessible Berths in an Accessible Coach with

two (2) wheelchair accessible toilet and one wheelchair accessible space with a wheelchair accessible toilet in a Seated Coach for each service pattern. . More details are provided in paragraph 9 (Coach Specific Requirements).

4.1.3 The length of the coaches shall be such that:

(a) a train of 16 Coaches plus two (2) class 92 locomotives (each locomotive being 22m in length) must fit into the current platform 1 at London Euston station; and/or

(b) a train of 16 coaches plus one (1) class 92 locomotive (each such locomotive being 22m in length) and one (1) class 86 or 87 locomotive (either of such locomotives being 18m in length) must fit in the current platform 1 at London Euston Station.

4.1.4 It shall be possible to change train lengths by inserting or removing Coaches in the train creating rakes that vary up to a maximum of 16 vehicles and a minimum of 2 vehicles.

4.2 Coach Mass

4.2.1 The tare mass of a Coach shall not be greater than 43 tonnes.

4.2.2 The Coaches shall have a route availability of RA 2 or less.

4.3 Floor Height

The nominal floor height above the rail at vehicle entry doorways and throughout the Coach shall be a maximum of 1200 mm subject to compatibility assessment of the rolling stock with the infrastructure. Any other reference to height in this Agreement shall be read subject to this provision.

4.4 Inter Coach Gangways

4.4.1 Inter-Coach gangways shall be at least 800 mm wide at floor level.

4.4.2 Inter-Coach gangways shall be at least 1900 mm high throughout.

4.4.3 The Inter-Coach gangway floor shall be level with the main saloon floor, free from step or trip hazards.

4.4.4 The gangway doors shall be lockable by the Franchisee's staff in service by use of a standard square key.

4.4.5 Gangways shall be leak, rattle and draught free under all operating conditions.

4.5 Coupling

4.5.1 It shall be possible to safely couple or uncouple Coaches mechanically, pneumatically and electrically on curves down to a radius of 160 m.

4.5.2 The coupler shall be fitted with its centreline at a height which is compatible with the locomotives and not incompatible with any other technical requirements of this Agreement and compliant with Applicable Laws and Standards.

4.5.3 The coupler shall be compatible with Network Rail's track geometry requirements for both mainline and non-passenger lines. The maximum angle from the longitudinal axis at which coupling can be achieved shall be notified by the Manufacturer to the Franchisee.

5. PERFORMANCE CAPABILITIES

5.1 Operational Routes

5.1.1 The Coaches shall be designed to operate at speeds of up to 110 mph.

5.1.2 Coaches shall be capable of operation on all Primary Routes, Diversionary Routes and all other potential routes.

5.1.3 Coaches shall be capable of negotiating the minimum horizontal and vertical track curvatures within Depots and sidings, which may be less than those defined for the designated routes.

5.2 Capacities between Servicing

5.2.1 The Coaches shall not require servicing between scheduled visits to the maintenance Depots.

5.2.2 Each toilet shall have a capacity sufficient to allow 1.2 full days of operation, before requiring any maintenance actions. An external warning indication shall be provided to alert staff when the effluent tank is approximately 75% full. The retention tank shall be fitted with a level gauge.

5.2.3 The fresh water tanks shall have sufficient capacity to allow 1.2 full days of operation of the toilet including routine use of the hand basin, based on the utilisation (above) in between refilling. An external warning indication shall be provided to alert staff when the water tank is approximately 25% full. The fresh water tank shall be fitted with a level gauge.

5.2.4 Where toilets are installed, the Coaches shall be capable of fully retaining all waste and odour (including grey water waste) to enable compliance with paragraph 8.5.5 of this Schedule, between servicing on all Primary Routes and service patterns.

6. RELIABILITY

6.1 General

6.1.1 Reliability assurance shall be controlled and demonstrated in accordance with the requirements of EN50126:1999, The Specification and Demonstration of Reliability, Availability, Maintainability and Safety (**"RAMS Specification"**) or an equivalent framework. The assurance shall address all stages of the Coach system lifecycle to include, as a minimum, the design, manufacture, build, test, introduction into service, reliability growth, operation/maintenance and decommissioning/disposal phases.

6.1.2 As part of the design and construction of the Coaches, the Franchisee shall provide a copy of the RAMS Specification and programme to the Authority.

6.2 Mean Distance between Service Affecting Failures

6.2.1 The mean distance between service affecting failures of the Coaches shall be measured in accordance with the following definition of "miles per 3-min delay":

- a failure en route that results in the Coach having to be withdrawn from the Passenger Services before it reaches its advertised end of journey
- a failure causing the Coach to experience a delay of 3 or more minutes
- a failure causing the cancellation or part cancellation of a Passenger Service;
- a delay of more than 3 minutes in a Coach entering service from a Depot, where the root cause is a technical or maintenance defect on the Coach.

6.2.2 When operating in 16 vehicle rakes, each rake shall achieve an MDBSAF of 250,000 miles in normal operating service.

6.2.3 The Franchisee shall provide a reliability growth programme to the Authority that demonstrates the reliability growth management activities and projected reliability performance over the life of the Coaches.

6.3 Mission Failures

A "mission failure" is defined as a failure en route that results in a Coach having to be withdrawn from service before it reaches its advertised end of journey, or in a delay exceeding 60 minutes.

6.3.1 Failure between Stations, requiring detrainment and evacuation of passengers, shall not occur more than once every 5,000,000 miles. Based on an 8 Coach train rake and such shall be reduced pro-rata by reference to the number of Coaches in short formations.

6.3.2 Failure causing a delay exceeding 60 minutes and/or requiring detrainment at a Station shall not occur more than once every 1,500,000 miles. Based on an 8 Coach train rake and such shall be reduced pro-rata by reference to the number of Coaches in short formations.

7. TRAIN WIDE FUNCTIONS

7.1 Gauge and Track Interaction

7.1.1 The Coaches shall comply with the gauging constraints on all Primary Routes, Diversionary Routes and other potential routes.

7.1.2 The design of the Coaches shall fully exploit the defined gauge to maximise the internal space.

7.1.3 Gauging shall be undertaken using the absolute gauging methods described in RGS GM/RT2149 'Requirements for Defining and Maintaining the Size of Railway Vehicles' and GC/RT5212 'Requirements for Defining and Maintaining Clearances'.

7.1.4 The Coaches shall be designed to ensure safe running. This includes having the required derailment resistance on twisted track (taking into account specifically the transition phase between canted and level track, and cross level deviations), having the required over speeding roll-over resistance and exhibiting stable running up to 10% above the maximum design speed. New and fully worn wheels, an appropriate range of effective wheel/rail conicities, and inflated and deflated secondary suspension conditions shall be considered.

7.1.5 The Franchisee shall procure asset data for compatibility assessments of the New Train Fleet with infrastructure. The Franchisee shall identify all non-standard platforms that result in non-standard stepping distances and the Franchisee shall notify the Authority of such non-standard stepping distances.

7.1.6 The Franchisee shall be responsible for obtaining all approvals, clearances and dealing with all design related issues relating to gauging or non-standard stepping distance issues on all Primary Routes, Diversionary Routes and all other potential routes at its own cost. For the avoidance of doubt this shall include any costed infrastructure alterations necessary for the safe operation of the New Train Fleet.

7.2 Wheel Rail Interface

7.2.1 The suspension design will be optimised to minimise track damage including RCF and wear, such that track access variable usage charge is minimised.

7.2.2 The Coaches shall be fitted with wheels confirming to the P8 or P12 profiles.

7.3 Ride Quality

7.3.1 The Coach ride quality shall demonstrate a mean comfort index of 1.8 based on the definition in EN 12299:1999 'Ride Comfort for Passengers - Measurement and Evaluation'. This shall be demonstrated by undertaking dynamic simulations using the appropriate Network Rail TfG files or over all of the Primary Routes and the most frequently used Diversionary Route.

7.3.2 Compliance with the ride comfort requirement shall be assessed using the 95th percentile Simplified Comfort Index in accordance with EN 12299:1999 'Ride Comfort for Passengers - Measurement and Evaluation'.

7.3.3 The design shall be optimised to ensure that an acceptable level of ride quality is achieved when one or more air springs are deflated.

7.3.4 The Coach's ride quality shall not be significantly degraded by wear or ageing of suspension components.

7.3.5 The ride quality requirements shall be demonstrated for both tare and crush load conditions over a range of speeds up to the maximum design speed of the Coaches.

7.4 Aerodynamics and Pressure Effects

7.4.1 The Coach design and construction shall ensure that passengers and/or the Franchisee's staff do not experience significant discomfort due to internal pressure changes when operating over the Primary Routes and Diversionary Routes, including:

7.4.1.1 in single bore/track tunnels; and

7.4.1.2 trains passing in twin track tunnels

7.4.2 The Coach design shall have adequate resistance to roll-over in high winds.

7.5 Noise and Vibration

7.5.1 The interior noise level shall not exceed:

7.5.1.1 66 dB (A) at head positions when sleeping, seated and standing in sleeping and seating areas, as measured in accordance with BS EN ISO 3381:2011, when travelling at 100 mph in open air with all auxiliary systems running and 73 dB (A) at standing positions in vestibules with gangway doors opened, as measured in accordance with BS EN ISO 3381:2011, when travelling at 100 mph in open air with all auxiliary systems running.

7.5.1.2 The maximum internal noise level shall not exceed 58 dB (A) at head positions when sleeping, seated and standing in sleeping and seating areas, as measured in accordance with BS EN ISO 3381:2011, when the train is stationary in open air with all auxiliary systems running.

7.5.1.3 Coaches shall not emit any prominent harmonics or discrete tones in any operating modes or conditions.

7.6 Fire Safety

7.6.1 The Coach design shall adequately mitigate the risk of fire and its products of combustion when operating across all designated routes.

7.6.2 In addition to all currently mandated standards, the Coaches shall also comply with the recently issued BS EN 45545 (which is not yet called up by the TSIs) and RGS GM/RT2130 Issue 4 (which will be issued in early 2014).

7.6.3 The Coaches shall meet the specific requirements of Operations Category 2, Design Category S (which means it is designated as Hazard level 2) in accordance with BS EN 45545.

7.7 Human Factors and Ergonomics

7.7.1 The Franchisee provide a copy of the human factors plan (**"Human Factors Plan"**) to the Authority which shall cover how human factors requirements will be identified, managed and closed out throughout the Coach design and development lifecycle. The scope of the Human Factors plan shall include the use of the Coach by passengers, train crew and maintenance staff and shall include the user population design range and relevant datasets.

7.7.2 Ergonomics and human factors criteria and techniques shall be applied to the design of passenger and crew areas of the Coach using relevant anthropometric data for passengers, train crew and maintenance personnel.

7.7.3 Each Coach shall present a safe, secure, user-friendly and comfortable environment for passengers, crew and maintenance staff with features and interfaces that are intuitive to users and minimise adverse effects from human errors.

7.8 Security, Anti Social Behaviour and Vandalism Resistance

7.8.1 The Coaches shall be capable of being made secure when stabled without compromising the need to maintain accessibility for emergencies.

7.8.2 The design of the interior bodyside windows and glazed surfaces shall optimise passenger safety in all foreseeable circumstances.

7.8.3 The Coach interior shall be sufficiently robust to minimise damage from foreseeable vandalism and misuse.

7.8.4 Tamper-proof fixing arrangements shall be fitted where necessary. Fasteners shall not be visible or accessible to passengers as far as practicable.

7.8.5 All interior bodyside windows and glazed surfaces shall incorporate a means to minimise the damage from vandalism by etching or scratching.

7.8.6 Internal and external finishes shall permit the easy removal of graffiti by trained personnel using proprietary graffiti cleaning chemicals, and the surfaces shall not readily degrade as a result of the removal process.

7.8.7 The Coach interior shall be free from gaps and crevices where litter, sharp objects or any other items could be concealed or lodged. Any equipment, such as litter bins and luggage modules shall be adequately designed to eliminate gaps or hidden voids.

7.8.8 Soft furnishings shall be resistant to damage by sharp objects and designed to be economical and easy to replace when deemed necessary.

7.8.9 All Coach interior equipment within the passenger areas including PIS and entertainment screens shall be resistant to vandalism.

8 GENERAL VEHICLE DESIGN

8.1 Vehicle Design

8.1.1 The Coaches shall have a design life of not less than 35 years.

8.1.2 The Coach structures and equipment shall be designed for the defined fatigue loadings and service duty cycles under UK operating conditions.

8.2 Exterior Requirements

8.2.1 Each Coach shall have smooth body contours as far as practical to allow efficient automatic or manual washing.

8.2.2 The Coach livery shall be agreed between the Authority and the Franchisee to complement the branding being developed for the service.

8.2.3 The Coaches shall be painted and shall be capable of being fitted with vinyl film in addition to the painted finish.

8.2.4 The paint finish shall be capable of withstanding the effect of any detergents used in the cleaning process.

8.2.5 The external paint and finishes shall have a high quality of detailing and finish, which shall remain durable and colour-fast for a life of not less than 12 years in service.

8.2.6 The bodyside windows shall be designed to enable maximum viewing for interior seated passengers yet provide appropriate privacy for those in Cabins.

8.3 Interior Design

8.3.1 The Coach interior fittings shall be robust and minimise damage due to scuffing and abrasion from contact with passenger luggage or wheelchairs, etc.

8.3.2 All panels shall be robustly secured, especially ones that are removable.

8.3.3 All materials and components shall be resistant to fading and scratching and shall be sufficiently durable to withstand heavy usage for half of the design life of the Coach (as stated in paragraph 8.1.1).

8.3.4 All interior panels, fixtures and fittings shall be designed to eliminate drumming, rattles and squeaks.

8.3.5 All interior glass panels shall use laminated glass.

8.3.6 The floor covering shall be anti-slip, aesthetically pleasing and appropriate to the function of each area of the Coach. All floor materials used shall be hard wearing.

8.3.7 The floor covering shall be laid in such a way to prevent liquids seeping beneath the covering.

8.3.8 The floor covering in the vestibules shall be capable of coping with moisture from incoming passengers and rain and snow entering from open doors.

8.3.9 All interior areas of the Coach that facilitate standing or walking passengers shall be fitted with appropriate means of support to maximise the safety of passengers in all normal and emergency modes of operation.

8.3.10 The floor shall be free from any fixed components that will obstruct, hinder and complicate cleaning.

8.4 Seating Provision

8.4.1 In the Seated Coach, the Franchisee shall procure seat types and arrangements appropriate to all users, and to ensure that seat construction and installation meets requirements for passenger comfort (including wide comfortable seats that have a recline facility), maintenance and cleaning.

8.4.2 In the Seated Coach, the seat back shall be sufficiently rigid to avoid discomfort to the passenger from being knocked or disturbed by passengers behind, or use by other passengers of the handhold or grab rail, or movement of fold down tables where fitted.

8.4.3 In the Seated Coach, the seat headrests shall be shaped to provide comfortable lateral support. The headrest shall be maximum height at the seat centre but be sympathetically shaped at either side to enable good vision between seats and a peripheral view of the horizon through windows on both sides.

8.4.4 In the Seated Coach, the priority and wheelchair space shall be easily discernible to all passengers.

8.4.5 All seats in the Seated Coach, shall have access to a 230 V socket outlet for laptop and mobile phone operation and charging.

8.4.6 In the Seated Coach, the floor area around all seats shall be designed to avoid obstruction to passengers' feet.

8.4.7 In the Seated Coach, pitch efficiency and seat widths shall be optimised between the requirement to achieve passenger flow through aisles, and the needs of the individual passenger for easy access and egress from the seat and journey comfort. The contouring of seat cushioning shall be designed to achieve defensible space for the seated passenger, avoiding the need for armrests if practicable.

8.4.8 In the Seated Coach, the seat width shall be maximised up to the bottom of the headrest without unnecessary tapering.

8.4.9 All seats within a Seated Coach shall be individually numbered

8.5 Toilets

8.5.1 Coaches shall be fitted as follows:

- Each Sleeper Coach shall be fitted with 1 controlled emission toilet.
- Each Seated Coach shall be fitted with 1 wheelchair accessible controlled emission toilet.
- Each Accessible Coach shall be fitted with 2 wheelchair accessible controlled emission toilets.
- Club Car Coaches shall have no toilets.

8.5.2 En-suite Berths shall be fitted with ensuite toilets.

8.5.3 Sufficient universal toilets shall be fitted such that each service pattern (as defined in Section 4.1) complies with the PRM-TSI requirements. More details are provided in Section 9 ('Coach Specific Requirements').

8.5.4 All toilets shall incorporate a high level of resistance to becoming blocked due to misuse and overfilling.

8.5.5 The Coach interior shall be free from toilet odours at all times.

8.5.6 All toilets and cubicles shall be designed to avoid dirt traps and to allow efficient and effective cleaning.

8.5.7 All toilet modules shall be completely sealed.

8.5.8 All toilet modules shall incorporate appropriate features to prevent fluid leakage into the saloon or vehicle underframe.

8.5.9 The toilet module shall be capable of being removed and replaced, without the need for major structural changes.

8.5.10 Toilet waste retention tanks shall be sited to facilitate ease of cleaning.

8.5.11 Toilet retention tanks shall be capable of being 100% drained during normal servicing.

8.5.12 Toilet door lock operation shall be clearly perceptible to all passengers and intuitive to the user providing unambiguous feedback as to whether the door is locked or unlocked.

8.5.13 All toilet doors shall incorporate a device to allow the door to be overridden and opened by the Franchisee's staff when 'locked'.

8.5.14 The design of the toilet access door unlocking device, intended for the Franchisee's staff, shall be sufficient to avoid the device being used or tampered with by passengers.

8.5.15 The toilet door lock operation shall be designed to ensure that in the event of failure, passengers are not locked in the toilet module.

8.5.16 All toilet doors shall incorporate a means for staff to lock the door out of use.

8.5.17 Means shall be provided to clearly identify to passengers that the toilet is 'locked out of use'.

8.5.18 An illuminated sign shall be provided in each car to inform passengers of the location and status of the nearest toilets. It should also indicate when the toilet is occupied.

8.5.19 A CfA device shall be provided in each PRM toilet to provide discrete two-way voice communication between the guard or customer services staff and the passenger.

8.5.20 In addition to any mandatory equipment, each toilet shall be fitted with the following:

Clause	Text	Standard Toilet	PRM Toilet	En-suite Shower/Toilets

8.5.20.1	A toilet bowl lid catch that holds up the lid when the train is in motion;	x	x	x
8.5.20.2	A flush device that (subject to risk assessment) is visible when the toilet seat is in the raised position;	x	x	-
8.5.20.3	A device to freshen the air by the addition of a pleasant fragrance;	x	x	x
8.5.20.4	A sink and a tap that provides warm water at a temperature suitable for hand washing;	x	x	-
8.5.20.5	A warm air hand drying facility that effectively dries hands within 20 seconds;	x	x	-
8.5.20.6	A mirror with tamper proof fixings;	x	x	-
8.5.20.7	A soap dispenser;	x	x	-
8.5.20.8	A toilet roll dispenser;	x	x	x
8.5.20.9	A system for disposal of sanitary towels;	x	x	x
8.5.20.10	A nappy changing facility;	x	x	-
8.5.20.11	Two hooks for coats and bags;	x	x	X (one hook on the outside and one hook on the inside)
8.5.20.12	A litter bin;	x	x	-
8.5.20.13	Support grab handles;	x	x	x
8.5.20.14	Suitable lighting; and	x	x	x
8.5.20.15	Smoke alarm.	x	x	x

8.5.21 It shall be possible for maintenance staff to remove and replace the toilet bowl and associated equipment within 30 minutes.

8.6 Luggage Stowage

8.6.1 Appropriate solutions should be utilised to ensure that luggage is stowed in a safe manner.

8.6.2 Storage space for luggage and clothes shall be provided in each Cabin. More details are provided in paragraph 9.1 'Sleeper Coach'.

8.6.3 Part of the Seated Coach shall be allocated to luggage storage. More details are provided in paragraph 9.3 'Seated Coach'.

8.6.4 Part of each Seated Coach storage area shall be utilised for the fire proof storage of clean and used linen

8.6.5 Secure lockable luggage facilities for small personal items (e.g. briefcase, laptop, handbag, valuable items etc.) shall be provided at each seat in the Seated Coach.

8.7 Signage

8.7.1 All non-mandatory signs shall be designed in accordance with ATOC guidelines.

8.7.2 Statutory signage shall conform to applicable standards including TSI-PRM.

8.7.3 Signage shall be durable and resistant to picking and malicious removal.

8.7.4 Unique Coach numbers allocated by the Rolling Stock Library shall be displayed externally and internally. Door positions shall be identified through signage.

8.8 Catering

Each of the Seated and Sleeper Coaches shall have adequate space to accommodate storage (including suitable restraints) and use of shore based trolley catering services.

8.9 Litter

8.9.1 Litter/recycling bins shall be appropriately distributed throughout the Coaches.

8.9.2 Litter/recycling bins shall be easily identifiable by passengers and capable of being rapidly emptied by cleaning staff.

8.10 Cleanability

8.10.1 Each Coach shall be fitted with two 230 V, metal clad, RCD protected socket outlets for commercial cleaning equipment.

8.10.2 Lighting and other interior assemblies shall be sealed against the ingress of dust and dirt.

8.10.3 Interior panels, covings and lighting shall be simply shaped to allow easy cleaning and have no visible gaps between sections that could act as water or dirt traps.

8.10.4 All interior materials shall be resistant to cleaning chemicals including chemicals required to kill pathogens and remove graffiti.

8.10.5 All heating and air conditioning ducts shall be designed to minimise the build up of dust, dirt and combustible detritus, and shall be fitted with suitable covers to allow easy access for cleaning yet prevent access by passengers.

8.10.6 It shall be possible to complete the daily standard clean, including the floor for a Coach interior, in no more than ½ man hour.

8.10.7 It shall be possible to complete a periodical heavy clean on each Coach in no more than 4 man hours.

9. COACH SPECIFIC REQUIREMENTS

9.1 Sleeper Coach

9.1.1 There shall be 10 Cabins in each Sleeper Coach - 6 x Ensuite Berths and 4 x Berths.

9.1.2 Each Sleeper Coach shall include a catering service point area enclosed behind a door. Provision of contents and catering equipment and supplies for this area shall be as per paragraph 8.8, 9.1.3 and 9.1.15 of this Schedule 1.

9.1.3 Each catering service point shall have sufficient working space and the following properly working equipment each of a quality and standard appropriate to the design and layout of the relevant area:

- 1 x water boiler
- 1 x holding oven suitable for 24 meal trays
- 1 x fridge
- 2 x trolley stowage

9.1.4 Each Sleeper Coach catering service point shall include 2 x 3 pin power sockets and 2 x USB sockets.

9.1.5 The changeover between single and double occupancy Cabins shall be designed to be completed by operational staff in no more than 2 minutes. Minimal training and no tooling shall be required.

9.1.6 All Cabin doors are to be lockable by passengers. The Franchisee will encode the key and pair it with the berth door lock with a programming unit, that can be used with a standard laptop or tablet (not included in CAF scope) and can be stored in the seated and club coach, or at the berth lock with a master key card. The passenger will then be free to use the key during the journey. The passenger will then be requested to hand it back at the end of the journey. If the passenger keeps the key at the end of their journey it will no longer operate any relevant door on the train once the door lock system has been reprogrammed. For the next journey new keys will be encoded and paired with the allocated berth door, or the key from the previous journey can be used if it has been returned.

9.1.7 Each Cabin type shall have an area suitable for in cabin dining should the passenger choose to eat in their Cabin.

9.1.8 Cabins shall have access to general access toilets located in each Sleeper Coach.

9.1.9 All the works necessary to carry and heat the water (which is additional to the requirement for water included in paragraph 5.2.3 of this Schedule 6.1A) used by the showers, based on an average utilisation of 2 x 5 minute showers per shower unit per journey, shall be incorporated in the design and validated by the acceptance type testing.

9.1.10 Each Cabin shall have passenger controllable interior temperatures regulation. The performance requirements are detailed in paragraph 10.6 'Heating, Ventilation and Cooling' of this Schedule 6.1A.

9.1.11 All Cabins shall have an exterior window (which shall be no smaller than the MkIII sleeper coach windows but preferably larger for observing the scenery on daylight portions of the journey) and shall be fitted with blinds (which can

be opened and closed) to prevent light entering the Cabin and visibility of the Cabin from outside of the Sleeper Coach.

9.1.12 All Cabins shall have a storage space for personal luggage.

9.1.13 All Cabins shall have personal clothing hangers incorporated into the design.

9.1.14 Cabin lighting should be controllable by each passenger such that the lighting levels can be adjusted between zero and maximum. A reading light shall be provided at each bunk.

9.1.15 Each Sleeper Coach shall include an integrated hot water boiler capable of heating water to at least 90degrees Celsius. This boiler will be connected to a 50 litre water storage tank that will feed the boiler with fresh water.

9.1.16 Each double bed Berth, included but not limited to the PRM berths, shall have a means inside the berth of illuminating an indicator in the corridor to indicate to train staff that the passenger does not want to be disturbed. The control in the Berth shall be un-illuminated and give a clear indication of the status of the exterior indicator.

9.1.17 Berth walls adjacent to be beds shall be finished in materials, including (a) Harris Tweed of the design previously provided to the Manufacturer; and (b) leather, in order to provide a soft surface which is not cold to the touch. Where that it is not possible (in the view of the manufacturer of the New Train Fleet acting reasonably) to use Harris Tweed for these purposes because compliance with laws and regulations prevent such use, then an appropriate alternative material of analogous composition and design to the Harris Tweed shall be used (where agreed by the Franchisee).

9.1.18 Decorative wall lighting shall be included in the Sleeper Coach corridor.

9.1.19 Each Berth shall have decorative lighting around the window, controlled independently of the main berth lights.

9.1.20 Each Berth shall include 3 holders for mobile devices, so these can be safely stowed when charging.

9.1.21 Decorative lighting shall be applied to the vestibule of the Sleeper Coaches.

9.1.22 Not Used

9.1.23 Decorative lighting shall be applied to the standard toilet exterior walls.

9.2 Club Car

9.2.1 Each Club Car shall provide a seated area for a minimum of 29 people, which includes a wheelchair user (30 if there are no wheelchair users, noting that two (2) seats are 'tip up' seats), in various seating combinations that include tables for 2 and 4 along with an option for communal seating / dining.

9.2.2 Not used

9.2.3 A minimum of 7 x 3 pin power sockets and 7 USB sockets shall be provided at the stool seating in the Club Car with a further 4 in excess of those required for fixed catering equipment in the galley area.

9.2.4 Lighting in the seated area shall be adjustable by the Franchisee's staff to achieve an atmosphere conducive with a social/dining area.

9.2.5 Each Club Car shall include a galley area with sufficient working space and the following properly working equipment, each of a quality and standard appropriate to the design and layout of relevant area:

- 1 x microwave oven with grill
- 1 x microwave oven
- 1 x water boiler,
- 1 x bean to cup coffee machine + 1 x milk reservoir
- 4 x refrigerated trolley stowage
- 2 x non-refrigerated trolley stowage
- 1 x fridge
- 1 x dishwasher
- 1 x ice machine
- 1 x toaster
- 1 x Holding oven capable of holding a wide range of cooked foods
- 1 x programmable convection oven
- 1 x sink
- 1 x sink dedicated for hand-washing only
- 3 x Atlas boxes

Appropriately designed and good quality working surfaces shall be provided in relevant areas and sufficient and legally compliant ventilation shall be installed to ensure the air quality within the galley is maintained at all times.

9.2.6 The Franchisee shall procure a power supply and internet connection for an electronic point of sale (EPOS) system. The system consists of an ipad mounting bracket and a small printer. Power supplies for both and a connection to the on-board wifi system will be required

9.2.7 Each Club Car shall include a control area where trains systems can be managed and monitored. The systems to be monitored shall include the Train Management System (TMS), public address, passenger information system, CCTV, fire alarm, passenger entertainment, train lighting, water, waste management and monitoring system, HVAC and the Cabin door locking system. This control area shall be integrated within or adjacent to the area allocated for the galley.

9.2.8 Each Club Car shall have a staff accommodation/seated area with a table and seating for up to 4.

9.2.9 Each Club Car shall provide 7 x stool seats with individual tables. Each seat should have 3 fixed positions, allowing users to face their own table, share a table with the person adjacent or face into the corridor.

9.2.10 Each Club Car shall include a shoe polisher in one vestibule end of the vehicle.

9.2.11 Each Club Car shall have a battery operated defibrillator with suitable labelling to identify its location.

9.2.12 Decorative lighting shall be applied to the exterior galley walls (from the bodyside to the galley door).

9.2.13 Decorative wall lighting shall be included in the Club Car saloon.

9.2.14 Vestibule walls adjacent to the interior doors shall be finished in materials to provide a soft surface which is not cold to the touch.

9.3 Seated Coach

9.3.1 The seated area of the Seated Coach shall contain a minimum of 31 reclining Cradle Seats of a quality and comfort appropriate to a long distance overnight journey plus one wheelchair space.

9.3.2 Each service pattern detailed in paragraph 4.1 shall meet the PRM-TSI requirements. This will require one wheelchair accessible space and a wheelchair accessible toilet in the Seated Coach for each service pattern serving Fort William, Inverness, Aberdeen, Glasgow and Edinburgh.

9.3.3 Each seat will be equipped with a personal reading light a host call, a 3 pin power socket and a USB power socket for charging laptops, tablets and mobile phones.

9.3.4 The Seated Coach shall:

(a) have exterior windows fitted with blinds (which can be opened and closed) the dimensions of such windows are indicated on the relevant Coach Layout;

(b) incorporate a luggage/freight storage area;

(c) contain a cycle rack capable of safely and efficiently storing a minimum of six (6) fully assembled bicycles and four (4) bicycles held in bicycles bags (the provision of the bicycle bags shall be the responsibility of the Franchisee) and a luggage storage rack for at least twenty (20) suitcases. The luggage storage rack shall be designed to be flexible such that it can also (as an alternative) cater for one (1) bicycle held in a bicycle bag and storage of up to sixteen (16) suitcases; and

(d) have a separate storage area designed to accommodate: (i) the equivalent of three (3) x bicycles; or (ii) the transportation of palletised freight and/or linen for use on the train and/or additional passenger baggage.

9.3.5 The luggage/freight storage area shall have an opening door positioned to facilitate access to the cycle storage/ baggage / freight area.

9.3.6 The luggage/freight storage area shall have 2 x 3 pin power sockets for powering freight chiller units.

9.3.7 The Seated Coach shall contain accommodation for the train guard. The accommodation should include access to communications equipment, a small desk and chair.

9.3.8 The communications equipment shall include:

9.3.8.1 Driver guard comms

(a) via telephone style handset

(b) incoming alert / warning

(c) indication that the system is functioning and connected through train lines to the locomotive

9.3.8.2 Guard Club Car comms

(a) staff audible comms should be possible between each car through the Control and Communication point (CCP) in particular Guards area to Club Car control area

9.3.8.3 Public address

(a) Same connection / functionality as Club Car control area

(b) Ability to select zones for announcements including Club Car galley / control area

(c) Selectable standard messages

9.3.8.4 Fire alarm

(a) Panel indicating fire alarm trigger locations

9.3.8.5 CCTV

(a) Cycling CCTV display or

(b) Selectable CCTV display (required to be possible to select a specific camera in the TMS)

(c) Automatic selection of appropriate camera upon fire alarm of emergency comms activation

9.3.8.6 Door system operation / interface

(a) Door enable and open

(b) SDO

9.3.9 Personal secure storage space should be provided (i.e. an individual means at each seat of safely securing a briefcase, laptop, handbag, valuable items etc.) in addition to space for securing larger items of luggage.

9.3.10 Each Seated Coach shall include an integrated hot water boiler capable of heating water to at least 90degrees Celsius. This boiler will be connected to a 50 litre water storage tank that will feed the boiler with fresh water.

9.3.11 Each seat and the wheelchair space shall have access to a table (where doing so will not prevent compliance with the PRM-TSI for wheelchair turning space). This table shall be either:

a) a seat back table on the seat in front; or

b) a table which can be stowed enabling a wheelchair user to access or egress the adjacent wheelchair space, in accordance with the PRM-TSI; or

c) a fixed table where there is no seat in front. Such tables shall have a feature which creates space to allow easier access to and from the seat when the table is not in use;

provided in each case that there shall be no requirement for a table where that table would interfere with the use of wheelchair turning space (as set out in the relevant PRM-TSI).

9.3.12 Cradle seats shall be finished in leather.

9.3.13 The headrest of the Cradle seat shall have a sliding mechanism to adjust the height at passengers' discretion. The headrest shall be finished in leather.

9.4 Not Used

9.4.1 Not used.

9.4.2 Not used.

9.4.3 Not used.

9.5 Accessible Coach

9.5.1 Each Accessible Coach should contain 1 x wheelchair accessible Berths identical to those installed in the Sleeper Coach in terms of fixtures, fittings and functionality except that it shall be accessible and suitable for use by Persons with Reduced Mobility (PRM). The Berth shall be compliant with PRM-TSI requirements for wheelchair accessible sleeping accommodation.

9.5.2 Each Accessible Coach should contain 2 x Berths identical to those installed in the Sleeper Coach in terms of fixtures, fittings and functionality.

9.5.3 Each service pattern detailed in paragraph 4.1 shall meet the PRM-TSI requirements. This will require no fewer than two (2) wheelchair accessible Berths in an Accessible Coach with two (2) wheelchair accessible toilets.

9.5.4 All Cabin doors are to be lockable by passengers. The Franchisee will encode the key and pair it with the berth door lock with a programming unit, that can be used with a standard laptop or tablet (not included in CAF scope) and can be stored in the seated and club coach, or at the berth lock with a master key card.. The passenger will then be free to use the key during the journey. The passenger will be requested to hand it back at the end of the journey. If the passenger keeps the key at the end of their journey it will no longer operate any relevant door on the train once the door lock system has been reprogrammed. For the next journey new keys will be encoded and paired with the allocated berth door where required, or the key from the previous journey can be used if it has been returned.

9.5.5 Each Accessible Coach should contain 2 x additional wheelchair accessible toilets that are identical in terms of fixtures fittings and functionality to those described in paragraph 8.5.

9.5.6 The exterior of each double bed berth, included but not limited to the PRM berths, shall be equipped with an illuminated "do not disturb" sign which can be controlled from the inside of the berth. The control shall provide positive indication that the sign is illuminated, such indication shall minimise light pollution within the berth.

9.5.7 Each Accessible Coach should contain 2 x double bed Ensuite Berths. Each berth shall be identical to those installed in the Sleeper Coach in terms of fixtures, fittings and functionality (save for the specification of the double bed and any fixtures, fittings and functionality required to accommodate that).

9.5.8 Each Accessible Coach should contain 1 x wheelchair accessible double bed Berths. Each berth shall be identical to those installed in the Sleeper Coach in terms of fixtures fittings and functionality, except that it shall be accessible and suitable for use by Persons with Reduced Mobility (PRM). The Berth shall be

compliant with PRM-TSI requirements for wheelchair accessible sleeping accommodation.

9.5.9 Berth walls adjacent to be beds shall be finished in materials, including (a) Harris Tweed of the design previously provided to the Manufacturer; and (b) leather, in order to provide a soft surface which is not cold to the touch. Where that it is not possible (in the view of the manufacturer of the New Train Fleet acting reasonably) to use Harris Tweed for these purposes because compliance with laws and regulations prevent such use, then an appropriate alternative material of analogous composition and design to the Harris Tweed shall be used (where agreed by the Franchisee).

9.5.10 Decorative wall lighting shall be included in the Accessible Coach corridor.

9.5.11 Each Berth shall have decorative lighting around the window, controlled independently of the main berth lights.

9.5.12 Each Berth shall include 3 holders for mobile devices, so these can be safely stowed when charging.

9.5.13 Decorative lighting shall be applied to the vestibule of the Accessible Coaches.

9.6 Coach Layout Drawings

Proposed vehicle layouts are included in Appendix 1 to Schedule 6.1 (*Rolling Stock).* Such vehicle layouts shall be subject to change as a result of the Design Review Process. Such change shall include any necessary amendments to ensure compliance with PRM-TSI requirements for the Seated Coach.

10. SYSTEM FUNCTIONS

10.1 Auxiliary Power Supply

10.1.1 Each Coach shall have an auxiliary power supply capacity continuously rated at least 10% over the calculated design loading so that additional features can be fitted during the life of the Coach.

10.1.2 Each Coach shall be fitted with auxiliary jumper cables interconnecting each Coach in a train and enabling connection to locomotive power supplies and the use of Depot shore supplies

10.1.3 Each Coach's batteries shall maintain essential and emergency systems, for at least 90 minutes, for the full range of environmental conditions experienced by the Coach in the event of auxiliary power supply failure. The battery design shall minimise the maintenance required.

10.1.4 Each Coach's essential and emergency systems shall include, but not be limited to:

10.1.4.1 reduced and emergency lighting (for saloon and emergency egress);

10.1.4.2 ventilation fans;

10.1.4.3 tail lamps;

10.1.4.4 internal emergency signage;

10.1.4.5 public address systems and communications systems;

10.1.4.6 door control system; and

10.1.4.7 CCTV systems.

10.1.5 In the event of a short term power interruption of 30 seconds or less, all systems that may be sustained by battery power shall remain powered.

10.1.6 Not used.

10.1.7 The Coach design shall ensure that flat batteries whether caused by a failure of a battery charger or voltage regulator or otherwise shall not disable the Coach.

10.2 Braking System

10.2.1 The Coach must be capable of holding without rolling back on the maximum gradient on the routes.

10.2.2 The Coach parking brakes shall be automatically applied by a spring. The brake shall be released pneumatically; the control system will ensure that this will not occur until the service brake has been established. The design shall prevent compounding of the brake force and it shall be capable of holding the Coach on the maximum gradient on the designated routes.

10.2.3 It is a requirement that in the event of the MRP being unable to be sustained due to major damage or leakage, an alternative means of releasing the parking brake is provided. It should be possible to release the brake without going under the vehicle.

10.3 Wheel Slide Control

10.3.1 Each Coach shall include a proven slide control system that shall operate effectively and efficiently. The configuration of the system control shall incorporate current best practice advice.

10.3.2 The wheel slide control shall maximise the use of available adhesion under braking conditions in all reasonably foreseeable UK wheel rail conditions.

10.4 Door Systems

10.4.1 Each Coach shall have a minimum of 2 power operated body side doors. However if 2 body side doors are proposed the supplier shall demonstrate that all train normal and emergency functions are deliverable safely and efficiently with this configuration.

10.4.2 Each Coach door control system shall be operable by the train guard.

10.4.3 The door control system shall include the functionality to minimise heat and cooling loss during waiting time at stations.

10.4.4 The door system shall provide an optimised method of obstruction detection that ensures the safety of boarding and alighting passengers, including when a portable ramp is used.

10.4.5 When an obstruction is detected, the door system shall provide appropriate information to assist in reducing the impact of obstruction detection on the station dwell time/station delays.

10.4.6 It shall be possible to isolate and lock out of service individual doors on each side of the Coach. The isolated door(s) shall be identified to the guard by the TMS.

10.4.7 All doors shall be interlocked into the traction and braking systems such that power cannot be taken and the brakes cannot be released unless the doors are electrically proved to be closed. The design shall integrate with the locomotive's systems and shall ensure that if this proof is lost when in motion then traction power shall be removed automatically and the brakes shall be applied.

10.4.8 An emergency egress handle shall be located at each doorway. Each emergency egress handle shall be protected from unintentional operation with an appropriate cover.

10.4.9 An emergency access device shall be located on the exterior of the vehicle adjacent to each doorway.

10.4.10 All the doors automatically close after 60 seconds.

10.5 Selective Door Operation

10.5.1 The Coaches shall be fitted with an Automatic Selective Door Operation (ASDO) system, consistent with ORR/HMRI requirements, to allow for the use of short platforms.

10.5.2 The ASDO system shall permit only doors which are positioned over a safely accessible platform area to open at any station.

10.5.3 The ASDO system shall be integrated into or interfaced with the TMS system so that the train can be automatically inaugurated at power up and following any split / join. The TMS system shall provide status information on the MMI/s in the Club Car control area.

10.5.4 The ASDO system shall be self-contained within the Coaches and not require the installation of facilities in the station, platform or track infrastructure. It may be assumed that platforms to be used by the Caledonian Sleeper shall be pre-defined for each station location, as will driver stop board positions.

10.5.5 The ASDO system shall interface with the passenger information system (PIS) to provide passengers with guidance on where to exit the Coach prior to, and at times of, selective door operation.

10.6 Heating Ventilation and Cooling ("HVAC")

10.6.1 Each Coach shall be fitted with a heating, ventilation and cooling system which is compliant to BS EN 13129-1:2002'Air Conditioning for Main Line Rolling Stock.

10.6.2 The HVAC system shall deliver a comfortable environment and be capable of regulating the temperature of all passenger saloons, sleeping berths, Club Car areas, vestibules and toilets.

10.6.3 The interior set point temperature in all general access areas shall be adjustable by maintenance staff and modes selectable by the train crew via the HMI. The interior set point temperature in all sleeping berths shall be adjustable by the passenger. Adjustable ranges shall be in accordance with BS EN 13129-1: 2002.

10.6.4 Interior temperature regulation shall be in accordance with the regulation curve defined in BS EN 13129-1.

10.6.5 The HVAC system shall provide emergency ventilation in the event of failure.

10.6.6 The emergency ventilation shall include smoke detection to provide control of air flow to minimise the effects of smoke.

10.6.7 The heating, ventilating and cooling system shall be designed to minimise mass and energy consumption.

10.6.8 The HVAC system shall be capable of maintaining a comfortable passenger environment in all likely UK ambient weather conditions, consistent with the environmental conditions set out in paragraph 3.2.

10.6.9 The system shall minimise temperature changes within the car when the doors are opened.

10.6.10 The system shall vary the volume of air which is moved within the relevant coach according to passenger load (e.g. When few passengers are on board the air flow should be the minimum).

10.7 Interior Lighting

10.7.1 Each Coach shall use high efficiency lighting to provide interior illumination levels in accordance with applicable standards.

10.7.2 The interior lighting distribution in the passenger saloon, including gangways, shall be arranged to create a safe, secure and pleasant environment. Light shall be thrown onto and across the ceiling

10.7.3 The interior lighting shall comprise normal, reduced, at seat personal and emergency lighting.

10.7.4 The emergency lighting system shall remain fully operational when subjected to the crash pulse defined in GM/RT2100 Issue 5.

10.7.5 Lighting enclosures shall be tamper proof, prevent the ingress and accumulation of dust and be sealed to IP54 (EN 60529 Specification for Degrees of Protection Provided by Enclosures).

10.7.6 The interior lighting system shall be fully compatible with the requirements of the CCTV system.

10.7.7 The interior lighting system shall fully complement the passenger information system and interior signage such that there is no adverse glare or reflections from any part of the Coach during any ambient light conditions.

10.7.8 The interior lighting shall be controllable by train crew.

10.8 Passenger Information and Communications

10.8.1 Each Train shall be fitted with a system that automatically generates audio and visual announcements as defined by the Train ID/Headcode in the working timetable and amended by short term plan (STP) or manually corrected by the train crew using the MMI in any Set.

10.8.2 The system shall automatically set up at a configured time before scheduled departure in preparation for boarding passengers. Automatic set up shall

require the diagrammed Train/Coaches to be available for the service and at the correct location. Train crew shall have the facility to accept or change the automatic set up.

10.8.3 The PIS shall provide all necessary information to meet legislative requirements, including PRM-TSI and support of ACOP015 Passenger Information During Disruption (PIDD).

10.8.4 The PIS shall provide destination, next station, stopping pattern, safety, delay, diversion and emergency information for the Train, presented in both audio and visual format, as and where required by PRM. Supplementary information such as scheduled and/or estimated time of arrival, delay, disruption and relevant departure board information at interchange and terminus stations shall also be provided.

10.8.5 Visually presented destination and stopping pattern information shall be capable of being assimilated by every passenger on entering the Train and during the journey in public areas, for example textual information supplemented by a map highlighting the route, destination, station stops and current location..

10.8.6 The PIS shall provide adequate information to all passengers, including those with disabilities and those with a limited understanding of English, with the functionality to display graphic and colour-coded symbols.

10.8.7 The Coach shall selectively present to passengers only that information that is most relevant to the current location in the current journey. The PIS system shall function effectively on diagrams that incorporate:

10.8.7.1 Trains uncoupling en-route with each portion proceeding to a different final destination (splitting service); and

10.8.7.2 Trains from different origins coupling en-route and continuing to a common final destination (joining service)

10.8.8 The system shall have capacity to manage two splits and/or two joins per service.

10.8.9 A platform facing side display shall be installed adjacent to each external door for the purpose of displaying the coach letter in accordance with PRM - TSI. The text on the display shall be white.

10.8.10 Each side of every Coach shall be equipped with a platform facing display to show destination and stopping stations, this display may be combined with the coach letter display. The display shall be operated whilst the Train is on platform, it shall enter a power saving mode and may become blank in the journey between stations.

10.8.11 The PIS system hardware and internal displays shall be capable of displaying text, pictograms and high quality video information. High priority PIS information (PRM information and emergency announcements) shall stop/override the entertainment system. The text on the display shall be white.

10.8.12 When the selective door operation system is in use, the PIS shall make specific announcements in the affected cars well in advance of arrival at the relevant station.

10.8.13 A control and communication point (CCP) shall be provided in each Coach to allow the train crew to select emergency or other announcements to meet the requirements of standards, legislation, customer service and good practice.

The Club Car shall have a second CCP in the galley. Each CCP shall have an associated display allowing status and information to be provided to the train crew. The CCP shall be co-located or integrated with the communication handset.

10.8.14 The PA system shall provide high quality and intelligible announcements (STI > 0.5 in all areas). Announcements shall be zoned according to the following selections:

10.8.14.1 Local (Default), i.e. on splitting services it shall be possible to make announcements to the local Train only. Announcements to other coupled coaches, by zoned area, shall be possible following selection.

10.8.14.1 Public areas (default) – may be deselected

10.8.14.1 Sleeper cabins – may be selected as a zoned group

10.8.15 The PA system shall be accessible on a first come first served basis when selected from any CCP. The CCP shall make provision for high priority announcements (e.g. in case of fire) that override normal PA or automatic announcements

10.8.16 The PA system shall comply with the requirements of the CR Loc & Pas TSI.

10.8.17 PA system volume level in public areas shall automatically adjust to compensate for the background noise level. Typically, the PA level shall be an average 8 to 10 dB(A) above ambient level, the maximum PA level shall be agreed but will be no more than 95 dB(A). The minimum level will be defined during detailed design stage.

10.8.18 The system shall provide selective calling full duplex intercom communications between individual CCPs, or defined functional groups of CCP. The arrangement shall support communication in the local Train and selection of coupled Trains with different destinations; it is proposed that destination will be used to identify the other Trains.

10.8.19 The system shall provide passenger emergency alarm facilities at each vestibule and in locations defined by CR Loc & Pas TSI. Each passenger alarm shall have an integrated or co-located discrete two-way voice communication between the train crew and the passenger at that alarm location.

10.8.20 The system shall include Call for Aid ("CfA") Units, located at wheel chair positions, in universal access toilets and sleeper cabins with wheelchair facilities. The CfA shall provide discrete two-way voice communication between the train crew using a CCP and the passenger at that alarm location.

10.8.21 A loudspeaker/microphone intercom shall be provided in each sleeper cabin as part of an attendant call system; this may be in the same format as the CfA. The attendant call system shall provide discrete two-way voice communication between the train crew using a CCP and the passenger at the calling location. Train crew shall also have the facility to call and communicate to an individual cabin.

10.8.22 Selective train crew intercom, if not answered within a configurable time, shall create an audible/visual alert over the PIS displays and PA loudspeakers in the relevant Coach(es).

10.8.23 Passenger Alarm, CfA or attendant call shall create an immediate audible/visual alert in the relevant Coach(es). The system shall support configuration of CCPs and or PIS areas where the alert is to be provided.

10.8.24 All CCPs shall display current status, e.g. if a CfA is operated and has not been acknowledged/cleared, the alarm location will be shown on the CCP display (and MMI in the Club Car).

10.8.25 Passenger alarms shall be reset locally using a carriage key. The time and location of alarm and reset shall be logged to the TMS.

10.8.26 CfA and attendant calls shall be reset from the CCP answering the call. The time and location of alarm and reset shall be logged to TMS.

10.8.27 In addition to passenger emergency alarm and CfA, emergency egress and fire/smoke detection and other TMS monitored conditions shall be alerted on the CCP (and MMI in the Club Car).

10.8.28 The passenger emergency alarm units shall be designed to deter malicious or accidental operation.

10.8.29 All necessary off train software and equipment required to maintain send, receive, process and configure PIS data shall be provided. A PIS Database Editor shall support the preparation of core data (Station name, TIPLOC code, CRS code, geo-location etc). Timetable, diagramming (stock allocation)

10.9 Mobile Communications

The design of the Coaches shall ensure that all mobile phone network signals are not significantly degraded at any location in each Coach.

10.10 On Board Wi fi

10.10.1 A wifi installation with sufficient capacity to manage typical email, business VPN and web browsing traffic will be provided. This system should be free to use by all users of the Passenger Services.

10.10.2 The design shall ensure that the WiFi network signals are available at 'Good' or better strength at any location in each Coach, including sleeper cabins.

10.10.3 The supplier shall provide secure and segregated train to wayside communications for the operational on board systems. The system shall conform to the cybersecurity requirements for transport applicable by EU directive and UK government policy (DfT).

10.11 Passenger Entertainment System

10.11.1 The proposed system incorporates a digital service accessible via a portal.

10.11.2 The passengers will access this system using their personal devices (laptops, tables, etc.) via a web based portal.

10.11.3 The portal uses a framework which dynamically adjusts graphic design of web pages, taking into account the characteristics of the device used (PC, tablet, mobile phone). As a result the portal is optimized for both laptops & portable devices such as iPhone, Android, Windows mobile.

10.11.4 The system will be setup in-line with the Franchisee's requirements. The user-data is stored on the train servers, so users can quickly login to the portal even

if no internet connection is available. The portal is optimized to host a wide variety of on-train content. The portal contains the following:

10.11.4.1 internet protocol television (IPTV);

10.11.4.2 Video On Demand: the passenger shall be able to browse the library of hosted movies. The player is integrated in the portal so a separate application is not needed;

10.11.4.3 E-press (newspapers and book): an automatic synchronization system shall be able to be setup so the newspapers are uploaded to the trains each morning. The reader is integrated in the portal;

10.11.4.4 News messages: News messages are automatically updated throughout the day;

10.11.4.5 Weather information: Weather information is automatically updated; and

10.11.4.6 Advertisements.

10.11.5 In combination with an internet link, the portal content shall be both dynamic (linked to route or GPS position) and remotely updatable (weather information or news). The portal shall also contain travel or passenger information.

10.11.6 It shall be possible to configure the system so different content is available for different types of passengers. For instance, free to class and payable elsewhere.

10.11.7 Not used.

10.12 Storage of Investigative Data

10.12.1 Each Seated Car shall be equipped with an OTDR that monitors all vehicles in the Train within which it is coupled and complies with applicable standards.

10.12.2 In addition to the mandatory requirements, the OTDR shall monitor and record Train brake controls status, WSP status, door status, and leading bogie brake cylinder pressure.

10.12.3 All necessary off train software and equipment required to receive, process, print, interpret and convert to information all aspects of OTDR data shall be provided. At least five operating licenses shall be supplied. OTDR time and date stamps shall be synchronised with other train systems and GPS; it shall maintain +/-2 sec accuracy.

10.12.4 It shall be possible to download from the OTDR data to the wayside or locally using laptop/Ethernet connection or USB flash stick.

10.13 Data Backbone for TMS and Passenger Multimedia Services

10.13.1 An Ethernet communication is to be used for Train Communication Networks, reference BS EN 61375-1:2012, BS EN 61375-2-5 and BS EN 61375-3-4. The TMS and PIS have mission critical roles and their TCN networks shall use redundant backbones. Individual Coaches shall feature a bypass function in case of total power failure; operation of bypass after inauguration shall not cause coach letter assignments to change.

10.13.2 Gigabit ethernet shall be provisioned for multimedia services.

10.13.3 M12 connectors with crimped terminations or moulded M12 (with spare cable length) shall be used on ethernet cables. RJ45 connectors are not acceptable without justification and validation of design

10.14 Train Management System

10.14.1 The TMS shall be fully integrated with other on board sub systems to provide consistent synchronised information and must exploit the functionality available from data communications technology to facilitate the regular extraction and updating of operational data stored on the Train.

10.14.2 Each Train shall be equipped with a train management system (TMS), located in each Seated Coach and the information from the TMS will be made available on the MMI in real time.

10.14.3 The TMS system shall log data associated with all Coaches in the Train. TMS shall connect to all Coaches in the Train in support of an inauguration process that determines the running order of Coaches, Vehicle ID, characteristics, and rotation of the vehicle. The TMS shall use Train Communication networks as defined in BS EN 61375.

10.14.4 The TMS shall be capable of generating, receiving and storing information on the Train status and location. In the event of any failure or defect of the TMS, it shall be possible to continue to operate the Train in passenger service in compliance with mandatory standards.

10.14.5 The TMS shall be capable of identifying failures of both service affecting and passenger facing equipment to the maintenance team following download so that repair and maintenance work can be planned.

10.14.6 The TMS shall be capable of identifying repair and maintenance work following download.

10.14.7 The TMS shall provide a common source of time, date and Train location information for all subsystems that require it. The TMS clock shall regularly and automatically update itself from an external time signal (e.g. GPS) and regularly re-synchronise the internal real time clocks for all interfaced subsystems within +/- 2 s.

10.14.8 The TMS shall record location and time at stations and at pre-set waypoints along the journey for later download (locally or remotely). Real time train location shall be available to be remotely accessed.

10.14.9 The TMS shall monitor and display relevant information to train crew in the control area of the Seated Coach.

10.14.10 The TMS shall provide a simple data download capability without the need for specialist software.

10.14.11 The TMS shall have remote diagnostics which will enable the TMS to be accessed on demand and information on status and on faults to be received to support maintenance activities. Faults database shall be possible to be updated remotely after a complete reset of the TMS.

10.14.12 All necessary off train software and equipment required to receive, process, print and interpret TMS data shall be provided.

10.15 Internal Saloon CCTV

10.15.1 Each Coach shall be fitted with a full colour CCTV system with resolution sufficient to meet the 'Field of view – object size' requirements in the following clauses, with reference to BS EN 50132-7.

10.15.2 The CCTV system shall have sufficient cameras to provide observation coverage of the Coach interior (except toilets and cabins).

10.15.3 The CCTV system shall have cameras located to provide facial identification of persons boarding and alighting, i.e. near each external doorway.

10.15.4 The CCTV system shall have sufficient cameras to provide facial recognition of persons entering or leaving Cabins and toilets.

10.15.5 The CCTV system shall have sufficient cameras to provide facial recognition of persons entering luggage storage areas.

10.15.6 The CCTV system shall have sufficient cameras to provide facial recognition of persons operating passenger alarms, emergency egress handles and CfA devices.

10.15.7 The cameras shall minimise the view outside the Train where possible to prevent fast changing scene and light conditions.

10.15.8 The cameras shall be located in such a way that each camera is viewed by at least one other.

10.15.9 Images from the CCTV system shall be viewable in the Club Car control area and the guard's compartment in the Seated Coach.

10.15.10 The normal operating mode of the system shall record images of sufficient quality and at a frame rate sufficient to support the specified 'Field of view – object size'. The recording rate shall be no lower than 12 fps.

10.15.11 In the event of a CCTV trigger event (e.g. operation of a passenger emergency alarm, emergency egress handle, fire/smoke detection etc.), the recording shall be tagged and the following information recorded:

10.15.11.1 Coach number

10.15.11.2 Date

10.15.11.3 Time

10.15.11.4 Location

10.15.11.5 Camera that recorded the event

10.15.12 The CCTV system shall provide a minimum of 28 days of recording capacity. Alternatively, the CCTV images shall be securely and automatically downloaded every 24 hours to a central database that has a six month storage capacity for the fleet of Trains.

10.15.13 The system shall comply with the ATOC National Rail and Underground CCTV Guidance Document.

10.15.14 The output produced by the CCTV system at both normal and high recording rates shall be capable of being admissible in any Scottish or English (UK) court of law.

10.15.15 The CCTV system recording and retrieval functions shall give a secure auditable trail of data that satisfies the requirements of evidential continuity to prove that the data has not been tampered with in any way. The audit trail shall include location, date and time data synchronised with TMS and other on board systems.

10.15.16 All necessary off train software and equipment required to extract, view, print and interpret CCTV images shall be provided.

10.15.17 It shall be possible to view any of the recorded images on a Train via a single diagnostic port.

10.15.18 Storage media shall be secure, easily accessible to Franchisee staff via a high security lock and key. It shall be possible to remove and replace the storage media within five minutes of accessing the Coach where located. Hot swapping shall be supported. Alternatively, pre-emptive shut down and conditioning of media for transit followed by automatic booting with new storage media and full operating condition within 180 sec.

10.15.19 It shall be possible to view a minimum of 4 simultaneous cameras feeds from the same diagnostic port.

10.15.20 The CCTV system shall be linked to other systems (e.g. fire detection, PIS or TMS), so that when specified events occur, images from the location of the detection are available in the Club Car control area, are tagged on recordings and optionally shown on the CCPs.

10.16 Fire Detection System

10.16.1 Each Coach shall be equipped with a fire and smoke detection system.

10.16.2 On detection of fire or smoke, the information, including the location within the Train shall be provided to the train crew on the MMI (in real time) in the Club Car control area of each Train.

10.16.3 On detection of fire or smoke, the information, including the location within the Train shall be recorded on the TMS for later download (locally and remotely but not both in parallel).

11. SIGNALLING AND TRAIN COMMUNICATIONS

Each Seated Coach and Club Car guard's area shall be equipped with wired audio link connecting train crew with the locomotive driver. The system will consist of:

11.1 An analogue audio signal: 600 Ohm at 0 dB;
11.2 1 x potential-free digital contact: To inform the driver about an incoming audio call from the crew member;
11.3 1 x potential-free digital contact: To inform the crew member about an incoming audio call from the driver in the locomotive;
11.4 Bell code dispatching signals will be provided by utilising the wired audio link and
11.5 whatever other systems are required to obtain the Safety Certificate to operate the New Train Fleet.

12. MAINTENANCE AND OPERATIONS

12.1. Coach Maintenance

12.1.1. Each Coach shall be designed for ease of maintenance, servicing, cleaning and repairability. This shall include the design of interior panelling and other items prone to vandalism.

12.1.2. Each Coach design shall incorporate features which enable maintenance and repairs to be carried out quickly and effectively.

12.1.3. Each Coach design shall be such that the length of time out of service for maintenance, overhaul and repair is minimised.

12.1.4. Each Coach design shall be such that maintenance can be accommodated in times that are outside of the service requirement.

12.1.5. Each Coach design shall incorporate simple to change modular equipment with simple to manage train diagnostics, condition monitoring and reliable train data systems.

12.1.6. Each Coach design shall take account of the need to ensure the long term availability and quality of all spare parts and consumables for the life of the Coach.

12.1.7. All Coach component and sub system parts including interior panelling and exterior trim shall be uniquely coded and labelled so that replacement parts can be easily identified.

12.1.8. All interior cupboard doors and panels shall incorporate retention devices as appropriate to minimise the risk of injury to passengers or to staff.

12.1.9. Suitable test and condition monitoring software and equipment to allow testing, fault diagnosis and repair of all sub systems shall be provided.

12.1.10. All necessary off train software and equipment required to send, receive, process, configure, print and interpret sub system data shall be provided.

12.1.11. All necessary special tools and equipment required to maintain and repair Coach equipment and sub systems shall be provided.

12.1.12. Coach external service connection points shall be located to ensure that only a minimum of trackside servicing points are required regardless of the orientation of the Train. Connection points shall be safe, durable, simple and quick to use and capable of repeated use in the harsh conditions to be expected at servicing locations. They shall be capable of being changed easily and quickly, in the event of failure.

12.1.13. All equipment locations shall be marked to identify the function, type and model of equipment installed. Major components shall be marked with the year and month of manufacture and fitted with an equipment identification plate that shows the manufacturers name, equipment designation, revision code, serial number and a bar code to allow tracking of components. All separable items of equipment must be clearly and permanently labelled in English in a suitable location that is clearly visible and legible when the equipment is installed. Nameplates for equipment shall be securely and permanently attached to a non-removable part of the component or major sub-assembly. They shall not be adversely affected by cleaning agents, graffiti or graffiti removal chemicals.

12.1.14. It shall be safe to work on any electrical equipment within 30 seconds after it has been isolated from its supply. Energy storage devices such as capacitors must be discharged.

12.1.15. Pneumatic components shall vent outside the passenger area. Exhausts from vented components must not present an OH&S hazard to maintenance staff.

12.1.16. For ease of maintenance all equipment that has a maintenance requirement shall be readily accessible and clearly labelled in English. All covers within the passenger area that are required to be opened during routine maintenance shall be fitted with security locks that visually indicate their locked status.

12.1.17. All lifting and jacking points shall be clearly marked and accessible without the need to remove other equipment.

12.2. Coach Repairs

12.2.1. Each Coach shall be designed and constructed to minimise the extent of exterior collision damage and the time to undertake any necessary repairs.

12.2.2. Each Coach shall be designed and constructed so that the time to repair vandalism and to replace damaged interior components is minimised.

12.2.3. Each Coach with bonded bodyside windows shall be designed and constructed so that they shall be exchangeable within 3 hours, including any curing time.

12.2.4. Each Coach with mechanically attached bodyside windows shall be designed and constructed so that they shall be exchangeable within 20 minutes.

12.2.5. Each Coach shall be designed and constructed so that bodyside door windows shall be exchangeable within 3 hours, including any curing time.

12.2.6. It shall be possible to replace failed exterior lamps within 15 minutes by maintenance staff standing 300mm below rail level without the need for special tools.

12.2.7. Where failed exterior lamps cannot be replaced in 15 minutes they shall be of a suitable LED technology designed with a lifetime similar to the Coach.

12.2.8. The time required to replace all major components shall be minimised.

12.2.9. There shall be a method for Franchisee's staff to temporarily secure a broken or cracked bodyside window, to allow the Coach to continue in service to the end of the day.

12.3. Documentation

12.3.1. The Franchisee shall provide comprehensive maintenance documentation to the Authority covering the maintenance requirements for the life of the vehicles, repair procedures, test procedures and fault-finding procedures.

12.3.2. The Franchisee shall provide comprehensive overhaul documentation to the Authority covering the overhaul requirements for the life of the vehicles.

12.3.3. The Franchisee shall provide comprehensive parts information to the Authority, including an illustrated parts catalogue showing all parts, their description, part numbers, ordering details etc.

12.3.4. The Franchisee shall provide all drawings related to the construction and maintenance of the Coaches to the Authority, including schematics, wiring diagrams, structural drawings, general arrangements etc.

12.3.5. The Franchisee shall provide detailed technical descriptions of the Coach and its operation to the Authority.

12.3.6. The Franchisee shall provide a copy of the fault finding guides for maintenance staff to the Authority.

12.3.7. The Franchisee shall provide a copy of the train crew operating manuals to the Authority.

12.3.8. The Franchisee shall provide a copy of the easy to read fault finding guides for train crew to the Authority.

12.3.9. The Franchisee shall provide a copy of the comprehensive documentation covering the cleaning requirements for the Coaches to the Authority.

12.3.10. The above documentation shall be provided in an agreed electronic format.

12.3.11. The above documentation shall be provided in the English language.

12.3.12. The electronic information shall include comprehensive cross-referencing (enabling easy navigation between documents and parts of the same document).

12.3.13. Electronic information shall be readily accessible and updatable.

12.4. Operations

12.4.1. BS85911-1 First aid boxes and mountings shall be provided and clearly labelled. The following size boxes shall be provided:

12.4.1.1. Seated Coach – medium;

12.4.1.2. Club Car (galley) – medium; and

12.4.1.3. Sleeper Coach (service points) – small.

12.4.2. The contents of the boxes shall be provided by the Franchisee.

12.4.3. An emergency tool cupboard shall be provided in each Seated Coach which shall be clearly labelled contain the following:

12.4.3.1. 10m of 18mm nylon rope;

12.4.3.2. 1 x Multi-purpose saw (BR part number 039/052076); and

12.4.3.3. 1 x 1500mm crowbar.