

**HITRANS Rolling Stock
Feasibility Study
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1 Executive Summary

Highland and Islands Transport Partnership has requested a feasibility study to further investigate the proposed internal Scottish sleeper service, Midnight Train to Georgemas (MT2G). The study was agreed to concentrate on the following;

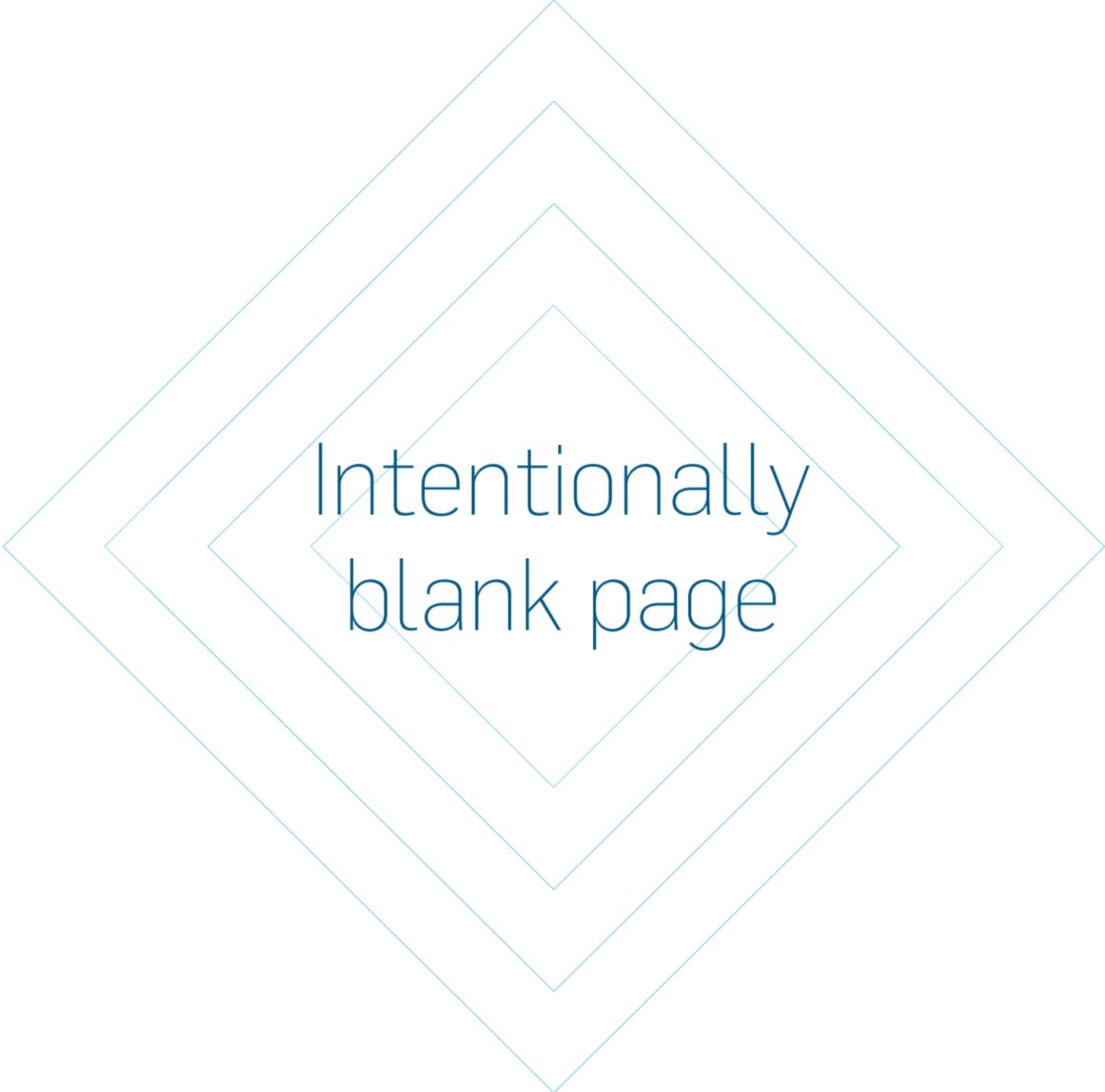
- Reviewing the availability of the rolling stock options, including existing, refurbished and new coaches;
- Considering the overhauls the coaches would require to make them fit for purpose;
- Considering the standards the fleet would have to comply with, as well as any derogations that would need to be applied for;
- Reviewing the maintenance arrangements of the fleet, including depot access, cleaning and stabling;
- Options for potential operators of the service.

It has been concluded that a trial operation of the MT2G service would be the initial stage in service implementation. It is recommended that the trial should be between 12 to 18 months, utilising existing rolling stock options with minimal modifications. This period should be used to assess the viability of a potential service long term and influence any decisions on longer term rolling stock strategy.

Whilst investigating the fleet configuration options, consideration was given to the operational aspect of the service whereby a portion of the service could split, and remain, at Inverness as well as if the service remained together for the duration of the route. An option with an Inverness portion is viable, but would require a depot access agreement.

The maintenance requirements of the service should be met by a single maintenance provider in the Central Belt of Scotland but servicing facilities will be required in both Caithness (and Inverness, if a portion of the service was to split, and remain, at Inverness). The location of the servicing facilities in Caithness should be Thurso, the destination of the northbound service and origin of the southbound service. A suitable site has been identified at Thurso for these facilities.

The options for potential operators of the service are considered, including key points raised during consultations had with interested operators. Key characteristics of the potential operator of the service are also outlined.



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2 Glossary of Abbreviations and Acronyms

Table 1: Glossary of Abbreviations and Acronyms

Abbreviation	Description
ASR	Abellio ScotRail
BSO	Brake Standard Open
BUO	Brake Unclassified Open
CAF	Construcciones y Auxiliar de Ferrocarriles
CET	Controlled Emission Toilet
DfT	Department for Transport
DRS	Direct Rail Service
DVT	Driving Van Trailer
HITRANS	Highlands and Islands Transport Partnership
HST	High Speed Train
HVAC	Heating, Ventilation and Air Conditioning
MT2G	Midnight Train to Georgemas
PIS	Passenger Information System
PRM	Persons of Reduced Mobility
RFM	Restaurant First Modular
RIR	Railways Interoperability Regulations
RLO	Restaurant Lounge Open
ROG	Rail Operations Group
RVAR	Rail Vehicle Accessibility Regulations
SCS	Serco Caledonian Sleeper
SLED	Sleep Either Class Disabled
SLEP	Sleep Either Class Pantry
TOC	Train Operating Company
TDM	Time Division Multiplexing
TSD	Trailer Standard Disabled
TSI	Technical Specification for Interoperability

3 Introduction

Highlands and Islands Transport Partnership (HITRANS) has commissioned SNC-Lavalin to undertake a feasibility study investigating the rolling stock options and associated matters for the proposed internal Scottish overnight sleeper service from Caithness to the Central Belt of Scotland.

The service titled 'Midnight Train to Georgemas', MT2G, would have provision for both sleeper accommodation and day coaches and could have the option to include facilities for the transportation of freight.

This study aims to build on the work previously carried out for HITRANS, whereby the economic benefits of the service were investigated and the operational aspects of the service were explored, including possible routing, rake formation, timetabling and potential passenger markets.

4 Rolling Stock

The rolling stock options covered in this section are based on the recommendations produced in previous feasibility study into MT2G, undertaken for HITRANS.

This section will consider the fleet configuration options for the service, as well as what requirements will need to be met and the work that is recommended to be carried out on the coaches prior to service. It will also consider options for a potential trial operation and service introduction on a permanent basis.

4.1 Fleet Configuration

An initial feasibility study carried out for HITRANS proposed two potential train formations, one of which enabled a portion of the train to be detached at Inverness northbound and attached southbound, with the second running as a fixed formation in both directions.

The proposed timetabling options associated with both formations ('with Inverness portion' and 'fixed rake') were developed as part of the initial feasibility study and are illustrated in Tables 2 to 7. The timetabling options include the options of travelling via Aberdeen and via the Highland Mainline, as well as including details of a fixed formation and a formation with a portion attaching and detaching at Inverness. .

The rationale behind the train splitting at Inverness is that it provides a northbound service that connects with the current sailing time for the early NorthLink ferry to Orkney, while still providing a travel option for Inverness service users as a 'hotel' until breakfast time.

At this stage, this report will review and consider rolling stock options for both proposed formations. However, it should be noted that only one of the two proposed formations would operate.

Table 2: Southbound Timings with Inverness Portion Attaching

Location	Arrive	Depart	Comments
Thurso	-	19:30	
Georgemas Junction	19:46	19:53	Train reverses.
Forsinard	20:26	20:29	
Helmsdale	21:05	21:09	
Brora	21:23	21:26	
Rogart	21:47	21:50	
Lairg	22:17	22:20	
Ardgay	22:35	22:38	
Tain	22:53	22:56	
Invergordon	23:15	23:18	
Dingwall	23:37	23:40	
Muir of Ord	23:51	23:55	
Inverness	00:18	00:53	Inverness portion attaches.
Carrbridge	01:28	01:42	
Perth	03:21	04:02	
Edinburgh	05:23	07:07	
Glasgow Central	08:11	-	

Table 3: Northbound Timings with Inverness Portion Detaching

Location	Arrive	Depart	Comments
Glasgow Central	-	21:19	
Edinburgh	22:25	22:30	
Stirling	23:08	23:10	
Perth	23:45	23:50	
Inverness	02:14	02:54	Inverness portion detaches.
Muir of Ord	03:25	03:26	
Dingwall	03:36	03:38	
Invergordon	03:54	03:55	
Tain	04:12	04:14	
Ardgay	04:30	04:31	
Lairg	04:46	04:48	
Rogart	05:02	05:03	
Brora	05:18	05:20	
Helmsdale	05:38	05:39	
Forsinard	06:15	06:17	
Georgemas Junction	06:55	07:25	Train reverses.
Thurso	07:42	-	Connection for ferry.

Table 4: Southbound Timings via Highland Mainline with Fixed Rake Formation

Location	Arrive	Depart	Comments
Thurso	-	19:30	
Georgemas Junction	19:46	19:53	Train reverses.
Forsinard	20:26	20:29	
Helmsdale	21:05	21:09	
Brora	21:23	21:26	
Rogart	21:47	21:50	
Lairg	22:17	22:20	
Ardgay	22:35	22:38	
Tain	22:53	22:56	
Invergordon	23:15	23:18	
Dingwall	23:37	23:40	
Muir of Ord	23:51	23:54	
Inverness	00:22	00:32	Train reverses.
Perth	02:47	02:52	
Stirling	03:29	05:30	
Anniesland	06:17	06:23	
Glasgow Queen Street	06:32	06:32	
Haymarket	07:42	07:44	
Edinburgh	07:48	-	

Table 5: Northbound Timings via Highland Mainline with Fixed Rake Formation

Location	Arrive	Depart	Comments
Edinburgh	-	23:23	
Haymarket	23:26	23:28	
Glasgow Queen Street	00:28	00:31	
Perth	02:01	02:03	
Dunkeld & Birnam	02:22	02:30	
Aviemore	03:50	04:50	
Inverness	05:35	06:42	Train reverses.
Muir of Ord	07:13	07:24	
Dingwall	07:34	07:39	
Invergordon	07:55	07:56	
Tain	08:13	08:15	
Ardgay	08:34	08:35	
Lairg	08:53	08:55	
Rogart	09:09	09:10	
Brora	09:25	09:27	
Helmsdale	09:49	09:50	
Forsinard	10:26	10:28	
Georgemas Junction	11:06	11:16	Train reverses.
Thurso	11:33	-	Connection for ferry. (Summer only)

Table 6: Southbound Timings via Aberdeen with Fixed Rake Formation

Location	Arrive	Depart	Comments
Thurso	-	19:30	
Georgemas Junction	19:46	19:53	Train reverses.
Forsinard	20:26	20:29	
Helmsdale	21:05	21:09	
Brora	21:23	21:26	
Rogart	21:47	21:50	
Lairg	22:17	22:20	
Ardgay	22:35	22:38	
Tain	22:53	22:56	
Invergordon	23:15	23:18	
Dingwall	23:37	23:40	
Muir of Ord	23:51	23:54	
Inverness	00:22	00:32	Train reverses.
Aberdeen	03:10	03:11	
Edinburgh	05:45	07:07	Provides early connection to London.
Glasgow Central	08:11	-	

Table 7: Northbound Timings via Aberdeen with Fixed Rake Formation

Location	Arrive	Depart	Comments
Glasgow Central	-	21:19	
Edinburgh	22:25	22:30	
Aberdeen	01:16	01:17	
Inverness	04:16	06:42	Train reverses.
Muir of Ord	07:13	07:24	
Dingwall	07:34	07:39	
Invergordon	07:55	07:56	
Tain	08:13	08:15	
Ardgay	08:34	08:35	
Lairg	08:53	08:55	
Rogart	09:09	09:10	
Brora	09:25	09:27	
Helmsdale	09:49	09:50	
Forsinard	10:26	10:28	
Georgemas Junction	11:06	11:16	Train reverses.
Thurso	11:33	-	Connection for ferry. (Summer only)

Note: The current Scrabster – Stromness morning ferry does not leave before 0845.

4.1.1 Proposed Formation Review

The initial feasibility study into MT2G recommended formations for both operating scenarios, these are illustrated below. The coach and loco types illustrated below the formations, in *italics* are those proposed in the initial feasibility study:

- Formation with an Inverness portion;

Locomotive	Sleeper	Day Coach	Day Coach	Lounge Car	Sleeper	Sleeper	DVT
<i>Class 73/9</i>	<i>SLED</i>	<i>Mark 3 TSO</i>	<i>Mark 3 TSO</i>	<i>Mark 2 Lounge Car</i>	<i>SLED</i>	<i>SLE</i>	<i>Mark 3 DVT</i>

- Fixed rake formation;

Locomotive	Day Coach	Lounge Car	Sleeper	Sleeper	DVT
<i>Class 73/9</i>	<i>Mark 3 TSO</i>	<i>Mark 2 Lounge Car</i>	<i>SLE</i>	<i>SLED</i>	<i>Mark 3 DVT</i>

It should be noted that a review of the selection and provision of locomotives falls outside of the scope of this document

As stated above, this report will consider scenarios for both a trial operation period (4.1.2) and full service introduction (4.1.3). The recommended rolling stock options differ in the two scenarios, however there are key considerations to take into account that are relevant to both. The key considerations are listed below.

Coach types

Both proposed formations above incorporate a combination of SLE and SLED sleeper coaches. These coach types are currently in operation for Caledonian Sleeper and would be coming off lease in 2019 and therefore would provide a low cost option for the MT2G service.

Below is an overview of the types of the sleeper coach types.

SLE (Sleeper Either Class) coaches have the highest potential capacity (13 rooms) and two toilets, but do not have a pantry facility on board. Also, the quantity of SLE coaches potentially available may be insufficient to support the needs of the service

SLED (Sleeper Either Class Disabled) coaches have 12 rooms, one of which has been converted to provide wheelchair user access and an adjacent wheelchair accessible toilet.

The other variant of sleeper coach currently in operation with Caledonian Sleeper is the SLEP (Sleeper Either Class Pantry). These coaches have 12 rooms, two toilets and a pantry facility on board, which includes a water boiler, microwave, sink, storage, USB charging points and staff rest facilities.

The proposal of not including SLEPs in the formation is not recommended, both from the perspective of guest service provision and staff facilities. The following describes the reasons for this;

- Service provision; relying solely on the lounge car for food and drink delivery is a significant risk on two fronts. a) it creates a single point failure for provision of hot food and beverages, and b) pantries are essential for peak periods, especially for morning (breakfast service), to ensure guests are served in a timely manner.
- Pantries provide staff facilities, for storing equipment, charging communication devices, resting and monitoring the coach(es).

In addition to the above considerations, the current proposed Inverness portion (SLED – Mark 3 TSO) has no pantry or lounge facilities at all, post service split.

As such, as an absolute minimum, it is proposed that the proposed SLE coaches are replaced by SLEPs and consideration be made as to whether pantry facilities would be required on any Inverness portion.

Rake formation

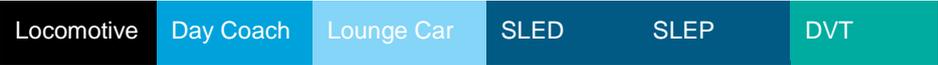
The fixed rake formation positions the SLED against the DVT, with the SLE next to the Lounge Car. This formation prevents a wheelchair bound guest from accessing the Lounge Car, so it is highly recommended that the SLED is always positioned against the Lounge Car, orientated, so that there is wheelchair access to the lounge itself.

Taking into consideration the above, sections 4.1.2 and 4.1.3, will use the following revised formations as a basis for discussion and proposals;

- Formation with an Inverness portion;



- Fixed rake formation;



Interface Considerations

In order that the proposed DVT (Mark 3) retains full system functionality with the proposed locomotives, there will almost certainly be some level of modification required*, to the locomotives, DVTs or both.

*Over time, different fleets of DVTs have undergone varying modifications to operate in specific formations. Any interface compatibility issues (and solutions) will be based on the combination of the locomotives selected and specific DVTs that are cascaded.

4.1.2 Trial Operation Period

The likely upfront cost and time implications of introducing refurbished, modified or new rolling stock would be significant. As a result, it is proposed that in the first instance, to manage the scale of the initial investment and to allow the MT2G service to be tested in a more timely and cost efficient manner, the stock being cascaded from Caledonian Sleeper be utilised.

All Mark 3 sleeper coaches currently operating on Caledonian Sleeper services are leased from Porterbrook. All Mark 2 coaches, apart from where stated otherwise, are currently owned by Caledonian Sleeper.

The handback and disposal plan for the Mark 2 and Mark 3 coaches is already being implemented with a percentage of both Mark 2 and Mark 3 coaches already committed to other users, or in the case of eight Mark 3 coaches due C3 overhaul being scrapped.

Whilst there are currently appropriate day and sleeper coaches available, there is a significant risk that if HITRANS or another appropriate body does not agree that the necessary coaches are stored serviceable in case the trial operation comes to fruition, then appropriate Mark 2 and Mark 3 coaches may not be available at all. Assuming such a commitment can be made in a timely manner, then based on current availability, below is a list of coaches that are potentially available for use as part of a trial;

Table 8: Potential Coach and Coach Type Availability

Coach type	Potential coaches
Mark 3 SLEP	10542, 10527, 10561, 10605, 10522, 10526
Mark 3 SLED	10699, 10680, 10689, 10722, 10718
Mark 2 RLO	6702, 6705, 6706, 6708
Mark 2 BUO	9800 [^] , 9802, 9803, 9804, 9805, 9809, 9810
Mark 2 BSO (temporary lease)	9497 [^] , 9507 [*] , 9513 [^] , 9526 [*]

[^] = owned by Eastern Rail Services

^{*} = owned by Riviera Trains

Also of note, is that the proposed formations do not include DVT, due to it not being cost effective to introduce DVTs for a potentially very short period of time; the implications of introducing DVTs would result in the need for the through control to the locomotive to be made compatible. Instead an additional SLEP is proposed in each rake. In this instance BUO or BSO coaches would provide both freight carrying capacity and incorporate an emergency handbrake.

In order to operate for a trial period, using the cascaded stock, a derogation against PRM:TSI would need to be applied for and granted (see 4.2.2 for further details).

On that basis that derogation is granted, the formation using stock solely cascaded from the current Caledonian Sleeper franchise is proposed as follows:

- Formation with an Inverness portion;

Locomotive	SLEP	SLED	Mark 2 BUO*	Mark 2 BUO*	Mark 2 RLO	SLED	SLEP
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- Fixed rake formation;

Locomotive	Mark 2 BUO*	Mark 2 RLO	SLED	SLEP	SLEP
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*Caledonian Sleeper currently operate BUO seated sleeper coaches, with reclining seats. These are unique to the 11 Caledonian Sleeper BUOs. It is feasible that alternative Mark 2 or Mark 3 day coaches could be utilised instead of BUOs. Currently Mark 2 BSO coaches are used on occasion on the Edinburgh Waverley – Fort William portion of the Caledonian Sleeper London Euston – Fort William Highlander route.

4.1.3 Full Service Introduction

Should a successful trial operation phase go ahead and approval be granted for a permanent service introduction, there are two options for rolling stock provision; refurbished or new coaches.

Of the two sleeper operations that currently operate in the UK, one operates with refurbished Mark 3 rolling stock (the GWR operated Night Riviera) and the other, Caledonian Sleeper, will be introducing new CAF built Mark 5 coaches during 2019.

The following will provide an overview of the formation options and considerations for both rolling stock types.

Refurbished Rolling Stock

Utilising existing stock, there are two main options. The first of which is retaining the formation with the existing stock, as used in the trial, illustrated in section 4.1.2.

Alternatively, a consist more closely aligned to formations proposed in the initial feasibility study, using a combination of existing stock and cascaded Mark 3 day coaches and driving trailers is illustrated below:

- Formation with an Inverness portion;



- Fixed rake formation;



New Rolling Stock

If new stock were to be procured, it would be more efficient to order additional coaches of the same configuration as the Caledonian Sleeper Mark 5s, as opposed to varying the design significantly. The formations below reflect this approach, with the addition of a DVT; the Mark 5 DTSO, which is currently being delivered for Trans Pennine Express (TPE):

- Formation with an Inverness portion;



- Fixed rake formation;



It should be noted that a risk when considering the option for new rolling stock would be the ability for the manufacturer to produce such a small number of varied vehicles.

4.2 Trial Operations Rolling Stock Considerations

As stated in section 4.1, it is recommended that any trial operation phase utilise existing coaching stock.

The following section summarises a number of the key considerations that should to be taken into account as part of the introduction of a trial operation MT2G service.

4.2.1 Person with Reduced Mobility Requirements

UK legislation requires all passenger rail vehicles to be compliant with the Technical Specification for Interoperability – Person with Reduced Mobility (PRM:TSl), and Rail Vehicle Accessibility (Non-Interoperable Rail System) Regulations 2010, RVAR, by 1st January 2020. This deadline is enforced by Regulation 45 of the Railways (Interoperability) Regulations 2011 (RIR 2011) such that it is unlawful for a passenger rail vehicle to be used in service on the trans-European rail system in the UK after 31 December 2019 if it does not comply with PRM:TSl.

However, there are individual cases where it is expected that fleets will operate beyond 2020 because it is not feasible, or practical, to modify the fleets to be compliant or there are already existing modification programmes in place. Therefore, in some instances, derogations have

been granted from the Department for Transport, DfT. The exceptions to compliance with PRM:TSI can take the of the following form;

- A derogation from part of the PRM:TSI has been granted under Regulation 14 of RIR 2011;
- A determination that part of the PRM:TSI does not apply has been made under Regulation 13(8) of RIR 2011; or
- A dispensation that part of the PRM:TSI does not apply has been granted under Regulation 46 of RIR 2011.

Considering the rolling stock options outlined previously, it is expected that if the MT2G service was to enter in to service, exemptions from PRM:TSI would be required. These would only be granted if sufficient mitigating measures could be shown to be in place.

It should be noted that the two existing sleeper services in the Britain, the Serco operated Caledonian Sleeper and the Great Western Railway (GWR) operated Night Riviera, both have been granted exemptions from PRM:TSI, due to the novel nature of a sleeper service. Therefore, parallels can be drawn from their exceptions to PRM:TSI when considering the proposed MT2G service.

The Night Riviera service operates a fleet of Mark 3 sleeper and day coaches and therefore is the most comparable to a proposed trail operation service for MT2G. GWR decided not to replace their Mark 3 coaching stock, but instead they have refurbished their coaches and have been granted dispensation for a number of sections of PRM:TSI 2008. These have been granted in consultation with The Disabled Persons' Transport Advisory Committee.

It should be noted that as part of the Night Riviera refurbishment, automatic plug doors were not installed. The original manual operation slam doors, with drop light windows were retained, as is illustrated in the below image.

With regards to the use of slam doors and drop light windows, all train operating companies have been requested to review the risks associated with drop light windows as a result of a number of fatalities caused by improper use. The operating companies must demonstrate the risks are being managed and mitigated in a proper manner.

The MT2G service would be comparable to the Night Riviera service and therefore, it may be assumed that there would be similarities in the exemptions granted. Appendix A describes the sections of PRM:TSI 2008 that the Night Riviera service does not comply with, corresponding to the following vehicle classifications RFM/RLO, SLEP, SLED, TSD and BSO.



Figure 1: Great Western Railway Night Riviera Coach with Manual Operation Slam Doors

4.2.2 Fleet Reliability Improvements

At present, there are some systems on the existing Caledonian Sleeper stock that are known to be problematic to maintain 'in rake'. It is strongly recommended that during any period of fleet down time, prior to the commencement of the MT2G service, that reliability improvements that are difficult to undertake while the fleet is committed to service operation.

On the basis that budget is likely to be limited, especially in advance of a trial period, which is likely to be in the region of 12-18 months, any reliability improvements need to be relatively low cost, high impact. Examples for Mark 3 coaches are:

- Overhauling automatic door systems (actuator assemblies and door leaves) on SLED accessible rooms (room 1);
- Overhauling of accessible toilet doors on SLEDs.

Examples for Mark 2 coaches are:

- Overhauling of internal sliding doors;
- Service/overhaul of HVAC system.

Once potential coaches for operating the MT2G service are identified, it is recommended that a survey of the stock be undertaken to prioritise any reliability improvement work. It would need to be established that such works were value for money.

4.2.3 Cosmetic and Branding Modifications

There are a number of cosmetic and branding modifications that could also be undertaken, budget permitting.

The two key cosmetic areas that could be addressed on the existing stock are the exterior livery and the soft furnishings.

The two options available for re-livery are:

- Full vinyl wrap, as per the Caledonian Sleeper franchise launch vehicles, whereby base colour(s), all branding and logos are applied in one process, or;
- Re-paint, with vinyl branding and logos.

Below are examples of a vinyl wrapped Mark 3 sleeper (left) and painted Mark 2 BSO (right).



Figure 2: Vinyl Wrap Mark 3 Sleeper (Left) and Painted Mark 2 BSO (Right) [1]

The soft furnishings that would have a positive impact throughout all coaches are the carpets, especially those in corridor areas and barrier matting in vestibule areas.

In addition, reupholstering the seats and curtains in the RLO and BUO coaches would give a positive impact without significant outlay.

4.3 Long Term Rolling Stock Considerations

During the initial trial operation period, once sufficient understanding is gained to give greater insight into the demands on the service, the rolling stock options of the service should be reconsidered.

The two long term rolling stock options of refurbishing existing stock or procuring new are considered below.

4.3.1 Refurbishing Existing Stock

Any refurbishment programme is likely to require Mark 3 coaches, which have been cascaded from other operations. At present, the most likely source of suitable Mark 3 driving van trailers (DVT) and seated (day) coaches are currently operating on the Abellio Greater Anglia franchise and are due to come off lease at the end of 2019. In a similar vein to the sleeper coaches, if an expression of interest is not raised by HITRANS, there is a risk that coaches are either committed elsewhere, or sold on for breaking. Mark 3 lounge cars could also be sourced, but Mk2 RLOs would remain a viable option.

As part of any refurbishment proposal, an assessment of the fleet's Level 5 exam status is required, to fully understand and plan for any exam/overhaul due dates.

By way of example, the Caledonian Sleeper Mark 3 coaches were undergoing a C3 exam at 500,000 miles and some coaches will be due towards the end of their lease period.

Any refurbishment programme would need to consider whether PRM:TSl compliance can be improved against unmodified stock. It is assumed that if refurbished stock is to be used, an approach consistent with that of the Night Riviera service be adopted.

Below is a list of potential areas that a refurbishment could focus on;

- Improving compliance to PRM:TSl, and any further standards (e.g. wheelchair space in seated coach);
- Installation of Wi-Fi and/or Infotainment systems;
- Upgrading of lighting to LED system;
- Internal refurbishment of rooms, especially the sink area;
- Refurbishment/replacement/relocation of seats in the selected seated/day coaches;

The image below illustrates the refurbished Night Riviera rooms.



Figure 3: Night Riviera Refurbished Room [2]

4.3.2 New Rolling Stock

The timescale for delivery and cost of new rolling stock would be significant. To be at all viable, the options for new rolling stock would be recommended to be the same in key design features to that of the new Caledonian Sleeper coaches. As well as traditional accommodation types, the Mark 5 sleeper coaches include a mixture of en-suite cabins and double beds.

The lounge (Club) is fitted with a larger galley style kitchen than the existing lounge coaches. The Club coaches also include a staff rest area and a guard's compartment.

The seated coaches have the same capacity as the current BUO coaches, a guard's compartment and luggage/cycle storage, with the added feature of a small service point, with a boiler, holding oven and trolley for the provision of refreshments.

In addition to the introduction of the Caledonian Sleeper Mark 5s, Trans Pennine Express (TPE) are also introducing a fleet of Mark 5A coaches, which include a Driving Trailer Standard Open (DTSO) coach.

It is recommended that the basic arrangement of a DTSO coach selected for MT2G should be consistent with the TPE design, with the potential reduction in seating capacity and inclusion of a secure area for the transport of light freight items.

It is assumed that any new stock would achieve the same level of PRM:TSI compliance as the new Caledonian Sleeper coaches by demonstrating areas of commonality.



Figure 4: Caledonian Sleeper Mark 5 Coach [3]



Figure 5: Caledonian Sleeper Mark 5 Coach [4]



Figure 6: TransPennine Mark 5A [3]

5 Servicing and Maintenance

The servicing and maintenance of the fleet is a key consideration for the proposed internal Scottish sleeper service. As the service will run along a single route, with the northbound service operating from the Central Belt and the southbound service operating from Caithness (and potentially Inverness, depending on the fleet configuration), there will be a requirement to have servicing provisions in the Central Belt, Caithness and potentially Inverness.

This section will explore the options for servicing and maintenance providers and where the servicing and maintenance of the fleet would be carried out.

5.1 Servicing Facilities

All locations where coaches are stabled between services must have provisions for daily servicing activities, including:

- A suitable shore supply;
- Infrastructure to enable interior cleaning of the coaches, including the making up of beds;
- CET facilities;
- Tanking facilities.

In addition, all locations should have the ability to undertake limited rectification of defects reported in service.

Consideration also needs to be given to the removal and storage of linen, storage of disposables/consumables required for service and control and disposal of CET waste.

5.1.1 Servicing in the Central Belt

In the Central Belt, Polmadie Traction & Rolling Stock Maintenance Depot (Polmadie) is the obvious location for servicing, as it currently services sleeper coaches on a daily basis and has the facilities and infrastructure in place to undertake and support any required servicing.

In addition to the above, Polmadie also has train washing facilities, so the north bound services would be washed every day as part of planned servicing activities.

5.1.2 Servicing in the North

There are a number of potential options for the location of the servicing facility for the service terminating in Caithness.

There are three potential locations:

- Thurso station;
- Wick station, or;
- Georgemas Junction.

Thurso is the planned termination point for the northbound services and is the preferred location for servicing; however, both Georgemas Junction and Wick station were considered as potential sites.

The following figure illustrates the existing stabling road, an old Motorail siding, at Thurso station which would provide an appropriate location for the servicing facilities in Caithness.



Figure 7: Existing Stabling Road at Thurso Station

The existing stabling road would provide the location of the required facilities to be installed. The outpost servicing facilities that would be required for this road are a shore supply, CET plant and a tanking supply. In addition suitable facilities and storage to enable cleaning and making up of the coaches prior to service would need to be identified. Similar facilities currently exist at Fort William for the Caledonian Sleeper service.

For a trial operation period, temporary power supply solutions from providers such as Aggreko could be installed relatively quickly and cost effectively. Additionally there is the option of using mobile CET and tanking equipment.

It has been assumed that small scale works such as these can be undertaken under Network Rail's Permitted Development rights.

It should be noted that the area to the right of the stabling road, illustrated in the above figure has been granted planning permission for a Premier Inn to be built. The site plan can be viewed in Appendix B. The proposed development does not appear to impede access to the servicing facilities; the proposed boundary of the development appears to stop well clear of the stabling road and the proposed access to proposed development is on the opposite side of the land, near the buildings in the top right of the figure.

Other Potential Sites

Georgemas Junction is the site of a Direct Rail Services facility and has a number of land owners surrounding the potential site which could therefore create a number of issues when securing access and approval for maintenance facilities.

Wick station has four unused roads, but only one currently has tracks still in place. It should be noted that all roads are heavily overgrown and dilapidated and there is significant drainage issues on the approach and at the points in to the sidings from the running line. Therefore, the investment in to the infrastructure at Wick station to enable servicing would be significant and would also require the rake to be moved from the end destination of Thurso and returned prior to service. Further information on both of the above sites can be viewed in Appendix C.

5.1.3 Inverness Option

Another consideration for the servicing facilities would be the requirement at Inverness, if a portion of the service was to attach and detach at Inverness. This would mean that there would need to be an interface with the existing facilities at Inverness and a guarantee that there would be capacity for stabling during the day. Furthermore, consideration would also need to be given to the other train operating companies who utilise Inverness as a depot and any future building works to ensure that access to the depot could be guaranteed. This could be achieved by entering in to a depot access agreement. The facilities already exist for CET, tanking, interior cleaning and servicing as Inverness. These facilities are currently used by both ScotRail and Caledonian Sleeper and are split between the maintenance depot and the platform facilities.

5.2 Maintenance Providers

Although there are plenty of options for servicing facilities, throughout rail operations in Scotland there are limited maintenance providers currently operating. Abellio ScotRail have in-house capabilities for the maintenance of their fleets and contract out major overhaul and modification programmes. Serco Caledonian Sleeper currently have a contract with Alstom to provide level one to four maintenance for the Mark 2 and Mark 3 coaches, with level five maintenance being contracted out separately. This arrangement will change throughout 2019 and Alstom will take on responsibility for level one to five maintenance.

The existing sleeper stock operates on an S, A and balanced B exam regime, with S exams carried out prior to entry into service from all locations, A exams carried out every 8 operational days at Polmadie and B1-8 exams carried out sequentially every 66 operational days (with a current backstop of 72 days), again at Polmadie.

The exam regime for any new stock will use different terminologies and periodicities, but is highly likely to break down into three main exam groupings, as above.

For the MT2G service, the full rakes will either start or finish in the Central Belt every night therefore it would be advantageous to base the maintenance of the fleet within the Central Belt. Furthermore, during the trial period it would be beneficial for the maintenance provider to have prior experience maintaining the fleet and the key facilities are already in place to address all the maintenance requirements.

Thus, considering the above points and the options for maintenance providers in Scotland, it is recommended that MT2G contract out all maintenance to a provider in the Central Belt, based on the following reasons:

- The experience and facilities already exist in the Central Belt;
- If the service is run with an Inverness portion, the fully formed rakes will only be stabled in the Central Belt (i.e. Caithness will never stable a 'full' rake).
- In addition, based on the planned timetabling, the window for servicing between arrival and departure will be considerably longer in the Central Belt

It is recommended that the maintenance provider be contracted to provide level one to five maintenance. Thus, all maintenance of the fleet would be carried out by one provider.

However, it should be noted that under similar arrangements, there are instances where level five maintenance is subcontracted to a separate provider.

6 Service Operators

The operational aspect of a service such as MT2G is a significant consideration prior to the conception of the service. A number of potential operators were identified and consulted on all aspects of the service.

6.1 Potential Operators

The potential operators consulted as part of this work are as follows;

- Serco Caledonian Sleeper;
- Abellio ScotRail;
- Rail Operations Group;
- Direct Rail Services;
- First Rail – First Group.

The operators considered within this study do not account for all the potential options and other operators could still be considered if the operation of MT2G went out to competitive tender. A further option could be that of an independent operator who has an open access agreement. The operators considered within this study expressed an initial interest within the timeframe of this feasibility study and all have unique aspects to be considered.

The following sections provide overview details for the operators consulted, whilst the discussions had can be found in Appendix D. Initial contact was made with both Direct Rail Services and First Rail – First Group PLC but subsequently at the present time neither operator could provide further involvement with the feasibility of the MT2G service.

6.1.1 Serco Caledonian Sleeper

Serco Caledonian Sleeper currently operate the sleeper service between Scotland and London. They provide two cross-border trains to and from London per night, the Lowlander serving Glasgow and Edinburgh and the Highlander serving Aberdeen, Inverness and Fort William. The currently operated rolling stock in Mark 2 and Mark 3 but they will be replaced with CAF Mark 5s in spring 2019.

Serco have operated this service since April 2015 and will own the franchise for a 15 year period

6.1.2 Abellio ScotRail

Abellio ScotRail is the Dutch owned national train operating company, TOC, of Scotland. They operate routes across Scotland, as well as operating stations and maintenance depots. ScotRail operate a varied fleet but notably the introduction of Hitachi 385's and refurbished HST in ongoing.

Previous to Serco obtaining the Caledonian Sleeper franchise, ScotRail operated the cross-border sleeper service.

6.1.3 Rail Operations Group

Rail Operations Group, ROG, predominately specialises in ad-hoc movement of rolling stock for rolling stock operating companies, as well as train operating companies. They provide locomotive hire services and the operate charter trains. They have an open access passenger licence but this is currently not used.

6.1.4 Direct Rail Services

Direct Rail Services, DRS, is a wholly owned subsidiary of the Nuclear Decommissioning Authority (NDA). Their key services are as follows;

- Intermodal Freight
- Specialist Freight
- Rail Network Infrastructure Support
- Major Infrastructure Project Support
- Passenger & Train Operating Company Support
- Fleet Maintenance
- Rail Transport Consultancy

DRS is an open access operator and currently have a fleet of locomotives that have a variety of different uses for different clients. This includes the movement of nuclear material and intermodal freight, as well as providing locomotives for the movement of passenger services.

6.1.5 First Rail – First Group

First Rail operate three rail franchises at the present time – Great Western Railway, South Western Railway and TransPennine Express. They also operate one open access passenger rail service, Hull Trains. Furthermore, they operate the London Trams service on behalf of Transport for London.

They have experience in operating the following types of passenger railways;

- Intercity
- Commuter
- Regional
- Sleeper

First Rail previously operated the ScotRail franchise as well as the Caledonian Sleeper franchise prior to Abellio and Serco respectively. At present they operate the TransPennine Express franchise which operates between Edinburgh and Glasgow and the major cities on Northern England, as well as the Riviera sleeper service, as part of the Great Western Railway operation. This has the potential to offer connections between the MT2G service and services that travel south to destinations such as Manchester Airport.

6.2 Operator Analysis

Further to the discussions had with potential operators of the MT2G service, it was determined that the following characteristics would be desirable to have from an operator:

- Established presence with Scotland;
- Prior knowledge of potential fleet;
- Prior experience of operating a sleeper service;
- Existing commercial relationships;
- A relationship with a maintenance provider;
- A relationship with a locomotive provider, if required;
- Opportunities to further develop the service, for example improve connectivity within Scottish transport links or develop the potential logistic prospects.

This is not an exhaustive list but provides the key characteristics to be considered for potential operators.

7 Conclusions

This report has examined the feasibility of the rolling stock options and associated matters for the proposed Midnight Train to Georgemas (MT2G) sleeper service.

It is recommended that a trial operation period be undertaken to ensure that this service could meet the expectations that would be set for it. It is anticipated that the trial period would be a period of 12 to 18 months and should capture both high and low tourist seasons. This period would also allow the operational aspects of the service to be negotiated, prior the full commitment required for a full time service.

The recommended rolling stock for the trial operation phase would be the Mark 2 and Mark 3 coaches, currently operating the Caledonian Sleeper franchise. Stakeholder engagement to clarify the availability of the coaching stock is required urgently.

Cascaded coaches would provide all the requirements for the service without the significant commitment to substantial modification programmes or the investment in to new rolling stock. The fleet would benefit from some basic component overhaul programmes prior to entry in to service. The period prior to entry in to service would also provide the opportunity to review any works to the coaches that cannot be completed when the coaches are in service.

During the trial period, it would be recommended that a review the rolling stock options be undertaken. This should include an understanding of the fleet performance and ongoing availability of both the Caledonian Sleeper and Night Riviera services, which will help inform any decision on the potential use of existing or new rolling stock for the service.

Throughout the proposed trial period and in to full service commencement, it is recommended that the maintenance provider for the rolling stock would have existing fleet knowledge and be based within the Central Belt. This would reduce the investment required to the outpost station, whereby the requirements would be limited to CET and tanking facilities, interior cleaning and defect rectification. As a full rake would be either starting or finishing service on a daily basis in the Central Belt of Scotland utilising, the maintenance facilities there would simplify the maintenance planning activities. The outpost station should utilise the stabling road at Thurso as this would again be the most cost effective solution.

The interest shown by potential operators during this feasibility study highlights that the interest to operate an internal Scottish sleeper service exists, both within operators that have prior experience of operating a sleeper service and out with. It is recommended that during any trial operational phase, the operator should be one with prior experience. This would provide the opportunity to expand on existing operations as opposed to having to develop a new business model and enter in to contractual agreements without the guarantee of the service operating indefinitely.

During the course of this study it has shown that the Midnight Train to Georgemas represents an opportunity to re-establish only the third sleeper service within Britain. The prospect of improving the connectivity with Caithness and the Central Belt significantly adds to the interest of the service. The investigations undertaken for this study have highlighted that at this point in time there is availability of appropriate rolling stock as well as interested operators for the service. However, stakeholder engagement to gauge support and backing for the venture needs to establish feedback promptly, otherwise there is a risk that the rolling stock that is key to proving the service may not be available.

8 Recommendations

This study has demonstrated that there is currently the rolling stock available to operate the Midnight Train to Georgemas service. However, it has demonstrated that further work is required on certain aspects to fully understand the practicalities of the creation of a new sleeper service. It also recognises that at this moment in time there is a unique opportunity with the availability of rolling stock suitable for this service but the timeframe associated with the availability cannot be guaranteed.

It is recommended that budgetary costs associated with the rolling stock requirements be investigated fully. The costs will depend on what overhauls and modifications are required to the existing rolling stock prior to entry in to service. These costs will be dependent on the rolling stock chosen for the service and therefore, cannot be guaranteed until the rolling stock has been selected.

It is recommended that a fully costed study for ensuring Thurso is fit for purpose as a servicing outpost be undertaken. This would include the installation of a temporary power supply, adequate facilities for CET and tanking and facilities to enable interior cleaning and defect clearance.

Throughout this study, two options for fleet configurations have been proposed. To determine which configuration would be the most suitable for the service supplementary information is required on the timetabling constraints of the service. It is recommended that further work is carried out on the assessment of the feasibility for attaching/detaching, platforming and servicing of a potential Inverness portion.

9 References

- [1] "Caledonian Sleeper," April 2019. [Online]. Available: <https://www.sleeper.scot/>.
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Appendix A Night Riviera PRM:TSI Details

Table 9: Night Riviera PRM:TSI Dispensation Details

PRM TSI Clause		Requirement(s)	Commentary
4.2.2.4.2.1 paragraph 1	Automatic door obstacle detection	External passenger access, automatic and semi-automatic, doors shall incorporate devices that detect if they close on a passenger where a passenger is detected the doors shall automatically stop and remain free for a limited period of time.	Door signals are not deemed to be appropriate for a sleeper service. High levels of staff and long dwell times act as mitigation.
4.2.2.4.2.1 paragraphs 7-10	Audible warnings for door opening or closing	<p>When a door is enabled for opening a signal shall be given that is clearly audible to persons inside and outside the train. This alert signal shall sound for a minimum of five seconds unless the door is operated, in which case it may cease after 3 seconds. This requirement is not applicable for external audible signals on high speed Class 1 and Class 2 trains.</p> <p>When a door is automatically or remotely opened by the driver or other member of the traincrew, the alert signal shall sound for a minimum 3 seconds from the moment that the door starts to open.</p> <p>When a door that is automatically or remotely closed, is about to operate, an audible alarm shall be given to persons inside and outside the train. The alarm shall sound for a minimum of 2 seconds before the door starts to close and shall be different in tone to that used when the door is released. The alarm shall continue to sound while the door is closing.</p> <p>The sound source for door warnings shall be located in the area local to the control device or, if there is no such control device, adjacent to the doorway.</p>	Door signals are not deemed to be appropriate for a sleeper service. High levels of staff and long dwell times act as mitigation.

4.2.2.4.2.2	Visual illumination warnings for external door buttons	If pushbuttons are provided for operation of doors then each pushbutton shall have visual indication, on or around the push button, when enabled and shall be operable by a force not greater than 15 Newton's.																	
4.2.2.4.1 paragraph 1	Palm operable door controls	Door controls, whether manual or pushbuttons, shall contrast with the surface on which they are mounted.																	
4.2.2.10 paragraph 4	Handrail in doorway	A vertical handrail shall also be provided for stepping on and off the train. Doorways with up to two entrance steps shall be provided with vertical handrails on both sides of the doorway, fitted internally as close as practicable to the vehicle outer wall. They shall extend from 700mm to 1200mm above the threshold of the first step.	New handrail fitted to interior lock side of bodyside doorway only, providing compliant height range.																
4.2.2.5	Door step/threshold lighting	Vehicle access steps shall be illuminated to a minimum of 75 Lux, measured across 80% of the width of the step by a light placed within or immediately adjacent to it.	No low level lighting currently provided.																
4.2.2.12.1	Step/Gap between train and platform	<p>7.4.1.3.2 Specific case for Rolling Stock operating in Great Britain "P"</p> <p>As dg is a negative value the first step as defined in clause 4.2.2.12.1 will need to be removed when operating on GB lines. Under these circumstances the first useable step on GB lines GB shall comply with the following table:</p> <table border="1"> <thead> <tr> <th>mm</th> <th>δh mm</th> <th>$\delta v+$ mm</th> <th>$\delta v-$ mm</th> </tr> </thead> <tbody> <tr> <td>on a straight level track</td> <td>200</td> <td>230</td> <td>160</td> </tr> <tr> <td>on a track with a curve radius of 300m,</td> <td>200</td> <td>230</td> <td>160</td> </tr> <tr> <td>standard</td> <td></td> <td>case</td> <td></td> </tr> </tbody> </table>	mm	δh mm	$\delta v+$ mm	$\delta v-$ mm	on a straight level track	200	230	160	on a track with a curve radius of 300m,	200	230	160	standard		case		Stepping distances dependent upon platform positions.
mm	δh mm	$\delta v+$ mm	$\delta v-$ mm																
on a straight level track	200	230	160																
on a track with a curve radius of 300m,	200	230	160																
standard		case																	

		on a track with a curve radius of 300m, 255 230 160 Eurostar case	
4.2.2.9 paragraph 6	Clearways – handrails (SLED and SLEP only)	Where the clearway of the gangway is narrower than 1 000 mm and longer than 2 000 mm there shall be handrails or handholds provided in, or adjacent to, inter-vehicle gangways that are provided for passenger use.	
4.2.2.4.1 paragraph 1 4.2.2.4.3.1 paragraph 5	Force required to open internal sleeping berth doors (Sled and SLEP only)	To latch or unlatch a manually operated door, for use by the public, the control device shall be operable by the palm of the hand exerting a force not exceeding 20 Newtons. The force required to open or close a manual door shall not exceed 60 Newtons (applies to interior doors only).	The exterior handle of the bodyside door requires a force in the region of 15-18 N to operate so is considered to be compliant.
4.2.2.8.3 paragraph 13	Passenger Information System – Non-Sleeper carriages: After departing origin stations no further audio announcements will be made until final destination. Compliant visual displays will be provided. Traincrew make oral announcements for intermediate stations.	The train shall be fitted with a public address system which shall be used either for routine or emergency announcements by the driver or by another crewmember who has specific responsibility for passengers. It shall be possible to give information (both audible and visual) in more than one language. (The choice and number of languages shall be the responsibility of the Railway Undertaking having regard to the clientele of an individual train service.) The following information shall be provided: • Information concerning the route of the train The final destination or route of the train shall be displayed inside each vehicle. The system shall be used to announce the destination and next stop of the train, or on departure from, each stop.	Vehicle fitted with new compliant audio-visual PIS system fitted, but intention of operator to not provide audible announcements on intermediate station stop arrivals/destination to avoid disturbance to passengers sleeping in saloon areas. Formal derogation required stating that information to be provided verbally by Traincrew to appropriate passengers requiring intermediate station alighting. Visual displays will be operable
4.2.2.8.1 paragraph 7 4.2.2.8.3 paragraphs 3 & 14			

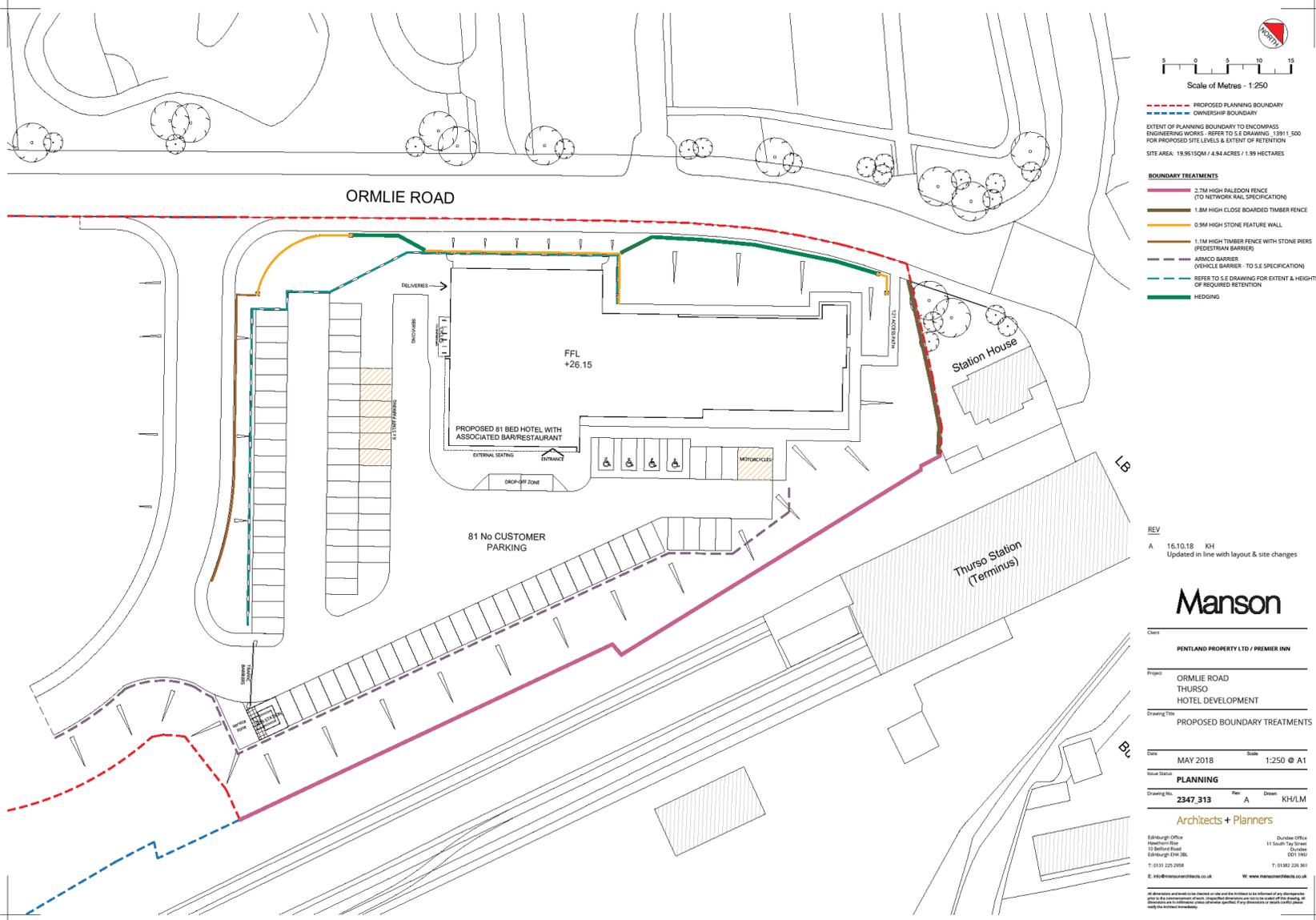
<p>4.2.2.8.3 paragraphs 4 & 16</p>	<p>Sleeper carriages: No audio or visual announcements. Staff wake passengers with intermediate tickets if required.</p>	<p>The next stop of the train shall be displayed such that it can be read from a minimum of 51% of passenger seats inside each vehicle. This information shall be displayed at least two minutes before arrival at the station concerned. If the next station is less than two minutes planned journey time away, the next station shall be displayed immediately following departure from the previous station.</p> <p>The (audible public address) system shall be used to announce the next stop of the train at least two minutes before the arrival of the train at that stop. If the next station is less than two minutes planned journey time away, the next station shall be announced immediately following departure from the previous station.</p>	
<p>4.2.2.8.1 paragraph 7</p>		<p>It shall be possible to give information (both audible and visual) in more than one language. (The choice and number of languages shall be the responsibility of the Railway Undertaking having regard to the clientele of an individual train service.)</p> <p>It shall be possible to give the following information:</p> <ul style="list-style-type: none"> • Safety Information and Safety Instructions in accordance with European or National Rules • Audible safety instructions in case of emergency • Warning, prohibition and mandatory actions signs in accordance with European or National Rules. • Information concerning the route of the train • Information concerning the location of on-board facilities 	
<p>4.2.2.8.3 paragraphs 4, 7 & 16</p>		<p>The next stop of the train shall be displayed such that it can be read from a minimum of 51% of passenger seats inside each vehicle. This information shall be displayed at least two minutes before arrival at the station concerned. If the next station is less than two minutes planned journey time</p>	

		<p>away, the next station shall be displayed immediately following departure from the previous station.</p> <p>The (audible public address) system shall be used to announce the next stop of the train at least two minutes before the arrival of the train at that stop. If the next station is less than two minutes planned journey time away, the next station shall be announced immediately following departure from the previous station.</p>	
<p>4.2.2.8.1 paragraph 4</p> <p>4.2.2.8.4 paragraphs 1 – 4</p>		<p>Visual information shall contrast with its background. Upper Case Letters and numbers used in front external displays shall have a minimum height of 70mm and on side displays 35mm on bodyside and internal indicators. Inside trains the font size shall be not less then 35mm for a reading distance in excess of 5000mm. 35mm display characters shall be considered to be legible up to a maximum viewing distance of 10000 mm.</p>	
<p>4.2.2.8.3 paragraphs 4, 8, 9, 13, 16, 17 & 18</p>		<p>The next stop of the train shall be displayed such that it can be read from a minimum of 51% of passenger seats inside each vehicle.</p> <p>The (visual passenger information) system shall be capable of giving announcements in more than one language. (The choice and number of languages shall be the responsibility of the Railway Undertaking having regard to the clientele of an individual train service.)</p> <p>If the (visual passenger information) system is automated, it shall be possible to suppress, or correct, incorrect or misleading information.</p> <p>The (audible public address) system may operate on a manual, an automated or pre-programmed basis. If the system is automated, it shall be possible to</p>	

		<p>suppress, or correct, incorrect or misleading information.</p> <p>The spoken information shall have a minimum RASTI level of 0,5, in accordance with IEC 60268-16 part 16, in all areas. The system shall meet the requirement at each seat location and wheelchair space.</p> <p>The (audible public address) system shall be capable of giving announcements in more than one language. (The choice and number of languages shall be the responsibility of the Railway Undertaking having regard to the clientele of an individual train service.)</p> <p>If the (audible public address) system is automated, it shall be possible to suppress, or correct, incorrect or misleading information.</p>	
<p>4.2.2.8.1 paragraph 3, 5, 6 & 7</p>		<p>Visual information shall be legible in all lighting conditions when the vehicle or station is operational. Descenders in Roman script shall be clearly recognisable and have a minimum size ratio of 20% to the upper case characters.</p> <p>Compressed descenders and ascenders shall not be used.</p> <p>It shall be possible to give information (both audible and visual) in more than one language. (The choice and number of languages shall be the responsibility of the Railway Undertaking having regard to the clientele of an individual train service.)</p> <p>It shall be possible to give the following information:</p> <ul style="list-style-type: none"> • Safety Information and Safety Instructions in accordance with European or National Rules • Audible safety instructions in case of emergency • Warning, prohibition and mandatory actions signs in accordance with European or National Rules. • Information concerning the route of the train 	

		<ul style="list-style-type: none"> Information concerning the location of on-board facilities 	
4.2.2.8.3 paragraph 16	Passenger information speakers RASTI levels.	The spoken information shall have a minimum RASTI level of 0,5, in accordance with IEC 60268-16 part 16, in all areas. The system shall meet the requirement at each seat location and wheelchair space.	The PA speakers are no being changed as part of this modification programme. The DfT has agreed that compliance with this requirement is not expected on vehicles manufactured prior to 1998.
4.2.2.6.2 paragraph 2	Width of standard toilet door.	The minimum door useable width shall be 500mm	
4.2.2.3	Number of wheelchair spaces.	According to the length of train, excluding locomotive or power head, there shall be in that train not less than the number of wheelchair spaces shown in the following table	Train length requires provision of two wheelchair spaces. Provision for one wheelchair in TSD vehicle and one wheelchair within an accessible berth in the SLED vehicle. Within TSD vehicle a single seat that can be used to transfer from a wheelchair is positioned adjacent to the wheelchair space.
4.2.2.11 paragraph 3	Number of accessible berths.	If a rail vehicle provides wheelchair accessible sleeping accommodation the exterior of the relevant vehicle door shall be marked with a sign in accordance with Annex N Clauses N.3 and N.4.	
4.2.2.12.3.6 paragraph 9	Dimensions of manual boarding ramp.	A ramp slope shall have a maximum value of 10.2° (18%) this maximum value may require assistance to the passenger	Based on platform height range of 890-915mm and vehicle floor height of 1200mm, ramp angle (1680mm ramp length) ramp slope will be between 11.3° to 10.3°

Appendix B Thurso Station - Planning Permission for Premier Inn



REV
A 16.10.18 KH
Updated in line with layout & site changes

Manson

Client: **PENTLAND PROPERTY LTD / PREMIER INN**

Project: **ORMLIE ROAD
THURSO
HOTEL DEVELOPMENT**

Drawing Title: **PROPOSED BOUNDARY TREATMENTS**

Date: **MAY 2018** Scale: **1:250 @ A1**

Issue Status: **PLANNING**

Drawing No: **2347_313** Rev: **A** Drawn: **KH/LM**

Architects + Planners

Edinburgh Office: 11 South Tree Street, Edinburgh EH4 3EL, T: 0131 225 2958, E: info@mansonarchitects.co.uk
Dunfermline Office: 13 South Tree Street, Dunfermline, T: 01382 226 361, W: www.mansonarchitects.co.uk

All dimensions and levels to be checked on site and to be linked to a reference of any discrepancies. Plans are to be constructed to scale. Contractors are to refer to the scale of the drawings. All dimensions are to be taken from the centre line of the structure. If a dimension or detail is not shown, it shall be taken from the centre line.

Appendix C Georgemas Junction and Wick Station Out Station Sites



Figure 8: Georgemas Junction Out Station Site



Figure 9: Wick Station Out Station Site



Figure 10: Wick Station Out Station Site

Appendix D Potential Operator Feedback

The proposed internal Scottish sleeper would provide an opportunity for a number of operators to expand on their current franchise agreements. A significant amount of the operators have previous experience operating a successful sleeper service and could transfer the knowledge gained from operating a cross border sleeper service to the proposed internal Scottish sleeper. Additionally, all the operators that were engaged have experience of moving coaches and dropping off and shunting coaches mid journey.

Furthermore, a number of operators could provide arrangements for the recommended fleet of Mark 2 and 3 coaches. This includes extending the lease in some cases or owning vehicles in others. There are operators that currently own options for the locomotives of the fleet as well. However, through the discussions it was noted that if a locomotive was used at both ends this would increase both the running and maintenance costs. However, if a single loco was used with a DVT the through control between the DVT and locomotive would need to be considered.

In the case of extending leases on vehicle it should be noted that all the operators have relationships to some degree with locomotive providers, maintenance providers and also extending to the commercial side of running a sleeper service.

With regards to maintenance contracts the suggested option would be to have a single maintenance provider for level one to five maintenance. This would ensure a single point of contact for the whole fleet's maintenance. It was also suggested that the maintenance plan be reviewed and ensured it was fit for purpose. This would consider both the mileage and line speed and as a result a new maintenance regime could be created. If there is potential to optimise the maintenance regime could it be made less onerous? Is there an opportunity to use field maintenance providers or train drivers to be technically competent? If this was possible this would aid the resource planning of the service.

There are instances where operators currently have staff based within the proposed route where as in other cases the staff would need to be sought to operate the service.

It was suggested that the trial of the service should be as low cost as possible, to guarantee this the route that the sleeper service would serve should be investigated. The inclusion of a stop at Inverness has the potential to increase the operational cost drastically and may not provide the benefit in passenger numbers required to balance the cost. If Inverness was not included, the operation of the sleeper service would simplify significantly. The route would then become Caithness to the Central Belt of Scotland directly.

It should be noted that the congestion currently experienced on the Highland Mainline might impact the MT2G service and it was suggested that the route would need to go via Aberdeen and Inverness. A further issue with congestion would be encountered at Edinburgh Waverley. This has the ability to be managed but the access to the station will dictate the cost of the service.

A number of potential operators currently operate services that could provide further connectivity to the MT2G service. The options for further connectivity include, ferry services, rail travel across Scotland and rail travel to cities in northern England.

One potential operator is currently acquiring two flex units which are 100mph and go anywhere. They have employed a consultant to assess the logistics market and are considering an Anglo-Scottish service. This has the potential to connect the sleeper service with a cargo train for logistics purposes. One option would be a High Speed Train, HST, converted with a class 91 locomotive. Further to this, they are currently optioneering for a 125mph non-stop logistics service but this will require buy-in from logistics companies.

Amendment Record

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