High Speed Rail Study
Phase 2 Report

Appendix Group 7
Procurement, institutional appraisal and implementation plan
In accordance with the east coast high speed rail (HSR) study terms of reference, AECOM and its sub-consultants (Grimshaw, KPMG, SKM, ACIL Tasman, Booz & Co and Hyder, hereafter referred to collectively as the Study Team) have prepared this report (Report). The Study Team has prepared this Report for the sole use of the Commonwealth Government: Department of Infrastructure and Transport (Client) and for a specific purpose, each as expressly stated in the Report. No other party should rely on this Report or the information contain in it without the prior written consent of the Study Team.

The Study Team undertakes no duty, nor accepts any responsibility or liability, to any third party who may rely upon or use this Report. The Study Team has prepared this Report based on the Client’s description of its requirements, exercising the degree of skill, care and diligence expected of a consultant performing the same or similar services for the same or similar study, and having regard to assumptions that the Study Team can reasonably be expected to make in accordance with sound professional principles. The Study Team may also have relied upon information provided by the Client and other third parties to prepare this Report, some of which may have been verified or checked for accuracy, adequacy or completeness. The Report must not be modified or adapted in any way and may be transmitted, reproduced or disseminated only in its entirety. Any third party that receives this Report, by their acceptance or use of it, releases the Study Team and its related entities from any liability for direct, indirect, consequential or special loss or damage whether arising in contract, warranty, express or implied, tort or otherwise, and irrespective of fault, negligence and strict liability.

The projections, estimation of capital and operational costs, assumptions, methodologies and other information in this Report have been developed by the Study Team from its independent research effort, general knowledge of the industry and consultations with various third parties (Information Providers) to produce the Report and arrive at its conclusions. The Study Team has not verified information provided by the Information Providers (unless specifically noted otherwise) and it assumes no responsibility nor makes any representations with respect to the adequacy, accuracy or completeness of such information. No responsibility is assumed for inaccuracies in reporting by Information Providers including, without limitation, inaccuracies in any other data source whether provided in writing or orally used in preparing or presenting the Report.

In addition, the Report is based upon information that was obtained on or before the date in which the Report was prepared. Circumstances and events may occur following the date on which such information was obtained that are beyond the Study Team’s control and which may affect the findings or projections contained in the Report, including but not limited to changes in ‘external’ factors such as changes in government policy; changes in law; fluctuations in market conditions, needs and behaviour; the pricing of carbon, fuel, products, materials, equipment, services and labour; financing options; alternate modes of transport or construction of other means of transport; population growth or decline; or changes in the Client’s needs and requirements affecting the development of the project. The Study Team may not be held responsible or liable for such circumstances or events and specifically disclaim any responsibility therefore.
Appendix 7A

Institutional appraisal
Appendix 7A

Institutional appraisal

Prepared for
Department of Infrastructure and Transport

Prepared by
AECOM Australia Pty Ltd
Level 21, 420 George Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
T +61 2 8934 0000  F +61 2 8934 0001  www.aecom.com
ABN 20 093 946 925

March 2013

AECOM in Australia and New Zealand is certified to the latest version of ISO9001 and ISO14001.

© AECOM Australia Pty Ltd (AECOM). All rights reserved.

In accordance with the east coast high speed rail (HSR) study terms of reference, AECOM and its sub-consultants (Grimshaw, KPMG, SKM, ACIL Tasman, Booz & Co and Hyder, hereafter referred to collectively as the Study Team) have prepared this report (Report). The Study Team has prepared this Report for the sole use of the Commonwealth Government: Department of Infrastructure and Transport (Client) and for a specific purpose, each as expressly stated in the Report. No other party should rely on this Report or the information contain in it without the prior written consent of the Study Team.

The Study Team undertakes no duty, nor accepts any responsibility or liability, to any third party who may rely upon or use this Report. The Study Team has prepared this Report based on the Client's description of its requirements, exercising the degree of skill, care and diligence expected of a consultant performing the same or similar services for the same or similar study, and having regard to assumptions that the Study Team can reasonably be expected to make in accordance with sound professional principles. The Study Team may also have relied upon information provided by the Client and other third parties to prepare this Report, some of which may not have been verified or checked for accuracy, adequacy or completeness. The Report must not be modified or adapted in any way and may be transmitted, reproduced or disseminated only in its entirety. Any third party that receives this Report, by their acceptance or use of it, releases the Study Team and its related entities from any liability for direct, indirect, consequential or special loss or damage whether arising in contract, warranty, express or implied, tort or otherwise, and irrespective of fault, negligence and strict liability.

The projections, estimation of capital and operational costs, assumptions, methodologies and other information in this Report have been developed by the Study Team from its independent research effort, general knowledge of the industry and consultations with various third parties (Information Providers) to produce the Report and arrive at its conclusions. The Study Team has not verified information provided by the Information Providers (unless specifically noted otherwise) and it assumes no responsibility nor makes any representations with respect to the adequacy, accuracy or completeness of such information. No responsibility is assumed for inaccuracies in reporting by Information Providers including, without limitation, inaccuracies in any other data source whether provided in writing or orally used in preparing or presenting the Report.

In addition, the Report is based upon information that was obtained on or before the date in which the Report was prepared. Circumstances and events may occur following the date on which such information was obtained that are beyond the Study Team's control and which may affect the findings, or projections contained in the Report, including but not limited to changes in 'external' factors such as changes in government policy; changes in law; fluctuations in market conditions, needs and behaviour; the pricing of carbon, fuel, products, materials, equipment, services and labour; financing options; alternate modes of transport or construction of other means of transport; population growth or decline; or changes in the Client's needs and requirements affecting the development of the project. The Study Team may not be held responsible or liable for such circumstances or events and specifically disclaim any responsibility therefore.

March 2013
Quality Information

Document: Appendix 7A

Ref: 60238250-6.0-REP-0601-7A

Date: March 2013
Table of Contents

1.0 Introduction 6
   1.1 Background 6
   1.2 Key considerations 6
      1.2.1 Relevant issues 6
      1.2.2 Governance of international HSR programs 7
      1.2.3 Relevant Australian experience 8
   1.3 Report structure 8

2.0 Competition considerations for HSR 9
   2.1 Introduction 9
   2.2 Demand and supply characteristics of HSR 9
      2.2.1 HSR demand characteristics 9
      2.2.2 HSR supply characteristics 12
   2.3 Alternative competitive models 13
      2.3.1 Economic regulation 13
      2.3.2 Competition in the market 13
      2.3.3 Competition for the market 17
   2.4 Recommended competitive model for HSR 20

3.0 Delivery models and procurement options 22
   3.1 Introduction 22
   3.2 Alternative structural options 22
      3.2.1 Vertical separation options 22
      3.2.2 Horizontal separation options 24
      3.2.3 Assessment of the alternative delivery options 24
      3.2.4 The most promising delivery options 27
   3.3 Procurement strategy 27
      3.3.1 Stage components 28
      3.3.2 Procurement considerations 28
   3.4 Stage packaging analysis 30
      3.4.1 Packaging options evaluation criteria 31
      3.4.2 Packaging options 31
      3.4.3 Assessment of the packaging options 32
      3.4.4 Preferred packaging option 38
   3.5 Procurement options analysis 39
      3.5.1 Procurement model evaluation criteria 40
      3.5.2 Procurement options 40
      3.5.3 Assessment of procurement options 42
   3.6 Delivery model 48

4.0 Program governance and delivery 50
   4.1 Program life cycle 50
   4.2 Preparation and corridor protection phase 50
      4.2.1 Government agreement 51
      4.2.2 Prepare an MoU 52
      4.2.3 Protect the corridor 52
      4.2.4 Prepare the HSR mandate 59
      4.2.5 Enact enabling legislation 62
   4.3 Detailed planning and procurement phase 63
   4.4 Construction phase 65
   4.5 Operation phase 65

5.0 Conclusions 68
   Introduction 73
   International case studies 73
      Taiwan High Speed Rail 73
      Japan – Shinkansen 76
      Spain – AVE 78
The Netherlands – Amsterdam to the Belgian Border High Speed Rail Link (HSL–South or HSL–Zuid) 81
United Kingdom – High Speed 1 85
United Kingdom – High Speed 2 88
France – TGV 90
Portugal – RAVE 93
United States - California High Speed Rail Project 96
Australian case studies 100
    AustralAsia (Alice Springs–Darwin) Railway 100
    National Broadband Network 101
    Australian Upstream Petroleum Sector (Oil and Gas) 102
    National Electricity and Gas Codes 103

Sub appendix 7A.1 Case studies
1.0 Introduction

1.1 Background
This appendix sets out the analysis of governance and institutional issues for a potential High Speed Rail (HSR) program in Australia to determine:

- The most appropriate institutional framework for governance, planning, procurement, construction, operation and regulation of the HSR program.
- An effective implementation plan for creating the recommended institutional framework and delivering the HSR program and for securing, if merited, an integrated HSR/corridor regional development concept.

1.2 Key considerations

1.2.1 Relevant issues
From a public policy perspective, it is important to keep in mind the likely objectives of a future Australian HSR program that would need to be supported by the governance and institutional arrangements. Potential objectives might include:

- For HSR to become an integral and effective component of future integrated transport networks on the east coast.
- Ensure transport markets are efficient.
- Ensure transport systems are integrated and networked.
- Relieve congestion on existing and future transport networks.
- Enable appropriate regional and urban development.
- Reduce transport carbon emissions.

Given the large amount of public funding likely to be required, ensuring the HSR program delivers an effective and affordable transport solution that is attractive to customers would have to be a central consideration. Appropriate governance and institutional arrangements would need to be established to ensure that, if adopted, the HSR program is subject to proper public oversight, effectively and efficiently delivered, and meets its objectives.

The analysis of governance and institutional arrangements for HSR in Australia must therefore address a range of constitutional, political and structural issues and satisfy a number of objectives:

- Determine appropriate roles for the public and private sectors in the development, delivery and operation of a future HSR program.
  - The allocation of roles and sharing of risks between public and private sectors in the promotion, planning, financing, land reservation, land acquisition, design, infrastructure construction, transport service provision and other elements of HSR program.
- Determine appropriate roles and responsibilities of each government jurisdiction in the development, delivery and operation of a future HSR system.
  - The multi-jurisdictional nature of a future HSR program and the aims and objectives of different governments in supporting the development of a future HSR program.
  - The legal obligations and responsibilities of the jurisdictions in respect of the various aspects of HSR system planning, development and procurement.
  - Ensure a future HSR system is planned, developed and delivered in a manner that supports its integration with other transport networks and maximises its contribution to the practical transport capacity of the nation.
  - Appropriate roles for different levels of government in governance and regulation.
- Identify any necessary legislative/policy initiatives necessary for the successful implementation of HSR program and the possible integration with the corridor regional development concept.

- Establish options for the stewardship of public entities involved in HSR development and delivery.
  - An appropriate governance framework for public sector entities, should the public sector be involved in the ownership and management of the infrastructure or in the provision of services.

- Select the most appropriate structural model for the delivery of HSR services.
  - The possible vertical separation of infrastructure components of the HSR system from the transport services supply in terms of ownership and management.
  - The possible horizontal separation of components of the HSR system on either a geographic or product basis.
  - The role of contestability in the provision of HSR services, either through competition for concession rights or direct competition between service suppliers.
  - The role of economic regulation in track access and access pricing and its possible influence on service levels and demand.

- Establish preferred procurement options for the delivery of a future HSR system.
  - Ensure staged implementation of a future HSR program is able to be procured cost effectively and efficiently.
  - Identify specific regulatory vehicles or contracting arrangements in the case of concession structures.
  - Assess alternative ways of funding and financing HSR, including through public-private partnerships (PPP).
  - An optimal procurement strategy for the public elements of the proposed structure and for the procurement/selection of private participants that delivers best value for money and conforms to national PPP policy guidelines.

- Develop a practical implementation plan for progressing the development of a future HSR system.
  - An effective implementation plan for creating the recommended institutional framework and delivering the HSR program and for securing, if merited an integrated HSR/corridor regional development concept.

1.2.2 Governance of international HSR programs

There is no single, well established governance and institutional model for HSR. Differences in constitutional, industry and market structures prevent the simple translation of approaches from other jurisdictions to Australia. However, a number of lessons have been drawn from the international experience that may be relevant to the Australian context:

- The size and complexity of HSR programs are such that governments have played a central role in the development of all HSR networks, particularly in providing the necessary political mandate and support, determining delivery structures, undertaking or playing a key role in procurement and underwriting the initial funding, and have in virtually all cases retained an ongoing role in the stewardship of the sector.

- Private sector involvement in the development, construction and operations of HSR networks has varied and success in transferring construction and operational investments and risks to the private sector is mixed, although access to private sector expertise and capability is essential.
Risks transferred to the private sector need to be carefully managed. ‘Unbundling’ project components to reduce size and risk for the private sector needs to be balanced against the interface risks that are created.

Given those interface risks, a single public co-ordinating authority has typically played a key role in program development.

Sub-national levels of government have sometimes contributed to the financing of HSR networks, to supplement central government funding, given the perceived importance of improved accessibility to regions.

A staged approach has typically been used, reflecting the high initial capital costs and to manage program risk.

Further detail is provided in Sub appendix 7A.1.

1.2.3 Relevant Australian experience

Although no HSR system exists in Australia, precedents from other major infrastructure developments in Australia provide useful insights:

- Multi-layered government support, facilitated through inter-governmental agreements and co-operative legislation, has played a crucial role in the delivery of infrastructure projects of national significance.
- Major multi-jurisdictional programs typically require a governance framework that ensures there is clear alignment between the participating governments around key program objectives and issues at each stage, i.e. a ‘gated’ approach.
- There has been a clear preference to quarantine and limit government financial risks to in the early stages of the program life-cycle, and to avoid a need to provide on-going financial support.
- Governments have been prepared to promote private sector participation and reduce project risks for the private sector through funding mechanisms (e.g. availability charges) and through the delivery model (e.g. initial government ownership).

Further detail is provided in Sub appendix 7A.1.

1.3 Report structure

The remainder of this appendix is structured into four sections:

- **Section 2** presents an analysis of competition issues relevant to a future HSR system and recommends a model for ensuring competitive HSR services.
- **Section 3** provides an assessment of alternative delivery models and procurement options for a future HSR system, including alternative structural options.
- **Section 4** presents the assessment of alternative governance options over the life cycle of a future HSR program.
- **Section 5** presents the institutional and governance outcomes for the phase 2 study.

Detailed case studies are presented in the attachment to this appendix.
2.0 Competition considerations for HSR

2.1 Introduction
Governments are naturally concerned with the efficient use of the nation's resources and, therefore, government policy making is often aimed at promoting economic efficiency. The most powerful driver of economic efficiency is competition as competitive markets ensure that services are tailored to the needs of customers and that prices reflect efficient costs. It is important to ensure, therefore, that future HSR development and service delivery in Australia is competitive and delivers efficient market outcomes.

This is in line with Australian governments' infrastructure policies that have facilitated a systematic shift from direct public provision of infrastructure facilities and services to the creation of competitive markets for the provision of those facilities and services. Since infrastructure sectors, like railways, contain elements of potentially competitive services and monopolistic segments, consideration has to be given to whether structural separation of the competitive and monopolistic elements is worth doing (i.e. whether the likely competitive benefits outweigh any likely increase in costs). The options for a competitive HSR delivery model address these issues.

There is a broad range of options for delivering competitive market outcomes and for developing potential competitive models for a future HSR program in Australia. The options include structural options, aimed at facilitating competition between multiple rail operators, and options that establish competition for the right to exclusively operate the rail service for a period of time. In this section, alternative competitive models for HSR are explored having regard to the likely demand and supply characteristics of HSR in Australia.

2.2 Demand and supply characteristics of HSR

2.2.1 HSR demand characteristics
A key question tied to HSR demand characteristics in Australia is whether competition will act as a binding constraint on HSR price and service levels, specifically whether competition between HSR and other modes (e.g. air and private car) will be strong enough, such that one is an effective close substitute for the other, to ensure that a potential exclusive provider of HSR services is not able to exert undue market power in setting prices or service levels. This enables conclusions to be drawn regarding the potential need for economic regulation in end user markets (that is, the markets for HSR services) to address the consequences of any market failure.

The demand analysis has enabled some relatively strong conclusions to be drawn regarding the capacity of intermodal competition to be a binding constraint on HSR price and service levels. Figure 1 shows the sources of forecast HSR travel demand in 2035 (assuming the entire HSR network was available). Although 19 per cent of predicted trips are new journeys (i.e. induced demand), 51 per cent and 26 per cent of predicted HSR demand are trips diverted from air and car respectively.
Figure 1  Source of HSR travel demand in 2035

The greatest diversion from air is predicted to come from inter-city travellers given the longer distances involved. A significant proportion of the diverted market is business travel (44 per cent). There is very little diversion expected from cars to HSR for the inter-city market and as expected, most of the diverted car trips come from long regional trips where HSR would offer a clearly superior travel time to road travel. Total diversion expected from conventional rail and coach is small which reflects the very low service quality of rail and coach services when compared to air and private car alternatives. A detailed assessment of mode shares by trip length and by market segment is set out in Appendix 1G.

Air travel is clearly a very close substitute for HSR in the inter-city markets and therefore would act as a strong binding constraint on HSR price and service levels in the longer term. In the main inter-city markets (i.e. travel between Melbourne, Sydney and Brisbane), air services are currently provided at a similar frequency to those proposed for HSR for significant periods of the day (and higher frequencies in peak periods). Further improvements in air service frequency could also be expected, although constrained by capacity constraints at Sydney Airport.

With the exception of regional markets where business travel is significant (e.g. Canberra-Sydney), private car is the dominant mode, although competition from air services would act as a strong binding constraint on HSR fare levels for some city pairs categorised as regional services. This would capture business-oriented markets such as Canberra-Sydney (all day) and other regional markets during morning and evening business peaks (e.g. Coffs Harbour-Sydney and Newcastle-Brisbane).

For the very large non-business, discretionary regional market, the core issue is cost and travel time differentials between HSR, air and the private car. Accordingly, for this market the relativity between HSR fares and private car operating costs is an important factor that limits the market power that can be leveraged in setting HSR fares. As discretionary travel tends to be less time sensitive than business travel, the ability of HSR to charge significantly higher fares for what would be much faster travel times is limited.

The experience of developed HSR networks internationally provides some supporting evidence to the likely response from other modes of transport, in particular air, to a future HSR service. Table 1 shows various international examples of diversion rates from air, roads and conventional rail to HSR.
For HSR networks in Japan, France and Spain, between 23 and 32 per cent of HSR patronage had diverted from air, largely attributed to more competitive journey times by HSR. Germany’s ICE experienced significantly lower diversion from air and road of 12 per cent which has been attributed to higher ICE ticket prices when compared with alternative modes and the strong competitive position of conventional rail services. In South Korea, 72 per cent of HSR patronage diverted from air, with 70 per cent of the nation being within a travel time of 3 hours of the rest of the country with HSR.

Table 1: International examples of diverted patronage to HSR

<table>
<thead>
<tr>
<th>High Speed Rail</th>
<th>Route</th>
<th>Diverted from air</th>
<th>Diverted from roads</th>
<th>Diverted from conventional rail</th>
<th>Induced demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanyo Shinkansen (Japan)</td>
<td>Shin–Oaska–Fukuoka</td>
<td>23%</td>
<td>16%</td>
<td>55%</td>
<td>6%</td>
</tr>
<tr>
<td>TGV (France)</td>
<td>Paris–Lyon</td>
<td>24%</td>
<td>37%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>AVE (Spain)</td>
<td>Madrid–Sevilla</td>
<td>32%</td>
<td>25%</td>
<td>14%</td>
<td>26%</td>
</tr>
<tr>
<td>ICE (Germany)</td>
<td>-</td>
<td>-</td>
<td>12%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>KTX (South Korea)</td>
<td>Seoul–Busan</td>
<td>72%</td>
<td>20–30%</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: ‘Diverted from roads’ includes private vehicle and coach.
Source: Cheng

Around the world, the introduction of HSR has had different competitive impacts on other modes, reflecting a broad range of factors that influence the relative attractiveness of HSR, including travel times, accessibility, relative prices and regulation. A summary of relevant experience across countries is presented below with further detail provided in the Sub appendix 7A.1.

In Taiwan, prior to the construction of HSR, air travel had a clear advantage over other modes of transport for distances over 300 kilometres given the general level of traffic congestion across the country. HSR is competitive with air travel in terms of favourable door-to-door journey times; however, arguably the full potential benefits of HSR have not been realised due to problems associated with efficient access to HSR stations. Currently, the time difference between access times to HSR stations and the line haul travelling times on the HSR system is small, i.e. it takes just as long to get to the HSR station as it takes to travel to the destination station. Lack of proper integration with other modes of transport has had a negative impact on HSR ridership.

In Spain, the AVE has taken a significant market share in domestic travel from airlines. After 2 years of operation, air traffic on affected routes suffered an estimated 60 per cent reduction in passenger numbers. Around 32 per cent of HSR passengers were diverted from air, 25 per cent from cars, 26 per cent was newly generated and 14 per cent of passengers switched from existing conventional rail services. In terms of modal split on the Madrid–Seville route, HSR’s introduction had a significant negative impact on the market share of domestic airlines, which fell from 25.1 per cent to 2.8 per cent. One negative impact was the government’s decision to prevent Iberia (the state-owned airline) from operating on the same routes as HSR. Following deregulation, AVE may face increased competition from low cost airline operators.

For the proposed High Speed 2 (HS2) phase 1 in the United Kingdom, the government has estimated that the project could eventually result in the substitution of 9 million road journeys and 4.5 million air journeys to HSR every year.

For the French HSR, most of the diverted passengers have come from air and about half of the traffic from newly-generated trips. The French rail operating company, SNCF, reported that its TGV trains have a dominant share of the air-rail travel market in several of the high speed corridors, taking over 90 per cent in the Paris–Lyon market (with a TGV travel time of less than two hours) and about 60 per

---

1 Cheng, High-Speed Rail in Taiwan, 2009.
cent in corridors where the TGV travel time is around three hours. Most of the diverted passengers came from air and half of the increased ridership came from newly generated trips.

Evidence from Europe has shown that HSR has clear advantages over air journeys in terms of end-to-end journey times on city pairs with air travel times of between 2–3 hours. Some examples include Paris-Lyon, Madrid-Seville and Rome-Bologna.

In Japan, HSR and airlines compete head-to-head. The immediate response to the opening of HSR routes was a reduction in the air fares by the two major Japanese airlines, Japan Airlines and All Nippon Airways on competing routes (though arguably the Japanese domestic airline market was less competitive than Australia’s is now). When the Shinkansen route was opened, both carriers operated a shuttle service between Tokyo and Osaka and fares were reduced to below the reserved seat train fare. Nevertheless, trips with either very short or very long access distances were almost exclusively made by HSR. HSR in Japan has been able to use its natural access advantage, with HSR stations located closer to target populations than competing airports, to compensate for the shorter line-haul time of air.

Based on the demand analysis and on observations of international experience, it is concluded that intermodal competition (or the threat of competition) will generally act as a strong binding constraint on HSR price and service levels across most core HSR market segments.

2.2.2 HSR supply characteristics

The demand analysis has identified that in all relevant markets, the potential for HSR to exercise monopoly power is constrained by the presence of strong intermodal competition. Where travel by air and HSR represent realistic alternatives for travellers, this competition would be particularly strong. However, the issue of supply competition in the HSR market also needs to be considered.

HSR infrastructure demonstrates characteristics of a natural monopoly, defined as an industry in which production by a number of suppliers is more costly than production by a single supplier:

- High fixed costs – the infrastructure costs required to build and operate the below-wheel HSR network are very significant.
- Economies of density – HSR has economies that arise from running more trains over a given line rather than building a second line. Any intra-modal competition from competing HSR lines would provide the same service offering to the same market segments, diluting potential cost economies from a single HSR line.
- Asset indivisibility – tracks and stations can only be expanded in discrete increments while demand fluctuates marginally in much smaller units. Therefore, any increases/decreases in supply can exceed increases/decreases in demand and result in temporary excess capacity (unmet demand) on specific routes.
- Economies of scope – for instance, there may be economies of scope between HSR services in the inter-capital and regional markets (e.g. efficiencies in rolling stock and train crew utilisation). This creates a barrier to entry of a subsequent operator into either of the two markets.

The naturally high barriers to entry for a new HSR operator wishing to compete with an incumbent HSR operator suggest that consideration has to be given to ensuring the delivery of efficient HSR rail services in Australia. Although intermodal competition (or the threat of competition) will generally act as a strong binding constraint on HSR price and service levels across most core HSR market segments, there may additional efficiency benefits by encouraging competitive pressures in the supply of HSR services.
2.3 Alternative competitive models

There are three broad options for ensuring competitive pressures in the supply of HSR services in Australia:

- Through the regulation of prices and service levels to mimic the anticipated outcomes from a competitive market for HSR services.
- By establishing competition within the relevant market between competing operators.
- By establishing competition for the market by tendering the right to exclusively operate a HSR service or services for a defined period (i.e. a concession).

Each option is generally mutually exclusive within the one market, although alternative models might apply in different markets. For instance, competitive services in subsidised commuter markets may be delivered through a concession but commercial long distance markets may be able to sustain multiple competing operators. Each option is discussed further below.

2.3.1 Economic regulation

Over the years, both publicly and some privately owned railways around the world have typically been subject to some form of government economic regulation, e.g. over pricing, market entry and exit (obligations to keep lines open and services operating) and minimum service levels.

The analysis of HSR demand characteristics indicated that intermodal competition (from air and road) would likely provide a binding constraint on HSR price and service levels across the key market segments. As such, there is no compelling argument for regulation in the end user market to control HSR prices and/or service levels to prevent monopoly behaviour from a future HSR operator.

However, given the large amount of public funding likely to be required and the likelihood that government would need to underwrite most of the market risk at least in early stages, government could hardly be indifferent to the service strategies and pricing policies of an HSR operator. At the same time, they would not wish to undermine the effectiveness of that public investment by constraining the ability of the HSR operator to adapt services and price structures to compete successfully with other modes. The nature of government involvement to resolve this dichotomy depends on the final HSR delivery model.

International evidence of HSR systems indicates that some level of government intervention in, or approval of, price setting is common, although the extent of government intervention varies significantly. Sub appendix 7A.1 sets out relevant international experience.

Traditional forms of economic regulation which oversee the prices and service levels of established natural monopolies (such as for utility companies and airports) would not seem optimal for a future HSR program. Opportunities to create supply side competition for the delivery of HSR services, combined with intermodal competition, would likely offer greater advantages as discussed in the following sections.

2.3.2 Competition in the market

Since the mid-1990s, there have been significant reforms aimed at creating greater supply side competition in railway markets in Australia, essentially by separating the potentially competitive elements of a railway service (i.e. operating train services) from the natural monopoly elements of a railway service (i.e. the infrastructure). Therefore, rather than regulating prices and service levels in the end market for rail services, regulation can be limited to only the natural monopoly elements (i.e. access to the infrastructure), allowing greater competition and innovation in the delivery of rail services. Similar reforms have also been implemented in other sectors of the economy, such as telephony and electricity.

Third party access regimes

A third party access regime provides a mechanism for potential new entrants to negotiate access to facilities that are essential for competition (such as railway lines). The national access regime in
Australia provides three approaches to facilitate third party access to nationally significant monopoly infrastructure:

- Voluntary access undertaking – providers of infrastructure services can establish a voluntary access undertaking that sets out the terms and conditions and service standards on which they will provide services to third parties. The undertaking may be submitted to a regulatory authority for approval.

- State or territory access regimes – a state or territory government may create and implement access regimes for particular infrastructure services within their jurisdiction. The state or territory access regime may be certified as ‘effective’ under the national access regime.

- Declaration of services – under certain conditions, a facility may be declared under the national access regime which creates a right for any person seeking access to the service to negotiate with the service provider and for an outcome to be arbitrated if agreement cannot be reached. A facility cannot be declared where it is subject to an ‘effective’ state or territory access regime.

A third party access regime may be appropriate for HSR infrastructure if the objective is to create an open market for the delivery of HSR train services. An analogy might be where the government provides airport infrastructure with airlines encouraged to enter the market to operate competitive air services.

Under such a model, there is no control over prices or service levels in the end market (only controls on prices and service levels of the natural monopoly facility - the rail infrastructure). In an immature HSR market, this would be a significant risk to realising the intended benefits of HSR as government would have little influence over price and service levels of the HSR operators.

Consequently, there is not a strong case for establishing an open access regime for the delivery of HSR services at least from the outset of HSR operations. Once the HSR market matures, the case for an open access regime may strengthen with the potential for greater service innovation than if government remained involved in service specification.

**Vertical separation to promote competition in the market**

In order to facilitate open access to railway services, some jurisdictions in Australia and internationally have vertically separated rail infrastructure from train operations. In Australia, the Australian Rail Track Corporation is an example of a vertically separated rail infrastructure provider. This takes a step beyond the ‘accounting separation’ required to facilitate third party access (which merely ensures costs and revenues are separated and transparent for the monopoly component of the business) to placing the monopoly facilities in a special purpose ‘competitively neutral’ organisation.

Separating infrastructure from operations will generally add cost and complexity, as an important operational interface is split between organisations. Therefore, the competitive benefits, in terms of facilitating greater competition for train services, would need to outweigh the additional costs incurred. This issue is discussed further in Section 3.

**International experience**

Third party access regimes are used extensively in Europe although in many cases competing above rail inter-city passenger operators are yet to emerge. In the United States, access regimes are applied selectively, either mutually agreed between freight rail operators or mandated by regulators as part of freight railway merger approvals, while the national passenger operator, Amtrak, has statutorily defined rights of access to certain freight lines. Nascent arrangements also apply in some developing countries.

In Europe, the Third Railway Package under a set of European Union (EU) Directives regulates railway markets including HSR operations. It requires open access to track infrastructure for international passenger operators.

---

2 National Competition Council, *Access to Monopoly Infrastructure in Australia*, October 2011, p. 3
The EU Railway Directives, among other things, were designed to:\(^3\):

- Promote the opening of traditionally closed monopoly rail markets to competition.
- Improve the interoperability and safety of national networks.
- Encourage the development of a sustainable, well integrated and efficient rail system.

The EU requires an accounting and management separation of the natural monopoly components of rail services, i.e. the rail network (below rail services), from the potentially competitive components of running train services (above rail services). Under the EU Railway Directives, each member state is required to establish a regulatory body responsible for providing non-discriminatory access to the rail network and services.

In response, Spain implemented a new regulatory framework, the Rail Sector Act (39/2003), which separated administrative and operational functions of the HSR network. Today, trains are operated by Spanish national railway company, Red Nacional de los Ferrocarriles Españoles (RENFE) but private companies are allowed to operate trains in accordance with EU legislation. Administrador de Infraestructuras Ferroviarias (ADIF), a Spanish state-owned company (under the responsibility of the Ministry of Public Works and Transport) is charged with the responsibility of managing railway infrastructure (i.e. track, signalling and stations). The Ministry of Development is responsible for the overall organisation and regulation of the railway system and the Rail Regulation Committee acts as an arbitrator in the event of disputes\(^4\).

France opened up its international passenger railway services in 2010 for third party access. Autorité de Régulation des Activités Ferroviaires (ARAF) is the railway regulation authority which is responsible for ensuring all parties have equal access rights to the national network\(^5\). The infrastructure manager, Réseau Ferré de France (RFF), is separate from the train operator. Société Nationale des Chemins de fer français (SNCF)\(^6\). Although the above and below rail services are provided by separate state-owned entities, the regime has so far been unsuccessful in attracting other third party operators.

In Japan, the Shinkansen has been privatised and the Ministry of Transport is responsible for rail regulation but operators generally run HSR services in separate regions (i.e. they are not competitive on a head-to-head basis). New HSR lines in Japan are generally earning sufficient revenue to cover operating and maintenance costs, but unable to contribute more than a fraction of capital recovery. Two thirds of the funds for new HSR lines are therefore from the national government and one third from regional governments. The railways are constructed and owned by state-owned Japan Railway Construction, Transport and Technology Agency (JRTT) and managed and operated by the companies. The maximum charge that JRTT can levy is equal to the profits from the new HSR operations. A little more than half of the national government funding comes from the payments received from companies for use of existing HSR lines, while the remainder comes from general taxation revenues.

In Taiwan, the track infrastructure for HSR is government-owned with only one operator operating the train services. The Taiwan High Speed Rail Corporation (THSRC) was appointed by the Taiwanese government, through a bidding process, to construct and operate the HSR network in Taiwan. The THSRC was a private consortium until 2009 when, due to poor financial performance, the government took majority control over the company\(^7\).

In Germany, the dominant rail operator Deutsche Bahn (DB) has separated infrastructure into a separate subsidiary company (DB-Netz).

Overall, international evidence suggests that the industry is predominantly vertically separated between above and below rail services, including HSR operators. In the majority of cases, there is only

---


one operator providing the train services with no head-to-head competition from other HSR service providers. In Europe, policy measures such as the EU directives have been introduced with the purpose of promoting third party access, but with limited success so far. Austria, Germany and Italy have implemented open access arrangements but, at this stage, the government-owned operator in each country maintains market dominance.

Although vertical separation of above and below rail operations is a common feature of international HSR systems, the extent of separation can vary. Commonly, even where some effort at vertical separation has been made, a common oversight of above and below rail HSR services remains, rather than more complete vertical separation. Relevant country examples are detailed in Table 2.

Table 2: International examples of above and below rail separation models

<table>
<thead>
<tr>
<th>Country</th>
<th>Vertical Separation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>Yes</td>
<td>Management separation - service is operated by SNCF, a state-owned entity, while ownership and management of the infrastructure have been transferred to RFF (also state-owned). SNCF has also been subcontracted by RFF to maintain the operations of tracks and control of maintenance and safety systems.</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>Yes</td>
<td>Management and ownership separation - track infrastructure remains the property of the Dutch Government, with Infraspeed Consortium responsible for the management of the infrastructure. Services are operated by the High Speed Alliance (HAS).</td>
</tr>
<tr>
<td>Spain</td>
<td>Yes</td>
<td>Management separation – track infrastructure is owned and maintained by ADIF (a state-owned entity), while RENFE Operadora is responsible for above rail operations.</td>
</tr>
<tr>
<td>UK (HS1)</td>
<td>Yes</td>
<td>Management and ownership separation - the government is the ultimate owner of the infrastructure, through London Continental Railways (LCR), and has the freehold of the associated land. HS1 Ltd holds the concession from the government to operate, manage and maintain the HSR infrastructure until December 2040. HS1 Ltd contracts out the maintenance of the infrastructure and the operation of the services.</td>
</tr>
<tr>
<td>Germany</td>
<td>Yes</td>
<td>Management separation – the government-owned dominant rail operator DB has been organised into multiple group companies with the infrastructure management the responsibility of DB Netz.</td>
</tr>
<tr>
<td>Japan</td>
<td>Only on lines built post-1987</td>
<td>Ownership separation – separation of ownership of infrastructure and train operations with national government leading the funding but getting a contribution from the benefiting regions. A state-owned entity coordinating the delivery with an ‘exclusive’ private train operator paying what it can afford for access, operations and maintenance of the infrastructure by the private train operator.</td>
</tr>
<tr>
<td>China</td>
<td>Yes</td>
<td>Ownership separation - the majority of the HSR infrastructure is owned by joint venture companies (predominantly state and provincial entities) but maintenance and train control is managed by the national train operator.</td>
</tr>
</tbody>
</table>

Source: Study team.

Even with third party access, the capacity of HSR networks to support ‘head-to-head’ competition in the market is largely dependent on market size. The base HSR forecasts developed for this study are consistent with about 6 million passenger journeys in 2035 (after ramp-up), increasing to about 84 million passenger journeys in 2065.

Figure 2 compares these forecasts with current annual passenger traffic for selected HSR services.
Assessment

For a future HSR program in Australia, head-to-head competition between operators on a commercially sustainable basis is unlikely to eventuate in any reasonable timeframe given international experience and local market characteristics. Once established, the market may mature to the point where head to head competition between multiple operators could be sustainable, but that is unlikely to be the case in the early ‘market building’ period. In the early stages of HSR development in Australia, the market is unlikely to commercially sustain multiple operators across a span of markets and time periods (i.e. other than peak periods) that justifies a large public investment in HSR infrastructure.

Nevertheless, it is possible that multiple train operators may exist early on focused on different products or geographic markets (e.g. inter-city vs. commuter services). The options for horizontal separation of HSR services are set out in Section 3.2.2. Where there are multiple operators on the same HSR infrastructure, an access regime may be required to regulate access (or alternatively access arrangements could be dealt with in the respective concession agreements).

2.3.3 Competition for the market

Competition for the market refers to the situation where participants tender for the exclusive right to enter a market, either for a commercial service or for a non-commercial service, for a defined period and subject to certain rules (e.g. Melbourne’s trains and trams).
This form of procurement allows the contract to be awarded to the bidder proposing to offer the highest price (or require lowest compensation) while meeting the specified minimum service standards in the tender conditions\textsuperscript{9}. Competition for the market is likely to embody a regulatory framework within it, to the extent key elements of the regulatory framework, such as maximum prices, performance targets and minimum service standards can be defined in the contract.

The predominant method to establish competition for the market is some form of competitive tendering and contracting\textsuperscript{10}. Competitive tension can be introduced to the supply side market without having to rely on multiple operators competing head to head. There is no requirement for vertical separation or for an access regime to underpin competition for the market.

Given the size and complexity of a future HSR system, there will be challenges throughout the life cycle of the project associated with contracts to establish competition for the market. Difficulties may include:

- Challenges in predicting revenue and demand to the satisfaction of financiers placing capital at risk, particularly with the creation of a new mode in greenfield circumstances\textsuperscript{11}. This makes the allocation of market risk to the contractors difficult.
- Limited private sector appetite for the construction and operating risks of a program the size and complexity of HSR, reducing the potential field of competitive bidders.
- Limited availability of private finance for projects of this nature, impacting on the potential use of PPP delivery models.
- The cost of bidding for a project of this size and complexity which may limit the field of potential bidders.

Concessioning (or franchising) is a common method of facilitating competition for the market. The concession holder is granted an exclusive right to operate a service for an agreed period of time. There is a range of possible models, with the variations related to the responsibilities of, and degree of risk passed to, the concession holder. Release of the concession to the market at regular intervals allows ongoing contestability of the service, with the benefits of improved efficiency and innovation.

The contract duration is a key consideration for concessioning. If too short a period is chosen, then the significant costs of bidding for a potential concession and the relatively short period of time in which benefits from operation of the service can accrue means that less competition for the franchise is likely. If too long a period is chosen, then there is less ongoing competitive tension and the risk that the government and community may have to put up with a poor operator for an extended period. A balance must be struck between two positions, namely:

- The contracting process must attract sufficient interest from bidders to ensure non-collusive competition, and should occur regularly enough to represent a realistic level of competition for the market.
- Concession bidders will seek a contract length that is sufficient to allow them to extract value from the bid submitted, to recoup capital invested, and to ensure that there is sufficient time for benefits from the award of the contract to outweigh the costs of bidding (which are likely to be significant).

Ultimately, in contract arrangements of this nature, government cannot transfer away all risk and retain a significant residual risk from non-performance or financial distress of the concession holder. In the assessment of any concession bids, government must be satisfied that the concession holder has the capacity to deliver the contracted services. These issues are explored more fully in the context of a future Australian HSR system in the procurement analysis in Section 3.

\textsuperscript{9} For a commercial service, this usually means the highest price bid is accepted, while for a non-commercial service the lowest subsidy bid is accepted.

\textsuperscript{10} The literature adopts a number of terms to describe competitive tendering contract arrangements, particularly franchising and concessions, which for this discussion are interchangeable.

\textsuperscript{11} Greenfield refers to construction of new infrastructure in an area free of existing development. In contrast, upgrading of existing infrastructure is referred to as brownfield development.
Competition for the market still requires a significant government oversight role. In particular, tender design, managing the bidding process and then ongoing contract monitoring post-award requires considerable government resources.

International and local experience

International evidence suggests that there is an increasing trend towards greater private sector participation in the development and delivery of HSR services.

Most countries have established rail service concession contracts, and even rail infrastructure contracts in some cases, in exchange for a fixed payment (e.g. HS1 in the United Kingdom, Taiwan, Portugal and more recently TGV France). This has been the favoured option as it allows the government to retain ultimate control over the assets while the private sector carries out day-to-day operations according to pre-specified rules in the contract.

Japan’s Shinkansen is one example where the HSR system was constructed by the state, in Japan’s case through JRCC. Japanese National Railways (JNR), a state-owned entity, was responsible for service operation and infrastructure maintenance. However, in 1987, JNR was divided and privatised as the HSR system ran into financial difficulties. JR East was spun off from JNR and is now responsible for operating all Shinkansen lines except the Tokyo–Osaka line (the Tōkaidō Shinkansen) which is owned and operated by Central Japan Railway Company, although it stops at several JR East stations.

In Taiwan, the Ministry of Transportation and Communication granted a private entity, THSRC, a concession to finance, construct, and operate the Taiwanese HSR system for a period of 35 years and a concession for HSR station area development for a period of 50 years. The Taiwan HSR was initially planned as a public sector project, but because of fiscal pressures the government decided to have the HSR project built through private finance. THSRC is responsible for operation and maintenance of the system, but the track infrastructure is owned by the Taiwanese Government. THSRC is the only operator of HSR services in Taiwan, although the government has taken control of the company because of its poor financial performance.

In the Netherlands, the Infraspeed consortium was awarded a PPP contract to design, build, finance and maintain the railway tracks and associated systems. An access fee is paid by the operator to the government to gain access to the HSR stations and the rail infrastructure. The government uses parts of these payments to provide the funding necessary for the civil works while paying a performance fee to the infrastructure provider. Train operators Fyra and Thalys share the use of the high speed tracks in the Netherlands with all services coordinated through NS Hispeed.

The original TGV line in France was built by public funding but the more recent extensions to TGV lines have been procured on a PPP basis which has allowed more lines to be built with the help of private financing and expertise.

HS1 in the United Kingdom was a design, build, finance, and operate concession contract originally contracted to LCR, the largest of the United Kingdom’s private finance initiative projects at the time. The domestic services on the high speed line are operated under a franchise agreement by South-Eastern Railway, while the international rail services are currently operated by Eurostar. Following the liberalisation of the international EU rail market in 2010, there is now the possibility of competing rail operators providing international services. Eurostar is an open access operator.

---

15 BD International, Phase II implementation study final report on the study for alternative transport system on HSL Zuid, Frankfurt, 2009.
17 http://highspeed1.co.uk, viewed 9 March 2012.
18 http://highspeed1.co.uk/regulatory/concession-agreement, viewed 26 February 2012.
HS1 in the United Kingdom is an example of where concession arrangements are contained within a regulatory framework. The office of the Rail Regulator (ORR) regulates HS1 through its concession agreement and the memorandum of understanding (MoU) with the Secretary of State. The function of ORR includes pre-approval of the regulatory framework, ensuring that HS1 has incentives to deliver efficient costs and competitive access charges. Other functions relate to network regulation/asset management, monitoring, reporting and enforcement. Any disputes relating to the breach of the terms and conditions of the concession contracts are brought to ORR for arbitration rather than through the courts.

In Australia, there has historically been strong private sector participation in infrastructure projects, although there appears to be less market appetite to assume traffic or demand risk in transport projects than in the past. For example, the Gold Coast light rail project is a PPP contract awarded to GoldLinQ to design, build, finance, operate and maintain a light rail public transportation system on an ‘availability payment’ basis.

Alice Springs–Darwin railway project was a build, own, operate and transfer back concession overseen by the AustralAsia Railway Corporation. The AustralAsia Railway Corporation was set up as a statutory body under the AustralAsia Railway Corporation Act 1996 to manage awarding the concession and contractual arrangements with the Asia Pacific Transport company, the successful consortium for delivering the project. Although the project was successfully delivered, the concession holder did not meet its revenue targets and the project was subsequently refinanced.

Assessment

Establishing competition for the market is a logical way to introduce supply side competition for the delivery of a future HSR system in Australia. There may be a single vertically integrated concession or a degree of vertical and horizontal separation with different concession agreement for logical parts of the future HSR system. These options are discussed further in Section 3.

2.4 Recommended competitive model for HSR

A number of conclusions have been drawn in respect of competitive issues related to the development of a future HSR system in Australia, bearing in mind the large up front capital contributions likely to be required from governments:

- Intermodal competition from air and car travel (or the threat of competition) would generally act as a strong binding constraint on HSR price and service levels across most core HSR market segments.

- Head-to-head competition in Australian HSR markets would not be commercially or economically justified within a reasonable timeframe given the likely market size.
  - Competing HSR networks would not be feasible and one integrated HSR network will provide all of the capacity Australia requires.
  - Vertical separation of infrastructure management from train operations (for dedicated HSR network) would therefore not be necessary to facilitate competitive access of competing train operators, although separation may still be considered for other reasons, such as facilitating a particular procurement or financing structure (these issues are addressed in Section 3).

- An open access regime is unlikely to be necessary or warranted, on competition grounds, given the potential downside risks to private sector investors in HSR (this should not preclude the shared use of infrastructure by train services in different markets).

- Competition for the market, through a concessioning framework, would likely be the most effective means of delivering competitive outcomes and meeting government objectives for the HSR system.

---

The concession agreement would be the appropriate mechanism for governments to ensure HSR objectives are achieved (such as ensuring competitive fares or minimum service levels and other public interest objectives).

Although government would likely own the HSR network because of the large public financial contribution required, a broad range of options exist for how the delivery of HSR services could be structured and these options are explored in Section 3.
3.0 Delivery models and procurement options

3.1 Introduction

Beyond competition issues, options for efficiently and effectively delivering a future HSR operation may also include alternative institutional or delivery models that provide discrete roles for the public and private sectors. The selected model should have regard to the appropriate management of risk and proper protection of the public interest and stewardship of public assets.

This section considers alternative options for industry structure, including vertical (functional) and/or horizontal (product, geography) separation options, to establish roles for the public and private sectors and options for managing HSR system procurement.

The procurement strategy for the HSR system has to address the following questions:

- What package of assets and services should be procured in any single contract?
- What procurement model(s) is most suitable for delivery?

The principles around the packaging and procurement of HSR program components are discussed in this section, with a focus on the delivery of the likely first stage of the program, i.e. the Sydney-Canberra stage of the Sydney–Melbourne line. These principles and the analysis of this first stage can equally be applied to other stages of the HSR program.

Together with the analysis of structural options, the procurement analysis drives the selection of the preferred delivery model for a future HSR program.

3.2 Alternative structural options

3.2.1 Vertical separation options

There are a number of vertical (or functional) separation options which will vary the scope of public and private sector participation in the development and operation of HSR system. The scope of potential roles is as follows:

- Acquire and own land – in all cases it is assumed that a publicly owned entity (Commonwealth and possibly state-owned) would acquire and own the land that supports the HSR system.
- Design and build the HSR network.
- Maintain the HSR network – maintaining the track, structures, signalling and electrical infrastructure.
- Operate the HSR network – controlling the movement of trains through the network. In a multi-operator environment, this function is generally allocated to the infrastructure manager (as is the case today with the Australian Rail Track Corporation) but it may also be allocated to the vertically integrated train operator (as is the case with the QR National coal network in Queensland).
- Operate train services – the operation of train services in a particular market or markets.
- Supply trains – the supply of rolling stock, which may also include finance and/or maintenance of the equipment.

Some of these roles may be bundled together to facilitate optimal packaging and procurement outcomes which is discussed further in the procurement analysis below.

There are three broad options in respect of public/private sector participation – a publicly developed and operated HSR system, a privately developed and operated HSR system and mix of public and private sector developed and operated HSR system. Within each broad option, there are various sub-options as outlined in Figure 3 and described below. The list of sub-options in Figure 3 is not exhaustive but covers the main combinations observed in the market today.
Under the vertically integrated public HSR option (1a), a publicly owned HSR Corporation would be created to develop, build and operate a future HSR system. The Corporation may be owned jointly by the relevant state/territory jurisdictions and the Commonwealth. The HSR Corporation would acquire land, build the HSR system and procure rolling stock utilising traditional public sector procurement approaches. The Corporation would also operate and maintain the HSR network and operate train services. Components of the construction and maintenance could be outsourced to private sector contractors but the public sector enterprise would manage and operate the train services.

Alternative vertically separated options create different public agencies to deliver different components of the system which allows a greater degree of focus and specialisation. Option 1b above contemplates a HSRDA to construct the HSR system, a separate HSR Network Manager to operate and maintain the network and a HSR Train Operating company (or companies) to operate the train services.

Under the vertically integrated private HSR option (2a), a private concession (or concessions) would be established to design, build, operate and maintain the HSR system. Private finance could also be utilised but would depend, among other things, on how the public financial contributions are structured. It is assumed that a publicly owned HSRDA would need to be established to procure the land necessary to support the development of the HSR system.

As with the public HSR delivery options, alternative vertically separated options could be contemplated which allow different organisations to deliver different components of the system. Option 2b above contemplates a HSR concession to design, build and maintain the HSR network. An additional operations concession (or concessions) would be established to operate the system (train services and the movement of trains through the network). A variation to this model would see the design, build

---

22 A relevant historical example might be the National Rail Corporation which was created to operate interstate rail freight services and was initially jointly owned by the Commonwealth, NSW and Victoria.
and maintenance contractor also operate the network (i.e. control the movement of trains) which may have some merit if there are multiple operations concessions operating over the same network.

Public-private HSR delivery options

A range of hybrid options exist that contemplate different roles for the public and private sectors. Option 3a is similar to the integrated public HSR option, except that the fleet is supplied through a private third party rolling stock supplier, similar to PPP fleet arrangements that presently exist in some Australian urban railways.

Options 3b to 3d respectively provide an expanded role for the private sector. Option 3b contemplates a publicly owned HSR Infrastructure Corporation that builds, operates and maintains the HSR rail network. A private operations concession, or concessions, would be established to operate the HSR train services. Under this option, the HSR Infrastructure Corporation may outsource the maintenance to a private sector contractor but with management and operations undertaken by the public sector enterprise.

Option 3c is similar to option 3b but with the operations of the network undertaken by the private sector train operator. Option 3d sees the publicly owned HSRDA responsible for building the HSR system but all operations and maintenance concessioned to a private sector operator, or operators.

3.2.2 Horizontal separation options

In addition to vertical (functional) separation of components of the HSR system, a range of horizontal separation options may also be contemplated, typically either by geography of product (service). In the context of a potential Australian HSR system, options for geographic separation would likely relate to sectors which cover the major market pairs, for example:

- Sydney-Canberra-Melbourne.
- Sydney-Brisbane.

Options also exist to separate by product or service type. This study has identified three types of service or HSR products:

- Inter-city services.
- Regional services (short and long).
- Commuter services.

Options exist to structure different concessions for each service type. These may also be separated by geography (i.e. regional services in Sydney-Brisbane sector are separated from regional services in the Sydney-Canberra sector).

Where the vertical delivery options in Figure 3 have the network operations being undertaken by an operations concession, and there are separate product-based operations concessions (e.g. separate commuter and inter-city operators), then it would typically be the inter-city operator that would control and operate the network, given their span of operations and likely larger scale, with the other operators provided access under an access agreement with the inter-city operator.

3.2.3 Assessment of the alternative delivery options

The appropriate delivery model would need to ensure that a future HSR system is effectively and efficiently delivered and meets its objectives. Several factors are relevant to the assessment of alternative models:

- Enhanced competition and innovation – an ability to promote competitive outcomes and greater service and cost innovation. This tends to favour more frequent concessioning and possibly separate operations and infrastructure concessions given longer lived assets in the latter (which may require a longer concession to allow the concession holder to recover capital invested).

- Interface efficiency (cost and risk) – vertical/functional integration at key interfaces minimises transaction costs and interface risks and promotes operational resilience. This tends to
favour more integrated models, particularly at critical operational interfaces such as network management and train operations.

- Integration efficiency (cost and risk) – integrated organisations may allow greater scale and efficiency benefits (e.g. shared depots and maintenance facilities). This tends to favour fewer, more integrated concessions to promote economies of scale and scope, and to transfer integration risk.

- Alignment of focus and skills – separated organisations may allow better alignment of specialist skills and focus and to procure ‘best in each class’ rather than the best consortium of skills. This tends to favour separation of construction from the operations concession(s) given the different skill sets required.

- Procurement efficiency and risk transfer – an ability to effectively and efficiently procure the major components of the system given the nature of a future HSR system (e.g. size, scope). May favour more separated models given the size and complexity of the procurements.

Assessment of vertical separation options

A detailed assessment of the packaging and procurement options is required before a preferred HSR delivery model can be finalised, but the pure public delivery models and the pure private delivery models compare less favourably to the public–private models.

The pure public HSR options (1a and 1b) score relatively poorly on the competition and innovation criterion. While intermodal competition would exert competitive pressure on publicly owned train operators, lack of competition on the supply side may lead to a less efficient and less customer focused outcome than alternative structural options which allowed contestability of train operations. This is supported by general experience in transport operations in Australia and more recent international experience. Historically, Australia’s publicly owned railways have been characterised by relatively low productivity, high costs and poor service quality. Freight railways have been progressively separated and privatised. Passenger railways still in public ownership are perceived to be bureaucratic and inefficient and are currently undergoing major reforms. There is likely to be little public appetite for investing taxpayer funds in establishing a new public sector train operator.

Operations could commence with a public operator and be privatised once HSR system becomes mature, as has been the case for HSR train operations in some countries (e.g. Japan). However, such an approach foregoes the benefit of leveraging private sector expertise, experience and incentive structures to tackle competitive private sector airlines in the early phase of HSR operations. Concession arrangements for private sector operators could be structured to manage risks in the start-up phase, particularly the market risks, and there would be no compelling need to commence operations with a public operator. Therefore, option 1 of a pure public delivery model has not been further considered. Similarly, option 3a which has a public sector operator of train services has also not been further considered.

The pure private sector options (2a and 2b) transfer construction, maintenance, operations and investment risks to the private sector. The operating railway is handed back to the government at the end of the concession period(s). There are a number of factors which make this type of contract problematic in the case of a future HSR program:

- It will be infeasible to privately finance the full infrastructure investment given the lack of a commercial return.

- Substantial public funding would be required with a need for close government oversight and stewardship of that investment.

- The sheer size and complexity of a future HSR program suggest an inability of most prime contractors (both domestic and international) to carry the delivery risk of such a program on its balance sheet.

- Wider public interests imply a need to integrate the HSR system with state transport systems and state infrastructure.

Therefore, option 2 of a pure private delivery model has not been further considered.
The most promising vertical options for the delivery of a future HSR program provide for public delivery of the HSR infrastructure network with transport services provided by private sector train operations. Even with public delivery of the infrastructure, establishing a single ‘turnkey’ contract may not be feasible. A turnkey contract is one in which a prime contractor is hired to deliver the project in its entirety and hand over an operational railway to the government. Some unbundling of the infrastructure into multiple contracts may be required. Other variations would include the extent to which system operations, infrastructure maintenance and rolling stock supply are bundled with the operator(s) of train services or with alternative suppliers. These options are explored in Section 3.4.

Assessment of horizontal separation options

The most promising options for geographic separation relate to segments which cover the major market pairs:

- Sydney-Canberra-Melbourne.
- Sydney-Brisbane.

It would be possible to separate HSR system services (i.e. train control) into north and south network operations with joint operations into Central Station in Sydney. Having regard to the interface efficiency and integration efficiency criteria, there is unlikely to be any merit in pursuing horizontal separation of infrastructure services unless it enabled creation of a north and south concession for train services (i.e. each operated train services, controlled the movement of trains on their networks and possibly also maintained their networks). In such circumstances there would be a need for a joint operations area (such as Central Station in Sydney and common use access areas). Although this would add some operational complexity and cost, it would be feasible.

Given the proposed staging of a future HSR system, allowing for separate north and south concessions would permit a separate competition to be run for the later concession, avoiding being locked into an incumbent operator.

Depending on the vertical structure, and in particular whether management of the HSR system was the responsibility of the infrastructure provider, then it would be feasible for Sydney-Canberra services to be operated separately from Sydney-Melbourne services and offered as separate concessions. The additional competitive and innovation benefits would need to be weighed against the potential loss of synergies between operators, i.e. the loss of interface and integration efficiency from multiple operators of train services.

An option also exists to separate train services by market or product. For example, offering separate concessions for commuter services and for regional/inter-city services. Separate market or product concessions may allow greater market focus and access to specialist skills and services. For instance, an airline company might be a strong candidate for a concession that aligned regional HSR services with its air operations, whereas commuter HSR operations might be more attractive to an urban rail operator. As with geographic separation options, the additional benefits of multiple concessions would need to be weighed against the potential loss of synergies between operations.

In the context of a future HSR system, separation of commuter services from regional and inter-city services would seem most merited. The commuter markets have different characteristics and different economics to the regional/inter-city services, likely requiring ongoing government financial support. It might therefore be sensible to structure a commuter concession in a different way to a regional/inter-city concession (e.g. with government providing the rolling stock and a shorter concession term).

With horizontal separation of train services by market or product, the operations of the network could either be managed by a separate infrastructure company or managed by the ‘prime user’ of the network, i.e. the largest operator, who would have obligations to provide access on reasonable terms and conditions to the other user(s).

Beyond the potential separation of the commuter services, the other feasible options are likely to be the separation of north and south regional/inter-city services and possibly separation of Sydney-Canberra-Melbourne regional services from Sydney-Melbourne inter-city services. Unbundling of inter-city and regional services between Sydney, Canberra and Melbourne into separate concessions is unlikely to be efficient given the loss of integration efficiency or synergies between the services in each market.
Given the proposed staged development of a future HSR system on the east coast, the most promising horizontal separation options would be to:

- Provide for possible geographic separation of north (of Sydney) and south (of Sydney) concessions to allow an effective competition to be run for the later stages to the north (although inter-operability between the physical networks should remain an objective).
- Potentially separate concessions for the commuter services (in each state) from the combined concession for regional and inter-city services, given the different market characteristics and economics of commuter services. The tendering of commuter services using designated train paths could be managed separately by state governments.

3.2.4 The most promising delivery options

The analysis indicates that pure public sector delivery models or pure private sector delivery models are unlikely to be optimal. The most promising options for the delivery of a future HSR program are likely to involve public delivery of the HSR network with private sector train operations. Potential variations include the extent to which infrastructure contracts are disaggregated, the form of contracting and the extent to which network operations, infrastructure maintenance and rolling stock supply are bundled with the operator(s) of train services or with alternative suppliers.

Likely horizontal separation options may include separate north and south concessions for regional/inter-city services, with possible separation of commuter operations in each state.

Procurement efficiency is a key consideration in the final delivery model, i.e. the ability to effectively and efficiently package and procure the major components of the system. These issues, and the implications for the preferred delivery model, are explored in detail below for the likely first stage of a future HSR program, the Sydney-Canberra sector. The preferred delivery model is then discussed in Section 3.6.

3.3 Procurement strategy

This section and the next two sections, the stage packaging analysis and the procurement options analysis, examine the proposed delivery of the HSR program by a future HSRDA and together seek to address the following questions:

- What package of assets and services should be procured in any single contract?
- What procurement model(s) is most suitable for delivery?

This section presents principles around the packaging and procurement of the HSR program components, with a focus on the delivery of the likely first stage of the HSR program, i.e. the Sydney-Canberra stage of the Sydney-Melbourne line. These principles and the analysis of this first stage can equally be applied to other stages of the HSR program.

The following terms are used throughout the procurement and packaging analysis:

- HSR program means the design, construction, operation and maintenance of a HSR line on the east coast of Australia.
- HSR line means either the Sydney-Melbourne line or the Sydney-Brisbane line of a HSR program.
- Project means the Sydney-Canberra stage of the Sydney-Melbourne line, being the recommended first stage of a future HSR program.
- Package means a component of the project, which might include infrastructure assets, signalling and train control systems, stations, rolling stock, infrastructure asset maintenance and train operations.
- Sub-package means a sub-component of one of the packages, being smaller packages of works in respect of infrastructure assets.
The procurement strategy recommendations presented in this section are judged as those most likely to deliver the best value for money but would be subject to further, more detailed assessment and finalisation by the party ultimately responsible for the delivery of the HSR program (see Section 4.3).

### 3.3.1 Stage components

In considering procurement strategies for the delivery of the Sydney-Canberra stage, this section focuses on the stage’s core components summarised in Table 3.

<table>
<thead>
<tr>
<th>Component</th>
<th>Risk-adjusted total cost</th>
<th>Key works</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure assets</td>
<td>$16.5</td>
<td>The stage includes:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Tunnels $7.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Bridges $1.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Earthworks $2.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- General civil works $1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Permanent way $1.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Depots, control centre and facilities $0.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Power $1.0</td>
</tr>
<tr>
<td>Signalling systems</td>
<td>$0.3</td>
<td>Signalling infrastructure and communications</td>
</tr>
<tr>
<td>Stations</td>
<td>$2.6 (excluding land acquisition)</td>
<td>The stage includes four stations:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Sydney Central</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Sydney South</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Southern Highlands</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Canberra</td>
</tr>
<tr>
<td>Rolling stock</td>
<td>$0.4</td>
<td>Seven HSR train sets</td>
</tr>
<tr>
<td>Asset maintenance (infrastructure, stations and rolling stock) and asset renewals</td>
<td>$8.9</td>
<td>Maintenance (including for infrastructure assets, signalling systems, rolling stock and stations)</td>
</tr>
<tr>
<td>Train operations</td>
<td>$9.9</td>
<td>Control of the movement of trains and the operation of train services for the Sydney to Canberra stage</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$38.6</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: Study team financial model (costs assumed on construction dates of 1 July 2030 to 1 July 2035).

The HSR program may also consist of various non-core components, such as enabling infrastructure, integration with existing transportation networks and potential adjacent developments. These have not been considered in this analysis.

### 3.3.2 Procurement considerations

A number of key issues have influenced the procurement strategy analysis:

- Infrastructure assets size.
- Contractor capacity and appetite.
- Financier capacity and appetite.
- Key risks.
- Market skill set.
- Impact on government.
- Future flexibility.

Each of these is discussed below.
Infrastructure assets size

The size and scale of the infrastructure assets works, costing approximately $16.5 billion,\(^\text{23}\) would be outside the delivery capacity of major industry participants, both locally and globally, for reasons of balance sheet capacity, ability to access appropriate levels of parent company support, human capital restrictions, restrictions on insurability and other resource limitations. It is therefore unlikely to generate sufficient market appetite if these assets were procured as a single integrated contract.

To overcome this issue, the infrastructure assets package should be further split (for example, based on prevailing terrain conditions, or between tunnels, bridges and depots), thereby creating sub-packages within the infrastructure asset package that are attractive to the market in their own right.

Contractor capacity and appetite

The first stage of HSR construction provides an opportunity to attract international participants into the Australian market. In addition to increasing the market capacity, the benefits of new entrants includes greater price competition, fresh ideas and innovation and access to a broader pool of resources and experience. The optimal delivery solution should be structured in manner which encourages domestic and international participation.

Contractors in the Australian market have demonstrated a capacity to deliver projects in the order of $1 billion to $2 billion. Detailed market testing has not been undertaken for this phase 2 study, and therefore there is limited intelligence as to the market’s likely capacity to deliver projects of a greater size. For example, there are projects being considered for procurement in the domestic mining sector, which are in the order of $5–7 billion. Given these projects are still in the procurement stage, the market’s interest and capacity to deliver packages of this size is yet to be fully tested.

The $1 billion to $2 billion range has therefore been used as an indicative guide to the appropriate package size. It is acknowledged that the market may have the capacity to deliver projects in excess of this size, although larger packages may impact the level of interest and therefore competition, and may consequentially not provide efficient delivery and value for money.

Financier capacity and appetite

A private financing solution for the Sydney-Canberra stage would not be commercially viable from a private financer’s perspective for the following reasons:

- The stage’s high capital costs exceed private financier capacity.
- While revenue is expected to exceed operating costs after the first three years of operations, operating cashflows are insufficient to cover ongoing asset renewals or any of the upfront capital costs. The stage does not generate a commercial internal rate of return.
- The stage’s greenfield construction, delivery and demand risks.

Financier capacity and appetite is dictated by the scope, size, level of risk and expected return associated with an investment. Notwithstanding that delivery of the stage as a single package would not be commercially viable from a private financer perspective, opportunities to leverage private sector investment in order to help finance the stage should still be considered for certain works. The key rationale for implementing this approach is to capture financial disciplines in the delivery and management of the relevant works, to transfer risk to parties who are better placed to handle that risk, and to maximise the sources of funding in addition to government funding.

Stage risks

There are a number of key stage risks including:

- Demand risks – the level of demand risk is influenced by the greenfield nature of the works, the length and timing of construction, strong competition (including from airlines and the possibility that Sydney Airport capacity issues may be eased), and that the stage would be the first stage of a transport product that is previously untested in Australia. Government would need to provide some form of support which could include government retention of

\[\text{23}\] For comparison, the Commonwealth Government’s annual transport infrastructure spend is typically $6 to 8 billion.
demand risk for a period of operations (e.g. during the ramp up period or possibly to the operational commencement of the next stage of the HSR program, when passenger throughput at the Sydney station may materially increase). Once the market is mature, demand risk may pass, either in part or in whole, to the private sector.

- Interface risks – while multiple packages may drive the best value solution, by their very nature a greater number of packages creates an increased interface risk. For example, if defects arise in relation to the infrastructure assets this could lead to complicated claims against or between multiple contractors (due to the difficulty in determining which party is primarily at fault), and potentially claims between government, operator and maintainer in relation to the impact of these defects on the operating arrangements.

- Construction risks – construction risk includes those risk factors that may lead to time and cost overruns (e.g. geological and hydrological conditions). Construction risk would be significant given the stage would cover a geographical area of approximately 281 kilometres (including greenfield, brownfield and tunnelling components), and is expected to require a construction period of around 7 years. The construction risk, and potentially the greenfield and brownfield elements, may dictate the approach to packaging and procurement of the stage.

Additional risks, such as planning, environment and financing risks would also need to be considered in structuring the optimal procurement strategy for the stage.

Market skill set

The inherent complexity of key stage components such as brownfield conditions, signalling, safety, other systems and rolling stock requirements would require specialised technical input. For example, there is only a select group of global companies who can supply signalling systems and/or rolling stock. This would suggest, where feasible, these stage components should be packaged and procured separately, rather than as an element of a larger package (for example, also including infrastructure components) where the ability to create competition between bidding consortia would be constrained by the limited number of specialist suppliers.

Impact on government funding

Given the large upfront capital requirement, Governments would have to play a leading role in funding the stage. However, given that the stage may generate positive operating cash flows, there may be opportunities to implement private finance structures, increasing risk transfer during the construction and/or the operation phase (e.g. PPP, commercial developments, privatisations), and therefore reducing the budgetary impact for government.

Future flexibility

The approach to packaging and procurement of the Sydney-Canberra stage should have regard to the requirements of future stages. This is particularly relevant to the following stage components:

- Train operations – the operating structure for the stage should have sufficient flexibility to ensure the horizontal separation options outlined in Section 3.2.2 remain feasible.

- Signalling – the choice of signalling and systems technology for the stage should be developed to ensure it does not constrain flexibility and competitive tension with respect to future signalling procurements (for example, one option may be to specify a signalling performance stipulation for the stage, such as European Train Control System Level 2, which would ensure multiple suppliers could bid for signalling systems procurements for later HSR program stages).

- Rolling stock – the selection of HSR train sets for the stage may influence future rolling stock procurements.

3.4 Stage packaging analysis

The stage packaging analysis considers the factors that would influence the approach to packaging the stage’s key components. The selection of an optimal packaging approach is interrelated with the assessment of procurement options considered in Section 3.3.
3.4.1 Packaging options evaluation criteria

Six criteria have been used to assess and evaluate the optimal approach to packaging the stage as set out in Table 4.

<table>
<thead>
<tr>
<th>Packaging criteria</th>
<th>Description</th>
</tr>
</thead>
</table>
| Market capacity, competition and appetite | - Is there sufficient market interest in delivering the stage package?  
- Is the package structured in a way to facilitate effective competition?  
- Does the private sector have the capacity to deliver the package, having regard to its size and complexity? |
| Appropriate risk transfer | - Does the package provide opportunities for government to appropriately allocate demand risk to the private sector?  
- What level of interface risk is created as a result of adopting a particular packaging approach and how can this be mitigated?  
- What level of construction risk can be transferred to contractors? |
| Technical requirements | Are the technical requirements/skills/capabilities required to deliver the elements of the package similar or compatible? |
| Economies of scale | Is the scale of a package of sufficient value to generate economies of scale and associated efficiencies? |
| Net cost to government | Does the packaging deliver lowest net cost to government, and minimise the impact on the Commonwealth budget position? |
| Future flexibility | Does the stage package consider the future requirements and objectives of the HSR program, thereby ensuring that the chosen procurement model is flexible in accommodating future stages? |

Source: Study team.

Each proposed package was assessed against these criteria in a Procurement Options Workshop (held on 21 August 2012) to assess its suitability as a package (prior to undertaking the procurement options analysis) with input from key study team advisors, including experts in relation to rail infrastructure, signalling and train communications systems, rolling stock and infrastructure procurement.

3.4.2 Packaging options

Section 3.2 identified and discussed a range of delivery options and recommended the options which merit further review. Delivery of the stage as a single package is not considered feasible and has not been further considered. There are three major packaging options that comprise alternative ways of unbundling the stage components and each is described in Table 5. In each case, infrastructure operation is bundled with operation train services although this would be varied in the case where there are multiple train operators on the network. This issue is discussed further in Section 3.6.

Option 1 is to package all of the major components separately to maximise competition and access to specialist capabilities.

Option 2 is similar to option 1, but packages rolling stock and signalling system procurement together. The rationale for option 2 is to pick up the synergies between rolling stock and modern communications based signalling systems, which operate through equipment installed in the rolling stock.

Option 3 is similar to option 2, but with infrastructure assets maintenance bundled in the train operations package. The rationale for this approach is to create a single point of responsibility for all network-related activities post-construction.

<table>
<thead>
<tr>
<th>Packaging option</th>
<th>Option structure</th>
</tr>
</thead>
</table>

March 2013
3.4.3 Assessment of the packaging options

Each of the packaging options was assessed against the packaging criteria outlined in Section 3.4.1, including discussion at the Procurement Options Workshop, with the results of the assessment, the key drivers underpinning the assessment, and further post-workshop analysis by the study team, summarised in the following sections.

Packaging Option 1

Option 1 involves procuring each of the key stage components individually (infrastructure assets, infrastructure assets maintenance, signalling systems (including maintenance), rolling stock (including maintenance), stations (including maintenance) and train operations (including train control), creating 6 packages in total. The assessment against each of the packaging criteria is presented in Table 6.

<table>
<thead>
<tr>
<th>Packaging option</th>
<th>Option structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 1 – delivery as individual packages</td>
<td>6 Packages:</td>
</tr>
<tr>
<td></td>
<td>- Infrastructure assets</td>
</tr>
<tr>
<td></td>
<td>- Infrastructure assets maintenance</td>
</tr>
<tr>
<td></td>
<td>- Signalling (including maintenance)</td>
</tr>
<tr>
<td></td>
<td>- Stations (including maintenance)</td>
</tr>
<tr>
<td></td>
<td>- Rolling stock (including maintenance)</td>
</tr>
<tr>
<td></td>
<td>- Train operations, including train control</td>
</tr>
<tr>
<td>Option 2 – packaging the signalling and rolling stock</td>
<td>5 Packages:</td>
</tr>
<tr>
<td>together, with all other components procured separately</td>
<td>- Infrastructure assets</td>
</tr>
<tr>
<td></td>
<td>- Infrastructure assets maintenance</td>
</tr>
<tr>
<td></td>
<td>- Signalling systems and rolling stock (including maintenance)</td>
</tr>
<tr>
<td></td>
<td>- Stations (including maintenance)</td>
</tr>
<tr>
<td></td>
<td>- Train operations, including train control</td>
</tr>
<tr>
<td>Option 3 – packaging the signalling systems and rolling</td>
<td>4 Packages:</td>
</tr>
<tr>
<td>stock together, and all other components separately, but</td>
<td>- Infrastructure assets</td>
</tr>
<tr>
<td>with maintenance of infrastructure assets packaged with operations</td>
<td>- Signalling systems and rolling stock (including maintenance)</td>
</tr>
<tr>
<td></td>
<td>- Stations (including maintenance)</td>
</tr>
<tr>
<td></td>
<td>- Train and infrastructure operations, (including maintenance of infrastructure assets)</td>
</tr>
</tbody>
</table>

Source: Study team
Table 6  Assessment of packaging option 1

<table>
<thead>
<tr>
<th>Packaging criteria</th>
<th>Suitability</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market capacity, competition and appetite</td>
<td>✓</td>
<td>- Infrastructure assets maintenance, signalling systems, rolling stock, stations and operations packages are likely to attract significant private sector interest in terms of both supply/construction and also potentially private investment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Delivery of each of these packages as individual contracts is likely to address private sector capacity constraints from contractor to human capital to insurance to resources.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- In contrast, the size and scale (at a cost of approximately $38 billion), technical complexity, and risk profile of the infrastructure assets package, would mean contractors are likely to encounter delivery constraints, and there may therefore be issues with generating market appetite.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- To overcome this issue, the infrastructure assets package should be further split (for example based on prevailing terrain conditions, or between tunnels, bridges and depots and so on), thereby creating sub-packages within the infrastructure asset package that are attractive to the market in their own right.</td>
</tr>
<tr>
<td>Appropriate risk transfer</td>
<td>✗✓</td>
<td>- Packaging stage components into a number of specialist packages would enhance the ability to achieve appropriate risk transfer and therefore value for money for government.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- For example, separately procuring infrastructure asset maintenance and post-commissioning maintenance for signalling, rolling stock and stations packages with the upfront build element for each respective package, is likely to achieve more effective whole-of-life maintenance risk transfer for government.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Given the size, scale and technical complexity of the infrastructure assets package, government is unlikely to achieve value for money transfer of deliverability and construction risks. To overcome this issue, the infrastructure assets should be split into a number of sub-packages, each attractive to the market in its own right.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- This approach needs to be balanced against the interface risk that could exist between contractors delivering different packages. Interface risks would not be limited to the construction phase. A significant interface issue during the operational phase of the stage would be the requirement to manage and coordinate multiple maintenance providers across a live rail environment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- While this packaging solution separately packages operations, it is unlikely that demand risk would be entirely passed to the private sector operator on the basis that the stage is the first stage of the Sydney-Melbourne line. However, a degree of demand risk may be transferred at a later stage upon demand reaching a steady state on the Sydney-Melbourne line.</td>
</tr>
<tr>
<td>Packaging criteria</td>
<td>Suitability</td>
<td>Comments</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Technical requirements  | ✓           | - Individually packaging each stage component facilitates a natural separation of works between packages with specific technical and capability requirements.  
                              - Allows for the procurement of the three greenfield stations as part of a single package which offers benefits given they are likely to have a common risk profile, synergistic benefits (such as reduced preliminaries and overheads) and potentially reduced interface risks (with one contractor responsible for all stations across the stage).  
                              - Allows recognition that assets have different lifecycles and useful lives and allows bundling of assets with a similar useful life.  
                              - Inclusion of maintenance within the signalling systems, rolling stock and stations packages increases the likelihood of satisfying the stage’s technical requirements, as contractors would be inherently incentivised to develop solutions that are optimal from an ongoing risk and cost perspective. |
| Economies of scale      | ✓           | - The infrastructure assets package represents a significant proportion of the total estimated cost of the Sydney-Canberra sector; therefore economies of scale are achievable. The remaining packages are all of a sufficient value to generate economies of scale and associated efficiencies.  
                              - Sub-packaging the infrastructure asset package into a number of integrated sub-packages retains the potential to deliver economies of scale (through bulk purchasing, streamlined processes, reduced bidding costs, etc) and therefore value for money to government. |
| Net cost to government  | ✓           | - Maximises the opportunity to capture private sector investment and therefore the private sector financial disciplines in the delivery of a broader range of the relevant works.  
                              - For example, each of the rolling stock, signalling systems, operations and stations packages may offer opportunities for private sector investment. However, given these four packages represent a relatively small proportion of the total stage cost ($13.2 billion or less that 35% of total cost), the potential benefit to government is worth pursuing but is not significant in the context of the financial disciplines this would bring to the whole stage.  
                              - Enhances value for money and budget certainty for government on the assumption that maintenance pricing for each stage component would be competitively derived and locked in at financial close. |
| Future flexibility       | ✓           | - Should generally facilitate greater flexibility with respect to potential future scope changes. The size of the infrastructure assets package might limit future flexibility; however, this can be managed via the implementation of various sub-packages.  
                              - There is going to be some limitation on the future procurement of operations and signalling systems, particularly with respect to the Canberra-Melbourne stage of the Sydney-Canberra line as they will partially share common track. |

Source: Study team.
Packaging option 2

Option 2 is similar to option 1, but packages signalling systems and rolling stock into one package (creating 5 packages in total). The assessment of option 2 is presented in Table 7.

Table 7  Assessment of Packaging Option 2

<table>
<thead>
<tr>
<th>Packaging criteria</th>
<th>Suitability</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Market capacity, competition and appetite | ✓           | - Each package is likely to attract significant private sector interest in terms of both supply/construction and also potentially private investment, with the exception of the infrastructure assets package, which would need to be sub-packaged in order to generate market appetite.  
|                                          |             | - Alstom, Bombardier and Siemens are considered the key firms currently capable (from both a technical and resourcing perspective) of delivering a signalling and rolling stock combined package. Therefore this packaging approach would prima facie reduce the size of the potential competitive market for the supply of signalling systems and rolling stock. However, it is likely that smaller signalling/rolling stock specialist firms (such as Hitachi, Inversys Rail, Ansaldo, GE Transportation, and Chinese rolling stock manufacturers), would form consortia in order to effectively compete with Alstom, Bombardier and Siemens, thereby not impacting the potential bidding market. In addition, by the time the stage is built, smaller market participants may have enhanced their capability and/or new market entrants may have emerged. |
|                                         |             | - Systems integration between signalling systems, communication systems and rolling stock is considered one of the biggest risks for the stage. By packaging the signalling systems and rolling stock together, this key stage risk (including rolling stock commissioning and acceptance risk) is likely to be substantially, if not entirely, transferred to the contractor.  
|                                         |             | - Given the size, scale and technical complexity of the infrastructure assets package, government is unlikely to achieve value for money transfer of deliverability and construction risks. To overcome this issue, the infrastructure assets should be split into a number of sub-packages, each attractive to the market in its own right.  
|                                         |             | - The key disadvantage of this packaging approach is the resulting increase in interface complexities and risks due to the separation of packages. Interface risks would be significant under option 2 (although noting this would be reduced compared to option 1, given that the signalling systems and rolling stock would be procured and maintained as a single package).  
|                                         |             | - With respect to transferring maintenance risk, given the size and scale of the infrastructure assets, and that it is a greenfield asset which means there is no benchmark for actual maintenance requirements, there is a possibility that maintenance risk would not be entirely passed to the private sector contractor.  
|                                         |             | - While this packaging solution separately packages operations, it is unlikely that demand risk would be entirely passed to the private sector operator on the basis that the stage is the first segment to be delivered in the HSR program. However, a degree of demand risk may be transferred at a later stage upon demand reaching a steady state.                                                                                     |
Packaging criteria | Suitability | Comments |
|-------------------|------------|----------|
| Technical requirements | ✓ | - Individually packaging each stage component facilitates a natural separation of works between packages with dissimilar technical and capability requirements and risk profiles.  
- A key advantage of this option is that it packages the signalling systems and rolling stock together, which should facilitate the development of a more effective, integrated, technical solution by the contractor for these stage components. |
| Economies of scale | ✓ | - Each package is of sufficient size and scale to create economies of scale.  
- In addition, sub-packaging the infrastructure asset package into a number of integrated sub-packages retains the potential to deliver economies of scale (through bulk purchasing, streamlined processes, reduced bidding costs, etc) and therefore value for money to government. |
| Net cost to government | ✓ | - Maximises the opportunity to capture private sector investment and therefore the private sector financial disciplines in the delivery of a broader range of the relevant works.  
- Enhances value for money and budget certainty for government on the assumption that maintenance pricing for each stage component would be competitively derived and locked in at financial close. |
| Future flexibility | ✓ | - If relevant contracts are appropriately structured, this packaging option would not limit governments’ future flexibility.  
- However, this would need to be heavily managed for the signalling systems and rolling stock package given the choice of contractor (and therefore their technical solution) may constrain flexibility with respect to future signalling and rolling stock procurements, particularly with respect to the Canberra-Melbourne stage of the Sydney-Melbourne line. |

Source: Study team.

Packaging option 3
Option 3 builds on option 2 and bundles the maintenance of infrastructure assets with train operations. The assessment of option 3 is presented in Table 8.
### Table 8: Assessment of Packaging Option 3

<table>
<thead>
<tr>
<th>Packaging criteria</th>
<th>Suitability</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Market capacity, competition and appetite              | ✓           | - The private sector is expected to have the capacity to deliver each package (with the exception of the infrastructure assets package, which would need to be further split into sub-packages).  
- Operators may view the opportunity to secure control over all aspects of operations and infrastructure maintenance as more commercially efficient when compared to the potential alternative of interfacing with multiple maintenance contractors within a live rail environment (as is likely to occur under options 1 and 2). |
| Appropriate risk transfer                              | ✓           | - A key advantage of this option is that it significantly mitigates interface issues with respect to the operating phase, and the ongoing maintenance of infrastructure assets across the stage by creating a single point of responsibility (being the operator). Option 3 also reflects that, unless there is strong reason otherwise, it is prudent to minimise the number of contractual interfaces thereby creating ongoing management efficiencies for the HSRDA.  
- A further advantage is that it is likely to facilitate a greater degree of maintenance risk transfer given the operator would undertake infrastructure assets maintenance risk under the concession contract (and could then pass this risk onto a maintenance sub-contractor should this model be employed).  
- While this packaging solution separately packages operations, it is unlikely that demand risk would be entirely passed to the private sector operator on the basis that the stage is the first stage to be delivered in the HSR program. However, a degree of demand risk may be transferred at a later stage upon demand reaching a steady state. |
| Technical requirements                                 | ✓           | - The technical advantages of option 2 are likely to be equally achievable under option 3.  
- A further key advantage of this option is that the operator should be able to better manage ongoing infrastructure assets maintenance requirements, both in terms of quantum and timing, in a manner which would have the least impact on its customers. |
| Economies of scale                                     | ✓           | - Each package is of sufficient size and scale to create economies of scale.  
- In addition, sub-packaging the infrastructure asset package into a number of integrated sub-packages retains the potential to deliver economies of scale (through bulk purchasing, streamlined processes, reduced bidding costs, etc) and therefore value for money to government. |
| Net cost to government                                 | ✓           | - The net cost to government benefits of option 2 are likely to be equally achievable under option 3.  
- In addition, given government is likely to achieve a greater degree of infrastructure assets maintenance risk transfer under this option compared to option 2, this should prima facie deliver an enhanced value for money outcome. |
| Future flexibility                                      | ✓           | - Should facilitate greater flexibility with respect to potential future scope changes. The size of the infrastructure assets package might limit future flexibility; however, this can be managed via the implementation of various sub-packages.  
- There is going to be some limitation on the future procurement of operations and signalling systems, particularly with respect to the Canberra-Melbourne stage. |

Source: Study team.
3.4.4 Preferred packaging option

Based on the assessment of each packaging option against the packaging criteria, and the consideration of other stage objectives, option 3 is considered to be the optimal packaging solution for the Sydney-Canberra stage. Packaging option 3 is preferred over the other options as it allows:

- Interface complexities to be materially reduced, given that the number of contractual interfaces are minimised by bundling the maintenance of infrastructure assets with train operations.
- A greater degree of maintenance risk transfer, given the operator would undertake infrastructure assets maintenance risk under the concession contract.
- The operator, who is best placed to identify maintenance requirements as it is the primary interface with the network on a daily basis, to determine the quantum and timing of maintenance functions in a manner that will have the least impact on its customers.
- Systems integration between the signalling systems, the communication systems and the rolling stock, which is considered one of the biggest risks for the stage. By packaging the signalling systems and rolling stock together, this key stage risk (including rolling stock commissioning and acceptance risk) is likely to be substantially, if not entirely, transferred to the contractor. There should also be significant commissioning efficiencies given the signalling systems and rolling stock would be developed in conjunction.

These benefits are considered to outweigh the benefits of packaging option 1 and option 2. The preferred stage packages are set out in Table 9.
Table 9 Preferred staged packages

<table>
<thead>
<tr>
<th>Stage package</th>
<th>Key considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure assets</td>
<td>Given market capacity constraints, this package would need to be further split into sub-packages, each of which would need to be attractive to the market in its own right. The proposed sub-packaging solution for the infrastructure assets is outlined in Section 3.5.3.</td>
</tr>
</tbody>
</table>
| Signalling systems and rolling stock (including design, supply and maintenance) | Rolling stock maintenance is likely to be structured as an initial 5 year fixed term (consistent with current industry practice), with pricing locked in at financial close. Signalling maintenance is likely to be structured as an initial bedding-in period, typically 1 to 2 years. Following expiration of these periods, the maintenance requirements would be competitively tendered as a separate package, or alternatively, potentially wrapped into the infrastructure maintenance contract (signalling system) and operations concession (rolling stock).

24 Some examples of projects where signalling systems and rolling stock have been packaged and procured together include the Seoul-Pusan HSR line in Korea, Gold Coast light rail system in Queensland, Victoria line upgrade as part of the PPP for the London Underground, Kuala Lumpur Express Rail link in Malaysia, and Qatar Foundation light rail system. |
| Stations (including maintenance) | Construction of 4 stations, including three greenfield stations and one brownfield station (Sydney Central). This package could be further split to separate the cost and complexity of a brownfield construction of Sydney Central (and the significant interest of the NSW Government in this site) from the greenfield stations. The 3 greenfield stations could then be bundled as a single package, or alternatively separated and procured as individual contracts, having regard to factors such as state/territory government interests and the best mechanism to integrate with broader station precinct developments and complementary infrastructure. |
| Operations and infrastructure assets maintenance (including train control) | The operations element would include operation of the train services and operation of the train control system, responsibility for infrastructure assets maintenance and for determining the occupation regime governing any maintenance sub-contractors (noting that from the HSRDA’s perspective, the operator would have responsibility for the performance of any maintenance services). There are a number of potential permutations with respect to the likely structure of the operations contract; including separate north and south concessions and the possible separation of commuter operations from regional/inter-city operations (these options are all feasible in the context of the preferred packaging option). Considerations with respect to structure would also include optimal contract duration (balancing the benefits between competitive tension via regular re-tendering against operational and maintenance efficiency gains made through asset familiarisation gained by the incumbent contractor).

The precise nature of ‘infrastructure maintenance’ (i.e. for what maintenance would the contractor be responsible, and what would be performed in-house by the HSRDA (if any)) would need to be determined, as would the optimal design of the infrastructure maintenance performance requirements (including the level of output versus input based key performance indicators). |

3.5 Procurement options analysis

Given the preferred packaging model, an assessment of alternative procurement models for each works package was undertaken. In this context, the procurement model refers to the nature or type of contract upon which the HSRDA would contract with the private contractor to deliver each works package within the stage.
3.5.1 Procurement model evaluation criteria

Table 10 summarises the criteria used to evaluate procurement options. It is noted that the criteria for evaluating packaging options overlap with the criteria for evaluating the procurement options, reflecting the interdependent relationship of the packaging and procurement solutions. The criteria have been determined based on review and consideration of the full suite of evaluation criteria in the Infrastructure Australia Guidelines and confirmed at the Procurement Options Workshop.

Table 10 Procurement model evaluation criteria

<table>
<thead>
<tr>
<th>Procurement criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value for money</td>
<td>This refers to the extent which the procurement option would achieve the optimal value for money for government having regard to:</td>
</tr>
<tr>
<td></td>
<td>• Design and construction innovation.</td>
</tr>
<tr>
<td></td>
<td>• Construction cost.</td>
</tr>
<tr>
<td></td>
<td>• Whole-of-life cost considerations.</td>
</tr>
<tr>
<td></td>
<td>• Risk allocation.</td>
</tr>
<tr>
<td></td>
<td>• Competitive tension.</td>
</tr>
<tr>
<td>Optimal risk transfer</td>
<td>Ability of the procurement option to enable an optimal level of risk transfer (including design, construction, commissioning and operations risk) to the private sector across the life of the stage (or package) and the flexibility of the option to deal with scope changes.</td>
</tr>
<tr>
<td>Stage objectives</td>
<td>Ability of the procurement option to meet governments’ stage objectives, such as supporting economic growth, increasing capacity, minimisation of capital costs and leveraging private sector expertise, as well as governments’ long-term vision and objectives for the stage.</td>
</tr>
<tr>
<td>Complexity of process</td>
<td>The complexity and resources required to manage the procurement process and institutional structure required to implement the procurement approach.</td>
</tr>
<tr>
<td>Level and complexity of interfaces</td>
<td>Ability of the procurement option to minimise the level and complexity of interface arrangements and reduce interface risks. This would be particularly important with respect to the infrastructure package as it is likely to need to be procured using multiple sub-packages.</td>
</tr>
<tr>
<td>Future flexibility</td>
<td>Whether the procurement option considers the future requirements and objectives of the stage, thereby ensuring that the chosen procurement model is flexible in delivering future scope changes.</td>
</tr>
</tbody>
</table>

3.5.2 Procurement options

The procurement options outlined in Table 11 capture the most relevant options available and are based on options commonly used for large-scale infrastructure projects and are consistent with the descriptions provided by the Infrastructure Australia Guidelines. The procurement options cover the full spectrum of risk transfer to the private sector, and public/private sector participation in the delivery of the stage. All of the models (or variations thereof) have been applied on infrastructure project procurements in Australia and internationally.
<table>
<thead>
<tr>
<th>Procurement option</th>
<th>Description</th>
<th>Suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alliance contracts</td>
<td>Alliancing is a form of relationship-based contracting in which the government collaborates with one or more non-owner parties (e.g. design, constructor, other key stakeholders etc) to share the risks and responsibilities in delivering the construction phase of a project. The abovementioned guidelines also apply to alliance contracting.</td>
<td>An alliancing approach is best suited to projects with complex, unclear, or unpredictable scope, design, or delivery issues, multiple interfaces, time pressures, or where there are benefits of early involvement of the contractor in design, planning phases, as well as the ongoing presence and involvement of the owner.</td>
</tr>
<tr>
<td>Design and Construct (D&amp;C) contracts</td>
<td>A D&amp;C contract typically involves government engaging a party for a specific scope of work with the contractor underwriting both the design and the construction delivery and cost (typically a fixed price).</td>
<td>A D&amp;C approach is best suited to projects with a highly certain technical specification, clear delineation of risk, limited prospect for scope change, limited complexity, and limited interfaces.</td>
</tr>
<tr>
<td>Design, Construct and Maintain (DCM)</td>
<td>The DCM model is similar to the D&amp;C model, with the inclusion of a period of maintenance to be delivered by the contractor</td>
<td>A DCM approach is best suited to projects with highly certain project specifications and future maintenance and/or operations requirements, opportunities for whole-of-life design innovation and operational synergy, clear delineation of risk, limited prospect for scope change, limited complexity, and limited interfaces.</td>
</tr>
<tr>
<td>PPP</td>
<td>A PPP involves the government contracting with a private sector partner responsible for the design, construction, operation, maintenance and finance of the infrastructure over an extended period of time, typically 20-25 years.</td>
<td>A PPP approach is best suited to projects with opportunities for genuine risk transfer, private sector innovation/synergy in whole-of-life design, costing, innovation, operations and maintenance, and private sector financial disciplines for on-time and on-budget project delivery. This requires a clearly defined output specification, identification of risk and opportunities for risk transfer, and limited scope change over the life of the project.</td>
</tr>
<tr>
<td>Design and Supply (D&amp;S) – Signalling systems and rolling stock</td>
<td>The signalling systems and rolling stock are procured on a traditional fixed price design and supply basis. Maintenance is sourced separately from the rolling stock procurement process and is either provided by a third party or undertaken in-house by the relevant network operator.</td>
<td>A D&amp;S approach is best suited to procurements where there is a focus on supply, a separation of supply and maintenance, limited opportunities for long-term risk transfer and limited complexity.</td>
</tr>
</tbody>
</table>
## Procurement option

<table>
<thead>
<tr>
<th>Procurement option</th>
<th>Description</th>
<th>Suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design, Supply and Maintain (DSM) – Signalling systems and rolling stock</td>
<td>The signalling systems and rolling stock supplier provides a fixed price to design and build/install the assets and undertake maintenance for a period, typically up to 15 years. Payment for maintenance services would take into account performance of the rolling stock including availability, reliability and potentially the operational performance of the relevant operator.</td>
<td>A DSM approach is best suited to procurements where there is a degree of certainty as to the specifications and future maintenance requirements of the asset, where there are opportunities for whole-of-life design innovation, and where there is limited prospect for scope change.</td>
</tr>
<tr>
<td>Lease and Maintenance Agreement (Leasing) – Signalling systems and rolling stock</td>
<td>This approach involves contracting with a party that will design, construct and finance the signalling systems and on a fixed period lease basis (e.g. 15 years). The rolling stock component would be procured through a dry lease (i.e. where the HSRDA as lessee takes rolling stock performance risk post-delivery). Maintenance would be provided under a fixed price 5 to 10 year agreement similar to that under the DSM approach.</td>
<td>A leasing approach is best suited to procurements where supply and maintenance are linked, there are opportunities for risk transfer and private sector innovation/synergy in whole-of-life design and costing.</td>
</tr>
<tr>
<td>Operations Concession</td>
<td>A train operating company (TOC) would be awarded a concession to provide HSR passenger services (including train control) over a defined period (say 10-15 years but potentially longer depending on the assets and responsibilities passed to the TOC). The TOC would fund itself through passenger revenue with possibly the support of a minimum revenue guarantee from the public sector. This model is very similar to those currently in operation in Australia and the United Kingdom.</td>
<td>A concession approach is best suited to projects with a long-term servicing horizon, where there are opportunities for transferring a significant degree of commercial risk to the private sector, and where there are opportunities for innovative operational and customer focused solutions.</td>
</tr>
</tbody>
</table>

### 3.5.3 Assessment of procurement options

The following sections outline the key considerations with respect to determining the optimal procurement structure for the preferred stage packaging outlined in Section 3.4. The analysis:

- Assessed the extent to which the relevant procurement options met the specific requirements for each stage package.
- Identified the preferred procurement model for each stage package.

The initial procurement analysis was undertaken at the Procurement Options Workshop, and was further developed during post-workshop analysis by the study team.
As outlined in Section 3.4.4, the preferred stage packaging structure comprises the following core works packages:

- Infrastructure assets.
- Signalling systems and rolling stock (including design, supply and maintenance).
- Stations including maintenance.
- Operations and infrastructure assets maintenance (including control of the movement of trains and the operation of train services).

Each optimal procurement model for each works package is discussed below.

**Infrastructure assets**

As noted above, the size of the infrastructure asset procurement, estimated at a risk-adjusted cost of approximately $16.5 billion, is too large to be delivered as a single integrated package in terms of contractor delivery capacity. This characteristic also poses challenges for involving private sector finance. The largest rail PPP in recent history, where contractual close occurred on 16 June 2011, was the French Tours to Bordeaux high speed line PPP which proved to be financially unsuccessful and had a capital value of ‘only’ US$10 billion. Difficulties with attracting private finance for the infrastructure assets package is also likely to be compounded as the stage is the first HSR program stage, and there would be less certainty on constructability, ridership and revenues. Furthermore, availability-based payment models are unlikely to mitigate this issue, or be a viable alternative for the HSRDA, on the basis that this approach would adversely impact value for money outcomes (as the availability charge would partly be a product of the private financier’s cost of debt which would be higher than government’s cost of debt).

The infrastructure package would therefore need to be split and procured in a number of sub-packages which are attractive to the market in their own right.

**Chapter 4** and **Sub appendix 7A.1** have considered matters relating to corridor development, including the development of a proposed construction packaging solution for the implementation of the stage’s infrastructure assets which considers the geographic and constructability attributes of the stage (for example, the location of proposed bridges, potential access points for tunnelling works and sub-package length). This construction packaging solution has been assumed to be the preferred solution for the purposes of the procurement options assessment.

**Table 12** provides a summary of the proposed infrastructure assets sub-packaging solution, the key characteristics of each sub-package relevant to the procurement options assessment, and outlines key procurement considerations with respect to each sub-package.
### Table 12 Infrastructure assets sub packages

<table>
<thead>
<tr>
<th>Sub-package (location from and to)</th>
<th>Length</th>
<th>Key procurement considerations</th>
</tr>
</thead>
</table>
| Sydney Station infrastructure works (non-station specific works) | 0.9 km | - The smallest sub-package (in terms of both length and cost)  
- The scope of works and risks for this sub-package are expected to be definable and well understood and the sub-package is therefore not expected to be complex from a constructability perspective  
- There are significant interfaces with the Sydney metropolitan rail network. It would need to be determined whether such interfaces would be managed as part of this infrastructure assets sub-package or as part of the stations package. A further option would be to combine these works into the stations package, given the interdependency between these infrastructure works and the HSR Sydney Central brownfield station  
- Risks are also expected to be relatively well known and definable, and as such should be able to be effectively allocated (and priced)  
- Should be within the delivery capacity of many top and mid-tier construction firms |
| Sydney tunnel - sub section 1 | 10.2 km | - The geographic split of the tunnelling works into three sub-packages has been based upon the location of potential tunnelling access points (i.e. for tunnel boring equipment)  
- While tunnelling is inherently complex, the scope of works and risks for these sub-packages are expected to be definable and well understood  
- Risks are also expected to be relatively well known and definable, and as such should be able to be effectively allocated (and priced)  
- No tunnelling sub-packages interfaces with an existing rail network  
- Local and international construction firms have demonstrated tunnelling capacity comparable to the size and scale of each sub-package |
| Sydney tunnel - sub section 2 | 11.8 km | |
| Sydney tunnel - sub section 3 | 8.2 km | |
| Glenfield to Douglas Park | 31 km | - Each of these linear infrastructure sub-packages are expected to broadly share common risk and constructability profiles  
- The scope of works and risks for each sub-package is expected to be definable and well understood and each sub-package is therefore not expected to be complex from a constructability perspective  
- Risks are also expected to be relatively well known and definable, and as such should be able to be effectively allocated (and priced)  
- The sub-packages do not share or impact on existing rail corridors and/or infrastructure  
- The capital cost of each sub-package may exceed the current preferred works size for domestic construction firms. However, there are works of this size on a global level, and the domestic mining sector is also procuring projects which are not of a dissimilar capital size, and therefore past domestic projects may not offer the best indicator of market capacity in this area |
| Douglas Park to Yerrinbool | 31.7 km | |
| Yerrinbool to Exeter | 31 km | |
| Exeter to Medway Jcn / Marulan | 31.3 km | |
| Medway Jcn / Marulan to Goulburn Airport | 31 km | |
| Goulburn Airport to Lerida Road | 31 km | |
| Lerida Road to Gundaroo | 31 km | |
| Gundaroo to Canberra** | 33.9 km | |

*Includes Canberra junction.  
Source: Study team.
Based on an assessment against the procurement criteria, the optimal approach would be for the greenfield and tunnel sub-packages to be delivered as individual D&C contracts. As the scope of works and risks for each sub-package are expected to be definable and well understood, fixed price models (i.e. D&C) and competitive tensions should deliver best value. It is noted that, given the relatively high number of sub-packages, the HSRDA would need to impose a high degree of both technical and performance specification in D&C contracts to ensure consistent and interoperable standards between sub-packages.

Key risks relating to land acquisition, planning and environmental approvals would be retained by government in all procurement options. Other risks (such as constructability) are expected to be well understood and definable, including the ability to specify requirements. As such, risk allocation should be able to be undertaken to ensure risk is effectively transferred to the party best able to manage that risk, which supports the use of a D&C model.

International and domestic market interest is likely to be significant for each sub-package which should create competitive tensions and enable government to drive value for money through the tender process.

A D&C model is understood by the market and involves a shorter and less complex procurement process relative to the other procurement options. An alliance or PPP approach would be particularly resource-intensive. This issue would likely be exacerbated by the number of sub-packages.

With respect to future flexibility, the scope for each sub-package is expected to be well defined and limited scope changes are expected during delivery. Scope changes post-commissioning are also expected to be minimal. This supports the implementation of a D&C model.

Procuring multiple sub-packages of works is likely to result in significant and complex interface risks. These risks would inevitably be retained by government irrespective of the delivery model for each sub-package. As discussed above, in order to reduce interface issues, the infrastructure assets maintenance would be procured as a separate package (as opposed to wrapping maintenance requirements into each infrastructure assets sub-package – in which case options such as a head contractor or detailed interface agreements signed by all contractors would be required).

With respect to the Sydney Station infrastructure works sub-package, given the interdependency between these works and the Sydney Central brownfield HSR station, and likely complex interface issues, there is an option to combine these works into the stations package. This option would likely materially reduce interface complexities by reducing the number of contractors interfacing with the Sydney metropolitan rail network, as well interfaces as between contractors.

Ultimately, the basis for determining the precise contracting strategy for each infrastructure assets sub-package would depend on the scale, complexity, technical composition and timing of the relative construction works within each respective sub-package (although noting that contracting strategy would likely be limited to traditional procurement models).

**Signalling systems and rolling stock**

Reflecting the unique nature of the signalling works and rolling stock package, the procurement options analysis was limited to consideration of the D&S, DSM, and leasing procurement models.

Based on an assessment against the procurement criteria, the optimal approach would be for the signalling systems and rolling stock to be delivered as a DSM contract. The DSM model was considered to drive the best value for money outcome, given contractors would be inherently incentivised to drive design and supply innovation as maintenance pricing would be competitively derived and locked in at financial close (likely to be for a period of 5 years with respect to the rolling stock, with forward pricing locked in at financial close).

While signalling is likely to represent a relatively small proportion of the stage cost (approximately $0.3 billion or 0.8 per cent of total stage cost), it has the potential to create significant delays to commissioning and the operational commencement of the stage. Systems integration between the signalling systems and the rolling stock is considered one of the biggest risks for the stage. Under the D&S and DSM procurement options, this key stage risk (including rolling stock commissioning and acceptance risk) is likely to be substantially, if not entirely, transferred to the contractor. Accordingly,
both the D&S and DSM methods were assessed favourably for the risk transfer criterion. However, a DSM model was assessed most favourably given the model is likely to also facilitate a greater degree of transfer of maintenance risk to the private sector.

Linking of supply and maintenance for a significant part of the rolling stock’s life encourages a whole-of-life approach by the contractor. It was considered that both the D&S and DSM models would facilitate this.

The signalling systems and rolling stock stage components are likely to offer significant opportunity for contractor involvement in terms of market innovation in all aspects of the respective technical solutions. Delivery models that access innovation from multiple parties through a competitive process should deliver the most innovation. It was considered that both the D&S and DSM models would achieve this outcome.

The choice of signalling systems should be undertaken to ensure it does not constrain flexibility and/or competitive tension with respect to future signalling procurements for the HSR program (particularly with respect to the Canberra-Melbourne stage given this will ultimately be part of the Sydney-Melbourne line). One approach may be for the HSRDA to specify a signalling performance stipulation for the stage, such as European Train Control System Level 2, which would facilitate interoperability with, and ensure multiple suppliers could bid for signalling systems procurements for later HSR program stages. No procurement options were considered to offer a clear advantage with respect to future flexibility.

Similar to the stations package, the supply, maintenance and possibly financing of the rolling stock offers an opportunity to attract private finance (using a leasing structure where the HSRDA is lessee) for the stage. However, given the benefits of bundling the signalling systems and rolling stock together, this procurement approach was not considered optimal.

**Stations**

The key issues with respect to station procurement include:

- Interface with the tunnelling works and the signalling and systems works.
- Interface with the operation and maintenance of the signalling and systems assets.
- Interface with train operations and train control, given the staff manning and managing the station should ideally come from the train operator (driven by a consistent customer interface).
- Fit-out of the station, following the station build.
- Where responsibility for property and commercial development best lies.

Based on an assessment against the procurement criteria, the optimal approach would be for stations to be delivered as a PPP. Domestic experience indicates that there is market appetite for PPP stations (e.g. Southern Cross Station in Victoria). The PPP model would be structured to include responsibility for designing, building (including station fit-out), financing and maintaining (but not operating) the station, over a period of 20 to 25 years. The PPP model would likely be based on some form of access charge.

While the stations package could be procured using a number of methods, covering the full spectrum of traditional models to fully financed models, it was considered that the stations package (including maintenance) offers one of the few opportunities to capture private finance (via a PPP structure) for the stage.

A PPP model was assessed most favourably for the value for money criterion on the basis it would deliver enhanced value through the private contractor and financier driving optimum on-time and quality performance and through synergies created by bundling the relevant design, construction and maintenance services. The benefits of a PPP are likely to outweigh any losses of synergistic and/or operational benefits created by wrapping stations maintenance with train operations.

There should be benefits from procuring and constructing the 3 greenfield stations as parts of a single contract, given they are likely to have a common risk profile (specific civil works), synergistic benefits
(such as reduced preliminaries and overheads) and potentially reduced interface risks (with one contractor responsible for all stage stations).

Given the estimated capital cost of the stations package (approximately $2.6 billion), procurement of stations via a single PPP delivery model structure would be restricted by private sector finance capacity and risk appetite. In addition, there are a broader set of considerations that would come into play, particularly around the brownfield station development at Sydney Central, and integration with existing transport systems, links to broader station precinct development and the broader operational and development objectives of the state and territory governments.

Therefore, the stations package should be split and procured in a number works packages across the stage to address these issues and to maximise private finance opportunities. The most likely split would be that the three greenfield stations (Sydney South, Southern Highlands and Canberra) would be packaged together and procured using a PPP model (based on some form of access charge). The Sydney Central brownfield station would be separately packaged and procured as either an alliance, D&C or DCM, subject to the technical, interface and risk attributes of the works, particularly the interface with the existing Sydney Central station and associated train operations. There may also be benefits to government in further splitting the three greenfield stations into individual sub-packages, in terms of both increased competition, and also to open up the development opportunity to smaller construction firms.

While a PPP model (which involves government contracting with the private sector for a period of 25–30 years) would typically limit future flexibility in the context of a station only package for this stage, this would not impact the procurement of future stations on later HSR program stages.

Property/commercial development opportunities may exist above and around stations. This revenue would be maximised by implementing a ‘precinct planning’ approach to new stations that focuses on maximising land intensity and uses at each station and integration of stations within those precincts. Property/commercial development could be best procured separately to the PPP, reflecting that:

- The skills required to undertake property development activities differ from those required to design, construct and commission large rail transport infrastructure projects.
- The financing requirements and bankability of returns differ between infrastructure projects and property development projects.
- Separation of a PPP, which is integral to the operation of the HSR, from commercial development, encourages the complete focus of the PPP contractor.

However, there is merit in including the property development opportunities with the station works/station fit-out package where, for example, assimilation of the station and the property development are integral to the operation of station and provided issues with respect to land ownership permitted this approach. In addition, inclusion of skilled property developers in the design and construction of the stations can act to ensure that the value of the property development opportunities is maximised. Ultimately, inclusion of property development with the stations package needs to be assessed on a case-by-case basis.

There may be joint development opportunities with other transportation users, such as metropolitan rail network, bus networks and airports. These other transport networks may be beneficial users of new HSR stations. Therefore, there may be an opportunity for the PPP company to seek a joint financing contribution and/or charge a form of user levy from the providers of these other transportation networks.

Ultimately, the viability of a PPP solution for the stage stations (or alternatively the three greenfield stations) would be subject to robust value for money assessment by government and also private sector finance and risk appetite for this procurement approach.

---

25 Inclusion of property development with station construction and fit-out has occurred in a number of local and international projects including: Chatswood Interchange in Sydney; Hong Kong Mass Transit Railway; Bay Area Rapid Transit in San Francisco; and Dallas Area Rapid Transit.
Train operations and infrastructure assets maintenance

Once the stage is operational, there is a potential to procure the long-term train operations and infrastructure assets maintenance under a concession agreement. An effectively structured concession should facilitate a value for money transfer of ongoing operational, maintenance and commercial risks to the operator. In addition, a concession arrangement has the advantage of a shorter fixed term (of around 10 to 15 years) compared to alternative privatisation models, which would permit government to more frequently test the market, capturing the benefits of competition between potential contractors.

It is unlikely that the concession holder would assume the full revenue risk associated with the stage until the system is proven. There may, however, be contractor interest in a mechanism to share a degree of revenue risk where competitive tension for the concession contract drives it. Given revenue risk offers government the best opportunity to incentivise appropriate operator behaviours (including in respect of customer service and train control efficiency), a concession structured to share a degree of revenue risk would be preferred.

Procuring the infrastructure assets maintenance as part of the train operating concession would materially reduce interface complexities as it creates a single point of responsibility. The precise nature of infrastructure maintenance would need to be determined, including the level of maintenance capability the HSRDA would outsource under the concession.

The optimal concession duration would need to be determined, balancing the benefits between competitive tension via regular re-tendering against operational and maintenance efficiency gains made through asset familiarisation, which rests with the incumbent contractor. This approach would allow government to include performance-based mechanisms in the concessions agreement that calibrate service payments based on the contractor’s performance against agreed key performance indicators relevant to both operations and maintenance.

It is noted that there is a possibility that the operator may sub-contract the infrastructure assets maintenance component to an infrastructure maintenance specialist. This should not create additional managerial complexities for the HSRDA’s given this interface would then be managed by the operator.

3.6 Delivery model

The optimal approach to a delivery model for a future HSR system would have the following features:

- A publicly owned HSRDA would be created to develop, procure and integrate the HSR system, including procuring and owning the required land.
- Construction of the HSR network would be undertaken in stages, with the infrastructure in each stage procured through the following core works packages:
  - Infrastructure assets (civil, tunnels, track) - the infrastructure assets packages would be split and procured in a number of sub-packages of a size and scope which are attractive to the market, generally through D&C contracts.
  - Signalling systems and rolling stock would be delivered as a combined DSM contract.
  - Stations would be delivered as a set of PPP contracts, including maintenance, combined where possible but with major city stations likely to be separated.
- Multiple train operations concessions including infrastructure assets maintenance responsibilities would be offered, and would include control of the movement of trains bundled with the operation of train services.
  - Options include separate north and south concessions, and possible separation of commuter operations from regional/inter-city operations in each state (with potential for the same operator to win multiple concessions).
  - Where separate franchises are offered for commuter operations, the regional/inter-city operator would control the movement of trains for all of the system and provide access (train paths) for the commuter operator.
Depending on the timing of the completion of the Canberra–Melbourne stage, the initial operations concession for Sydney/Canberra-Melbourne would be combined with the re-tendering of the Sydney-Canberra operations concession.
4.0 Program governance and delivery

4.1 Program life cycle

The multi-jurisdictional nature of a future HSR program gives rise to a range of constitutional, political and structural issues that need to be reflected in the governance and institutional arrangements for HSR. The governance and institutional arrangements must have regard to the legal obligations and responsibilities of the jurisdictions and the aims and objectives of different governments throughout the life of the HSR program and establish appropriate roles for the public and private sectors in the development, delivery and operation of a future HSR program.

The potential governance and institutional framework for HSR should consider the four phases of the program life cycle: preparation and corridor protection, detailed planning and procurement, construction and operations. The role of government will change throughout the program life cycle to account for the evolution of the activity being undertaken. During commencement of the HSR, governmental roles are in a multi-jurisdictional decision-making capacity. The institutional model then evolves over the program life cycle to reflect the changing role of government from policy maker to project developer to oversight of the railway operation. Figure 4 illustrates the four key phases of the program life cycle.

A distinction is usefully made between the market building/market proving phase of operations and the subsequent, more mature market phase, where government’s role may be more significant in the early phase. It is likely that phases will overlap as the HSR program rolls out in stages.

Figure 4 Four phases of the HSR program life cycle

Source: Study team.

The role of government includes implementing the necessary arrangements to protect the public interest across the life of the program. Program governance in each phase of the HSR life cycle is discussed below.

4.2 Preparation and corridor protection phase

The preparation and corridor protection phase provides the necessary policy foundation for the procurement, construction and operation of HSR. This phase requires alignment between Commonwealth, state and territory governments on the program objectives, and agreement on the mechanisms and timeframes for resolving issues and activating commitments to proceed and protect relevant corridors/assets, including delivering any enabling regulations or legislation. Although there would be benefit in multi-jurisdictional agreements, not all decisions would require agreement by all jurisdictions and there may be some instances where more limited agreements are sufficient (e.g. specific issues in respect of a Sydney-Melbourne line that do not have any wider network ramifications for HSR in Queensland).

A successful model for pursuing multi-jurisdictional agreements of the sort needed to support the HSR program is to adopt a ‘gated approach’ using a series of formal agreements. The agreements act as gates, whereby parties provide agreement or otherwise to proceed with the next stage of the HSR
program. Five stages are contemplated in this preparation and corridor protection phase as illustrated in Figure 5.

**Figure 5** Preparation and protection stage gates

<table>
<thead>
<tr>
<th>Stages</th>
<th>Recommendations to Government</th>
<th>Prepare MoU</th>
<th>Protecting the Corridor</th>
<th>Preparing HSR Mandate</th>
<th>Enacting enabling Legislation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Confirm Australian Government interest in HSR and agreement to proceed</td>
<td>Alignment with States and Territories on: - Program objectives - Mechanisms for program governance - Issues to be addressed and timeframes for resolving issues</td>
<td>Agreement on what to protect and what are the mechanisms and approach to be adopted - Proving of preferred route alignment and station locations - Community consultation - Environmental Impact Statements</td>
<td>Continuing to build the case for HSR in advance of a formal mandate</td>
<td>Enacting enabling legislation and regulations that establish the HSR Development Authority with necessary powers and functions and any complementary changes required</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage Gates</th>
<th>Government approval</th>
<th>MoU</th>
<th>IGA (Protecting the corridor)</th>
<th>IGA (HSR mandate)</th>
<th>Ready to proceed</th>
</tr>
</thead>
</table>

Each stage in the preparation and corridor protection phase acts as a gate for progressing to the next stage. The timing for each stage and the relative timing for activities within each stage that determine the overall timing for project delivery are detailed in Figure 6. Each stage is then described in the following sections.

**Figure 6** Preparation and corridor protection phase

### 4.2.1 Government agreement

The first stage gate is to confirm Australian Government interest and in principle agreement to progress a future HSR program and achieve commitment to proceed with the next steps.

The Department of Infrastructure and Transport (the Department), would prepare a recommendation to the Commonwealth Minister for Infrastructure and Transport to move forward with the HSR program and agreement to prepare a Cabinet submission. The Cabinet submission would seek formal
endorsement to move forward into the next stage and seek to establish a MoU with the relevant states and the ACT, and would approve funding for site surveys and environmental assessments.

Once Ministerial agreement to proceed with the project has been obtained, further engagement with the relevant states and the ACT can take place in order to solicit support for the HSR program.

4.2.2 Prepare an MoU

This stage prepares for the second stage gate – the signing of a MoU between the Commonwealth, New South Wales, Victoria, Queensland and the ACT to progress towards an Intergovernmental Agreement (IGA) to protect a future HSR corridor and associated sites (i.e. Stage Gate 3). The MoU would, inter-alia, set out the process to be followed, the timelines for resolving issues and the responsibilities of the parties.

The MoU formalises communication, co-operation and co-ordination of the HSR program prior to any formal commitment through an IGA. Australian Government planning activities prior to the signing of a MoU would include:

- Compiling a record of work completed and issues yet to be resolved.
- Formulating a proposition to take to New South Wales, Victoria, Queensland and the ACT with respect to the future conduct of a joint HSR program.

The content of the proposed MoU would include agreement on objectives and the mechanism and timeframes for resolving issues prior to any formal agreement, including the scope of the activities to be covered in the next stage, for example:

- Corridor and station sites to be preserved.
- Responsibilities of the jurisdictions.
- Mechanism(s) to protect corridors/sites.
- Legislation/regulations required.
- Implementation and financing plan.

The MoU would also establish a framework for public consultation in the lead up to a formal IGA, including the role of the each jurisdiction, timeframes and mechanisms for capturing and addressing issues that emerge.

To achieve a MoU, multi-jurisdictional steering committees and working groups would be required to shape the necessary legislative and policy actions prior to the formal establishment of a multi-jurisdictional coordinating authority.

Existing committees such as the Standing Council on Transport and Infrastructure (SCOTI) and the Transport and Infrastructure Senior Officials’ Committee (TISOC) would perform the role of multi-jurisdictional decision makers for HSR prior to the creation of a formal Authority. It is also likely that a sub-committee of the TISOC, such as a HSR Steering Committee and a HSR Joint Working Party/Group, would be required to focus on HSR.

The first role for the HSR decision makers would be to establish a common set of endorsed objectives for HSR between the Commonwealth and the jurisdictions.

By leveraging existing committees in the first instance, well established protocols in relation to the role of the Chair, the frequency of meetings, venues and secretariat arrangements can be used to facilitate the involvement of all parties and expedite proceedings.

4.2.3 Protect the corridor

Corridor protection is the reservation of land for subsequent use in preparation for the construction of a major transport project and facilitation of access through adjacent land during the construction phase. The aim of corridor protection is to confirm a preferred rail corridor (with local adaptations as necessary) and to protect future use of the corridor by rezoning, resuming, purchasing or continuing to hold land within the corridor.
After signing the MoU, the third stage undertakes the work necessary for the states and territories to establish an IGA to move ahead and protect the HSR corridor and associated strategic sites and assets.

The multi-jurisdictional nature of HSR complicates the process of corridor preservation. Currently, legislative provisions and policies for corridor planning and protection are varied and inconsistent between different states and territories in Australia. Given the long-term nature of the program and the amount of public funding needed, it would be important to ensure that the process is efficient and achieves the project objectives.

Governments would begin to work together on the development of HSR and, in particular, focus on six key issues:

- Confirming the preferred sites and corridor alignment for the project, including station locations and other critical infrastructure.
- Proving those sites as being suitable through further technical investigations as required.
- Community consultation and preparing regulatory impact statements and environmental impact statements.
- Agreeing requirements for project-specific legislation to standardise statutory planning regulations, including environmental assessments, at each of the government levels along the corridor.
- Agreeing on what to protect in advance of a formal mandate to proceed with the development of a future HSR system.
- Agreeing the mechanism by which strategic sites and locations would be protected and the responsibilities of the parties for effecting the protection.

Each issue is discussed below.

Confirming the preferred sites and corridor alignment

Phase 2 of the strategic study into a potential HSR system on the east coast of Australia presents preferred corridors, route alignments and station locations for a future HSR system. The analysis has had a particular focus on developing an optimal HSR system and ensuring that decisions on alignment and station locations were taken to optimise the performance of the HSR system and maximise its potential as a transport option.

Nevertheless, once broader state and territory considerations are taken into account, there may be some refinements to the HSR alignments that could be agreed with the states and territories to present an overall optimal outcome. For instance, the selection of Homebush as a terminating HSR station in Sydney was discounted in favour of Central. There may be some merit in protecting options for Homebush as an additional future HSR station given Homebush is preferred to Central for many outbound HSR passengers from Sydney and it could open up a number of corridor/infrastructure synergies with fast commuter rail options from western Sydney. These issues would need to be resolved with the jurisdictions before a final agreement is reached on what corridor and sites to protect.

Site suitability studies

Confirmation of the final preferred sites and corridor alignment would be subject to various site suitability studies, such as geological analysis. Site testing and analysis requires several key inputs:

- A work plan for the conduct of surveys.
- Agreement from land owners/occupiers/title holders.
- Legal authority to enter and conduct testing on land.
- Individual contractor management, including coordination of testing and analysis activity and results and funding of the site studies.

Work undertaken during site suitability studies would form the basis of environmental impact statements for use in government budgeting and approval processes.
There are adequate powers within the Commonwealth, the states and the ACT to enter onto, and examine, land for the purpose of site studies. The structure of the Authority responsible for developing HSR would influence which governments (Commonwealth or state/territory) lead which components of the site suitability activities and at which stage.

Preference may be given to the Commonwealth preparing the work plan with jurisdictional input, and co-ordinating and funding the site suitability studies. Funding may include any compensation payable for site access during site testing.

Jurisdictions should take responsibility for agreement from land owners/occupiers/title holders for site access and for relevant adoption of state and territory legislation. Jurisdictions may take responsibility for managing the contractors conducting the site works.

Initial examination suggests that existing state and territory legislation relating to access for site testing is sufficient to undertake this stage and no legislative amendments are necessary to conduct the survey work. State and territory governments have powers to enter/gain access to land under their respective land acquisition Acts, with the exception of New South Wales. The relevant Acts confer powers on relevant government authorities and authorised persons to enter onto private land. Allowed activities during preliminary studies generally include making surveys, taking samples, and digging and boring. In New South Wales, powers to enter onto land are conferred by other legislation, such as the NSW Public Works Act 1912, and it is possible that power over entry is only exercisable after land has already been acquired, or at least has been identified as suitable for carrying out a public work. Due to inconsistencies in state and territory law, consultation with relevant state and territory officials would be required as part of the broader consultation process during the detailed planning and procurement phase.

Land held under native title is also subject to jurisdictional land acquisition legislation whereby powers to enter land for the purpose of assessing its suitability for public infrastructure may be exercised. Generally, but not always, entry must take place in accordance with an authorisation and certain procedural requirements might need to be satisfied before entry, or its authorisation, takes place and there might be an entitlement to compensation for damage or loss suffered.

In respect of land that is owned and/or occupied by the Commonwealth, the Commonwealth itself is likely the most appropriate convener of site suitability studies. Discussions between Commonwealth agencies as to the Commonwealth’s specific rights in relation to that land, the types of activities undertaken there, and the legislation under which the relevant Commonwealth agency operates, would allow for an agreed position to be developed on the possible use of the land for HSR. In all instances, there might be an entitlement to compensation for loss suffered or damage caused by the exercise of powers of entry. However, compensation as a result of conducting a preliminary study is expected to be minimal.

Previous examples of jurisdictional responsibility for site studies are as follows:

- AusLink: corridor studies were primarily conducted and funded by the Commonwealth with some data input by the states.
- The Alice Springs to Darwin rail line: surveys were undertaken by the Northern Territory, and funded by the Commonwealth.
- There are also examples of IGAs between the Commonwealth and the states for a number of infrastructure projects, (e.g. North Sydney Freight Corridor), where the Commonwealth contributes a percentage of the cost for technical studies.

Community consultation and preparing regulatory and environmental impact statements

The HSR program would require a regulatory impact statement and environmental impact statement prior to formalising a decision to protect a specific HSR corridor. This would involve considerable public consultation given the potential wide spread impacts of a HSR corridor protection program.

---

26 Legislative interpretation in this section relies on preliminary advice prepared by the Australian Government Solicitor (AGS) prior to March 2009 and in some instances, cross-referencing AGS preliminary advice with relevant state and territory Acts. Current advice should be sought prior to beginning corridor protection activity.
Commonwealth policy proposals should address all regulatory impacts – economic, social and environmental, with an additional focus on regional and Indigenous impacts. As the HSR program would be a multi-jurisdictional infrastructure investment, would affect regional Australia and would have a significant environmental impact, it is unlikely that the policy would be eligible for a regulatory impact statement exemption.

**Project-specific legislation**

The HSR program would come up against large volumes of planning administration and process prior to commencement of construction. There would be a risk of the project being delayed, and incurring significant costs, while statutory planning regulations, including environmental assessments, are met at each of the Commonwealth, state, territory and local government levels along the corridor.

The introduction of Commonwealth and complementary state/territory project-specific legislation would aim to harmonise an approach to the large volume of government planning regulations the project would likely face during the planning approvals process.

Legislation would apply to the use or development of land for the purposes of the HSR program. The relevant parts of the legislation that would apply to the planning process would address, at least, the following inclusions and exemptions:

- Authorisation for the Department of Infrastructure and Transport in the Commonwealth, and for the equivalent in each state and territory, to act as a planning authority in respect of the HSR corridor for the purposes of the HSR program.
- Exemptions for approval for construction/development works.
- Exemptions with respect to relevant building, mining and heritage acts.

A key purpose of the legislation would be to ensure that approval would not be required from any person or body other than the relevant Authority (the Department of Infrastructure and Transport and the equivalent in each state and territory) or the relevant Commonwealth, state and/or territory environmental protection authority, to carry out works for the purposes of the HSR program. These powers/exemptions would apply despite anything to the contrary in any other enactment or law, a permit, licence, consent, approval or other, but would not extend to standards of construction and safety that may apply under any other Act.

Relevant state and territory building and mineral resource development/extraction Acts would not apply in relation to land for which a construction permit has been issued or to any works undertaken on that land. Certain obligations under heritage legislation may also be exempted by the Minister administering the relevant heritage Act.

Existing Commonwealth, state and territory project-specific legislation may serve as a reference for the development of HSR legislation, for example the *Melbourne City Link Act 1995* and the *EastLink Project Act 2004* from Victoria.

**Agreement on what to protect**

The agreement on what to protect includes consideration of land reservations, policies in respect of adjacent land use, station locations and station classifications, and details of complementary infrastructure and access.

During construction of the railway infrastructure, easements on land adjacent to the right of way may be required to allow heavy machinery access to the right of way for activities including the creation of cuttings, bridges and tunnels, formation of track and turnouts, drainage, signalling systems, electrification, and building of stations and railway yards.

Following construction, a narrower corridor would provide right of way, with consideration for a wider corridor zoned for land use appropriate for a noise barrier and the possibility of complementary development adjacent to the right of way, such as rail interchanges, intermodal hubs, retail and office precinct development.

The scale of corridor protection is determined by the assets being protected. Figure 7 indicates some of the considerations in preparing the corridor.
Corridor preparation considerations

- Right of way
  - Corridor necessary for rail infrastructure and operational rail services
  - Access for maintenance of the right of way and associated infrastructure
- Station platforms and immediate station precinct to support passenger ingress and egress, complementary development and interchange with other transport services
- Other development within the easement
  - Voice and data cables
  - Gas or water pipelines
  - Electric power transmission lines
- Width to maintain vertical alignment of railway

The width of the corridor to be protected would also depend on the land zoning and type of activity performed on adjacent land. Considerations in built-up areas, for example, may differ from those on or near pastoral land.

A narrow corridor might be applied in appropriately zoned sites, such as in rural and regional areas, but a wider corridor or noise barrier applied in some built-up areas, where land costs are not prohibitive. Wider corridors would also be required at station locations and where large-scale complementary developments are being targeted.

Agreement on how to protect the corridor

Agreement on how to protect the corridor includes agreement on the right mechanism for protecting each component and timing and funding arrangements for protection activity. The land resumption, purchase, holding or sheltering-from-development decisions should include the following considerations:

- Rezoning land and restricting planning approvals within and adjacent to the corridor to preserve the land for the future.
- Assessing time value of money considerations of acquiring and/or purchasing land prior to HSR construction and delaying payment until just before construction starts, except in hardship cases.
- Assessing time value of money considerations of maintaining land currently held that is vacant/poorly utilised prior to HSR construction.
- Prioritising the funding of land purchase over competing government priorities.

The responsibilities of each jurisdiction for protecting the preferred sites and alignments would be agreed.

Land identified as a preferred site for the HSR corridor may be sheltered from development until construction of the HSR infrastructure is due to begin. Rezoning and restricting planning approvals limits the range of land uses permissible on a site or changes the development controls applicable to a site. By rezoning land as appropriate to support HSR, both for the corridor and land adjacent to the corridor, land can be preserved for possible future use by a HSR program. Rezoning considerations may also apply to land adjacent to the corridor. Encouragement of compatible land use within and
beside rail corridors may be via strict zoning or via policies that promote land use in accordance with jurisdictional plans.

The potential costs of rezoning include:

- Fees or charges, such as administrative fees and development contributions.
- Procedural costs, the cost of time and professional resources associated with securing planning approvals and rezoning.
- Compensation to land owners for lost income where a current or planned income stream is reduced.
- Potential productivity loss from vacant/poorly utilised land until HSR construction occurs.
- Opportunity cost for government budgets — resumption/purchase/holding of land takes priority over other programs.
- Compliance costs associated with meeting development controls or standards.

Rezoning and planning approval regulations should account for types of development that, although they may meet zone requirements, may not be directly compatible with the HSR corridor. For example, building a road that crosses the HSR planned corridor may be in keeping with the plan for HSR, but the additional cost of building a bridge, tunnel or re-routing the corridor must be taken into consideration and those additional costs factored into the overall cost of the new road.

Preference should be given to the option to rezone land where the preferred corridor site is not yet developed, such as for rural and regional areas. These sites should be given first priority in the protection process due to their relatively low cost of protection. Where sites are developed, there may be relatively high cost of protection and rezoning to accommodate HSR and those costs must be weighed against the cost of available alternatives (including future land acquisition).

Time value of money is also an important consideration. There is a cost to the community from the advance purchase of land and for holding land, often well in advance of the requirement for construction. The trade-off is that sheltering-from-development and early land acquisition has a larger benefit compared to being forced into more expensive construction (such as tunnelling). A number of protocols might be observed in respect of land acquisition:

- Preference should be given to land procurement in accordance with the staging of the HSR program. For example, sites along the Sydney-Melbourne corridor should be given preference over other sites. Preference should also be given to peri-urban and tunnel portal sections that may otherwise become infeasible due to encroaching urban development.
- There is a preference to hold Crown land that is suitable for the HSR corridor to reduce the compliance costs associated with resuming the land at a later date.
- It is preferable to secure land that has a strong likelihood of being developed in a manner that is not complementary with HSR operation. However, land that falls under this third preference may also be secured by rezoning and the relative costs of both options should be assessed.

The Department of Infrastructure and Transport, and the equivalent in each state and territory, would seek funding through a HSR New Policy Proposal to cover funding for site testing, compensation for land owner/occupier/title holders for both site testing and land acquisition, funding for rezoning activities, and top-up funding for additional SCOTI and working party roles that arise through the HSR program.

Each jurisdiction would follow their own budget process for funding with standard budget rules determining the process in each jurisdiction.

**IGA to establish and protect a HSR corridor**

The third stage gate is for the Commonwealth and the relevant states and territories to commit to establish and protect a HSR corridor, and associated critical sites, through an appropriate IGA.

This first IGA would cover, inter-alia:
A statement of the public policy objectives to be achieved from a future HSR program.

A clear definition of the proposed HSR program and the corridor, route alignments and station locations to be protected.

General principles that will apply to the delivery of a future HSR system, including agreement on the role of the government and the allocation of project risks.

General principles that will apply if any variation to that route becomes necessary.

The obligations of the parties to preserve the route and agreed station locations.

The organisation, or organisations, which would be responsible for protection of the route with an agreed timeline for such protections.

The principles by which the parties agree that any required public resources for protecting the route would be allocated among them.

An undertaking to coordinate land-use and regional development policies relevant to the proposed HSR program.

The intent of the IGA is to formalise mechanisms for land resumption, purchase, holding or sheltering-from-development, timing for these mechanisms, and the funding arrangements for corridor protection and to commit to any legislative or regulatory amendments necessary for the efficient and effective protection of the corridor.

Under the IGA, each jurisdiction would have responsibility for the conduct of land title searches and searches of subdivision plans where appropriate to identify land demarcations within their jurisdiction. The preferred staging of the HSR program would determine the timing for conducting site suitability studies and land acquisition within their jurisdiction. A recommended approach would be that all jurisdictions begin planning for appropriate rezoning and preparations are made for site studies once the IGA is signed.

While initial examination suggests that no legislative amendments are necessary for the acquisition of land within the rail corridor (see text box below), there may be some requirement for amendments to state and territory Acts relating to land rezoning and restricting planning approvals which, if deemed advantageous to the HSR program, should be included in the IGA.

Under current arrangements, rezoning activity is generally performed by local councils. Advice should be sought as to the cost of amending state and territory legislation to streamline zoning powers for the corridor. Although there is no requirement to amend legislation in this area, as the relevant functions already exist, there may be benefits from a standard approach to rezoning and avoiding the need for jurisdictions to negotiate with multiple local councils along the HSR corridor.

Funding and payment arrangements to compensate existing land owners/occupiers/title holders should be included in the IGA. It is unlikely that current funding to the Department of Infrastructure and Transport and its state and territory equivalents would be sufficient to meet these compensation requirements and new funding should be sought by each party to meet new payment arrangements in the IGA. Additional funding might also be sought to address the additional workload of the SCOTI and the TISOC and to address funding for the HSR Working Party.

### Government powers to acquire land

A variety of government powers and rights exist in relation to accessing and acquiring land in order to provide public services, such as would be the case for a future HSR project corridor.

The site-specificity of the land holdings along the preferred corridor and the high cost associated with track deviation can give rise to a hold-up problem between the owners/occupiers/title holders of the land within and adjacent to the corridor and the acquirer of the land. This has potential to delay and create higher costs for the project.

In all Australian jurisdictions, the compulsory acquisition of land by or on behalf of a government or government agency may be authorised in circumstances where the proposed use of the land is within the powers and functions of the relevant government or agency. Commonwealth, state and territory land acquisition Acts set out procedures for the acquisition of land by each government respectively.
Under these laws, land may be acquired either compulsorily or by agreement. Generally, the acquisition of land by compulsory process involves:

- Notifying the holders of relevant interests in the land of the proposal to acquire the land.
- In the Commonwealth and in jurisdictions other than New South Wales and Victoria, the potential for those persons to object or seek a review of the proposal.
- The publication of a notice by which the land is acquired.

Land that is privately owned may be subjected to the compulsory acquisition procedures set out in the land acquisition Acts of the various jurisdictions.

Land owned/occupied by local government bodies may also be compulsorily acquired. However, in New South Wales there are constraints on the power to acquire local government land that is subject to a restriction or dedication which can only be removed by an Act.

For land held under native title, each state and territory has the power, under its land acquisition legislation, to compulsorily acquire native title rights and interests in relation to land, although the position is clearer in some of the states and territories. A compulsory acquisition of native title by a state or territory under their respective land acquisition legislation would be valid for native title purposes so long as the state or territory complied with the procedural requirements in the Native Title Act. Generally this involves the state or territory compulsorily acquiring all the rights and interests in the land (i.e. both native title and non-native title rights), providing native title holders/registered claimants a ‘right to negotiate’, and giving the native title holders and any registered native title claimants the same procedural rights that they would have if they instead held ordinary title (generally freehold) to the land concerned. Where native title is extinguished by a compulsory acquisition, the native title holders will be entitled to just terms compensation for the acquisition, either in accordance with the relevant state or territory land acquisition legislation or Division 5, Part 2 of the Native Title Act 1993.

For land owned/occupied by the Commonwealth, it is expected that the relevant Commonwealth agencies would work to reach an agreed position. It is feasible that a state or territory could acquire an interest in land that is held by the Commonwealth with the Commonwealth's agreement, subject to the Commonwealth complying with the relevant part of the Commonwealth Lands Acquisition Act 1989.

Land acquisition Acts within each jurisdiction set out principles and procedures for determining the amount of compensation that is payable to the holders of interests in land that is compulsorily acquired.

Initial examination suggests that existing state and territory legislation relating to accessing land and the acquisition of land is sufficient to undertake both the Preparation and Corridor Protection and the Planning and Procurement phases of a future HSR program and no legislative amendments are necessary for entry onto or the acquisition of land within the rail corridor. Preference should be given to state/territory acquisition of land as a significant proportion of land for use in the HSR corridor would be land currently held by the three states and the ACT. This land would include access corridors alongside existing roads and highways and undeveloped Crown land in each jurisdiction. Existing state and territory processes for acquiring land are well established and would meet HSR program requirements, hence there are no significant incentives to amend existing legislation and processes in relation to land acquisition by the states and territories and any additional work created by setting up new legislation/processes can be avoided.

4.2.4 Prepare the HSR mandate

The fourth stage is to prepare a HSR mandate and work towards a second IGA that commits the jurisdictions to develop a stage or stages of a future HSR program. It is acknowledged that the period between the first IGA, to establish and protect a HSR corridor, and the second IGA, to commit to implement a HSR program, may be many years apart.

The key activities in this stage include:

- Implementing the requirements of the IGA on corridor protection.
Continuing to build the case for HSR in advance of a formal mandate, including reaching agreement on key implementation issues such as funding and commitments of each party.

The SCOTI, under the MoU, may elect to form a new HSR Working Party, funded from existing budgets, to oversee the HSR program during the preparation and protection phase, prior to the creation of a formal Authority. It is expected that the jurisdictions would be responsible for implementing the IGA to protect the HSR corridor, having regard to the agreed protection mechanisms and funding arrangements.

The HSR Working Party would responsibility for monitoring and oversight of corridor protection activities, undertaking any work required to build the case for HSR and advancing discussions on key implementation issues.

IGA to implement a HSR program

The IGA that would establish a mandate to develop a HSR stage or stages would likely include:

- Public policy objectives.
- Commercial performance aims of the proposed HSR system.
- Minimum technical performance capability the system is intended to offer.
- An agreed first stage with an anticipated earliest decision date for committing to its implementation.
- Agreed train station stops and service patterns, with general principles that would apply in considering any variations to those service patterns.
- Broad principles by which the parties are agreed that infrastructure and a train operator(s) would be procured.
- Anticipated principles of infrastructure capacity allocation between products of different service types, in particular between commuter services and others.
- Overall public governance structure to be instituted and the organisation which would be responsible for the delivery of the HSR system on behalf of government, i.e. the HSRDA.
- Role of the Commonwealth and each jurisdiction in the development of the proposed HSR system, including the potential for state/territory-led developments.
- Scope of changes (if any) to Commonwealth and/or state legislation that are agreed to be necessary or desirable to further the project, including to establish the HSRDA with all necessary powers, and an undertaking by the parties to implement such legislation.
- Funding commitments for the development of the HSR system.
- An agreement on issues that are unresolved or outstanding and agreement on a process for their resolution.

With regard to the establishment of the HSR DA, the IGA might include the following details:

- Objectives and form of the Authority.
- Responsibilities and functions of the Authority.
- Funding of the Authority, including payment arrangements and contributions from each jurisdiction.
- Appointment of Board Members – the composition of the HSRDA board and appointment of members.
- Operations of the Authority – process for approval of the HSRDA strategic plan, structure for the conduct of meetings and committees.
- Strategic Plan, Work Program, Estimates and Reports – reporting arrangements from the HSRDA to the Council of Australian Governments/SCOTI/ TISOC.
• Model legislation.
• Staff – management, APS staff and non-APS staff conditions of employment.
• Miscellaneous – delegations, review provisions for the Act and the IGA, amendments of other Acts as required.

It would be important that a future HSRDA be established as an off-budget agency which would allow government to commit agreed funding in the budget cycle and for the HSRDA to then spend the funds across budget years linked to the project milestones. It would also allow the HSRDA to take on debt and to optimise its funding.

The appropriate form of government agency for the HSRDA would be agreed but the options would include a government-owned statutory authority or a government-owned corporation. Establishing the HSRDA as an executive agency or statutory agency, both prescribed agencies under the *Financial Management and Accountability Act 1997*, would not be appropriate for several reasons including:

• The HSRDA would require some financial autonomy from the budget cycle.
• The HSRDA would require a governing board comprised of representatives for each jurisdiction.
• The activities of the HSRDA would not be seen as central to government.

The establishment of the HSRDA as a Government Business Enterprise (GBE) – a GBE authority, a GBE company limited by guarantee or a GBE company limited by shares – is dependent on a range of factors, including27:

• Requirement for new legislation to establish the body.
• Coercive/regulatory powers that would be exercised by the body.
• Commercial influence on prices/supply as a market participant.
• Arrangement of the executive governing the body.
• Body is primarily budget funded or holds money on its own account.
• Composition of ownership – wholly Commonwealth-owned, multi-jurisdictional ownership, public/private ownership.

The System of National Accounts categorises government controlled corporations as "mainly engaged in the production of market goods and/or non-financial services"28. This definition suggests that any of the forms listed above might be appropriate as the HSRDA, particularly since the HSRDA would not be actively competing in the supply of services in the market place.

Should the HSRDA be wholly Commonwealth-owned, a GBE authority may be the most appropriate form. Benefits of Commonwealth authorities are increased transparency and clear articulation of the powers, roles and responsibilities of the body in its enabling legislation. Potential disbenefits are that it would not be able to hold money on its own account, borrow or invest, or engage staff other than as specified in its legislation. However, should the HSRDA at any stage be envisaged to conduct business in a commercial/competitive environment, a company structure should be adopted.

Should the HSRDA have multi-jurisdictional ownership, the Department of Finance and Deregulation suggests that the HSRDA should be established as a government company29:

> [A] common approach for delivering Commonwealth-State programs has been to establish companies, usually limited by guarantee, involving the Commonwealth and the state governments as members. It has also been relatively common to have representatives of all members present on the board. In many

---

27 GBEs have wider investment powers than other bodies under the *Commonwealth Authorities and Companies Act 1997*. 28 From the Australian Bureau of Statistics definition, market goods and services are those that are sold at ‘economically significant prices’, which are prices ‘that have a significant influence on the amounts that producers are willing to supply or on the amounts that purchasers wish to buy. 29 Department of Finance and Deregulation, *Governance Arrangements for Australian Government Bodies August 2005 – Financial Management Reference Material No. 2, 2005..*
cases such companies will not be classified as Commonwealth companies for the purposes of the CAC Act as they will not satisfy the control test under the CAC Act. [Paragraph 121]

Should the HSRDA be a joint Commonwealth, state and territory-owned entity, then each jurisdiction may contribute equity in kind (e.g. assets, land) in addition to cash.

A comprehensive stakeholder engagement process should be implemented prior to finalising the mandate agreement. The HSR Working Party consultation should include stakeholders involved in the following extant agreements:

- National Partnership Agreement on the Implementation of Major Infrastructure Projects.
- Intergovernmental Agreement on Rail Safety Regulation and Investigation Reform.
- Intergovernmental Agreement for Regulatory and Operational Reform in Road, Rail and Intermodal Transport.
- Intergovernmental Agreement on Surface Transport Security.

The National Transport Commission (NTC) could play a role in the establishment of the IGA for HSR. In accordance with sub-clause 11.6 of the Intergovernmental Agreement for Regulatory and Operational Reform in Road, Rail and Intermodal Transport, the NTC can be directed by SCOTI to investigate and/or report on regulatory and operational reform of rail in Australia. The NTC is well placed to assess the alignment of HSR program governance arrangements and operations with the strategic direction for national rail projects.

Integrated regional development concept

The study has examined the merits of establishing an integrated regional development concept, and as outlined in Chapter 9 of the main report, found there was some merit in establishing a set of complementary land use and development policies to actively promote the potential benefits of HSR.

It would be premature to establish specific governance arrangements to facilitate the development and implementation of appropriate supporting policies until there is a specific mandate to construct a HSR system. Nevertheless, as part of the work leading up to the IGA to deliver that mandate, there would be an opportunity for the various jurisdictions to reach alignment and a consistent approach on what supporting development policies should be implemented. Such policies have the potential to shape where people choose to work and live and, as such, will need to be integrated with other broader government policies on regional development. Agreed initiatives, or at least the guiding principles, could then be included in the IGA.

4.2.5 Enact enabling legislation

Enacting enabling legislation is the fifth stage and follows jurisdictional agreement to develop a HSR stage or stages. At the end of this stage, the HSR program is ready to proceed to the detailed planning and procurement phase.

The HSRDA would be required to coordinate all aspects of the HSR program as it progress through detailed preparation and procurement and into construction. The HSDRA would require professional management, possibly with international expertise, and so would not be established until there is a clear commitment and mandate to build a component of the HSR system.

The HSRDA would take over roles being performed by government departments, both federal and state/territory, in relation to the planning, preparation and development of the HSR system.

The introduction of complementary legislation would establish the HSRDA with all of the necessary powers and functions required, including its constitution, objectives, powers and responsibilities of the HSRDA and agreed funding arrangements.

4.3 Detailed planning and procurement phase

The detailed planning and procurement phase undertakes all of the detailed planning required before commencing procurement activities. The procurement and packaging analysis presented in Section 3.0 would be updated and finalised, having regard to contemporary market conditions, before final decisions are taken on the procurement strategy.

The role of the HSRDA

The HSRDA’s key role would be to:

- Finalise system definition and scope of the approved HSR development.
- Finalise approvals and proceed to procure necessary land and strategic sites/assets.
- Update and finalise procurement and packaging strategy.
- Prepare high level designs in sufficient detail to inform the specific D&C contracts to be put to the market.
- Manage procurement and oversight construction and delivery of the program.

The states and the ACT would be expected to take a leading interest in development in and around the HSR station precincts, particularly in respect of the CBD stations. For instance, it would be expected that NSW would take a lead role in the redevelopment of Central Station to accommodate a HSR station and integrate it with other complementary developments, such as heavy rail and light rail feeder services, buses and taxis. Central Station is a primary hub for Sydney’s existing transport network and therefore it is anticipated that NSW would establish a NSW HSRDA to coordinate and manage developments in the entire Central Station precinct, including the development of the HSR Station PPP for Central Station.

Similar arrangements are anticipated for the other states and the ACT in respect of the CBD station PPPs. The peripheral and regional stations could be managed directly by the HSRDA as greenfield station developments.

The state/territory HSRDA would have to adopt certain design specifications in respect of the station redevelopment, including design capacity, enabling technology and systems. There would likely be a need for significant penalties if program timelines are not met (i.e. if delays in respect of station redevelopment had the potential to delay the HSR program).

The state/territory HSRDA may also take responsibility for ‘value capture’ initiatives, such as commercial exploitation of retail space, in and around the station precinct. The benefits of those initiatives may be directed to the HSR program as a future revenue stream with details to be agreed as part of the overall financial and funding framework.

If the procurement strategy set out in Section 3 were to be adopted, then the HSRDA may be structured into four core divisions, each with responsibility for undertaking the detailed planning required in advance of formal procurement:

- Land acquisition and land use planning.
- Infrastructure.
- Rolling stock and systems.
- Stations.

A support division would be required to provide commercial and contractual support in addition to legal, finance and other corporate services. An example of a possible HSRDA organisational model is presented in Figure 8.
The HSRDA would take responsibility for developing and managing the various D&C contracts for infrastructure and the DSM contract for rolling stock and signalling. The station PPPs would be established either directly by the HSRDA or through state/territory HSRDAs.

**Program governance**

Managing a program of this scale and complexity would require strong governance and oversight. The HSRDA would need to be established with appropriate commercial and contracting skills, most likely utilising national and international expertise, with oversight from a properly constituted Board. The Board members would similarly need appropriate skills and experience delivering large and complex infrastructure programs. The Board would report to the responsible Ministers and to Parliament.

There would also need to be clear definition of rights and obligations of the Commonwealth and the states in relation to the HSR program, particularly if the states and the ACT were to take the lead on redevelopment of key CBD station precincts. It may be prudent for the enabling legislation to require a high degree of transparency around any HSR-related activities led by a state/territory agency in order to allow the HSRDA to properly manage risk and coordinate the overall program and perhaps also some ‘step-in’ rights for the HSRDA, should any state/territory activities put the HSR program schedule and/or budget at risk. The details would need to be negotiated into the funding arrangements between the Commonwealth and the states/territory.

The states and/or the ACT may choose to implement specific governance arrangements to implement other development objectives connected to the HSR program, either specifically agreed with the Commonwealth and other jurisdictions as part of the IGA or other objectives of its own. For instance, a HSRDA might be established to facilitate particular development initiatives in a specific region or regions. There is unlikely to be any significant benefit in a centralised approach to these governance arrangements and, given the need to integrate with other state/territory complementary policies, allowing the states and the ACT to tailor their own approach to implementing regional development initiatives would seem sensible.
Standards authority
At present, there is no authority with responsibility for setting and managing HSR standards. It would be expected that the HSRDA would fulfil this role during the initial stages of HSR program development and then the responsibility would likely transfer to the agency overseeing HSR operations (see Section 4.5).

4.4 Construction phase
The construction phase incorporates the construction and delivery of the proposed HSR system and is expected to take at least 7 years for the first stage. Over this period, the HSRDA would be responsible for:

- Oversight of the various contractors.
- Independent verification and validation of system designs and progress against milestones.
- Coordination with the relevant government authorities.
- Integration of HSR components.
- Preparation of Train Operations and Maintenance concession agreement(s) and procurement of the concessionaire.
- Reporting to the responsible Ministers and Parliament.

The HSRDA organisational model would largely remain the same as the model established for the detailed planning and procurement phase.

Safety regulation
A new national rail safety regulator has been established and will be in place by the end of 2012. The national regulator will replace individual state rail safety regulators and is expected to harmonise rail safety arrangements across the country. Although the national rail safety regulator is unlikely to have HSR-specific technical skills, the current ‘co-regulatory’ rail safety model in place in Australia will be adaptable to future HSR operations. In the co-regulatory model, the rail safety operator would develop an appropriate safety management system for its operations as part of the safety accreditation process. The national rail safety regulator would be responsible for accrediting a new HSR operator and would ‘import’ any necessary HSR expertise required to fulfil its responsibilities.

It is expected that the Train Operations and Maintenance concessionaire would be in place at least 18 months in advance of the date of commencement of operations to hire and train its workforce, establish operational systems, including its safety management system, and to obtain all necessary approvals and licences to operate.

Environmental regulation
Compliance with existing environmental legislation and regulatory controls would be included as a condition of contract for the relevant contractors involved in the construction of the HSR system. Specific environmental risks and agreed mitigations would be established during the detailed planning of the system. Existing state and Commonwealth regulatory oversight is expected to be adequate although, for a project of this scale, some augmentation of regulatory resources would likely be required.

4.5 Operation phase
The operations phase sees the commencement of HSR operations with the Train Operations and Maintenance concessionaire taking operational control of the HSR system and providing transport services. The role of the HSRDA would evolve into management of the concession contracts but initially would continue to manage the ongoing construction of new stages of the HSR system as well as manage the early concession contracts. The operations phase also includes connections with existing transport services in each jurisdiction, and the arrangement of train paths for commuter rail.

March 2013
The skills and expertise required to manage concession contracts are different to those required to oversee construction and systems procurement contracts and, therefore, there may be a case for separate authorities, i.e. a HSRDA and a HSR Management Authority. While it would be necessary for the HSRDA to bring in additional skills, separate authorities are unlikely to be optimal, creating an unnecessary interface and coordination challenge. Continuing with a single authority that would become the HSR Development and Management Authority (HSRDMA) would be the preferred model.

**Figure 9** shows a potential organisational model for the HSRDMA.

**Figure 9** HSRDMA organisational model (operations phase)

As construction activities are completed, the procurement functions of the HSRDMA would wind down. An issue to be considered in the staging the future HSR program is the potential loss of skills and expertise between stages if stages of the HSR program do not run back to back. This is an issue for both the HSRDMA and the supplier industry generally.

The role of the HSRDMA during the operations phase would include:

- Ensuring the Train Operations Concessionaire(s) meets its (their) obligations under the concession contract(s).
- Monitoring states’ compliance with undertakings pursuant to their allocation of HSR train paths for commuter services.
- Negotiating any variations to the concession contract as necessary.
- Providing a single point of contact for the Concessionaire in respect of any issues emerging in any jurisdiction.
- Reporting to the responsible Ministers and to Parliament.

It is acknowledged that the HSR governance arrangements may evolve over the operations phase as outlined in **Figure 4**. As the HSR market matures, it may be appropriate to move away from a concession model for HSR operations and move to an open access model. In an open access model,
the government would facilitate access to the monopoly asset, in this case the rail infrastructure and stations, and allow open competition to determine the rail services provided. The analogy in aviation would be the government facilitating access to airports, with the open market determining what air services are provided. The advantage of the open access model is that it may allow more innovation in service design than with a government-led concession arrangement.

Provision would be made across the HSR network for inter-city services to operate in conjunction with commuter rail services. The capacity entitlements of each state for commuter services would be agreed as part of the second IGA, including the period of the entitlement, charges to apply and a mechanism for varying entitlements over the period. The provision of train paths for commuter rail within the HSR timetable would need to be included with maintenance activity for both infrastructure and rolling stock while taking account of peak travel periods for commuters.
5.0 Conclusions

Appropriate governance and institutional arrangements would need to be established to ensure that, if adopted, the High Speed Rail (HSR) program is subject to proper public oversight, effectively and efficiently delivered, and meets its objectives. The analysis of governance and institutional arrangements for HSR in Australia must therefore address a range of constitutional, political and structural issues and satisfy a number of objectives. The outcomes of the phase 2 study set against these objectives are presented in Table 13.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Issues</th>
<th>Outcomes of the phase 2 study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determine appropriate roles for the public and private sectors in the development, delivery and operation of a future HSR program</td>
<td>- The allocation of roles and sharing of risks between public and private sectors in the promotion, planning, financing, land reservation, land acquisition, design, infrastructure construction, transport service provision and other elements of HSR program.</td>
<td>- Governments would need to play a central role in the development of a future HSR network, particularly in providing the necessary political mandate and support, determining the way the HSR system would be procured and funded and underwriting the funding of the infrastructure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The size and complexity of HSR programs are such that government would need to have direct involvement and oversight of program development and delivery:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Governments would own the HSR infrastructure because of the large public financial contribution required.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Governments would also retain an ongoing role in the stewardship of the sector (post-construction):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Governments would oversee the delivery of train services against agreed price and service quality metrics but designed not to constrain market agility and innovation and would also undertake certain regulatory functions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The private sector would be heavily involved in a broad range of roles:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Design and construction of components of the HSR infrastructure, including development of station precincts in partnership with the relevant government.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Supply of rolling stock and relevant componentry for the signalling and communications systems.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Operation of HSR train services.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Maintenance of the HSR system.</td>
</tr>
<tr>
<td>Objectives</td>
<td>Issues</td>
<td>Outcomes of the phase 2 study</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Determine appropriate roles and responsibilities for each government</td>
<td>- The multi-jurisdictional nature of a future HSR program and the</td>
<td>- Governance would evolve across the four phases of the HSR program lifecycle:</td>
</tr>
<tr>
<td>jurisdiction in the development and delivery and operation of a</td>
<td>aims and objectives of different governments in supporting the</td>
<td>- Preparation and corridor protection.</td>
</tr>
<tr>
<td>future HSR program</td>
<td>development of a future HSR program.</td>
<td>- Detailed planning and procurement.</td>
</tr>
<tr>
<td></td>
<td>- The legal obligations and responsibilities of the jurisdictions</td>
<td>- Construction.</td>
</tr>
<tr>
<td></td>
<td>in respect of the various aspects of HSR system planning, development</td>
<td>- Operations.</td>
</tr>
<tr>
<td></td>
<td>and procurement.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Ensuring a future HSR system is planned, developed and delivered</td>
<td></td>
</tr>
<tr>
<td></td>
<td>in a manner that supports its integration with other transport</td>
<td></td>
</tr>
<tr>
<td></td>
<td>networks and maximises its contribution to the practical transport</td>
<td></td>
</tr>
<tr>
<td></td>
<td>capacity of the nation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Appropriate roles for different levels of government in governance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and regulation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Identifying any necessary legislative/policy initiatives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>necessary for the successful implementation of HSR program and the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>possible integration with the corridor regional development</td>
<td></td>
</tr>
<tr>
<td></td>
<td>approach.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- A ‘gated’ decision making process should be implemented to ensure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>alignment of the Commonwealth, states and territories at critical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>milestones before progression through each stage of the HSR program.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Five preparatory gates are envisaged before a decision to proceed:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Commonwealth Government in-principle decision to proceed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- MoU between the Commonwealth, state and territory governments that</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sets out the road map to the establishment of at least two</td>
</tr>
<tr>
<td></td>
<td></td>
<td>intergovernmental agreements (IGAs):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- IGA1 to provide the policy mandate for the protection of a HSR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>corridor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- IGA2 to provide the policy mandate for the implementation of the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>first stage of a HSR program.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- HSR legislation to provide the legal framework for the implementation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>of the HSR program.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Preparatory steps before an agreement to implement a HSR system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>should be facilitated through extant multi-jurisdictional committees,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>such as the SCOTI and the TISOC.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Safety regulation would be administered through existing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>institutions (the national rail safety regulator) with the regulator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>bringing in additional HSR skills as required.</td>
</tr>
<tr>
<td>Objectives</td>
<td>Issues</td>
<td>Outcomes of the phase 2 study</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Establish options for stewardship of public entities involved in HSR development and delivery</td>
<td>- An appropriate governance framework for public sector entities, should the public sector be involved in the ownership and management of the infrastructure or in the provision of services.</td>
<td>- A publicly owned HSR Development Authority (HSRDA) would be created to develop, procure and integrate the HSR system, including procuring and owning the required land. The HSRDA would evolve into a HSR Development and Management Authority in the operational phase and would prepare and manage train operations concessions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The HSRDA may be owned by the Commonwealth or jointly by the Commonwealth and the relevant states and territory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- A Government Business Enterprise (GBE) authority or a GBE company would be the appropriate organisational model, depending on the final ownership structure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- States are expected to play a key role in the redevelopment of their CBD station precincts to accommodate HSR and state HSRDAs are envisaged. States may also be allocated specific capacity to facilitate express commuter services to their capital city CBDs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- A layered approach to program governance would be adopted, with state-led agencies responsible for HSR CBD station developments subject to the oversight of the HSRDA.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- It may be prudent for enabling legislation to require a high degree of transparency, with specific obligations and reporting requirements around any HSR-related activities led by a state/territory agency in order to allow the HSRDA to properly manage risk, coordinate the overall program and perhaps also some ‘step-in’ rights for the HSRDA should any state/territory activities put the HSR program schedule and/or budget at risk.</td>
</tr>
<tr>
<td>Objectives</td>
<td>Issues</td>
<td>Outcomes of the phase 2 study</td>
</tr>
<tr>
<td>------------</td>
<td>--------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Select the most appropriate structural model for the delivery of HSR services</td>
<td>Development of appropriate institutional structures for a future HSR program, having regard to:</td>
<td>Intermodal competition from air and car travel (or the threat of competition) would generally act as a strong binding constraint on HSR price and service levels across most core HSR market segments.</td>
</tr>
<tr>
<td></td>
<td>- The possible vertical separation of infrastructure components of the HSR system from the transport services supply in terms of ownership and/or management.</td>
<td>Head-to-head rail services competition in Australian HSR markets is unlikely to be commercially or economically justified within a reasonable timeframe given the likely market size:</td>
</tr>
<tr>
<td></td>
<td>- The possible horizontal separation of components of the HSR system on either a geographic or product basis.</td>
<td>- Competing HSR systems would not be feasible and one integrated HSR system would provide all of the capacity Australia requires.</td>
</tr>
<tr>
<td></td>
<td>- The role of contestability in the provision of HSR services, either through competition for concession rights or direct competition between service suppliers.</td>
<td>- Vertical separation of infrastructure management from train operations (for dedicated HSR network) is unlikely to be necessary to facilitate competitive access of competing train operators.</td>
</tr>
<tr>
<td></td>
<td>- The role of economic regulation in track access and access pricing and its possible influence on service levels and demand.</td>
<td>An open access regime is unlikely to be necessary, or warranted, on competition grounds, given the potential downside risks to private sector investors in HSR (this should not preclude the shared use of infrastructure by train services in different markets).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Competition for the market (that is competition for the right to provide certain services on an exclusive basis) is likely to be the most effective means of delivering competitive outcomes and meeting government objectives for the HSR system:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- A concession model is the most likely form of delivery model to ensure supply side competition for HSR.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The concession agreement would be the appropriate mechanism for government to ensure HSR objectives are achieved (such as ensuring competitive fares and minimum service levels and other public interest objectives).</td>
</tr>
</tbody>
</table>
### Objectives

- Establish the preferred procurement options for delivery of a future HSR system

### Issues

- Ensuring staged implementation of a future HSR program is able to be procured cost effectively and efficiently.
- Identifying specific regulatory vehicles or contracting arrangements in the case of concession structures.
- Assessing alternative ways of funding and financing HSR, including through public-private financing and funding partnerships.
- An optimal procurement strategy for the public elements of the proposed structure and for the procurement/selection of private participants that delivers best value for money and which conforms with the national public-private partnership (PPP) policy guidelines.

### Outcomes of the phase 2 study

- Construction of the HSR system would be undertaken in stages, with the infrastructure in each stage procured through the following core works packages:
  - Infrastructure assets packages (civil, tunnels, track) would be split and procured in a number of sub-packages of a size and scope which are attractive to the market and facilitate strong competitive bidding, generally through D&C contracts.
  - Signalling systems and rolling stock would be delivered as a combined DSM contract.
  - Stations would be delivered as a set of PPP contracts, including maintenance, combined where possible but with major city stations likely to be separated.
  - Multiple Train Operations concessions including infrastructure assets maintenance responsibilities would be offered, and would include control of the movement of trains bundled with the operation of train services:
    - Options include separate north (of Sydney) and south (of Sydney) combined inter-city/regional concessions, and possible separation of commuter operations in each state from the inter-city/regional concession (with potential for a company to bid for multiple concessions).
    - Where separate franchises are offered for commuter operations, the inter-city/regional concessionaire would control the movement of trains for the entire route and provide access (train paths) for the commuter operator.
    - Allocation of capacity between inter-city/regional concession holders and commuter operations would be the responsibility of the HSRDA.
    - Depending of the timing of the completion of the Canberra-Melbourne stage, the initial Operations concession for Sydney/Canberra-Melbourne would be combined with the re-tendering of the Sydney-Canberra Operations concession to offer a combined Sydney-Canberra-Melbourne concession.
Sub appendix 7A.1 Case studies

Introduction
This attachment summarises research relevant to a potential HSR development on the east coast of Australia which is presented in two sections:

- International case studies.
- Australian case studies.

International case studies
There is no single, well established governance and institutional model for HSR. Tailored arrangements in each country allow for industry participation, while retaining appropriate government checks and balances. Nevertheless, a number of lessons have been drawn from the international experience and are presented in this attachment.

Differences in industry and market structures prevent the simple translation of institutional and regulatory approaches from other jurisdictions. It is important to understand the key drivers of selected approaches and to understand the pros and cons of alternatives in the Australian context.

Research has mainly been conducted on the existing and proposed HSR systems in comparable jurisdictions and inferences have been drawn from the existing institutional and governance arrangements. Consideration has also been given to the policies adopted by countries around the world to increase competition regarding the HSR market. The relevant case studies covered in this attachment, largely through desktop research, are:

- Taiwan – Taiwan High Speed Rail (THSR)
- Japan – Shinkansen
- Spain – AVE
- The Netherlands – Amsterdam to the Belgian Border High Speed Rail Link (HSL–South or HSL–Zuid)
- United Kingdom – High Speed 1 (HS1)
- United Kingdom – High Speed 2 (HS2)
- France – TGV
- Portugal – RAVE
- United States – California High Speed Rail Project.

Taiwan High Speed Rail

Project background
THSR line runs approximately 345 kilometres along the west coast of the Republic of China (Taiwan) from the capital of Taipei to the southern city of Kaohsiung. Construction commenced in March 2000, with running tests implemented in January 2005 and was managed by a private company, the Taiwan High Speed Rail Corporation (THSRC), which also operated the line. The total cost of the project was approximately US$18 billion, including government contribution of US$3.2 billion and cost overruns of US$1.7 billion. The THSR was completed in January 2007 after a 14 month delay. Figure 10 provides an illustration of the THSR network.
Objectives and intermodal competition

Before HSR entered the Taiwanese market, private cars and inter-city buses dominated the majority of inter-city trips. Alleviating growth in traffic volumes and congestion was an objective of HSR. Original traffic forecasts estimated an initial daily ridership of 200,000 which was expected to grow to 400,000 by 2036. However, the initial ridership was much less than forecast. Technical problems with the reservation and ticketing system also adversely impacted the actual ridership.

HSR is relatively competitive with air traffic as it provides favourable door-to-door journey times. However, reportedly the full benefits of HSR have not been realised due to problems associated with intra-regional accessibility to HSR stations. The time differences between access times to HSR stations and line haul travelling times on the HSR system are small. Lack of proper integration with other modes of transport also had a negative impact on HSR ridership.

Before HSR, air travel had a clear advantage over other modes of transport for distances over 300 kilometres. Inter-city buses had about 30-40 per cent market share even with unreliable travel times due to its lower prices.

Industry structure

The HSR track infrastructure is government-owned. THSRC (the operator) was appointed by the Taiwanese Government, through a competitive bidding process, to construct and operate the HSR network. THSRC is also responsible for maintaining the system.

THSRC was a private consortium until 2009 when, due to poor financial performance, the government took majority control of the company.

Tendering and construction of the project

The THSR was tendered using a Build-Operate-Transfer (BOT) procurement approach where the private sector would build and finance the project without any government support. Following a bidding process, the THSRC (comprised entirely of Taiwanese companies) was awarded the BOT contract in September 1997. THSRC was incorporated in May 1998 and by July 1998, agreements were signed between the Ministry of Transport and Communications and THSRC, which granted THSRC the concession to finance, construct and operate the HSR system for a period of 35 years and a
The concession for rolling stock, which was awarded to the Taiwan Shinkansen Consortium (TSC), was embroiled in controversy as the line was initially specified to use European standards and train sets. This caused disruption to the rail superstructure specification which contributed to cost overruns. TSC developed the rolling stock in conjunction with a consortium of Japanese builders, most notably Kawasaki Heavy Industries.

**Role of government**

THSRC was awarded the concession on the basis that no government support would be required by the consortium to undertake the project. However, the project ran into financial difficulty due to optimistic market demand forecasts, with revenue unable to cover operational costs and expenses. The Taiwanese Government played a crucial role in financially supporting the HSR project. THSRC breached its concession agreement as it was unable to maintain the specified debt/equity ratio within the given timeframe.

The project experienced cost overruns mainly due to delays and a heavy interest burden. The problems were further exacerbated by the optimistic forecasts and insufficient patronage. Soon after winning the concession, THSRC was unable to obtain debt financing for $10 billion without a government guarantee which led it to be in breach of its contract. The Taiwanese Government bailed out THSRC by requiring government-owned enterprises to make substantial equity investments towards the project. Finally, after more cost overruns and an estimated 1 year scheduled delay, the Taiwanese Government formally announced that it would bail out the project.

Following the takeover of the company's board by the Taiwanese Government in 2009, the financial problems were addressed by refinancing THSRC's loans. The restructuring of the concession meant that in an event of default on payments, the concession would be terminated with the government obligated to take over the full debt of THSRC. Further, since THSR was the first 'mega' PPP project in Taiwan, the banks were apprehensive about financing the project at below market rates without full government guarantee. To this effect, a trilateral agreement between the THSR consortium, the government and the banks was signed on the basis that the Taiwanese Government would take over the debt if the concession was terminated.

**Observations**

- The operational experience of THSR was plagued by optimistic forecasts and insufficient actual ridership. Even with growing passenger volumes and load factors, ridership fell well short of the forecast.
- Lack of integration with existing transport networks was an issue for HSR and which undermined its attractiveness to passengers.
- Indirect/direct government funding was crucial to the completion of THSR, notwithstanding that THSR was initially envisaged to be wholly financed by the private sector.
- Core project risks (such as design risk) were initially transferred to the private sector under the BOT; however, as government funding became involved to ensure project completion, risks were consequently transferred back to the government.
Japan –Shinkansen

Project background

The Shinkansen, also known as the ‘Bullet Train’, is a network of HSR lines in Japan operated by four companies (JR East, JR Central, JR West and JR Kyushu). JR East, JR Central and JR West are separate privately owned and publicly listed companies. JR Kyushu is state-owned.

The first HSR service was introduced in 1964 (the Tokaido Shinkansen line from Tokyo to Osaka). Today Japan has nearly 2,500 kilometres of high speed line in service - more than any other country in the world other than China. Figure 11 shows the existing and proposed Shinkansen network.

Objectives and intermodal competition

A major driving force behind the development of the Shinkansen network was the benefits it brought to the regional and national economy. Therefore, local communities served by new HSR routes were expected to contribute to the total funding in proportion to the expected benefits.

---


32 JRTC, Railway Assistance Toward Tomorrow, 2012
In two of the HSR corridors, Tokyo–Osaka and Osaka–Fukuoka, HSR services were highly profitable. The profits derived from the HSR service between Tokyo and Osaka (the most utilised HSR line in the world) were used to subsidise the construction cost of newer HSR lines, built in less populated areas mainly for promoting regional development.

In Japan, air and HSR compete head-to-head. The immediate response to the opening of HSR routes was a reduction in the air fares by the two major Japanese airlines, Japan Airlines and All Nippon Airways on competing routes. When the Shinkansen route was opened, both carriers operated a shuttle service between Tokyo and Osaka and reduced fares by 5.5 per cent to be lower than the reserved seat train fare.

Competition between air and HSR was also boosted by the privatisation of Japan National Railways (JNR) in 1987, followed by the staged domestic airline deregulation introduced in the 1990s.

That said, Shinkansen stations are typically centrally located, whereas airports may require considerable access and egress time. As a result, HSR in Japan was able to use its natural access advantage to compensate for the shorter line-haul time of air.

**Industry structure**

JNR (a state-owned entity) was responsible for the development of the first proposed HSR line from Tokyo to Osaka.

Following the successful introduction of HSR in 1964, the Japan Railway Construction Public Corporation (JRCC) was established to procure future HSR on behalf of the state. Subsequent lines were constructed by JRCC, with JNR responsible for service operation and infrastructure maintenance. Japan’s Shinkansen is an example where the HSR system was constructed by the state (through JRCC).

In 1987, as the HSR system ran into financial difficulties, JNR was privatised and divided into six railway companies based on six distinct geographic regions (i.e. three operators on the mainland, namely JR East, JR West and JR Central, and three on each of the islands namely JR Hokkaido, JR Shikoku and JR Kyushu), as well as a freight operator.

In 1991, JR Central, East and West bought the existing HSR infrastructure from the national government to which they have to pay an annual fee for 60 years. In 2003, JRCC was merged with the Corporation for Advanced Transport and Technology to form the Japan Railway Construction, Transport and Technology Agency (JRTT). JRTT is an independent administrative agency which owns the Shinkansen lines built post-1987 (i.e. after the privatisation of JNR) and is in charge of constructing new Shinkansen lines (as based on the Development Plan for the Shinkansen Network which was approved in 1970). JRTT levies track access charges on the companies operating the service along the sections it owns (i.e. those built after 1987), on the basis of projected ridership – i.e. designed to ensure access charges are affordable. The maximum charge that can be made is equal to the profit of the new Shinkansen operations.

Japan’s Shinkansen network is today operated by four companies, namely JR Central, JR East, JR West and JR Kyushu.

**Tendering and construction**

The development of the initial project was facilitated by JNR using a traditional D&C approach, with the government almost entirely funding the single package. The construction was financed by issuing bonds in Japan and borrowing from the Japanese Government and the World Bank. The loans were expected to be returned through the revenues from passenger fares. JNR used its Right of Way provisions (through the Ministry of Transport) to acquire substantial land for the HSR infrastructure, which was also developed for commercial use.

HSR lines built after the 1987 reform are constructed and owned by JRTT and are leased to the JR companies, whereas the lines built prior to the privatisation are owned by JR Central, East and West. JR East purchased the HSR line from Tokyo to Niigata and the track from Tokyo to Morioka. JR Central purchased the HSR line from Tokyo to Osaka, and JR West purchased the HSR line from Osaka to Hakata.
Role of government

Prior to the 1987 privatisation of JNR, the construction of HSR lines in Japan was funded through debt incurred by the national government and JNR.

Since the 1987 reform, the national government funds two-thirds of the construction cost and local governments fund one-third of the construction cost under the Shinkansen Railway Development Act. The national government funding is derived from the revenues from the sale of rail lines to private companies and the national public works budget (i.e. a little over half of the funding comes from the payments for the procurement of existing Shinkansen Railways, the rest comes from the General Account). It can be said that new Shinkansen construction projects are based on a PPP model, where JR operations are supported by funding from both national and local governments\(^{33}\).

The Ministry of Transport is responsible for the overall planning and supervision of the project. The Ministry of Finance is responsible for the funding and budget approvals. JRCC had been set up especially to take over the procurement process on behalf of the government, and this function has been provided by JRTT since 2003. JNR initially operated the lines, but following the privatisation in 1987, operations and ownership of rail infrastructure transferred to various JR companies (though lines constructed post-1987 are owned and leased by JRTT).

Observations

- The Japanese Government has gradually introduced private sector financing and participation in the HSR operations but has maintained control of planning and new construction.

- The Japanese Government’s infrastructure policy is based on retaining public ownership of future HSR assets while levying ‘affordable’ annual leasing charges for the use of the network, primarily by privately owned train operating companies who also control trains and maintain the infrastructure assets.

- Regional communities served by new HSR lines contributed to the total funding in proportion to the benefits provided directly or indirectly by the network.

Spain – AVE

Project background

The first AVE line was inaugurated in 1992 between Madrid and Seville and paved the way for the expansion of the network around the country. HSR in Spain received a high percentage of European Union (EU) funding. The Spanish Government is committed to the long-term development of the network as shown by its investment of 1.5 per cent of Spanish GDP to national infrastructure until 2020. Figure 12 provides an illustration of the existing and planned Spanish HSR network.

\(^{33}\) “Shinkansen (Bullet Train) System in Japan” retrieved from http://republicans.transportation.house.gov/Media/File/Testimony/Rail/4-19-07-Matsumoto.pdf
Objectives and intermodal competition

The main objective for the development of HSR in Spain was promoting social integration, territorial integration, economic development and competitiveness. Improving territorial equity and promoting economic development in the relatively poorer regions of the country were the key drivers underpinning route alignment which ultimately led to higher than expected construction costs.

AVE took a significant market share in domestic travel from airlines. After two years of operation, air traffic suffered an estimated 60 per cent reduction in passenger numbers. Gourvish’s 2010 study shows that with the introduction of HSR on the Madrid to Seville line, total rail traffic increased by 35 per cent while the proportion of passengers travelling by air declined sharply as shown in Table A-14.

Table A-14: Changes in modal traffic shares for the Madrid-Seville route (%)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Madrid - Seville</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before 1991</td>
</tr>
<tr>
<td>Air</td>
<td>40</td>
</tr>
<tr>
<td>Train</td>
<td>16</td>
</tr>
<tr>
<td>Car/Bus</td>
<td>44</td>
</tr>
</tbody>
</table>

Source: Gourvish\(^{35}\).

One of the reasons driving the success of the HSR line was the government’s decision to prevent Iberia (the state-owned airline) from operating on the same routes as HSR. However, now that airlines in Spain have been deregulated, AVE may face increased competition from low cost airline operators.

---


\(^{35}\) ibid.
Industry structure
HSR in Spain is government-owned with separate government-owned entities responsible for the rail infrastructure and the train operations. European railway directives drive the separation of infrastructure and operations. Accordingly, in 2005 the state railway entity Red Nacional de los Ferrocarriles Españoles (RENFE) was split into two independent state-owned companies, namely RENFE Operadora - the operator, and Rail Infrastructure Administration (ADIF the new agency for management of rail infrastructure).

Tendering and construction
For the Madrid to Seville corridor, almost 80 per cent of the total funding came from the Spanish Government. The remaining funding was covered by EU grants.

The Perpignan to Figueras corridor, which links France to Spain, has been financed through a PPP arrangement36.

Role of government
HSR in Spain was mainly financed through government funding. Furthermore, the Spanish Government passed the new Rail Sector Act in line with the European regulations in an attempt to make the rail sector competitive and more efficient by opening the market to other international operators.

Following the Rail Sector Act, RENFE Operadora and ADIF were created. AVE is run on dedicated HSR track owned and managed by ADIF.

ADIF, apart from owning the current HSR lines, is also the owner of passenger rail stations, freight terminals and the telecommunication network. In addition, it constructs and maintains HSR lines, allocating capacity to passenger operators while also managing traffic control operations and safety systems.

RENFE Operadora was established from RENFE’s operating and maintenance business units. While RENFE Operadora assumed the assets, employees and other liabilities of the existing business units, most of the outstanding debt was transferred to the government and taken off the company’s balance sheet. Consistent with the approach adopted internationally for comparable rail projects, RENFE Operadora is required to obtain a licence to operate services on the AVE network. In return, RENFE Operadora pays a licence fee (or equivalent) to ADIF for use of the rail infrastructure including separate charges for the use of stations and yards.

In 2010, one of the European Union directives called for the opening of HSR lines to competition. Therefore, even though trains are operated by RENFE Operadora, private companies are now also allowed to operate trains on the same lines.

The Ministry of Development is responsible for the overall organisation and regulation of the railway system whereas the Railway Regulatory Committee, a body under the Ministry for Public Works that oversees the proper operation of the system, is responsible for the overall regulation of the system while also acting as an arbitrator in the event of disputes37. It is also responsible for regulation standards and legislation, safety authorisations and certificates, supervision, inspection and control.

Figure 13 provides an illustration of the Spanish institutional arrangement under the New Rail Act.

Observations

- HSR is provided by separate government-owned infrastructure and train operating companies.

- AVE received significant EU funding, especially for the cross border lines. The project received significant EU regional development funds as AVE links regions which are relatively economically deprived.

The Netherlands – Amsterdam to the Belgian Border High Speed Rail Link (HSL–South or HSL–Zuid)

Project background

The High-Speed Line South (HSL or HSL-Zuid in Dutch) is a 125 kilometre HSR line in the Netherlands, which links Amsterdam to the Belgian border. The HSR line became operational in 2009.

HSL is part of the Trans-European Transport Network (TEN-T) of high speed train lines although, because of the financing structure, the influence of TEN-T was very limited. Connecting the Netherlands with the rest of the European high speed passenger network was an important motive behind the project.

The Netherlands HSR project was developed by a special project organisation, HSL-South.

The construction of HSL was completed in 2007; however, operations only started in 2009 after a 4 year delay because of problems with the rolling stock order and the security system. It is estimated that the construction costs amounted to approximately €7.2 billion. The HSL privately financed infrastructure contract with a value of €1.2bn reached financial close in December 2001.

Figure 14 provides a map of the HSL-Zuid network in Netherlands.
Objectives and intermodal competition

The primary objectives for the development of the network are:

- Linking the main ports of Rotterdam, Schiphol and Amsterdam to the TEN-T network of HSR.
- Providing impetus to economic development.
- Reducing air traffic for medium distances within Europe.

One aspect of the extension of HSR to the Netherlands and competition with air was the inclusion of KLM Royal Dutch Airlines in a two-part consortium which has a 15 year franchise to operate HSR. High Speed Alliance (HSA), the operator of the HSL-Zuid network, is in fact a Joint Venture between KLM Royal Dutch Airlines which owns 10 per cent and Dutch Railways (NS) which owns 90 per cent. The franchised HSR line runs from Amsterdam to Rotterdam and the Belgian border. The Dutch view to this was that the HSR station at Amsterdam Airport Schiphol, may take away some traffic on short and medium haul routes, but at the same time it extends the catchment area of the airport.

Industry structure

The government tendered a concession to run trains on the HSL line to HSA, which is expected to pay the Dutch Government for the exclusive right to domestic transport on the high speed line for a 15-year period. The track infrastructure remains the property of the Dutch Government, which pays an annual performance-linked fee to the infrastructure manager (Infraspeed Consortium) in return for meeting agreed availability targets.
Tendering and construction

The project was packaged and procured in two parts, the substructure (six contracts) and the superstructure (one contract). The key reasons for this separation were the expected inability of the construction industry to assume multi-billion euro contracts, competition requirements, existing detailed substructure designs and an agreement with Belgium which put time pressure on the expected completion date.

- **Superstructure** - (encompassing rails, electric system, telecommunications system, safety and signalling, sound barriers, balustrades and fences, facilities in the tunnel buildings, emergency facilities, ventilation systems in the tunnels and long-term maintenance thereof) – the superstructure was procured using a PPP approach via a single availability based design, building, financing and maintenance (DBFM) contract. The Infraspeed consortium won the infrastructure provider contract after a European tender process with pre-qualification, an Invitation to Tender, negotiations and a Best and Final Offer stage. As part of the contract, Infraspeed guarantees 99.46 per cent availability of the line over the 25-year concession period from 2006 to 2031. As of 2006, the Dutch Government will pay Infraspeed an annual fee for making the HSL infrastructure available, which allows Infraspeed to cover its expenses, recover its capital investment and, subject to various contingencies, earn its anticipated IRR. Consistent with the approach adopted in Australian PPPs, the availability payment is subject to actual HSR network availability (i.e. if the consortium fails to realise 99.46 per cent availability, the fee is reduced).

- **Substructure** - (includes structures, earthworks, etc) – The Dutch Government took the view that it would be unable to successfully transfer the risks related to the substructure works and ground conditions, and decided that this aspect of the project would be best procured using a traditional D&C approach. The substructure was therefore contracted out to six engineering and construction consortiums with payments by the government during and upon completion of the engineering and construction phases. Although this type of contracting appeared to be integrated, detailed input assumptions that were not transferred, coupled with weak output definition, resulted in severe cost overruns and time delays.

- **Network connections** – awarded as a D&C contract.

The train operations and rolling stock supply were procured separately, with the separation of infrastructure and operations (awarded as a single train operations concession). Passenger transport was contracted out under a concession agreement to HSA. The contract did not work and was recently terminated and the incumbent Dutch Railways (NS) has taken control within their traditional mandate.

One of the main challenges of this framework was the management of interfaces between the various parties involved. To limit the complexity of each sub-project, the Dutch Government took the role of central counterpart, grouping similar types of risks while retaining the related interface risks between the various contractual arrangements.

Most of the risk was transferred to the private consortium except for demand risk and Infraspeed was remunerated on an availability basis, subject to any deductions for unavailability of the infrastructure and is independent of the level of traffic.

An access fee is paid by the operator to the government to gain access to the HSL stations and the rail infrastructure. The government used parts of these payments to fund the necessary civil works and pay a performance fee to the infrastructure provider. Also, when needed, loans may be provided by private financiers to the infrastructure provider which is then responsible for making the repayments.

Services between Amsterdam and Brussels are offered by NS Hispeed (a subsidiary of HAS) and are operated by trains branded with the name Fyra39, while the existing operator Thalys40 operates between Amsterdam and Paris. Fyra and Thalys share the use of the high speed tracks in the

---

39 Fyra is a joint initiative of NMBS/SNCB and NS Hispeed.
40 Thalys provides commercial passenger rail transport services on behalf of SNCF and SNCB and is a joint service offered by the Belgian, French and Dutch railways. Its international capital is divided as follows: 62 per cent held by the SNCF, 28 per cent held by the SNCB and 10 per cent held by the DB.
Netherlands with all services coordinated through NS Hispeed. NS Hispeed facilitates the sales and operations of all high speed connection through the Netherlands. Head-to-head competition has not been a feature of the Dutch market.

**Role of government**

Even though the HSL-Zuid line was a PPP deal, it relied heavily on government funding, drawing on private investment for only 14 per cent (approximately €1 billion) of the project cost. The Dutch Government retained risks relating to the provision of the sub-surface works in the project. Market consultation undertaken by the Dutch Government revealed that the private sector was not likely to accept demand risk and this risk was therefore retained by the Dutch Government. According to a report by the Dutch Audit Commission, the state bore the resulting loss even though the construction contracts made the contractor responsible for the risks associated with the construction and maintenance of the network. The major financial risks remained with the state.

The HSL-Zuid project team was set up at the start of the project as a separate group under the supervision of the Ministry of Transport. However, no government agency had clear accountability for the execution of the project. **Figure 15** illustrates the institutional arrangements for the HSL-Zuid Line.

**Figure 15** Institutional arrangements for the HSL–Zuid line

Source: D Loschacoff.

**Observations**

- The HSL-Zuid was regarded as an innovative and exemplary PPP project at the time it was launched due to the risk profile adopted. Despite its high profile as a PPP, however, the HSL-Zuid project relied mostly on public funding, drawing on private investment for only 14 per cent (i.e. about €940 million) of the project cost. From the beginning, a number of mistakes were made in terms of planning and risk management which undermined the success of the project.

---

The demand risk (for operating contract) and infrastructure risk were retained by the Dutch Government. The Government also retained all rights with respect to operating, capacity utilisation and tariff structure.

The Dutch Government retained considerable risks relating to the provision of the subsurface works in the project to ensure that overall best value for money was achieved.

Given the project was managed by two different government departments, there were issues with the project delivery and the procurement process. No government agency had clear responsibility for the execution of the HSR project.

The level of unbundling during procurement and delivery phase increased interface risks but it also reduced the size of the contract, allowing the private sector to better assess risks associated with different sub-components.

**United Kingdom – High Speed 1**

**Project background**

Channel Tunnel Rail Link, or High Speed 1 (HS1) is a 108 kilometre HSR network that runs from Central London to the Channel Tunnel. In 1996, London and Continental Railways (LCR) was granted a concession to design, finance, construct, operate and maintain the HSR link. It was originally planned that the project would be privately financed; however, those plans were abandoned in 1997 after actual Eurostar revenues were found to be overly optimistic compared to prior projections. The private sector was now unwilling to take naked revenue risk on a greenfield rail project of this nature. The project was funded by a mixture of government grants and private funding by LCR. After LCR experienced financial difficulties, the United Kingdom Government stepped in and the line was transferred to government ownership in 2009. The LCR team delivered the physical project on time and on budget (£5.2 billion).

HS1 Ltd acquired the operating rights of the line in 2010 from the United Kingdom Government for a fee of $US3.4 billion. HS1 Ltd is jointly owned by Borealis Infrastructure and Ontario Teachers’ Pension Plan, two Canadian pension funds. It holds the concession to operate, manage and maintain the infrastructure until December 2040. The United Kingdom Government, due to its ownership of LCR, maintains ownership of the infrastructure of the railway and the freehold of the associated land.

**Figure 16** provides a map of the HS1 network in the United Kingdom.

![Existing HS1 network](http://highspeed1.co.uk/)
Objectives and intermodal competition

The line was built to carry international passenger traffic from the United Kingdom to Continental Europe, but it also carries domestic passenger traffic to and from towns and cities in Kent, and has the potential to carry some freight traffic.

The Eurostar services using HS1 faced strong competition and price wars from ferry and airline companies, which was one of the reasons that led to their shortfall in traffic volumes and average revenue yield, though there is strong evidence of optimism bias in the original forecasts.

Industry structure

The network is operated on a vertically-separated basis. As noted above, HS1 Ltd purchased the concessional right to operate, manage and maintain HS1 from the United Kingdom Government. It contracts out various functions including infrastructure management and passenger services. Domestic passenger services are provided by Southeastern, with Eurostar being the international provider. Eurostar is an open-access operator, operated jointly by the French (SNCF) and Belgian (SNCB) railways and Eurostar UK. Since government takeover of the line in 2009, the rail network has been owned, maintained and managed by Network Rail.

Tendering and construction

The original contract was awarded in 1996 to LCR under a target cost approach, with a Design Build Finance and Operate procurement model. However, following financial distress, the project was restructured in 1998 into two distinct phases under a Design-Build-Finance model:

- **Phase 1** – comprised the section which runs from the Channel Tunnel portal to north Kent. It was opened to passenger traffic on 28 September 2003 and was built at a cost of £1.2 billion.

- **Phase 2** – comprised the second and final section of the line which travels across the River Thames and into London St Pancras. It opened on 14 November 2007 and was built at a cost of £4 billion.

The funding structure of HS1 is summarised in Table 15.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Section 1</th>
<th></th>
<th>Section 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Central government debt</td>
<td>2.65</td>
<td>69%</td>
<td>1.25</td>
<td>42%</td>
</tr>
<tr>
<td>Central government grants</td>
<td>0.70</td>
<td>18%</td>
<td>1.20</td>
<td>58%</td>
</tr>
<tr>
<td>Third party finance</td>
<td>0.49</td>
<td>13%</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: California High Speed Rail Authority\(^43\).

LCR faced further financial difficulties in 2009 and the United Kingdom Department for Transport (UK DIT) took direct ownership for a nominal price. This was possible due to the company’s dependence on significant levels of government-guaranteed debt.

In 2010, HS1 Ltd purchased the right to operate, manage and maintain the HSR infrastructure until December 2040 for £5.3 billion\(^44\). Network Rail is the contractor for maintaining and operating the railway infrastructure and three of the stations, namely St Pancras International, Stratford International and Ebbsfleet International. Eurostar International Ltd maintains and operates Ashford International Station.

\(^43\) California High Speed Rail Authority, *California High-Speed Rail Project: International Case Studies*, 2011, p.18.

\(^44\) Note: This figure has been converted in GBP from the original USD value of $3.4 billion using current exchange rates.
Role of government

In 1998, due to unrealistic traffic forecasts, LCR ran into financial difficulties. The project was subsequently restructured, with the government providing funding assistance in the form of grants.

Railways in Great Britain are privately operated but they are subject to control by the central government. Since 2006, DfT has run competitions for the award of passenger rail franchises, monitoring and enforcing the contracts with the private sector franchisees. Franchises specify the passenger rail services which are to be run in addition to quality and other conditions (e.g. the cleanliness of trains, station facilities, opening hours, the punctuality and reliability of trains, etc) which the operators have to meet. Some franchises receive a subsidy from DfT for doing so, while some are cash-positive meaning that the franchisee pays DfT for the contract. The Office of Rail Regulation (ORR) regulates HS1 through its concession agreement and the memorandum of understanding with the Secretary of State. The function of ORR includes pre-approval of the regulatory framework and ensuring that the HS1 has incentives to incur efficient costs and access charges. Other functions relate to network regulation/asset management, monitoring and reporting and enforcement. Any disputes relating to the breach of the terms and conditions of the concession contracts are brought to ORR for arbitration rather than the court of law.\(^45\).

Figure 17 illustrates the institutional arrangements for HS1.

The roles of the key parties in the HS1 organisational structure are:

- **United Kingdom DfT**: the United Kingdom DfT was the procuring authority for UK HS1.
- **LCR**: LCR was originally granted a concession to design, finance, construct, operate and maintain the HSR project. LCR was privately owned at this stage, but in 2009 the United Kingdom DfT took direct ownership of LCR for a nominal price.
- **Bechtel Consortium**: The construction of HS1 was project-managed for LCR by a Bechtel-led consortium, which was responsible for design, project management, and construction management of HS1. The consortium delivered the physical project on time and to budget.
- **HS1 Ltd**: HS1 Ltd holds the concession from government to operate, manage and maintain the HSR infrastructure until December 2040.

• **Network Rail**: Network Rail is a contractor to HS1 Ltd and following completion of construction, operates the railway infrastructure and three stations.

• **Eurostar International Ltd**: Eurostar maintains and operates Ashford International Station on HS1 Ltd’s behalf including Eurostar International Limited which continues to own and operates the Eurostar trainsets running between London and European destinations.

• Southeastern hold a regional franchise serving domestic customers and pays access charges to HS1.

**Observations**

• ORR regulates HS1 Limited through its Concession Agreement and a MoU with the state.

• The lessons learnt from the implementation and delivery of HS1 has led the United Kingdom Government to the realisation that significant public sector involvement in projects of this size is inevitable.

• The government funded 87 per cent (in grants and debt) of Section 1 of HS1, and 100 per cent of Section 2 (refer to Table 15).

**United Kingdom – High Speed 2**

**Project background**

High Speed 2 (HS2) is the proposed line between London and West Midlands and is expected to be operational by 2026 subject to government approvals and funding. The driving objective for the development of HS2 was the need for substantial additional passenger transport capacity. The government decided that a new HSR network was the best way to provide additional capacity while providing substantial economic and environmental benefits. The route is proposed to take the form of a ‘Y’, with a trunk from London to Birmingham. The route would then split into two spurs, one to Manchester, and the other to Leeds via the East Midlands. The line is to be built in phases with the London to Birmingham section being the first phase. There will be no intermediate calling points between London and the West Midlands. **Figure 18** provides an illustration of the proposed HS2 network.
Objectives and intermodal competition

Among the driving objectives for the construction of HS2 were the need for additional passenger transport capacity and the provision of connections to existing lines which are expected to cut journey times between London and Edinburgh and Glasgow considerably.

The first phase of HS2 is expected to include a connection to mainland Europe via HS1 and the Channel Tunnel. On completion of HS2, the network will also include a direct link to Heathrow. The impact of HS2 Phase 1 on domestic aviation is likely to be insignificant due to the absence of flights between Birmingham and Heathrow. A stronger impact is forecast for the Y network as rail would compete more effectively with aviation for journeys between Scotland, the north of England and London.

The government has estimated that the project could eventually result in the substitution of nine million road journeys and 4.5 million air journeys to HSR every year.

---

Industry structure
The ownership of the track infrastructure and stations with respect to HS2 is anticipated to be similar to that of HS1 with the operation of train services to be concessioned to the private sector.

Tendering and construction
It is currently proposed that the private sector will play a key role in the delivery, operation and financing of HS2. The government will drive procurement solutions to ensure optimal project outcomes and achievement of policy directives.

Observations
A number of lessons learnt from HS1 will be applied to the development of HS2. Among these are:

- The staged approach to delivering a HSR program, adopted after the failure in the implementation of HS1 as a single stage project, has proved to be a critical success factor and is being increasingly adopted by other countries.
- Direct government involvement is crucial to the success of HSR projects.

France – TGV

Project background
France opened its first HSR line in 1981 between Paris and Lyon. Its high speed trains are referred to as TGVs (Train à Grande Vitesse). The network now extends throughout the country, with eight new lines including extensions within France and to the neighbouring countries. Since the Paris-Lyon line was opened in 1981, France has seen continual expansion of the HSR network with the most recent opening of the Rhine-Rhône line which links northeast France to the Mediterranean. Additional lines are in the planning process.

The TGV program was originally developed by the Société Nationale des Chemins de fer Français (SNCF), the French national rail operator, before the introduction of the European Union Rail Directives. At that time, SNCF’s infrastructure and train operations were still fully integrated and, as the national railways manager, it was able to borrow at rates with implicit or explicit guarantees from the French Government.

The TGV network owes its success in large part to the development of the network in phases on the basis of lines that were expected to be most successful. The focus of the original line was a HSR connection between Paris and Lyon, referred to as TGV Sud Est. The second line developed was the TGV Atlantique, which opened in 1989. This was followed by TGV Nord Europe (1993) and TGV Méditerranée (2001). Figure 19 provides a map of the existing and proposed HSR network in France.
Objectives and intermodal competition

One of the main objectives for building the first HSR line was to relieve congestion on the rail link between Paris and Lyon while connecting cities of significant size.

Most of the diverted passengers came from air and about half of the traffic came from newly generated trips. The French rail operating company, SNCF, reported that its TGVs have a dominant share of the air-rail travel market in several of the HSR corridors, taking over 90 per cent in the Paris-Lyon market (with a TGV travel time of less than two hours) and about 60 per cent in corridors where the TGV travel time is around three hours.

This observation was supported by the analysis of the Paris-Marseille route reported in a study for the European Commission DG TREN conducted by SDG in 2006 in relation to air-rail market share. SDG noted that the potential for a Low Cost (Air) Carrier to commence service, subject to landing and take-off slot constraints at Paris, could trigger significant reduction in air fares and put pressure on rail fares. In 2006, SDG quoted a one way Paris-Marseille air fare at €108 compared to a one way rail fare of €63. Given the price differential, in 2005 rail market share was estimated at 67 per cent. Prior to HSR, EasyJet operated on the abovementioned route but withdrew presumably on the grounds that slots could be more profitably used on a route where there was no competition from TGV.

The French and Belgium national carriers (Air France and Brussels Airlines) have withdrawn service on the 251 kilometre route between Paris Charles de Gaulle and Brussels since the opening of the HSR service in March 2001. The incorporation of certain rail services into Air France’s aviation network, with consistent flight numbering and integrated ticketing, facilitated further acceptance by passengers.
Industry structure

The operation of train services has been separated from infrastructure management. This led to the establishment in 1997 of Réseau Ferré de France (RFF), the new national intercity rail network infrastructure manager (also state-owned).

The national government transferred the ownership of the rail network (including the HSR network) to RFF, which also manages the rail system and is responsible for upgrading, developing, and enhancing the network, while also ensuring its overall consistency. RFF provides the infrastructure to train operators, including SNCF (which heavily dominates its use) on an availability basis (i.e. its charges are unrelated to actual use of the network thereby avoiding any demand risk).

RFF usually contracts out the engineering works and the ongoing maintenance of the new and existing infrastructure. It acts as project manager and allocates contracts for the development of the infrastructure on a section by section basis, bringing in specialist contractors to work on the civil works in order to alleviate the default risk of a single contractor and to counter any resource constraint in the market. However, the interface risk between different infrastructure works is retained by RFF (i.e. the French Government).

The domestic HSR network is currently solely operated by Voyageurs France Europe, the long-distance rail branch of SNCF, whereas Eurostar and Thalys TGV, of which SNCF is a shareholder, provide international HSR operations to locations in Belgium, Holland and the United Kingdom.

RFF has also subcontracted the responsibility to maintain the operations of tracks and control of maintenance and safety systems, including signals and pointwork, to SNCF.

Tendering and construction

Prior to 1997, the development of the TGV network was financed and funded by the State (through SNCF) mainly from borrowings.

The second wave of French TGV projects (including LGV Est, LGV Rhine–Rhone, Sud–Atlantique and Brittany–Loire) has been characterised by a more integrated procurement approach, with private finance and sometimes demand risk transfer to the private infrastructure provider. Several reasons drove this change in approach, including the positive experiences in other sectors where private finance was used to fund infrastructure, a growing concern relating to the risk of cost overruns and RFF’s attempts to limit further burden to its balance sheet from carrying more debt.

In 2007, RFF was permitted to enter into PPPs to finance and deliver projects following the introduction of safety and development legislations. As a result, all recently constructed and planned future developments of TGV lines have been procured using a PPP approach. The use of PPPs as a procurement method has allowed for risk sharing between project partners and more lines to be built beyond the capacity of the state budget with the help of private financing and expertise.

Role of government

The initial TGV projects were developed and funded by SNCF on a corporate basis and guaranteed by the state. Successively, the projects started being funded by RFF which could borrow money from the international markets. However, the funding is backed by government guarantee and is restricted to the amount that RFF can repay based on its access fees. In addition to borrowings, the TGV lines have also been developed with grant funding from local sources given the contribution of the network to regional development. Local entities that contributed to the funding included the city and county council, district council and the regional councils. Local funding has formed around 25–35 per cent of total funding of the TGV lines.

All transport policy decisions fall under the Ministry of Transport and Tourism. The Regulatory Authority for Railway Activities (ARAF), which is part of the Independent Regulators’ Group (IRG-Rail), is responsible for ensuring that properly licensed train operators that have rights of access under EU directives are treated on a non-discriminatory basis in applying for access to the national railway network. The legislation is designed to transform the French rail network from a closed and administered system to one which is open and regulated.

After 2007, RFF was allowed to enter into PPPs to finance and deliver new infrastructure projects. Under the PPP structure, RFF retains the demand risk of infrastructure access charges (principally
through payments by SNCF), but transfers design, construction, maintenance and financing risk to a private Special Purpose Vehicle (SPV) infrastructure provider. The SPV consists of construction firms, banks and (other) equity providers and is structured as a project finance vehicle with back-to-back contracting for construction and maintenance and direct agreements with financiers.

The French Government and regional governments contribute to the projects through payments via RFF and directly into the SPV. The European Union is also able to directly support the SPV with subsidies, should the SPV be acknowledged by the competent public entity (usually the Ministry of Transport) as their representative. The SPV finances the infrastructure construction and receives over the long-term duration of the contract an availability payment from RFF.

The rolling stock for all TGV lines is procured by SNCF and is funded through lease commitments.

Observations

- The development of the network was done in phases with those lines projecting the highest demands and commercial performance being selected first.
- The national infrastructure railway manager was not only responsible for developing the HSR infrastructure but also for the ongoing maintenance of the rail network which was then contracted back to SNCF, the dominant rail operator.
- Local authorities were in part responsible for funding the HSR project given HSR contributes and/or supports the regional and local development.

Portugal – RAVE

Project background

The Portuguese HSR network was designed to establish a high speed line from Lisbon to Madrid. Although having the project details finalised, separated into six separate packages, settled and ready for the launch of PPP concessions, the project was definitively abandoned on 21 March 2012 by the Portuguese Government. The European financial crisis, the discovery of illegal clauses in the contract and irregularities found in the concession and the process by which it had been awarded are said to be amongst the causes which led to the abandonment of the project.

The project would have involved the construction of new lines totalling approximately 650 kilometres between Lisbon, Porto and Madrid, with the project’s total investment value being approximately €8 billion. The project was to be financed by a mixture of European Union grants and public and private finance. **Figure 20** shows the proposed Portuguese HSR network.
Objectives and intermodal competition

The objective behind an investment in HSR focused on increasing economic benefits via reduced travel times, transport costs, and regional inequalities, potentially culminating in the growth of a city along the route between Lisbon and Porto.

Additionally, intermodality would provide numerous benefits both to passenger and freight services. Freight services in particular would open new trade markets and divert traffic from trucks by linking conventional rail, road, air, and the ports of Sines and Lisbon. Benefits of this shift toward rail are improved air quality and reduced energy consumption\(^\text{48}\).

Tendering and construction

The packaging approach implemented by RAVE involved separating the project into six distinct PPP packages.

The first five PPP packages were for the DBFM of the rail substructure and superstructure, excluding the signalling and telecommunications systems, for a 40-year period, based on geographical segregation of the system.

The breakdown of the infrastructure packages scheduled for procurement was as follows:

- Two packages were to be dedicated to the Lisbon-Madrid line, the first covering the crossing of the Tagus river, and the second to the Spanish border (€600 million for the first section and €2.4 billion for the second section).

- The Porto-Vigo line was to be completed in two packages, for a total investment of €2.2 billion (€845 million for the first and €1.4 billion for the second).
- The Lisbon-Porto line was to be a single package with a total investment of €4.5 billion.

The sixth package was for the design, supply, installation and maintenance of the signalling and telecommunications systems for a 20-year period, for the entire length of the three priority links of the project. A single signalling package would ensure interoperability across the line. It was established that six packages represented an optimal balance between generating private sector interest and minimising the extent of interface between projects and contractors. The minimisation of interface risk is said to be one of the strongest points of the Portuguese HSR model.

A PPP approach was selected for the procurement of each package because of the success of PPP-based HSR developments internationally.

One package achieved finance close prior to its abolishment on 21 March 2012. The procurement process for the first package, the Poceirão–Caia PPP, was launched in June 2008.

**Role of government**

The Portuguese Government assigned the responsibility of developing and coordinating studies and works necessary to decide on the planning, construction, financing and operations of the Portuguese HSR network to RAVE (which was specifically created for this purpose in 2000). RAVE, which has recently been dismantled as a result of the country’s financial crisis, was owned by the government and the Portuguese state railway.

Even though a PPP approach was to be adopted for the development of the Portuguese HSR, the government was still to shoulder a major share of the project’s costs and risks. The state was forced to compromise on several contract conditions in order to satisfy bank lenders and took on itself the risk posed by interest rate fluctuation. In addition, the line had to rely on heavy public investment to be built, with 55 per cent of the project cost borne by the Portuguese state and the EU. The public sector outside of Portugal was also expected to take on some financial risk in the form of substantial loans from the European Investment Bank to the private sector companies building the lines. 49

RAVE claimed that the PPP approach would have resulted in 40 per cent less cost versus it being built by the public sector (using traditional procurement approaches). It also noted that the cost of the project would have decreased over the course of planning and bidding rather than increasing. The Portuguese HSR system was anticipated to be one of the cheapest in the world. 50

The HSR operations, capacity allocation and railway traffic management were to come under the authority of the State and the REFER (the public infrastructure manager), which also manages Portugal’s national rail network.

The Portuguese State was also going to be responsible for the procurement of the rolling stock which it would allocate to the future operator of the system.

**Figure 21** shows the institutional arrangements which had been proposed for the Portuguese HSR.

---


50 ibid.
Observations

- A PPP approach was selected for the procurement of each package given the success of PPP-based HSR developments internationally.
- PPPs can generate considerable savings; however, they require expertise and need to be tailored specifically for each project.
- Complex projects like HSR need to be separated out into several contracts for each task with ‘interface’ risk being introduced (i.e. by using 6 PPP projects the interface risk for the Portugal HSR was reduced).
- The project faced delays due to elections, highlighting the need for cross-party support.
- The issues which led to the non-delivery of the project, including the European financial crisis and irregularities with the contract, should also be noted.

United States - California High Speed Rail Project

Project background

The California HSR (CHSR) system is a long-term and complex program, covering approximately 1,300 kilometres over varying terrain, connecting multiple cities and metropolitan areas. Being developed under the guidance of the California High Speed Rail Authority (CHSRA), CHSR is currently in the business case stage with construction scheduled to commence in 2012.

Figure 22 shows the planned HSR network in California.
Objectives and intermodal competition

The project's development is directly related to California's need for improved transportation infrastructure, as its cities cannot continue to rely on existing infrastructure or persist with the development of new highways if California's economic, political and social needs are to be met in the future.

Features of the proposed HSR network are its integration into the existing transportation system and its ability to provide the inter-regional connections and enhance regional systems as required by the funding authorisation mechanism. Given the high reliance on private vehicles in the United States, it is anticipated that HSR will represent a highly attractive alternative to trips by car.

Tendering and construction

The California HSR system will be developed through a phased strategy utilising smaller, discrete projects that can stand on their own while being matched to available funding and delivered through the most appropriate business models. The phased approach enables the HSR system to be introduced to the market gradually, building ridership before the next route is launched. It also allows
for improvements to be continually made to the regional systems that connect with HSR, resulting in conventional and high-speed systems complementing each other.

The development of the California HSR system is proposed to be divided into the following five stages:

**Stage 1 – Initial Operating Section (IOS) construction and upgrade to existing rail systems**

Stage 1 consists of the construction of a ‘spine’ of up to 130 miles in the Central Valley (north of Bakersfield to north of Fresno) that will lay the foundation for the state-wide HSR system. This package will also involve simultaneous improvements to the existing rail systems, laying the foundation for HSR as it extends to those areas.

Design and Build contracts and potentially several small ‘advance’ works (Design Bid Build – DBB) contracts are to be employed. Under the DBB approach the public sector is required to take on design risks and potential contractors will bid for the project based on the design in the tender documents. This approach provides an initially low price and allows flexibility. However, the public sector retains the interface risks between the design and build contract and into the eventual performance of the railroad which may thereby reduce the overall price certainty.

As the signalling, communications, power system and vehicles are excluded from the scope, the decision was made not to use a PPP approach, thus removing the potential system integration risk transfer benefit. Therefore, construction of the IOS is expected to require state and federal funding until it is completed and operational.

**Stage 2 – Initial HSR operations**

This stage will involve extending the HSR system to Merced and San Fernando Valley, closing the gap between Northern and Southern California. The decision as to which direction to extend the service first will be dependent on the expected revenue, capital and operational costs, funding availability, public input, environmental approvals and the level and type of potential private investment.

Private sector contracts will be issued for vehicle provision, train operations, and infrastructure operations and maintenance. Once the section is operational, it is expected that operating revenue will cover the operating costs and therefore, state or federal funding will not be required during operation.

Provision of vehicles may be contracted either via a lease-based financing or a long-term service contract that follows a PPP structure to deliver and maintain the train sets over time. Train operations may be competitively procured via a franchising agreement.

**Stage 3 – Bay to Basin**

Stage 3 comprises the extension of the HSR system to San Jose, completing the development of the Bay to Basin section, allowing greater integration with the commuter rail services serving San Jose and the San Fernando Valley.

At this stage, there may be greater private-sector participation in operations and maintenance and various forms of private finance. As with the IOS, the scale of construction and engineering for this incremental section is too large to be procured under a single contract. However, there are sub-sections in the proposed development that are significant enough to form potential viable Design-Build-Finance-Operate and Maintain PPPs.

**Stages 4 and 5 – San Francisco and Los Angeles/Anaheim (Phase 1) and extensions to Sacramento and San Diego (Phase 2)**

Stages 4 (Phase 1) and 5 (Phase 2) involve a route connection of approximately 800 kilometres between San Francisco and Los Angeles/Anaheim through the upgraded commuter rail corridors and systems (Phase 1) and extension of the HSR system to Sacramento and San Diego, representing the completion of the 1,300 kilometre state-wide system (Phase 2).

The costs of the expansions in Phase 1 are more within reach in terms of PPP market capacity and potentially passenger revenue based finance. It is expected that the ridership revenue generated from the Phase 1 stage may provide an opportunity to repay or finance future capital costs toward the completion of Phase 2.
All operations and maintenance of both Phase 1 and 2 are expected to be performed by private-sector third parties together with private investment.

The role of government

The United States Government, under the California High Speed Rail Act, formed the CHSRA, a California state agency which is to oversee the development of the HSR network. It authorised initial funding of $US9 billion in bond funds for HSR and $US950 million for complementary improvement in the State’s connecting systems. As the procuring authority, CHSRA will develop the specifications of the services to be procured. Once the procurement models have been selected, CHSRA will prepare the documentation and run the procurement process to select parties to fulfil other roles for the development of the HSR system.

The organisational structure proposed (shown in Figure 14), suggests that CHSRA will contract three separate entities to facilitate delivery of the infrastructure (InfraBuildCo), infrastructure operations (InfraCo), and train operations (Train Operating Company):

- InfraBuildCo is the entity responsible for the delivery of infrastructure, specifically for signals and systems integration, superstructure construction, substructure construction and the construction of stations and depots.
- InfraCo is the infrastructure operator. It will be required to oversee train dispatching/signalling, infrastructure maintenance, power provision and station operations and management. InfraCo will collect track access charges from the Train Operating Company which enables InfraCo to recover a portion of its capital costs.
- The Train Operating Company (TOC) will be responsible for passenger service, vehicle maintenance and vehicle procurement, however, it may choose to contract out a portion of its services to other parties. The TOC pays InfraCo track access charges for the use of the tracks which may include direct costs like traction power and infrastructure maintenance, and share of other costs for initial infrastructure construction, system expansions or renewal costs. Passenger demand risk may be shared between the TOC and InfraCo by structuring the track access charges on a per train basis.

Figure 23 shows the proposed institutional structure for the California HSR network.

Source: CHSRA
The institutional structure is still subject to agreement and approval by the Californian Government and therefore should be considered as a working arrangement potentially subject to future changes.

Observations
The CHSR project is still in the business case phase. The observations below are therefore purely based on what is reported in the current business case.

- The phased approach, proposed to be adopted to build the CHSR network, would enable the HSR system to be introduced to the market gradually and partially reduce the project risk.
- It is proposed that InfraCo will collect track access charges from the Train Operating Company. This may enable it to recover a portion of its capital costs. By structuring the track access charges on a per train basis, passenger demand risk may be shared between the train operating company and the infrastructure operator.

Procurement of vehicles is anticipated to lie with the Train Operating Company, and may be contracted either via a lease-based financing or a long-term service contract that follows a PPP structure to deliver and maintain the train sets over time. Train operations may be competitively procured via a franchising agreement.

Australian case studies
Over the last 15 years, Australian Governments’ infrastructure policy has primarily been focused on creating a competitive market where private and public suppliers can provide infrastructure efficiently. Although there is no existing HSR model in Australia, lessons learned from other rail developments or major infrastructure developments in other sectors may be instructive in a number of areas:

- Institutional and regulatory arrangements (including legislative arrangements) for major infrastructure projects of national significance.
- Role of Commonwealth, state and local governments and the role of IGAs in the delivery of major projects.
- Existing legislative arrangements and governance framework for the creation and operation of SPVs.

This section sets out relevant Australian case studies, based on desktop research, covering:

- AustralAsia Railway.
- National Broadband Network.
- Australian Upstream Petroleum Sector.
- National Electricity and Gas Codes.

AustralAsia (Alice Springs–Darwin) Railway
The Alice Springs-Darwin Railway comprises 1,420 kilometres of standard gauge track that commenced construction in July 2001 and was completed in 2004, well ahead of the schedule. The entire track network is now integrated with Darwin’s new East Arm Port, which includes a railway embankment and intermodal container terminal 51.

The project was assisted in part by a $191.4 million up-front Australian Government financial contribution. The South Australian and Northern Territory Governments also contributed up to $367.8 million to the project, and the rest of the estimated $1.3 billion cost was financed by the private sector.

In addition to the financial contribution, the Australian Government also agreed to lease the 830 kilometre line between Tarcoola (near Adelaide) and Alice Springs to the consortium selected to extend the line. Government support also came in the form of a balanced allocation of risks via the

concession deed, various protections, for example for native title, Aboriginal land rights, heritage and sacred site issues, pre-existing contamination and sponsorship and establishment of an ‘effective’ access regime until 2030 (required to remove the risk of subsequent regulatory intervention into access arrangements).

The project was managed by the AustralAsia Railway Corporation, an organisation set up by the South Australian and Northern Territory Governments. The AustralAsia Railway Corporation is a statutory body established under the **AustralAsia Railway Corporation Act 1996** and supported by the South Australian Government through complementary legislation. The Corporation was established in 1997 by the Northern Territory and South Australian Governments to manage the award of the Build, Own, Operate and Transfer back concession and associated contractual arrangements with the Asia Pacific Transport Company, the successful consortium for delivering the project.

The governments jointly guaranteed the Corporation’s obligations. The respective rights and obligations of the two governments were regulated by an IGA. The Corporation had negotiated a detailed concession deed which sought to identify risks that may arise during the project and balance these risks by apportioning appropriate responsibility for them.

**Observations**

- The crucial role that the government plays through financial contribution and joint guarantees.
- The project illustrated the role of IGAs between governments and the benefits of establishing a project development organisation jointly owned by multiple governments. This level of multi-layered government support demonstrates an example of how governments need to take a long-term view to ensure successful delivery of major infrastructure projects.

**National Broadband Network**

The National Broadband Network (NBN) rollout is one of the critical elements of the Australian Government’s national infrastructure agenda and aims to deliver broadband services to 88 per cent of homes and businesses.

NBN Co Ltd (NBN Co) is a wholly-owned Commonwealth Government business enterprise established to design, build and operate the project. The company is operated through the shareholding of the Minister of Broadband, Communications and the Digital Economy and the Minister of Finance and Deregulation. NBN Co will provide wholesale, open access network by making its wholesale services available to service providers on non-discriminatory terms.

Initially, $27.5 billion of funding for the NBN will come from the Australian Government, with the amount being paid back with a return over the life of the project. Other sources of funding are private capital and profits from operational earnings. Further, from 2015 additional funds will be raised from the domestic and international capital markets. It is expected that an estimated $13.4 billion will be raised either through project finance or the financial markets.

The **Telecommunications Act 1997** and the **Competition and Consumer Act 2010** regulate all telecommunications industry participants, including NBN Co. However, specific NBN Co requirements have been enacted by the following acts:

- **The National Broadband Network Companies Act 2011.** The key elements of the Act are:
  - The operations of NBN Co and functional separation of NBN Co and divestiture of assets by NBN Co.
  - NBN Co’s ownership/control arrangements for terminating Commonwealth ownership and the future sale of NBN Co.
  - NBN Co’s reporting obligations if the Commonwealth sells down its stake in the company.
  - Anti-avoidance obligations that ensure that NBN Co continues to meet its obligations.
The Telecommunications Legislative Amendment Act 2011. The key elements of the Act relate to amending the Competition and Consumer Act 2010 and the Telecommunications Act 1997 to:

- Introduce new access, transparency and non-discrimination obligations relating to the supply of NBN Co’s wholesale services.
- Extend technical and open access obligations to owners of other fast broadband networks.

These Acts implement policy commitments made by the government when it announced the NBN policy in 2009 that the NBN will operate on a wholesale only, open access and non-discriminatory basis thereby providing a platform for robust competition.

The supply of services is overseen by the Australian Consumer and Competition Commission (ACCC). As such, NBN Co cannot discriminate in the supply of services between access seekers, or in activities related to the supply of those services. NBN Co intends to supply its services under its Wholesale Broadband Agreement and to lodge a special access undertaking with the ACCC that will operate with the Wholesale Broadband Agreement.

Observations

- Government plays an important role in major infrastructure investment through funding and policy directives.
- The role of government-owned authorities in the planning, design and delivery of major infrastructure projects.
- The importance of government control and the gradual privatisation of NBN Co.
- Role of legislative amendments to ensure that all services supplied by NBN Co will be declared for third party access.
- The presence of regulatory regime – the approval of the special access undertaking that would establish the regulatory framework under which all access seekers would subsequently enter into access agreements with NBN Co.

Australian Upstream Petroleum Sector (Oil and Gas)

The upstream petroleum sector projects are complex, multi-jurisdictional in nature involving land access, environmental safety and community wellbeing issues. Accordingly, the regulatory framework for the sector involves more than one jurisdiction. The upstream petroleum sector includes exploration and appraisal, development, construction and production. For natural gas, the definition of upstream includes processing and delivery to export terminals or domestic gas transmission pipeline.

Currently, there is duplication and overlap between 22 different laws and 150 statutes governing upstream petroleum activities with project approvals taking longer than a streamlined approval process. Accordingly, the Productivity Commission conducted a review of Australia’s framework for regulating upstream petroleum activities and recommended ways for streamlining the regulatory approvals, while removing duplication between jurisdictions.

The existing regulatory framework governing the upstream petroleum sector emanates from the Australia’s federal system of government with powers shared between the Commonwealth, state and territory governments.

However, at present the regulatory arrangements are undergoing reform. The stakeholder consultation process generally supports the widespread reform process. The key recommendations for improving existing regulatory arrangements include:

- Reducing unnecessary delays, in particular, for heritage and environmental processes through statutory timelines, ensuring legislation objectives are clear with respect to guidelines for project approvals and assessment.

• A staged establishment of a new national regulator while providing state and territory
governments the option of conferring their responsibilities on a bilateral basis.

• A national safety authority to remain a separate entity with an exclusive focus on
occupational health and safety regulation.

Australia has adopted a 'sector-specific legislative system' for regulating petroleum projects i.e.
petroleum legislation sets out predetermined conditions under which the rights to explore for, and
extract petroleum resources are granted by means of standard licences and leases\(^{53}\). A similar
approach has been taken in Canada and the United States. Further, a large part of the legislative
arrangements relates to environmental, heritage, native title and land rights legislation.

According to a study conducted by Daintith, the Australian regulatory regime for upstream petroleum
activities involves administrative rules embedded in legislation\(^{54}\). The regime operates by prohibiting
certain activities and then granting businesses the administrative authority to carry out operations
under the relevant regulatory provisions. Further, the Australian regime also involves delegation of
regulatory powers and responsibilities to government departments and agencies. A large proportion of
legislation relates to environment, heritage, development and local government, and native title and
land rights.

The Productivity Commission report summarises some of the desirable objectives for an institutional
model as follows:

• Separation of policy formulation and advice from regulatory administration where possible.

• Avoiding multiple approvals or assessment processes between jurisdictions.

• Minimising inconsistencies in legislative requirements and decision making processes.

• Minimising overlapping administration by multiple agencies.

• Ensuring that regulators are independent, accountable and have clear objectives.

Observations

• There is a trend towards clear separation of policy formulation from regulatory administration. The Productivity Commission maintains that the benefits include improved credibility, stability and consistency in regulatory decisions with independent regulators operating at arm’s length from Ministers.

• Another trend that has emerged is the move towards an objective-based regulation rather than prescriptive legislation.

• Clear and simple approval process will assist industry participants in managing their investments and associated regulatory risks.

National Electricity and Gas Codes

Observations from the electricity/gas market reforms address the question of whether the development
of effective regulatory arrangements with good governance arrangements remains a viable strategy for
increasing competition and investment in infrastructure industries.

In 2003, the Council of Australian Governments agreed to establish a new regulatory framework for
the energy sector. The new framework included a suite of reforms that related to governance and
institutions, economic regulation, electricity transmission, user participation and gas market
development.

As a part of these reforms since mid-2005, the Australian Energy Market Commission (AEMC) and the
Australian Energy Regulator (AER) have the responsibility for oversight and regulation of the national
electricity market. AER has the responsibility for the enforcement of, and monitoring compliance with,

\(^{53}\) K Hossain, Law and Policy in Petroleum Development: Changing Relations between Transnationals, Frances Pinter,

\(^{54}\) T Daintith, Discretion in the Administration of Offshore Oil and Gas: A Comparative Study, Australian Resources and Energy
the rules, together with the responsibility for economic regulation of electricity transmission. The AER also issues infringement notices for certain breaches of the National Electricity Law and Rules, and is the body responsible for initiating court proceedings. The AEMC is responsible for rule making and market development.

A MoU between the ACCC, the AER and the AEMC guides interaction between these three bodies and their function in the Australian Energy market.

Market regulation: The AER is the statutory commission, comprising two State-appointed members and a representative from the ACCC, funded by an MCE-approved industry levy. It is a ‘constituent part’ of the ACCC but operates as a separate legal entity.

Further, the AER will initially be responsible for the regulation of electricity transmission and the electricity wholesale market in the national electricity market jurisdictions, with its role being extended to Western Australia and the Northern Territory with the agreement of those jurisdictions. By 2005, the AER assumed responsibility for the regulation of gas transmission in all jurisdictions other than Western Australia (unless Western Australia otherwise agrees).

The AER took over:

- The ACCC’s role in regulating transmission access, including the regulation of electricity transmission prices.
- The role of National Electricity Code Administrator Limited (NECA) in monitoring compliance with, and enforcing, the National Electricity Code – the National Electricity Tribunal will be abolished and the AER will have to apply to the courts for the imposition of a penalty for a breach of the Code (it is unclear what body will perform the Tribunal’s current role in reviewing decisions of the National Electricity Market Management Company Limited and NECA under the National Electricity Code).

The creation of the AER mainly entails combining functions previously performed by the ACCC and NECA into a single regulatory body.

Rule-making and market development: The AEMC is a statutory commission, comprising two state-appointed members and a Commonwealth-appointed member. Like the AER, it is funded by an MCE-approved industry levy. The AEMC assumed responsibility for the process of changing the National Electricity Code (and, following the MCE’s consideration of the Productivity Commission’s review of the National Gas Access Regime, the National Gas Code). It will not be able to initiate substantive code changes itself, but will be required to consider proposed code changes submitted by market participants, user representatives, market operators and government. This will involve the AEMC undertaking a consultation process and establishing working groups to achieve maximum stakeholder agreement for proposed code changes. The AEMC will have the power to reject, amend or approve proposed code changes with written reasons, applying a ‘net benefit’ test based on the achievement of the market objectives (including the long-term interests of consumers). The AEMC will also be required to undertake reviews as directed by the MCE.

There is no doubt that one of the areas in urgent need of reform is the process for changing the National Electricity Code. Most proposed changes to the Code (other than derogations) currently need to be evaluated by the Code Change Panel, agreed by NECA and then approved by the ACCC. The role of the ACCC in the code change process is a critical issue. The current problem of regulatory duplication will be perpetuated by requiring ACCC approval of code changes that have already been approved by the AEMC.

However, the MCE is clear that the ACCC will retain responsibility for competition-related code-change authorisations and for industry access-related code-change approvals. However, the MCE is keen to see a more streamlined code change process based on:

- Consultation and cooperation between the AEMC and the ACCC under an MCE-endorsed MoU that will address, among other things, the circumstances in which the ACCC may undertake its own consultation on any proposed code changes.
- The AEMC being required to ‘assess and report on’ the competition and access impacts of proposed code changes, to ‘advise’ the ACCC (on request) on proposed code changes and to ‘assist’ the ACCC in considering whether to authorise or approve such code changes.
The ACCC having the ‘discretion’ not to seek submissions or undertake consultation in relation to proposed code changes but merely to rely on the submissions received and consultation undertaken by the AEMC (the Trade Practices Act being amended to confer this discretion on the ACCC).

**Policy-making:** Since July 2004, the MCE is the body responsible for energy market policy making.

**Observations**

- The energy industry saw establishment of a national energy regulator with the regulatory arrangements instituted under a new IGA between various jurisdictions.
- Generally, reliance on IGAs and cooperative legislation was required for the establishment of a national framework.
- The new framework is designed to improve accountability, streamline decision-making and remove unnecessary duplication of regulatory processes. It is also designed to provide an appropriate balance between development and implementation of energy market rules, industry regulation and general competition regulation.
Appendix 7B

Implementation plan
Appendix 7B

Implementation plan

Prepared for
Department of Infrastructure and Transport

Prepared by
AECOM Australia Pty Ltd
Level 21, 420 George Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
T +61 2 8934 0000  F +61 2 8934 0001  www.aecom.com

March 2013

AECOM in Australia and New Zealand is certified to the latest version of ISO9001 and ISO14001.

© AECOM Australia Pty Ltd (AECOM). All rights reserved.

In accordance with the east coast high speed rail (HSR) study terms of reference, AECOM and its sub-consultants (Grimshaw, KPMG, SKM, ACIL Tasman, Booz & Co and Hyder, hereafter referred to collectively as the Study Team) have prepared this report (Report). The Study Team has prepared this Report for the sole use of the Commonwealth Government: Department of Infrastructure and Transport (Client) and for a specific purpose, each as expressly stated in the Report. No other party should rely on this Report or the information contain in it without the prior written consent of the Study Team.

The Study Team undertakes no duty, nor accepts any responsibility or liability, to any third party who may rely upon or use this Report. The Study Team may also have relied upon information provided by the Client and other third parties to prepare this Report, some of which may not have been verified or checked for accuracy, adequacy or completeness. The Report must not be modified or adapted in any way and may be transmitted, reproduced or disseminated only in its entirety. Any third party that receives this Report, by their acceptance or use of it, releases the Study Team and its related entities from any liability for direct, indirect, consequential or special loss or damage whether arising in contract, warranty, express or implied, tort or otherwise, and irrespective of fault, negligence and strict liability.

The projections, estimation of capital and operational costs, assumptions, methodologies and other information in this Report have been developed by the Study Team from its independent research effort, general knowledge of the industry and consultations with various third parties (Information Providers) to produce the Report and arrive at its conclusions. The Study Team has not verified information provided by the Information Providers (unless specifically noted otherwise) and it assumes no responsibility nor makes any representations with respect to the adequacy, accuracy or completeness of such information. No responsibility is assumed for inaccuracies in reporting by Information Providers including, without limitation, inaccuracies in any other data source whether provided in writing or orally used in preparing or presenting the Report.

In addition, the Report is based upon information that was obtained on or before the date in which the Report was prepared. Circumstances and events may occur following the date on which such information was obtained that are beyond the Study Team's control and which may affect the findings or projections contained in the Report, including but not limited to changes in 'external' factors such as changes in government policy, changes in law; fluctuations in market conditions, needs and behaviour; the pricing of carbon, fuel, products, materials, equipment, services and labour; financing options; alternate modes of transport or construction of other means of transport; population growth or decline; or changes in the Client's needs and requirements affecting the development of the project. The Study Team may not be held responsible or liable for such circumstances or events and specifically disclaim any responsibility therefore.
## Quality Information

<table>
<thead>
<tr>
<th>Document</th>
<th>Appendix 7B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ref</td>
<td>60238250-6.0-REP-0601-7B</td>
</tr>
<tr>
<td>Date</td>
<td>March 2013</td>
</tr>
</tbody>
</table>
Table of Contents

| 1.0 | Introduction | 1 |
1.0 Introduction

This appendix provides a detailed delivery program for Line 1 of the preferred HSR system (see Figure 1). The program is summarised in Chapter 12 of the main report and Appendix 4A. The program here provides more detail for the construction, testing and commissioning activities that comprise the overall delivery program.
DETAILED IMPLEMENTATION PROGRAM - LINE 1 STAGE 1

ID | Task Name | Dur | Date
---|-----------|-----|-------
53 | CIVIL WORKS DESIGN & CONSTRUCTION (Syd to Can) | 82 months | 2012
54 | Section 1 - Sydney Central Station | 82 months | 2013
55 | Section 1 Design | 24 months | 2014
56 | Section 1 Construction | 58 months | 2015
57 | Section 2 - Sydney Tunnel (Sub Section 1) | 72 months | 2016
58 | Section 3 - Sydney Tunnel (Sub Section 2) | 66 months | 2017
59 | Section 4 - Sydney Tunnel (Sub Section 3) | 66 months | 2018
60 | Section 5 - Glenfield to Douglas Park | 66 months | 2019
61 | Section 6 - Douglas Park to Yerrinbool | 66 months | 2020
62 | Section 7 - Yerrinbool to Exeter | 58 months | 2021
63 | Section 8 - Exeter to Medway Jcn / Marulan | 58 months | 2022
64 | Section 9 - Medway Jcn / Marulan to Goulburn Airport | 62 months | 2023
65 | Section 10 - Goulburn Airport to Larida Road | 70 months | 2024
66 | Section 11 - Larida Road to Gundaroo | 70 months | 2025
67 | Section 12 - Gundaroo to Canberra | 62 months | 2026
68 | E& M DESIGN, MANUFACTURE & INSTALLATION (Syd to Can) | 102 months | 2027
69 | Systems Design Period | 15 months | 2028
70 | Systems and Equipment Manufacturing - Stage 1 | 25 months | 2029
71 | Depots Site Preparation | 10 months | 2030
72 | Depots Construction | 24 months | 2031
73 | Systems and Equipment Delivery | 12 months | 2032
74 | E&M Systems Installation | 18 months | 2033
75 | System Installation Completion | 0 months | 2034
76 | POWER GRID SUPPLY (Syd to Can) | 53 months | 2035
77 | Power Study | 13 months | 2012
78 | Power Implementation | 40 months | 2013
79 | ROLLING STOCK (Syd to Can) | 53 months | 2014
80 | Rolling Stock Manufacture - Line 1 Stage 1 | 20 months | 2015
81 | Rolling Stock Delivery - Line 1 Stage 1 | 36 months | 2016
82 | PPP STATION (Sydney South, Southern Highlands & Canberra) | 49 months | 2017
83 | Tender Process for PPP Stations | 8 months | 2018
84 | Award of PPP Stations Contract | 0 months | 2019
85 | Design & Construction of PPP Stations | 40 months | 2020
86 | TRACKWORK CONSTRUCTION (Syd to Can) | 19 months | 2021
87 | Section 2 - Sydney Tunnel (Sub Section 1) | 9 months | 2022
88 | Section 3 - sydney tunnel (sub section 2) | 9 months | 2023
89 | Section 4 - Sydney Tunnel (Sub Section 3) | 9 months | 2024
90 | Section 5 - Glenfield to Douglas Park | 9 months | 2025
91 | Section 6 - Douglas Park to Yerrinbool | 9 months | 2026
92 | Section 7 - Yerrinbool to Exeter | 9 months | 2027
93 | Section 8 - Exeter to Medway Jcn / Marulan | 9 months | 2028
94 | Section 9 - Medway Jcn / Marulan to Goulburn Airport | 9 months | 2029
95 | Section 10 - Goulburn Airport to Larida Road | 9 months | 2030
96 | Section 11 - Larida Road to Gundaroo | 9 months | 2031
97 | Section 12 - Gundaroo to Canberra | 9 months | 2032
98 | TESTING & COMMISSIONING (Syd to Can) | 34 months | 2033
99 | Staff Training (Drivers etc) | 18 months | 2034
100 | Static Testing | 6 months | 2035
101 | Test Track (dynamic testing) | 6 months | 2012
102 | Test Running | 6 months | 2013
103 | Trial Operations | 6 months | 2014
104 | Commence Operations - Sydney to Canberra | 0 months | 2015

Detailed Implementation Program - Line 1 Stage 1 Page : 2 of 2