8.0 Passenger trains

Summary

- Reliable, frequent and fast passenger trains are essential to the economic success of NSW and to the amenity of life, particularly in Global Sydney. The rail system must become world class, financially sustainable and attractive to commuters in Sydney and neighbouring regions.
- Infrastructure NSW endorses the three tier railway strategy developed by Transport for New South Wales (Transport for NSW) as the basis for rail infrastructure investment, including the North West Rail Link (NWRL). Once implemented, the rail system will comprise:
  - a rapid transit network using single deck trains operating at high frequency across the day
  - a suburban network using double deck trains providing high seating capacity, and with a particular focus on the commuter market
  - an intercity network serving the Central Coast/ Hunter, Illawarra and Blue Mountains, offering fast and comfortable services
- Additional capacity will be required in the core of the network, particularly the CBD, over the next 20 years. Existing assets must be used as intensively as possible before constructing new major infrastructure in the long term.
- Accordingly, the recommended strategy proposes increased use of the City Circle to provide additional capacity in the CBD within 10 years.
- Beyond year 10, the extension of rapid transit from the NWRL over the Sydney Harbour Bridge and through the Inner West to Strathfield is proposed. This approach requires the modernisation of existing lines as well as Wynyard and Town Hall stations.
- An incremental program to accelerate the intercity routes is proposed, with a target of one hour journey times to Sydney from both Gosford and Wollongong, and a two hour journey time from Newcastle. The focus of the program will be operational improvements supported by targeted capital works to reduce journey times.
- Planning for an extension of the Eastern Suburbs Railway to Randwick and Maroubra is recommended after year 10, in conjunction with land use intensification in South East Sydney.

8.1 Snapshot

- The passenger rail network of over 1,000 route kilometres and approximately 300 stations is to be split between Sydney Trains in the metropolitan area and NSW Trains elsewhere.
- The core fleet of about 220 eight car electric train sets provides around 2,500 trains services each weekday, travelling at an average speed of 40 kilometres per hour.
- Current infrastructure, buildings and equipment are recorded at a book value of over $20 billion[1].
- 44 percent of journeys to work in the CBD are by rail (refer Section 3). However, rail comprises only 5.3 per cent of all journeys in the Sydney region[2].
- Over the past 20 years, rail demand in Sydney has grown at a little over one percent per annum, effectively tracking general population growth. By comparison, rail patronage has grown by over five percent per annum in Melbourne and four percent per annum in London over the same period.
- Demand for rail services is forecast to increase 37 per cent over the next 20 years[3].
- The condition of RailCorp's infrastructure has been assessed as very good (refer Section 2).
- In 2010-11, the total cost of running the railway was $3.5 billion, compared with farebox revenue of only $700 million. In the four years from 2006-07 to 2010-11, operating expenses increased by $588 million, while farebox revenue increased by only $136 million[4].

1 NSW Treasury, 2012-13 Budget Paper 4; asset values as at 30/06/11 excluding land, tunnels and other excavations prior to 2000.
2 NSW Bureau of Transport Statistics 2012, Transport Facts.
3 NSW Bureau of Transport Statistics 2011, Rail Options for the Sydney Greater Metropolitan area, Draft Options Paper.
4 RailCorp 2011, Annual Report 2010-11.

Table 8.1 Cost Recovery Ratios in a Sample of Cities

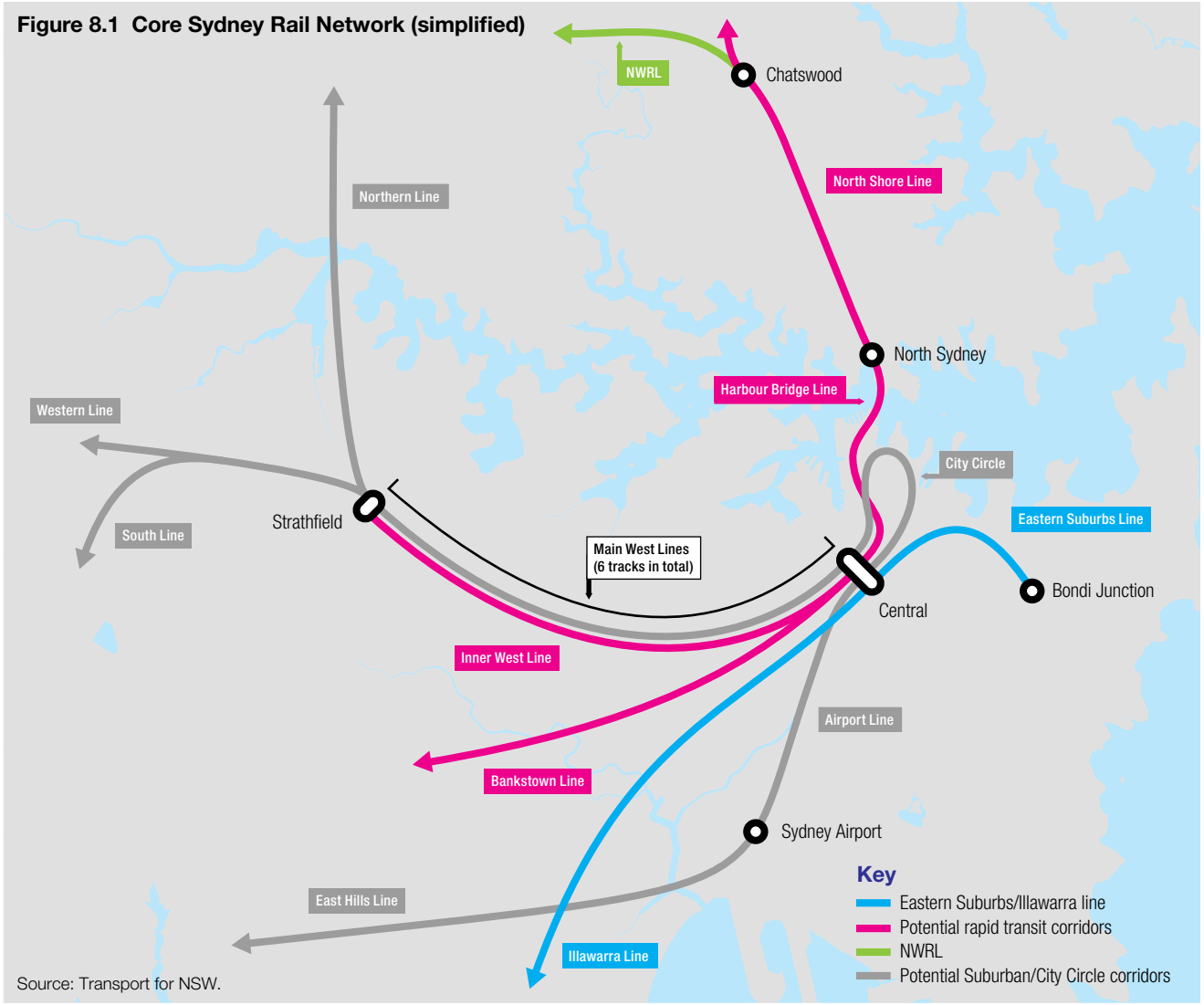
	Cost Recovery (%)	Year of data
Sydney (RailCorp)	20%	2010-11
London (London Underground)	75%	2009-10
Montreal (Metro)	57%	2006-07
New York (Metropolitan Transit Authority)	56%	2009-10

Sources: RailCorp 2011, Transport for London 2010; Societe de Transport de Montrèal; Metropolitan Transport Authority.

- Government railway subsidies in NSW significantly exceed international norms, as shown in Table 8.1. Each trip currently costs the NSW taxpayer around $9.45, compared with $6.81 only four years ago[5].
- The configuration of the Sydney rail network is shown in Figure 8.1.
- The network exhibits strong demand peaks on weekday mornings and evenings, partly reflecting the relative lack of demand management strategies. Figure 8.2 summarises demand at CBD stations across the week. Similar patterns exist at other major Sydney centres.
- The peak passenger flows on the network occur between 8am and 9am on weekdays. Platform crowding most often occurs at Town Hall, Wynyard and Central in the evening peak.

5 RailCorp 2011, Annual Report 2010-11.

Figure 8.1 Core Sydney Rail Network (simplified)



Source: Transport for NSW.

8.2 Infrastructure NSW's approach

The Government has recognised that the current subsidy of passenger rail places an unsustainable burden on the taxpayer, and diverts funds which otherwise could be invested in new infrastructure. In February 2012, Transport for NSW announced a reform of RailCorp to return the passenger railway to a more sustainable financial position and improve services to customers.

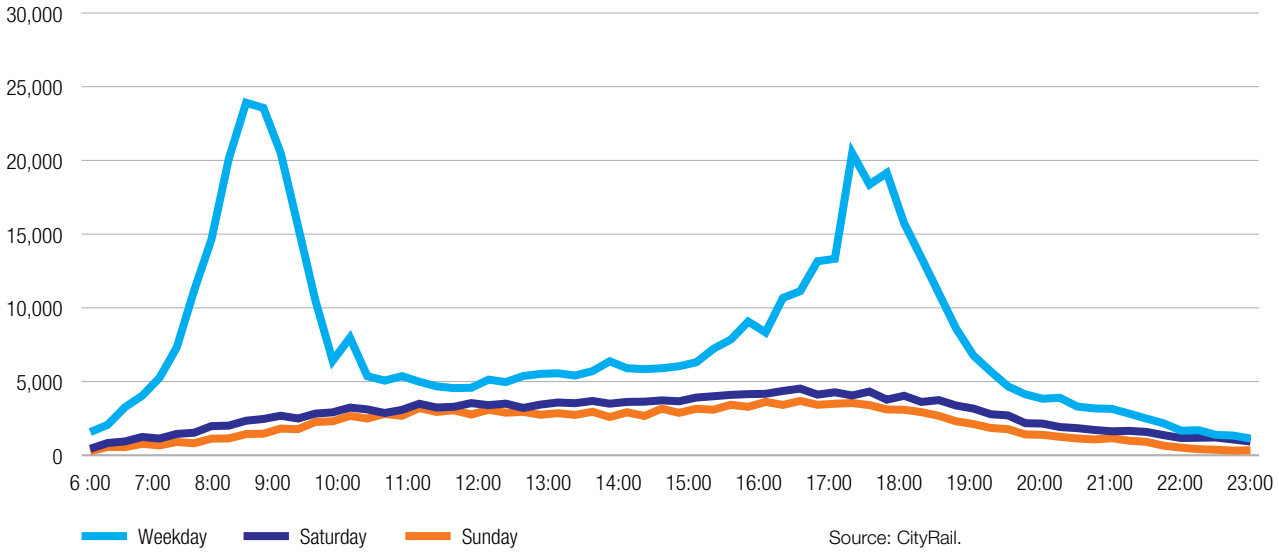
Infrastructure NSW considers that the passenger rail network should first achieve best practice operating performance and then develop an investment program that is realistic and affordable.

This approach is consistent with the plans for operational reform of RailCorp and the strategic principles set out in the 'Sydney's Rail Future' announcement June 2012.

Given that congestion issues are concentrated within a short period of the day and on a relatively small part of the network, Infrastructure NSW has focused on targeted opportunities to provide additional capacity and manage demand.

This section is concerned with the Sydney passenger rail network. Transport services in Regional NSW are covered in Section 10.

Figure 8.2 CBD Station Entries and Exits by Time of Day



Source: CityRail.

8.3 The high capacity railway

8.3.1 Sydney's Rail Future

The rail strategy in the Draft Transport Master Plan is based on "Sydney's Rail Future", released by Transport for NSW in June 2012. Sydney's Rail Future sets out a vision for the modernisation of the metropolitan rail network to provide more capacity.

The first two stages of 'Sydney's Rail Future' focus on operational and network efficiencies, which are fully endorsed by Infrastructure NSW. Using existing rolling stock, these efficiency changes will reduce train delays at busy CBD stations and thereby enable the operation of more closely-spaced services to give a higher capacity system.

The later stages of Sydney's Rail Future involve more radical changes including a three tier railway and a second harbour crossing. The proposed three tier railway comprises:

- a rapid transit network utilising single deck trains operating to a turn-up-and-go service pattern
- a suburban network using double deck trains on the majority of the existing network
- an intercity network serving the Central Coast, Hunter, Blue Mountains and South Coast, using comfortable double deck trains.

Infrastructure NSW believes that the concepts underlying Sydney's Rail Future form a sound basis for increasing network capacity and delivering the Government's commitment for the NWRL.

8.3.2 Capacity on the suburban network

The current operations of CityRail provide a range of suburban and intercity services. Selected one hour peak flows into Sydney's CBD are shown in Table 8.2.

Table 8.2 Peak hour train loadings

	Measured at	Passengers - 1hr AM peak	Up tracks
Main West Lines[a]	Redfern	39,700	3
Illawarra	Sydenham	16,500	1 – 2
North Shore	Sydney Harbour Bridge	14,300	1
Bankstown & East Hills via Sydenham	Redfern	11,100	1
East Hills via Airport	Wolli Creek	7,500	1
Eastern Suburbs	Kings Cross	7,400	1

Source: CityRail.
[a] 'Main West Lines' includes Western, Northern, South, Inner West and Intercity services using the route between Strathfield and Central.

The Main West Lines carry the highest number of passengers, but have the benefit of a six track alignment from Strathfield to Central. However, capacity is currently constrained because:

- the service pattern results in a number of bottlenecks
- services are compressed from three lines into two lines North of Central (relatively few trains terminate at Central).

The peak load from the Main West Lines into the CBD is around 17,000 per line per hour (34,000 passengers across two lines). The loads on other lines are all below this level. Peak traffic over the Sydney Harbour Bridge is currently around 14,000 per hour (compared with the 16,000 peak hour flow on buses using lane seven of the bridge), although it is expected to increase to around 20,000 per hour per line in the peak after the NWRL opens in the next decade.

The Airport Line carries relatively few passengers; trains are crowded since only eight trains operate in the peak hour. The Eastern Suburbs railway is the most underutilised line, reflecting its limited catchment area of three stations. An opportunity to use this infrastructure more intensively is considered in Section 8.6.

International benchmarking also indicates that Sydney's existing lines carry far fewer passengers in peak periods than many railways overseas, as shown in Table 8.3.

Table 8.3 International Capacity Comparators

System	Trains per hour	Max people per sqm	Total line capacity (people per hour)
Sydney CityRail	19 – 20	2.5	24,000
Paris RER (line A)	25 – 26	3 – 3.5	40,000
Munich S Bahn	28	4	45,000
Hong Kong MTR	30	4 – 5	60,000

Source: Transport for NSW.

Taken together, the data in Tables 8.2 and 8.3 indicates that the network is not running at or near capacity in an absolute sense. This finding is supported by work undertaken by Interfleet Technology for Infrastructure NSW, which identifies a range of potential 'quick wins' to add more capacity at peak periods.

Accordingly the problem of rail capacity needs to be primarily understood in terms of unlocking latent capacity. The existing network ought to be able to provide peak capacity of up to 40,000 per line per direction.

8.3.3 Capacity within the CBD

Rail services in the CBD use the Harbour Bridge Line (linking Main West and North Shore services via Town Hall and Wynyard) and the City Circle.

The Harbour Bridge Line experiences significant congestion under the current service pattern. This arises because it has heavy passenger flows in both directions, including a large number of interchanging passengers, and intervals between services can be irregular.

However in contrast the City Circle is relatively lightly used. This situation has existed since the opening of the Eastern Suburbs Line in 1980. At present the City Circle carries 29 trains in the PM peak hour compared to 48 trains per hour in 1972[6]. The spare train paths in the City Circle could carry around 25,000 extra passengers in the peak hour.

The busiest CBD stations are Town Hall and Wynyard as summarised in Table 8.4.

6 CityRail, December 1971 Metropolitan Timetable.

Table 8.4 CBD Station Utilisation

Station	Platforms	Station Entries – PM Peak (15:00 – 18:30)
Town Hall	6	39,000
Wynyard	4	33,000
Martin Place	2	12,000
Circular Quay	2	8,000
St James	2	4,000
Museum	2	6,000
Total	18	102,000

Source: CityRail.

Severe congestion is generally limited to two of the 18 CBD platforms; that is, Platform 2 at Town Hall and Platform 3 at Wynyard for around one hour in the PM peak. While operational factors play a part, the service pattern aggravates the situation because:

- the largest flow of interchange passengers alighting in the CBD (from the North Shore) directly conflicts with the largest number of passengers boarding in the CBD (for the Main West)
- Main West passengers can only board at two of the CBD stations.

Despite the steady increase in congestion on the Harbour Bridge Line at Wynyard and Town Hall, no attempt has been made to redistribute traffic towards the surplus capacity on the City Circle. Circular Quay, St James and Museum stations are currently used by very few passengers.

Rail capacity enhancement strategies over the past decade have focussed on the construction of a new line through the CBD – either a second harbour rail crossing, or a "relief" line from Central to Wynyard. As discussed further in Section 8.3.5, these proposals have very high capital costs. Unlocking the spare capacity in the City Circle could potentially deliver congestion relief much sooner and at a much lower cost.

The Bradfield-era flying junctions outside Central provide the basic infrastructure needed to feed more trains into the City Circle. However, this change would have significant operational implications, which are the responsibility of Transport for NSW.

Given the operational implications of restructuring the service pattern to increase utilisation of the City Circle, Infrastructure NSW has not commissioned detailed work on the options in this area itself.

Recommendation Infrastructure NSW recommends an independent study of options to use the City Circle to provide additional CBD capacity in the medium term. This will require detailed analysis of the infrastructure and operational implications.

8.3.4 Rapid Transit Services

Infrastructure NSW fully endorses Transport for NSW's proposal to progressively introduce rapid transit services using single deck trains onto parts of the network, starting with the NWRL. The rapid transit services will provide turn-up-and-go frequencies and complement the double deck services on the legacy commuter network.

In the longer term, single deck trains offer the potential to cost-effectively increase network capacity, particularly on the Harbour Bridge Line. The potential capacity increases available are indicated in Table 8.5.

Table 8.5 Indicative passenger capacity of double deck and single deck train systems

	Train capacity[1]	Seats per train	Trains per hour	Total passengers per hour
Double deck	1,200	890	20	24,000
Single deck – comfortable[1]	1,200	600	30	36,000
Single deck metro – max[2]	2,000	400	30	60,000

[1] Double deck assumes a nominal capacity of 1200 people with seating in line with Waratah train specifications. Planned frequency of 20 tph across the harbour bridge from Sydney's Rail Future. Single deck 'high seating' capacity could have 500-600 seats (Source: Halcrow 2011), single deck would be based on standard international design with 3 doors per side.

[2] Source: MTR for Transport for NSW.

Single deck trains are able to operate at higher frequencies because delays at stations from passenger boarding and disembarking are less than with a double deck fleet. Higher frequencies will require the introduction of new train control systems, using technology that is proven in service overseas.

Table 8.5 evidences that single deck rolling stock could provide over 50 percent more capacity than current services, which is enough to meet demand for several decades if demand continues to grow at its historic rate of just over one percent per annum.

8.3.5 Network Design Issues

'Sydney's Rail Future' envisages that the rapid transit network will connect the NWRL with the Bankstown Line and the Illawarra Line as far as Hurstville, via a second harbour crossing and a new line through the CBD.

Infrastructure NSW acknowledges that this scheme represents one solution to the long term capacity challenges in the CBD. However in the absence of detailed cost estimates and economic analysis, it is unclear whether the proposed scheme is the best value-for-money solution to the problem.

The cost of the second harbour crossing scheme will exceed $10 billion and funding may not be available for many years. Further, the utilisation of rapid transit both south and west of the CBD appears sub-optimal. The current proposal will serve the Bankstown Line, which carries only 6,600 passengers in the peak hour, and part of the Illawarra Line which already has good access to the CBD via the Eastern Suburbs Line.

By contrast the heaviest traffic flows outside the CBD occur on the six-track Main West Lines between Strathfield and Central. The development work undertaken on the West Metro project, indicated that this corridor through the Inner West could offer a strong market for rapid transit services.

Accordingly, Infrastructure NSW has considered what other options may exist to bring the benefits of rapid transit to more customers, sooner and at lower cost.

8.3.6 An Alternative Approach

The alternative approach is to introduce rapid transit services on to the existing network. Services on the NWRL would be extended into the CBD using the existing Harbour Bridge Line. Trains would then continue on the existing Inner West Line from Central to Strathfield.

This approach would provide high capacity metro-style services on the most congested part of the network from Strathfield to Chatswood via the CBD. The target capacity for the rapid transit lines would be 40,000 passengers per direction per hour. It would allow passengers from the NWRL to travel to the CBD without interchanging at Chatswood.

Additionally, once rapid transit is introduced on the Inner West Line, the other four lines between Strathfield and the City could be exclusively used as express lines. This would mean faster and more frequent services to the CBD for passengers on the Western, Northern and South Lines.

Based on an initial scoping, this scheme would require:

- re-signalling of the North Shore, Harbour Bridge and Inner West Lines
- junction remodelling outside Central to link the Harbour Bridge and Inner West Lines
- new single deck rolling stock
- upgrades of Wynyard and Town Hall interchanges as part of the CBD Transit Improvement Plan discussed in Section 7.

Reconfiguring the network in this way is a complex matter and careful attention must be paid to disruption impacts. However, the delivery of the Thameslink project through central London shows that modernisation and expansion of an operating railway can be a viable alternative. A pre-condition for success will be completion of Transport for NSW's reforms to establish a rail operation capable of managing major changes.

Recommendation Infrastructure NSW recommends the introduction of metro-style rapid transit services between Chatswood and Strathfield via the Sydney Harbour Bridge, to allow direct running of trains from the NWRL to the CBD and free up capacity for faster and more frequent trains from the West.

Implementation of the recommendations in relation to the City Circle and rapid transit could deliver a three tier railway in the following form during the 2020s:

- single deck rapid transit via the Sydney Harbour Bridge – serving the NWRL, North Shore, Inner West and Bankstown
- double deck suburban via City Circle – serving the Main West, Main South and East Hills – and via the Eastern Suburbs/Illawarra Line
- intercity to Sydney Terminal – serving the Central Coast, Hunter, Illawarra and Blue Mountains.

8.4 Mainline acceleration program

8.4.1 Introduction

The average trip on CityRail takes around half an hour and covers a distance of slightly under 20 kilometres. For these journey types, frequency and reliability of service are more important than speed.

However, there are significant markets where journey time is a more important driver of demand. These include the Central Coast, Hunter and Illawarra. Faster trains to these destinations would effectively expand the catchment area from which people can access jobs in Global Sydney and spread our growing population across a larger area.

Gosford and Wollongong are both 80 kilometres from Sydney. Express services currently take around 80 minutes from Gosford and 90 minutes from Wollongong, which limits the size of the commuter market. CityRail express services from Newcastle to Sydney generally take around two hours and 40 minutes, which is slower than the pre-war "Newcastle Flyer" steam train.

Based on international comparators, Infrastructure NSW considers that reductions in intercity journey times would be likely to stimulate considerable demand growth. Journey times to Sydney of one hour from the Central Coast and Illawarra, and two hours from Newcastle, would require services to operate at an average speed of 80 kilometres per hour.

8.4.2 Incremental Approach

Funding constraints and the limited size of the market are likely to preclude the transformational approach of a new high speed line for at least 20 years. Accordingly, Infrastructure NSW's proposed strategy is an incremental approach that seeks to deliver progressive reduction in journey times year by year. The emphasis in early stages will be on operational changes, including tighter timetabling and fewer intermediate stops.

Opportunities to increase actual running speeds on the main lines should be carefully re-examined from the bottom up, with a focus on identifying time savings which can be captured without major capital expenditure. Once these gains have all be achieved, higher cost improvements can be considered to increase speeds, such as signalling upgrades, new trackwork and new rolling stock.

The existing lines to the North and South will never be fit for true high speed operation, given the topological constraints on the Illawarra escarpment and the Hawkesbury River crossing. However a target average speed of 80 kilometres per hour can accommodate some speed restrictions and does not require a 350 kilometres per hour high speed line.

An example of what can be achieved through incremental change is provided by Chiltern Railways in the UK. Chiltern operates a secondary line between London and Birmingham, a distance of 180 kilometres. Through a program of incremental improvement over the last 15 years, journey times have been reduced from two hours 20 minutes to one hour, 40 minutes[7]. These reductions have been achieved on an operating railway, with relatively low levels of capital expenditure.

Recommendation The new NSW Trains should be given an objective of identifying and delivering journey time savings with a target of one hour journey times from Wollongong and Gosford to Central, and a two hour journey time from Newcastle to Central.

A phased approach is recommended:

- A pilot program for acceleration on the South Coast Line between Sydney and Wollongong over the first five years, to develop the new approach without interfering with the core of the network
- Extension of the concept to the Central Coast between years 5 and 10, with further incremental improvements to Wollongong services
- More capital works after year 10, and extension of the program to Newcastle services.

8.5 Demand side strategies

8.5.1 Peak Hour Pricing

Rail patronage is extremely 'peaky', particularly between 8am and 9am on weekdays. Abundant spare capacity exists in the off peak and at weekends. Price signals offer an option for managing demand in the peak.

7 Chiltern Railways, Network Rail timetables.

The anticipated impact of more differentiation between peak and off peak fares would be 'peak spreading', where some passengers choose to change the time of their journey earlier or later. The introduction of the Opal card provides the technology to allow a tailored pricing scheme to be introduced in the CBD.

Targeted peak price signals could provide a material contribution to the strategy for managing growing demand. Modelling suggests that a fare structure with a 25 percent peak surcharge for customers arriving at CBD stations between 8 am and 9 am, along with a 25 per cent discount for those arriving before or after this window, could reduce peak hour demand by about 10 percent, or potentially one to two train loads on each line[8].

Recommendation Infrastructure NSW recommends that the Government considers strengthening off-peak travel price incentives following the introduction of the Opal card. The objective of any changes will be to spread demand in the CBD more efficiently.

8.5.2 Building Off-Peak Patronage

The introduction of clearer peak / off-peak price signals would form the starting point for a broader and more pro-active approach to increasing off-peak patronage. Complementary measures to support this could include:

- providing more frequent services in the "shoulder period" (i.e. just before 8 am and just after 9am)
- 'Clockface' service frequencies across the day
- Rewarding regular travel in the off-peak, through bonuses to Opal card accounts.

Promoting off-peak and contra-flow patronage extracts more value from currently poorly utilised infrastructure, defers the need for expensive new capacity, and can also help provide "city shaping" benefits that bring more balanced travel patterns.

For example, consistent off-peak services to Parramatta (improving on the current three to 16 minute variability in service intervals) could contribute to employment growth in this key centre.

Recommendation Infrastructure NSW recommends that Sydney Trains operate an express train service between the CBD and Parramatta across the day, with a turn-up-and-go frequency level.

8.6 Network expansion

8.6.1 Assessing Growth Schemes

The rail infrastructure priorities over the next decade will be better utilisation of the existing asset base, and delivering the NWRL. Once these objectives have been achieved, consideration can be given to investment in further network expansion. Infrastructure NSW has considered where planning for longer term expansion should best be directed.

A starting point is to examine areas of relatively high population density with strong demand for travel to a major centre. Unless there is a very substantial change in employment patterns and mode choice, this indicates consideration of new lines connecting Inner Sydney to the CBD. The principal corridors of interest comprise:

- Victoria Road – Anzac Bridge – CBD
- Parramatta Road – Broadway – CBD
- Northern Beaches – Mosman – North Sydney – CBD
- Anzac Parade – CBD

The challenge for construction of metro railways on these corridors is the development of a viable business case. During 2008-10, detailed work was undertaken on both the Victoria Road and Parramatta Road corridors (North West Metro and West Metro respectively).

The evidence from this exercise is that the costs of new construction are extremely high, particularly in the CBD, while patronage is likely to be modest. Infrastructure NSW has been unable to obtain any evidence that forecast passenger numbers on any non-rail corridor into the CBD will exceed the capacity of a well-run bus solution for at least 20 years.

Accordingly, Infrastructure NSW has concluded that the construction of a new metro network should not form part of the Strategy, as such a scheme is highly unlikely to represent the highest and best use of limited Government funds. Instead Infrastructure NSW recommends that the main focus of investment should be incremental improvements to the existing bus and light rail network, as set out in Section 7.

However, Infrastructure NSW has identified one incremental expansion for consideration: the extension

8 Douglas Economics 2012, Modelling the Ability of Fare Incentives to Spread AM Peak passenger loads, prepared for Infrastructure NSW.

of the Eastern Suburbs Railway (ESR) to the South-Eastern suburbs. This project is more attractive because it can leverage the spare CBD access capacity of the existing line and support significant urban consolidation in locations likely to be appealing to the housing market.

8.6.2 Eastern Suburbs Railway Extension

The Eastern Suburbs Railway scheme authorised in 1967 was to run from the City to Kingsford. The original plans recognised the existence of significant demand for rail services in the South-Eastern suburbs, a combined catchment area of around 200,000 people.

The journey time by rail to Martin Place would be approximately 11 minutes from Randwick and 14 minutes from Kingsford/Maroubra. This is less than half the time for comparable bus services in peak hours.

However due to construction time and cost overruns, the line that finally opened in 1979 was truncated at Bondi Junction. The southern section was postponed indefinitely.

Thirty five years after the truncation of the ESR, South-Eastern Sydney remains relatively less developed than might be expected given its proximity to the CBD and coastal position. The existing apartments growth centre in South Sydney would also be likely to extend East in response to a rail development.

Project Practicability

A potential extension of the ESR is shown in Figure 8.3.

Lack of capacity in the CBD can be a constraint of rail expansion proposals. A key feature of the existing ESR is that it has a large amount of latent capacity even in peak periods. At present, patronage is only 7,400 passengers in the AM peak hour, less than half the number that travel in the reverse direction from the Illawarra. Furthermore the principal CBD station on the ESR is Martin Place, the most centrally located CBD station and one which has substantial platform and circulation space.

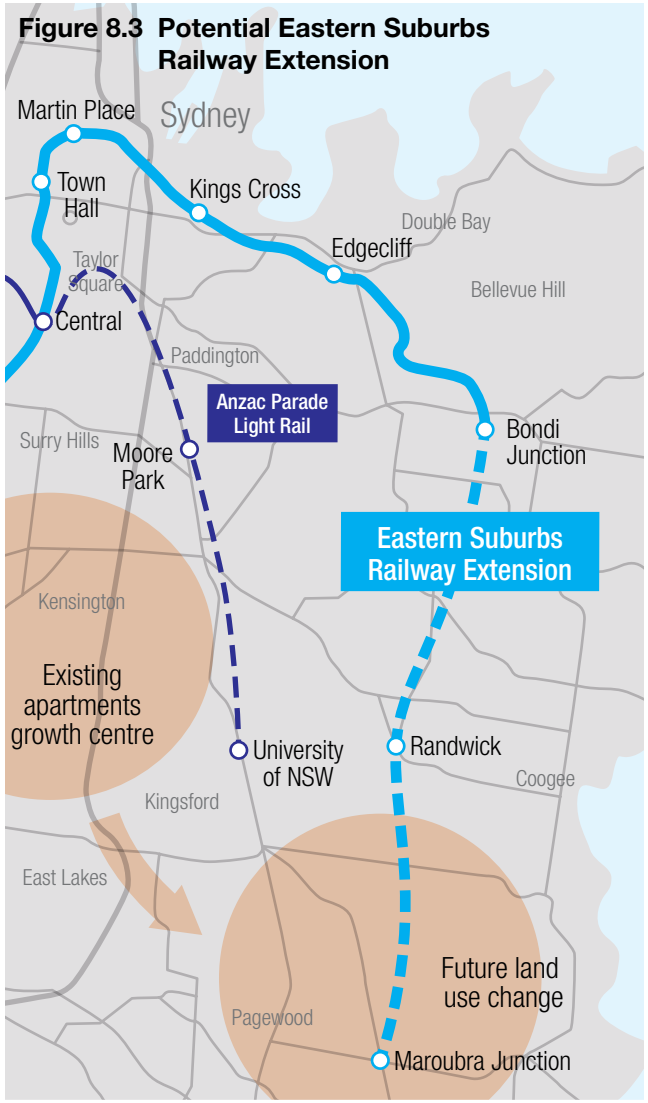
An extension of the ESR to the South-Eastern suburbs would require approximately six kilometres of new tunnels. New stations would be required at Randwick, to serve the health and education precincts, and at Maroubra Junction.

Based on these parameters, the scale of the project is approximately half the size of the Epping Chatswood Rail Link and one-quarter the size of the NWRL.

An extension of the ESR would complement, rather than compete with, a light rail line along Anzac Parade to Central. The heavy rail would provide the rapid journey times and mass transit capacity into the northern CBD that light rail is unlikely to offer (refer Section 7).

Recommendation Infrastructure NSW recommends planning for an extension of the ESR to Randwick and Maroubra between years 10 and 20 of the Strategy.

Figure 8.3 Potential Eastern Suburbs Railway Extension



8.7 Summary

8.7.1 Conclusions

An efficient rail system is essential to NSW particularly in terms of managing commuter traffic to the CBD. Infrastructure NSW strongly supports the Government's strategy to bring Sydney's train services up to world-class standards and put the rail system back onto a sustainable financial footing.

Infrastructure NSW supports the three tier railway concept set out in Sydney's Rail Future, including a rapid transit network that has the NWRL as its first stage. Infrastructure NSW recommends further work on how to best expand rapid transit services from Chatswood to the CBD.

Re-signalling the existing lines, combined with targeted capacity upgrades, could bring the benefits of this new technology to more customers, and more quickly, than a second harbour crossing.

Infrastructure NSW also recommends that work be undertaken to assess how the City Circle can be more intensively used, since this may defer the need to construct a new line through the CBD for several decades.

Infrastructure NSW has identified that faster train services from the Illawarra, Central Coast and Hunter may assist in managing the challenge of a growing population. Infrastructure NSW recommends that a program of incremental improvement to travel times be undertaken, with a target of a one hour journey time between Wollongong and Gosford to Sydney, and a two hour journey time from Newcastle to Sydney.

Infrastructure NSW recommends a higher differential between peak and off-peak fares to the CBD following the introduction of the Opal ticket system. This should be complemented by targeted improvements to off-peak services, for example from the CBD to Parramatta.

An extension of the Eastern Suburbs Railway to Randwick and Maroubra is recommended as the most prospective network expansion option beyond 2022, conditional upon a definitive strategy for land use densification in the South-Eastern suburbs.

8.7.2 Recommended Actions

	Recommendation	Years	Type	Cost and Funding Implications
16	**Start construction of North West Rail Link**	0 – 5	Major project	Existing Government commitment.
17	**Mainline Acceleration Program** Wollongong – Sydney pilot scheme	0 – 5	Program	Emphasis will be on operational improvements, supported by a scoping of $100 million for targeted works on speed restrictions and pinch points. Does not allow for major civil works, line re-signalling or new rolling stock.
18	**Turn-up-and-go express train service between Sydney CBD and Parramatta across the day**	0 – 5	Asset utilisation	Operational reform – no capital works proposed.
19	**Improve CBD rail off-peak price incentives**	0 – 5	Asset utilisation	Assume overall outcome is revenue neutral.
20	**Mainline Acceleration Program** Target one hour express service Wollongong – Sydney and Gosford – Sydney	5 – 10	Program	Continuation of pilot program from Years 0 – 5. Scoping of $1 billion for capital works.
21	**Unlock City Circle spare capacity to relieve CBD congestion**	5 – 10	Asset utilisation	Scoping of $1 billion allows for reconfiguration of junctions and associated works outside Central to allow more services to access the City Circle. It does not include resignalling of the City Circle.
22	**Modernise Wynyard and Town Hall stations**	5 – 10	Major project	Transport costs included within CBD Transit Improvement Plan (refer Recommendation II).
23	**Rapid transit extension from NWRL to CBD and Inner West, and release additional capacity on Main West Lines**	10 – 20	Major project	Scoping of $5 billion assumes resignalling of North Shore, Harbour Bridge and Inner West Lines and new rolling stock. Works include capacity upgrades between Chatswood and North Sydney and junction works at Central.
24	**Develop extension of Eastern Suburbs Railway to Randwick and Maroubra**	10 – 20	Planning	Cost of planning work is not material.
25	**Mainline Acceleration Program** Target two hour express service Newcastle – Sydney	10 – 20	Program	Continuation of previous program. Scoping of $500 million for capital works.