South West Rail Link Concept Plan and Environmental Assessment

VOLUME 1 – Main Volume

November 2006

Transport Infrastructure Development Corporation

PARSONS BRINCKERHOFF

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Date: 6 November 2006 .....

Distribution: TIDC .....

Submission of Environmental Assessment
Prepared under the *Environmental Planning and Assessment Act 1979*, Section 75H

Environmental assessment prepared by:	
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Address	Ernst & Young Centre Level 27 680 George Street Sydney NSW 2000
In respect of:	
Project to which Part 3A applies	
Applicant name	Transport Infrastructure Development Corporation
Application address	Locked Bag 6501 St Leonards NSW 2065
Land to be developed	As described within the Environmental Assessment
Proposed development	As described within the Environmental Assessment
Environmental assessment	An environmental assessment is attached
Certificate	I certify that I have prepared the contents of this document and to the best of my knowledge: ▪ It is in accordance with the requirements of Part 3A; ▪ It contains all available information that is relevant to the environmental assessment of the development to which it relates; and ▪ The information contained in the document is neither false or misleading.
Signature	
Name	Kathleen Bunting
Date	6 November 2006

Contents

Contents (continued)

Page Number

Contents (continued)

Page Number

Contents (continued)

Page Number

Contents (continued)

Page Number

Contents (continued)

Page Number

Contents (continued)

Page Number

List of tables

Contents (continued)

Page Number

List of figures

Contents (continued)

Page Number

List of appendices

Volume 2 – Technical Papers

Volume 3 – Technical Papers

Glossary and abbreviations list

AHIMS	Aboriginal Heritage Information System (Aboriginal heritage database)
ARI	Annual recurrence interval: The long-term average number of years between the occurrence of a flood as big as, or larger than, the selected event. For example, floods with a discharge as great as, or greater than, a 100 year ARI flood event will occur, on average, once every 100 years.
ARTC	Australian Rail Track Corporation
CBD	Central Business District
CCTV	Closed circuit television
Chainage	Measure of rail track distance from Sydney (Central Station) in kilometres
CPTED	Crime prevention through environmental design
Concept Plan	The SWRL Concept Plan is included in Part E of this report and outlines the scope and staging of the proposal for which TIDC is applying for concept approval under Part 3A of the *Environmental Planning and Assessment Act 1979*.
dBA	A-weighted decibels (unit of measurement for noise)
CEMP	Construction Environmental Management Plan
DEC	Department of Environment and Conservation
DIPNR	Department of Infrastructure, Planning and Natural Resources (now the Department of Planning and the Department of Natural Resources)
'Down' rail tracks/services	Tracks/services that travel away from Sydney
Edmondson Park release area	The area bounded by Camden Valley Way, Denham Court and the Hume Highway that has been released for development and was rezoned through amendments to the Liverpool and Campbelltown Local Environmental Plans in March 2006 (area shown in Figure 3-3).
EMR	Environmental Management Representative
EMS	Environmental Management System
ESD	Ecologically sustainable development
Global arc	The corridor of concentrated jobs and activities in centres from North Sydney to Macquarie Park and from the City to the airport and Port Botany, which will remain the powerhouse of Australia's economy
Global economic corridor	The corridor of concentrated jobs and activities in centres from North Sydney to Macquarie Park and from the City to the airport and Port Botany, which will remain the powerhouse of Australia's economy
GRP	Gross regional product: the increased value of goods and services produced in the region that are not purchased for further processing or resale
INP	The Department of Environment and Conservation's *Industrial Noise Policy*
KBR	Kellog Brown and Root
$L_{A1(60\ second)}$ noise level	The 'typical maximum noise level' for an event, used in the assessment of potential sleep disturbance during night-time periods
$L_{A10(15\ minute)}$ noise level	The 'average maximum noise level' during construction activities, used to assess the construction noise impacts
L_{A90}	The 'background noise level' in the absence of construction activities. (This parameter represents the average minimum noise level during the daytime, evening and night-time periods respectively. $L_{A10(15\ minute)}$ construction noise goals are based on the L_{A90} background noise levels.)
L_{Amax}	The 'maximum noise level' occurring during a train passby noise event

$L_{Aeq(24\ hour)}$	The 'equivalent continuous noise level', sometimes also described as the 'energy-averaged noise level'
L_{AE}	The 'sound exposure level', which is used to indicate the total acoustic energy of an individual noise event. (This parameter is used in the calculation of $L_{Aeq(24\ hour)}$ values from individual noise events.)
LEP	Local Environmental Plan
LGA	Local Government Area
MREP	Metropolitan Rail Expansion Program: collective term for the proposed North West Rail Link, CBD Rail Link, and SWRL (also referred to as NewRail and Sector 4)
NPV	Net present value: the present value of the net economic/financial benefit
NSW	New South Wales
PB	Parsons Brinckerhoff (consultant that prepared this report)
PMF	Probable maximum flood: an estimate of the largest flood that could conceivably occur and is typically used to consider implications arising from the design of major infrastructure and flood evacuation
Primary communities	Properties and communities within 500 metres of the proposed SWRL corridor
Proponent	The person proposing to carry out development comprising all or any part of the SWRL, including any person certified by the Minister to be the proponent (such certification to be obtained prior to commencement of the relevant part of the SWRL)
Proposed SWRL corridor	The corridor that is shown on Figures 7.1a to 7.1d in the Concept Plan and Environmental Assessment (Main Volume)
Quadruplication	Duplication of a twin-track line to provide a total of four tracks
RBL	Rating background noise level: the overall single figure background noise level representing quiet ambient conditions in each assessment period
RCBC	Reinforced box culvert
Secondary communities	Communities (of people) between 500 metres and 2.5 kilometres of the proposed SWRL corridor
SREP	Sydney Regional Environmental Plan
SEPP	State Environmental Planning Policy
South West Growth Centre	Area identified for land release and growth in the Sydney Metropolitan Strategy; also generally known as the South West Sector
South West region of Sydney	The region of Sydney covered by the LGAs of Wollondilly, Camden, Campbelltown and Liverpool, as defined in the Sydney Metropolitan Strategy
SSFL	Southern Sydney Freight Line
SWRL	South West Rail Link
TIDC	Transport Infrastructure Development Corporation
TPDC	Transport and Population Data Centre
Transit oriented development	Development that seeks to create a more compact and varied urban form, within walkable/cycle-friendly precincts served by strong/fast public transport links, to reduce car dependency and provide a wide choice of housing styles within easy reach of shops, recreation, civic amenities and jobs
'Up' track/services	Tracks/services that travel towards Sydney
UXO	Unexploded ordinance
Viaduct	A raised bridge consisting of supporting arches and piers to carry a rail line over a valley, creek floodplain etc.

Summary

S.1. Introduction and need

S.1.1 Background

In December 2004, the New South Wales (NSW) Government announced a new land release plan for Sydney's South West and North West Sectors as part of its strategy to respond to Sydney's growing population. The release of this land was underpinned by a NSW Government commitment to ensure that the required infrastructure is put in place early in the development of these areas.

In June 2005, the NSW Government exhibited a Draft Structure Plan for the South West Growth Centre (Department of Planning 2005), which was later revised in response to public exhibition of the draft versions. The revised plan shows centres, major road and public transport routes, and future employment areas to accommodate the future population. In total, the plans indicate that the South West Growth Centre could potentially be developed to provide 90,000 to 110,000 dwellings and accommodate 250,000 to 300,000 people.

On 9 June 2005, the NSW Government announced it would invest funds over the next 15 years to develop the Metropolitan Rail Expansion Program, which comprises the following three separate rail link projects, as shown in Figure S-1:

- the North West Rail Link — a new rail line to Rouse Hill from Cheltenham via Castle Hill with long-term plans to extend to Vineyard and the Richmond Line
- the CBD Rail Link — a new rail line in tunnel between Central Station and the North Shore Line at St Leonards, including new stations in the Sydney Central Business District (CBD) and the lower North Shore, and extra tracks between St Leonards and Chatswood
- the South West Rail Link (SWRL) — a new rail line to Leppington from Glenfield Station, with long-terms plans for an extension beyond Leppington.

In November 2005, the Transport Infrastructure Development Corporation (TIDC) was directed by the Minister for Transport to undertake the necessary technical studies and reviews to confirm and, in some locations, finalise the alignment of the SWRL; and the necessary work and documentation for the SWRL project to allow concept approval to be obtained under Part 3A of the *Environmental Planning and Assessment Act 1979*.

SWRL proponent

TIDC is a statutory State-owned corporation under the *Transport Administration Act 1988* with the principal functions of developing major railways systems and other major infrastructure projects. TIDC is seeking the Minister's approval for the Concept Plan for the SWRL. For that purpose, TIDC has undertaken an Environmental Assessment in accordance with the Director General's requirements for the environmental assessment of the Concept Plan for the SWRL. In relation to the SWRL, TIDC currently reports to a Project Steering Group comprising representatives of TIDC, RailCorp, NSW Treasury, the Department of Planning, the NSW Premiers Department and the Growth Centres Commission.

Construction of the SWRL would be carried out by TIDC or another entity, to be determined at a later date. Post-construction, the SWRL would be managed and operated by RailCorp.

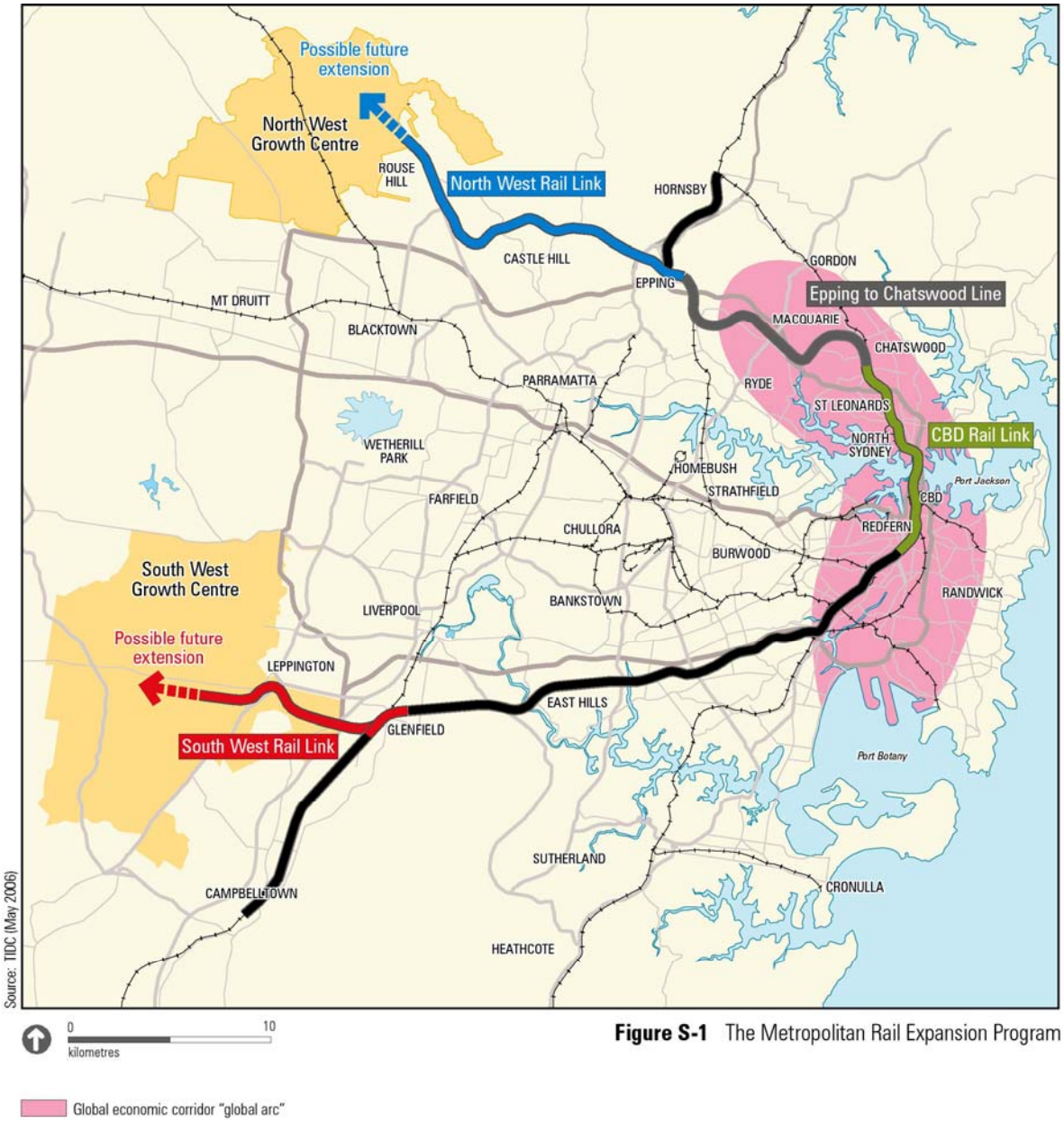

Figure S-1 The Metropolitan Rail Expansion Program

Approval requirements and the Environmental Assessment

Part 3A (Major Infrastructure and other Projects) of the *Environmental Planning and Assessment Act 1979* was introduced in August 2005 and establishes a new assessment and approval regime for major infrastructure projects in NSW. On 7 April 2006, the NSW Minister for Planning made an order under s75B(1) of the *Environmental Planning and Assessment Act 1979* declaring the SWRL to be a project to which Part 3A applies.

Section 75M allows the Minister for Planning to authorise or require submission of a Concept Plan for Part 3A projects. On 3 July 2006, the Minister for Planning authorised TIDC to submit a Concept Plan for the SWRL under Part 3A of the *Environmental Planning and Assessment Act 1979.* A Concept Plan outlines the scope, development options and staging of a project for which the proponent is applying for concept approval. In contrast to a more detailed 'project approval', a 'concept approval' provides a proponent with a level of certainty in defining the key parameters of a project, while allowing flexibility to further refine the design as more information becomes available.

Part 3A also allows the Environmental Assessment to focus on key environmental issues, which are identified at an early stage in the assessment process through preparation of a Project Application and Preliminary Environmental Assessment report. The Project Application and Preliminary Environmental Assessment report for the SWRL (Parsons Brinckerhoff 2006b) was lodged with the Department of Planning on 24 May 2006 and informed preparation of the Director-General's Environmental Assessment requirements.

On 12 July 2006, the Director-General of the Department of Planning issued Environmental Assessment requirements for the environmental assessment of the Concept Plan for the SWRL. This Summary outlines the key findings of the Environmental Assessment for the SWRL and summarises key components of the Concept Plan.

Overview of the SWRL

As shown in Figure S-2, the SWRL comprises approximately 13.1 kilometres of dual-track electrified rail between Glenfield and Leppington in south-western Sydney. It also includes an upgrade to Glenfield Station, new flyovers at Glenfield Junction, two new stations at Edmondson Park and Leppington, and a train stabling (train parking) facility in east Rossmore, west of the planned Leppington town centre. The SWRL is described in more detail in Section S.3.2 of this Summary and in the Main Volume of the Concept Plan and Environmental Assessment ('the Main Volume').

The purpose of the Concept Plan and Environmental Assessment contained in the Main Volume is:

- to assist in seeking the Minister's approval for the Concept Plan for the SWRL; and
- to demonstrate that the Director-General's requirements for the environmental assessment have been satisfied.

This Summary should be read in conjunction with the complete SWRL Concept Plan and Environmental Assessment report, which provides full details of all of the aspects covered in this Summary document.

S.1.2 Need and benefits of the SWRL

The SWRL would be located largely within the South West Growth Centre of Sydney (also generally known as the South West Sector), an area of land release and significant growth identified in the Department of Planning's Sydney Metropolitan Strategy *(City of Cities – A Plan for Sydney's Future* 2005b). The SWRL is an integral component of the 'Centres and Corridors' and 'Transport' strategies of the Metropolitan Strategy.

The South West Growth Centre Structure Plan (Department of Planning 2006) incorporates the SWRL to Leppington, which is identified as an integral part of the anticipated urban structure and transport network proposed for the South West Growth Centre. The South West Growth Centre is proposed to be developed to provide up to 110,000 dwellings and house up to 300,000 people. The SWRL is planned to pass through planned 'transit oriented' development at Leppington and Edmondson Park. Leppington has been identified as the major centre (regional centre) in the Growth Centre (with up to 26,000 dwellings), as it provides the best opportunity to provide significant retail and services employment. Edmondson Park is one of the first precincts in the Growth Centre to be released for development. It is planned to accommodate approximately 7,500 dwellings and 23,000 people and was rezoned in March 2006 to accommodate a town centre with approximately 25,000 square metres of retail floor space, relatively high density residential development, areas of open space, a nature reserve and a corridor for the SWRL.

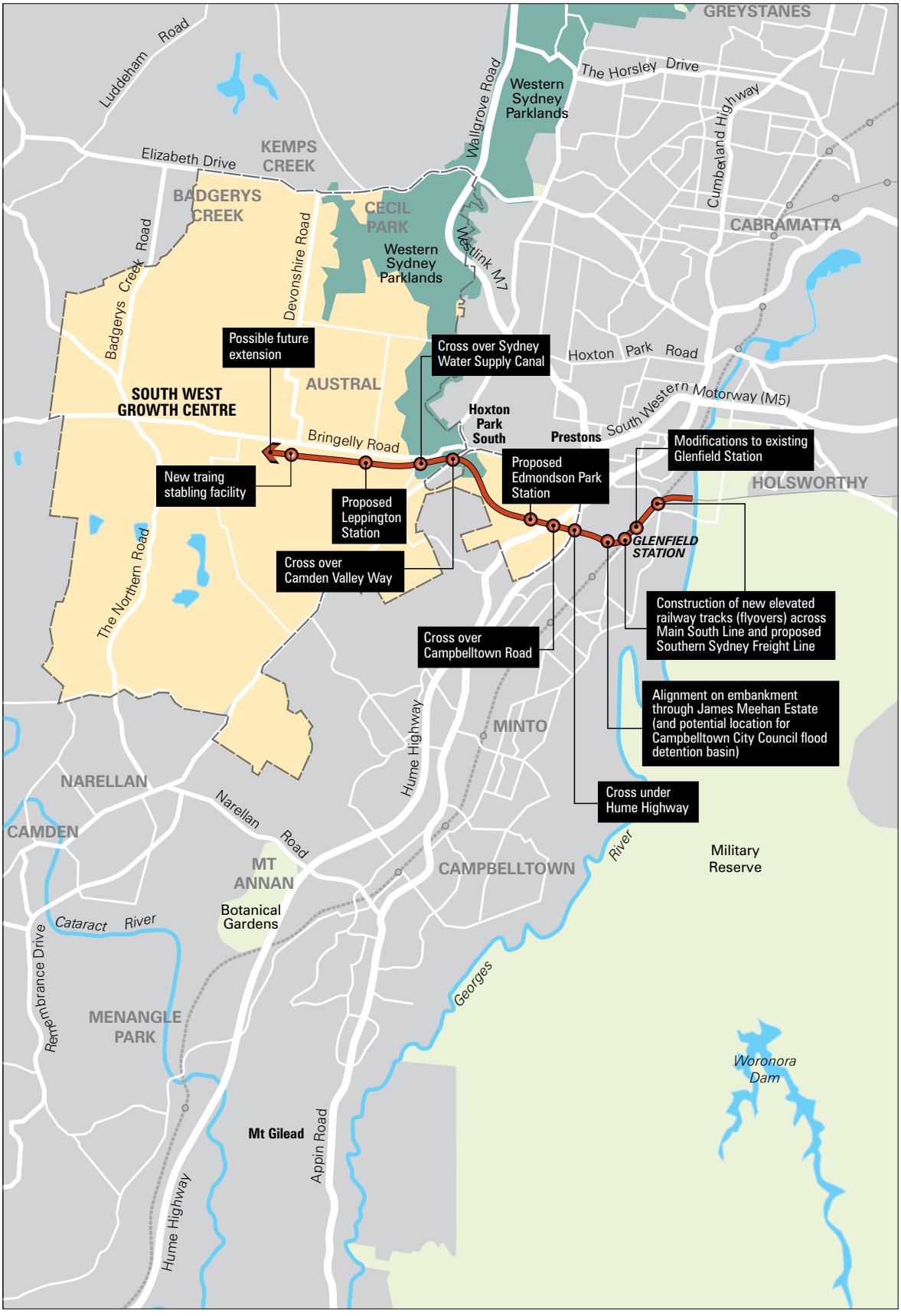

Figure S-2 South West Rail Link (SWRL) location and key components

The need for the SWRL is described in detail in Chapter 2 of the Main Volume. In summary, the SWRL project is needed to:

- support transport growth in a high demand corridor by providing additional services to the East Hills Line and additional stabling for Sector 2 of the Sydney metropolitan rail network (the Airport and East Hills Line, Main South Line (via Granville), Bankstown Line, and the Inner West Line)
- provide new rail services to the outer metropolitan area and maximise access for new communities
- encourage a reduction in the use of the private car as the main mode of transport for journeys to and from the South West region
- encourage the use of public transport and enhance accessibility for existing and future residents in the South West region
- encourage integrated transport and land use planning in the South West region, which is necessary to achieve the appropriate levels of urban consolidation and commercial development around transport nodes.

The train stabling facility proposed west of Leppington Station (in east Rossmore) is required as a key component of the SWRL project to support both rail patronage growth associated with development in the South West Growth Centre, and additional passengers on CityRail's southern-western services as a whole. The stabling is required to store trains when they are not in operational use. The SWRL is also needed to increase rail service capacity on the existing East Hills Line from the south-west, by allowing additional services to operate to the City from Leppington.

Glenfield Junction, the junction of the South and East Hills Lines, requires reconfiguration as part of the SWRL. Currently, Glenfield Junction presents a significant timetabling and capacity constraint on the existing network. The Junction needs to be grade-separated through the construction of flyovers to carry the East Hills Line and the SWRL over the Main South Lines to accommodate future growth on the network, including the addition of the SWRL services (Connell Wagner 2006b). The predicted growth on the Campbelltown to East Hills Line means that, in time, a flyover would need to be constructed at Glenfield North Junction regardless of whether the SWRL proceeds.

S.1.3 Community and stakeholder involvement

The community and other stakeholders were involved in the SWRL project prior to TIDC's involvement. This involvement occurred during and following:

- structure planning exercises led by the former Department of Infrastructure, Planning and Natural Resources (DIPNR) as part of planning for development of the South West Growth Centre
- early corridor planning and project development undertaken by other NSW Government agencies prior to November 2005, including exhibition of the *South West Rail Link Overview Report* (the 'Overview Report') by DIPNR (2005).

The latter document was placed on exhibition from June to October 2005. It provided information on the investigations and studies completed and described two possible route options for the SWRL. During the exhibition of the Overview Report, all relevant reports were made available for public inspection at the local Councils and the former DIPNR office in Parramatta. A website, 1800 number and email address were also available during

exhibition. All submissions received on the Overview Report were documented and informed the subsequent project development undertaken by TIDC.

During the preparation of the SWRL Project Application and Preliminary Environmental Assessment (from November 2005 to May 2006), TIDC utilised the freecall 1800 project information line, and fax number/email address to receive enquiries, and the TIDC website for information. Meetings were held with key stakeholders, such as councils and other government agencies, to help identify the appropriate approvals pathway and the key issues that would apply to the project. A planning focus meeting was held with government agencies on 15 December 2005 to discuss the scope of the proposed environmental investigations and the key issues. The SWRL Project Application and Preliminary Environmental Assessment report was also placed on TIDC's website.

During the preparation of the Concept Plan and Environmental Assessment for the SWRL, the following community and stakeholder involvement activities were implemented:

- continuation of the project webpage, information line, fax number and email address
- establishment of a project database to manage and record stakeholder issues, which were considered in the Environmental Assessment
- distribution of a newsletter in early June 2006 to key stakeholders and approximately 3,500 residents/occupants in the vicinity of the proposed SWRL corridor
- a project briefing with government agencies and local councils on 9 June 2006
- 22 meetings with stakeholders and community groups in July and August 2006.

Key issues raised by the community and stakeholders during this latter phase are analysed in Chapter 4 of the Main Volume. The most frequently raised issues related to potential land use and property impacts; project alternatives; visual impacts and urban design; traffic, transport, parking and access; noise and vibration; and the need for an effective consultation process.

The SWRL Concept Plan and Environmental Assessment will be publicly exhibited for a minimum of 30 days, during which time formal written submissions to the Department of Planning will be sought. These submissions will then be analysed in a Submissions Report, which will respond to issues raised and identify any changes to the project or mitigation measures and other commitments proposed.

A series of community information sessions and further meetings with stakeholders are proposed during the exhibition period. The dates and venues for the exhibition and community information sessions will be communicated by advertisements and an update newsletter.

S.2. Statutory and planning

The SWRL was declared to be project to which Part 3A of the *Environmental Planning and Assessment Act 1979* applies by a Ministerial Order made on 7 April 2006, pursuant to Section 75B.

On 3 July 2006, the Minister authorised TIDC to submit a Concept Plan for the SWRL under s75M. The Part 3A process is summarised in Figure S-3.

On 12 July 2006, the Director-General notified TIDC under s75F of the Environmental Assessment requirements for the environmental assessment of the Concept Plan for the SWRL.

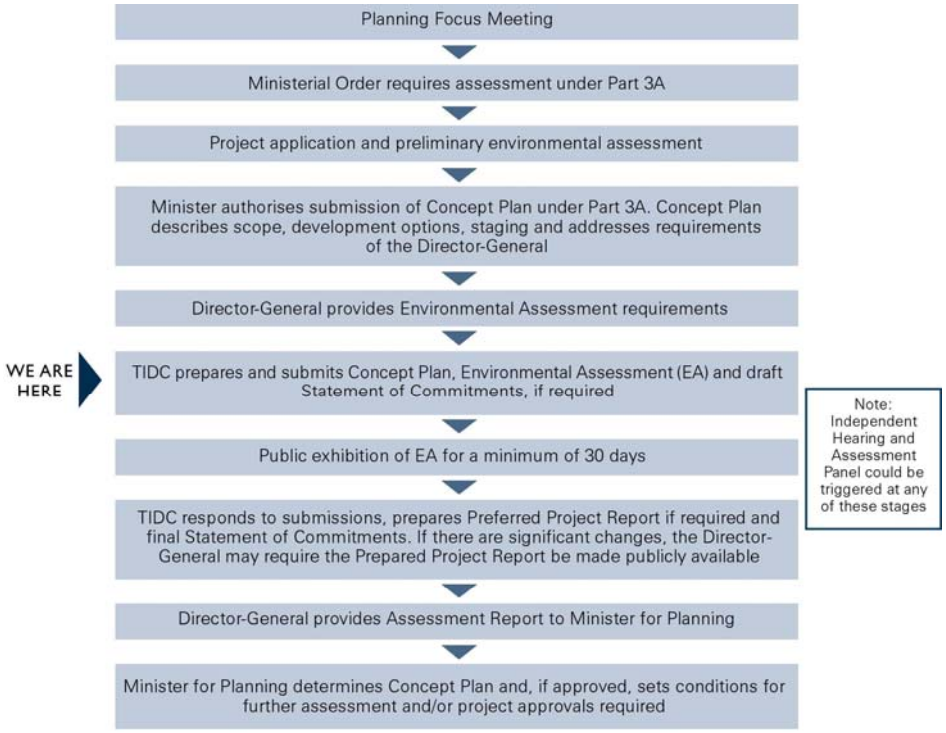

Figure S-3 Part 3A planning and decision-making process

Under s75O, the Minister may give approval for the concept plan for a Part 3A project if the proponent submits a concept plan for the project and the environmental assessment requirements with respect to the giving of approval for the concept plan have been complied with.

Further details of the SWRL (including how it is proposed to be staged) are provided in Sections S.3.2, S.5 and in the Main Volume.

S.2.1 Strategic planning context

As discussed above, the SWRL is a key component of the Metropolitan Strategy and the South West Growth Centre Structure Plan. Together with the newly released draft Campbelltown Centres Structure Plan 2006, these plans identify a hierarchy of current and emerging strategic centres. Of key relevance to the SWRL, Leppington is identified as a 'Planned Major Centre'. Edmondson Park and Glenfield are not identified as significant centres, and instead fall under the 'smaller' or 'local' typology of centres serving local catchments only.

The Department of Planning is currently preparing a Subregional Planning Strategy for the South West region, incorporating the Liverpool, Campbelltown, Camden and Wollondilly Council Local Government Areas. The Strategy will build on and develop in more detail the principles of the overall Metropolitan Strategy. It will also define the role of the various centres, identify key directions for the South West region (at a subregional level) and identify a hierarchy of centres. The recently gazetted State Environmental Planning Policy (Sydney Region Growth Centres) 2006 sets out the statutory plans and processes that now apply in the South West Growth Centre and defines the precincts that will guide the future precinct planning. The SWRL would pass through parts of the Edmondson Park, Western Sydney Parklands, Leppington North, Leppington and Rossmore precincts. Now that the Policy is gazetted, the Growth Centres Commission will manage the planning process for the Growth Centres.

As the next stage of planning for the Growth Centre, more detailed local precinct plans will be coordinated by the Growth Centres Commission and prepared by local councils or land owners. This process will determine the land use zoning and detailed development controls that will apply within each precinct.

S.2.2 Statutory planning instruments

As a result of s75R, if concept approval for a Part 3A project is given, environmental planning instruments continue to apply to the project. If approval to carry out a Part 3A project (or part of it) is given, then only state environmental planning policies (SEPPs) will apply to the carrying out of the project (or that part of it). Accordingly, relevant instruments have been considered in the Concept Plan and Environmental Assessment.

The SWRL crosses through areas covered by the Liverpool Local Environmental Plan 1997, the Campbelltown (Urban Area) Local Environmental Plan 2002, the Campbelltown Local Environmental Plan No. 112 – Macquarie Field House, the Camden Local Environmental Plan No. 48 and Sydney Regional Environmental Plan No. 31 – Regional Parklands, which applies to the planned Western Sydney Parklands. The SWRL is not prohibited under these Plans in any of the zones it crosses.

SEPP No. 63 - Major Transport Projects does not currently apply to the SWRL project. On 19 October 2006, draft State Environmental Planning Policy (Infrastructure) SEPP was placed on public exhibition. If gazetted, this SEPP would replace SEPP No. 63 and 18 other SEPPs, allowing for the development of new railway lines and augmentation of existing railway infrastructure without development consent.

S.2.3 Applicable legislation

In addition to planning approval required under the *Environmental Planning and Assessment Act 1979*, approvals are likely to be required under the *Protection of the Environment Operations Act 1997* (an Environment Protection Licence) and the *Roads Act 1993*. Consent for category 1 remediation works (under *Environmental Planning and Assessment Act 1979*) is also likely to be required. Under s75U, certain specified authorisations are not required for an 'approved project' under Part 3A (i.e. where approval to carry out the project has been granted). Consequently, if the Minister grants approval to carry out the SWRL or a particular stage of it, certain specified authorisations would not be required. In addition, under s75V, an Environment Protection Licence under the *Protection of the Environment Operations Act 1997* and consent under the *Roads Act 1993* cannot be refused, if necessary for the carrying out of an 'approved project' under Part 3A.

There is also potential for impacts of the SWRL to trigger assessment under the (Commonwealth) *Environment Protection and Biodiversity Conservation Act 1999,* due to the presence of Commonwealth listed endangered ecological communities/threatened species, Commonwealth listed heritage items (at the former Ingleburn Army Camp), and the presence of Commonwealth land (also at the former Ingleburn Army Camp) along the proposed corridor. Neither the lodgement of the SWRL Concept Plan, nor the granting of a concept approval by the Minister would (of themselves) constitute an ‘action’ under the Act requiring referral under the *Environment Protection and Biodiversity Conservation Act 1999*.

The SWRL will be referred to the Commonwealth Minister under the *Environment Protection and Biodiversity Conservation Act 1999,* if required.

S.3. Selection of SWRL preferred option and alternatives considered

S.3.1 Development of SWRL concept and alternatives considered

Planning for a railway, road or other transit mode serving what is now known as the South West Growth Centre began in the early 1990s in association with planning for the proposed second Sydney Airport at Badgerys Creek and later by early land use planning for urban development in the South Creek Valley. More recent considerations of the SWRL have addressed future planning and development of Sydney's South West Growth Centre to house its growing population and the requirement to provide transport to this population. These studies were led by various individual parties and a consortium of NSW Government departments, including former rail agencies (which now comprise RailCorp), the Ministry of Transport, and the (former) DIPNR-Transport planning division.

The horizontal alignment of the SWRL between Glenfield and the Edmondson Park town centre was largely fixed following the exhibition of the Edmondson Park Local Environmental Plans (in 2004). DIPNR publicly exhibited a northern and a southern SWRL alignment, known as 'reference route options', west of the Edmondson Park town centre in its *South West Rail Link Overview Report* (2005).

As part of its more recent investigations, TIDC reviewed the two reference route options to confirm their technical feasibility and investigate further their potential impacts, particularly in relation to:

- potential flooding near the existing rail corridor at Leppington
- the planning of the proposed Leppington town centre and the relative location of the proposed stabling facility in east Rossmore
- the number of private properties potentially affected and the total area of acquisition required
- the overall cost of the railway development.

As a result of this review, two refined options were identified, a refined southern alignment and a refined northern alignment.

Possible flooding issues and the potential effect of the stabling facility on the future development of the Leppington town centre also led to the relocation of the proposed Leppington Station and stabling facility further to the west and north towards Bringelly Road. This also influenced the location of the refined northern and southern alignments considered by TIDC.

The refined southern alignment reduced potential impacts on the Forest Lawn Memorial Gardens Cemetery, and reduced severance of the Casa Paloma Caravan Park. The refined northern alignment avoided potential impact on the Forest Lawn Memorial Gardens Cemetery.

As detailed in the *South West Rail Link Route Option Report* (TIDC 2006a) appended to the Main Volume, the performance of each refined alignment option was assessed against technical, engineering, operational, environmental and cost criteria.

The refined northern alignment was identified as the preferred option as it exhibits a number of advantages, including that:

- it would have less private property acquisitions and less potential impact on residential amenity, with noise targets likely to be exceeded at fewer residences than the southern route
- its capital cost would be approximately $11 million less than the refined southern alignment.

In addition to the horizontal alignments/routes considered, more detailed assessment of station location options, options for reconfiguration of Glenfield Junction, stabling facility location and configuration options, and development staging options were also considered, as described in Chapter 6 of the Main Volume.

The concept for the SWRL assessed in the Main Volume is the refined northern route alignment.

S.3.2 The SWRL project

Physical description

As identified in Figure S.2, the SWRL project comprises, in summary, the construction, operation and maintenance of:

- Stage A (Glenfield Junction early works) comprising:
  - commencement of early works (construction Stages 1 to 4) at Glenfield North Junction and Glenfield South Junction (this excludes work at the direct interface with the Glenfield Station upgrade works which are part of Stage B)
  - establishment and use of construction work sites (including the establishment of access tracks) at Glenfield and the James Meehan Estate.
- Stage B, comprising the construction and operation of the remaining portions of the SWRL:
  - the proposed rail lines and associated infrastructure within a defined 40 metre wide corridor between stations and 60 metres wide at the stations
  - Leppington Station, Edmondson Station and the train stabling facility
  - the Glenfield Station upgrade works
  - construction sites and ancillary facilities, including power supply, sectioning huts, signalling structures, access roads, and other infrastructure required for the operation and maintenance of rail services and infrastructure.

Stage A is at fairly well advanced design stage; although some further environmental assessment is required to clarify the impacts of these works. Stage B of the SWRL is at a less advanced design stage and further environmental assessment of aspects of this stage is needed.

The proposed SWRL alignment does not preclude a possible future extension beyond Leppington.

Operational requirements

Initially, it is anticipated that four trains per hour would depart from Leppington on the SWRL for the Sydney CBD via the East Hills Line. In addition, it is anticipated that four trains per hour would depart from Leppington for the Sydney CBD via Granville and Liverpool on the Main South Line. Services from Leppington to the Sydney CBD via the East Hills Line would increase as demand increases. Trains are likely to travel at between 80 and 125 kilometres per hour between stations on the SWRL.

It is anticipated that at the commencement of operations, a total of 12 trains would need to be stabled at the train stabling facility, with up to 16 trains stabled by 2031. Future demand is likely to increase this to a total of 20 trains in the longer term. The facility may be used by 10-car train sets in the long term. The facility would be open 24 hours a day and provide for internal train cleaning of all trains overnight, visual and safety inspections of trains, train washing, brake and horn tests, external cleaning of graffiti, as required, and minor maintenance.

Construction requirements

The Stage A early works at Glenfield would take approximately 24 months to construct. The construction duration of the full project (Stages A and B, including commissioning) is estimated at approximately 41.5 months (close to 3.5 years).

The overall construction of the SWRL would comprise the following main construction phases:

- a preparatory phase to isolate the construction zones or relocate or protect existing services or utilities
- a phase of major civil construction, when earthworks, culverts and bridges would be constructed, including the Glenfield Junction, main alignment works, the train stabling facility works and the station works
- a final phase of testing and commissioning and handover of the SWRL to RailCorp for operation.

A major work site is proposed on land owned by the Department of Planning south-west of Glenfield Station, with other sites and temporary access arrangements likely to be required at the stations, stabling facility, bridges, the dive structure at the Hume Highway and at Glenfield Junction. It is anticipated that approximately 20 short-term weekend rail track possessions (track closedowns) would be required to construct the works at Glenfield Junction, of which 10 possessions would be required for the Stage A works. It is likely that some night works would be required at Glenfield during these weekend possessions, during works at road crossings, and at other times to ensure works can be undertaken safely.

The track possessions required to construct the works at Glenfield Junction would each last 2 days and would shut down the whole Junction, allowing work to be carried out on both the Main South and the East Hill Lines simultaneously. Buses would replace passenger services during these times.

S.4. Environmental Assessment

S.4.1 Existing and future environment

The existing and planned future environment in the vicinity of the SWRL project is described in detail in Chapter 5 of the Main Volume.

Existing environment

Key features of the existing social and cultural environment include:

- a predominance of rural-residential land uses along the corridor, which would cross through three local government areas (Liverpool, Camden and Campbelltown)
- other land uses including established residential areas in Glenfield, Denham Court and Horningsea Park; special uses such as educational uses (particularly at Glenfield), the Forest Lawn Memorial Gardens Cemetery, and the former Ingleburn Army Barracks; open space areas, including the Western Sydney Parklands; the Glenfield Waste Facility; and some areas of retail/commercial uses, including the Glenfield town centre and rural market gardening businesses in Leppington and Rossmore
- a regional transport network that includes limited bus services, a rail network that only extends as far west as Glenfield, a relatively good regional road network (including the South Western Motorway, the Hume Highway and the recently completed M7), and a relatively undeveloped local road network
- an acoustic environment that varies along the length of the proposed SWRL along with change to surrounding land uses and the proximity of each location to major roads and the existing rail corridor
- a number of areas of potential Aboriginal archaeological, cultural and social significance to the Aboriginal community, particularly along relatively undisturbed creek lines, low slopes and ridges
- a number of sites and places of non-Indigenous heritage value, including the Ingleburn Military Area, the Sydney Water Supply Upper Canal, historic road alignments (Camden Valley Way and Cowpasture Road), the Denham Court viewshed, Hurlstone Agricultural High School and historic fenceline remnants
- a number of important views, including along the historic road alignments and the Denham Court viewshed noted above, views from Macquarie Field House, and views from within the Forest Lawn Memorial Gardens Cemetery and the Western Sydney Parklands
- a range of community profiles, including the established community of Glenfield, the residential area of Denham Court, the relatively new residential area of Horningsea Park (which has a high number of young families), and the predominantly rural-residential areas of Leppington and Rossmore, with greater numbers of couples without children and people from non-English speaking backgrounds.

Key features of the existing biophysical environment include:

- a number of watercourses and ephemeral creeks that make up parts of the Georges River and Hawkesbury-Nepean River Catchments and a number of flood-prone areas, including at the site of the Edmondson Park town centre (and Station) and the site of the potential Glenfield flood detention basin area

- remnant vegetation that makes up the endangered Shales Hills Woodland and Shales Plain Woodland sub-units of Cumberland Plain Woodland and Sydney Coastal River Flat Forest – Alluvial Woodland, which are threatened ecological communities listed under the *Threatened Species Conservation Act 1995* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
- the potential occurrence of *Pimelea spicata* (a threatened plant species listed under both the *Threatened Species Conservation Act 1995* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 199*) and the confirmed occurrence of a population of the Cumberland Plain Large Land Snail (*Meridolum corneovirens*), which is listed as vulnerable under the *Threatened Species Conservation Act 1995*.

Planned future environment

As described above, the proposed SWRL would pass through a number of precincts in the South West Growth Centre that are planned for major development in the future. Edmondson Park is likely to be developed first, as the area is already largely planned and has been rezoned. Some parts of this development are likely to be in place by the time the SWRL is constructed. Leppington has not yet been released for development and the timing of its development is as yet unconfirmed, but it would be likely to follow the SWRL construction. Other key planned developments in the vicinity of the SWRL corridor and the wider South West Growth Centre include:

- major upgrades to the road network in the Growth Centre, including to parts of Campbelltown Road, Bringelly Road, Camden Valley Way, Eastern Road, Ingleburn Road and Rickard Road
- the development of a number of strategic bus corridors in the wider South West region; a 'regional public transport boulevard' linking Liverpool to Leppington, Narellan and Campbelltown; and other regional and local bus routes and priority measures (although the latter are yet to be planned in any detail)
- construction of the Southern Sydney Freight Line alongside the Main South Line from Sefton to Macarthur, including a proposed passing loop at Glenfield North Junction
- extension of Leacock Regional Park to cover the Glenfield Waste Facility (when it ceases operation)
- development of the Glenfield Road residential estate for 1,000 dwellings (already commenced)
- the Western Sydney Parklands, which are planned to be developed as a regional recreation and conservation resource (The proposed SWRL corridor would pass through the Hoxton Park Ridge precinct (Precinct 9) of the Parklands.)

The planned and likely future developments in and around the proposed SWRL line will have major implications for the future social, cultural and biophysical environment in the area, which have been assessed and addressed in the Main Volume.

S.4.2 Environmental risk analysis

As part of the SWRL Project Application and Preliminary Environmental Assessment preparation (Parsons Brinckerhoff 2006b), key issues were identified as the focus for consideration in the SWRL Environmental Assessment. This involved an environmental risk analysis based on preliminary environmental and engineering investigations.

The environmental risk assessment was undertaken in accordance with the Director General's Environmental Assessment requirements. In addition to the 'key issues' prescribed by the Director General's Environmental Assessment requirements, TIDC has also identified and considered a number of other environmental issues.

The above process allowed the Environmental Assessment to focus on the identified 'key' issues. It also recognised that the route selection and concept design processes may have already avoided or reduced the extent of some impacts through, for example, alignment refinements. The environmental issues identified as 'other' issues would be of more minor consequence and can be managed through appropriate management actions and mitigation measures.

S.4.3 Overview of potential impacts

Key issues

The assessment of the key environmental issues for the SWRL included a range of technical studies with a level of assessment appropriate for the 'concept' level of the project design and concept approval process. This included preliminary noise and hydraulic modelling and other higher level assessments, with commitments to undertake further assessment and delineation of management measures during the next phase of the project as the design of Stage B is developed further. The key potential environmental, social and economic impacts of the SWRL are summarised in Table S-1, along with key management commitments proposed to avoid, remedy and mitigate those potential impacts.

Table S-1 Key potential impacts of the SWRL

Key issue	Identified key potential impacts	Key management commitments
Land use, property and infrastructure planning (see Chapter 10 in the Main Volume)	Permanent impacts on directly affected properties and land uses crossed by the proposed SWRL corridor — including direct effects on 54 rural-residential properties in Edmondson Park, Leppington and Rossmore, and 28 properties under Government ownership. These properties would be acquired (in full or in part) in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991*. In the context of the proposed future development of the area, this impact is not considered significant. Land use severance, sterilisation and access impacts — The SWRL design has sought to minimise these issues and where severance is expected to be high, the land acquisition strategy identified purchase of whole parcels. As the area is proposed to be developed, these issues are not expected to be significant in the long-term, as precinct planning would take account of these issues. At Edmondson Park, the impacts of severance have largely been addressed through the rezoning process, which included provision for the SWRL. The future design work for the SWRL would look at any additional crossings needed. Construction phase impacts on adjacent land uses, including noise and vibration amenity, visual amenity, social disruption, traffic/transport amenity and business impacts — These issues are considered to be manageable with the effective implementation of standard construction	Further assessment and confirmation of land use and property impacts following further design development. A Land Asset Management Plan to address 'land surplus to use' post-construction. Further consultation with relevant government agencies regarding implementation of appropriate development controls within the vicinity of the rail line; integration with planning for sub-precincts 9.7 and 9.6 of the Western Sydney Parklands; and to ensure the design of the SWRL makes allowance for any required measures to improve connectivity across the corridor to mitigate severance impacts and potential collocation of utilities or other beneficial land uses.

Key issue	Identified key potential impacts	Key management commitments
	environmental management measures.	
Traffic, transport parking and access (see Chapter 11 in the Main Volume)	Significant regional operational benefits for traffic, transport and accessibility, as discussed in Section S.1.2. The mode of access demands and patronage predicted at the proposed stations were considered in the development of the station concepts, thereby minimising impacts on the surrounding transport network. Operational phase impacts at Glenfield Station, including removal of approximately 120 commuter car parking spaces along Railway Parade — These spaces are proposed to be replaced as a minimum so impacts would be negligible. Benefits of the Station upgrade, including the addition of easy access facilities would be expected to outweigh the impacts. Potential severance impacts (operational phase) of the SWRL on movements of pedestrians and cyclists — Opportunities exist to minimise impacts and enhance connections, which would be further considered during the future design phases. Construction phase impacts on local and regional traffic and access associated with vehicle movements for earthworks — Overall, additional congestion is expected to be minimal given the current heavy traffic loads experienced on most roads in the South West Growth Centre and wider region. Construction phase impacts on general traffic, bus services and pedestrians during construction of over and underbridges at existing road crossings — Impacts would be manageable and not significant with implementation of construction management measures. Construction phase disruptions to rail services and station access (including parking) at Glenfield Junction — Replacement buses, communication and other mitigation measures would minimise impacts.	Further assessment in the next phase of the project, including: ▪ traffic modelling and traffic management analysis at intersections potentially affected during construction ▪ pedestrian modelling and further assessment of station mode of access interchange facilities ▪ assessment of pedestrian and cycle linkages alongside and across the SWRL ▪ ongoing liaison with transport stakeholders during the design development. Management of construction traffic impacts (Stage A) via high level Traffic Management Reports, site-specific Traffic Management Plans for construction work sites, and Traffic Control Plans where works are proposed in the road corridor or would affect trafficable areas.
Noise and vibration (see Chapter 12 in the Main Volume)	Operational noise impacts (running trains) — If mitigation measures are not implemented, there is the potential for a significant number of exceedances of the Department of Environment and Conservation's (DEC) 'planning noise levels' under a Year 2017 scenario. However, for most of the project area, significant noise reductions could be achieved by using low level noise barriers/mounds in conjunction with land use measures such as setbacks and rezonings; although on upgraded sections of track (near Glenfield), compliance with the 'planning levels' may be harder due to the restrictions on barrier locations, and the source height of diesel locomotive noise emissions. As the project is at a preliminary level of design development, detailed assessment of the potential mitigation measures for operations (such as source controls, the location and height of noise barriers or bund walls, and building treatments) will be undertaken at a later stage in	Further assessment of operational noise impacts as part of the design development. Provision of acoustic measures to meet, where reasonable and feasible, the design goals where land use planning and consent conditions would not provide adequate protection. Determination of the extent of any physical noise mitigation measures to mitigate train stabling noise. Review the results of RailCorp's investigations into addressing horn noise and consider the feasibility in consultation with RailCorp in implementing a low volume horn test.

Key issue	Identified key potential impacts	Key management commitments
	the assessment process. Operational noise impacts (train stabling facility) — Without noise mitigation, continuous noise emissions would exceed the noise goals at existing nearby residential receiver locations. Buffer distances of up to 200 metres would be required (without noise mitigation) to achieve compliance with the applicable noise goals for continuous and semi-continuous noise. Without noise mitigation, noise levels during train horn and brake tests during the night-time would also significantly exceed the DEC criterion. However, the implementation of appropriate noise mitigation and the ability to plan land use zones in the area presents a significant opportunity to effectively manage the potential noise impacts. Operational vibration impacts — Vibration levels are predicted to be perceptible at some of the existing and proposed residential locations; however, the levels would be well below the 113 dB (building damage) criterion. Construction noise and vibration impacts — At the majority of locations, the predicted average maximum construction noise levels would exceed the noise goals when plant and equipment are located close to residential and commercial receiver locations. The highest impacts are predicted to occur adjacent to residential locations where rockbreaking or vibratory pile driving may be required (at bridge locations and possibly some other earthworks locations). Impacts would be temporary, as construction moves along the corridor, and manageable with standard construction management measures.	In regard to operational vibration, investigate feasible and reasonable mitigation measures in consultation with local Councils and RailCorp if buildings are within approximately 30 metres of the nearest track centreline. Preparation of a Construction Noise and Vibration Management Plan prior to construction (Stage A).
Hydrology and surface water (see Chapter 13 in the Main Volume)	The design of the waterway structures proposed for the SWRL can accommodate floods with an annual recurrence internal of 100-years, but further consideration of the potential for blockage of culvert cells during flood events is required, or consideration of alternative bridge structures. Increases in flood levels for larger existing flood events up to the probable maximum flood (the largest flood that could conceivably occur). Changes in flood behaviour in the vicinity of Edmondson Park Station; although further preliminary design has demonstrated that the vertical alignment in this area can be modified to further reduce impacts. Impacts on property from these changes are anticipated to be relatively minor and can be managed through appropriate crossing design, additional assessment and incorporation of appropriate mitigation measures.	Further assessment of potential impacts and appropriate management measures including: ▪ a more detailed flood assessment to confirm the extent of flooding impacts and inform future design development, in particular the location and design of drainage structures ▪ additional flooding assessment and vertical rail alignment design work at Edmondson Park Station and surrounds, in coordination with LandCom, the Growth Centres Commission and Councils.
Biodiversity (see Chapter 14 in the Main Volume)	Potential residual direct and indirect impacts on threatened biodiversity, including Cumberland Plain Woodland, Sydney Coastal River Flat Forest, the Cumberland Plain Large Land Snail and (potentially) *Pimelea spicata* — Impacts would relate to clearing of native vegetation,	Targeted biodiversity assessments during suitable survey seasons to confirm the findings of the habitat-based assessment. Liaison with relevant

Key issue	Identified key potential impacts	Key management commitments
	removal and modification of fauna habitats, fauna injury during construction and operation, edge effects (changes in habitat conditions along boundaries of remnants), habitat fragmentation, alteration of natural flow regimes and noise disturbance. Biodiversity off-sets are likely to be required for areas outside the Growth Centre (i.e. Liverpool and Campbelltown areas). The SWRL was largely incorporated within planning for the establishment of conservation areas in Edmondson Park. The remainder of the project would be addressed through a biodiversity certification process proposed by the Growth Centres Commission; although additional off-sets could be required to compensate for direct impacts on land identified as a 'deferred matter' through Edmondson Park and riparian zones in the Growth Centre.	government agencies to resolve measures for residual biodiversity impacts, which may include the establishment of off-sets, biobanking and other appropriate measures. A Flora and Fauna Management Sub-plan (Stage A).
Heritage (Chapter 15 in the Main Volume)	Further Aboriginal consultation in accordance with protocols developed for developments within the South West Growth Centre is required to confirm the likely impact of the proposed SWRL on identified cultural heritage items and places. A preliminary assessment identified that some known sites are potentially within the proposed construction corridor. Procedures can be put in place to ensure that a potential burial site within the Ingleburn Military Area is identified and managed appropriately, if it exists and is affected by the SWRL. Direct and indirect impacts on items/areas of historic heritage significance, including: ▪ direct impacts on parts of the former Ingleburn Military Camp ▪ crossing of the Sydney Water Supply Upper Canal and associated Bunya Pines, with potential loss of the integrity of the landscape and setting, and damage/loss of the row of pines ▪ impacts on the visual quality of historic road alignments and historic viewsheds of Old Cowpasture Road, Cowpastures Road, Camden Valley Way, Denham Court Road, Macquarie Field House and Hurlstone Agricultural High School. With the implementation of proposed management measures, and considering the planned future development of several of these roads/areas, overall impacts would be expected to be manageable.	Aboriginal heritage: ▪ Continuation of the impact assessment of the SWRL in accordance with the Growth Centres Commission's Protocol and Precinct Assessment Method (Context Pty Ltd 2006) Historic heritage: ▪ Further assessment of areas that have not yet been surveyed ▪ Preparation of a referral to the Commonwealth Department of Environment and heritage regarding impacts on the Ingleburn Military Camp, if required ▪ Various measures to ensure that the design in the vicinity of heritage items (such as the Sydney Water Supply Upper Canal and the former Ingleburn Military Camp) considers existing relevant polices and procedures for management of these heritage items
Visual impacts and urban design (Chapter 16 in the Main Volume and Technical Paper 4)	Temporary visual impacts to surrounding residents and nearby roads when construction work sites are in use. Direct and indirect impacts on the visual environment — The rail corridor has the potential to be a visually dominant feature in the landscape. The highest impacts are predicted in association with the flyovers at Glenfield; and for rural-residential properties at Croatia Avenue (Edmondson Park), Jardine Drive, Denham Court	Use of specifically developed urban design principles to guide the design of the Stations and stabling facility. Further visual and urban design assessment as part of the future design work. Preparation of a detailed Urban and Landscape Design Plan,

Key issue	Identified key potential impacts	Key management commitments
	and in Leppington/Rossmore. These impacts would be reduced in the long-term as the area is developed. Impacts would be managed by the implementation of urban design and visual management measures.	including detailed urban design and landscape plans for the proposed station works, the stabling facility and the corridor as a whole.
	Light spill impacts from operation of lighting at the stabling facility and Stations.	Various general measures to mitigate visual impacts.
Social impacts (Chapter 17 in the Main Volume)	Major social benefits in regard to improved accessibility, connectivity and transport choice and affordability	Development and implementation of communications processes throughout the delivery of the project.
	Impacts on residential amenity, community severance and concern over relocation/acquisition — Overall, these impacts would be manageable in the long-term as the area is developed and the SWRL is integrated with the wider Growth Centre developments	Development of measures to minimise negative impacts on the Forest Lawn Memorial Gardens Cemetery, including consideration of cultural sensitivities and particularly visual and noise impacts.
Economic and business impacts (Chapter 18 in the Main Volume)	Regional economic benefits associated with increased accessibility across the region (which would facilitate economic growth, investment and residential development); and reduced socio-economic costs associated with reduced road congestion, air pollution and road accidents, and improved transport affordability.	As part of the Community and Stakeholder Involvement Plan, further assessment of the magnitude of the impacts of construction on adjacent businesses during construction and consultation with business owners during construction planning to address their concerns.
	Temporary adverse construction impacts on some businesses in the vicinity of worksites, and positive impacts on other businesses (e.g. construction contractors) that would benefit from the project construction.	Liaison with the Department of Planning (Sydney Region West) and Campbelltown Council about the planning implications of the SWRL project for Glenfield.
	Positive and negative impacts on some businesses in the area, depending on the circumstances of the business; the overall potential impact would be positive with any negative effects short-term and minor.	
	Potential impacts on the hierarchy of Glenfield as a centre — the future role of Glenfield may evolve over time as a transit centre, partly as a result of its strategic location at the future junction of the SWRL, Main South and East Hills Line.	

Other environmental issues

The SWRL is predicted to have relatively minor potential impacts on the following environmental issues given the implementation of standard management and mitigation measures:

- air quality and greenhouse gas emissions during construction
- hazards and risks during construction and operation
- potential public safety impacts during construction and operation
- potential impacts on services and utilities during construction and operation, including the Sydney Water Supply Canal
- potential soil, water quality and groundwater impacts during construction and operation

- the generation of waste and the use of energy or other resources during construction and operation
- potential impacts associated with the presence of contaminated land and other hazardous materials, including at the former Ingleburn Military Camp
- potential cumulative impacts.

These issues are discussed in Chapter 19 of the Main Volume and can be managed effectively through standard environmental management measures, which are proposed to be incorporated into TIDC's Statement of Commitments for the project.

S.5. The SWRL Concept Plan and conclusions

S.5.1 Scope of the Concept Plan and approval

TIDC is seeking approval for the Concept Plan for the SWRL under s75O(1) of Part 3A of the *Environmental Planning and Assessment Act 1979*.

The SWRL is described in further detail in Chapters 7 and 8 of the Main Volume and is the subject of the Environmental Assessment set out in Part D of the Main Volume. The description of the SWRL reflects the level of design development completed to date.

The SWRL, as described and assessed in the Main Volume, comprises two stages (Stage A and Stage B). Stage A (Glenfield Junction early works) comprises the construction, operation and maintenance of:

- commencement of early works (Stages 1 to 4) at Glenfield North Junction and Glenfield South Junction (this excludes work at the direct interface with the Glenfield Station upgrade works which are part of Stage B)
- establishment and use of construction work sites (including the establishment of access tracks) at Glenfield and the James Meehan Estate.

Subject to the terms of any Concept Plan approval, additional design and environmental assessment would be undertaken for the following elements of Stage B of the SWRL, comprising the construction and operation of:

- the proposed rail lines and associated infrastructure within a defined 40 metre wide corridor between stations and 60 metres wide at the stations
- Leppington Station, Edmondson Station and the train stabling facility
- the Glenfield Station upgrade works
- construction sites and ancillary facilities, including power supply, sectioning huts, signalling structures, access roads, and other infrastructure required for the operation and maintenance of rail services and infrastructure.

S.5.2 Draft Statement of Commitments

The Environmental Assessment of the SWRL project has identified a range of potential environmental impacts and recommended management measures to avoid or reduce the potential impacts of the SWRL. Chapter 21 of the Main Volume contains a draft Statement of Commitments proposed by TIDC. Following concept approval, the finalised commitments would guide subsequent phases of the project development to minimise potential impacts on the environment.

S.5.3 Conclusions and next steps

The SWRL is expected to have significant environmental, social and economic benefits for the South West region of Sydney and the wider metropolitan area. However, the nature of the SWRL means that some potential adverse impacts, including some potentially significant impacts, are unavoidable. Overall, the benefits of the SWRL are considered to outweigh the adverse impacts, considering the proposed implementation of management commitments, mitigation measures and safeguards by TIDC during the further design, construction and operational stages.

The next steps for the project are as follows:

- exhibition of the SWRL Concept Plan and Environmental Assessment for a minimum of 30 days and invitation for the community and stakeholders to make submissions
- some further environmental assessment of Stage A of the project to determine the extent of impacts
- TIDC prepares a Submissions Report and, if required, a Preferred Project report and final Statement of Commitments
- Director-General of the Department of Planning provides an Assessment Report on the SWRL Concept Plan to the Minister for Planning, who then determines the Concept Plan and, if approved, sets conditions for further assessment and/or further approvals required.

The following steps would be undertaken in accordance with the terms of the concept approval.