

Appendix A

Environmental Assessment
requirements

12/07 2006 WED 13:15 FAX +61 2

008/013



NSW GOVERNMENT
Department of Planning

Contact: Lisa Mitchell
Phone: (02) 9228 6354
Fax: (02) 9228 6355
Email: Lisa.Mitchell@planning.nsw.gov.au

Martin Halliday
Director, Planning and Environment
Transport Infrastructure Development Corporation
Locked Bag 6501
St Leonards NSW 2065

Our ref: 9040496
Your ref: 116207

Dear Mr Halliday

**Director General's Requirements for the Environmental Assessment of the
Proposed South West Rail Link Project**

The Department has received your application for the proposed South West Rail Link project (Application Number: 06_0158), and has considered your request for the preparation of a concept plan for the project.

I wish to advise you that on 3 July 2006 the Minister for Planning authorised the preparation of a concept plan for the proposed South West Rail Link project.

I have attached a copy of the Director General's requirements (DGRs) for the environmental assessment of the concept plan for the project. These requirements have been prepared following the Planning Focus Meeting held on 15 December 2005, the project briefing held on 9 June 2006 and in consultation with relevant government agencies including Liverpool City, Campbelltown City and Camden Councils.

It should be noted that the Director-General's requirements have been prepared based on the information provided to the Department to date. Under Section 75F(3) of the Act, the Director-General may alter or supplement these requirements if necessary and in light of any additional information that may be provided prior to the proponent seeking approval for the concept plan for the project.

I would appreciate it if you would contact the Department at least two weeks before you propose to submit the Environmental Assessment for the project to determine:

- the fees applicable to the application;
- consultation and public exhibition arrangements that will apply;
- options available in publishing the Environmental Assessment via the Internet; and
- number and format (hard-copy or CD-ROM) of the Environmental Assessments that will be required.

Prior to exhibiting the Environmental Assessment, the Department will review the document to determine if it adequately addresses the DGRs. The Department will consult with other relevant government agencies in making this decision. If the Director-General considers that the Environmental Assessment does not adequately address the DGRs, the Director-General may require the proponent to revise the Environmental Assessment to address the matters notified to the proponent. Following this review period the Environmental Assessment will be made publicly available for a minimum period of 30 days.

Bridge St Office 23-33 Bridge St Sydney NSW 2000 GPO Box 39 Sydney NSW 2001
Telephone (02) 9228 6111 Facsimile (02) 9228 6191 DX 10181 Sydney Stock Exchange Website planning.nsw.gov.au

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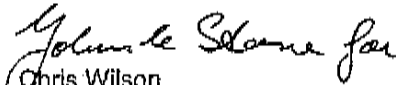
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If your proposal includes any actions that could have a significant impact on matters of National Environmental Significance, it will require an additional approval under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). This approval would be in addition to any approvals required under NSW legislation. If you have any questions about the application of the EPBC Act to your proposal, you should contact the Commonwealth Department of Environment and Heritage in Canberra (6274 1111 or <http://www.deh.gov.au>).

If you have any enquiries about these requirements, please contact Lisa Mitchell, Manager, Transport on 02 9228 6354.

Yours sincerely



Chris Wilson
A/Executive Director
Sustainable Development Assessments
as delegate for the Director General

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Director-General's Requirements

Section 75F of the *Environmental Planning and Assessment Act 1979*

Application number	06_0158
Project	The construction and operation of the South West Rail Link being: <ul style="list-style-type: none"> • a heavy passenger railway off the East Hills line generally between the Glenfield station area and Leppington; and • associated infrastructure including stations, train stabling, roadways, car parks, bus interchanges, public amenities and intermodal facilities.
Location	Between Glenfield and Leppington
Proponent	Transport Infrastructure Development Corporation (TIDC)
Date issued	12 July 2006
Expiry Date	12 July 2006
General Requirements	<p>The Environmental Assessment (EA) must include the following:</p> <ol style="list-style-type: none"> 1. an executive summary; 2. a description of the project including: <ul style="list-style-type: none"> ▪ the objectives of the project; ▪ staging of the project and components which may be subject to subsequent approval(s) ▪ the alignment and corridor width (including any tunnel sections) ▪ general construction and operation requirements; ▪ patronage forecasts and mode shift assumptions; and ▪ the alternatives considered including route alignment (vertical and horizontal), number and location of stations, location of stabling facilities and construction compounds and justification for the option(s) chosen. 3. a general environmental risk analysis identifying the potential environmental impacts associated with the project (taking into account issues raised during consultation), (Note: where the risk analysis identifies additional key environmental impacts to those identified in the 'key issues' section of the Director-General's Requirements, an appropriately detailed impact assessment of these additional key environmental impacts must be included in the EA). 4. an assessment of the key issues specified below, with the following aspects addressed for each key issue (where relevant): <ul style="list-style-type: none"> ▪ describe the existing environment; ▪ predict the level of potential impacts based on an assessment of worst case impact scenarios; identify any planning, land use or development related assumptions used in impact prediction and/or developing management and mitigation commitments; ▪ describe measures that would be implemented to avoid, minimise, mitigate, offset, and/or monitor the impacts of the project; identify any opportunities for changing particular components of the project to reduce impacts. 5. a draft Statement of Commitments, outlining environmental management, mitigation and monitoring measures. 6. a conclusion justifying the project taking into account: <ul style="list-style-type: none"> ▪ the environmental, social and economic impacts; ▪ the suitability of the site; and ▪ whether or not the project is in the public interest.
Key issues	<ul style="list-style-type: none"> • Interrelationship with Land Use and Infrastructure Planning <ul style="list-style-type: none"> ▪ implications for existing and future planning, land use and development strategies, including: <ul style="list-style-type: none"> ▪ precinct planning (including around Leppington Station);

	<ul style="list-style-type: none"> ▪ existing and proposed passenger and freight rail infrastructure (including the Southern Sydney Freight Line); ▪ infrastructure to be provided by the Growth Centres Commission; ▪ future extension requirements of public roads including Camden Valley Way; and ▪ the future extension of the SWRL to Bringelly. • Corridor Acquisition and Land Use – including property and land acquisition impacts, severance (including access to green space such as the Western Sydney Parklands), sterilisation of land and impacts on adjacent land use including the impact of the proposed stabling facility. • Traffic, Transport, Parking & Access <ul style="list-style-type: none"> ▪ Operational Impacts – including <ul style="list-style-type: none"> ▪ opportunities for the integration of rail and bus services including modal interchange facilities, local bus services, strategic corridors and external network connections, access and mobility considerations; ▪ opportunities to provide pedestrian and cycle links to the Western Sydney Parklands across and alongside the rail line; and ▪ potential local traffic impacts taking into account mode of access to stations and the parking facilities to be provided (including park & ride and kiss & ride). ▪ Construction Impacts – Including <ul style="list-style-type: none"> ▪ identifying haulage routes, impacts to local and regional traffic from haulage and other construction activities; ▪ impacts to existing station facilities such as parking and access during construction; and ▪ impacts to bus and rail servicing during construction, particularly the potential impact of construction at Glenfield. • Noise and Vibration <ul style="list-style-type: none"> ▪ Operational Noise & Vibration – including <ul style="list-style-type: none"> ▪ impacts from rail (air borne & regenerated), the stabling yard, other ancillary infrastructure and cumulative impacts taking into account existing and proposed passenger and freight rail infrastructure; ▪ consider the implications of mitigation measures (e.g. residential setbacks) on precinct planning and lot yields, in consultation with the Growth Centres Commission. ▪ Construction Noise & Vibration – Including <ul style="list-style-type: none"> ▪ construction traffic, works outside of standard work hours, and blasting impacts. • Flooding and Surface Water <ul style="list-style-type: none"> ▪ Identify riparian zones for water way crossings and impacts from those crossings. ▪ flood impact assessment should in accordance with the <i>NSW Government Floodplain Development Manual (2005)</i>; and ▪ identify potential increases in flood levels, duration, hazard impacts, and mitigation options through appropriate flood modelling; • Flora & Fauna - including impacts on threatened species (aquatic and terrestrial), critical habitats (aquatic and terrestrial), populations, ecological communities, native vegetation and corridors. • Indigenous and Non-Indigenous Heritage – identify areas of direct and indirect impact (including areas of heritage potential); assess the heritage significance of any identified sites; and consider potential measures to offset any unavoidable impact on heritage. <ul style="list-style-type: none"> ▪ indigenous heritage assessment should be consistent with the strategies/ approach developed by the Growth Centres Commission and the Department of Environment and Conservation; and ▪ any heritage assessment of the Upper Canal should be consistent with Conservation Management Plan for the Upper Canal, Pheasant's Nest
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	<p>to Prospect Reservoir, NSW, Vol 3. Inventory. Upper Canal. Section 8 (SCA, 2001)</p> <ul style="list-style-type: none"> • Visual and Urban design – Identify and evaluate the visual impacts of key design components of the project (including the rail flyover) and from key vantage points. • Social Impacts - social benefits, impacts on the local community and existing sensitive land uses adjacent to corridor • Economic Impacts - business impacts and economic impacts to surrounding centres.
Consultation	<p>You should undertake an appropriate and justified level of consultation with relevant parties during the preparation of the EA, including:</p> <ul style="list-style-type: none"> • local, State or Commonwealth government authorities and service providers; and • the public (including community groups or affected landowners) - document all community consultation undertaken to date or discuss the proposed strategy for undertaking community consultation. This should include any contingencies for addressing any issues arising from the community consultation and an effective communications strategy.
Deemed Refusal Period	120 days
Statement	a signed statement from the author of the EA certifying that the information contained in the report is neither false nor misleading.

Electronic publishing of the Environmental Assessment

Electronic documents presented to the NSW Department of Planning for publication via the Internet will need to meet certain criteria. Adobe Acrobat PDF files and Microsoft Word documents must be no bigger than 1.5 Mb. Large files of more than 1.5 Mb will need to be broken down and supplied as different files. File names will need to be logical so that the Department can publish them in the correct order. Avoid sending documents that are broken down into more than 10 files.

Image files should not be bigger than 2Mb. The file names will need to be clear and logical so the Department can publish them in the correct order.

- Graphic images will need to be provided as [.gif] files.
- Photographic images should be provided as [.jpg] files.
- Large maps will need to be presented as individual files and will need to be calibrated to be no more than 2Mb each.
- Images inserted into the document will need to be calibrated to produce files smaller than 1.5Mb. Large images will need to be presented as individual files and will need to be calibrated to be no more than 2Mb each. The file names will need to be clear and logical so the Department can publish them in the correct order.



Department of
Environment and Conservation (NSW)

Our reference : 03/
Contact : Gavin Martin 9995 6834

Mr David Gainsford
Transport Infrastructure Development Corporation
Level 7, Tower A, Zenith Centre
821 Pacific Hwy
Chatswood NSW 2067

Dear Mr Gainsford

RE: Aboriginal Cultural Heritage Assessment Requirements for the NW and SW Rail Links

Incoming
12 JUL 2006 48279
Orig: MRH
Copy: _____
Actr: _____
RCR: 4056

As you are aware, the DEC and Transport Infrastructure Development Corporation (TIDC) met on 26 June to discuss the above matter. This letter provides follow-up advice to the TIDC regarding the Aboriginal cultural heritage (ACH) assessment requirements for the proposed NW and SW rail links. The DEC is aware that the development applications are to be considered under Part 3A of the *Environmental, Planning and Assessment Act 1979*. As per current protocols, the DEC will act in an advisory capacity to the Department of Planning on Aboriginal cultural heritage matters.

As the NW and SW rail links are either located adjacent to, or pass through, the Growth Centre precincts the DEC is of the view that the Aboriginal community consultation protocol (the Protocol) and ACH assessment methodology (the Methodology) which are currently under development for the Growth Centres should be adopted for the NW and SW rail links (Protocol and Methodology attached).

The DEC understands that the Growth Centres Commission (GCC) is of a similar view. The GCC has given permission to the DEC to provide the draft Protocol and Methodology to TIDC. It should be noted that these remain in working draft form and are yet to receive final endorsement from any of the relevant parties.

Over the past several months the GCC, with heritage consultants Context Pty Ltd., has been developing a protocol for engaging with Aboriginal community groups in the assessment of the land proposed for the NW and SW Growth Centre precincts. In addition, the GCC has been developing a detailed methodology for undertaking the ACH assessments of the Growth Centre precincts which will inform precinct planning. The DEC has played a central advisory role in the development of these documents. The primary objectives of the Protocol and Methodology are:

1. to ensure that policies and decisions regarding Aboriginal cultural heritage are developed with a good understanding of the needs and interests of Aboriginal people;
2. to allow Aboriginal communities to contribute knowledge and information relevant to the assessment of Aboriginal cultural heritage;
3. to identify Aboriginal cultural heritage values within the Precinct with the aim of informing precinct planning outcomes;
4. to provide the information base on which the Department of Environment and Conservation can assess precinct level approvals; and,
5. to identify prospective conservation areas based on their Aboriginal cultural values.

Applying the Protocol and Methodology to the NW and SW rail link projects will maintain consistency with the approach taken for the Growth Centre precincts and minimise the risk of the environmental assessment not complying with ACH requirements. Maintaining consistency in the assessment approach will also allow for meaningful comparison with future assessments to be undertaken with the adjacent Growth Centre precincts, including for development areas within the Edmondson Park release area.

The methodology developed for undertaking ACH assessments has the key objectives of identifying areas of cultural value to inform assessment and land use planning decisions. While the DEC would expect TIDC to make every practical attempt to avoid disturbance to Aboriginal objects and landscapes it is understood that once the Concept Plan for the routes for the rail lines are established there will be fewer options to avoid impacts to Aboriginal heritage given the nature of the project. The DEC advises that while disturbance to ACH should be avoided where possible, offsets to mitigate against the loss of ACH may also need to be considered. Any offsets must be discussed and developed with the relevant Aboriginal community groups and the DEC.

The first stage in the Part 3A approval process is the development of a Concept Plan. Based on discussions at the recent meeting between our agencies, the DEC understands that the time-frame for preparation of the Concept Plan is approximately three months. Following this, a detailed environmental assessment of the confirmed route of the rail links will then take place.

Given the above timeframe, the DEC considers that the steps outlined in the Methodology should be separated to fit within these two approval stages. The DEC recommends the following approach:

Concept Plan stage

The focus of the Aboriginal cultural heritage assessment during preparation of the Concept Plan should be on completion of Steps 1 in the Methodology. Within this Step particular emphasis should be given to:

- engaging with the Aboriginal communities and providing as much opportunity for Aboriginal stakeholder involvement as possible (following the recommendations in the Methodology); and,
- preparation of the preliminary values map.

Given the limited time-frame the DEC recommends that less emphasis be given to the historical research components of Steps 1, although obviously the assessment should draw on the extensive work already undertaken in the North West and for Edmondson Park in the South West. The DEC also recognise that it may be necessary to undertake some initial field investigations (which is part of Step 2) to inspect some of the known Aboriginal heritage objects and places and/or other areas identified through the preliminary values mapping undertaken in Step 1.

The DEC also recommends that the Statement of Commitments to be prepared to accompany the Concept Plan address the following matters:

- completion of the full Aboriginal cultural heritage assessment using the relevant parts of Steps 2, 3 and 4 in the Methodology;
- on-going consultation with the Aboriginal stakeholders; and

- a commitment to work with the Aboriginal stakeholders to identify and seek agreement on suitable offsets that may be needed to counter-balance any unavoidable impacts on Aboriginal cultural heritage.

Project Plan / Approval stage

The assessment work to be completed for this stage should focus on Steps 2, 3 and 4 of the Methodology. In addition, the DEC would expect that the matters identified in the Statement of Commitments (see above) would be fully explored and detailed in this stage. As discussed above, given the linear nature of the proposed rail line and the lower opportunities that presents to avoid impacts, the DEC would recommend that TIDC work closely with the Aboriginal communities to identify any suitable offsets. Some offset options were highlighted in the DEC's recent letter to the Department of Planning, but the views of the communities on these and other options will need to be fully canvassed.

The DEC acknowledges that there are some tasks associated with the Methodology which may not be applicable to the assessment requirements for the NW and SW rail links, in particular in areas where impacts are minimal or previous land use disturbance has been severe the level of detailed investigation described in the Methodology may not be necessary. The DEC would like to meet with the consultants contracted to undertake the ACH assessments prior to the assessment work beginning to discuss these issues and confirm their approach to implementing the Methodology. Separate meetings with the consultants contracted to assess the NW and those contracted for the SW should take place.

Given the linkages with the Edmondson Park assessment work that is about to commence, the DEC would also recommend that:

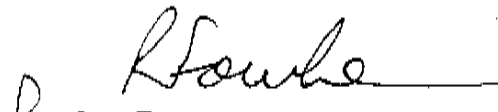
- the consultants contracted to undertake the assessment of the SW rail link be made fully aware of the further cultural heritage assessment being undertaken in Edmondson Park by consultants acting on behalf of Landcom;
- TIDC and Landcom look to arrange an initial joint briefing for the Aboriginal communities on these two projects in the SW, how they relate, the assessment path, application of the Methodology and the relationship with the broader Growth Centres planning framework; and
- that a similar meeting be instigated with the Aboriginal communities with an interest in the NW rail link to discuss the assessment path, the application of the Methodology and relationship with the broader Growth Centres planning framework.

The DEC considers these first briefings critical to ensuring that the Aboriginal communities are given a clear understanding of the linkages and overlaps between the various projects underway. Given that the Methodology is yet to receive final endorsement from the communities it will also be an important step in determining their level of support to undertake the proposed assessments. The DEC would be interested in attending and assisting at the community briefings.

The DEC will be discussing a similar approach for the first Edmondson Park precinct planning assessments with Landcom in the very near future.

Should you require any further advice, or wish to arrange the initial consultant meetings, please contact Gavin Martin 9995 6834.

Yours sincerely

 7/7/06.

Lou Ewins
Manager
Planning and Aboriginal Heritage
Metropolitan Branch
Environment Protection and Regulation Division

cc. Lisa Mitchell / Dinuka McKenzie
Department of Planning

APPENDIX **A**

PROTOCOL FOR ABORIGINAL STAKEHOLDER INVOLVEMENT IN THE ASSESSMENT OF ABORIGINAL HERITAGE IN THE SYDNEY GROWTH CENTRES

1. Introduction

Aboriginal consultation acknowledges the right of Aboriginal people to be involved, through direct participation on matters that directly affect their heritage. This is consistent with the NSW Government's Aboriginal Affairs Plan¹, which promotes the increased participation of Stakeholder Aboriginal Communities in matters that affect them. Aboriginal consultation is a primary component of the Aboriginal cultural heritage assessment for the Growth Centres.

This Protocol should be read in conjunction with the *Consultant Brief for Identifying and Assessing Aboriginal Cultural Heritage in the Sydney Growth Centres* and *Appendix B – Precinct assessment method for Aboriginal cultural heritage in the Sydney Growth Centres*.

1.1 Purpose

Involving Aboriginal people early in the planning process increases the opportunity that they have to influence the outcomes of that process.

This Protocol has been developed in consultation with Aboriginal communities to ensure that Aboriginal stakeholders are given adequate opportunity to share information about areas that have a high social and cultural value in the landscape, and to participate in developing land use and management options for these areas.

Implementation of the Precinct Assessment Method requires collaboration between Stakeholder Aboriginal Communities, and consultants and involvement of Stakeholder Communities in key tasks within each step. Successful identification, assessment and management of Aboriginal cultural heritage values will not be achieved if consultation is only carried out at the beginning of the process, or if consultation fails to be maintained during subsequent phases of the process.

Community consultation is a process that provides community members with an opportunity to inform and contribute to the making of the best possible decisions in the context of a clear and realistic understanding of constraints. It is important to recognise that within a community, different groups or individuals may provide different views and that all views need to be considered.

It is important that Aboriginal communities are able to sustain a relationship with their heritage places through involvement in heritage research. For this reason the process of Aboriginal community involvement is as important as the outcomes it secures

¹ The Government's Aboriginal Affairs Plan may be viewed at <http://www.daa.nsw.gov.au/policies/policy.html>

1.2 Stakeholder Aboriginal communities

The **Stakeholder Aboriginal Communities** identified in this Protocol are individuals or organisations who represent community or familial interests of the Aboriginal communities of the Growth Centres. In the Growth Centres, Stakeholder Aboriginal communities include Local Aboriginal Land Councils (as custodians of the country under the *Land Rights Act 1983*), and traditional owners who identify as descendants of the original (pre-European) inhabitants of the area (including registered Native Title claimants).

The Stakeholder Aboriginal Communities currently registered for the Growth Centres are as follows:

North West Growth Centre

- Darug Aboriginal Cultural Heritage Assessments (Gordon Morton – registered Native Title claimant);
- Darug Custodian Aboriginal Corporation (traditional owner community organisation);
- Darug Tribal Aboriginal Corporation (traditional owner community organisation); and
- Deerubbin Local Aboriginal Land Council.

South West Growth Centre

- Cubbitch Barta Native Title Claimants Aboriginal Corporation (registered Native Title claimant, traditional owner community organisation);
- Darug Aboriginal Cultural Heritage Assessments (Gordon Morton – registered Native Title claimant);
- Darug Custodian Aboriginal Corporation (traditional owner community organisation);
- Darug Tribal Aboriginal Corporation (traditional owner community organisation);
- Gandangara Local Aboriginal Land Council; and
- Tharawal Local Aboriginal Land Council.

The contact details of these registered Stakeholder Aboriginal Communities are contained in Attachment 1.

1.2.1 Role of Stakeholder Aboriginal Communities

Listed Stakeholder Aboriginal Communities are the primary determinants of the significance of their heritage and should be involved in assessing and describing the Aboriginal heritage values of the land with which they are associated. It is essential that both Local Aboriginal Land Councils and traditional owners are involved in heritage assessment.

1.2.2 Stakeholder Boundaries

Local Aboriginal Land Councils will be invited to participate in heritage assessment for all land in those areas within the Land Council's boundary defined by the *Land Rights Act 1983*. Traditional owner organisations may also wish to supply maps indicating the land for which they wish to be involved in heritage assessment. In the absence of such mapping, all traditional owners associated with the Growth Centre will be invited to be involved in heritage assessment accordance with this Protocol (see section 3.1 below).

1.2.3 Identifying additional stakeholders

Additional stakeholders may be identified where they can demonstrate community or cultural interests, not already represented by the listed stakeholders. Community interest should not be a purely commercial interest.

1.2.4 Other interested communities and individuals

In addition to Stakeholder Aboriginal Communities there are **other interested communities and individuals** (both Aboriginal and non-Aboriginal) who may have an interest in the identification of heritage values in the Growth Centres. These may include (among others):

- Aboriginal community organisations other than Local Aboriginal Land Councils and traditional owners (including those not directly involved in heritage assessment such as Aboriginal community or health groups);
- other local Aboriginal families / communities; and
- historical societies.

These communities and individuals will have a role in providing information relevant to the assessment of significant heritage in the Precinct.

1.2.5 Involvement in site assessment and consultancy work

Individual Stakeholder Aboriginal Communities are not guaranteed consultancy work (e.g. site assessment) during Precinct Assessment by virtue of their listing as Stakeholders. However, it remains essential that Aboriginal involvement occurs at all stages of Precinct Assessment, including site assessment work, in order to inform the assessment of Aboriginal cultural values of places and landscapes.

Stakeholder Aboriginal Communities as holders of particular skills and knowledge relevant to heritage assessment are well placed to contribute to the identification of Aboriginal cultural heritage through participation in site assessment. Best endeavours will be made to involve members of the Stakeholder Aboriginal Communities in site assessment or at a minimum, seek their support for the proposed site assessment methodology.

1.2.6 How were stakeholders identified?

The Stakeholder Aboriginal Communities were identified through the following processes:

1. Staff from the Growth Centres Commission and the Department of Environment and Conservation, and heritage consultants with experience working in the western Sydney region met to identify all stakeholders who were known to them.
2. Advertisements were placed in national Indigenous newspapers and local print media calling for responses from Indigenous people with an interest in Aboriginal heritage in the two Growth Centres.
3. All people and organisations that were identified through the first meeting and through the advertisements were contacted to arrange a face-to-face meeting.
4. At the first meeting with each stakeholder organisation and individual stakeholders, these stakeholders were asked if they were aware of any further stakeholders with an interest in the Aboriginal heritage of the Growth Centres who had not been identified, and who were not represented by any of the organisations that were listed.
5. Letters were sent to Native Title Services NSW, the NSW Aboriginal Land Council and Aboriginal liaison officers in relevant local governments requesting advice on the list of stakeholders that was developed.

1.2.7 DEC Interim Consultation Guidelines

(National Parks and Wildlife Act 1974: Part 6 Approvals – Interim Community Consultation Requirements for Applicants, December 2004)

The DEC Interim Consultation Guidelines (December 2004) remain applicable to any process seeking the granting of permits under Part 6 of the *NPW Act*, including the identification and approvals for Aboriginal cultural heritage in the Growth Centres.

The process for involving stakeholders contained in this Protocol is consistent with the intent and purpose of DEC's Interim Consultation Guidelines.

Furthermore, the process already undertaken to notify and register the Aboriginal Stakeholder Communities listed in this Protocol will be taken into account in considering whether sufficient consultation (under DEC Interim Consultation Guidelines) has been undertaken during precinct assessment of Aboriginal cultural heritage. The notification process described above should be undertaken at the commencement of detailed precinct planning to inform the precinct planning process and any future s87 and s 90 applications made pursuant to the NPW Act (see also section 3.1 below).

1.3 Objectives for Aboriginal stakeholder involvement

The overall objectives for Aboriginal stakeholder involvement are:

- to allow communities to contribute knowledge and information relevant to the assessment of Aboriginal cultural heritage;
- to allow communities to define and describe the importance of heritage landscapes, sites or objects to them and their culture and traditions;
- to sustain the relationship between Indigenous people and their heritage places.
- to ensure that decisions regarding Aboriginal cultural heritage are developed with a good understanding of the needs and interests of Aboriginal people
- to develop confidence and trust of the Stakeholder Aboriginal Communities in the outcomes of Aboriginal heritage assessment;

Aboriginal consultants with the required experience are encouraged to tender to undertake and coordinate Aboriginal heritage research and assessment.

In most cases, a single professional consultant team, which may include Aboriginal team members, will be engaged to undertake heritage assessments, and work with Aboriginal stakeholders. The consultant team, including any Aboriginal team members, should demonstrate extensive and successful experience in working with the Aboriginal stakeholders associated with the relevant Growth Centre or Precinct.

2. Working with Aboriginal stakeholders

The Precinct assessment method advocates the involvement of Aboriginal communities throughout the assessment process in the variety of specialist fields that make up the study.

Involvement of the Stakeholder Aboriginal Communities in the research and investigations helps to develop the capacity of communities in both investigating and understanding their heritage. Through their interaction with specialist consultants (botanists, archaeologists, historians, ethnographers etc.) the community will develop a greater knowledge of techniques that are available for them to record and understand their heritage, and an understanding of what information is being used to determine their heritage.

Through their greater understanding of the techniques that are used to identify and assess heritage value, Aboriginal stakeholders will be able to contribute to decisions about heritage interpretation and management with greater confidence and certainty.

Consultants are required to work with Stakeholder Aboriginal Communities in the Precinct assessment of Aboriginal cultural heritage at all stages. In particular Stakeholder Aboriginal Communities have a role to:

- contribute to the identification of known information, and knowledge gaps;
- participate in heritage research and investigations (including archaeological survey and historical or ethno-historical research where undertaken);
- assess significance, including:
 - responding to historical, ethnographical and archaeological reports, and describe the Aboriginal cultural values of evidence contained in such reports;
 - contributing statement(s) about Aboriginal cultural significance of the landscape, sites or places within it; and
- participate in discussions about how to respond and manage Aboriginal heritage values identified in the assessment.

The extent and nature of the collaboration will be negotiated by the consultants and communities in each case. The processes for consultation that are presented in this document are provided as a minimum standard for stakeholder consultation in each stage of the assessment process. Consultants who are engaged to assess Aboriginal cultural heritage will implement each of these processes.

The implementation of processes for consultation or engagement with Aboriginal stakeholders that extend beyond these minimum standards will be well regarded.

2.1 Skills and experience of sites officers

Aboriginal people who participate in archaeological assessment will have demonstrated skills and experience in field identification and survey techniques, and possess cultural knowledge. The consultant will liaise with Aboriginal communities to ensure that the individuals involved in site assessment are sufficiently equipped (skills, experience, safety, physical ability) to undertake that work. They will also have the ability to assist in communicating the results of survey work back to Aboriginal stakeholders for the assessment of cultural values and significance, and returning the community's advice to the GCC. See Attachment 2 – Provision of Aboriginal assessment and advisory services by Stakeholders.

2.2 Multiple Stakeholder Aboriginal Communities

In each Precinct there is likely to be more than one registered stakeholder community with a primary interest in the Aboriginal heritage of that area. It is important that consultants are able to demonstrate that they can work with all Aboriginal groups.

2.3 Resources

While all the Stakeholder Aboriginal Communities speak of the importance of heritage to them, the resources each community has to participate in heritage work is limited. Sensitivity must be given to the competing needs and demands of each community in requesting their involvement, particularly where communities will be required to be involved in assessments of multiple Precincts.

2.4 Timing

Timing of Aboriginal community involvement is crucial for both the efficient completion of heritage investigations and the effective participation of communities in heritage assessment. Communities need to give sufficient advance notice of key assessment activities (including start up meetings, surveys, workshops and reviewing studies) for them

to make staff available. In the case of heritage survey, this should be at least two weeks, and some scope to negotiate dates within a reasonable period.

Critical timelines and milestones for the completion of assessment activities (e.g. site survey) and delivery of reports will be communicated to communities at the commencement of assessment. Stakeholder Aboriginal Communities will be asked to make an undertaking to work within these timelines.

3. Stakeholder consultation activities

3.1 Pre-assessment activities

Commencement of Precinct planning

Following the formal 'declaration' of precincts (i.e. to commence of detailed Precinct planning), the GCC will make the necessary arrangements to make this decision known to local Councils and other stakeholders including Aboriginal stakeholders.

The provision of information about commencement of Precinct planning will flag to Aboriginal stakeholders that the assessment of Aboriginal cultural heritage is imminent.

Notification and registration

Following selection of a consultant to undertake Aboriginal heritage assessment in the Precinct, the consultant will make initial contact with all stakeholders listed in this Protocol who have been identified for the Growth Centre and request their involvement.

The consultant will also seek to confirm that the stakeholders listed in this Protocol cover all Aboriginal communities with direct interest in being involved in assessment by:

- making contact with relevant Local Aboriginal Land Council(s), Registrar of Aboriginal Owners, Native Title Services, local council(s) and Department of Environment and Conservation, and
- via an advertisement in the local print media.

It is important that in seeking confirmation of involvement and in advertisements, the consultant specify that the consultation will not only inform the precinct planning process, but will inform future s87/s90 applications for the subject area.

Each stakeholder will be contacted directly by the consultant. They will be asked to register their interest in participating as a stakeholder, and to identify the level of involvement they wish to have within the Precinct.

Regarding their level of involvement, they will select between having:

- **Primary involvement:** active involvement in heritage identification, assessment, and management; OR
- **General involvement:** only to be kept informed about the process and outcomes.

Stakeholders who elect to have only **general** involvement will not be invited to participate in heritage assessment activities, rather they will be provided with a copy of the final report for the Precinct.

With all stakeholders who identify for **primary** involvement, the consultant will negotiate with them regarding their involvement and encourage their input into the investigation and assessment of Aboriginal cultural heritage in the Precinct. This may include:

- contributing to the identification of known information, knowledge gaps and priorities for further research;

- participating in historical, anthropological and archaeological research and investigations;
- contributing statement(s) about Aboriginal cultural significance of the landscape, sites or places within it; and
- responding to historical, ethnographical and archaeological reports, and describing the Aboriginal cultural values these reports help to identify and support;
- contributing statement(s) about Aboriginal cultural significance of the landscape, sites or places within it;
- attendance at workshops and meetings to discuss draft findings or review draft Final Report for the Precinct;
- participating in negotiations discussions / debate about how to respond to places of Aboriginal significance in planning instruments and other forums; and
- other roles that the consultant may agree with the stakeholders.

A number of mechanisms may be set up to enable Aboriginal stakeholders to engage in these activities. These mechanisms may include:

- participating in a workshops or meetings at key points within the assessment process;
- providing written comment or reports;
- participate in research activities such as historical, anthropological and archaeological research and investigations; and
- community-based consultation.

For each step in the assessment process, a minimum level for involvement of Aboriginal stakeholders is described in this Protocol.

Aboriginal stakeholders will respond to the request to register within 10 working days of receipt of the request to register.

The registration process allows Aboriginal stakeholders to register to be included in consultation for each Precinct. The registration process is not an opportunity for stakeholders to request the exclusion of other stakeholders.

3.2 Step 1: Gather and analyse existing information

Stakeholders invited to identify known sources of information and information gaps

Stakeholder Aboriginal Communities will be involved in Step 1 by making direct input to the consultant on the processes of gathering and analysing existing information in consultation with stakeholders.

The consultant will ensure stakeholders are involved in identifying:

- known sources of information relevant to Precinct for each of the research areas (landscape and environmental information, history, archaeology);
- information that is held / known by the community but not yet recorded; and
- information gaps of which they are aware.

Information that is gathered from this process will inform the consultant's work to identify existing information and information gaps.

Stakeholders review and comment on draft Step 1 Report

At the completion of Step 1, the consultant will produce the Step 1 Report. This report may include preliminary values maps which detail existing information about Aboriginal heritage values of the Precinct.

The consultant will provide a hard copy report to each Stakeholder Aboriginal Community. Stakeholders may make comment to the consultant about any limitations of the report or process in order to inform the next stage of investigations.

3.3 Step 2: – Identify and assess Aboriginal cultural heritage and values

In Step 2, the consultant will undertake necessary investigations, and then assess significance. When assessing significance, the consultant will assess and rank places and values identified during survey and consultation according to required assessment criteria and rankings.

Each Stakeholder Aboriginal Community with primary involvement in assessment of the Precinct will also report on the social and cultural values present in the Precinct. Communities' assessment of significance will necessarily follow their close involvement in site survey, investigations and review of consultants' findings.

Stakeholders participate in archaeological survey, historic research and other investigations.

Consultants are encouraged to work with Stakeholder Aboriginal Communities in a way which:

- allows communities to contribute knowledge and information relevant to historical research and other investigations;
- develops skills and capacity amongst community members in order to enhance their understanding of their heritage.
- build the knowledge of Stakeholder Aboriginal Communities about aspects of their heritage.

It is essential that Stakeholder Aboriginal Communities are involved in site survey work for Aboriginal cultural heritage. Appropriate mechanisms include:

- Meet with archaeologists prior to field work to review known information and plan and prioritise field survey.
- Participate in site survey.
- Review and assist in reporting outcomes;
- Contribute to the development of a detailed follow up field work proposal;
- Participate / monitor excavation works or other activities; and
- Undertake additional site visits where necessary to identify places of Aboriginal cultural importance.

Stakeholders write reports to consultant on social / cultural values of the Precinct.

Consultants are encouraged to allow Stakeholder Aboriginal Communities to lead the identification of social / cultural information and the identification of knowledge holders.

Appropriate mechanisms should be negotiated with Stakeholder Aboriginal Communities and can be reported back to the consultant team in written form, through individual meetings or workshops.

Stakeholders participate in a workshop or meetings to discuss and agree significance findings across the Precinct

Following the research and investigations, Stakeholders Aboriginal Communities will work with the consultant to prepare a comprehensive assessment of Aboriginal cultural heritage significance for the Precinct.

Ideally this will involve all stakeholders participating in a half to one-day workshop in which a combined assessment of significance which builds upon the input of all stakeholders and the consultant's findings will be developed.

The outcomes of the workshop will be descriptions and rankings of the Aboriginal heritage significance of sites, places, objects and landscapes within the Precinct and any other issues or implications for responding to significance that arise. These outcomes will be reported in the Draft Step 2 Report.

Stakeholders who are unable or choose not attend the workshop will be allowed to make separate comment prior to the workshop for consideration at the workshop.

Stakeholders review and comment on draft Step 2 Report.

A hard copy of the Draft Step 2 Report and related maps will be provided to each Stakeholder Aboriginal Community. The consultant will provide the community with adequate time to read and respond to the draft Step 2 Report. The amount of time for comment will be negotiated with Stakeholder Aboriginal Communities and will conform to the reporting and delivery timelines of the overall Precinct planning process.

Note: stakeholders may request to take draft findings to a committee or council meeting for consideration. Stakeholders undertake to convene an extraordinary meeting (where possible) when time constraints require a faster turn around.

Final Step 2 Report

A hard copy of the final Step 2 Report will be provided to each of the stakeholders.

3.4 Step 3: Develop land use and management options

In Step 3, the consultant will collaboratively develop land use and management options to appropriately manage and conserve the significance of Aboriginal cultural heritage places and values that are identified in Step 2. These management options will relate closely to the findings of Stage 2 and the outcomes of the Stage 2 workshop.

Stakeholders and consultants contribute to land use and management options for heritage places.

The consultant will discuss with each stakeholder their needs with regard to being able to discuss their preferences for land use and management options in a forum with other stakeholder groups. Some stakeholder groups may not feel comfortable presenting information and their views in a public forum.

The consultant will need to consult with, meet and obtain feedback from all stakeholders. Some stakeholders may wish meet one on one with the consultant, while others may agree to meet with other stakeholders whom they are able to work comfortably with.

The consultant will produce the draft Final Report.

Consultant presents draft Final Report to meeting of all stakeholders review and comment.

The consultant will convene a meeting of all stakeholders and present the consolidated findings contained in the draft Final Report for review and discussion. A hard copy of the draft Final Report and related maps will be provided to each Stakeholder Aboriginal Community prior to the meeting.

Communities may request adequate additional time before or after the meeting to read and respond to the draft Report. The amount of time for comment will be negotiated with

Stakeholder Aboriginal Communities and will conform to the reporting and delivery timelines of the overall Precinct planning process. Stakeholders may request to take draft Final Report findings to a committee or council meeting for consideration. Stakeholders undertake to convene an extraordinary meeting (where possible) when time constraints require a faster turn around.

Final Step 3 Report

A copy of the final Step 3 Report will be provided to each of the stakeholders.

3.5 Step 4: Input into Precinct Planning (subject to separate process)

The final development layout of Precincts will be informed by a range of constraints and studies and will involve an additional process of public consultation.

Attachment 1. Stakeholder contact details

North West Growth Centre

Darug Tribal Aboriginal Corporation

Contact person	Desmond Dyer
Preferred method of contact	Initial contact by letter Followed up with phone contact
Contact details	PO Box 441 Blacktown NSW 2148 Telephone/fax (02) 02 8814 9547 Email: dez56@optusnet.com.au

Darug Aboriginal Cultural Heritage Assessments

Contact person	Celestine Everingham Or Gordon Morton
Preferred method of contact	Initial contact by letter or fax Followed up with phone contact
Contact details	90 Hermitage Road Kurrajong Hills, NSW 2758 Telephone (02) 4507 7421 Fax (02) 4507 7421

Darug Custodian Aboriginal Corporation

Contact person	Leanne Watson
Preferred method of contact	Initial contact by letter or fax Followed up with phone contact
Contact details	PO Box 81 Windsor NSW 2756 Telephone (02) 4577 4581 Fax (02) 4577 5098 Email mulgokiwi@aol.com

Deerubbin Local Aboriginal Land Council

Contact person	Kevin Kavanagh
Preferred method of contact	Initial contact by letter or fax Followed up with phone contact
Contact details	Deerubbin Local Aboriginal Land Council PO Box V184 Mount Druitt Village NSW 2770 Phone : (02) 9832 2457 Fax: 02 9832 2496 Email: staff@deerubbin.org.au

South West Growth Centre**Darug Custodian Aboriginal Corporation**

As outlined above.

Darug Tribal Aboriginal Corporation

As outlined above.

Darug Aboriginal Cultural Heritage Assessments

As outlined above.

Gandangara Local Aboriginal Land Council

Contact person	Len Malone
Preferred method of contact	Initial contact by letter Followed up with phone contact
Contact details	Len Malone Chairperson Gandangara Local Aboriginal Land Council PO Box 1038 Liverpool NSW 2170 Phone: (02) 9602 1708 Email: gandangara@glalc.org.au

Cubbitch Barta Native Title Claimants Aboriginal Corporation

Contact person	Glenda Chalker
Preferred method of contact	Initial contact by letter or fax Followed up with phone contact
Contact details	55 Nightingale Road Pheasants Nest NSW 2574 Telephone (02) 4684 1129 Fax (02) 4684 1129

Tharawal Local Aboriginal Land Council

Contact person	Cliff Foley or Robyn Williams
Preferred method of contact	Initial contact by letter or fax Followed up with phone contact
Contact details	220 West Parade Couridjah NSW 2571 Telephone (02) 4681 0049 Fax (02) 4683 1375

Department of Environment and Conservation

Contact person	Director Metropolitan Branch
Contact details	PO Box 668 Parramatta NSW 2134 02 9995 6800

Attachment 2: Provision of Aboriginal assessment and advisory services by Stakeholders

SOURCE: National Parks and Wildlife Act 1974: Part 6 Approvals Interim Community Consultation Requirements for Applicants. Department of Environment and Conservation.

In addition to providing feedback on the proposed methodology, registered stakeholders may lodge offers to provide Aboriginal assessment and advisory services to the proponent for the cultural assessment and/or the archaeological assessment.

In meeting DEC requirements, the proponent should expect that offers to participate in the archaeological assessment will detail skills and experience in one or more of the following:

- field identification and survey techniques (including confirmation of physical ability to undertake fieldwork)
- cultural knowledge
- ability to assist in communicating the results of the survey back to the stakeholders for the assessment of cultural values and significance and returning advice on their response to the proponent.

The number of Aboriginal people that a proponent might engage in the archaeological assessment will depend on the scale and nature of the project, and should provide a balance of field experience and cultural knowledge. DEC anticipates that in some instances there will be multiple offers from suitably qualified, skilled or experienced Aboriginal people. DEC does not require all such people to be engaged, as the number and type of service providers to be engaged is a matter for proponents to determine. The focus should be on improving the outcome of the assessment process and may require some form of competitive selection by the proponent.

DEC does not have or seek a role in the determination of fees or other terms of engagement for service providers. This is a contractual matter between the proponent and service providers. However, it is recommended that the proponent should ensure that the engagement of service providers is through a written agreement or contract that addresses all of the following:

- the services to be provided
- roles and responsibilities of the parties
- payment terms.

The above arrangements mirror DEC expectations regarding engagement of scientific/archaeological services.

APPENDIX **B**

PRECINCT ASSESSMENT METHOD FOR ABORIGINAL CULTURAL HERITAGE IN THE SYDNEY GROWTH CENTRES

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Introduction

This Precinct Assessment Method has been designed to provide a consistent and comprehensive approach to Aboriginal cultural heritage (ACH) identification and management across broad scale land areas. The method has been developed specifically for application to Precincts in the North West and South West Growth Centres of Sydney (refer to Appendix C).

This method employs broad, landscape-scale investigation across Precincts in the Growth Centres. Working at a Precinct scale is intended to streamline the assessment and approvals process. It also allows Stakeholder Aboriginal Communities and Aboriginal heritage consultants to gain an appreciation of heritage across larger areas, and allows for the achievement of more meaningful conservation measures than can be achieved through 'site by site' assessment. It also affords consideration of Aboriginal cultural heritage early and throughout the planning process for each Precinct.

Importantly, the Precinct Assessment Method recognises that Aboriginal heritage is complex and dynamic. A range of multi-disciplinary research methods, including Aboriginal consultation, historical, landscape and environmental research, and archaeology (among others) will need to be used to ensure all values of Aboriginal heritage are assessed. Places of importance identified may range from archaeological sites and artefacts, to landscapes and environmental features, to places of 'post-contact' importance to Stakeholder Aboriginal Communities.

This Precinct Assessment Method has been developed with the input of Aboriginal stakeholder communities in the NW and SW Growth Centres.

This Precinct Assessment Method should be read in conjunction with the *Consultant Brief for Identifying and Assessing Aboriginal Cultural Heritage in the Sydney Growth Centres* and *Appendix A – Protocol for Aboriginal stakeholder involvement in the assessment of Aboriginal Heritage in the Sydney Growth Centres*.

Method steps

It is anticipated that Precinct assessment of Aboriginal cultural heritage will be undertaken in steps, and that at the conclusion of key steps or at defined *thresholds* during the study, the scope of further work and associated costs for later steps in each step will be refined. The steps and related thresholds are as follows:

Step 1 – Gather and analyse existing information

Threshold 1 – Scope and cost preliminary tasks of Step 2

Step 2 – Identify and assess Aboriginal cultural heritage and values

2a – Undertake investigations

Threshold 2 – Scope and cost additional investigations of Step 2

2b – Assess significance

Step 3 – Develop land use and management options

Threshold 3 – Scope and cost Step 4 (if required)

Step 4 – Input into Precinct Planning

The staged approach allows the large-scale data-gathering, field survey, mapping and Aboriginal stakeholder involvement required to evaluate the potential of a broad Precinct, to be progressively targeted and focussed towards identifying and assessing places and values of likely significance in greater detail.

Role of Aboriginal Stakeholders

Implementation of the Precinct Assessment Method requires collaboration between Stakeholder Aboriginal Communities and consultants, and involvement of Stakeholder Communities in key tasks within each step. Successful identification, assessment and management of Aboriginal cultural heritage values will not be achieved if consultation is only carried out at the beginning of the process, or if consultation fails to be maintained during subsequent phases of the process.

Specific roles of Stakeholder Aboriginal Communities are outlined within each task of each step in this method and detailed in Appendix A.

1.0 Step 1 – Gather and analyse existing information

This step involves collating, reviewing and synthesising available relevant information. It must include social / cultural, landscape and environmental, historical and ethno-historical and archaeological information and data. The aim of this step is to identify any information gaps that need to be addressed to adequately undertake the Aboriginal cultural heritage values identification and assessment in later steps of the Precinct Assessment Method.

1.1 Tasks

The primary tasks in Step 1 are:

- Scope and gather existing information and knowledge from previous studies, reports, academic work, and knowledge holders. (Preliminary overview field survey might be also be undertaken where appropriate.)
- Stakeholder Aboriginal Communities invited to identify known sources of information and information gaps.
- Summarise existing information and collate data in a usable form as a basis for the subsequent steps (and to inform other Precinct studies).
- Identify data gaps and prioritise further research to be undertaken in order to adequately identify and assess the Aboriginal cultural heritage values present within the Precinct (this may include development of a preliminary sensitivity map that will identify areas with potential ACH value and significance and those without).
- Prepare a Step 1 report which details and justifies the proposed fieldwork and investigations in Step 2.
- Invite Stakeholder Aboriginal Communities to review and comment on Step 1 Report.

Threshold 1 – Scope and cost preliminary tasks of Step 2

Some existing sources have been previously identified and a bibliography is attached. Existing studies including studies undertaken for previous Precinct planning work should be used as a starting point.

Consultant responses will be asked to outline in collaboration with Stakeholder Aboriginal Communities the preferred approach to involving members of the Aboriginal stakeholder communities in Step 1.

1.2 Collate existing information

1.2.1 Social and cultural places and values

Social / cultural information refers to information held in reports and other documents relating to the views and accounts given by Aboriginal people about an area. Such information may include any ethnographic investigations undertaken in the past or documented oral histories. It can also include the responses of Aboriginal groups to particular proposed developments in an area. Analysis of this information will provide insight into the connections that individuals and communities have with places and landscapes, both historically and today.

Equally important is the known information that is held within a community about their history, their stories and their lived experience. This scoping step will allow communities to identify this knowledge and appropriate approaches to obtain and document their knowledge.

Some information may be sensitive or have restricted public access. Appropriate protocols for sourcing and holding cultural information would be expected to be identified and followed (refer to s4.4 of the Consultant's Brief - *Culturally sensitive information*).

This scoping work might also identify data or sources of data relevant to other areas of investigation, for example information gathered relevant to understanding Aboriginal use of resources, or places of important events in the interaction of Aboriginal and European people.

Role of Aboriginal stakeholders

Consultants are encouraged to allow Stakeholder Aboriginal Communities to lead scoping of social / cultural information and the identification of knowledge holders and report this back to the consultant team in written form, through individual meetings or workshops (see also Appendix A).

1.2.2 Landscape / environment

Analysis of landscape and environmental information is an essential component of the data analysis step. This information will have the following roles in Precinct assessment of Aboriginal heritage:

- providing clear associations between the types of occupation evidence and the landscapes in which they are found;
- the landscape context also provides the basis for identification of the range of resources available to Aboriginal people living in the region and how this may have influenced Aboriginal use and occupation of the land;
- provide baseline information about the level of previous development / disturbance of the Precinct to inform archaeology assessments;
- providing baseline information about landscape and the condition of natural resources (flora, fauna, geomorphology, water quality etc.) which are important culturally to contemporary Aboriginal people; and
- the identification of landscape types and features (e.g. for the purposes of aesthetic value assessment) or identification of elements of particular cultural importance.

Key tasks

- Map and describe the landform units present within the Growth Centres. Use standard landscape unit recording (see McDonald et al. 1998).
- Map and describe the geomorphology, including areas of potential older occupation evidence and/or stratigraphic deposits and palaeo-geomorphic features. Follow up field assessment may be necessary at Step 2 (a qualified and experienced geomorphologist would need to be engaged to undertake this assessment).
- Incorporate existing disturbance mapping (where available) to identify areas of differing integrity. Follow up field assessment may be necessary at Step 2 (a qualified and experienced geomorphologist would need to be engaged to undertake this assessment, if required).
- Map and describe the water resources in the study area (such as permanent and ephemeral watercourses, springs, water holes, and swamps). Use existing data (available from DEC & Department of Planning) and supplement with ground truthing where necessary.
- Using available information on ethno-botanical and faunal resources provide a list of food resources which may have been utilised by Aboriginal people in this area and map and describe sources for these resources as far as possible.

- Map and describe other inorganic resources known to have been used by Aboriginal people, such as stone raw material and ochre sources. Other additional resources may become apparent through the literature review. Using the landform units as the basic descriptive unit, map and describe the locations of these resources across the study area.
- Incorporate any information from the Stakeholder Aboriginal Communities on food and raw material resources known to them.
- Group resources information into ‘resource zones’ which may have been used by Aboriginal people (potentially using data from DEC which describes the ecological for vegetation communities known to have existed in the study area).
- Describe, map and tabulate these resource zones according to their landform associations.
- Map all known reserve land in the region (data available through the DEC) and Voluntary Conservation Areas, declared Aboriginal Places and other conservation areas.

It is expected that the landscape / environmental analysis will be undertaken by personnel with experience and/or qualifications in terrain mapping, geomorphology and GIS and other specialists as required.

Role of Aboriginal stakeholders

Consultants should involve Stakeholder Aboriginal Communities to:

- enable information held by Stakeholder Aboriginal Communities (e.g. knowledge about plant resources etc.) to inform the research;
- increase the awareness and knowledge of Stakeholder Aboriginal Communities of the landscape, geomorphological and environmental context which might inform the identification of Aboriginal cultural heritage places (e.g. by providing mapped information to stakeholder communities);
- build confidence of Stakeholder Aboriginal Communities in the information used to develop models of prior occupation and use (e.g. by being transparent and inclusive in the work being done).

Sources

- Existing ethno-botanical studies.
- Preliminary predictive assessment of the levels of disturbance across the release areas that has been undertaken (Jo McDonald CHM, 2004). This information will be made available by GCC.

1.2.3 Historical background

Background historical research for the Precinct should be restricted to a review of existing sources of information including:

- ethno-historical information descriptive of Aboriginal traditional life with particular focus, but not restricted to, the Precinct (e.g. Attenbrow 2002);
- post-contact Aboriginal history from first-contact¹ to the present day related specific to the Precinct (e.g. Kohen 1993, Goodall 1982 & 1996, Willey 1987).; and
- the HHIMS and AHIMS Registers in the DEC, and all state and federal heritage registers;

¹ Current work by Department of Environment and Conservation in its Living Places program has provided valuable data relevant to the collation of a preliminary list of places of potential historic Aboriginal association. Further work is currently being undertaken for Sydney Aboriginal Historical Places Project (in progress), sources for which will be made available via the Growth Centres Commission.

- relevant regional/local area histories.

With the aim of producing:

- an outline thematic history (key themes associated with Aboriginal use and occupation of the Precinct);
- a preliminary list of places of potential post-contact Aboriginal importance for further investigation; and
- data relevant to other areas of investigation, for example any information gathered on the location and description of pre-contact Aboriginal archaeological places or areas of traditional cultural significance/association.

The completion of this step will identify the extent to which primary historical research is required in the Precinct in Step 2.

Role of Aboriginal stakeholders

Researchers are encouraged to work with Stakeholder Aboriginal Communities in a way that allows communities to:

- continue to build their knowledge about the history and prehistory of Aboriginal people in western Sydney;
- contribute their knowledge and perspective to understanding the areas history; and
- retain a sense of confidence in the process.

It is worth noting, however, that the history and pre-history of Aboriginal people in Sydney is contested. Aboriginal stakeholders will disagree on the content of some of these existing sources and should be given the opportunity to have their views heard and considered in this scoping step.

1.2.4 Archaeology

The key purpose of the background archaeological work is to synthesise the available information from previous archaeological studies to provide a context and baseline for what is known about Aboriginal cultural heritage in the Precinct.

This will provide an indication of the nature and range of occupation evidence to be expected within the specific landscape contexts of the study area. The synthesis of information will also assist in determining what archaeological features are unusual or rare within the study area.

Based on this synthesis and taking into account historical and landscape/environmental data, a preliminary model for archaeological site distribution might also be developed.

Key tasks

- Review and synthesise the information from published and unpublished reports (including heritage studies, heritage surveys and excavation reports) and registers (AHIMS).
- Map and describe the range of places and features previously recorded in the Precinct.
- Map, describe and tabulate the results of all excavations undertaken in the Precinct
- Map, describe and tabulate the results of all surveys undertaken in the Precinct.
- Identify the major research themes and models of settlement behaviour developed for the Precinct.
- Synthesis of existing information to form a benchmark for assessing significance (incorporate any regional studies which provide a significance context, where available).

- Identifying gaps in Aboriginal archaeological knowledge for each Growth Centre.
- Incorporate historical and landscape/environmental background data to develop a preliminary model for archaeological site distribution, to be refined at later steps.

Sources

Background Aboriginal archaeological information for the NW and SW Growth Centre Precincts is available from a number of sources that include:

- The DEC AHIMS Sites Register (in the form of site recording cards etc).
- The DEC Report Library (survey and assessment reports, S87/S90 reports etc).
- Stakeholder Aboriginal community groups and developers.
- Other sources of information that will have variously drawn upon in the above types of reports (generally from the DEC) include more comprehensive planning studies and zoning plans commissioned by Councils for specific local government areas (and parts thereof for large scale land releases) to provide 'bigger picture' scenarios.
- Published journal articles/references as may be contained within sources such as the *Australian Archaeology*, *Australian Aboriginal Studies* etc.
- A range of published and unpublished sources (e.g. university theses) may also be consulted, where available and practicable.

NOTE: Current work by DEC may provide substantial advancement of regional studies on Aboriginal archaeology. In particular this may provide (to be confirmed):

- summary of results of all surveys undertaken in the region;
- summary of results of all excavations undertaken in the region;
- preliminary predictive modelling of Aboriginal sites and
- DEC databases which map and describe (in GIS) the range of places and features previously recorded in the region will be made available.

Role of Aboriginal stakeholders

Archaeologists are encouraged to work with Stakeholder Aboriginal Communities to:

- identify previous work which may not have been undertaken in a manner satisfactory to the stakeholder communities (e.g. without their involvement);
- maintain trust and support of the Stakeholder Aboriginal Communities in the process;
- identify other knowledge held by communities relevant to previous archaeology work.

1.3 Step 1 Report

1.3.1 Identify data gaps and prioritise further investigation

A synthesis and review of the information obtained during data collation and gathering will identify any gaps in the existing data. Gaps in the data may be restricted to particular information sets (for example, social/cultural values) or a particular area where little or no cultural heritage assessment has been undertaken in the past.

Other gaps may be qualitative - where previous work has not been of a sufficient or relevant standard to be used or may have been rejected by the stakeholders or the broader community or the DEC.

The report on data gaps should include:

- identify particular data sets where information may be lacking.

- rate the standard of collated information and whether it meets current recording and Aboriginal consultation standards.
- provide a discussion of the information regarding Aboriginal cultural heritage that is not currently available, or is poorly understood or represented in the existing studies and literature.
- describe the assessment requirements for the areas or information sets that require additional information.
- identify those areas or data sets which require further assessment to ensure a comprehensive assessment within the Precinct.
- develop a plan for further investigations as part of Step 2, in consultation with Stakeholder Aboriginal Communities.

A report on priorities and outcomes should be prepared and agreed by all stakeholders, and provide the basis for additional investigations in Step 2.

The Step 1 report will also identify those places that may need further investigation to determine their significance and integrity, and the nature of investigation required. The report should provide a rationale and justification for investigations and indicative timing to inform Threshold 1. (This report may also provide information relevant to Threshold 2).

Where there is sufficient information, the consultant may also wish to identify likely places for conservation or where detailed further investigation may be required.

Role of Aboriginal stakeholders

- In accordance with Appendix A, the consultant will consult with Stakeholder Aboriginal Communities about the findings and outcomes of Step 1
- It is expected the consultant will also meet with stakeholders to discuss the results of Step 1 and develop an investigations strategy to be employed at Step 2 including proposed field inspections and confirmation of access issues and personnel involvement.

1.3.2 Preliminary values map

A preliminary values map which reflects the findings of preliminary investigations of Step 1 will accompany the Step 1 Report.

Mapping places and elements/characteristics known and likely Aboriginal cultural heritage significance and value is an essential part of scoping where detailed significance assessments and field recording should take place during Steps 2 and 3. It should also identify, if possible, those areas where Aboriginal cultural heritage values are unlikely to occur and where no further investigation or field survey is needed.

The preliminary values map should include and identify, to the extent of information available:

- the known places of social, spiritual, cultural value, including natural resources of significance;
- known historic places;
- known archaeological places; and
- potential places/areas of historic, archaeological, social, spiritual, cultural/natural significance.

The map should be clear and concise and at a suitable scale. Map data files should be forwarded electronically in ArcView shapefile format. The map data files generated should be suitably attributed.

Places not yet fully identified or defined in significance terms should be included on the maps as ‘sensitive’ areas where further investigation, which may include archaeological excavation, may better establish their integrity and heritage significance. Some notional or preliminary heritage significance can be attributed to those ‘sensitive’ places (which still require further investigation and work) if it is appropriate to do so.

**Threshold 1 – Scope and cost Steps 2 and 3
(excluding further investigations in step 2)**

2.0 Step 2 – Identify Aboriginal cultural heritage places & values

Step 2 includes two sequential components:

- *Step 2A – Undertake necessary investigations* – to gather information about Aboriginal heritage places and values; and
- *Step 2B – Assess significance* to identify and rank the relative importance of heritage places so that meaningful recommendations about protection and management can be made in Step 3.

2.1 Step 2a – Undertake necessary investigations

The aim of this step is to undertake sufficient archaeological investigations, landscape mapping, historical research and community-based cultural research to adequately identify Aboriginal heritage places and values in the Precinct.

Additional investigations may be required under all information strands identified above².

2.1.1 Tasks

The key tasks in this step are:

- With Stakeholder Aboriginal Communities, undertake comprehensive field survey, historical research and consultation sufficient to inform the identification of places of known or potential Aboriginal cultural heritage value and significance in the Precinct. Investigations will include:
 - overview historical research;
 - archaeological survey;
 - community-based research (e.g. cultural mapping and oral histories).
- *Threshold 2 – Scope and cost additional investigations (where required)*
- Undertake further research where required to inform the location, extent, condition or level of significance of a place. Where appropriate (and when supported by an agreed research design), this may include excavation work under s.87 permit from DEC. Additional investigations will need to be justified for the purposes of informing Precinct planning.
- Prepare reports on historic, archaeological and other information relevant to the assessment of significance.

The comprehensive field investigations and recording will address the priorities identified in the Step 1 Report. This will include historical research, archaeology and involvement of stakeholder communities to identify cultural places and values.

² In the case of landscape and environmental analysis, this would be limited to disturbance / geomorphological mapping and fieldwork essential to understanding archaeological values, with any other environmental background work subject to a separate consultancy.

2.1.2 Social and cultural places and values

In addition to Aboriginal stakeholder involvement in historic and archaeological site identification and recording (e.g. through investigation, field survey, and / or review and comment on reports) Stakeholder Aboriginal Communities will be encouraged to undertake community-based social and cultural research, facilitated by the consultant, to identify places of significance to Aboriginal culture.

The social and cultural research process has several interrelated aims.

- to ensure places of importance to the Stakeholder Aboriginal Communities are identified and taken into consideration during Precinct planning are clearly identified to ensure their recognition during Precinct planning;
- to ensure that values and places and importance to Aboriginal culture and community identity (which may be the same as or different from places of, for example, archaeological importance) are clearly identified and articulated;
- identify and document those cultural values held by the Aboriginal groups and people which may not have been identified during the archaeological investigation or historical research; and
- provide an understanding of the cultural values of information obtained during archaeological investigation or historical research and other investigations.

Key tasks

Investigation into the social and cultural values of the Stakeholder Aboriginal Communities may draw on information gathered using anthropological, ethnographic, social mapping or oral history methods. It is also likely that places of archaeological and historic importance identified through other studies will be of significance to Stakeholder Aboriginal Communities.

Methods used for ‘social impact assessment’³ or social heritage value assessment may also be relevant. Investigation into the social and cultural ‘environment’ needs also to include a strong feedback mechanism through which the results of investigation into the other 3 data sets (history, environment and archaeology) are shared and explored with the community in order to understand the importance of all this information to community members.

Approaches might include:

- collection of oral histories from community members;
- meetings and interviews with key ‘knowledge holders’ within communities;
- field trips to places/areas selected by the Stakeholder Aboriginal Communities within the study area (as required);
- cultural mapping exercises with members of Stakeholder Aboriginal Communities.

These tasks should result in a comprehensive record of cultural/social associations within the study area and identification of places and landscapes within the study area with social/cultural associations.

Role of Aboriginal stakeholders

It is expected that consultants will facilitate Stakeholder Aboriginal Communities to lead the investigation and reporting of social / cultural values.

Stakeholder Aboriginal Communities will be required to report back to the consultant team in written form, through individual meetings or workshops (see also Appendix A). Furthermore, Stakeholder Aboriginal Communities will be given opportunity to:

³ These are discussed by Anthony English, 2002, *The Sea and the Rocks Gives Us a Feed: Mapping and Managing Gumbaingirr Wild Resource Use Places*, NSW National Parks and Wildlife, p.59ff.

- respond to historical, ethnographical and archaeological reports, and describing the Aboriginal cultural values these reports help to identify and support;
- contribute statement(s) about Aboriginal cultural significance of the landscape, sites or places within it;
- attend at workshops and meetings to discuss draft findings or review draft Final Report for the Precinct;
- participate in negotiations discussions / debate about how to respond to places of Aboriginal significance in planning instruments and other forums; and
- undertake other roles that the consultant may agree with the stakeholders.

Reporting

Stakeholder Aboriginal Communities need to be given appropriate opportunities to describe in their terms, the cultural values contained in the country of the Precinct being assessed.

Information regarding locations/areas that are identified by the Stakeholder Aboriginal Communities might be obtained through workshops and meeting with key groups, representatives and knowledge holders. The approach to this will be negotiated with Stakeholder Aboriginal Communities. Some options include:

- in writing (from each community individually), compiled by the consultant;
- in a confidential forum facilitated by the consultant, who then produces a single report;
- in writing (by two or more Stakeholder Aboriginal Communities working together); or
- a combination of the above.

Stakeholder Aboriginal Communities will also be asked to report on preliminary obligations arising from significance.

Some information given by Aboriginal groups may be sensitive in nature. An agreement as to how this information will be delivered (closed or open reports) will need to be established. Information must include: the source community for the value; any implications for land development that might arise from significance (for further negotiation). Information may include (at the discretion of the Stakeholder Aboriginal Communities): locations, maps and extent of the significant place; what makes the place important; relative importance compared to other important Aboriginal heritage site.

It is desirable that the Stakeholder Aboriginal Communities are given a primary role in this investigation; however, the documentation of social / cultural associations may require a suitably qualified anthropologist or heritage professional with demonstrated experience in this field.

2.1.3 Historical research

Historical information contributes to the identification of stories and associations important to understanding the pre- and post-contact heritage significance of the area.

Historical research will need to be undertaken in cases where background desktop review indicates that further research is warranted to inform the occurrence of places of historic or contemporary significance to local communities within the Precinct (for example, sites of events or places of contact between early Europeans and Aboriginal communities).

Historic research will ideally be conducted in tandem with ethnographic/oral historical research (see section 2.1.2).

Where it is not available from secondary sources reviewed in Step 1, historical research will need to be undertaken to provide specific focus on the Aboriginal history of the Precinct up until the present day and identify as many historically documented places of Aboriginal

association as possible. Historical research will provide valuable information to other investigations, including archaeology and community-based social / cultural research.

Key tasks

Historical research would aim to produce:

- A brief description of historical Aboriginal cultural affiliations with the area through time (i.e. initial clan/language group, relevant later “post-smallpox” regroupings, more recent affiliations by resettled Aboriginal people).
- An overview of ethno-historical information about traditional Aboriginal life specific to the local area.
- A very brief regional historical overview to contextualise the local history.
- A detailed description of historical events and themes involving Aboriginal people within and immediately adjacent to the Precinct from first contact to the present day (this should include 20th century history not just early colonial and very recent history).
- A list of places with historical Aboriginal associations within the Precinct and a description of the historical information about how these places were used and when. Ideally this would also involve mapping of these places as accurately as possible.
- Conclusions about the types of areas which are likely to have been used by Aboriginal people at various times for various reasons (e.g. when considering a fringe camp on a farming property in the 1840s, statements could be made about the types of other areas people may have accessed/used for economic or cultural reasons).
- Summary tables of relevant source material (e.g. blanket returns records, reserves/camps/missions in the area).

Where additional detailed primary historical research is required to understand the significance of a place, this should be justified and undertaken in accordance with section 2.1.5 below.

Sources

Historical research would draw on existing published sources (including more detailed research into articles and local history publications) and may include direct information such as ethno-historical accounts of Aboriginal people living in a particular area. It can also be more indirect information such as European land use practices, which would have affected where Aboriginal people could live and how they could use the land.

The following repositories may need to be consulted:

- Mitchell Library (including the Dixon collection and the State Reference Library);
- State Records NSW;
- Fisher Library (University of Sydney);
- Local Libraries and Historical Societies;
- Australian Institute of Aboriginal & Torres Strait Islander Studies (Canberra), and
- Department of Environment & Conservation (DEC) Aboriginal Heritage Information Management System (AHIMS).
- NSW State Heritage Register.

Role of Aboriginal stakeholders

Historic research can help Stakeholder Aboriginal Communities to understand or uncover stories about the post-contact history of their people, and as such, complements and

provides a context for assessing the contemporary social values of places and landscapes to Aboriginal people. It provides a background for understanding why certain places or landscapes are important to Aboriginal people today. It can also explain the way in which, and reasons why, Aboriginal people have settled in the landscape in post-contact times. Historical and ethno-historical information can relate to both specific places and locations in the study area, and to broader themes in the regions.

Consultants are encouraged to work with Stakeholder Aboriginal Communities in a way which:

- allows communities to contribute knowledge and information relevant to historical research and other investigations;
- develops skills and capacity amongst community members in order to enhance their understanding of their heritage.
- build the knowledge of stakeholder communities about aspect of their heritage.

Appropriate mechanisms might include:

- Circulating outcomes of historic and ethno-historic research to Stakeholder Aboriginal Communities.
- Receiving comment from communities.
- Involving members of communities in research roles (where primary research is to be undertaken).
- Direct contact / consultation about the historic knowledge of community members.

Reporting

Documentation of outcomes of historical research shall be compiled at this step. Reporting of historical research will inform the assessment of significance later in Step 2 and will become a section of the Step 2 Report.

As well as these reporting outcomes, the research should also result in:

- Relevant data to other areas of investigation (e.g. information gathered on the location and description of pre-contact Aboriginal archaeological sites or areas of traditional cultural significance/association).
- Comprehensive lists of all sources examined and data recorded.

2.1.4 Archaeology – targeted field survey, recording and documentation

Stakeholder Aboriginal Communities and archaeologists will jointly undertake a fieldwork program to comprehensively and accurately survey, ground truth, record, map and report on known, newly discovered, or likely Aboriginal heritage places (both pre- and post-contact).

The purpose of this investigation is to identify archaeological sites and potential archaeological deposits are identified and to provide a current account of known Aboriginal site condition. Due to restricted visibility and survey sampling it may not always be possible to identify all archaeological sites present within a Precinct.

Survey work may also provide information relevant to understanding any tangible or intangible Aboriginal Cultural heritage values associated with certain places, landforms, names, views, vegetation etc.

Key tasks

It is expected that all areas of land which are not identified as being significantly disturbed or have not been adequately assessed in the recent past would be within the scope of the archaeological field survey. Ground truthing within those areas of the Precinct determined

to be sensitive in the preliminary values map, or over the whole Precinct may be necessary to ensure comprehensive coverage and identification of cultural values. A high level of sampling must be used to ensure that a representative sample of all landforms present with the Precinct are surveyed.

- Employ the landscape and landform categories developed during Step 1.
- Ensure appropriate sampling of undisturbed land and land not previously surveyed.
- Record any Aboriginal sites/objects and areas of Potential Archaeological Deposit identified during the course of the survey.
- Re-visit known Aboriginal places identified during Step 1 and record their current condition.
- To identify those sites or areas where investigation is required to identify their extent and/or significance/value.

The archaeological assessment will be undertaken by a relevant multi-disciplined team comprising archaeologists, possibly other scientists such as geomorphologists, and Aboriginal representatives. Ground truthing within those areas of the Precinct determined to be sensitive in the preliminary values map, or over the whole Precinct may be necessary to ensure comprehensive coverage and identification of cultural values.

Researchers are required to record pre-contact as well as post-contact Aboriginal archaeological sites (using historical data and awareness of the type of materials which may be encountered).

Role of Aboriginal stakeholders

It is essential that Stakeholder Aboriginal Communities are involved in site survey work for Aboriginal cultural heritage. Appropriate mechanisms for involvement may include:

- Meeting with archaeologists prior to field work to review known information and plan the field survey.
- Participate in field survey and site recording;
- Review and assist in reporting outcomes / recommendations;

Reporting

Survey reports required by the DEC's *Standards and Guidelines Kit for Archaeological Practice in Aboriginal Heritage Management (NPWS, 1997)* will be completed as a component of reporting on the overall Step 2 Report.

Recording and locating places should be in formats compatible with **DEC Inventory** entries for Aboriginal sites, or based on them (refer to DEC's *Standards and Guidelines Kit NPWS, 1997*). A database of places may be required. DEC will advise on the use of standard templates to be used by different researchers across Precincts.

The use of McDonald et al 1998 landform categories in mapping of survey coverage is encouraged. Other spatial data sets, such as landforms, geomorphic information, Aboriginal cultural/social significance will have their own unique attributes. A discussion with DEC and the Growth Centres Commission upon inception will clarify further data requirements.

Threshold 2 – scope and cost Step 2 further investigation (where required)

2.1.5 Further detailed investigation (where required)

The extent to which additional research is required would vary from Precinct to Precinct, and would only be undertaken in cases where the information from previous investigations

is insufficient to make recommendations for appropriate land use planning responses to heritage values.

In some cases, for example where an area is unlikely to be developed due to other constraints (e.g. a floodplain), additional investigation may not be warranted as implications of the information will not materially affect the land use planning for the Precinct.

Social and cultural places and values

To complete the comprehensive consultation process with Stakeholder Aboriginal Communities sufficient to understand the Aboriginal cultural values of the Precinct, stakeholder communities need to be given the opportunity to review the outcomes of other investigations being undertaken, as well as opportunities for additional / alternative cases of heritage significance (of the same or different places) to be identified.

It is expected that consultants will facilitate Stakeholder Aboriginal Communities to lead the investigation of social / cultural values. Appropriate mechanisms should be negotiated with Stakeholder Aboriginal Communities and can be reported back to the consultant team in written form, through individual meetings or workshops (see also Appendix A).

Further historical research

Further historical research will only be undertaken where available information and preliminary research is insufficient, or indicates that further investigation would help confirm the extent, location or significance of an historic place of Aboriginal cultural value.

Additional historical research should be targeted to identifying, confirming or disproving the occurrence of a place or event (or its extent, location or significance) which is important to understanding the Aboriginal heritage of the Precinct. The focus of additional historic research would largely be primary sources which have not previously been studied.

It is expected that additional historical research will only be required for some cases in some Precincts.

Consultants are encouraged to involve Stakeholder Aboriginal Communities in additional historic research in the manner set out for historic research in 2.1.3 above.

Further archaeological investigations

Where necessary, conduct additional investigation (e.g. targeted excavation or more detailed site recording) or other follow up fieldwork. Any excavation work will require a s.87 Permit from DEC under an agreed research design.

Further archaeological investigations should only be undertaken in areas where further information is essential to develop the significance assessment and site ranking, which will in turn inform precinct planning.

As far as possible, within time constraints, physical investigations should aim to avoid the need for further investigative work at the post precinct planning stages. Any investigations undertaken post precinct planning will have a much more limited scope to inform planning decisions.

Archaeological survey and any further subsurface investigations should use the *NPWS Cultural Heritage Standards & Guidelines Kit* (NPWS, 1997). Survey and excavation reporting required by these guidelines should be integrated into the products of this study.

It is expected that members of Stakeholder Aboriginal Communities participate in planning and undertaking any additional archaeological investigations as part of this step.

2.1.5 Summary reports

Summaries which will inform significance assessment and input to the Step 2 report should be compiled in draft form at this point. The summaries should include the following:

- archaeological context— this section should collate and describe the state of knowledge about the archaeology of the Precinct and place it in its geographical and research context. The section should integrate all the data collected about known archaeological places and potential areas of archaeological or other Aboriginal cultural heritage value (i.e. the predictive model). The section should pay particular attention to significant historical, socio/cultural or archaeological research themes and the ability of the known or potential archaeological evidence of the Precinct to address them.
- historical context— this section should aim to identify the historical processes, patterns, events and themes which have shaped post contact history in the region of the Precinct and Aboriginal history in particular. It should provide the context of and evidence for the mapped known and potential historic places. It is not appropriate to model historical use and occupation of the landscape but investigation may identify areas of potential significance - the existence of which needs to be tested through physical examination or excavation. The role of ethno-history and the issues associated with the scale of the historical context section is important - i.e. Precinct reports must be located in a broader historical context.
- Aboriginal cultural context (incorporating community based or anthropological research and consultation on the results of archaeological, historical and other research). This section needs to draw together, describe and analyse the results of the community based research. Different forms of investigation may be desirable for different locations in the study areas, depending on the nature of the communities and the way they wish to approach this investigation.
- Draft maps which present information in a usable form for the assessment of significance.

Reporting should be, as much as practicable, in plain English and designed to be both comprehensible and appealing to the Stakeholder Aboriginal Communities whilst maintaining a high standard of scholarship (i.e. referencing of sources).

2.2 Step 2b – Assess significance

Following the identification of places of tangible or intangible Aboriginal cultural values, and their more accurate mapping and recording (during Step 2A) the Aboriginal cultural heritage *significance* of those places and values must be assessed, identified and documented.

This will involve collaboration between consultants and Stakeholder Aboriginal Communities to assess and rank the relative importance of places identified in the investigations and to make recommendations for their conservation, management or protection (Step 3).

2.2.1 Tasks

Significance assessment should be clear and logically follow the processes of assessment set out below and clearly state why and how a place or item or value is of heritage significance according to which criterion or community reason.

- **Compile information** from historic, archaeological and social / cultural investigations.
- **Aboriginal Stakeholders assess and report on social / cultural values** of the Precinct.

- Consultant and Stakeholder Aboriginal Communities **assess and rank places and values** identified during the research, investigations and Aboriginal consultation process according to required assessment criteria and rankings.
- **Map places of known significance** across the Precinct demonstrating on the map the relative level of significance of each place (exceptional, high, moderate, some).
- **Map the sensitivity of places** in which heritage values have not been confirmed but are expected (e.g. high sensitivity) or not expected (e.g. low sensitivity), with reference to both the *likelihood* of occurrence, and the *level of significance* of the potential heritage values.
- Develop **preliminary management recommendations** for significant places to inform an Indicative Layout Plan.
- **Prepare a draft Step 2 Report**, which compiles information on historical, archaeological and Aboriginal cultural information, documents tangible and intangible heritage significance of the Precinct and justifications for significance, and includes a comprehensive sensitivity/significance map.
- Invite Stakeholder Aboriginal Communities **review and comment on draft Step 2 Report**.
- Consultant produces **Step 2 Report**.

Findings of the Stage 2 Report will need to inform an Indicative Layout Plan for the Precinct at 9-12 months following commencement.

2.2.2 Assess and rank significance

Heritage significance refers not just to the physical fabric or appearance of a place or landscape but all the elements that contribute to its meaning including its context, history, uses and social and spiritual properties (Heritage Collections Council 2001:11). For this reasons, elements and characteristics that embody, express or demonstrate that significance should be specifically identified.

Assessing significance necessarily involves consideration of social, spiritual, scientific, aesthetic and historic values in an integrated manner and multiple sources of data (arising from Steps 1 and 2A). For example, the assessment of scientific significance may be based on information derived from archaeological survey, anthropological studies, historical research, Aboriginal community input, among others.

Key tasks

The key tasks of significance assessment are as follows:

- *Apply criteria* derived from existing heritage assessment frameworks, including broader heritage values (e.g. via the NSW heritage guidelines).
- *Involve Stakeholder Aboriginal Communities* as the primary source of information to identify, define and describe aspects of significance to Aboriginal people.
- *Develop rankings* of relative significance (exceptional, high, moderate, some) for all heritage places and provide consistent justifications for these.

Apply criteria

Heritage significance can be determined by assessing the attributes and characteristics of a place or value against established heritage significance assessment criteria. The NSW Heritage Office guidelines incorporate the five types of cultural heritage values identified in *The Burra Charter* (social, spiritual, scientific, aesthetic and historic values) into a specifically structured framework. While not specifically devised for Aboriginal cultural heritage assessment, the framework has great flexibility and with the established means of

determining the relative significance of an Aboriginal place or object, and input from communities, it offers a consistent means to measure and establish the relative importance of a place within a Precinct.

The criteria are expressed as:

- a) An item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area).*
- b) An item has strong or special association with the life or works of a person, or group of persons, of importance in the cultural or natural history of NSW (or the cultural or natural history of the local area).*
- c) An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).*
- d) An item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons.*
- e) An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area).*
- f) An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area).*
- g) An item is important in demonstrating the principal characteristics of a class of NSW's:*
 - cultural or natural places; or*
 - cultural or natural environments**(or a class of the local areas' cultural or natural places; or cultural or natural environments.)*

Assessments of archaeological heritage value prepared under the current DEC policy requirements align with criterion e (above), which includes the concept of archaeological research significance. Criteria f and g, which cover rarity and representativeness, are also commonly addressed in order to understand archaeological significance.

Criterion d may cover all or any aspects of social, cultural or spiritual values held by a community or group and therefore aligns with aspects of Aboriginal cultural significance. Criterion d can also encompass the concept of educational significance or the 'ability to demonstrate significance' of an Aboriginal place, as it does in the current listing, on the State Heritage Register, of the Brewarrina Fish Traps. The concept of aesthetic significance is also sometimes addressed under the current DEC policy requirements and the *Standards and Guidelines Kit* suggests that decisions about aesthetic significance, along with decisions about educational and cultural significance for Stakeholder Aboriginal Communities, must be driven by community members.

Involve Aboriginal stakeholders

Stakeholder Aboriginal Communities need to be given appropriate opportunities to describe in their terms, the cultural values contained in the heritage places of the Precinct being assessed.

Significance assessment should be a collaborative process between communities and consultants, with each bringing to the table information and perspectives about the relative importance, and appropriate management of, significance heritage places.

Sometimes Aboriginal cultural values will not be linked to specific places in a Precinct but derive from broader understandings of the meaning and significance of the landscape of a region. Sometimes values may be expressed simply in terms of the fact that the subject

land fell within the land occupied by a particular cultural group. Ways to alternatively express these values should be addressed in proposals and/or as work proceeds.

Some places (e.g. unmodified natural features in the landscape) can be places of significance to communities, but are archaeologically 'invisible' and can only be identified with the aid of Aboriginal interpretation. These may be associated with stories, culture or events prior to or after first contact with non-Aboriginal people.

Stakeholder Aboriginal Communities will also be asked to report on preliminary obligations arising from significance. Refer to Appendix A.

Develop significance rankings

The relative significance of individual places, Aboriginal community associations, values and other elements and features within a Precinct will need to be assessed and ranked.

Ranking is a tool that can be used to identify how and why a place, activity or value may have heritage significance and how significant it is. For values and places defined as important to Aboriginal community identity, the relative significance of heritage values should be primarily determined by Aboriginal stakeholders, with the professional assistance where required.

Significance ranking should identify level of significance of an Aboriginal heritage place as '*exceptional, high, moderate or some*' and identify what key elements contribute to or define that significance. Justification for each ranking will need to be reported along with the statement of significance. The justification can be expanded or qualified during an assessment, (for example if new or additional information comes to light) provided that the expansion or qualification is consistently applied and documented and the same ranking system is applied.

The system for ranking and reporting of significance must be consistent across Precincts within the Growth Centres. A model approach is set out below (table 2.1)





Ranking	Example justifications	Suggested mapping colour
Exceptional	<ul style="list-style-type: none"> • Rare example of its type in the nation, state or outstanding example of its type in the region; and / or • Irreplaceably expresses Aboriginal cultural heritage, history or stories of the region (or State or nation); and / or • Of primary and essential importance to the identity and culture of the Aboriginal communities of the region; and / or • Intact with no disturbance; and / or • Loss or unsympathetic or further disturbance or change <i>will irreversibly</i> diminish the Aboriginal cultural heritage significance of the Precinct and/or community cultural identity of the Aboriginal communities associated with the Precinct. 	Red with black hatching 
High	<ul style="list-style-type: none"> • Rare example of its type in the region; and / or • Expresses (possibly in combination with other places or features) the Aboriginal cultural heritage, history or stories of the region; and / or • Important to the identity and culture of the Aboriginal communities of the region; and / or • Existing disturbance and evidence of change does not detract from Aboriginal cultural heritage significance; and / or • Loss or unsympathetic or further disturbance or change <i>is likely to</i> diminish the Aboriginal cultural heritage significance of the Precinct and/or community cultural identity of the Aboriginal communities associated with the Precinct. 	Red 
Moderate	<ul style="list-style-type: none"> • Rare example of its type in the Precinct, but not the region (or Growth Centre); and / or • Expresses in combination with other places or features the Aboriginal cultural heritage, history or stories of the region; and / or • Contributes to the identity and culture of the Aboriginal communities of the region; and / or • Existing disturbance and evidence of change does not detract from Aboriginal cultural heritage significance of the place; and / or • loss or unsympathetic or further disturbance or change <i>may</i> diminish the Aboriginal cultural heritage significance of the Precinct and/or community cultural identity of the Aboriginal communities associated with the Precinct. 	Yellow / orange 
Some	<ul style="list-style-type: none"> • Common example of its type in the Precinct; and / or • Does not express clear community or cultural values of the precinct or only in a minor way; and / or • Substantially modified or impacted; and / or • Loss or change <i>is unlikely</i> to diminish Aboriginal cultural heritage significance of the Precinct and/or applicable Aboriginal community cultural identity. 	Blue / none 

Table 2.1 – Suggested significance rankings and justifications

Notes on applying significance rankings

Ranking within context – Significance rankings must relate to the relative importance of the place within the Precinct, region (or where relevant, state or nation). Information from previous studies in the region⁴, including any previous assessments of Precincts within the Growth Centre should be used to make such judgements. Where information is not available to make comparisons within the Growth Centre or region, a precautionary approach to ranking should be applied until such time as information becomes available.

Applying rankings – Ranking should be determined by identifying the heritage significance each element, place or value embodies in its own right, and the contribution that each element, place or value makes to the heritage value and significance of the Precinct, area, region (or state or nation, where relevant) or community cultural identity as a whole.

For example, a midden site may have ‘moderate’ scientific (archaeological) significance in its own right (within its specific and limited context), but because it is one of many such similar sites across the Precinct it is only of ‘low’ contributory scientific value to Precinct as a whole. It may have never been held in strong community esteem compared to other middens or places in the Precinct, and so may be ranked as possessing a ‘low’ contributory significance to community cultural identity. As noted above, consideration should also be given to the occurrence of similar sites in the region or within other Precincts in the Growth Centre where this is available.

Ranking places, components and attributes – It is likely that some places will have attributes, features and characteristics that need to be individually ranked and documented to ensure relevant and tailored policies and planning can apply to them.

For example, a landscape may have been identified as having heritage significance because of its traditional ownership and cultural associations and because it has extensive areas of native vegetation. During ranking, the traditional ownership attribute is ranked by the community as a cultural value that is of high cultural significance in its own right and of high contributory significance to community cultural identity as a whole. However, the native flora is ranked ‘moderate’ because there are other areas of native flora that are more representative or important and because it is not as important as the traditional ownership and cultural association value of the landscape.

With this in mind, the community with professional input, assigns the landscape as a whole, an overall ‘high’ ranking to ensure that highest and best heritage management policies will apply.

Alternatively, when multiple ranking of attributes, elements and features of a place or value proves cumbersome or confusing, the major elements, features or characteristics of the place or value can be individually identified and documented as a place or value of heritage significance and assigned a ranking.

Places of unknown or potential significance – Places of unknown or potential significance will also need to be identified in the significance assessment. These places will also need to have significance rankings applied, as far as possible. In addition to ranking, the consultant will also be expected to rate the *likelihood* of places to contain significant heritage.

Consideration of places of unknown and potential significance should be made in making recommendations for the Precinct (section 3).

2.2.3 Map known significance and sensitivity

Mapping should clearly identify those places according to their assessed heritage significance and reflect the ‘ranking’ of each place or value, in the required colour key (refer to table 2.1 above). As ranking is closely aligned to policies, it will be important to

⁴ Current collaborative work by DEC and the Roads and Traffic Authority may provide substantial advancement in regional knowledge about Aboriginal archaeology.

define as precisely as possible, the extent (two and three dimensional) for any place and indicate those places with multiple and/or overlapping significance. Places of sufficiently high significance to warrant consideration of inclusion in a conservation area status should be particularly identified.

Mapping is an essential output of the assessment process. The key mapped outputs should include:

- all known places of social, spiritual, cultural value, including natural resources of significance as well as historic places and archaeological places;
- places of unknown or potential significance (*sensitivity*) identified by consultant or the Stakeholder Aboriginal Communities – this may include a predictive model for the location of archaeological and other Aboriginal cultural heritage places); and
- the relative significance (exceptional, high, moderate, some) of all places.

Hardcopies of all maps should be provided with the reports. Maps should be clear and concise and at a suitable scale. Map data files should be forwarded electronically in GIS format. The map data files generated should be suitably attributed.

Mapping culturally sensitive places

Consideration should be given in mapping to the sensitivity of cultural information. Limited information may be given for some areas, in particular, areas of social importance to Aboriginal people where value assessment is not appropriate for public display. The boundaries of these areas will be identified as well as any restrictions/requirements placed on them by the Aboriginal community.

In some cases, places may be identified and a ranking applied, but the cultural stories or values associated with them not documented. In other (exceptional) cases, communities may request that the reporting be ‘closed’ and only the recommendation for precinct planning be made public (refer to s4.4 of the Consultant’s Brief - *Culturally sensitive information*).

Intangible values

Sometimes Aboriginal cultural values will not be linked to specific places in a Precinct but derive from broader understandings of the meaning and significance of the landscape of a region, sometimes values may be expressed simply in terms of the fact that the subject land fell within the land occupied by a particular cultural group. In these cases an approach that results in mapped known or potential places, misses the opportunity to work with communities to develop management responses which acknowledge the general Aboriginal cultural values of areas in sometimes very simple ways.

Such intangible values are expected to be identified through reporting in a manner appropriate to Aboriginal communities.

2.3 Step 2 Report

The Step 2 report (which expands on the contextual summaries in Step 2A) will accurately locate and describe the significance of places and values and rank them so that consistent and focussed policies can be developed in Step 3.

Reporting should be, as much as practicable, in plain English and designed to be both comprehensible and appealing to the Stakeholder Aboriginal Communities whilst maintaining a high standard of scholarship (e.g. referencing of sources).

The Step 2 Report should be in the form of the final project report except for the sections about policies and recommendations. It should include completed assessments and mapping in required formats and forms and be of sufficient quality to be used outside the project team (e.g. community consultation) if required.

Reporting and documenting of places of particular cultural importance or sensitivity to Stakeholder Aboriginal Communities should be negotiated with the communities. In some cases, it may not be essential for exact locations or detailed reasons to be published (refer to s4.4 of the Consultant's Brief - *Culturally sensitive information*).

Key tasks

- Map and describe all of the cultural heritage values identified during assessment and rank these by their level of significance.
- Map the places according to their significance assessment.
- Describe the ranking system used and justify the ranking given for each site.
- Map and describe areas of high cultural value that may be possible candidate areas for conservation.
- In regard to the existing network of reserves in Western Sydney identify areas of high cultural significance for conservation.

Threshold 3 – Scope and cost Step 3

3.0 Step 3 – Develop land use and management options

3.1 Tasks

The primary tasks in Step 3 and thresholds for scoping and costing it by steps, are:

- Stakeholders and consultants contribute to **land use and management options** for heritage places.
- Consultant prepares draft Final Report in a form and in sufficient detail to inform Precinct planning and to assist Government to identify planning and statutory contexts and applications.
- Consultant presents draft Final Report to meeting of all stakeholders review and comment and finalises Report following meeting.

Threshold 4 – Scope and cost Step 4 (if required)

3.2 Develop recommendations

Where a landscape, sites or places within it are identified that have Aboriginal cultural significance, consultants and Aboriginal stakeholders will work together to collaboratively determine how to best respond to the place.

Land use recommendations and management options should be developed and documented based on the significance assessments and rankings with the following additional considerations;

- the obligations arising from significance;
- the likely impacts of proposed changes on the place and its significance;
- consideration of what is possible, what constraints, what tools can be used; and
- the needs and preferences of Stakeholder Aboriginal Communities, the Growth Centres Commission and land owners;

A palette of options / responses may be developed, but they should be able to be applied consistently according to significance rankings and site/value type and characteristics.

Policies should support the overall recognition of Aboriginal values and the consideration of these in the land use planning and development process. In particular they should endeavour to:

- recognise, acknowledge, value and celebrate the prior Aboriginal occupation and use land use within the Growth Centres and Aboriginal peoples' continuing associations with these areas;
- where possible support the cultural concepts of space and place, and recognise the connectivity of places with a cultural landscape – as opposed to the protection of a only a sample of regional places;
- recognise the “layering of history” and land uses and Aboriginal peoples' changing relationships with these areas;
- increase the wider community's awareness and appreciation of the Growth Centres' associations and importance for Aboriginal people;
- provide for the involvement of Aboriginal people and organisations in the planning and management of the Growth Centres' cultural heritage values; and
- enable Aboriginal people and organisations to participate in the land use planning and development process, including the control of sensitive cultural information.

In order to determine appropriate responses to significant cultural heritage it is important to clearly articulate what the value is, determine in what the value is expressed contained or evidenced.

In arriving at recommendations for a significant place, consideration needs to be given to the level of change or impact that can occur to a place without affecting the significance of the values associated with that place.

Recommendations will be stronger where justification for significance and the likely impacts of proposed changes on significance place are both articulated.

Opportunities for Aboriginal involvement

As noted above, Stakeholder Aboriginal Communities will work with the consultant to determine appropriate management responses to make recommendations to the Growth Centres Commission.

Involvement will include meetings with the consultant to develop recommendations and the presentation of a draft Final report back to communities (see 3.4 below).

3.4 Final report

It is envisaged that in combination the outcomes of Steps 1-4 will be combined in a Final Report, which includes:

- method and approach;
- context sections (archaeology, historic research, social / cultural values, landscape and environmental);
- significance assessment;
- maps of significance rankings and sensitivity;
- management policies and recommendations;
- sources and references; and
- report when and how that Aboriginal communities were involved in the process (if relevant, this may also include feedback from communities about the success of the process).

The numbers of copies of draft and final reports to be produced by consultants is to be negotiated and determined.

Threshold 4 – Scope and cost Step 4

4.0 Step 4 – Input into Precinct Planning

Provision should be made for ongoing advice to the Precinct planning team during development of the Precinct Plan and its various means to manage, conserve, interpret and accommodate those places of Aboriginal cultural heritage significance. This could be providing advice and input into the development and refinement of Precinct plans and attending meetings, presentations, community meetings, further stakeholder liaison etc. It may also involve review and comment on draft Precinct plans, recommended statutory and planning contexts and requirements, issues, ideas, concepts and opportunities regarding Aboriginal cultural heritage.

Glossary of terms

Aboriginal cultural heritage refers to the historic, archaeological, spiritual social and aesthetic values of a place, object or tradition that relate to the Aboriginal occupation of the continent before and after European colonisation.

Stakeholder Aboriginal communities means those individuals, communities and organisations associated with the country of the North West and South West Growth Centres who have registered their involvement during Step 1 of this project, or who are identified during early steps of the application of the Precinct Assessment Method.

Aboriginal community/ies includes the broader Aboriginal communities of NSW (and Australia), including the identified Aboriginal stakeholders for the North West and South West Growth Centres.

Aboriginal cultural value refers to the value that Aboriginal heritage places have within present-day Aboriginal culture. The term ‘cultural value’ is used in preference to ‘social value’ or ‘social significance’ in order to embrace the religious or spiritual meaning of places as well as the historical meaning they may have or their significance as ‘memory’ sites (NPWS, 1998).

Archaeological (scientific) values are derived from an understanding of the material evidence (archaeological record) and normally refers to the research value and potential of that evidence.

Cultural heritage values refers to the social, archaeological and aesthetic values of a place, object or tradition.

Cultural Landscape is the landscape upon which human associations/interactions have given meaning.

Historical Values are based on historical records and include archival sources and oral histories. It refers to and frames the historical dimension of the other categories (archaeological (scientific), social, aesthetic)

Intangible cultural heritage meanings and values that are not physical

Landform patterns large-scale landscape units such as a catchment area (McDonald et al. 1998).

Landform elements individual features contained within a broader landform pattern such as a hill crest or alluvial fan (McDonald et al. 1998).

Landscape used in the same way as place but applies to a large contiguous geographic area, usually comprised of a number of topographic features.

Multi-value the inclusion of all values in the identification, assessment and management of a cultural heritage item.

Regional Assessment a cultural heritage study undertaken at a whole of landscape scale incorporating the cultural values present across the entire area.

Representativeness demonstrates the principle characteristics of a class of cultural or natural places/environments.

Post-contact means the period following first interaction between Indigenous and non-Indigenous individuals or communities in Australia. Heritage places or values arising from this period are sometimes referred to as ‘European’ or ‘historic’ heritage. Post-contact heritage includes Aboriginal heritage.

Sensitivity the likelihood of an area or location to contain significant Aboriginal cultural heritage. Taking into account the landscape, its integrity and what is known of Aboriginal cultural heritage distribution in a region.

Social Values are the values attributed to places, sites, landscapes, traditions by the community and is an important reflection or indicator of community identity.

Tangible refers to cultural heritage meanings that are physical, having material remains.

Values the reasons why an item is important to individuals, groups or communities. Key cultural heritage values area social/spiritual, scientific, historic and aesthetic.

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Appendix B

Checklist of issues to be addressed
in the Environmental Assessment

Requirements	Reference in report	Technical Paper
General requirements:		
Executive summary	Separate Summary document	n/a
Project description , including: <ul style="list-style-type: none"> project objectives project staging details of components requiring subsequent approval(s) alignment and corridor width (including any tunnel sections) general construction and operation requirements patronage forecasts and mode shift assumptions the alternatives considered, including route alignment (vertical and horizontal); number and location of stations; location of stabling facilities and construction compounds; and justification for the preferred option(s). 	Part C Section 1.4 Chapters 7 and 8 Chapter 3 Section 7.3 Sections 8.1 and 8.2 Section 2.5 Chapter 6	n/a
Environmental risk analysis identifying the potential environmental impacts associated with the project (taking into account issues raised during consultation).	Chapter 9	n/a
Assessment of key issues specified below, with the following aspects addressed for each key issue (where relevant): <ul style="list-style-type: none"> a description of the existing environment prediction of the level of potential impacts based on an assessment of worst case impact scenarios (including identification of any planning, land use or development related assumptions used in impact prediction and/or development of management and mitigation commitments) a description of measures that would be implemented to avoid, minimise, mitigate, offset and/or monitor the impacts of the project (including identification of any opportunities for changing particular components of the project to reduce impacts). 	See key issues below Chapter 5 Part D and Chapter 5 Part D and Chapter 21	See key issues below
Draft statement of commitments outlining environmental management, mitigation and monitoring measures.	Chapter 21	n/a
Conclusion justifying the project and taking into account: <ul style="list-style-type: none"> the environmental, social and economic impacts the suitability of the site whether or not the project is in the public interest. 	Part F Section 22.2 Section 22.4 Section 22.5	n/a
Key issues		
Interrelationship with land use and infrastructure planning Implications for existing and future planning, land use and development strategies, including: <ul style="list-style-type: none"> precinct planning (including around Leppington Station) existing and proposed passenger and freight rail infrastructure (including the Southern Sydney Freight Line) infrastructure to be provided by the Growth Centres Commission 	Chapter 10 Section 10.1.1 Section 10.1.2 Section 10.1.3	n/a

Requirements	Reference in report	Technical Paper
<ul style="list-style-type: none"> future extension requirements of public roads including Camden Valley Way the future extension of the SWRL to Bringelly. 	<p>Section 10.1.3</p> <p>Section 10.1.4</p>	<p>Technical Paper 1</p>
<p>Corridor acquisition and land use, including:</p> <ul style="list-style-type: none"> property and land acquisition impacts severance (including access to green space such as the Western Sydney Parklands) sterilisation of land impacts on adjacent land use (including the impact of the proposed stabling facility). 	<p>Section 10.2.1</p> <p>Section 10.2.2</p> <p>Section 10.2.2</p> <p>Section 10.2.3</p>	<p>n/a</p>
<p>Traffic, transport, parking and access</p> <p>Operational impacts, including:</p> <ul style="list-style-type: none"> opportunities for the integration of rail and bus services, including modal interchange facilities; local bus services; strategic corridors and external network sectors; and access and mobility considerations opportunities to provide pedestrian and cycle links to the Western Sydney Parklands across and alongside the rail line potential local traffic impacts, taking into account mode of access to stations and the parking facilities to be provided (including park & ride and kiss & ride). <p>Construction impacts, including:</p> <ul style="list-style-type: none"> identification of haulage routes and impacts to local and regional traffic from haulage and other construction activities impacts on existing station facilities such as parking and access during construction impacts on bus and rail servicing during construction, particularly the potential impact of construction at Glenfield. 	<p>Section 11.2</p> <p>Section 2.3 and 11.2.3</p> <p>Section 11.2.4</p> <p>Sections 11.2.1 and 11.2.2</p> <p>Section 8.1.4 and 11.1</p> <p>Section 11.1</p> <p>Sections 11.1.3–11.1.5</p>	<p>Technical Paper 1</p>
<p>Noise and vibration</p> <p>Operational noise and vibration, including:</p> <ul style="list-style-type: none"> impacts from rail (air borne and regenerated), the stabling yard, other ancillary infrastructure and cumulative impacts (taking into account existing and proposed passenger and freight rail infrastructure) consideration of the implications of mitigation measures (e.g. residential setbacks) on precinct planning and lot yields, in consultation with the Growth Centres Commission. <p>Construction noise and vibration, including:</p> <ul style="list-style-type: none"> construction traffic works outside of standard work hours blasting impacts. 	<p>Chapter 12</p>	<p>Technical Paper 5</p>
<p>Flooding and surface water, including:</p> <ul style="list-style-type: none"> identification of riparian zones for waterway crossings and impacts from those crossings flood impact assessment should be in accordance with the <i>NSW Government Floodplain Development Manual (2005)</i> 	<p>Chapter 14</p> <p>Section 13.1</p>	<p>Technical Papers 2 and 3</p>

Requirements	Reference in report	Technical Paper
<ul style="list-style-type: none"> identify potential increases in flood levels, duration, hazard impacts, and mitigation options through appropriate flood modelling. 	Sections 13.2-13.5	
<p>Flora and fauna, including impacts on:</p> <ul style="list-style-type: none"> threatened species (aquatic and terrestrial) critical habitats (aquatic and terrestrial) populations and ecological communities native vegetation and corridors. 	<p>Chapter 14 Section 14.5 Section 14.3 and 14.4 Section 14.5 Section 14.3</p>	Technical Paper 3
<p>Indigenous and non-indigenous heritage. Identify areas of direct and indirect impact (including areas of heritage potential); assess the heritage significance of any identified sites; and consider potential measures to offset any unavoidable impact on heritage.</p> <p>The indigenous heritage assessment should be consistent with the strategies/approach developed by the Growth Centres Commission and the Department of Environment and Conservation.</p> <p>Any heritage assessment of the Upper Canal should be consistent with the Conservation Management Plan for the Upper Canal, Pheasant's Nest to Prospect Reservoir, NSW, Vol 3, Inventory. Upper Canal, Section B (SCA, 2001).</p>	<p>Chapter 15</p> <p>Section 15.1</p> <p>Section 15.2</p>	Technical Papers 6 and 7
<p>Visual and urban design - identify and evaluate the visual impacts of key design components of the project (including the rail flyover) and from key vantage points.</p>	Chapter 16	Technical Paper 4
<p>Social impacts - social benefits, impacts on the local community and existing sensitive land uses adjacent to the corridor.</p>	Chapter 17	Technical Paper 8
<p>Economic impacts - business impacts and economic impacts in the surrounding centres.</p>	Chapter 18	n/a
Consultation		
<p>Undertake an appropriate and justified level of consultation with relevant parties during the preparation of the EA, including with:</p> <ul style="list-style-type: none"> local, State or Commonwealth government authorities and service providers the public (including community groups or affected land owners), including documentation of all community consultation undertaken to date or discussion of the proposed strategy for undertaking community consultation (this should include any contingencies for addressing any issues arising from the community consultation and an effective communications strategy). 	Chapter 4 and Appendix C	n/a

Appendix C

Community and stakeholder
consultation details

Table C.1 Record of stakeholder meetings

Stakeholder	Meeting date
<i>Government stakeholder groups</i>	
Liverpool City Council	31 July 2006
Campbelltown City Council	2 August 2006
Camden City Council	2 August 2006
NSW Roads and Traffic Authority	10 August 2006
Landcom	14 August 2006
Department of Planning (Heritage Office)	16 August 2006
Sydney Catchment Authority	16 August 2006
Department of Natural Resources	Declined
Department of Primary Industries (Agriculture)	Declined
Department of Primary Industries (Fisheries)	Declined
Growth Centres Commission	Declined
Sydney Water	Declined
<i>Community and business stakeholder groups</i>	
Hurlstone Agricultural High School	25 July 2006
Glenfield Public School	25 July 2006
Glenfield Park School	25 July 2006
Campbell House School	25 July 2006
Ajuga School	25 July 2006
South West Action Group	25 July 2006
Four Lanterns Caravan Park	27 July 2006
Leppington Progress Association	31 July 2006
Land and Assets Protection Group	2 August 2006
Forest Lawn Memorial Park	8 August 2006
Chinese Growers Association	10 August 2006
Leppington Primary	14 August 2006
Ingleburn North Public School	Declined
Camden Chamber of Commerce & Industry Inc	Declined
Camden Historical Society Inc	Declined
Camden Residents Action Group (CRAG)	Declined
Campbelltown Chamber of Commerce and Industry	Declined
Casa Paloma Caravan Park	Declined
Catherine Fields Progress Association	Declined
Ingleburn Chamber of Industry and Commerce	Declined
Liverpool Chamber of Commerce	Declined
Macarthur Business Enterprise Centre	Declined
Narellan Action Group (NAG)	Declined

Stakeholder	Meeting date
<i>Transport stakeholders</i>	
Action for Public Transport	8 August 2006
Busabout	14 August 2006
Bicycle NSW	Declined
Bus and Coach Association	Declined
Interline	Declined
Liverpool Traffic Committee	Declined
Metrolink	Declined
NSW Taxi Council	Declined
South Western Sydney Taxi Cooperation	Declined
<i>Emergency services stakeholders</i>	
NSW Fire Brigades (West 6 Zone Office)	14 August 2006
NSW Police (Senior Executive Offices)	16 August 2006
Ambulance NSW (Southwest Ambulance Service)	Declined

Table C.2 Issues raised by government agencies and where discussed in this report

Issues raised	Section in this report
<i>Planning focus meeting (meeting with various agencies held on 15 December 2005)</i>	
<ul style="list-style-type: none"> ▪ Flora and fauna and heritage impacts ▪ Integration of the proposed alignment with existing road networks ▪ Flood mitigation measures ▪ Impacts on Camden Valley Way ▪ Impacts on existing water and sewerage services ▪ Impacts regarding access to new stations ▪ Potential construction and operational impacts in relation to the Southern Sydney Freight Line ▪ The need for ongoing consultation with relevant agencies and community stakeholders 	<p>Chapters 14 and 15</p> <p>Section 2.3, Chapter 11 and Technical Paper 1</p> <p>Chapter 13</p> <p>Chapter 11 and Technical Paper 1</p> <p>Chapter 19</p> <p>Chapter 11 and Technical Paper 1</p> <p>Chapter 10</p> <p>This Chapter and Chapter 21 (Draft Statement of Commitments)</p>
<i>Roads and Traffic Authority (letter dated 29 June 2006 and meeting held 10 August 2006)</i>	
<ul style="list-style-type: none"> ▪ The proponent should work with the RTA at the detailed design stages of the project to consider issues of: <ul style="list-style-type: none"> ▶ flooding ▶ road crossings (bridges or tunnels) ▶ traffic, transport, parking and access. ▪ Other issues to consider include: <ul style="list-style-type: none"> ▶ the need for providing adequate modal interchange facilities at the proposed railway stations to attract more rail patronage, and to minimise road network impact from overspill parking 	<p>Chapters 13 and 11 and Chapter 21 (Draft Statement of Commitments)</p> <p>Chapter 11 and Chapter 21 (Draft Statement of Commitments)</p>

Issues raised	Section in this report
<ul style="list-style-type: none"> ▶ the need to integrate planning stages with the Roads and Traffic Authority/Growth Centres Commission ▶ the need for close consultation and liaison during the planning stage 	
Department of Natural Resources (letter dated 21 June 2006)	
<ul style="list-style-type: none"> ▪ Impacts on native vegetation corridors. 	Chapter 14
<ul style="list-style-type: none"> ▪ Impacts on watercourses and riparian zones. 	Chapters 13 and 14
<ul style="list-style-type: none"> ▪ Impacts on salinity processes 	Chapter 19
<ul style="list-style-type: none"> ▪ Impacts on waterbodies and wetlands (as opposed to farm dams) 	Chapters 13 and 14
<ul style="list-style-type: none"> ▪ Potential impacts on wetlands 	Chapter 14
<ul style="list-style-type: none"> ▪ Mitigation measures in relation to wetlands 	Chapter 14
NSW Department of Primary Industries (letter dated 16 June 2006)	
Department of Primary Industries – Fisheries:	Chapter 13
<ul style="list-style-type: none"> ▪ proposed waterway crossings or works within waterways 	
<ul style="list-style-type: none"> ▪ need to apply best practice methods to waterway crossings and bank erosion protection works 	Chapter 13
<ul style="list-style-type: none"> ▪ impacts to aquatic threatened species 	Chapter 14
<ul style="list-style-type: none"> ▪ any 'key threatening processes' proposed (e.g. degradation of native riparian vegetation) 	Chapter 14
<ul style="list-style-type: none"> ▪ any proposed blockages to fish passage – permanent or temporary 	Chapter 14
<ul style="list-style-type: none"> ▪ rehabilitation measures proposed for aquatic and riparian habitats. 	Chapter 14
Department of Primary Industries – Agriculture:	Chapter 14
<ul style="list-style-type: none"> ▪ management of weeds, during post-construction according to local or regional weed management plans 	
<ul style="list-style-type: none"> ▪ noise assessment, including risks to any existing poultry farms 	Chapter 12
<ul style="list-style-type: none"> ▪ changes to local hydrology including impacts on water catchments to farms 	Chapter 13
<ul style="list-style-type: none"> ▪ construction mitigation measures 	Various chapters
<ul style="list-style-type: none"> ▪ consultation should include options for relocation of agricultural businesses. 	N/A
Department of Primary Industries – Mineral Resources:	To be addressed through future design and environmental assessment
<ul style="list-style-type: none"> ▪ potential for future underground coal mining and/or coal seam gas extraction in relation to future subsidence. 	
Department of Environment and Conservation - Metropolitan Branch (letter dated 23 June)	
Impacts on:	
<ul style="list-style-type: none"> ▪ noise and vibration 	Chapter 12
<ul style="list-style-type: none"> ▪ Indigenous heritage 	Chapter 15
<ul style="list-style-type: none"> ▪ flora and fauna 	Chapter 14
<ul style="list-style-type: none"> ▪ land use and property 	Chapter 10
<ul style="list-style-type: none"> ▪ assessment work and approaches being pursued in the South West and North West Growth Centres. 	Chapters 2 and 10

Issues raised	Section in this report
<i>Department of Environment and Conservation (letter dated 16 August 2006, meeting held 18 July 2006)</i>	
<ul style="list-style-type: none"> ▪ Consultation with Aboriginal groups and impacts on Aboriginal heritage 	Chapter 15
<i>Sydney Catchment Authority (letter dated 21 June 2006, meeting held 16 August 2006)</i>	
<ul style="list-style-type: none"> ▪ Potential impacts on the Upper Canal's operational capacity, and how impacts will be minimised ▪ Security and public safety in relation to people entering the land on which the Upper Canal is located ▪ Need for further consultation with Sydney Catchment Authority at detailed design phase of project ▪ Construction impacts (pollution, contamination, vibration, operational, and security of canal). ▪ Heritage significance of the Upper Canal ▪ Stormwater issues and water quality management in the Upper Canal ▪ Vibration issues in relation to the potential to cause cracking of the Upper Canal, from excavation as part of the pre and post construction stages 	<p>Chapter 19</p> <p>Chapter 19</p> <p>Chapter 19 and Chapter 21 (Draft Statement of Commitments)</p> <p>Chapter 19</p> <p>Chapter 15</p> <p>Chapter 19</p> <p>Chapter 12</p>
<i>RailCorp (letter dated 16 June 2006)</i>	
<ul style="list-style-type: none"> ▪ Operational and maintenance issues of the new line and integration with the existing system ▪ Impacts on the existing rail network (passenger and freight) ▪ How the project will relate to other rail projects whilst under construction and future rail projects 	<p>Chapter 8</p> <p>Chapter 10</p> <p>Chapter 10</p>
<i>Heritage Council of NSW (letter dated 16 June 2006 and meeting held 16 August 2006)</i>	
<ul style="list-style-type: none"> ▪ Heritage significance of the site ▪ Non-Aboriginal heritage items within the area affected by the project 	<p>Chapter 15</p> <p>Chapter 15</p>
<i>Growth Centres Commission (letter dated 19 June 2006)</i>	
<ul style="list-style-type: none"> ▪ Operational noise and vibration ▪ Traffic, transport, parking and access issues 	<p>Chapter 12</p> <p>Chapter 11</p>
<i>Campbelltown City Council (meeting held 31 July 2006)</i>	
<ul style="list-style-type: none"> ▪ Traffic and parking issues; and feasible mitigation options at Glenfield. ▪ Timing of works and estimated disruption at Glenfield Station ▪ Visual impact of Glenfield flyover structures 	<p>Chapter 11</p> <p>Chapters 8 and 11</p> <p>Chapter 16</p>
<i>Camden City Council (meeting held 2 August 2006, letter dated 20 June 2006)</i>	
<ul style="list-style-type: none"> ▪ Design options and alternatives in particular reference to the servicing of stabling yards ▪ Acquisition process and timeframe ▪ Mitigation measures for traffic issues throughout construction ▪ Assess the importance of Camden Valley Way and the 	<p>Chapter 6</p> <p>Chapter 10</p> <p>Chapter 11</p> <p>Chapter 16</p>

Issues raised	Section in this report
Sydney Water Canal in terms of their visual impact	
<ul style="list-style-type: none"> ▪ Consider the alternative of a third station in the vicinity of the Western Sydney Parklands and the Forest Lawn Memorial Gardens Cemetery 	Chapter 6
<ul style="list-style-type: none"> ▪ An appropriate level of flood modelling to be undertaken along the proposed rail line. 	Chapter 13
<i>Liverpool City Council (meeting held 31 July 2006, letter dated 20 June 2006)</i>	
<ul style="list-style-type: none"> ▪ Future land use and zoning, traffic, transport, hydrology, and flora and fauna issues (consultation needed with Council) 	Chapters 10, 11, 13 and 14
<ul style="list-style-type: none"> ▪ Noise impact criteria should take into account future land use 	Chapter 12
<i>NSW Fire Brigade (meeting held 14 August 2006)</i>	
<ul style="list-style-type: none"> ▪ Design options and alternative route options are to address and consider the Brigade policy. 	N/A
<ul style="list-style-type: none"> ▪ Further consultation is required with the NSW Operations Research Centre (more detailed planning stages). 	Chapter 21 (Draft Statement of Commitments)

Darzin database entries

Main category	Subcategory	Comments received
Design and alternative route options		What will this land between Denham Court properties and SWRL (back of Cassidy Street) be used for?
		Is the alignment proposed to go under the Sydney Water Canal?
		Why isn't the alignment further away from properties on Cassidy Street?
		Stakeholder rang to discuss further information regarding the planning process and is concerned about why the northern alignment is preferred.
		If the proposed new line from Rouse Hill to Leppington was extended a little further south to link up with the spur line at Glenlee Washery, the proposed new 1 goods line from Campbelltown to Glenfield would not be required and the money earmarked for that new goods line can be diverted to build a new line between Leppington and Glenlee Washery.
		The EA will need to include the detailed information in Appendix B to demonstrate that the northern alignment is better than the shorter southern alignment with its lower construction cost.
		Is a flat junction proposed at Glenfield?
		Are you bridging over Camden Valley Way?
		Refinements requested to alignment west of Leppington station to minimise full property resumption and allow owners to remain in area.
		Against the alignment going through Denham Court - would prefer the other alignment.
Alternative route options		Refinements requested to alignment west of Leppington station to minimise full property resumption and allow owners to remain in area.
		Are you not looking at southern alignment at all?
		Stakeholder's property is affected by southern alignment. A general discussion with landowners about where they are up to was held.
		Is there flexibility to move (the northern alignment) further away?
		Why aren't you assessing the southern alignment as the preferred option?
		The RTA needs to be consulted at the detail design stages of the projects in particular with respect to flooding, road crossings (bridges or tunnels) as well as construction arrangement issues.
		We would like to submit another line for consideration: the line runs on the original Southern line but changes west of the caravan park. I have been told by TIDC that the stabling yard had to be moved out of this area because of flooding, but a cutting half a kilometre square is quite different to a railway track.

Main category	Subcategory	Comments received
		<p>The stakeholder requests that further consideration of alternative routes for the south-west rail link is addressed in the Director General's EA requirements.</p> <p>Review and response to alignment alternative requested.</p>
	Train stabling yard	<p>Ensure stabling yard is appropriately sized for future requirements.</p> <p>The stabling yard location is in the right place. We hope you leave it as an island configuration when it's extended, or grade-separate it — need to avoid problem of flat junctions.</p> <p>Consider the servicing of stabling yard (and stations) in the short to medium term before sewerage is provided.</p>
	Train stations	<p>The functional layout of the proposed uses at both the proposed Edmondson Park and Leppington stations need to be considered in the EA.</p>
	Tunnel option	<p>Did you consider undergrounding the route?</p> <p>Has anyone conducted a study to determine the impact to the industry or where they should relocate to?</p> <p>There are potential losses to his business as existing customers may not return to his business if he moves and is unable to supply while re-establishment takes place.</p> <p>Stakeholder has a business opposite the station and is concerned about how the changes to the platforms at Glenfield Station would affect the business as these platforms are proposed to move to the north.</p>
Economic and business impacts		
Flooding		<p>A Section to the north of Rickard Rd slopes south and a section to the south of Rickard Rd slopes north and when it rains all the run off of the street runs into the area where the station is to be built.</p> <p>There are 3 large dams on the Northern side of Byron Rd where the Northern Alignment runs through. Some of these dams still had water in the drought season even though they were used for market gardens. With the slope of the land we feel that the area where the Northern Alignment runs through will be flood prone as these dams hold thousands of liters of water and when the dams aren't there any more, or are still there in heavy rain, we believe the area could flood. The area is already flood prone as all the rain water from the overflow of the dams and the run off from south of Byron rd runs into a creek at the bend on Byron Rd and settles in that area as the land is very flat.</p> <p>A Section to the north of Rickard Rd slopes south and a section to the south of Rickard Rd slopes north and when it rains all the run off of the street runs into the area where the station is to be built. We would like to submit another line for consideration: the line runs on the original Southern line but changes west of the caravan park. I have been told by TIDC that the stabling yard had to be moved out of this area because of flooding, but a cutting half a kilometer square is quite different to a railway track.</p> <p>The dam sometimes floods out where the corridor is proposed. If an embankment is proposed past there, this might be an issue.</p> <p>Flooding is a key issue that needs to be considered in the EA.</p> <p>Stakeholder asked the flora/fauna surveyors to have someone call them and explain how the proposed route can be justified from a flooding perspective. Stakeholder said that the previous proposed SWRL route was on higher ground where as the current proposed route (which backs her property) is at a lower ground level and therefore more vulnerable to flooding.</p>

Main category	Subcategory	Comments received
		<p>The RTA needs to be consulted at the detail design stages of the projects in particular with respect to flooding, road crossings (bridges or tunnels) as well as construction arrangement issues.</p> <p>The stakeholder requests that an appropriate level of flood modeling is used.</p>
Flora and fauna		<p>Flora and Fauna is a key environmental issue that needs to be addressed in the EA.</p> <p>Native vegetation corridors are a key issue that needs to be considered in the EA.</p> <p>The EA needs to address whether these works will include 'key threatening processes' as listed under the FM Act. For example, degradation of native vegetation.</p> <p>It is also noted that the South West Rail Link Project Application & Preliminary Environmental Assessment (TIDC, April 2006) document cites the draft Guidelines for Threatened Species Assessment under Part 3A (DEC 2005) that require an 'Avoid, mitigate and then offset' approach.</p> <p>The EA needs to address any rehabilitation measures proposed for aquatic and riparian habitat.</p> <p>Linkages across the proposed corridor that are to enable suitable and convenient crossing points for all pedestrians, vehicular, public transportation, storm water, flora and fauna and service and infrastructure needs to be considered in the EA.</p> <p>Need for close liaison with Council concerning traffic and transport issues, hydrology and flora and fauna issues.</p> <p>The EA needs to address any proposed blockages to fish passage.</p> <p>The EA needs to address the likely impacts to aquatic threatened species as listed under the Fisheries Management Act (FM Act). Even if the habitat is not suitable for listed species there needs to be a statement in the EA to this effect.</p> <p>When addressing Waterway crossings and bank erosion protection works in the EA, it needs to follow best practice fish habitat as outlined in the; Policy and Guidelines for Fish Waterway Crossings and Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings.</p> <p>The preferred option (Northern Alignment) would be in the vicinity of numerous remnants of the Cumberland Plain vegetation community (Shale Plains Woodland), several riparian corridors & an area zoned as environmentally significant - the most significant remnants are classified as 'Regional Core' & 'Local Core', the general vicinity is classed as 'Regional Connectivity'.</p> <p>Objects to northern alignment on grounds of noise, impact on biodiversity.</p>
General		<p>Appreciate formal briefing of the full Council when the EA is nearly complete.</p> <p>Stakeholder to check whether the Colonial Landscapes Study can be provided to the consultants.</p> <p>Stakeholder to check whether they have previously provided input to the Edmondson Park LEP process and generally along the alignment.</p> <p>The EA needs to be aware that RailCorp will be accountable for the environmental performance of the project during its operational phase; under RailCorp's Environmental Protection Licence No. 12208 issued under the Protection of the Environment</p>

Main category	Subcategory	Comments received
		<p>(Operations) Act.</p> <p>None of the side streets down to Railway Parade have pedestrian crossings – permanent crossings are needed to enhance safety of access to and from the station.</p> <p>Is it likely the SWRL will be built before most development in the area?</p> <p>Will the proposed alignment be all aboveground?</p> <p>Is the SWRL different from the freight line? [SSFL]</p> <p>Do not want to lose the potential school population, from the proposed development by Mirvac on the western side. There is no public school zoned for this area.</p> <p>The stakeholder wants to know that this expansion will not be sold off - like it was done in the past.</p> <p>The stakeholder believes that the government needs to plan the growth for tomorrow.</p> <p>Who is the Growth Centres Commission?</p> <p>Will you be talking to Ingleburn North School?</p> <p>Would like to see sensible responses to submissions. Previous responses on other projects have not been responded to properly. The stakeholder gets the impression the project is set in stone before the process starts – Ministers always say yes to projects like this. You need to be flexible with things to enable people to bring issues up.</p> <p>Will we have the opportunity to view the EA and respond?</p> <p>Can we get a copy of the (roll out) map?</p> <p>Landcom is proposing meeting in August. The stakeholder would like this to cover Ed Park and SWRL jointly or alternatively run as back to back meetings.</p> <p>Do we need to do formal registration of interest?</p> <p>How much do groups know about the EA process?</p> <p>A Connell Wagner report says that the northern alignment is longer, doesn't meet RailCorp standards for minimum curve radii, etc, and that the northern alignment was therefore no good. Now there is a new report which says something different and contradicts the earlier report. Who/what do we believe?</p> <p>If you build SWRL before most of the housing in the area, people will choose schools based on their closeness to the station.</p> <p>Need to continue liaison with NSW Police but more so in the subsequent more detailed planning stages.</p> <p>Suggested future EA correspondence is copied to the Attorney-Generals department.</p>

Main category	Subcategory	Comments received
		<p>Left a message that they are residents of Byron rd Leppington .We have some issues with this study.</p> <p>Wanted to know if a decision had been made regarding the Northern Alignment.</p> <p>Will the Glenfield station be on the same site?</p> <p>Do you have a sense you will get there in 2012?</p> <p>Do you have a feel for whether you have a surplus or lack of fill?</p> <p>Is there a reason why you are only showing one alignment on drawing?</p> <p>Had a general discussion with stakeholder about the preferred route.</p> <p>General discussion relating to route.</p> <p>Will it just be passenger movements on the line?</p> <p>Where is train stabling at the moment?</p> <p>How much emphasis do you put on objections?</p> <p>Construction access along Quarter sessions Road is not favoured by the stakeholder.</p> <p>Has there been any dissent in the community about the project?</p> <p>Is the 2012 date the construction completion date?</p>
		<p>Consultation</p> <p>Stakeholder wanted to know if the stakeholder meetings being undertaken in July/August includes consultations with individual residents and directly affected residents and not just organisations? If not, what consultation is being undertaken with these residents?</p> <p>The RTA would also like the Environmental Assessment to consider the need for providing adequate modal interchange facilities at the proposed railway stations to attract more rail patronage and to minimise road network impact from overspill parking.</p> <p>Various road upgrades proposed in future. Close liaison needed on details at a subsequent planning stage.</p> <p>A good contact for us in relation to having a stakeholder meeting.</p> <p>The RTA needs to be consulted at the detail design stages of the projects in particular with respect to flooding, road crossings (bridges or tunnels) as well as construction arrangement issues.</p> <p>Need to continue liaison with NSW Police but more so in the subsequent more detailed planning stages.</p> <p>Landowners want to be involved in consultation on indigenous/ non-indigenous items surveys and significance assessments.</p> <p>Need to continue liaison with NSW Police but more so in the subsequent more detailed planning stages.</p>

Main category	Subcategory	Comments received
		<p>Suggested future EA correspondence is copied to the Attorney-Generals department.</p> <p>Stakeholder believed that when consulted last year they were told that the alignment might move a small amount - he took that to mean a very small amount, i.e. not as far as it has been modified.</p> <p>Various road upgrades proposed in future. Close liaison needed on details at a subsequent planning stage.</p> <p>Need to continue liaison with Fire Services but more so in the subsequent more detailed planning stages.</p> <p>Suggested future EA correspondence is copied to the Attorney-Generals department.</p> <p>Need for close liaison with Council concerning traffic and transport issues, hydrology and flora and fauna issues.</p> <p>Appreciate formal briefing of the full Council when the EA is nearly complete.</p>
		<p>Request information</p> <p>Wanted a copy of project application.</p> <p>Stakeholder requested general information about the proposed route.</p> <p>Update material sent via mail would like to more sent as my friends would like to have them too.</p> <p>Requested 50 brochures of North West and South West Rail Link information to distribute at next growers association meeting.</p> <p>TIDC to send copies of PA.</p> <p>More information regarding alignment.</p> <p>TIDC to send copies of PA.</p> <p>TIDC to send copies of PA.</p> <p>Wants more information regarding project.</p> <p>Had a few questions regarding the line near Edmondson Park.</p> <p>TIDC to send copies of PA.</p>
		<p>Stakeholder requested 15 hard copies of the South West Rail Link Project Application and Preliminary Environmental Assessment report dated April 2006.</p> <p>Requested a hard copy of the latest report.</p> <p>TIDC to send copies of PA.</p> <p>Seeking information regarding the northern alignment.</p> <p>More information regarding Leppington.</p>

Main category	Subcategory	Comments received
		<p>Wanted some general information about the project.</p> <p>Wants to know more information regarding the project.</p> <p>Stakeholder requested a copy of the newsletter.</p> <p>More information about the project.</p> <p>Stakeholder wanted to know the process of seeking comment for Environmental Assessments.</p> <p>Wanted to know if an alignment has been made regarding the SWRL.</p> <p>Stakeholder requested 200 copies of the June update.</p> <p>Stakeholder requested a hard copy of the report.</p> <p>Stakeholder said that the web directed enquiries to Council but they do not have any information.</p> <p>Request info on alignment for SWRL.</p> <p>Once construction starts will there be someone we can contact at any time?</p> <p>How many trains per hour will be moving out of stabling yard?</p> <p>I would appreciate a copy of the report so I can see valuation regarding my lot.</p> <p>How will emergency vehicle access be affected?</p> <p>Stakeholder wanted an update on the project.</p> <p>What are the heights of the rail embankments?</p> <p>Stakeholder asked if Glenfield Station will move to a new location or is it only being upgraded?</p> <p>What measures will be put in place to manage construction noise, dust etc?</p>
		<p>What measures are proposed at stations to ensure security?</p> <p>Would cemetery be considered sensitive to noise?</p> <p>Stakeholder is interested in buying property in Leppington and wanted more information about the project.</p> <p>If track-bed insulation is used, would that preclude use of other mitigation?</p> <p>Stakeholder wanted to know where the stabling facility is located on today's road directories?</p> <p>Did you consider providing a station to serve Horningsea Park residents?</p>

Main category	Subcategory	Comments received
		<p>What speed will trains be travelling at?</p> <p>How long will it take you to get the trains out?</p>
	<p>Surveys</p>	<p>If your consultants still need access to xx Road, she can be contacted on xx.</p> <p>She was concerned as she has tenants on the property who gave the surveyors permission, however she wasn't aware of it.</p> <p>Stakeholder wanted to know when the heritage surveyors will arrive to undertake the survey.</p> <p>Stakeholder said access is fine, but would like confirmation of access.</p> <p>Stakeholder was ringing regarding the property access letter - he is away from home a lot so only just got it. He said property access is fine.</p> <p>Stakeholder is going to be away from July 18 to August 9 so will need to try and schedule visits for surveys before or after this.</p> <p>Stakeholder has advised that the property at xx is a fuel depot, and it is therefore not appropriate for people to visit to do surveys.</p>
<p>Indigenous and non-indigenous heritage</p>		<p>Does DEC know there is an additional stakeholder (Darug Aboriginal Cultural Assessments)?</p> <p>The stakeholder requests that a detailed heritage impact assessment with respect to the crossing of the Sydney Water Canal is addressed in the Director General's EA requirements.</p> <p>Landowners want to be involved in consultation on indigenous/ non-indigenous items surveys and significance assessments.</p> <p>The EA needs to consider the potential impact on any land of Aboriginal significance.</p> <p>The canal is an important piece of operational infrastructure and critical in terms of Sydney's day to day water supply infrastructure. It is also heritage.</p> <p>The stakeholder noted there is a land claim over the area by Thurrawal. May need to talk directly to them as well. Department of Lands makes decision on claims and can advise status (i.e. whether it is pre-negotiation or already lodged), what is the boundary and whether it is the Land Council or the Council representing a group.</p> <p>Important to cover 'place values' as well as archaeological in assessment. Any sites found need to be registered with AHIMS.</p> <p>Indigenous and Non-Indigenous Heritage is a key environmental issues that needs to be addressed in the EA.</p>
<p>Land use and property</p>		<p>Stakeholder's parents own the property affected.</p> <p>Enquired whether his property will be affected by the railway line.</p> <p>Looking at buying a property in Denham Court and wants to know if it would be affected.</p> <p>Wanted to know if his property is affected.</p> <p>The stakeholder requests that the impact of the future extension of the south-west rail link beyond Leppington station and the</p>

Main category	Subcategory	Comments received
		<p>proposed stabling facilities on land and vegetation in the vicinity of the project is addressed in Director General's EA requirements.</p> <p>Don't want further development because are an agricultural boarding school. Want to retain semi-rural setting. The School is concerned about development pressures and being squeezed for land.</p> <p>Land use and property is a key environmental issue that needs to be addressed in the EA.</p> <p>Will the project affect the school (Hurlstone Ag High School)?</p> <p>Will the piece of land owned by RailCorp be used for parking?</p> <p>The stakeholder requests that the opportunities to reduce the number of properties directly affected by the rail link should be further considered in the Director General's EA requirements.</p> <p>Stakeholder had some questions re the railway going through his property.</p> <p>Will the project affect the school (Hurlstone Ag High School)?</p> <p>Stakeholder has concerns about if and how her property will be affected?</p> <p>The corner of Bringelly road to the station and across from Rickard Rd to Dickson Rd is not big enough to have a shopping center, car parking for shopping center, station, bus stop, road, residential and green space.</p> <p>Bringelly Rd is to be 6 lanes and Rickard and Dickson Rds will be 4 lanes and this will cut into the area allocated for all the above. The shopping center can still be on the corner of Bringelly and Rickard but instead of spreading west it can spread south resulting in more room for residential close to the shopping centre.</p> <p>Property valuations conducted and land acquisition process. Procedural fairness.</p> <p>Calculation of private properties impacts in PAR report is incorrect. There is an alternative that affects less properties. This should be investigated. The EA needs to look at all alternatives.</p> <p>Stakeholder's parents are affected.</p> <p>Proposed car parking facilities in terms of their impact on the surrounding urban landscape (not to sterilize land or limit future development) needs to be considered in the EA..</p> <p>Would like to know what properties are going to be affected by the Rail Line?</p> <p>Noise impact criteria must take into account future land use.</p> <p>Does DoP own land between cemetery and SWRL?</p>
	Acquisition	<p>Property acquisition process and timing.</p> <p>In terms of land needed to be acquired for Leppington station, how soon roughly would that happen?</p> <p>Stakeholder wants to sell but property value has dropped with uncertainty. Seeking information on timing of a decision and when</p>

Main category	Subcategory	Comments received
		<p>property will be acquired.</p> <p>Will Government enter into option contracts like the private sector?</p> <p>Stakeholder wanted to know when land resumption will start and how will payment be assessed and land sale information?</p> <p>Will the valuation template be for the purpose of a railway or for the town centre, and would it be different? Will private developers offer a higher value?</p> <p>After EA process is finalised, at which point would you consider the alignment to be locked in? When will you start purchasing?</p> <p>Stakeholder wanted some more information about property acquisition as he is currently affected.</p> <p>Landowner on northern alignment option. Was aware of southern alignment option when acquiring property. Concerned that northern alignment has only been introduced recently.</p> <p>Timing and sequence of project and acquisition is important.</p> <p>When is the project going ahead, when will it finish and when will property acquisitions start?</p> <p>Letter regarding their client's property - request for compulsory Acquisition as matter of urgency.</p> <p>He also asked about property acquisition.</p> <p>There is lots of speculation about property prices and the details of the Land Acquisition Act are unknown (e.g. will the improved value of my property be compensated or just land value?)</p>
	Compensation	<p>Submission on SWRL - potentially affected by Northern alignment - concerned about compensation.</p> <p>Stakeholder lives opposite the location of the stabling yard. Was vocal in opposition to the green zoning during the structure planning process, and is very concerned about the planning process for the rail line and ensuring people get a fair deal in terms of compensation etc.</p>
	Land value	<p>Reduction in noise and visual amenity in areas closest to SWRL will mean those plots will be impossible to sell. This will affect property values. Plots at northern end are mainly sold to ethnic (mainly Asian) families and are the highest value sites. If this affects our ability to sell, we will be looking for compensation.</p>
	Rezoning	<p>The defining of the alignment of the corridor (both horizontally and vertically) needs to be addressed in the EA, in order to determine land use zoning of the deferred lands within Edmondson Park.</p>
	Wider planning issues/development	<p>Calculation of private properties impacts in PAR report is incorrect. There is an alternative that affects less properties. This should be investigated. The EA needs to look at all alternatives.</p> <p>Leppington Town Centre is not large enough to provide for future expansion. Should not be squashed beside Bringelly Road.</p> <p>Ensure effective interfaces with work already completed or ongoing regarding surrounding land use by Council and others.</p> <p>Are there plans to plant vegetation to mitigate for visual impacts?</p>

Main category	Subcategory	Comments received
		<p>The Metrostrategy has many problems. SRA have placed all their eggs in the one basket in that there is only one rail route south of Liverpool and any breakdown of plant in that area causes delays and bottlenecks between Liverpool and Campbelltown which also reflect delays into the rest of the rail network disrupting the timetables.</p> <p>The proposed Leppington Town Centre should not have a major 6 lane road dissecting it. This will have an impact on customers going from 1 side of the road to the other to do their business and businesses interacting with other businesses. Commercial properties should still continue along the main road but the major part of the town centre should be concentrated to the south of The corner of Bringelly road to the station and across from Rickard Rd to Dickson Rd is not big enough to have a shopping centre, car parking for shopping centre, station, bus stop, road, residential and green space. Bringelly Rd is to be 6 lanes and Rickard and Dickson Rds will be 4 lanes and this will cut into the area allocated for all the above. The shopping centre can still be on the corner of Bringelly and Rickard but instead of spreading west it can spread south resulting in more room for residential close to the shopping centre.</p> <p>What is the future land use for the James Meehan Estate post construction?</p> <p>EA needs to identify likely interfaces and dependencies on the existing and future road network as far as possible. Subsequent planning stages need to be integrated with RTA/ Growth Centres Commission.</p> <p>The stakeholder believes that the EA should address possible future extensions of the rail link and the need to avoid impacts on areas of conservation value that are either already protected, or are to be nominated for protection in the forthcoming SEPP.</p> <p>Who owns the land between the school and the railway? What will happen in that area. The School has had some previous involvement in discussion overdevelopment of the site?</p> <p>Stakeholder has been in touch with Growth Centres as he had been advised by a developer that his land would eventually be used for a shopping centre.</p> <p>Stakeholder was interested in the plans for residential development of the area.</p> <p>How will the proposed rail infrastructure blend in with the semi-rural visual aesthetics of the area?</p> <p>Stakeholder across the road from the stabling facility.</p>
Noise and vibration		<p>Most relevant key concern to stakeholder would be the construction noise and safety if spoil trucks/ traffic proposing to use Rickard Road as a route.</p> <p>The EA needs to place no restrictions (noise and vibrations measures) on surrounding urban and future urban areas.</p> <p>Operational noise and vibration needs to be carefully considered in the EA.</p> <p>Noise and Vibration is a key environmental issue that needs to be addressed in the EA.</p> <p>Noise will affect amenity of area for families. Concerned about vibration impacts on monuments.</p>
	Noise	<p>Will there be more noise?</p> <p>Noise impact criteria must take into account future land use.</p>

Main category	Subcategory	Comments received
		<p>Will noise mitigation take account of number of trains coming out of stabling yard in future?</p> <p>What will the change in noise levels be?</p> <p>Will noise barriers be put in place prior to construction?</p> <p>Will TIDC consider using track bed insulation?</p> <p>Will concrete noise walls be considered parallel to Cassidy Street?</p> <p>Objects to northern alignment on grounds of noise, impact on biodiversity.</p>
Other environmental issues		<p>Concerned about construction impacts (pollution, contamination, vibration, etc) as well as operational (same issues) and overall security of canal. Bridges may need special treatment to afford security to the canal.</p> <p>Most relevant key concern to stakeholder would be the construction noise and safety if spoil trucks/ traffic proposing to use Rickard Road as a route.</p> <p>It is essential that the proposal does not prevent the Sydney Catchment Authority (SCA) from meeting its operational needs and objectives.</p> <p>Further information should be provided in the EA on any proposed waterway crossings or works within waterways.</p> <p>Is the Sydney Water Canal disused?</p> <p>The canal is an important piece of operational infrastructure and critical in terms of Sydney's day to day water supply infrastructure. It is also heritage.</p> <p>The stakeholder believes that the EA should address the impacts of the project on the water quality and alluvial processes of water bodies that are traversed by the rail link or otherwise impacted upon the project.</p> <p>Potential cumulative impacts of future Bringelly extension.</p> <p>Watercourse and riparian zones are a key issue that needs to be considered in the EA.</p> <p>Salinity is a key issue that needs to be considered in the EA.</p> <p>Any bridging of the canal needs to be co-ordinated with the requirements of SCA in terms of space for access/ maintenance.</p> <p>The EA needs to consider the safety, both for passengers and workers within the network and people coming into contact with the rail system.</p>
Social impacts		<p>Security at stations and the school is a concern. Will the over bridge be open 24hrs? Will you be speaking to Police?</p> <p>Asian families are very concerned about feng shui principles. Rail line and barriers etc would not be good for feng shui.</p> <p>The SWRL and the construction site would be clearly visible from the schools. The schools do experience problems with students absconding grounds and there is some concern that such students may be attracted to either the operating rail line, or the construction site. This is a clear safety issue. Quarter Sessions Road access would need to be managed to prevent access to the</p>

Main category	Subcategory	Comments received
		<p>rail corridor and construction site.</p> <p>I am yet to have found a community in this area that I can settle down in, but am hoping that the new Edmonson suburb meets my needs. I hope that the planning department considers the needs of the growing youth and professionals in our area and not that of bolstering employment rates or community numbers.</p> <p>Project doesn't just affect management of the cemetery; it also affects 100s of families that have plots there.</p> <p>Social impacts is a key environmental issue that needs to be addressed in the EA.</p>
Traffic, transport, parking and access		<p>Traffic, Transport, parking and access needs to be considered in the EA.</p> <p>Convenience for passengers should be a key factor in detours/ relocated.</p> <p>Dickson Road and Eastwood Road Leppington – will the rail line cut off these roads?</p> <p>Would like to see roads in area upgraded. People drive through to Glenfield Station.</p> <p>The stakeholder thinks that the proponent needs to demonstrate at least that access for buses, pedestrians, cyclists and car parking are all feasible for the patronage levels that are predicted, even though the detailed design of interchanges etc could be left to a later stage.</p> <p>The EA should detail impacts on the existing rail network (passenger and freight) and how the project will relate to any other rail projects either under construction or proposed for the future (such as freight priority works, infrastructure upgrades and the like).</p> <p>The stakeholder would like the EA to consider the specific issue of public access to this regional open space, (Western Sydney Parklands) which will be a major regional resource for both existing Liverpool urban areas and the future South West sector.</p> <p>RailCorp has a direct interest in the connections into the existing rail system. It is important that disruptions to existing passenger and freight services are replaced bus facilities at Glenfield need to include appropriate space for buses and include layover and parking and facilities for drivers.</p> <p>During the construction phase it is essential that stations can continue to operate safely and efficiently, both for passengers and rail works.</p> <p>Linkages across the proposed corridor that are to enable suitable and convenient crossing points for all pedestrians, vehicular, public transportation, storm water, flora and fauna and service and infrastructure needs to be considered in the EA.</p> <p>Include pedestrians and cyclists in overall access concept for stations.</p> <p>Construction traffic issues need to be comprehensively managed.</p> <p>The EA needs to address RailCorp's issues, particularly in regard to operation and maintenance of the new line and integration with the existing system.</p> <p>Entrance to school is right by station. Will the school entrance be moved?</p> <p>The RTA needs to be consulted at the detail design stages of the projects in particular with respect to flooding, road crossings</p>

Main category	Subcategory	Comments received
		<p>(bridges or tunnels) as well as construction arrangement issues.</p> <p>Traffic/ parking issues and feasible mitigation options at Glenfield.</p> <p>Need for close liaison with Council concerning traffic and transport issues, hydrology and flora and fauna issues.</p> <p>The stakeholder would like the EA to address mitigation measures such as pedestrian/cycle bridges across the SWRL where it is in a cutting through the Parklands.</p> <p>Linkages across the proposed corridor that are to enable suitable and convenient crossing points for all pedestrians, vehicular, public transportation, storm water, flora and fauna and service and infrastructure needs to be considered in the EA.</p> <p>When the station moves north 80m, will it be where all the cars are parked now?</p> <p>The implications of car parking, entry points and bridges on the connectivity of both sides of the town centres needs to be considered in the EA.</p> <p>Traffic, transport, Parking and Access is a key environmental issue that needs to be addressed in the EA.</p> <p>Parking should not be provided to stimulate patronage.</p> <p>Traffic congestion on Camden Valley Way as well as access in and out of Forest Lawn Memorial Park.</p>
	<p>Visual impacts and urban design</p>	<p>What would it look like (train line itself). Would there be a cyclone fence?</p> <p>Visual impacts and urban design is a key environmental issue that needs to be addressed in the EA.</p> <p>The stakeholder requests that the impact of the project on the visual amenity of the area, with specific attention to those areas where the rail line is raised above natural ground level is addressed in the Director-General's EA requirements.</p> <p>Will flyovers be visible from the school?</p> <p>The stakeholder requests that the Crossing of Camden Valley Way and the Sydney Water Canal are considered important in terms of visual impact in the Director General's EA requirements.</p> <p>Stakeholder stated that they will probably get view of SWRL, but believe that it shouldn't affect them too much.</p> <p>Visual impact of Glenfield flyover structures.</p> <p>The RTA needs to be consulted at the detail design stages of the projects in particular with respect to flooding, road crossings (bridges or tunnels) as well as construction arrangement issues.</p> <p>Embankment would be quite visible from plots at northern end of cemetery.</p>

Appendix D

Visual assessment approach

The visual assessment approach used in this assessment is illustrated in Figure 16.1 and described in detail below.

D.1 Visual units

As detailed in Section 5.1.5, the study area is divided into five visual units for the purpose of assessing the visual environment (see Figure 5-5). These units were based on identifiable differences between landscape character types and geographical boundaries.

For the 'on opening scenario' (existing visual environment with some development around Edmondson Park), a summary for each visual unit is provided in Tables 16-1 to 16-5, which addresses the potential impact on the main identified viewpoints. The overall visual change from each viewpoint is described, and the rankings of 'sensitivity' and 'magnitude of change' were used to define the expected visual impact. These two terms, 'sensitivity' and 'magnitude of change', are described below.

D.2 Sensitivity

This term measures the sensitivity of an area or viewpoint to visual or landscape change. It combines the values associated with the scenic quality of a location with its landscape significance.

Scenic quality

Scenic quality forms a key consideration in any visual assessment, as it measures the degree to which the visual aesthetics of a landscape are valued from a human point of view and the impact that any proposed changes may have on such values.

Relevant studies on scenic quality have concluded that people tend to prefer landscapes that are relatively natural and vegetated, especially those with water features, dramatic topography and contrasting features. Landscapes that people usually prefer least are those with a high degree of human disturbance, as well as landscapes with few trees and landforms that are flat and unvaried (Department of Planning 1988; Preston 2001; Queensland Main Roads 1997).

Normally the term 'landscape character' is used when referring to scenic quality as a means of describing a landscape type. It refers to aspects such as landform, land use, tree cover and location, which together form a homogenous landscape distinguishable from adjacent landscapes.

Landscape significance value

It is necessary to understand the significance, or landscape value, of a particular landscape in order to assess how acceptable any proposed change to that landscape would be (Australian Council of National Trust 2004).

According to the Australian Council of the National Trust (2004), in addition to scenic quality and visibility, 'landscape significance' can be measured in regard to a landscape's:

- scarcity
- visitation/recognition
- occurrence in the arts.

These three measures of landscape significance are often difficult to investigate and can be subjective; however, relevant studies on landscape/scenic values and heritage can be used for guidance. Such relevant references have been used for this assessment and are referred to throughout this Chapter.

Heritage and ecological values, which are covered in Chapters 15 and 14, respectively, should also be broadly considered when assessing landscape significance value.

D.3 Visibility

‘Visibility’ is important when ascertaining how sensitive a particular site or landscape may be to any proposed visual change. It is usually indicated by three main measures:

- visual prominence (how easily a site is seen)
- visual accessibility (how closely and often a site is seen)
- viewer permanence (whether viewers are permanent, such as residents, or transient, such as road travellers).

In terms of visual change, the highest impact is usually on local or foreground views (less than 1 kilometre away), while sub-regional or mid-ground views are moderately sensitive (1 to 5 kilometres away), and regional or distant views (over 5 kilometres away) are the least sensitive (Queensland Main Roads 1997).

The term ‘visual catchment’ or ‘viewshed’ can be used to describe where a site can be seen from, thereby identifying its overall visibility. It is usually defined by topographic features, such as ridgelines, that limit the extent of views. Potential views can be limited by intervening vegetation, buildings and infrastructure.

Sensitivity ranking

The assessment approach presented in Appendix D was used to define an overall sensitivity ranking for each of the main viewpoints along the proposed SWRL corridor. This sensitivity ranking was based on a value judgement, considering both scenic quality/landscape significance values and the visibility of particular viewpoints, to give an overall ‘sensitivity’ ranking of low, moderate or high.

D.4 Magnitude of impact

The ‘magnitude of impact’ of a project is a measure of the overall extent of potential visual change as a result of the project. It takes into account the difference between the existing landscape character and the character of the project, the extent of landform change, surrounding land use, the bulk and scale of the project, loss of vegetation and changes to available views.

D.5 Visual impact

Measures of visual sensitivity and magnitude of impact are combined to give an overall indication of the potential ‘visual impact’, which is ranked as low, moderate or high. Specific management and mitigation measures were developed for all existing viewpoints that are categorised as having a potentially moderate or high visual impact.

The visual impact associated with planned land use change in the study area was also broadly described. Management and mitigation measures were also developed to address visual impacts on future land uses and the overall design of the proposed SWRL corridor.

Appendix E

SWRL Route Options Report



Transport Infrastructure
Development Corporation

South West Rail Link

Route Option Report

Report Prepared by:



Transport Infrastructure
Development Corporation

Date: March 2006
Revision: 1
Status: Final

Commercial in Confidence



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1 EXECUTIVE SUMMARY

INTRODUCTION

In June 2005, the NSW Government announced it would invest \$8 billion over the next 15 years to develop the Metropolitan Rail Expansion Program (MREP). The MREP consists of three projects:

- North West Rail Link (NWRL);
- Redfern to Chatswood Rail Link (RCRL); and
- South West Rail Link (SWRL).

In November 2005, the Transport Infrastructure Development Corporation (TIDC) was directed to undertake the following:

- The necessary technical studies and reviews to confirm and, in some locations, finalise the alignments of the North West and South West Rail Links;
- The necessary technical studies and reviews to finalise and confirm two alignments in the CBD, and determine which of these should, at the appropriate time, be delivered first; and
- For the North West and South West Rail Links, undertake the necessary work and prepare the documentation to a stage sufficient to obtain a Concept Approval.

This report has been prepared to assist in finalising the alignment of the South West Rail Link (SWRL), a proposed new rail line from Glenfield to Leppington in Sydney's south west. The SWRL will include two new stations at Edmondson Park and Leppington and a new stabling facility to the west of Leppington Station.

BACKGROUND

A number of studies have been undertaken since the early 1990s to develop routes for the SWRL. These studies culminated in the development of two alternative routes: a northern route and a southern route (refer Figure 1 below). These routes were described in the South West Rail Link Overview Report which was placed on public exhibition in 2005.

The northern and southern routes as described in the Overview Report share a common alignment between Glenfield and Cabramatta Creek, just west of the proposed Edmondson Park Station. The southern route then travels west from Edmondson Park and passes through the residential area of Denham Court, the southern section of the Forest Lawn Memorial Gardens and through the Casa Paloma Caravan Park to the proposed Leppington Station near Byron Road. The northern route travels north west from Cabramatta Creek, through the northern segment of Forest Lawn Memorial Gardens, through a section of Western Sydney Parklands and then on to the proposed Leppington Station.

Seventy seven submissions were received in response to the public exhibition and raised concerns relating to property, flooding, noise and endangered vegetation impacts. There

were also concerns raised over the planning of Leppington Town Centre and the proposed location of the stabling facility.

TERMS OF REFERENCE

The Terms of Reference for this report are as follows:

1. Undertake a review of the previous studies of the southern and northern route options.
2. Undertake further studies to refine the southern and northern route options.
3. Provide a comparison between the two refined route options against a number of differentiating factors including technical, environmental, social, operability and costs.

REFINEMENT OF ROUTE OPTIONS

The northern and southern routes as described in the Overview Report (referred to in this report as reference routes) have been refined to take into account feedback from public submissions and further planning of Leppington Town Centre. The reference southern and northern routes and the refined southern and northern routes are shown in Figure 1 below.

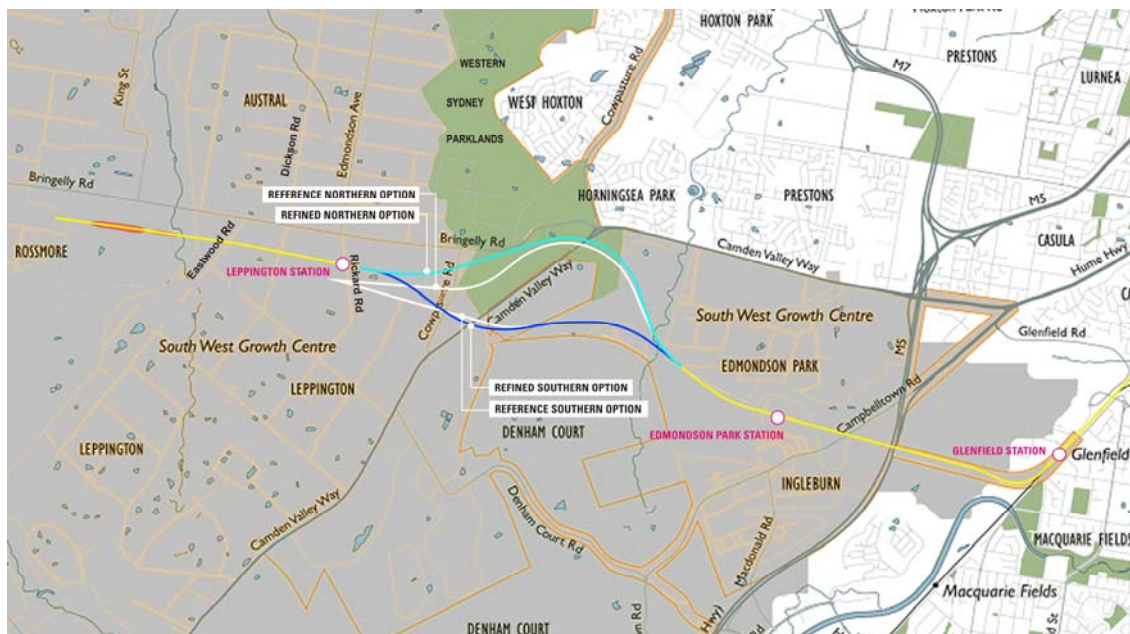


Figure 1: Reference and refined southern and northern routes

Leppington Station and the proposed stabling yard have been located further west than in the reference routes. This is in response to the current urban planning for the new town centre (as shown in the *South West Growth Centre Structure Plan*) and the potential flooding constraints in the area. The stabling yard has been located away from the future Leppington Town Centre.



The refined southern route runs through Denham Court in a cutting and then travels slightly further south than the reference route at the southern end of the Forest Lawn Memorial Gardens before traversing north to the proposed Leppington station.

The refined northern route travels in a northerly direction just before Denham Court, and goes slightly further north than the reference route to avoid impacting the Forest Lawn Memorial Gardens before traversing in a southerly direction through the Western Sydney Parklands to the proposed Leppington Station.

COMPARISON OF THE REFINED ROUTE OPTIONS

A comparative analysis of the refined routes has been undertaken based on the following criteria: technical and constructability, operability, environmental, property, social/community and cost. Key findings are summarised in Table 1 below.

Table 1: Comparison of refined routes

Issue	Refined Southern Route	Refined Northern Route
Technical and constructability:		
Route length and directness	Route is 500m shorter. More direct route through to Leppington.	Route is 500m longer.
Constructability	No substantive difference.	No substantive difference.
Hydrology and flooding	No substantive difference.	No substantive difference.
Local traffic	No substantive difference.	No substantive difference.
Operability:		
Travel times between the two stations	One minute less in both directions (trip to city approx. 50 mins).	One minute longer in both directions (trip to city approx 50 mins).
Environmental:		
Clearing of endangered ecological communities	4.0 hectares	5.6 hectares
Clearing of core/support for core habitat	3.9 hectares	3.6 hectares
Cultural Heritage	Disturbs area of moderate archaeological sensitivity.	Disturbs area of high archaeological sensitivity.
Residences affected by noise	Noise goals exceeded at a greater number of residences (with or without noise mitigation).	Noise goals exceeded at a lower number of residences (with or without noise mitigation).



Visual impact (note: overall visual amenity of area will change with future development)	Impacts on semi-rural character of Denham Court. Impacts where route crosses Camden Valley Way and the Casa Paloma Caravan Park.	Impacts on rural character of Western Sydney Parklands Obscures views of scenic hills at Denham Court from Edmondson Park.
Property:	44 land holdings affected. Full acquisition of 24 privately owned properties required. Partial acquisition of 12 privately owned properties. 8 residential and 4 rural acreage dwellings require demolition. Impact on Forest Lawn Memorial Gardens.	44 land holdings affected. Full acquisition of 13 privately owned properties required. Partial acquisition of 13 privately owned properties. 1 residential and 1 rural acreage dwellings require demolition. Impact on Western Sydney Parklands.
Social and community:	Loss of amenity in low density residential area of Denham Court. Loss of low income housing at Casa Paloma Caravan Park.	Loss of recreational land in precinct 9 (Hoxton Park Ridge) of Western Sydney Parklands.
Capital Cost:	Capital cost of section from Edmondson Park to Leppington is approximately \$11m greater.	Capital cost of section from Edmondson Park to Leppington is approximately \$11m less.
Breakdown:		
- Construction cost	\$88.0m	\$91.0m
- Land acquisition cost	\$84.2m	\$75.5m
- Surplus land resale	-\$7.5m	-\$13.1m
TOTAL	\$164.7m	\$153.4m
Operating and maintenance cost:	Operating and maintenance cost is approximately \$50k less per annum.	Operating and maintenance cost is approximately \$50k more per annum.

KEY FINDINGS

In summary, the refined southern and northern routes are very similar in terms of technical and constructability criteria. There are some differences between the two routes in relation to the other evaluation criteria.

The refined southern route:



-
- Is 500 metres shorter than the northern route, resulting in a one minute difference in travel time and an annual operation and maintenance cost which is approximately \$50K less than the northern route;
 - Has a capital cost which is approximately \$11m greater than the refined northern route;
 - Has less overall impact on endangered ecological communities (1.6 hectares less clearing required), but a slightly greater impact on core habitat (0.3 hectares more clearing required);
 - Has less impact on cultural heritage;
 - Has a greater impact on private property owners, with 24 privately owned properties needing to be fully acquired, with 8 residential and 4 rural acreage dwellings to be demolished; and
 - Has a greater impact on residential amenity than the refined northern route, with noise targets being exceeded at a greater number of residences (with or without noise mitigation).

The refined northern route:

- Is 500 metres longer than the southern route, resulting in a one minute increase in travel time and an annual operation and maintenance cost which is approximately \$50K more than the southern route;
- Has a capital cost which is approximately \$11m less than the refined southern route;
- Has a greater overall impact on endangered ecological communities (1.6 hectares more clearing required) but a slightly lower impact on core habitat (0.3 hectares less clearing required);
- Has a greater impact on cultural heritage;
- Has less impact on private property owners, with 13 privately owned properties needing to be acquired, with 1 residential and 1 rural acreage dwelling to be demolished; and
- Has less impact on residential amenity, with noise targets being exceeded at fewer residences than the southern route (with or without noise mitigation).

Selection of a preferred route will depend on the weighting given to each of the criteria used for evaluation.

2 INTRODUCTION

2.1 BACKGROUND

In June 2005, the NSW Government announced it would invest \$8 billion over the next 15 years to develop the Metropolitan Rail Expansion Program (MREP) (refer Figure 2). The MREP consists of three projects:

- North West Rail Link (NWRL);
- Redfern to Chatswood Rail Link (RCRL); and
- South West Rail Link (SWRL).

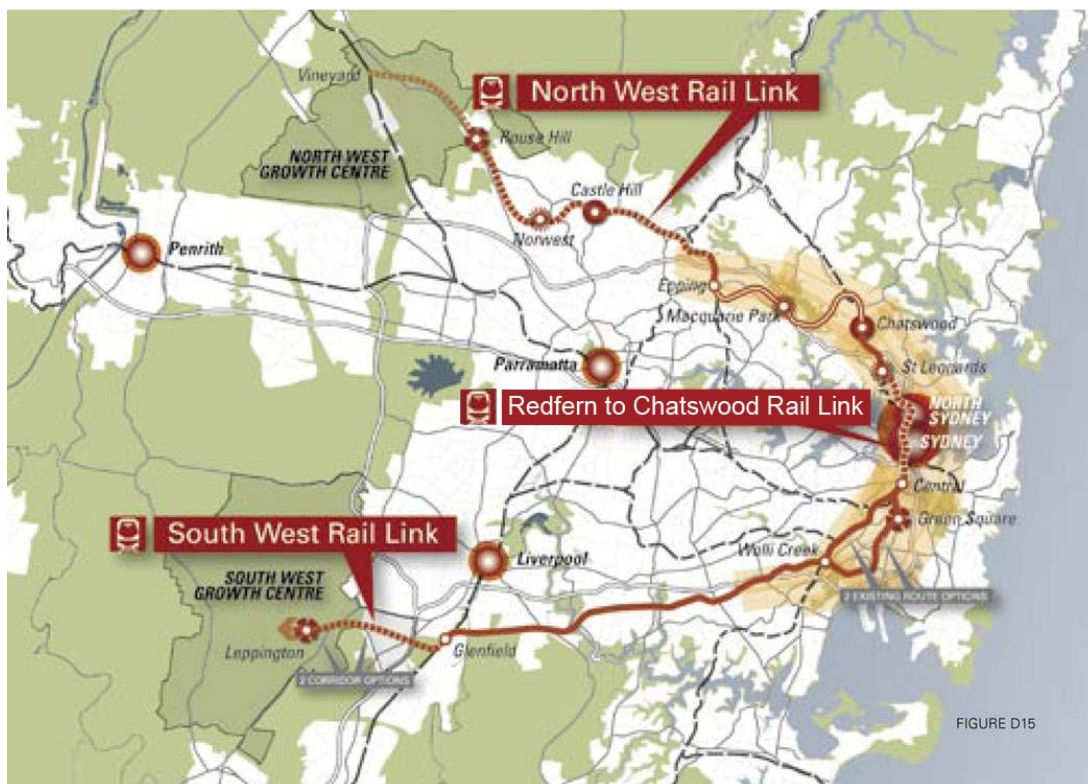


Figure 2: The Metropolitan Rail Expansion Program

In November 2005, the Transport Infrastructure Development Corporation (TIDC) was directed to undertake the following:

- The necessary technical studies and reviews to confirm and, in some locations, finalise the alignments of the North West and South West Rail Links;
- The necessary technical studies and reviews to finalise and confirm two alignments in the CBD, and determine which of these should, at the appropriate time, be delivered first; and



- For the North West and South West Rail Links, undertake the necessary work and prepare the documentation to a stage sufficient to obtain a Concept Approval.

This report has been prepared to assist in finalising the alignment of the South West Rail Link (SWRL), a proposed new rail line from Glenfield to Leppington in Sydney's south west. The SWRL will include two new stations at Edmondson Park and Leppington and a new stabling facility to the west of Leppington Station.

Planning for a railway to service the South West Sector began in the early 1990s and was initially driven by the proposed Badgerys Creek Airport. More recently, planning for the rail line has been driven by planning for new residential development at Edmondson Park and Leppington.

Recent studies have focused on developing concept route options, assessing environmental impacts, and obtaining feedback from the community and stakeholders. These studies are summarised below.

- Leppington Rail Link: Rail Design Study (Connell Wagner, June 2001)

This study reviewed the various routes that had been proposed over a ten year period from the early 1990s and proposed a preferred route. This route is the reference southern route.

- South West Rail Link: Environmental Issues Study (Connell Wagner, July 2003)

This study reviewed the environmental impacts of the reference southern route. The study was released at the time the *South West Rail Link Overview Report* was exhibited in 2005.

- South West Rail Link: Alternative Alignments at Denham Court (Connell Wagner, March 2005)

This report was commissioned in response to concerns regarding the impact of the SWRL on the existing residential area of Denham Court, the Forest Lawn Memorial Gardens and the Casa Paloma Caravan Park. The study suggested three alternatives: a tunnel between Edmondson Park and Leppington; a deep cutting through Denham Court rather than at grade; and an alternative route alignment to the north of the Forest Lawn Memorial Gardens. The alternative alignment to the north is the reference northern route.

- South-West Rail Link Overview Report (Department of Planning, June 2005)

The NSW Government exhibited an Overview Report of the South West Rail Link between June and October 2005 outlining work undertaken to date and identifying a northern and a southern route.

2.2 TERMS OF REFERENCE

The Terms of Reference for this report are as follows:

1. Undertake a review of the previous studies of the southern and northern route options.



2. Undertake further studies to refine the southern and northern route options.
3. Provide a comparison between the two refined route options against a number of differentiating factors including technical, environmental, social, operability and costs.

2.3 METHODOLOGY

TIDC engaged a number of specialist consultants to provide advice on key areas of this report including ecology, heritage, noise, hydrology, urban design, property and engineering (refer to Appendix A for further details). Regular consultant coordination meetings were held to identify key issues and coordinate the report.

Consultants provided input to this report for each of the key areas, with TIDC providing overall coordination and management of the process.



3 STRATEGIC CONTEXT

3.1 METROPOLITAN STRATEGY

The NSW Government's *Metropolitan Strategy City of Cities – A Plan for Sydney's Future* was released in December 2005. It identifies two major growth centres – the North West Growth Centre and the South West Growth Centre (refer Figure 3).

The Metropolitan Rail Expansion Program (MREP) is an integral component of the metropolitan strategy as it will service these growth centres, providing links between the major new growth and employment areas of the metropolitan region.

The proposed South West Rail Link will cater for the South West Growth Centre. Strategic planning for the South West Growth Centre is underway and more detailed local planning is being progressively undertaken by Liverpool and Campbelltown councils for the developing area of Edmondson Park and beyond. The release of land is underpinned by a commitment to ensure that public transport links and services are in place early in the development of these areas.

3.2 SOUTH WEST GROWTH CENTRE

The South West Growth Centre is expected to eventually contain 100,000 dwellings with a population of approximately 270,000 people. Structure planning for the development of this Growth Centre is progressing and represents an opportunity to deliver well-designed urban development integrated with timely provision of transport infrastructure.

A draft Structure Plan indicating the broad pattern of land uses, new roads, environmental areas and town centres was exhibited in June 2005. An amended Draft Structure Plan was on exhibition for community comment from 27 January to 10 March 2006 (refer Figure 4).

A key element of the *South West Growth Centre Structure Plan* is the development of a major town centre based around a new railway station at Leppington. The town centre is proposed to be the principal commercial and retail heart and public transport hub for the new surrounding suburbs, which will ultimately have a population of approximately 270,000 residents. The town centre is intended to accommodate a major shopping centre, a TAFE college, medium density housing (apartments and townhouses), supporting commercial services, community services and recreation facilities.

The alignment for the eastern section of the SWRL between Glenfield and Edmondson Park is planned to be incorporated into amendments to the *Liverpool Local Environmental Plan 1997* and *Campbelltown (Urban Areas) Local Environmental Plan 2002*.

3.3 LEPPINGTON TOWN CENTRE

A key issue in determining the most appropriate route for the South West Rail Link is the location of the proposed Leppington Station / Town Centre.



There is a unique opportunity at Leppington, to plan both the railway and town centre in parallel, to maximise the synergy between the two developments. This will enable the railway through the town to be optimised in terms of alignment and be planned to facilitate the creation of a best practice, transit orientated development, mixed use town centre.

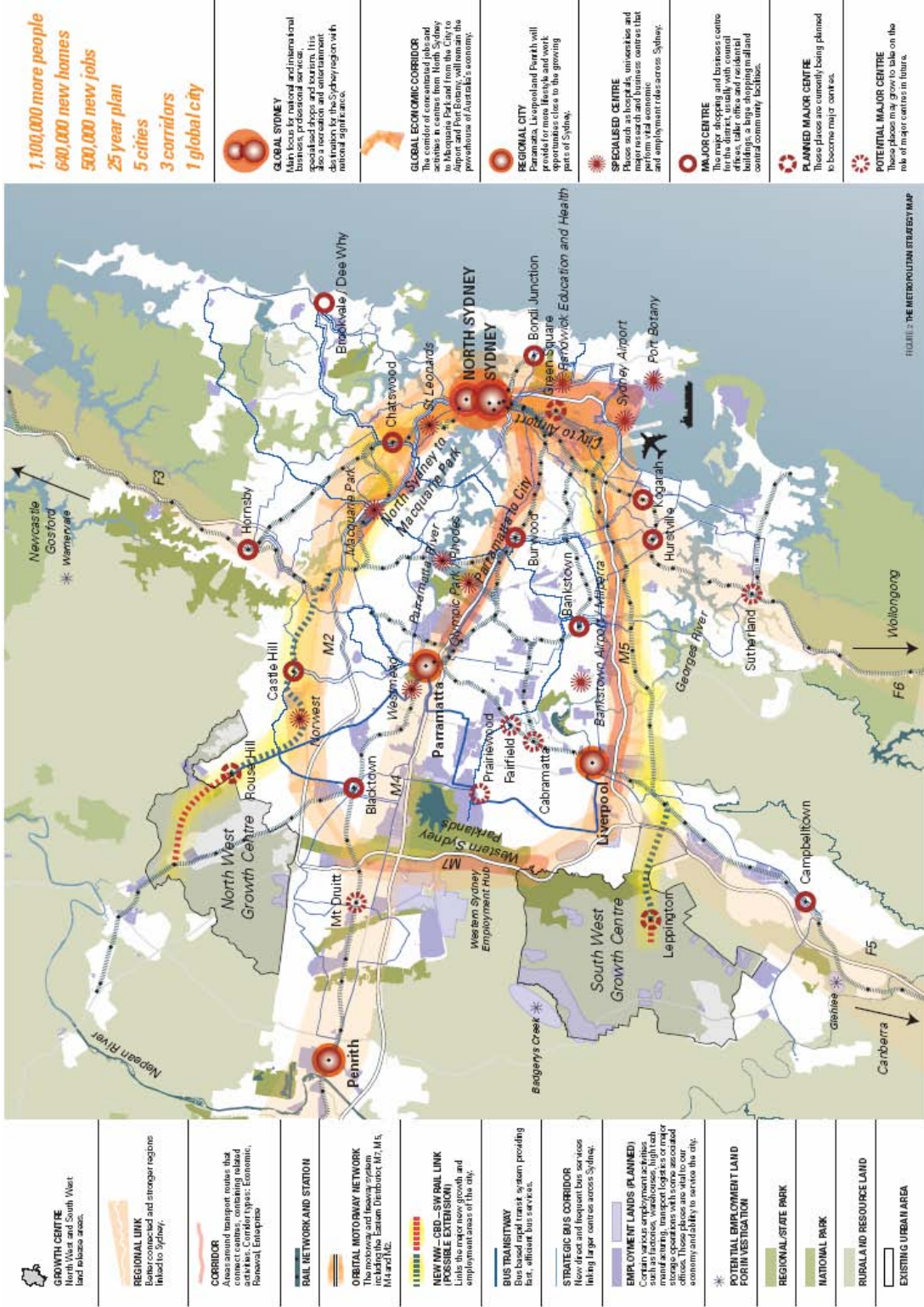


Figure 3 Metropolitan Strategy for Sydney (DoP, Dec 2005)

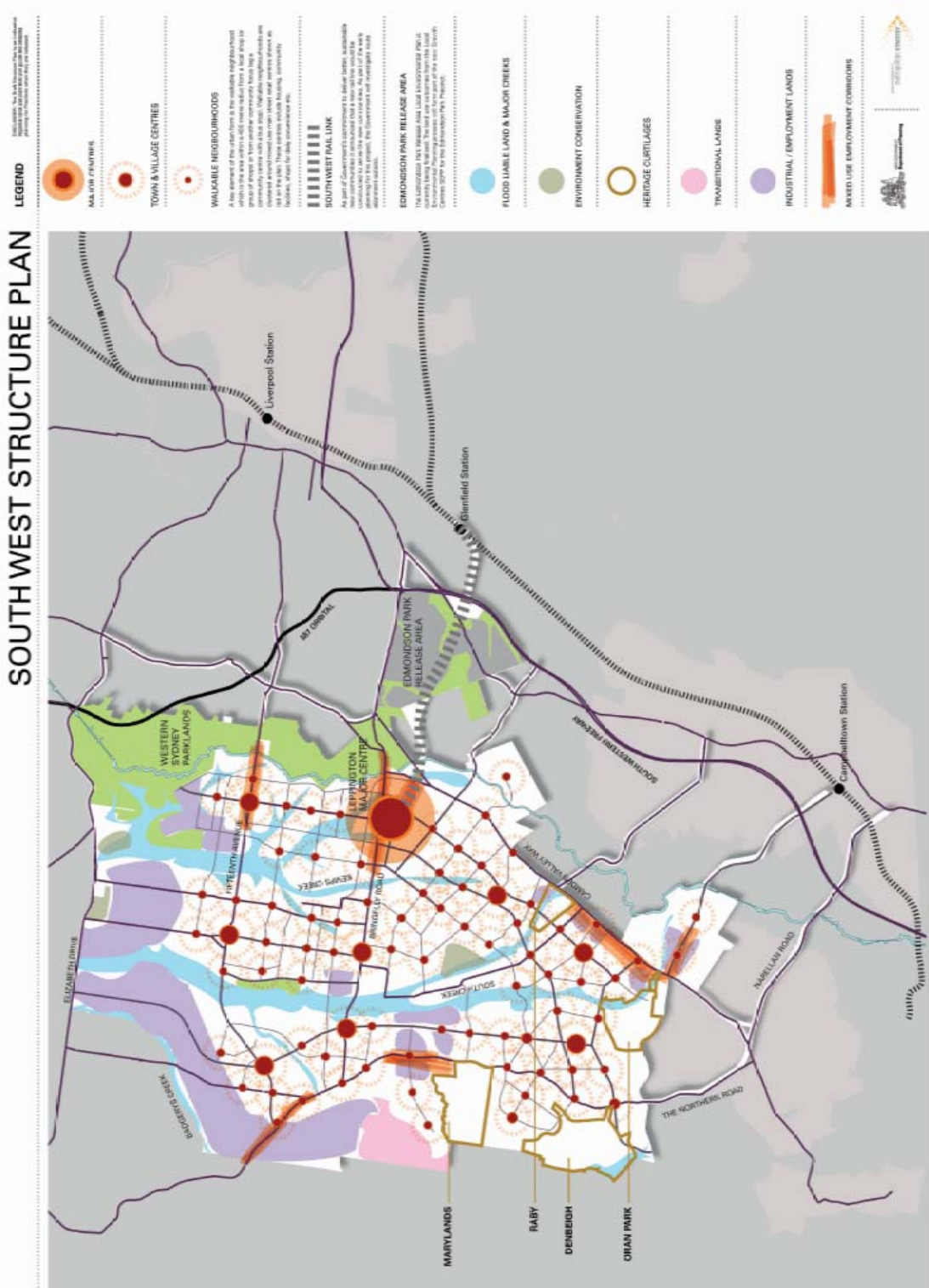


Figure 4 South West Growth Centre Structure Plan



The principles that are important in the early stages of planning a major town centre served by rail are summarised below.

- The major town centre should enjoy good exposure to and connectivity with the new Leppington Rail railway station, as well as main roads such as Bringelly Road, which will be the closest arterial road in the short term for access and exposure to the town centre.
- To function effectively in the long term, the railway station and the town centre must also be efficiently served by upgraded road and bus networks to, from and through surrounding suburbs.
- The rail alignment should facilitate connections between existing and proposed roads, the town centre and the site of the railway station.
- There needs to be sufficiently large areas of land surrounding the rail station to accommodate buildings and activities planned for the town centre (for example, 250ha would accommodate an 800m walking radius).
- The natural features of the land should enable special amenity to be created or reinforced in order to give a strong identity to the town centre (for example, parkland, lake and views).
- Must ensure that the station integrates with planning for the town centre and that appropriate land uses are located adjacent to the rail corridor and stabling area.
- The railway station should be at the heart of the town centre and preferably fully or partially grade separated below ground level from its surrounds in order to facilitate access to and from the station and permit development directly over the station.

The siting of the town centre in Leppington is also constrained by local factors including the northward-flowing watercourses and related potential flood prone land. These constraints have a fundamental influence on the railway station location, the rail alignment and the area available for a future town centre.

Further details on the proposed location of the station and stabling facility are provided in Section 4.4.

4 ROUTES

4.1 REFERENCE ROUTES

A number of studies have been undertaken since the early 1990s to develop routes for the SWRL. These studies culminated in the development of two alternative routes: a northern route and a southern route as illustrated in Figure 5 below (referred to in this report as the reference northern and reference southern route). These routes were described in the South West Rail Link Overview Report which was placed on public exhibition in 2005.

The reference northern and southern routes as described in the Overview Report share a common alignment between Glenfield and Cabramatta Creek, just west of the proposed Edmondson Park Station. The reference southern route then travels west from Edmondson Park and passes through the residential area of Denham Court, the southern section of the Forest Lawn Memorial Gardens and through the Casa Paloma Caravan Park to the proposed Leppington Station near Byron Road. The reference northern route travels north west from Cabramatta Creek, through the northern segment of Forest Lawn Memorial Gardens, through a section of Western Sydney Parklands and then on to the proposed Leppington Station.

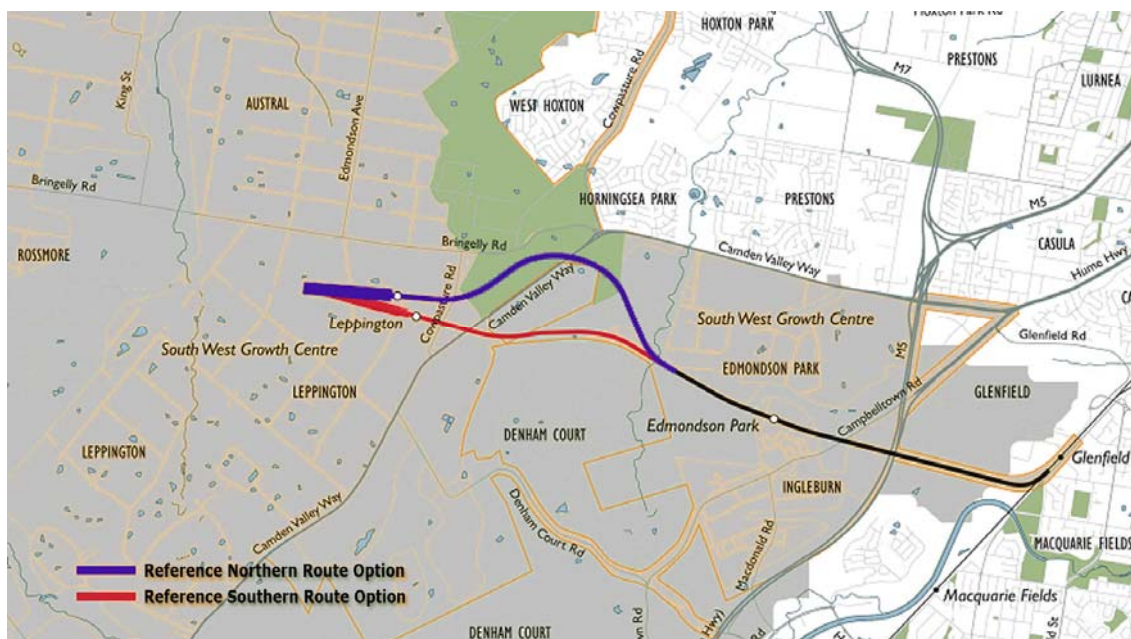


Figure 5: Reference Routes

Seventy seven submissions were received in response to the public exhibition and raised concerns relating to property, flooding, noise and endangered vegetation impacts. There were also concerns raised over the planning of Leppington Town Centre and the proposed location of the stabling facility.

4.2 ALTERNATE ROUTE OPTIONS

In refining the reference routes, four alternate route options from Edmondson Park to Leppington were developed and assessed (refer Figure 6). In all options, Leppington Station and the proposed stabling yard have been located further west than proposed by the reference routes.

The alternate route options were developed taking into account rail operational requirements, issues raised in *Overview Report* submissions, potential flooding constraints and current urban planning for the new Leppington town centre (as shown in the South West Growth Centre Structure Plan).

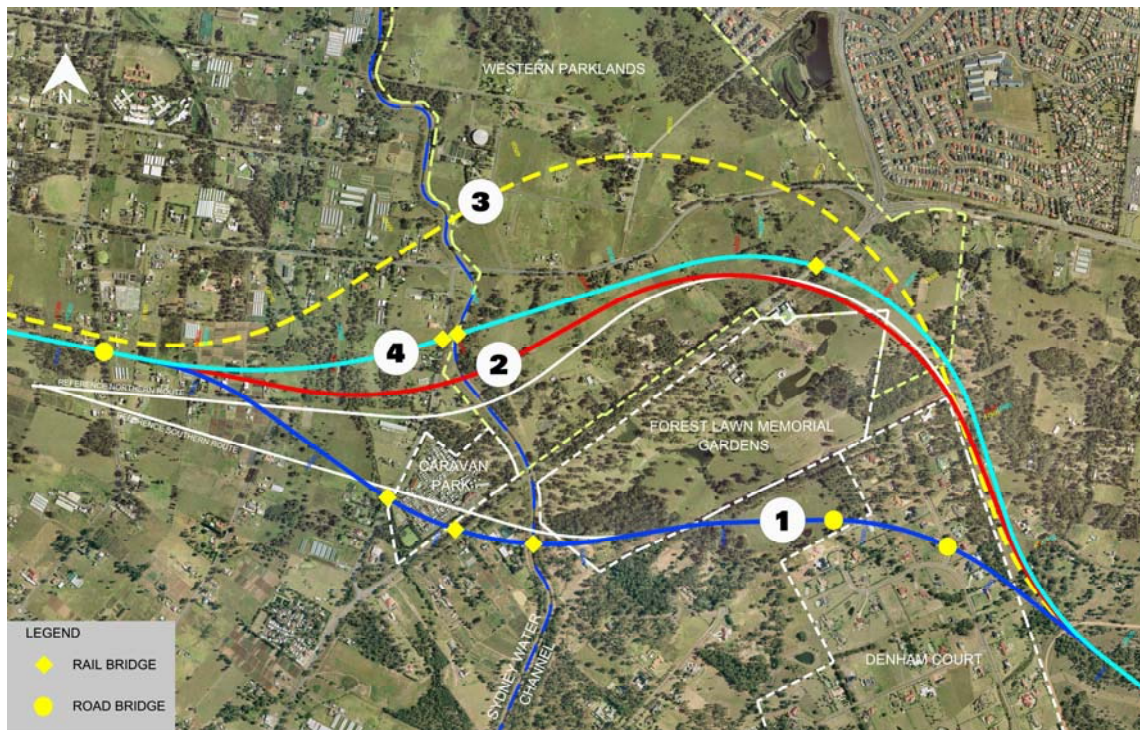


Figure 6 Alternate Routes

OPTION 1

This route option follows the reference southern route through Denham Court in a deeper cutting. It then goes slightly further south than the reference southern route, passing through the southern end of the Forest Lawn Memorial Gardens and the Casa Paloma Caravan Park before travelling north to the proposed Leppington station.

OPTION 1A

This route follows the same alignment as Option 1, however passes through Denham Court in tunnel rather than a cutting.



OPTION 2

This route is similar to the reference northern route but travels slightly further north. It passes north of Denham Court, cuts across the north-east corner of the Forest Lawn Memorial Gardens and into the Western Sydney Parklands, where it deviates from the northern reference route through to Rickard Road. West of Rickard Road, the route follows the corridor common to all of these options to the proposed station and the stabling facility at Leppington.

OPTION 3

This option travels further north than Option 2 to provide a better rail alignment. Though the improved rail alignment allows for greater line speed, it is approximately 800m longer than Option 1 and has a greater number of bridge crossings than the other routes. It also results in greater severance of the Western Sydney Parklands.

OPTION 4

This route travels slightly further north than Option 2, avoiding Forest Lawn Memorial Gardens and then travelling through the Western Sydney Parklands, before moving towards Bringelly Road to join the corridor, common to all of these options, to the proposed station and the stabling facility. The future widening of Bringelly Road would allow for a combined rail and road corridor minimising the impacts on the Western Sydney Parklands.

4.3 REVIEW OF ALTERNATE ROUTES

A review of the alternate route options was undertaken to select the preferred northern and southern routes - referred to as the refined northern and southern routes.

Option 1 was considered to be an improvement on the reference southern route as it had less encroachment on the Forest Lawn Memorial Gardens and a reduced impact on the Casa Paloma Caravan Park. The route includes a deeper cutting through Denham Court to reduce noise and visual impacts.

Option 1A further reduces the impacts on Denham Court residents by the use of a tunnel rather than a cutting. However this would result in a significant additional cost of approximately \$100 million.

Option 2 is only marginally different to the northern reference route with a slightly improved rail alignment. However, as it still cuts across the north-east corner of the Forest Lawn Memorial Gardens it does not provide a significant improvement on the reference northern route.

Option 3 has an improved rail alignment, but severs a larger section of the Western Sydney Parklands and has a greater number of bridge crossings. This option does not align with the proposed widening of Bringelly Road.

Option 4 has an improved rail alignment compared to the reference northern route and completely avoids the Forest Lawn Memorial Gardens. This option also aligns with the proposed widening of Bringelly Road.

Based on this analysis, Option 1 has been identified as the refined southern route and Option 4 has been identified as the refined northern route.

4.4 REFINED ROUTES

In both refined routes, Leppington Station and the proposed stabling yard have been located further west than in the reference routes. The station would be just west of Rickard Road, at the heart of the town centre. The stabling yard has been located away from Leppington Town Centre. This is in response to the current urban planning for the new town centre and the potential flooding constraints in the area (refer Figure 7).



Figure 7 Leppington Town Centre and Indicative Transport Networks

The location and vertical profiles for the refined southern and northern routes are shown in Figure 8 and Figure 10. A detailed comparison of the two refined routes is provided in the next section.

The refined southern route runs through Denham Court in a cutting and then travels slightly further south than the reference route at the southern end of the Forest Lawn Memorial Gardens before traversing north to the proposed Leppington station.

The refined northern route travels in a northerly direction just before Denham Court, and goes slightly further north than the reference route to avoid impacting the Forest Lawn Memorial Gardens before traversing in a southerly direction through the Western Sydney Parklands to the proposed Leppington Station.

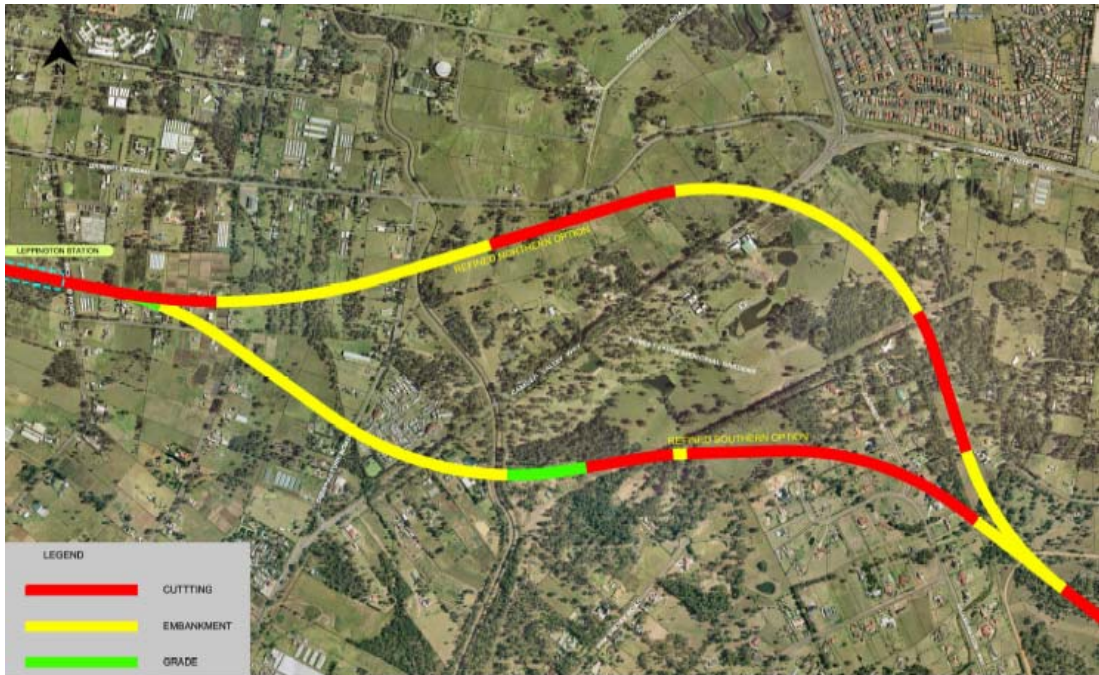


Figure 8 Refined Southern and Northern Routes - location

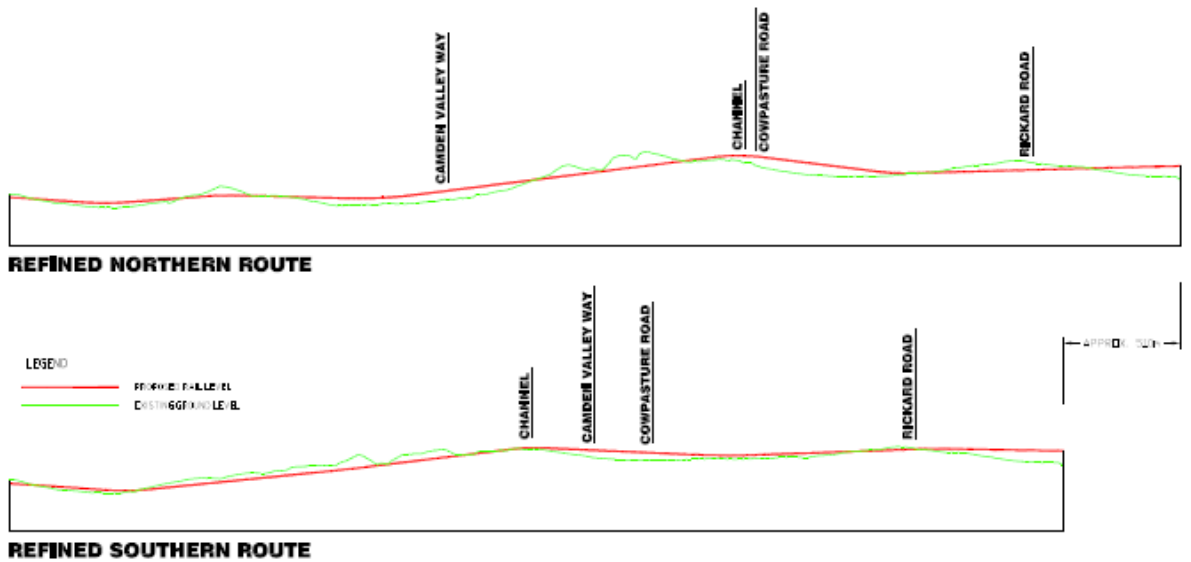


Figure 9 Refined Southern and Northern Routes – vertical profiles



5 COMPARISON OF REFINED ROUTES

A comparison of the two refined routes has been undertaken to identify and assess the differences between the two options. The following issues have been considered:

- technical and constructability issues;
- operability;
- environmental impacts;
- property;
- social / community impacts; and
- capital cost including property acquisition.

5.1 TECHNICAL AND CONSTRUCTABILITY ISSUES

5.1.1 Constructability Issues

The refined southern route is 500m shorter than the northern route and is a more direct route through to Leppington. The refined northern route would require more earthworks to accommodate the railway through the escarpment between the Forest Lawn Memorial Gardens and Bringelly Road. The refined southern route has a greater number of road and bridge crossings and a deep cutting through Denham Court. Overall there is no substantive difference between the two routes.

5.1.2 Hydrology and flooding

From a hydrology perspective both the refined northern and southern routes will cross tributaries to Bonds Creek and Cabramatta Creek. These tributaries generally flow in a northerly direction. For the purposes of this assessment, two types of watercourse crossings were considered:

- Major crossings which drain catchments larger than 40 hectares; and
- Minor crossings which drain catchments smaller than 40 hectares.

Of the minor crossings, those draining catchments less than 3 hectares were ignored for this assessment.

The refined northern route has seven waterway crossings in total, consisting of three minor crossings, and four major crossings. The refined southern route also has seven waterway crossings in total, consisting of four minor crossings, and three major crossings.

In terms of hydrologic impacts, there are only minor differences between the refined northern and refined southern routes. The refined northern route will require one additional major waterway crossing compared to the refined southern route, however, this crossing is rather conventional. The refined southern route contains two waterway crossings located in a cutting and one major crossing that provides marginally adequate clearance above the adjacent floodplain. This crossing is likely to require additional



culvert and channel works in comparison to the equivalent refined northern route crossing.

Neither refined route contains significant flooding constraints and it would appear that all major crossings are sufficiently above the floodplain to provide a suitable level of flood protection. Both options are feasible in terms of potential hydrologic impacts provided that the waterway openings and drainage channels are sized to account for the potential impacts due to blockage, flood impacts on upstream development and, where appropriate, the flood consequences in rarer events.

5.1.3 Local traffic issues

In relation to local traffic issues there are only minor differences which are summarised in Table 2 below. The refined northern and southern routes differ only in a small number of locations.

Table 2 Traffic impacts

Location	Refined Southern Route	Refined Northern Route
Cassidy Street, Denham Court	Deep cutting to permit road bridge.	No impact.
Camden Valley Way	Bridging required.	Bridging required.
Cowpasture Road	Bridging required.	Bridging required.
Byron Road	Intersects with this road twice. Likely road re-alignment required.	Does not intersect this road.
Rickard Road	Severs this road. Bridging required.	Passes beneath Rickard Road in cutting.

5.2 OPERABILITY

Train operations have been simulated along the two routes between Edmondson Park and Leppington stations. The simulations were undertaken to determine the travel time of an eight car Tangara Basin carrying maximum passenger capacity between stations on each route in both directions. The results of the train performance simulations indicate that the travel times between the two stations for the refined southern route are approximately one minute less in both directions than for the refined northern route, which is 500m longer. A one minute time difference on an approximately 50 minute train trip from Leppington to Sydney CBD is considered insignificant.



5.3 ENVIRONMENTAL ISSUES

5.3.1 Flora

Based on Department of Environment and Conservation mapping, the following endangered ecological communities would be directly impacted by the refined routes (refer to Figure 10):

- Shale Plains Woodland – corresponds with the Cumberland Plain Woodland ecological community that is listed as endangered under both the NSW Threatened Species and Conservation Act 1994 (TSC Act) and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act);
- Shale Hills Woodland – also corresponds with the Cumberland Plain Woodland ecological community that is listed as endangered under both the TSC Act and the EPBC Act; and
- Alluvial Woodland (Sydney Coastal River Flat Forest) – corresponds with the River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions that is listed as endangered under the TSC Act.

Within the above vegetation communities, three conservation significance assessment classes have been designated (see Figure 11): core habitat; support to core habitat; and other remnant vegetation.

Table 3 below provides a summary of the total areas of vegetation that would be directly impacted by the need to clear a 40 metre wide corridor for either refined route. It should be noted that additional impacts on vegetation may result from ‘edge effects’ and construction sites and access.

The refined southern route would impact on 4.0 hectares of endangered ecological communities compared with 5.6 hectares for the refined northern route. The refined southern route would impact on 3.9 hectares of area defined as ‘core’ or ‘support for core habitat’ compared to 3.6 hectares for the northern route.

Table 3 Comparative ecological impacts

Factor	Area of direct impact (hectares)	
	Refined Southern Route	Refined Northern Route
Endangered ecological community		
Cumberland Plain Woodland	3.6	4.6
Alluvial Woodland (Sydney Coastal River Flat Forest)	0.3	1.1
Total endangered ecological community clearing required	4.0	5.6

Conservation significance assessment classes

Core habitat	0.4	0.9
Support for core habitat	3.5	2.7
Total core/support for core habitat	3.9	3.6
Other remnant vegetation	0.1	2.0
Total vegetation clearing required	4.0	5.6

Only one threatened species of plant, *Pimelea spicata*, has previously been recorded within the area. This endangered species is listed under both the TSC Act and the EPBC Act. The area of habitat for this threatened species that would be directly impacted by both refined routes is unknown and would require field investigations.

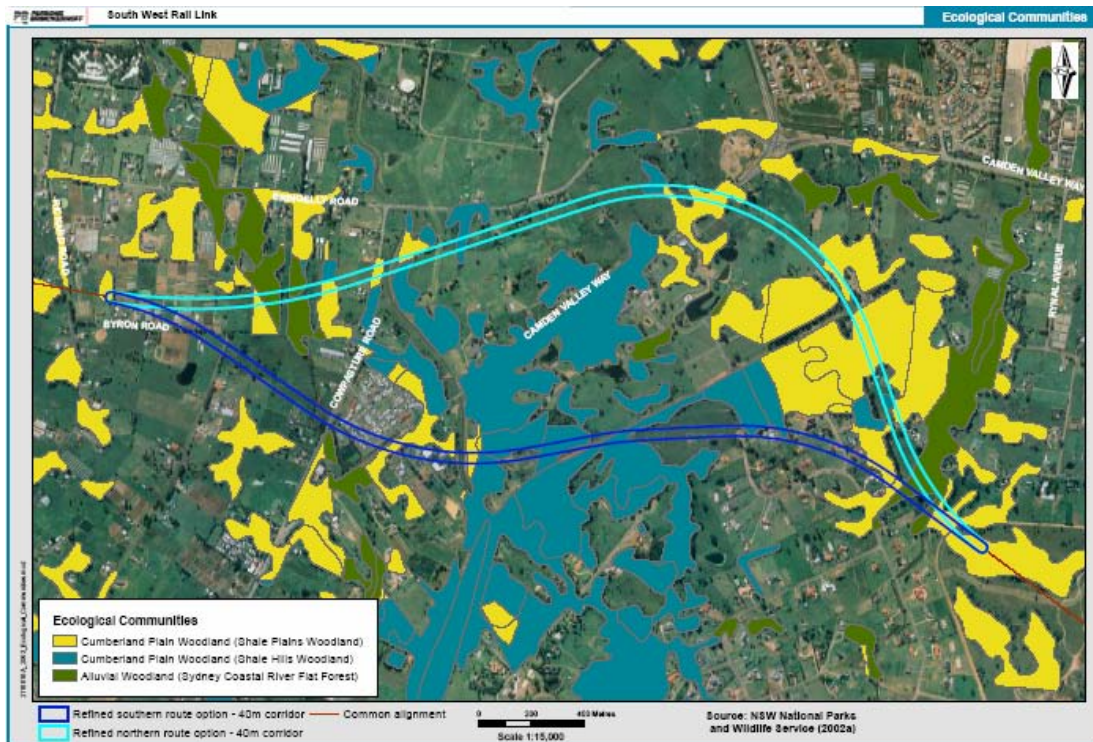


Figure 10 Endangered Ecological Communities

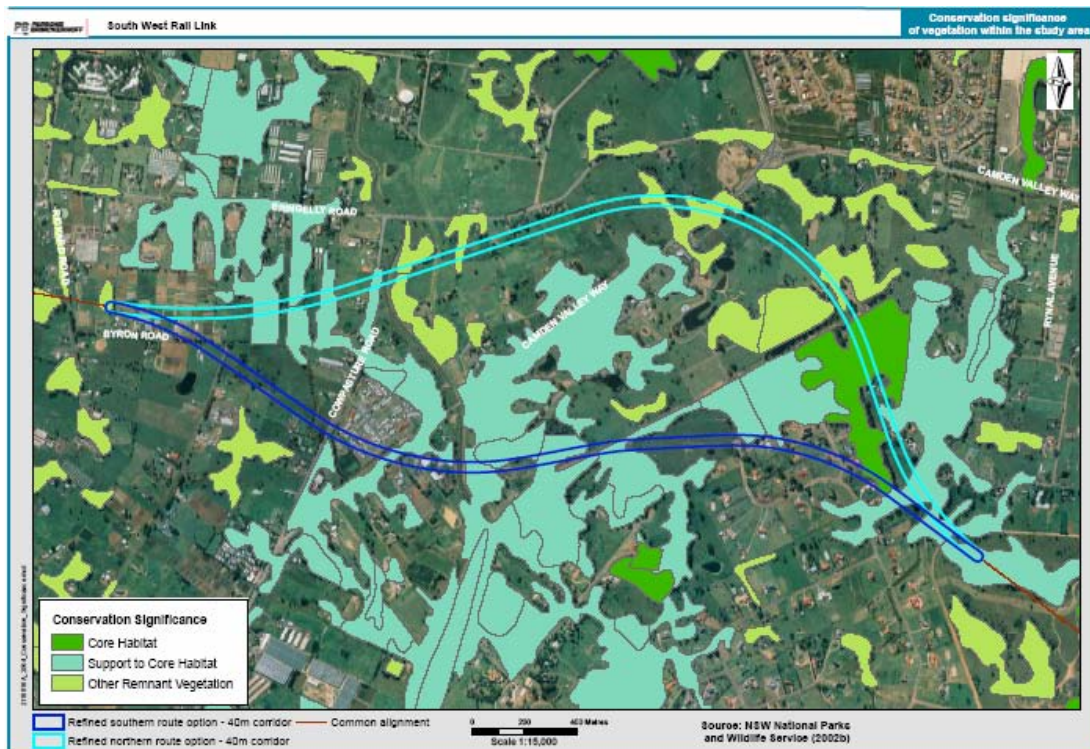


Figure 11 Conservation Significance

The presence along both refined routes of Cumberland Plain Woodland, a nationally listed endangered ecological community, would likely qualify both refined routes as matters of national environmental significance and therefore, the assessment would need to be referred to the Commonwealth Department of the Environment and Heritage.

Both refined routes would also require clearing of endangered ecological communities listed under the TSC Act. The areas of endangered ecological communities requiring clearing are likely to be considered significant and, in accordance with the NSW *Environmental Planning and Assessment Act 1979*, acceptable recovery and threat abatement plans and compensatory habitat arrangements would also need to be discussed with Department of Environment and Conservation. Compensatory habitat arrangements may involve additional land acquisition and additional costs to those discussed in Section 5.6.

5.3.2 Fauna

The following threatened fauna species have previously been recorded in habitat along both the refined routes:

- Bush Stone-curlew (bird) – listed as an endangered species under the TSC Act;
- Cumberland Plain Land Snail – listed as an endangered species under the TSC Act;
- Grey-headed Flying-fox – listed as a vulnerable species under both the TSC Act and the EPBC Act;



- Five species of Microchiropteran bats.

The area of habitat for these threatened species that would be directly impacted by either refined route is unknown and will require field investigations as part of detailed environmental assessment for the preferred route. Similar to flora impacts, if the selected route is considered to have a significant impact on threatened species listed under the TSC or EPBC Acts, then recovery and threat abatement plans would need to be implemented and the assessment referred to the Commonwealth Department of the Environment and Heritage.

The northern route provides a buffer between the existing properties in Denham Court and the rail corridor which could be utilised as a fauna corridor connecting the southern end of the Western Sydney Parklands and regional parks being proposed as part of the Edmondson Park release.

5.3.3 Indigenous Heritage

Indigenous heritage items recorded on the National Parks and Wildlife Service's Aboriginal Heritage Information Management System (AHIMS) in the vicinity of the proposed SWRL alignments include isolated finds, open artefact scatters and a scarred tree (see Figure 12).

Both refined routes are located close to isolated finds near where they cross the Sydney Water Supply Upper Canal. The refined routes would be on embankment at these locations and there is potential for disturbance of these heritage items by earthworks or vegetation removal.

The refined northern route is located close to another isolated find (item EPCS-7) on the high side of Cabramatta Creek within Edmondson Park. This item is not currently recorded on AHIMS but was identified as part of an Aboriginal heritage management plan conducted for the Edmondson Park Composite Site (AMBS 2003). While the site location is considered to possess only a moderate potential for in situ archaeological deposits, the report identifies the site as forming part of a wider area of high archaeological sensitivity due to the low level of disturbance in the area. The area of high sensitivity is intersected by the refined northern route as shown in Figure 13. It also forms part of the area which was deferred under the Draft Edmondson Park LEP.

The refined southern route is also located close to an open artefact scatter (item EPCS8) located on a vehicle access track along the western perimeter of the Edmondson Park LEP area. The same report referred to above considered this location to have a low potential for in situ subsurface archaeological deposits but the surrounding area to be of moderate archaeological sensitivity in which subsurface archaeological deposits are likely to remain intact to some degree.

Knowledge of cultural heritage sensitivity and archaeological remains is less well documented outside of the areas investigated as part of the Edmondson Park LEP investigations. Previous desk top investigations were undertaken as part of the 2003 Environmental Issues Report and indicated that identification of sites was more likely in areas with sloping topography, near water courses and in less disturbed environments.

There are also two claims on the Register of Native Title Claims of relevance to the alignments. One is in the Camden LGA by the Gundungurra Tribal Council Aboriginal

Corporation and the other is both the Camden and Campbelltown LGAs by the Darug Tribal Aboriginal Corporation. These claims potentially affect both routes.

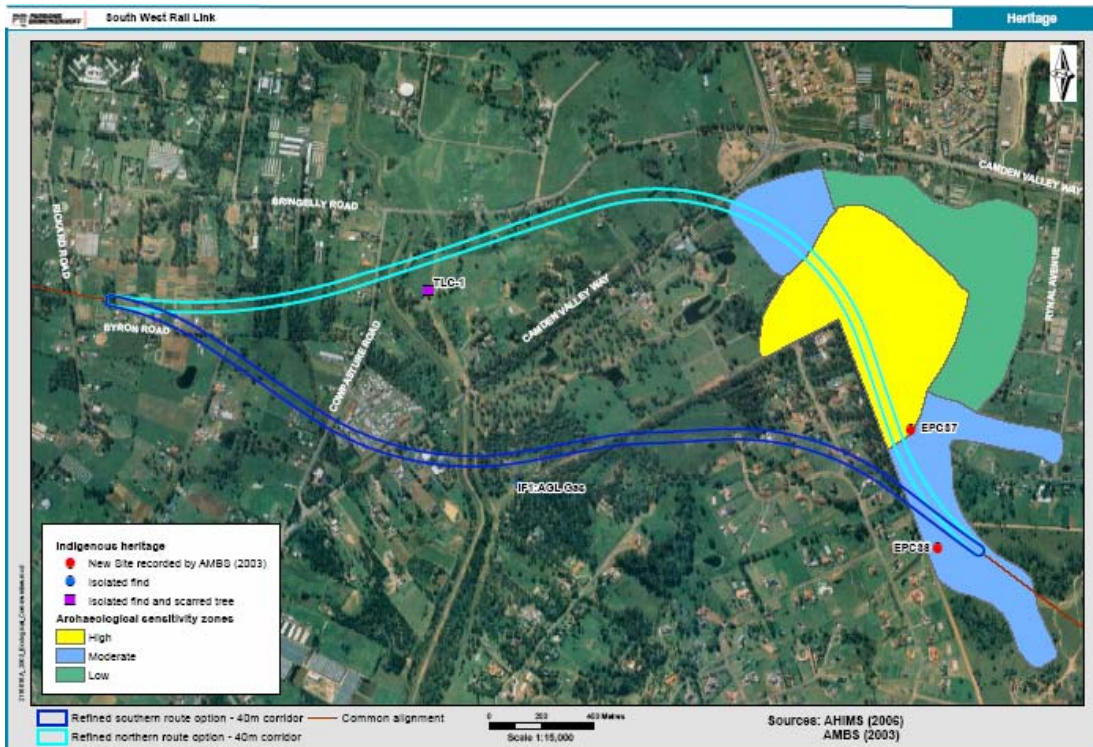


Figure 12 Heritage Sites

5.3.4 Non-Indigenous Heritage

The only non-Indigenous heritage items located close to either refined route is the Sydney Water Supply Upper Canal between Denham Court and Cecil Hills, which is heritage-listed on the Campbelltown and Liverpool LEPs, the State Heritage Inventory, the Sydney Catchment Authority’s Section 170 heritage register and the National Trust Register.

Both refined routes would bridge over the Sydney Water Supply Upper Canal. The refined northern route would have a higher clearance over the canal than the refined southern route. The impacts of the crossing of the canal by each route are likely to otherwise be similar.

While not known to be listed on any heritage registers, it is possible that some of the main roads crossed by the refined routes will have heritage value which relate to their historical function as roads built and used by early settlers. Camden Valley Way, Denham Court Road and Cowpasture Road are likely examples. Background reports also refer to some of these roads as forming important visual corridors and part of the cultural landscape (Austral Archaeology 2003, Clements and Taylor 1992, Landcom 1998). Any impacts from the railway would therefore also constitute impacts on these values (refer to section on visual impacts below for further details).

5.3.5 Noise Impact

A noise assessment has been carried out for two situations:



- Existing situation – Residential receivers as at January 2006, with SWRL operating at ‘start up’ level (128 trains per day); and
- Future situation – Residential receivers as estimated from the NSW Government’s - South West Growth Centre Structure Plan with an assessment of both ‘start up’ and ‘anticipated maximum’ SWRL traffic levels (128 and 400 trains per day respectively).

Previous acoustic studies for the SWRL have recommended a 40m residential setback from the centre of the corridor as the most basic mitigation measure (for example, by planning roads or parkland on either side). Consistent with this advice, the minimum setback for residential receivers was taken as 40m from the centre of the corridor.

It is likely that the Department of Environment and Conservation (DEC) will apply the following noise goals to the SWRL project:

- LA_{max} 80 dBA; and
- LA_{eq}(24hour) 55 dBA.

The assessment of the two situations has been simplified by considering impacted receivers in two groups:

- Receivers with noise goal exceedances; and
- Receivers more generally affected by train noise (taken to be receivers with predicted noise levels greater than 5 dBA below the goals).

While the number of potentially affected properties has been used to provide an impression of the general effect on the community, the number of residential receivers with noise goal exceedances is the overriding concern and is used as the basis for the assessment.

The outcomes of the Future Situation assessment are summarised on Figure 13. The lower value in the table is for ‘start up’ level SWRL traffic, while the upper value is for ‘anticipated maximum’ level SWRL traffic. The refined northern route has less residences with noise goal exceedances in both the ‘no barrier’ and ‘barrier’ situations than the refined southern route.

The planning information available for the Edmondson Park area is broad and preliminary and this limits the detail to which the assessment of impacted residences can be carried out. For the Edmondson Park residential area to the east of Cabramatta Creek, the northern and southern route do not differ and hence the potential impacts will be identical. Both planning and mitigation measures would be used to ensure that potential impacts are managed responsibly and effectively.

The assessment of the Edmondson Park residential area to the west of Cabramatta Creek found that the refined northern route had the least number of potentially affected residences (in the study area). With regard to Edmondson Park however, it is noted that the residences affected by the refined southern route are generally in the already developed Denham Court area and those affected by the refined northern route are generally in the Edmondson Park area where potential impacts would be managed through both development planning and mitigation measures.

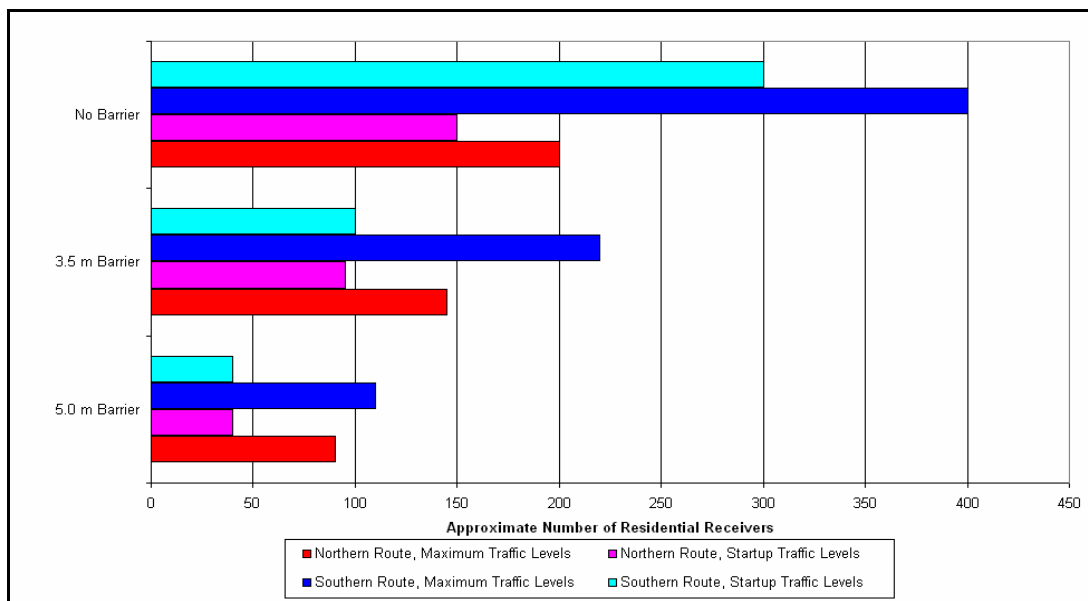


Figure 13 Predicted noise goal exceedances at residential properties

5.3.6 Visual Impacts

i) Refined Southern Route – Visual Impacts

The refined southern route emerges from a cutting on the western edge of Edmondson Park and then back into a cutting through Denham Court. This route would reach its highest elevation east of Camden Valley Way and cross over Cowpasture Road on a declining gradient. Within Leppington, this route generally proceeds on embankment on a declining gradient as far as Byron Road. West of Byron Road, the route would be at the surface and then on embankment at Dickson Road.

The refined southern route is expected to be visible from the following locations:

- the south-western areas of the Forest Lawn Memorial Gardens;
- the Camden Valley Way view corridor - the refined southern route is expected to be visible to traffic travelling between the crest where Camden Valley Way crosses the Sydney Water Supply Upper Canal and the intersection with Cowpasture Road;
- Casa Paloma Caravan Park;
- the Cowpasture Road view corridor; and
- land close to the corridor in Leppington, particularly around Dickson Road.

The refined southern route would impact the semi-rural character of Denham Court. Development in Denham Court is guided by Liverpool City Council’s *Development Control Plan No. 12 – Denham Court*. The Plan recognises the scenic hills of the Denham Court locality as having both a local and regional significance. The Plan contains requirements for dwelling designs to maintain views between dwellings and minimise the intrusion of dwellings on the natural landscape. In accordance with the plan, dwelling designs at

Denham Court have generally capitalised on the large lot sizes and opportunity for rural vistas.

The Denham Court view shed (refer Figure 14) has been recognised in the *Liverpool Heritage Study* (Clements and Taylor 1992) as forming an important part of the cultural landscape. Any visual impacts on the view shed would therefore impact on these values.



Figure 14 Denham Court View shed

The Camden Valley Way was identified in the *Camden Scenic and Cultural Landscapes Study* (Landcom 1998) as a view corridor that forms an important part of the cultural landscape. Any visual impacts caused by the railway on the Camden Valley Way view corridor would therefore impact on the cultural landscape. Cowpasture Road has also been identified as being an important part of the cultural landscape by Austral Archaeology (2003) and any visual impacts to this would similarly impact the cultural landscape.

ii) Refined Northern Route – Visual Impacts

Between Edmondson Park and the Western Sydney Parklands, the refined northern route would proceed through shallow cutting, deep cutting, low embankment and then a further short section of cutting before returning to embankment near the boundary with the parklands. The embankment would gain elevation west of Edmondson Park where it enters the Western Sydney Parklands on the approach to Camden Valley Way. The alignment would continue to gain elevation as it crosses over Camden Valley Way and proceed through the southern portion of precinct 9 of the Western Sydney Parklands, generally adjacent to Bringelly Road.



Within the Parklands, between Camden Valley Way and Cowpasture Road, the alignment would continue on a rising gradient as it transitions from embankment into cutting and then returns to embankment where it reaches its highest elevation immediately east of Cowpasture Road. The alignment would cross over Cowpasture Road on a declining gradient. Within Leppington, the route proceeds on a declining gradient on embankment to just west of Bonds Creek. From west of Bonds Creek, the route is generally level and in cutting under Rickard Road and then on embankment at Dickson Road.

The refined northern route is expected to be visible from the following locations:

- the north western corner of Edmondson Park;
- the Camden Valley Way view corridor - the refined northern route is expected to be visible to traffic travelling between the crest where the road crosses the Sydney Water Supply Upper Canal and the intersection with Bringelly Road and Cowpasture Road (north);
- traffic on Bringelly Road;
- the southern portion of the Western Sydney Regional Parklands; and
- land close to the corridor in Leppington, particularly around Dickson Road.

Where the refined northern route is on embankment in the north-western corner of Edmondson Park, the railway line may obscure views towards the scenic hills at Denham Court to the west.

As mentioned above, the Camden Valley Way view corridor and Cowpasture Road have been recognised in some background reports as forming an important part of the cultural landscape. As for the refined southern route, any visual impacts from the refined northern route on the Camden Valley Way view corridor and Cowpasture Road would impact on the cultural landscape.

The refined northern route would create a visual intrusion through the southern portion of precinct 9 (Hoxton Park Ridge) of the Western Sydney Regional Parklands. The route is expected to obscure views from the parklands towards the west, including views of the scenic hills at Denham Court.

iii) Visual Impact Summary

The visual amenity of the existing areas is generally high based on the open spaces, large lot sizes, existing vegetation and green spaces and limited density and development of residential premises. In the future, the visual amenity of the areas will change substantially as a result of additional residential development, new and expanded roads and other utilities / infrastructure. The SWRL would be a part of this new visual landscape and its visual impact in the future would be reduced compared with the existing situation.

The refined northern route, where it proceeds into a cut as it heads west over the ridgeline, whilst not in the line of sight of the vista along Camden Valley Way will be visible at the Camden Valley Way/Bringelly Road intersection and the Western Sydney Parklands, which will generate some moderately high visual impact. However Bringelly Road is proposed to be widened to a six lane arterial road as it crosses the ridgeline, which will fundamentally change the character of the ridgeline in this location in the future, altering the visual quality of the landscape.



As the refined northern route exits the ridge travelling west the route will be elevated, and will be a prominent feature within the landscape and visual impact will be moderately high.

The refined southern route traverses the ridge where terrain is less significant and prominent and the route will not require as much cut and fill. Thus visual impact will be moderate in comparison. However where the route crosses both Camden Valley Way and the Casa Paloma Caravan Park the exposure and sensitivity of observers will be high, correspondingly generating high visual impact.

In the lower lying land to the west of the ridgeline there are generally negligible differences between the landform in the corridor of each route, and hence the potential different visual impacts generated by each route are low and would not be apparent.

5.4 PROPERTY

The key issue in relation to property is the extent and nature of land ownership (public versus private ownership) of those landholdings that will need to be acquired for the SWRL corridor.

5.4.1 Refined Southern Route

The refined southern route passes through part of the Denham Court low density residential area, the southern edge of the Forest Lawn Memorial Gardens, the Casa Paloma Caravan Park and small rural landholdings (see Figure 15). It crosses a number of roads and the Sydney Water Supply Canal. Further to the west of Camden Valley Way, the land is mainly zoned as 1(b) Rural - small holdings, some of which is used for market gardens. The western end of the route is within the area of land to be used for the future Leppington town centre.

5.4.2 Refined Northern Route

The refined northern route passes through land zoned for future urban development that fronts Jardine Drive, Edmondson Park and Camden Valley Way, Leppington before passing through land owned by the Department of Planning for the development of the Western Sydney Parklands (see Figure 16). Further to the west of Cowpasture Road are small rural landholdings. This route avoids the northern edge of the Forest Lawn Memorial Gardens and crosses a number of roads and the Sydney Water Supply Canal. The western end of the route is within the area of land to be used for the future Leppington town centre.

Overall, the affected properties for both refined routes are predominantly residential or semi-rural acreage allotments. The other major land uses affected are the Forest Lawn Memorial Gardens and the Casa Paloma Caravan Park (refined southern route) and Western Sydney Parklands (refined northern route). Several small market gardens are affected by both routes.

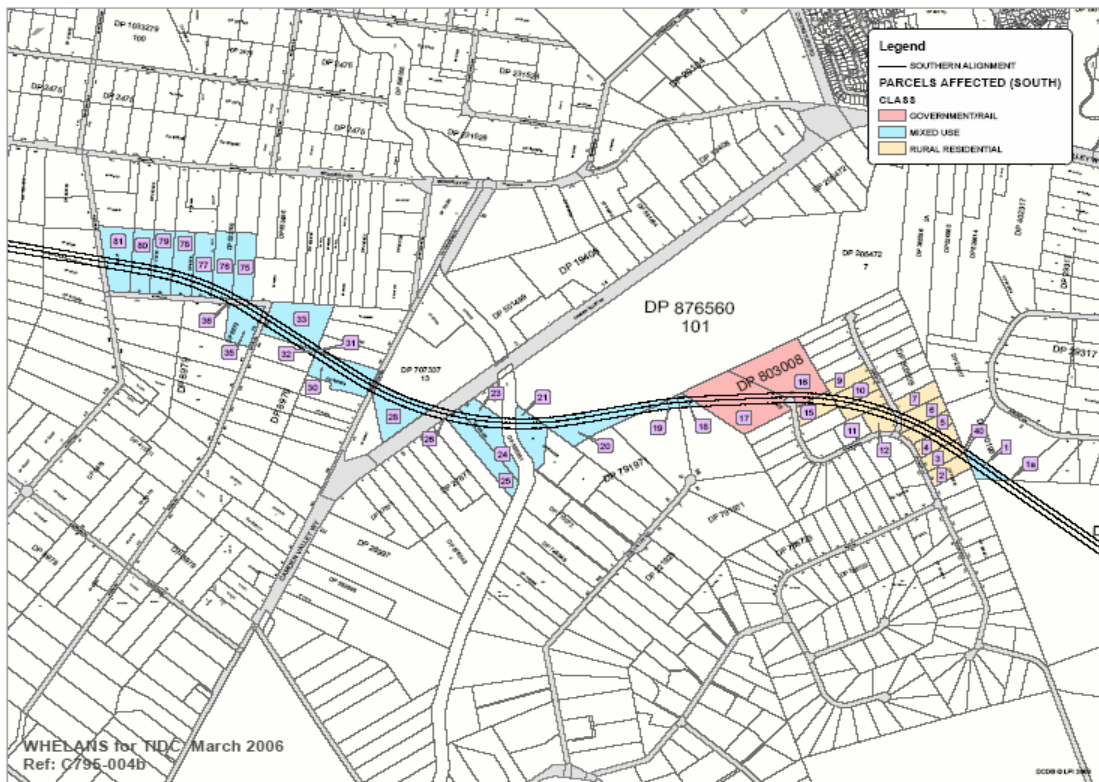


Figure 15 Landholdings Affected by the Refined Southern Route

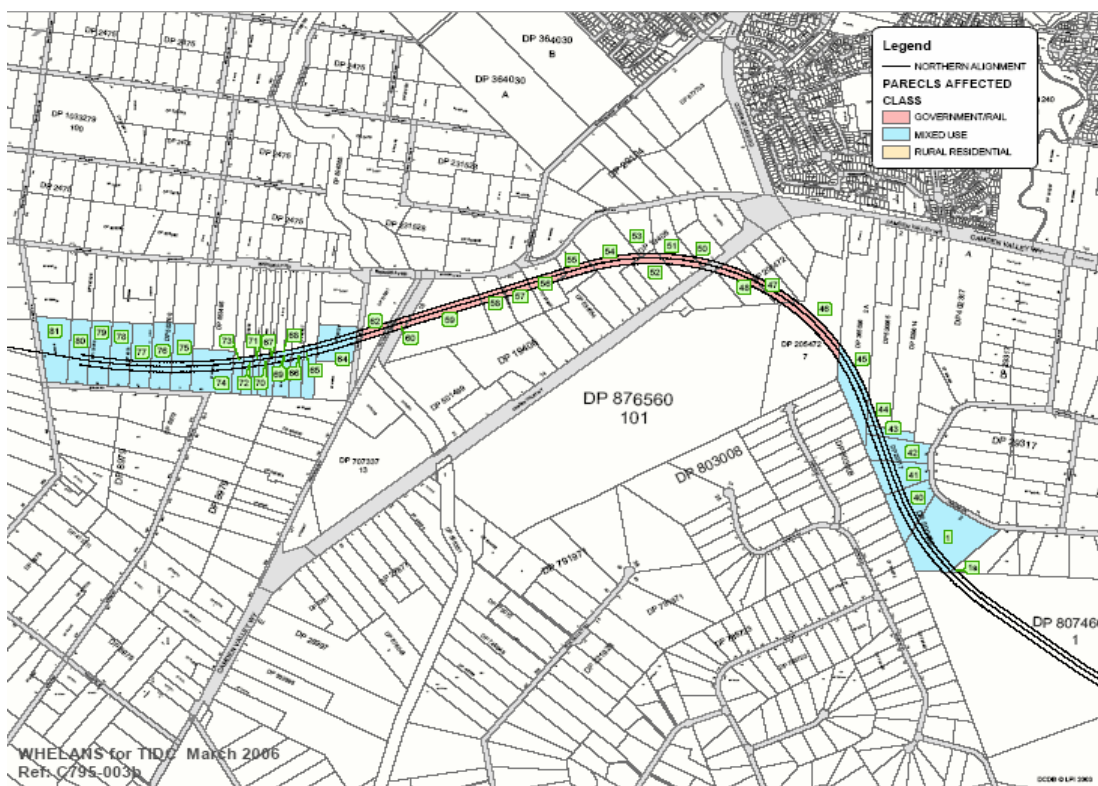


Figure 16 Landholdings Affected by the Refined Northern Route

Private property acquisition has been based on full acquisition except where the land required is a relatively small proportion of a large land holding.

Both refined routes cross publicly-owned land which includes RTA and Council roads, the Sydney Water Supply Canal owned by Sydney Catchment Authority, RailCorp land at Denham Court and land acquired by the Department of Planning for the development of the Western Sydney Parklands.

The table below summarises the number of properties affected by each refined route.



Table 4 Land ownership

Land ownership	Refined Southern Route section	Refined Northern Route section
Privately owned		
: residential	12	0
rural acreage	20	25
quasi commercial	4	1
Total privately-owned	36 (24 whole acquired)	26 (13 whole acquired)
Government owned:		
RailCorp	2	0
Department of Planning	0	13
Sydney Catchment Authority	1	1
Public roads	5	4
Total Government-owned	8	18
Total properties affected	44	44

The refined southern route will require the whole acquisition of 24 privately-owned properties while the refined northern route will require 13 privately-owned properties to be acquired. There would be partial acquisition of the remaining residential properties as the impacts would be less extensive.

The most significant impact on residential properties will occur at Denham Court where development has occurred mainly in the last 10 to 15 years and is characterised by large residences typically on one hectare blocks and the Casa Paloma Caravan Park which provides low cost housing in the area. Both of these areas are impacted by the refined southern route.

5.5 SOCIAL AND COMMUNITY ISSUES

The refined southern route would have adverse affects on the low-density residential character of Denham Court. The amenity of Denham Court would be negatively affected by noise, visual and severance impacts caused by the railway line. Denham Court contains large lot housing in a semi-rural landscape with easy access to local and regional facilities. This route would substantially detract from the character of this locality. The refined southern route would also involve land take and amenity effects at the Casa Paloma Caravan Park and the southern portion of the Forest Lawn Memorial Gardens. It is noted that the Caravan Park is within the South West Growth Centre boundary and would likely be redeveloped as part of that strategic development.

The refined northern route would have adverse affects on the residential properties along the route. The amenity of this area would be affected by noise, visual and severance



impacts caused by the railway line. This route may also have a number of effects on the Western Sydney Parklands which are planned as a key community resource for western Sydney. The alignment would traverse the southern portion of Precinct 9 (Hoxton Park Ridge) of the parklands on an embankment and in a deep cutting through this section. This section of Precinct 9 has been identified in the *Western Sydney Parklands – Management Vision* (DIPNR 2004) as catering for community facilities, active and passive recreation, commercial recreation and tourist facilities. The planning and development of the parklands are at an early stage and there are opportunities to integrate the SWRL into the overall design of the parklands and provide crossings to minimise severance.

5.6 COST ESTIMATES

5.6.1 Construction cost

The construction cost estimate comparison for the routes from Edmondson Park to Leppington stabling facility was based on preliminary design information. This information included the refined southern and northern routes in plan, aerial photos, and preliminary long sections showing existing ground and proposed rail levels.

From this preliminary data, likely bridge and culvert locations and extent, likely cut and fill general arrangements, and locations of utility services and their impacts were determined. Work site access and logistics were assumed to be straightforward and environmental controls were assumed to be typical of a greenfield road/rail project.

In addition to direct costs, allowance has been made for client costs and contractors design, preliminaries, risk and margin (based on recent market experience) to determine the design and construction cost estimate.

The design and construction cost for the Edmondson Park to Leppington section of the refined southern route is estimated at \$79.7 million and for the refined northern route is estimated at \$82.4 million (in 2006 dollars).

5.6.2 Land Acquisition Costs

An assessment has been made of the land acquisition costs associated with the refined southern and northern routes between where the routes diverge at Denham Court and Rickard Road, Leppington. The land costs associated with the SWRL route east of Denham Court and west of Rickard Road are the same and, accordingly, have not been assessed as part of this study. In preparing the estimates, individual properties have been valued taking account of the requirements of the *Land Acquisition (Just Terms Compensation) Act 1991*. This Act makes allowances, where appropriate, to adequately compensate the dispossessed owners for market value, severance, special value, disturbance, solatium and any adverse impact on the residual land if only part of the site is acquired. In this regard, partial or total acquisition has been assumed depending on the impact of the route on individual properties.

The differential values of the individual properties have been estimated. Whole and partial acquisitions have been assumed on a lot-by-lot basis depending on the impact of the alignment and whether properties were broadly classified as residential acreages, for example, Denham Court where it was assumed that properties were totally acquired, or



rural sites and land zoned for future residential subdivision which were assumed to generally be partially acquired. These costs have been summarised in Table 5 below.

In addition to the market value of the land, the estimates make allowance for matters including severance, special value, disturbance, solatium and any adverse impact on residual land where there is partial acquisition of the site. A contingency of 10% has been allowed for unidentified partial interests in the affected properties including such things as leases and ground rents. The estimates also include transaction costs, conveyancing costs and legal costs as detailed in Table 5.

The refined northern route estimate includes \$6.2 million in respect of partial acquisition of the Western Sydney Parklands land held by the Department of Planning.

Table 5 Summary of acquisition costs

Land ownership	Refined Southern Route Section		Refined Northern Route Section	
	Low	High	Low	High
Acquisition costs				
• direct compensation	\$63.2m	\$69.6m	\$57.7 m	\$63.8m
• 10% contingency	\$6.3m	\$6.9m	\$5.7m	\$6.3m
• transaction cost	\$0.2m	\$0.2m	\$0.2m	\$0.2m
• conveyancing costs	\$0.2m	\$0.2m	\$0.2m	\$0.2m
• court action costs	\$7.0m	\$7.0m	\$5.0m	\$5.0m
Total acquisition costs	\$76.9m	\$84.2m	\$68.8m	\$75.5m

5.6.3 Operating Costs

The refined northern route is 500 metres longer than the refined southern route and there will be increased operating and maintenance costs. RailCorp have indicated that this will be approximately \$50k per annum.

5.6.4 Summary Costs

A comparison of the total cost estimates (covering only the relevant section of the rail link) indicates that the refined southern route would cost approximately \$11 million more than the refined northern route (refer to table 6). Land acquisition costs have a differential of approximately \$8 million, whilst resale of surplus land has been estimated at \$7.5million for the refined southern route and \$13.1million for the refined northern route.

RailCorp already owns two sites in Culverston Avenue at Denham Court. It has been assumed for the refined northern route this land would be sold as surplus land which has been valued at the original 1996 purchase price of \$3.4 million.



Table 6 Summary of total cost estimates

Description	Refined Southern Route Section	Refined Northern Route Section
Construction Cost	\$88.0m	\$91.0m
Land Acquisition Cost (High cost figure)	\$84.2m	\$75.5m
Surplus land resale	-\$7.5m	-\$13.1m
Total	\$164.7m	\$153.4 m

5.7 SUMMARY

A comparison of the refined route is summarised in the table below.

Table 7 Comparison of refined routes

Issue	Refined Southern Route	Refined Northern Route
Technical and constructability:		
Route length and directness	Route is 500m shorter. More direct route through to Leppington.	Route is 500m longer.
Constructability	No substantive difference.	No substantive difference.
Hydrology and flooding	No substantive difference.	No substantive difference.
Local traffic	No substantive difference.	No substantive difference.
Operability:		
Travel times between the two stations	One minute less in both directions (trip to city approx. 50 mins).	One minute longer in both directions (trip to city approx 50 mins).
Environmental:		
Clearing of endangered ecological communities	4.0 hectares	5.6 hectares
Clearing of core/support for core habitat	3.9 hectares	3.6 hectares
Cultural Heritage	Disturbs area of moderate archaeological sensitivity.	Disturbs area of high archaeological sensitivity.



Residences affected by noise	Noise goals exceeded at a greater number of residences (with or without noise mitigation).	Noise goals exceeded at a lower number of residences (with or without noise mitigation).
Visual Impact	Impacts on semi-rural character of Denham Court.	Impacts on rural character of Western Sydney Parklands
(note: overall visual amenity of area will change with future development)	Impacts where route crosses Camden Valley Way and the Casa Paloma Caravan Park.	Obscures views of scenic hills at Denham Court from Edmondson Park.
Property:	44 land holdings affected.	44 land holdings affected.
	Full acquisition of 24 privately owned properties required. Partial acquisition of 12 privately owned properties required.	Full acquisition of 13 privately owned properties required. Partial acquisition of 13 privately owned properties required.
	8 residential and 4 rural acreage dwellings require demolition.	1 residential and 1 rural acreage dwellings require demolition.
	Impact on Forest Lawn Memorial Gardens.	Impact on Western Sydney Parklands.
Social and community:	Loss of amenity in low density residential area of Denham Court.	Loss of recreational land in precinct 9 (Hoxton Park Ridge) of Western Sydney Parklands.
	Loss of low income housing at Casa Paloma Caravan Park.	
Capital Cost:	Capital cost of section from Edmondson Park to Leppington is approximately \$11m greater.	Capital cost of section from Edmondson Park to Leppington is approximately \$11m less.
Breakdown:		
- Construction cost	\$88.0m	\$91.0m
- Land acquisition cost	\$84.2m	\$75.5m
- Surplus land resale	-\$7.5m	-\$13.1m
TOTAL	\$164.7m	\$153.4m
Operating and maintenance cost:	Operating and maintenance cost is approximately \$50k less per annum.	Operating and maintenance cost is approximately \$50k more per annum.



6 KEY FINDINGS

In summary, the refined southern and northern routes are very similar in terms of technical and constructability criteria. There are some differences between the two routes in relation to the other evaluation criteria.

The refined southern route:

- Is 500 metres shorter than the northern route, resulting in a one minute difference in travel time and an annual operation and maintenance cost which is approximately \$50K less than the northern route;
- Has a capital cost which is approximately \$11m greater than the refined northern route;
- Has less overall impact on endangered ecological communities (1.6 hectares less clearing required), but a slightly greater impact on core habitat (0.3 hectares more clearing required);
- Has less impact on cultural heritage;
- Has a greater impact on private property owners, with 24 privately owned properties needing to be fully acquired, with 8 residential and 4 rural acreage dwellings to be demolished; and
- Has a greater impact on residential amenity than the refined northern route, with noise targets being exceeded at a greater number of residences (with or without noise mitigation).

The refined northern route:

- Is 500 metres longer than the southern route, resulting in a one minute increase in travel time and an annual operation and maintenance cost which is approximately \$50K more than the southern route;
- Has a capital cost which is approximately \$11m less than the refined southern route;
- Has a greater overall impact on endangered ecological communities (1.6 hectares more clearing required) but a slightly lower impact on core habitat (0.3 hectares less clearing required);
- Has a greater impact on cultural heritage;
- Has less impact on private property owners, with 13 privately owned properties needing to be acquired, with 1 residential and 1 rural acreage dwelling to be demolished; and
- Has less impact on residential amenity, with noise targets being exceeded at fewer residences than the southern route (with or without noise mitigation).



REFERENCES

Selection of a preferred route will depend on the weighting given to each of the criteria used for evaluation.

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This report has been prepared using input from studies or investigations undertaken for TIDC by the following consultants:



APPENDIX A SCHEDULE OF SPECIALIST CONSULTANTS

This report has been prepared using input from studies or investigations undertaken for TIDC by the following consultants:

Engineering and report preparation	Connell Wagner/TMG
Hydrology	Webb McKeown Associates Pty Ltd
Constructability and cost	Tenix Projects Pty Ltd
Cost overview	Evans & Peck Pty Ltd
Environmental (ecology, cultural heritage, and social/community)	Parsons Brinckerhoff Australia Pty Ltd
Urban design	Architectus Sydney
Noise	Heggies Australia Pty Ltd
Property valuation	Australia Pacific Valuations
Property identification	Whelans Operations Pty Ltd